



EXPLORATION AND MINING in British Columbia 2011





Ministry of Energy and Mines

**Ministry of Forests, Lands and
Natural Resource Operations**

EXPLORATION AND MINING in British Columbia 2011

Ministry of Energy and Mines
Mines and Mineral Resources Division
British Columbia Geological Survey

Ministry of Forests, Lands and
Natural Resource Operations
Regional Geologists

Front Cover:

Willow Creek mine expansion located about 40 kilometres west of Chetwynd. (Photo credit: Kirk Hancock)

Back Cover:

Brucejack Lake camp situated lakeside to the Brucejack Lake, owned by Pretium Resources. (Photo credit: Gayle Febbo)

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FOREWORD

INTRODUCTION

Exploration and Mining in British Columbia 2011 represents the latest annual documentation of the activities of the province's exploration and mining industry. The record goes back to 1874 when the *Annual Report of the Minister of Mines* (Figure 1) first went to print and has evolved through various formats over the years. The volume provides a region-by-region perspective with an in-depth look at significant projects in British Columbia. Readers who wish to acquire a general picture of the mining and exploration industry in British Columbia may find the *British Columbia Mines and Mineral Exploration Overview* (Figure 2) to be a useful publication.

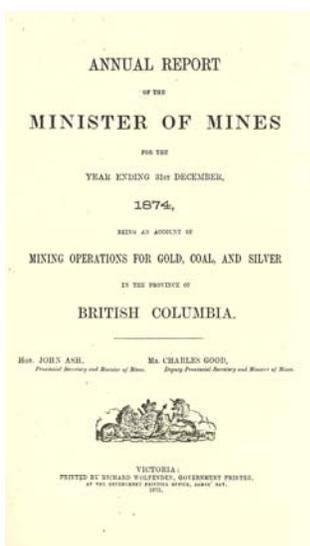


Figure 1. The duty of the collection of information on the Province's mining industry goes back to 1874 when the *Annual Report of the Minister of Mines* first went to print.

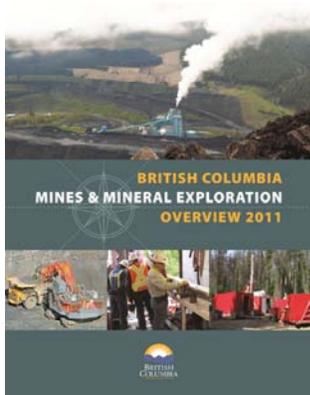


Figure 2. *British Columbia Mines & Mineral Exploration Review 2011* is a companion volume to this publication and provides a more generalized overview of the Province's mining and exploration industry.

The province's exploration sector for coal, metals and industrial minerals is large and by necessity the reviews and summaries contained in this volume tend to be focused on the larger and/or more advanced projects. To learn about other projects, readers are encouraged to contact the appropriate regional geologist. Contact information is given below.

Readers are also encouraged to use this publication in concert with the online geological databases accessible through the BC Ministry of Energy and Mines' Internet site (<http://www.empr.gov.bc.ca/Mining/Pages/default.aspx>). The Ministry's well known MapPlace is a gateway to mineral and coal inventories (MINFILE; COALFILE); assessment reports; tenure; geology; geochemistry; and geophysics.

Information in *Exploration and Mining in British Columbia 2011* has been compiled and written by the province's regional geologists, contractors, and the BC Mineral Development Office under the guidance of the Chief Geologist of the BC Geological Survey.

BC's Regional Geologists and the Mineral Development Office

During the past year three of five of the Regional Geologist positions have been filled with new staff that have been challenged to meet publication deadlines or provide local knowledge that experience will eventually afford them. Contractors provided both seed information and final drafts of the Skeena and Omineca/Northeast chapters. The net effect is portions of some chapters have not benefitted from the Regional Geologist insights this document usually conveys. This will change as new staff settle into their roles and connect with the industry and its activity.

Regional geologists are located in Vancouver (Bruce Northcote), Smithers (Jeff Kyba), Kamloops (Jim Britton), Prince George (Paul Jago) and Cranbrook (Dave Grieve) (Figure 3). They work with

the BC Ministry of Energy and Mines and Geological Survey Branch to provide geological and mineral industry expertise and to promote mineral exploration and development in the province. As regional experts they also support various functions of the natural resource sector agencies as well as the Ministry of Forests, Lands and Natural Resource Operations, where their positions currently reside.

Regional geologists’ roles and responsibilities include:

- fostering sustainable exploration, development and use of the province’s mineral and coal resources;
- providing clients with up-to-date technical information and professional advice about known and potential mineral and coal deposits;
- providing geological and mineral resource information to project review or land-use decision-making processes;
- monitoring the status of the mining industry and the development of infrastructure required for mineral resource development;
- working on field projects and surveys, compilations, promotional brochures and deposit models; and
- contributing information to maintain and update geosciences databases (*e.g.* MINFILE).

Regional Geologists Contact Information			
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Methodology

Compilation of *Exploration and Mining in British Columbia* presents certain challenges. Deadlines demand manuscript submission before all information from programs carried out later in the year is available, and before some programs are even complete. It is also difficult to garner information on all programs that have occurred. In particular, critical grassroots exploration that leads to many new discoveries may be difficult to track because it typically occurs below *Mines Act* permit thresholds.

Regional geologists maintain contact with their industry peers throughout the year, and ideally are able to visit them at project sites to view outcrops and drill core and to discuss results and progress. A significant amount of information is gleaned from corporate press releases, websites and reports. Late in the year informal surveys are conducted to gather as much of the statistical information as possible, but in some instances the authors use their professional judgement to provide reasonable estimates.

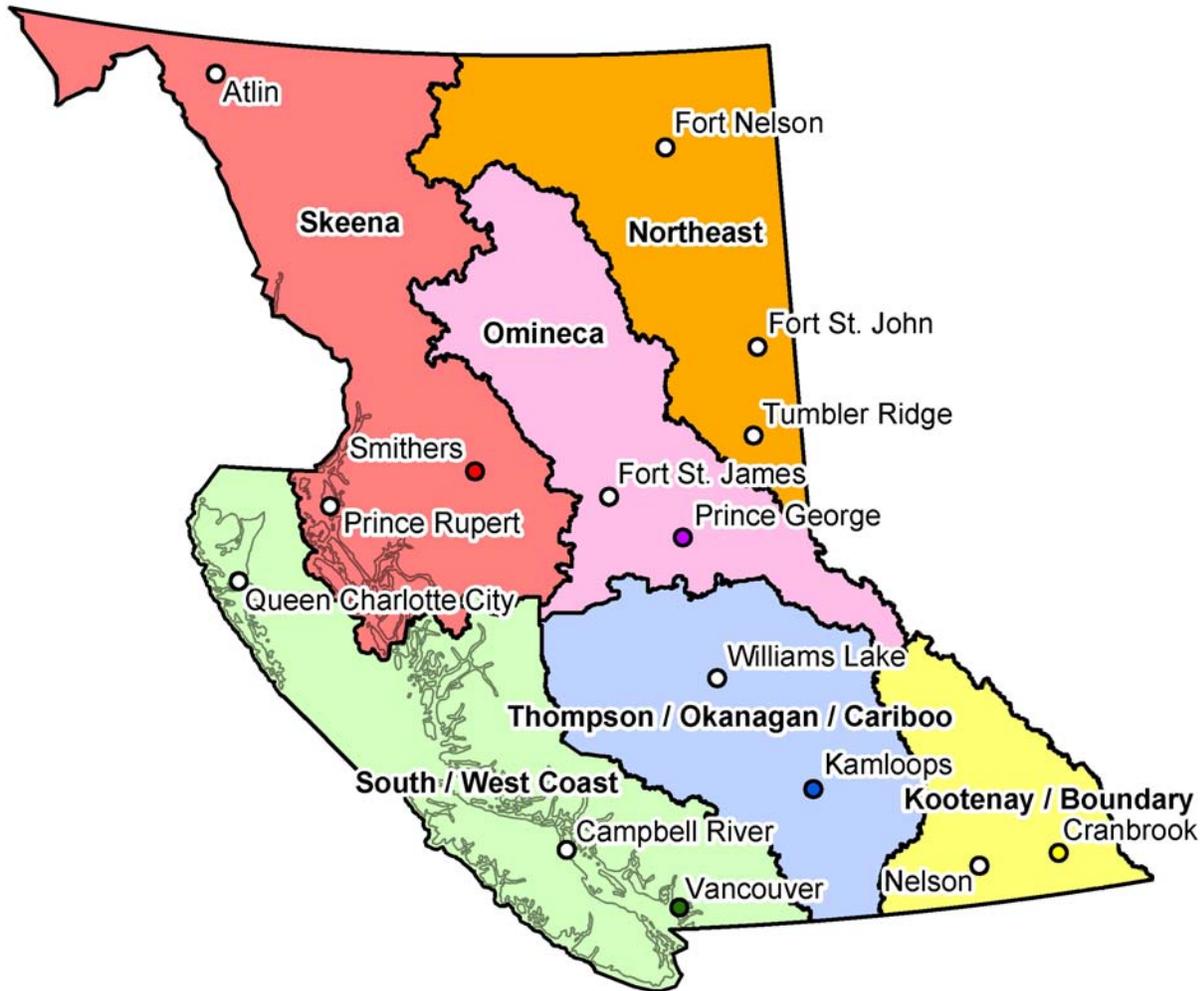


Figure 3. The locations of the various regions referred to in this publication and the locations of many of the cities and towns in the province.

Exploration expenditures are broken down by category: grassroots exploration, early-stage exploration, advanced exploration, mine evaluation, and mine lease exploration. Grassroots exploration commonly does not require permitting and the activities and expenditures assigned to this category are less likely to be reported. Early-stage exploration involves focused activities often based on a deposit model. It may include geophysics, geochemistry, trenching and drilling. Advanced-stage exploration is concerned with resource definition emphasizing drilling and bulk sampling, but may include baseline environmental studies, economic pre-feasibility work and exploration of secondary targets. Mine evaluation begins with the firm commitment to develop a resource, and usually coincides with a pending application to government to open a mine; it tends to concentrate on the environmental, social, engineering and financial assessments of a project. Mine lease exploration represents work on a mining property beyond known reserves; it may have characteristics of early-stage or advanced exploration.

Since the exploration expenditures include some estimates, final dollar figures for each region are rounded to the nearest whole million.

ACKNOWLEDGMENTS

The cooperation of the industry in providing information and access to project sites is always welcomed and sincerely appreciated. The staff authors also wish to thank John DeGrace, Gayle Febbo and Mireille Pelletier (Blue Metal Resources) for accepting the invitation to contract research and write portions of the volume. Paul Wojdak, emeritus Regional Geologist, provided editorial commentary and oversight for the Skeena region. Robin Chu produced the new series of compilation maps used throughout the publication. Compilation and layout of the volume was completed by George Owsiaccki and Garry Payie of Total Earth Science Services.

TABLE OF CONTENTS

OMINECA REGION

Summary and Trends	1
Mines, Mine Development and Mine Reclamation Projects	3
Quarries	4
Exploration Highlights.....	4
Porphyry Copper, Gold and Molybdenum Projects.....	4
Epithermal and Vein-type Projects.....	7
SEDEX and Massive Sulphide Projects	8
Rare Earth Metal Projects.....	9
Ultramafic-hosted Projects	9
Industrial Mineral Projects	9
2012 Outlook	10
Acknowledgments	10

SKEENA REGION

Summary and Trends	11
Mines and Quarries.....	11
Major Metal Mines.....	11
Industrial Mineral Quarries	15
Mine Evaluation Projects.....	15
Mineral Exploration.....	24
Porphyry Copper Projects	24
Porphyry Copper-Gold Projects in Stikine Terrane, Iskut District	24
Porphyry Copper-(Molybdenum-Gold) Projects in the Skeena Arch.....	30
Porphyry Molybdenum Projects.....	31
Molybdenum in the Atlin-Cassiar District....	32
Molybdenum in the Skeena Arch	32
Nickel in Ultramafic Rocks.....	32
Massive Sulphide Projects.....	33
Atlin-Cassiar District	33
Stewart-Iskut District.....	33
Terrace-Smithers District.....	34
Gold-Silver Projects	34
Epithermal and Orogenic Veins in the Atlin District	34
Epithermal and Intrusion-related Veins in the Stewart District	34
Intrusion-related Gold in the Skeena Arch....	35
Acknowledgments	36

NORTHEAST REGION

Summary and Trends	37
Coal Mines and Planned Producers	37
Coal Exploration and Development Projects	41
South of Tumbler Ridge.....	41
Wolverine Valley Area.....	41
Chetwynd-Pine River Area	44
Hudson's Hope Area	44
Outlook for 2012.....	45
Acknowledgments	45

THOMPSON-OKANAGAN-CARIBOO REGION

Foreword	47
Overview	47
Mines and Quarries	47
Metal Mines	47
Coal Mine	51
Industrial Mineral Mines	51
Rock Quarries, Aggregate Pits and Placer Mines.....	51
Mine Development Projects	52
Mine Evaluation Projects	52
Mineral Exploration Projects.....	53
Porphyry Projects.....	55
Thompson River-Shuswap Lake	55
Cariboo.....	56
Chilcotin.....	57
Gold Bridge-Bralorne-Lillooet.....	57
Similkameen River	57
Okanagan	58
Skarn Projects	58
Cariboo.....	58
Vein and Breccia Projects.....	58
Thompson Rivers and Shuswap Lake	58
Cariboo.....	58
Chilcotin.....	59
Fraser River.....	60
Gold Bridge-Bralorne-Lillooet.....	60
Okanagan	60
Similkameen River	61
Sediment-hosted Gold Projects.....	61
Cariboo.....	61
Stratiform Sulphide Projects	61
Thompson Rivers-Shuswap Lake.....	61
Cariboo.....	62
Magmatic Projects	62
Thompson Rivers and Shuswap Lake	62
Similkameen River.....	62
Outlook for 2012	62
Geoscience Notes	62

WEST COAST AND SOUTH COAST REGIONS

Summary and Trends	63
Mines and Quarries	63
Metal	65
Coal.....	67
Industrial Minerals and Aggregates	68
Industrial Minerals	68
Glacial Marine Clay	69
Dimension Stone, Landscaping Stone	69
Major Aggregate Mines	70
Mine Development and Mine Evaluation Projects.....	71
Projects in Environmental Assessment	71
Exploration Highlights	72
Haida Gwaii and Central Coast.....	72
Northern Vancouver Island.....	72

Central Vancouver Island.....	75
Southern Vancouver Island	75
Inside Coast, Sunshine Coast	76
Northern Cascades, Southeastern Coast Ranges ..	76
Outlook	78
Acknowledgments	78

KOOTENAY-BOUNDARY REGION

Summary and Trends	79
Mines	80
Coal	80
Metal	83
Industrial Minerals	84
Mine Evaluation Projects.....	84
Exploration Highlights.....	85
Gold Projects.....	85
Boundary District.....	85
West Kootenays.....	89
East Kootenays	90
Base Metals Projects	90
West Kootenays.....	90
East Kootenays	91
Polymetallic Projects.....	92
Boundary District.....	92
West Kootenays.....	92
East Kootenays	93
East Kootenay Coalfields Projects	94
Industrial Minerals Projects.....	95
Acknowledgments	96

EXPLORATION AND MINING IN OMINECA REGION, BRITISH COLUMBIA

By **John R. DeGrace, PEng/PGeo**
Contract Regional Geologist, Prince George

SUMMARY AND TRENDS

In 2011, significant management changes, takeovers and acquisitions affected the Omineca Region. Having met the terms and conditions of an option/joint venture agreement entered with First Point Minerals Corp in 2009, Cliffs Natural Resources Corp acquired controlling interest in First Point's **Decar** nickel project and became the exploration program manager. Eastfield Resources' **Km 26** project was sold to OroAndes Resource Corp in September, with Eastfield to continue for the time being as "Control Person" in respect of the project. In October, Aurico Gold Inc acquired Northgate Minerals Corp and, along with that, Northgate's **Kemess** mine and **Kemess Underground** project. Paget Minerals transferred its interest in its **Buck** property to Silver Quest Resources, and Silver Quest in turn was sold to New Gold Inc. New Gold also acquired Richfield Ventures Corp, and with it Richfield's important **Blackwater** gold project. By the end of the year, New Gold had further consolidated its holdings in the area through its acquisition of Geo Minerals Ltd, holder of the nearby West Blackwater property.

Construction was underway throughout 2011, leading to production from Thompson Creek Metals' **Mt Milligan** mine planned for late 2013. Northgate Minerals Corp's **Kemess** mine ceased production in January 2011, and the permitting process for its nearby **Kemess Underground** mine project was underway. Sable Resources' **Shasta** underground silver-gold operation in the Toodoggone area continued seasonal production.

The Omineca Region saw an apparent doubling in exploration activity after a strong 2010, continuing the rebound that followed the 2008 recession. Total exploration expenditures in 2011 were an estimated \$71.5 million. This substantial increase from \$33 million in 2010 certainly demonstrates the busy year, but may in part reflect limited reporting due to a lengthy absence without a regional geologist in this region. Likewise drilling activity, at a total of about 162 000 m, compared to about 83 000 m in 2010.

The principal exploration focus remained upon porphyry and epithermal copper-gold prospects in the Quesnel and eastern Stikine terranes. In addition to porphyry deposits, sedimentary exhalative (SEDEX), rare-earth elements, ultramafic-hosted nickel, and vein-hosted gold deposits remained important targets. The

main focus of industrial mineral exploration was high-purity sandstone for processing into frac sand.

Exploration highlights, in alphabetical order of project, included:

- Continued exploration and site preparation for underground workings by Canada Zinc Metals Corp on its **Akie** and related prospects northeast of Williston Lake;
- Renewed exploration by Taseko Mines Ltd. of its carbonatite-hosted **Aley** niobium deposit;
- Drilling and pilot plant testing by Stikine energy Corp of its **Angus** silica deposit southeast of Bear Lake;
- Continued extensive drilling by New Gold Inc on its **Blackwater** gold project (acquired from Richfield Ventures Ltd) and, its Capoose silver project (acquired from Silver Quest Resources Ltd);
- Exploration by Canadian International Minerals Inc on its **Carbo** rare earth element project east of Bear Lake;
- Extensive drilling by Cliffs Natural Resources Inc on its **Decar** serpentinite-hosted Ni deposit;
- Further diamond drilling by Serengeti Resources Inc on its **Kwanika** deposit, and regional exploration work the Quesnel trough;
- The discovery by Leeward Capital Corp of a high-grade porphyry molybdenum zone on its **Nithi Mountain** property;
- Diamond drilling and extensive IP surveying by XStrata Copper Canada as part of its ongoing evaluation of the southern **Quesnel trough**.

Locations of projects discussed in this report and considered to be of regional significance are shown in Figure 1. The approximate allocation of expenditures among greenfield, early phase, advanced phase, and mine development expenditures is set out in Figure 2. Placer exploration and mining, while a significant traditional activity within this Region, is not considered in this report.

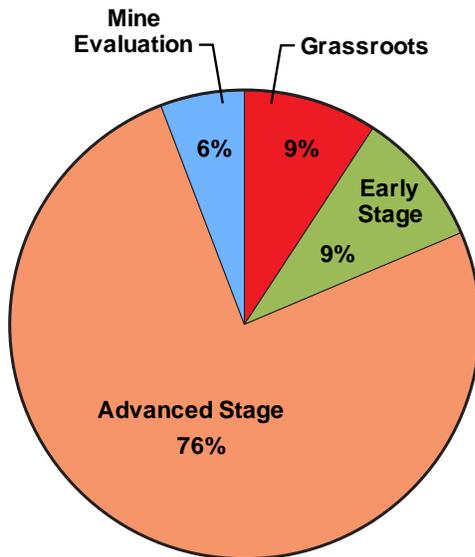


Figure 2. 2011 exploration expenditures, by exploration stage (Grassroots: search for an exploration target; Early Stage: focused initial work on a target; Advanced Stage: resource delineation; Mine Evaluation: Focus on EA certificate, community acceptance and government approval).

MINES, MINE DEVELOPMENT AND MINE RECLAMATION PROJECTS

Since acquiring Terrane Metals Corp in late 2010, Thompson Creek Metals Co Inc has continued to move aggressively towards development of its **Mt Milligan** copper-gold porphyry deposit. Completion of mine development, at a total cost of \$1 265 million, is anticipated in 4th quarter 2013 (Figure 3). As of November, more than 13 000 m³ of concrete had been poured, and engineering design was more than 75% complete. Mine development expenditures in 2011 have



Figure 3. Mine development at Mt. Milligan (courtesy Thompson Creek Metals).

not been published but, based on early 2011 expenditures, the estimated total cost, and the timing of mine development, these may amount to at least \$200 million. Once in operation, production will ramp up to 60 000 tonnes per day over an expected mine life of 22 years. During construction, employment is expected to peak at over 600; and the mine production labour force – all of whom will commute from Fort St. James and Mackenzie – will be about 400. Reserves stand at 952.5 million kg Cu and 170 000 kg Au.

In October 2011 Northgate Minerals Corp was acquired by Aurico Gold, and with it Northgate’s Kemess Projects. Kemess South mining activity ended in late 2010, although mill production continued until March 2011. In 2011, 3.04 Mt of ore were processed to produce 2 947 million kg of Cu and 410 kg of Au from the old workings.

Meanwhile in 2011, the **Kemess Underground** (formerly “Kemess North”) project was in the permitting process leading to production. Kemess Underground will use the same concentrator and tailings facility as Kemess South, and ore will be extracted by a block/panel cave operation over an approximate 12-year mine life. A preliminary economic assessment for the project was completed in 2011 and, based on its positive recommendation, a full feasibility study is to be completed in 2012. Over 6000 m of drilling were completed as part of the engineering, geotechnical and environmental phases of the project.

Indicated Resources at Kemess Underground are 136.5 Mt containing 73 710 kg Au and 390.4 million kg Cu. Within this is located a 10.3 million tonne “high-grade sector” containing 12 760 kg Au and 54 million kg Cu grading 1.35 grams per tonne Au and 0.52% Cu, respectively.” The projected annual production from Kemess Underground is expected to average 2700 kg of Au and 18.8 million kg Cu, using the existing facilities from the Kemess Mine to process ore and impound tailings. The mine will exploit what Aurico describes as a “classic calc-alkaline porphyry” copper-gold deposit hosted by Lower- to Mid-Jurassic monzonitic intrusions.

TTM Resources’ **Chu** porphyry Molybdenum project south of Vanderhoof, still undergoing environmental baseline studies, saw a limited drilling program to check the probable mining conditions in its “starter pit” east and west zones. In addition, a 6-10 tonne bulk sample is being sent to SGS Lakefield for pilot plant-scale metallurgical testing to determine whether Mo recoveries can be improved. The Chu project to date has been tested by about 70 000 m of diamond drilling, that has defined a low-fluorine molybdenum porphyry hosted by a quartz stockwork, mostly in hornfelsed siltstone. The deposit contains measured plus indicated resources of 371 Mt at a cutoff grade of 0.04% Mo, and an inferred resource of 257 Mt at the same cutoff.

Sable Resources Ltd's **Shasta** mine continued to be an intermittent gold and silver producer, with the ore processed at the nearby Baker mill.

Reclamation efforts at old mine sites are an ongoing activity. In 2011, SNC Lavalin was site contractor in respect of the former Ingenika and Onward mines, located on Tse Keh Nay traditional territory near Delkluz Lake. Work included redeveloping road access (for later decommissioning), removing mining refuse and debris, decommissioning old buildings, recontouring disturbed areas and revegetating as applicable, and environmental studies. Late in 2011, Northgate Minerals/Aurico was recognized by the BC Technical Committee on Reclamation by the conferral of the Jake MacDonald award for outstanding reclamation achievements at the Kemess South mine. Some 250 hectares, out of approximately 600 disturbed, were in the final stages of reclamation, including the decommissioning of mine infrastructure, recontouring and developing drainage control, and revegetating using native species.

QUARRIES

Chemical Lime Company of Canada Inc operates a small limestone quarry about 5 km southeast of **Giscome**. Activity has been minimal in recent years, with most shipments from the quarry being from stockpiled material. Within the community of Giscome itself, Canadian National Railway Company continued production from its **Giscome basalt** quarry to supply road ballast requirements for maintenance of its main and spur lines. **Hunterstone** Quarries, near Valemont, continued low-level production of talus-derived quartzite dimension stone for specialty construction.

EXPLORATION HIGHLIGHTS

Mineral exploration in the Omineca region was extremely active in 2011, with some 105 approved Notices of Work for 2011 issued to 50 operators – 11 of whom spent in excess of \$1 million on their projects. Much of this work was centred on the Quesnel and Stikine terranes, where both porphyry and epithermal projects were important; but SEDEX, rare earth element and ultramafic-hosted deposits captured much interest as well. Activities on major projects in 2011 are summarized in Table 1.

Porphyry Copper, Gold and Molybdenum Projects

Porphyry projects in the Omineca Region are located within the Quesnel and Stikine volcanic terranes. Generally they may be grouped into copper-gold porphyry deposits and prospects in the Quesnel terrane,

and gold and molybdenum porphyries in the southeastern Stikine terrane.

Goldreach Resources Ltd, working southeast of Blackwater on its **Auro** project, completed a roughly 3 000 m drilling program with disappointing results, along with an airborne ZTEM survey.

Leeward Capital Corp, continuing its exploration of its **Nithi Mountain** porphyry molybdenum project just south of Fraser Lake, completed a 7000 m drilling program. The 2011 project identified a high-grade molybdenum phase within its Delta Zone, about 1 km in length and open in both directions. By way of example, D-11-60 included 24.38 m grading 0.122% Mo, D-11-61 includes 6.1 m grading 0.188% Mo, and D-11-54 included 62.69 m grading 0.119% Mo. Excluding the 2011 discovery, the resource estimate as of August 2011 was of 148 Mt total indicated resources grading 0.023% Mo, and inferred resources of 240 Mt grading 0.20% Mo. The Nithi Mountain deposit bears strong geologic resemblance to the nearby Endako mine.

Well to the north of these projects, Kiska Metals continued evaluation of its **Falcon/Redton** copper-gold and molybdenum porphyry prospects. The original Falcon molybdenum discovery had been made in 2007; and other targets were developed subsequently – including in particular the “Red Zone” copper-gold porphyry. In 2011, these two targets were the particular focus of a substantial IP and geochemical exploration program. Follow-up drilling is expected in 2012.

Several projects were underway in the general vicinity of the Mt. Milligan mine development. Teck Resources Ltd completed an extensive IP survey, and soil geochemistry, on its **Weedon** Project. Orestone Mining's **Captain** porphyry copper-gold project, about 65 km northeast of Fort St. James, was explored by a modest IP program and about 1200 m of diamond drilling. To the north of Captain, Cayden resources conducted a diamond drilling program on the same scale in order to expand its known resource and to test additional targets on its **Wildcat** copper-gold monzonite-hosted porphyry deposit. About 30 km west of Mt. Milligan, Yankee Hat Minerals Ltd completed about a 1100 m drilling program on its **Fran** copper-gold porphyry property. Also to the west of Mt. Milligan, Logan Resources Ltd undertook mapping, IP and geochemical exploration on its **Chuchi** porphyry copper-gold target.

To the east of Fort St. James, Torch River Resources Ltd completed a 150 m drilling program aimed at evaluating “the extent of porphyry style Cu-Mo-Ag-bearing mineralization located on **Fort-Elden** breccia zone.”

Further to the North, Serengeti Resources Ltd continued exploration on its **Kwanika** copper-gold porphyry deposits, completing a 1320 m drilling program to test new targets and an extensive geochemistry program to support future targeting. Activities on Kwanika to date have defined two closely-separated

TABLE 1. MAJOR EXPLORATION PROJECTS, OMINECA REGION, 2011

Property	Operator	MINFILE (NTS ref)	Commodity	Deposit Type	Work Program
3Ts	Silver Quest Resources Ltd	093F 055, 068	Ag, Au	low-sulphidation epithermal	GC, DD (1645 m)
Akie	Canada Zinc Metals Corp	094F 031	Zn, Pb, Ag	SEDEX	A, GC, EN, DD (6028 m), GD (444 m)
Aley	Taseko Mines Ltd	094B 027	Nb	carbonatite	DD (20 000 m)
Angus	Stikine energy Corp	(093J 042)	sandstone	sedimentary	G, DD, GC (rock), PP, DD (1850 m)
Auro	Goldreach Resources Ltd	(093F/2)	Au	low-sulphidation epithermal	A, AB-EM, DD (3003 m)
Blackwater	New Gold Inc	093F 037	Au, Ag	low-sulphidation epithermal	A, IP, GC (rock), DD (60 000 m)
Blackwater East & West	RJK Explorations Ltd	093F 037	Au, Ag	low-sulphidation epithermal	P, IP, AB-EM, GC (soil & silt, rock)
Capoose	New Gold Inc	093F 040	Ag, Au	vein	A, IP, AB-EM, AB-MG, GC, EN, DD (4759 m)
Captain	Orestone Mining Corp	093J 026	Cu, Au	porphyry	IP, DD (2000 m)
Carruthers Pass	Cariboo Rose Resources Ltd	094D 172	Au, Ag, Pb, Zn	VMS	IP, DD (801 m)
Carbo	Canadian International Minerals Inc	093J 014	REE	carbonatite	GC (rock), DD (3090 m)
Carbonatite Syndicate	Bolero Resources Corp	093J 014	REE	carbonatite	GC (soil), DD (2000 m)
Chu	TTM Resources Inc	093F 001	Mo	porphyry	EN, DD (2000 m)
Chuchi	Logan Resources Ltd	093N 159	Cu, Au	porphyry	IP, GC (soil, silt, rock)
Cliff Creek	Guardsmen Resources Inc	094E 066	Au, Ag	low-sulphidation epithermal	UG (dewatering)
Copley	Kootenay Gold Inc	(093F 076)	Au	low-sulphidation epithermal	A, GC, DD (1008 m)
Day-Roy-Porcupine	Equitas Resources Corp	094D 065	Cu, Au	Porphyry	AB-MG, GC (soil, rock), DD (280 m)
Decar	Cliffs Natural Resources Inc	093K 041	Ni	ultramafic	GC (rock), BU (250t), MS, EN, DD (12 000 m)
Falcon/Redton	Kiska Metals Corp	(093N 017)	Cu, Au, Mo	alkalic porphyry	P, G, IP, GC (soil, silt, rock)
Fort-Elden	Torch River Resources Ltd	093K 093	Cu, Au, Mo	porphyry	DD (1500 m)
Fran	Yankee Hat Minerals Ltd	093K 108	Cu, Au	porphyry	DD (1100 m)
Laidman	National Gold Corp	093F 067	Au, Ag	vein	TR, IP, GC (rock)

TABLE 1. CONTINUED

Property	Operator	MINFILE (NTS ref)	Commodity	Deposit Type	Work Program
Kemess Underground	Aurico Gold Inc	094E 021	Cu, Au	calc-alkalic porphyry	GDS (6 166 m)
Kliyul	Kiska Metals corp	094D 023	Cu, Au	porphyry	IP
Km 26	Oroandes Resource Corp	(093K 027)	Ni, Au	ultramafic	IP
Kwanika	Serengeti Resources Inc	093N 019	Cu, Au	alkalic porphyry	A, GC (soil), DD (1320 m)
Manson Creek group	Angel Jade Mines	(093N 068)	Au	vein	TR, GC (rock)
Mount Alcock/Pie	Canada Zinc Metals Corp	094F 023	Zn, Pb, Ag	SEDEX	G, GC (soil, silt, rock)
Nithi Mountain	Leeward Capital Corp	093F 006- 016	Mo	porphyry	A, EN, DD (7000 m)
Ruby	Brocade Metals Corp	094C 022	Au, Ag	vein	A, P, G, AB-MG, AB- RD, TR, GC (soil, silt, rock)
Quesnel Trough	Xstrata Copper Canada	(093J, K)	Cu, Au	porphyry	A, IP, GC (soil, rock), DD (7563 m)
Weedon	Teck Resources Ltd	093J 062, 072	Cu, Au	alkaline porphyry	IP, GC (Soil)
Wildcat	Cayden Resources Inc	093N 228	Cu, Au	porphyry	GC (rock), DD (2000 m)

Work Program Abbreviations:

A = access (trail, road construction on claims; AB-EM = airborne electromagnetics; AB-MG = airborne magnetics; AB-RD = airborne radiometrics; BU (X tonnes) = bulk sample (weight in tonnes if known); CD = condemnation drilling; CQ = coal quality testing; CT = carbonization test (coal); DD (Xm) = diamond drilling totalling X metres; EN = environmental baseline studies/monitoring, remediation work; FS = feasibility studies; G = geology, mapping etc.; GC = geochemical sampling (rock, soil, silt etc.); GD = geotechnical drilling; GP = geophysics (general); IP = induced polarization; 3D-IP; MG = magentics; MK = marketing (primarily for industrial mineral products); MS = metallurgical studies; OB = overburden drilling; OP-BU = open pit bulk sample; P = prospecting; PD = percussion drilling; PF = pre-feasibility studies; PP = pilot plant; R = reclamation; RC = reverse circulation drilling; TR = trenching; UG (Xm) = X metres of underground development; UG-BU = underground bulk sample; UT = UTEM; VLF; WT = washability test (coal)

deposits, designated the Central (Cu-Au) and South (Cu-Au-Mo-Ag) Zones. The Central Zone is hosted in and around a potassically-altered monzonite stock, and contains a combined indicated and inferred resource of 96.1 Mt of “open pit resource” containing an estimated 355 Mkg Cu and 31 185 kg Au. The South Zone is in a fault-bounded sequence of strongly altered alkali to intermediate intrusive rocks and contains an inferred resource of 74.3 Mt containing 248 Mkg Cu and 8 220 kg Au. Work was begun on a preliminary economic assessment of the higher-grade Cu-Au resource. In addition to work at Kwanika, IP surveys were completed on several other properties in the same vicinity.

As part of its ongoing **Quesnel trough** project, and partly in joint venture with Serengeti, XStrata Copper Canada completed a total of almost 300 line km of IP survey, about 7500 m of diamond drilling, and geochemical exploration across some 19 claim blocks.

Farther to the north, Kiska Metals Corp completed a significant IP exploration program on its **Kliyul** copper-gold porphyry project. Equitas Resources began an early-stage evaluation of its **Day-Roy-Porcupine** copper-gold porphyry property about 50 km south of Kemess. An airborne magnetic survey was flown, rock and soil samples collected, and one initial diamond drill hole completed. Continuation of the program is planned for 2012.

Epithermal and Vein-type Projects

The extreme southeast corner of the Omineca region saw intense activity by New Gold Inc on its **Blackwater** bulk tonnage Au project, based out of its 100-person camp. By 2012 the company expects to have 12 drills in operation on the property.

New Gold has chosen to classify Blackwater as a “low-sulphidation epithermal gold-silver deposit,” hosted within Jurassic Hazleton Group volcanic rocks and developed above (and coeval with) Cretaceous rhyolitic intrusions. There appears to be regional structural control. The deposit remains open in all directions and at depth; and as of September 2011 resources stood at 165 Mt indicated, averaging 1.01 g/t containing 153 000 kg Au; and 39 Mt inferred, averaging 0.94 g/t containing 34 000 kg Au. These estimates were made using a cutoff grade of 0.4 g/t of Au. Very intensive diamond drilling on the project, totaling about 60 000 m, continued throughout 2011, and plans are for a much more extensive program in 2012. The 2011 drilling program was supplemented by IP and by rock and soil geochemical surveys.

In related activities, Silver Quest/New Gold completed some 4 500 m of drilling on the **Capoose** project, a Titan 24 IP program, and an airborne EM/Magnetic survey. Capoose is a disseminated silver-gold deposit, with minor lead and zinc, hosted by intermediate to acidic garnetiferous volcanic and sedimentary rocks. Silver Quest also completed a drilling and geochemical reconnaissance of its **3Ts** property. Located between Capoose and Blackwater, Parlance Resources completed a significant stream sediment and soil geochemical program on its **Big Bear** project (Figure 4).

Close by Blackwater, RJK Explorations conducted an IP survey, an extensive Digem V Ztem airborne survey, and geochemical prospecting to define areas for future drilling on its **Blackwater East** and **Blackwater West** holdings. A short distance to the west of Blackwater, Global Geological Services (for National Gold Corp) completed a program of trenching, IP and geochemical surveys on its **Laidman** property (Figure 5).

South of Fraser Lake, Kootenay Gold Inc (Joint Venture with Northern Vertex Capital Inc) completed a drilling and trenching program on its **Copley** project, which it considers to be in a low sulphidation epithermal gold setting similar to Blackwater.

In the **Manson Creek** area, Angel Jade Mines completed extensive trenching and sampling across five potential epithermal gold prospects in a well-established placer gold area.

Brocade Metals Corp undertook detailed mapping and sampling of its **Ruby** prospect trench area first examined by Cominco in the 1940s (Figure 6). This detailed examination was supplemented by airborne



Figure 4. Silt Sampling at the Big Bear project (courtesy Parlance Resources).



Figure 5. Trenching at the Laidman Project (courtesy National Gold Corp).

magnetic and radiometric surveys across the entire property area, and by extensive soil and silt geochemistry. Ruby is a silver +/- gold (minor lead and zinc) vein complex prospect hosted within the Upper Proterozoic Ingenika Group of metasedimentary rocks.

In the far north of the Region, Guardsmen Resources began the process of re-accessing its **Cliff Creek** underground workings by dewatering the old test mine. The mine opening had exploited a low-sulphidation epithermal vein system developed by Cheni Gold Mines Inc in the 1980s and 1990s.



Figure 6. Channel sampling at Brocade Metals' Ruby Project (courtesy Brocade Metals).

SEDEX and Massive Sulphide Projects

Cariboo Rose Resources Ltd followed-up with drilling in tantalizing indications of volcanogenic (Cu, Zn, Ag, Au) massive sulphides at its **Carruthers Pass** project about 70 km south of the Kemess Mine. Additional massive sulphides were encountered, and further work is planned.

To the north of Williston Lake, Canada Zinc Metals Corp continued developing its advanced-stage **Akie** zinc-lead SEDEX deposit and the nearby **Pie** and **Mount Alcock** prospects. The project is located geologically within the Paleozoic Selwyn Basin, a prolific sedimentary environment for this type of deposit, in the Kechika Trough at its southernmost extent. In 2011, over 6000 m of drilling were completed on the Cardiac Creek Zone at Akie, including extensions to the southeast and northwest (Figure 7). Geotechnical drilling in support of a planned access portal were completed, along with trail



Figure 7. Diamond drilling on the Northwest extension of the Akie SEDEX project (courtesy Canada Zinc Metals).

improvements leading to the site. Environmental baseline studies continued as well. Exploration on Pie and Mount Alcock (together the Kechika Project) consisted of geological mapping; and soil, silt and rock geochemistry.

Rare Earth Metal Projects

Bolero Resources Corp continued exploration on its “**Carbonatite Syndicate**” project northeast of Prince George and close by Spectrum Mining’s Wicheeda project. Drilling on the project targeted coincident geophysical and cerium-lanthanum-in-soil anomalies identified in previous programs.

Carbonatite-hosted rare earth elements were also the subject of Canadian International Minerals Inc’s exploration of its **Carbo** project, about 80 km NE of Prince George and 50 km east of Bear Lake, and also adjoining the Wicheeda project. Carbonatite intrusions in that area have been identified as hosting niobium and light rare earth elements (La, Ce, Pr, Nd). Following-up encouraging 2010 results, over 3000 m of drilling were completed on three targets in 2011, with carbonatite encountered in four out of six holes (Figure 8). In addition, a 250 tonne bulk sample was taken for metallurgical testing, and environmental studies on the property were begun.

Taseko Mines continued work on its **Aley** niobium (carbonatite) deposit, located about 140 km north of Mackenzie, completing a substantial diamond drilling program that is expected to allow conversion of the current inferred resource estimate to that of indicated and measured. The inferred resource consists of 159 Mt grading 0.43% Nb₂O₅, with a cutoff at 0.20% Nb₂O₅. The niobium mineralization is highly continuous and close to surface, and the deposit (based on 2010 results) remains open in three directions and at depth.



Figure 8. Drill on-site at the Carbo REE project (courtesy Canadian International Minerals).

Ultramafic-hosted Projects

In June 2011 Cliffs Natural Resources Inc became project manager of First Point Minerals Corp’s **Decar** project, and began a very active field season. At Decar, the rare mineral Awaruite is targeted in an ultramafic host. Awaruite is an alloy of 75% Ni and 25% Fe (Ni₃Fe), which at Decar comprises between 0.1% and 0.15% of its host rock. In July, Cliffs began drilling in the “Baptiste and “Sydney” zones, and a total of 11 166 m were completed. Metallurgical testing was initiated on this very unusual resource, and an environmental baseline study begun. Studies to date, using a composite sample from 2010 core, indicated a head grade of 0.22% total Ni, of which 0.14% appeared to be potentially recoverable.

OroAndes Resource Corp, with Eastfield Resources as operator, completed a significant IP survey of a similar target, **Km 26**, about 30 km to the east of Decar.

Industrial Mineral Projects

In 2011, Stikine Energy Corp changed the focus of its exploration for sources of bedrock-sourced frac sand from the high-purity **Nonda** deposit not far from the Yukon border to the **Angus** project, located about 12 km southeast of Bear Lake in the southern part of the Region.

At Nonda, A bulk sample collected the previous season was evaluated and an environmental baseline study begun. A conservative inferred resource of 625 Mt was identified. At Angus Ridge, a diamond drilling evaluation consisting of 11 boreholes totaling 1850 m was completed, along with mapping, petrographic studies, and rock geochemistry (Figure 9). Work was begun on an environmental baseline study. In addition to work on Nonda and Angus, Stikine undertook a broad-based reconnaissance of other possible frac sand sources in Northern BC.



Figure 9. Drilling blast holes for bulk sample at the Angus property (courtesy Stikine Energy).

Stikine Energy also established a pilot plant in Abbotsford, BC, to test crushing and scrubbing the sandstone product from the Nonda and Angus projects to ensure that an acceptable frac sand product can be generated at low cost.

2012 OUTLOOK

2011 was a year which saw a resurgence of confidence and investment in mineral exploration and development and that was certainly reflected by the level of activity in the Omineca Region. As long as metal prices hold, there is every reason to expect a very active season in 2012. Global economic circumstances as they developed in 2011 have introduced a level of uncertainty that may mitigate against greatly expanded activity, however. Work will continue to bring Mt. Milligan into production, and Kemess Underground is in the wings as a new producer.

ACKNOWLEDGMENTS

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EXPLORATION AND MINING IN THE SKEENA DISTRICT, BRITISH COLUMBIA

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With contributions from Gayle Febbo and Mireille Pelletier, Blue Metal Resources

SUMMARY AND TRENDS

Exploration activity in northwest British Columbia (Map 1) reached record levels of expenditure and metres drilled in 2011. Approximate totals are \$220 million and 380 467 metres (Figures 1 and 2). This expenditure represented an increase of \$48 million (22%) from 2010 and included at least 54 drilling projects and 21 projects with over \$2 million in expenditures.

Producing mines Endako and Huckleberry have undergone significant upgrades and expansions resulting in extended mine life to 2028 and 2021 respectively. These two projects have added significant portions to the 2011 estimated total of over \$400 million in mine development. Several proposed mine projects are progressing through environmental assessment processes including Red Chris copper-gold, KSM gold-copper, Kitsault molybdenum, Kutcho Creek copper-zinc, Schaft Creek copper-gold-molybdenum and Morrison copper. The Tulsequah Chief copper-zinc-gold-silver development has been reactivated with the installation of a water treatment plant. Mount Klappan Coal has also seen renewed interest. Metal production and mine reserves are listed in table 1.

Small mine (< 75 000 tonnes milled per year) development included Dome Mountain underground gold, Fireside barite, Yellow Jacket gold and Silver Tip silver-lead-zinc.

The Northwest Transmission line received final project approvals in May 2011 and anticipates 287 kilowatt service to be available at Bob Quinn Lake by spring 2014. A design and build contract has been awarded and pre-construction work is underway.

Highlights from 2011 are:

- 1) KSM - reserve estimate totals 2.192 billion tonnes @ 0.55 g/t Au
- 2) Brucejack – Bonanza-grade gold intercepted (Figure 3) 73 255 m drill program completed.
- 3) Red Chris - Over one kilometre long copper-gold intercepts from deep drilling; poised for mine construction with receipt of final development permits
- 4) Tulsequah Chief – Installation of interim water treatment plant, poised for mine construction

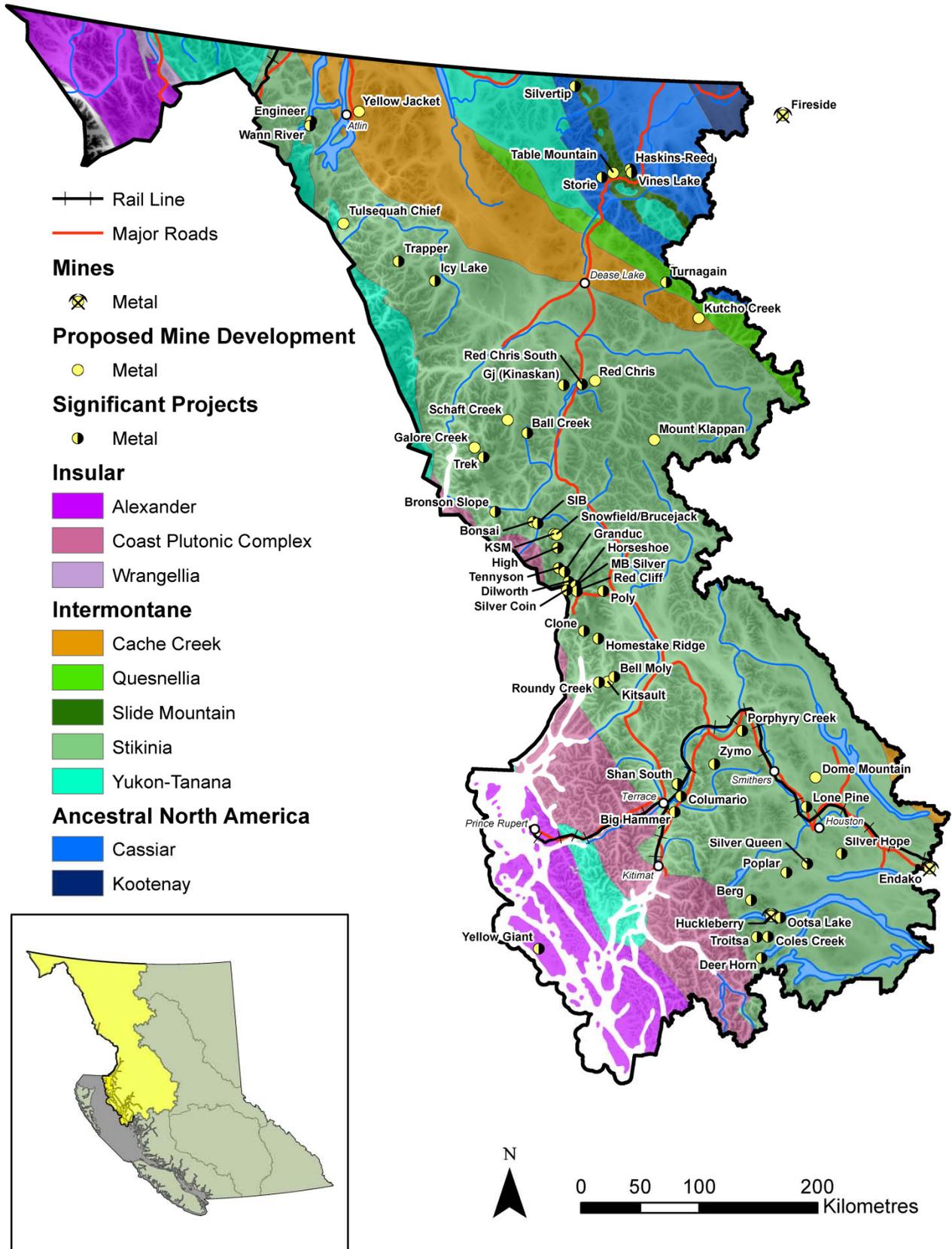
- 5) Kutcho Creek – Updated pre-feasibility, poised to enter EA process
- 6) Schaft Creek – Updated resource estimate,
- 7) Mount Klappan Coal - Multinational steel producer POSCO acquires 20% of project
- 8) Kitsault – Feasibility complete, poised to enter EA process
- 9) Tanzilla – Discovery of west gossan zone
- 10) Silver Queen – Porphyry-style mineralization intercepted
- 11) Poplar – Multi-hundred metre copper-gold-molybdenum intercepts, major drilling program
- 12) Granduc – Updated resource estimate, new massive sulphide zone identified
- 13) Big Missouri –Dillworth – Large drill program, narrow high-grade gold intercept

MINES AND QUARRIES

MAJOR METAL MINES

Thompson Creek Metals Corp (operator and 75% owner) and Sojitz Corporation (25% owner) focussed on constructing a new mill and upgrading “measured and indicated resources” to “proven and probable” reserves at their co-owned **Endako** open pit molybdenum mine (MINFILE 093K 006). Total 2010 molybdenum production at 4543 tonnes exceeded forecasts by 7%. The increased output relative to 2009 was partially due to a slightly higher average ore grade of 0.060% vs 0.059% Mo. 10 176 200 tonnes of ore was milled with 74.5% recovery at a cost of \$8.89 per pound. Ore was dominantly mined from the West Denak pit.

Results from a 21 500 m drilling program conducted in 2011 increased reserves by 9% to 141 611 tonnes of contained molybdenum adding 2 years of forecasted mine life to 2028. Proven and probable reserves as of June 2011 are estimated to be 308.68 Mt at an average grade of 0.046% Mo with an additional measured and indicated 57.37 Mt grading 0.030% Mo. Inferred resources include 49.34 Mt grading 0.035% Mo.



Map 1. Operating mines and selected major exploration projects in the Skeena district, 2011.

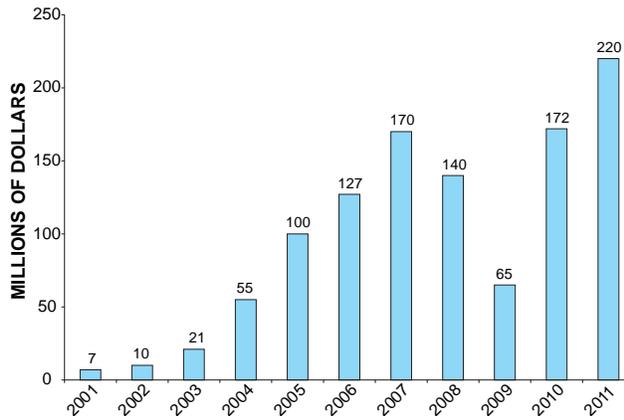


Figure 1. Annual exploration expenditure, Skeena district.

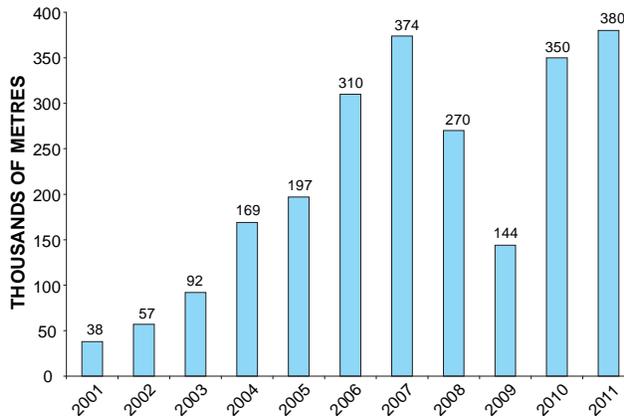


Figure 2. Annual exploration drilling, Skeena district.

Modernization and construction of the new mill continue with project engineering and procurement complete and most major components in place. Daily processing capacity of the new facility is expected to increase 44% from 28 122 to 49 895 t/d. Capital costs for the project are anticipated to be 15% above previous estimate of \$550 million due to delays in final project engineering, material delivery and weather. Approximately \$527 million have been spent since project inception through September 2011. Pre-commissioning activities are underway at the new facility and is forecasted to be complete by early 2012. The current producing mill (constructed in 1965) is scheduled to continue operation until the start-up of the new mill.

Endako is a porphyry molybdenum deposit within the early Cretaceous Francois Lake granite batholith. The ore body is a 3.5 km long vein system that changes in strike along its length from west-northwest in the Endako pit to northerly in the Denak pit, resulting in an arcuate shape. The zone is 400 m wide and extends more than 400 m below surface at a moderate southerly dip. Mineralization is related to intrusion of the Casey aplite which domed and fractured the older and coarse-grained Endako phase of the batholith. Post-mineral cross faults



Figure 3. Brucejack bonanza gold, 0.6 m grading 18 755 g/t Au and 9 312 g/t Ag from 60.60 m in drill hole SU-115. Photo courtesy of Pretium Resources.

segment the ore zone into the Endako, East Denak and West Denak pits. In the long-term mine plan these will merge into a large ‘Super-Pit’ (Figure 4).

The **Huckleberry** copper-gold-silver-molybdenum mine (MINFILE 93E 037) is located 123 km southwest of Houston BC and is operated by Huckleberry Mines Ltd. Ownership is divided between Imperial Metals Corp (50%), Mitsubishi Material Corporation (32%), Dowa Mining Ltd (6%), Furakawa Company Ltd (6%) and



Figure 4. Areal view of Endako Mine showing the 3 existing pits. Courtesy of Endako Mines.

TABLE 1. MINE PRODUCTION AND RESERVES, SKEENA DISTRICT, 2011

Mine	Operator	Production (2010)	Tonnes milled (2010)	Reserves	Grade
Endako	Thompson Creek Metals Corp.	4543 tonnes molybdenum	10 176 200	340 300 000 tonnes @ 0.046% Mo (June 1 2011)	0.060% Mo
Huckleberry	Huckleberry Mines Ltd.	20 643 tonnes copper, 38 tonnes molybdenum, 90.6 kg gold 6 337 kg silver	5684 300	11 747 400 tonnes @ 0.359% Cu, 0.005% Mo (May 11, 2010)	0.377% Cu, 0.006% Mo
Fireside	Fireside Minerals Ltd.	not available	25 000 (in 2011) *approximate*	170 400 (not NI 43-101 compliant)	

Marubeni Corporation (6%). 2010 metal production totalled 20 643 tonnes copper, 90.6 kilograms gold, 6337 kilograms silver, and 38 tonnes molybdenum from 5684 300 tonnes of ore. Grades averaged 0.396% Cu and 0.007% Mo. Copper recovery was 91.7%. Forecast 2011 metal production is 17 690 tonnes copper, 79.4 kilograms gold and 5329 kilograms silver. Lower production values are due to significant mill-feed sourcing from low-grade stock piles in combination with material mined from the Main Zone Extension and the “Pushback Plan”.

The “Pushback Plan” is designed to decrease the pit wall angle in the Main Zone pit after two stability incidents on the north wall halted mining of the Main Zone Extension. Vertical drilling completed in 2010 west of the Main Zone pit successfully identified near-surface minable resources. Pit optimization modelling calculated 7.8 Mt of ore will be released due to the Pushback Plan. Proven and probable reserves from the Main Zone Extension including material from the Pushback Plan (excluding stockpiles) total 11 747 400 tonnes averaging 0.359% Cu.

Stockpiled ore totalling 6.5 Mt with average grade 0.33% Cu combined with 7.8 Mt released during the Pushback Plan operation will be sufficient mill feed to continue production until at least January 2014.

Development planning to extend the mine life includes plans to mine material below the Main Zone Pit, across the “Saddle Zone” which separates the Main Zone and the Main Zone Extension Pits and beneath the current tailings facility to form a “Super Pit”. This plan is known as the “Main Zone Optimization” and is illustrated in cross-section in figure 5. Measured plus indicated resources in the Main Zone Optimization total 180.7 Mt with average grades of 0.315% Cu and 0.006% Mo.

Included in this mineralized resource, 39.7 Mt averaging 0.343% Cu and 0.009% Mo (using a 0.20% Cu cut-off) are contained within the Main Zone Optimization pit shell and are sought to be developed into mineable reserves. Mine life would be extended to 2021. Additional inferred resource totals 48.0 Mt with average grades of 0.263% Cu and 0.003% Mo. Base case capital commitments over the course of the project are forecast at \$212 million and after tax cash flows of \$221 million over the life of the mine. Huckleberry Mines is seeking an amendment to their current *Mines Act* Permit to proceed with detailed engineering, procurement and commissioning to begin waste stripping in the 2nd quarter of 2012.

Exploration at Huckleberry in 2011 was dominated by geophysical surveys. Titan 24 and Natural Source Audio Magneto Telluric (NSAMT) surveys identified conductive targets proximal to the existing mine. Drill targets for 2012 included testing some of the geophysical anomalies and deep drilling the main deposit. The Main Zone deposit remains open at depth and is sparsely drilled below the Main Zone Optimization plan despite drill intercepts exceeding 0.5% Cu.

Huckleberry is a porphyry copper deposit related to the late Cretaceous Bulkley intrusions. In the Main zone, copper mineralization occurs in hornfelsed and fractured Hazelton Group volcanic rocks adjacent to a 500 m diameter granodiorite stock. The arcuate ore zone is 150 to 200 m wide by 600 m long and rims the contact of the stock. The mined-out East zone was larger, measuring 150 m wide by one km long, and centred on a fault-controlled 40 m wide granodiorite dike that trends at 105°. Ore in both zones is a stockwork of quartz, pyrite and chalcopyrite, crosscut by gypsum-filled fractures. The Main and East zones are disrupted by the 105 Fault

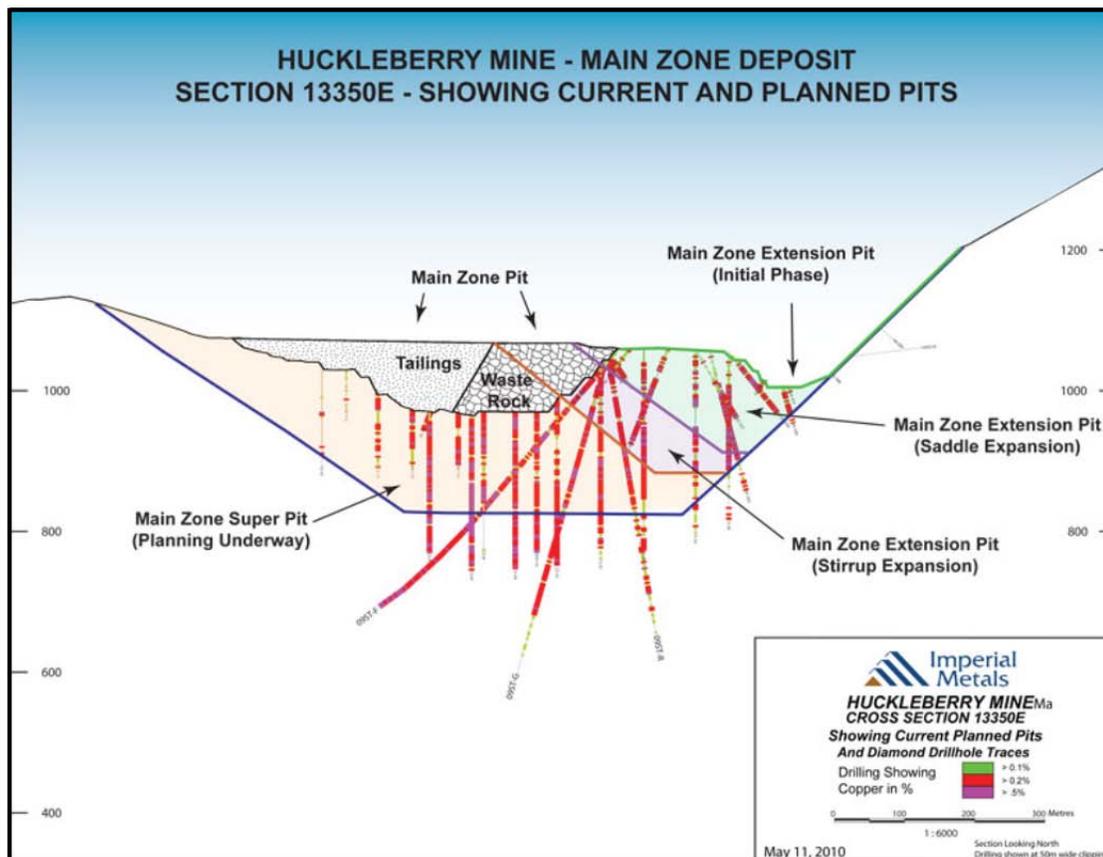


Figure 5. Cross-section of Huckleberry “Main Zone Optimization” plan with Cu bearing drill-hole intercepts. Courtesy of Imperial Metals.

resulting in 100 m of dextral offset of ore. The Main Zone Extension is the faulted portion of the Main Zone north of the 105 Fault. The upper benches of the northern pit wall have been subject of stability issues due to fault splays.

INDUSTRIAL MINERAL QUARRIES

Fireside Minerals Ltd continued to mine barite from its summer-seasonal **Fireside** barite operation (MINFILE 94M 003) located 125 km east of Watson Lake. Approximately 25 000 tonnes of material were mined from the Bear pit (Figure 6) however total barite production estimates were not available. Step-out diamond drilling during 2011 totalled approximately 500 m and adding approximately 30 000 tonnes to the Bear Pit resource (A. Allan personal comm.). All the barite was trucked to the company’s grinding and bagging plant in Watson Lake. Bagged product is sold on site to various operators who utilize the heavy additive in drilling fluids in the oil and gas industry. Vertically-dipping barite veins at Fireside are associated with a gabbro dike of inferred Paleozoic age that was emplaced into Kechika Group sediments.

Jade in northwest BC is mined chiefly by Cassiar Jade Contracting. Production of high-value gemstone

comes from three localities: **Provencher Lake** (MINFILE 104I 073, 092), **Kutcho** (MINFILE 104I 078) and **Cassiar** (MINFILE 104P 005). At both Provencher and Kutcho, located 80 and 90 km respectively east of Dease Lake, the jade that is recovered occurs equally as “placer” boulders in glacial till and as lenses in bedrock. Angular boulder trains in the till are traced using an excavator to their source in bedrock. Nephrite jade is formed at the contact between tectonically-emplaced serpentinite and argillite of the Cache Creek terrane east of Dease Lake, and of the Slide Mountain terrane at Cassiar.

MINE EVALUATION PROJECTS

Exploration of the Iron Cap deposit in 2010 significantly augmented the resource of the **KSM (Kerr-Sulphurets-Mitchell)** gold-copper-molybdenum porphyry project, located 65 km northwest of Stewart. Owner-operator Seabridge Gold Inc released an updated resource estimate in February 2011 reporting proven plus probable reserve totalling 2192.4 Mt averaging 0.55 g/t Au, 0.21% Cu, 3.04 g/t Ag and 53.2 ppm Mo. Measured plus indicated resources total 2549.3 Mt grading 0.55 g/t Au, 0.21% Cu and 57 ppm Mo using a cut-off grade of 0.5 g/t Au equivalent. Additional inferred resources total 1100 Mt grading 0.41 g/t Au, 0.17% Cu and 49 ppm Mo.



Figure 6. Fireside barite quarry mined approximately 25 000 tonnes in 2011. Photo courtesy of Fireside Minerals.

An updated pre-feasibility study released in May incorporated the February 2011 resource and the addition of the proposed Iron Cap pit resulting in an extended mine life from 37 to 52 years. Estimated initial capital expenditure is \$4.68 billion. Mining would initiate at the high-grade gold zone exposed at surface in the Mitchell deposit and continue for 40 years. Material in sequence from Sulphurets then Kerr and lastly the Iron Cap will augment mill feed and make up the last 12 years. A 120 000 t/d mill throughput feeding a conventional flotation circuit would produce a 25% copper concentrate to be shipped from Stewart. The KSM project is undergoing a joint environmental assessment as mandated by the *Canadian Environmental Act* and the *British Columbia Environmental Assessment Act*. Plans to submit an EA application were delayed due to the joint engineering study of a Snowfields-KSM mine plan.

2011 drilling comprised of resource and geotechnical drilling totalling 15 188 m. The Sulphurets deposit received the most drilling on the property totalling 34 drill holes and 11 480 m aiming to upgrade inferred and unclassified resources within proposed pit designs to the indicated category. Nine drill holes totalling 2631 m tested the up and down-dip projections of the Kerr deposit's west-dipping ore zone. Geotechnical drilling totalled 5530 m mainly at the Mitchell deposit with the primary objective to investigate underground panel cave mining viability below the proposed open pit.

The KSM porphyry deposits (Figures 7 – 12) are associated with the Mitchell intrusions, high level diorite to monzonite plugs and dikes that intrude folded and faulted volcanic and sedimentary rocks of the Hazelton and Stuhini groups. The principal Mitchell zone is exposed in an erosional window below the Mitchell thrust fault; the upper fault sheet contains the displaced segment of the deposit, the Snowfield zone, 2 km east on the adjoining property owned by Pretium Resources. The Mitchell zone comprises of schistose rocks with abundant sericite, disseminated pyrite and a strongly deformed

quartz-pyrite-chalcopyrite stockwork containing remarkably uniform copper and gold grades. The phyllic alteration assemblage appears to overprint earlier chloritic and potassic events also associated with stockwork mineralization.

Iron Cap is in the upper sheet of the Mitchell thrust fault, and below the Sulphurets thrust. Chalcopyrite occurs as fine disseminations and quartz-pyrite veins. Epithermal style mineralization containing higher gold and silver grades is also present at Iron Cap as quartz stockwork and breccias. Original textures are commonly obliterated by intense silicification. This mineralization style is similar to zones on the nearby Brucejack property and demonstrates the transition from porphyry to epithermal styles in the district.

The **Snowfield** deposit is bisected by mineral claims owned by Pretium Resources Inc and Seabridge Gold Inc. An updated resource estimate released in February exclusively on Pretium property, reports measured plus indicated resources totalling 1370 Mt averaging 0.59 g/t Au, 1.72 g/t Ag, 0.1% Cu and 85.5 ppm Mo. Additional inferred resources contribute 833 Mt averaging 0.34 g/t Au, 1.9 g/t Ag, 0.06% Cu and 69.5 ppm Mo.

Snowfield comprises two separate mineral zones: the Main (or North) copper-gold zone and the Upper gold-molybdenum zone. The Main zone is considered to be the upper portion of the Mitchell deposit displaced by the Mitchell thrust fault. Similar to the Mitchell deposit, the Main zone is characterized by intense quartz-pyrite-chalcopyrite crenulated stockwork. Gold occurs mainly in chalcopyrite. Mineralization in the Upper gold-molybdenum zone is characterized by disseminated pyrite and weak to moderate quartz-pyrite-carbonate stockwork in undeformed volcanic rocks. Gold occurs mainly in anhedral, disseminated pyrite.

Pretium Resources Inc signed two agreements with Seabridge Gold Inc regarding their Brucejack-Snowfield and KSM projects. The two companies agreed to mutual access in the proposed Mitchell and Snowfield pits allowing both operators to conduct stripping activities across the claim boundary (Figure 13). A mutual cooperation and confidentiality agreement was signed to enable the efficient preparation of an engineering study combining KSM and Snowfield projects as a single mine operation. Combined, the KSM, Snowfields and Brucejack deposits comprise the largest in-ground gold resource identified to date in North America. Potential quantities of metals within reserve, measured, indicated and inferred categories across the six projects approach 13.7 million tonnes copper and 4.7 million kilograms (151 million ounces) gold.

Bonanza gold intersections in 2011 at **Brucejack** have prompted aggressive follow-up development. The Project was purchased by Pretium Resources Inc in late 2010 from Silver Standard Resources for \$450 million combined cash and Pretium common shares. Eight drill rigs completed 176 drill holes totalling 73 255 m in 2011,

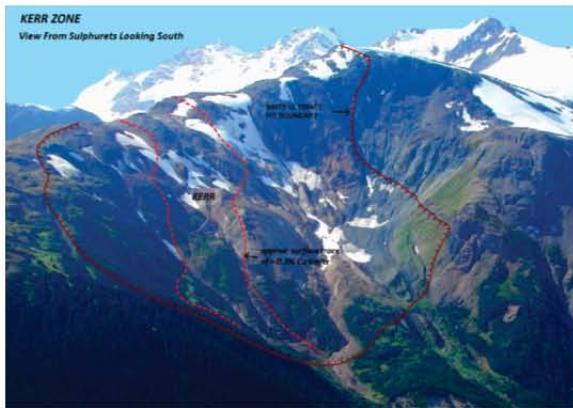


Figure 7. Kerr deposit outline with 0.3% Cu cut-off limit. Photo courtesy of Seabridge Gold.

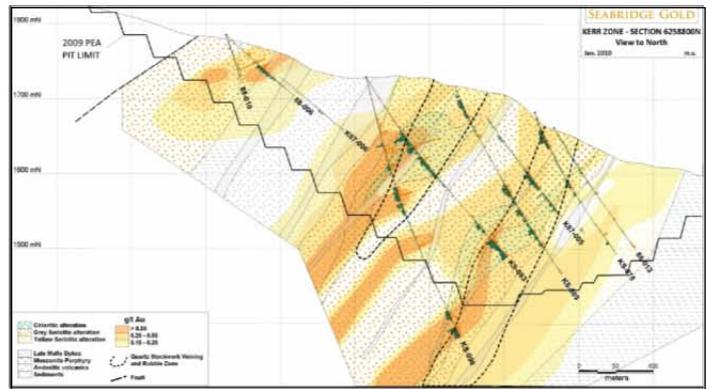


Figure 8. Kerr deposit cross-section with proposed pit outline and Au grades. Courtesy of Seabridge Gold.

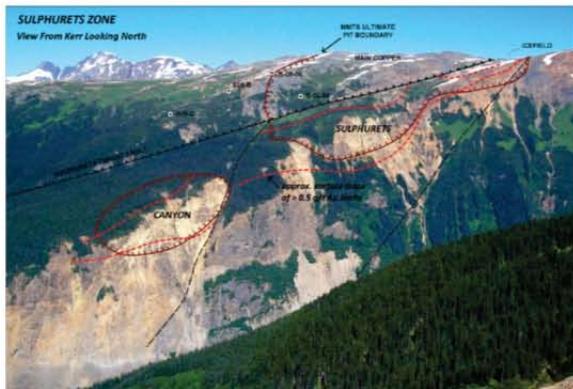


Figure 9. Sulphurets deposit outline with 0.3% Cu cut-off limit. Photo courtesy of Seabridge Gold.

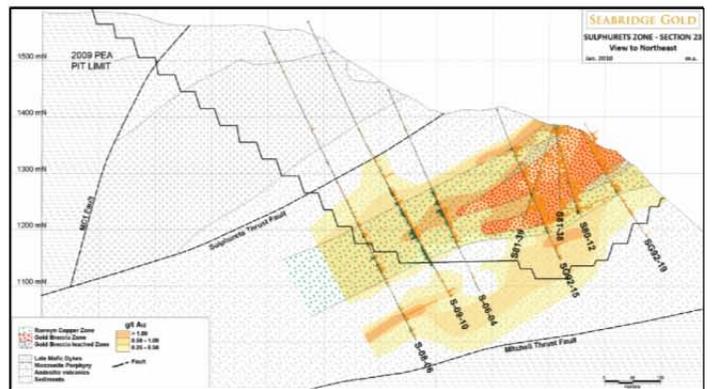


Figure 10. Sulphurets deposit cross-section with proposed pit outline and Au grades. Courtesy of Seabridge Gold.

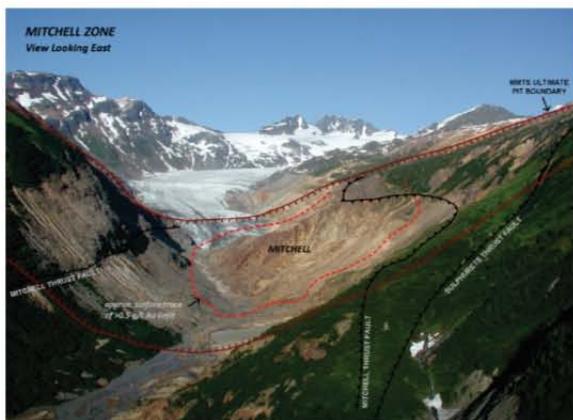


Figure 11. Mitchell deposit outline with 0.3% Cu cut-off limit. Photo courtesy of Seabridge Gold.

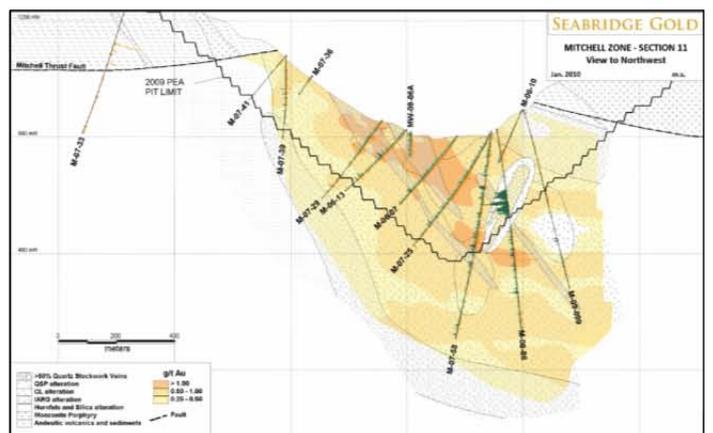


Figure 12. Mitchell deposit cross-section with proposed pit outline and Au grades. Courtesy of Seabridge Gold.



Figure 13. The Bell 407 played an integral role in Pretium Resources helicopter intensive year at Snowfields – Brucejack projects. Photo courtesy of Joel Ashburner.

all of which was helicopter supported. Multiple bonanza-grade gold intercepts from The Valley of the Kings added to an updated resource reported in late 2011. Measured plus indicated resources total 9.3 Mt grading 16.92 g/t Au and 105.6 g/t Ag. Additional inferred resources total 4.0 Mt averaging 25.67 g/t Au and 20.6 g/t Ag. Contained metal in the measured plus indicated category using a 0.30 g/t Au cut-off grade totals 365 425 kg (12.89 million ounces). Resource models are based on seven deposits including the SG, Gossan Hill, Galena Hill, Bridge Zone, Valley of the Kings, Shore Zone and West Zone. Resource data is drawn from 1190 diamond drill holes totalling 219 394 m including 452 historical surface drill holes, 442 historical underground drill holes exclusively in the West Zone, and 296 surface drill holes completed since 2009. Conservative modelling restrictions were applied uniquely to each zone to address the localized high grades in the resource estimate. Additional conservative measures were applied to modeling the Valley of the Kings Zone by capping grades at 900 g/t Au and in the West and Shore Zones at 220 g/t Au. The highest grade intercept on the property to date was drilled this year in the Valley of the Kings zone returning 0.6 m grading 18 755 g/t Au and 9312 g/t Ag. Additional

bonanza grades over 1000 g/t Au were returned across 24 intervals in 17 holes during the year (Figure 14).

Operations continue throughout the winter months, including construction of a 79 km road starting from Highway 37. Underground workings constructed between 1986 and 1989 are being dewatered in preparation for underground exploration drilling in 2012 (Figure 15). An updated preliminary economic assessment incorporating the updated resource estimate is anticipated to be completed in early 2012. A project description has yet to be submitted to initiate the environmental assessment process.

The Brucejack area is underlain by Stuhini and Hazelton Group volcanic and sedimentary rocks that strike north-northwest, dip and face to the east, and are intruded by the Mitchell-Sulphurets monzonite stocks, dated at 192.7 Ma. The mineralized area is underlain mainly by andesitic tuff and flow-rocks of the Unuk River Member (of the Betty Creek formation) and underlying sandstone (Jack Formation). The volcanic-sedimentary sequence is cut by several east-trending zones of intense, pervasive quartz-sericite-pyrite alteration containing gold-bearing quartz veins, stockworks and breccias. In a few

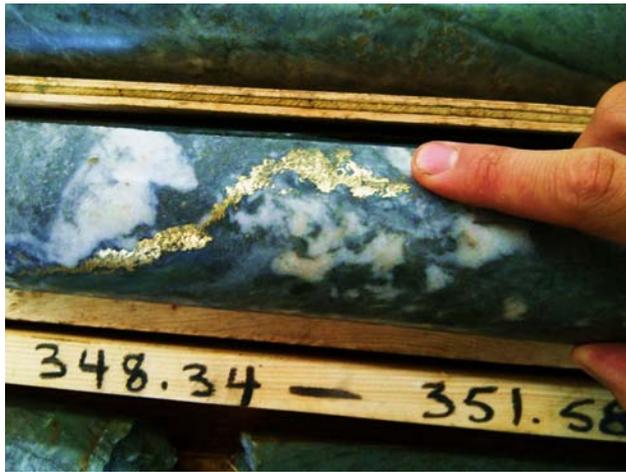


Figure 14. Gold vein in drill core from Brucejack. Twenty-four intercepts drilling in 2011 graded over 1000 g/t Au. Photo courtesy of Cole Mooney.



Figure 15. Eight rigs drilled 73 255 m at Brucejack between May and October this year. Underground workings pictured above are being dewatered and prepared for further development. Photo courtesy of Pretium Resources.

areas, sedimentary and volcanic horizons can be identified within the strongly altered zones, but commonly the parent rock cannot be identified. The quartz-sericite zones form a 3 km long north-south arcuate belt within 500 to 800 m of the prominent Brucejack fault. Geological mapping shows alteration and gold-silver mineralization follow the Stuhini-Hazelton contact zone. However, the relationship and timing with respect to the Mitchell-Sulphurets intrusions remains unclear.

Results released from 45 diamond drill holes (49 760 m) completed between late 2010 and April 2011 on Imperial Metals Corporation's **Red Chris** copper-gold project (MINFILE 104H 005) confirm economic copper-gold mineralization continues below the proposed 400 m open pit depth. The 49 760 m drilling program identified multiple intercepts several hundred meters in length containing mineable copper-gold values in the East, Saddle and Main zones. Best intercepts are summarized in table 2 with high-grade copper intercepts shown in

figure 17. The deposit remains open to the east and south emphasizing the size potential of this porphyry system.

Proven and probable reserves reported in May 2010 do not reflect the most recent drilling results and therefore remain un-changed at 302 Mt with an average grade of 0.359% Cu and 0.274 g/t Au. Updated measured plus indicated resources total 619 Mt with an average grade of 0.38% Cu and 0.36 g/t Au. Inferred resources total 619 Mt with an average grade of 0.30% Cu and 0.32 g/t Au. The project is to be a conventional shovel and truck open pit mine with a 30 000 t/d processing plant and conventional flotation circuit to produce an average of 337 tonnes of concentrate per day. Mine life is estimated to be approximately 28.3 years. Mine construction is scheduled to begin in 2012 upon receipt of pending *Mines Act* and related permits. Capital costs are estimated at \$443 million to construct the mill and a 115 km high voltage power line to connect to the proposed Northern Transmission Line sub-station at Bob Quinn Lake.

Deep drilling resumed in summer 2011 aiming to further define the Red Chris deposit and to explore the previously identified **Gully Zone** located over 1 km west of the proposed pit design. (Figure 16) The maximum depth in the Gully Zone was drill tested to 470 m by previous workers returning widely distributed copper-gold mineralization and strong alteration. Three drill holes have been completed in the area testing for deeper mineralization. Drilling and compilation of results are planned to continue through the winter months.

The Red Chris deposit comprises the adjoining Main, East and Saddle porphyry copper-gold zones within a monzodiorite stock dated at 204 Ma. The stock intrudes Stuhini Group volcanic rocks to the north and is overlain by, and faulted against, Bowser Lake Group sedimentary rocks to the south.

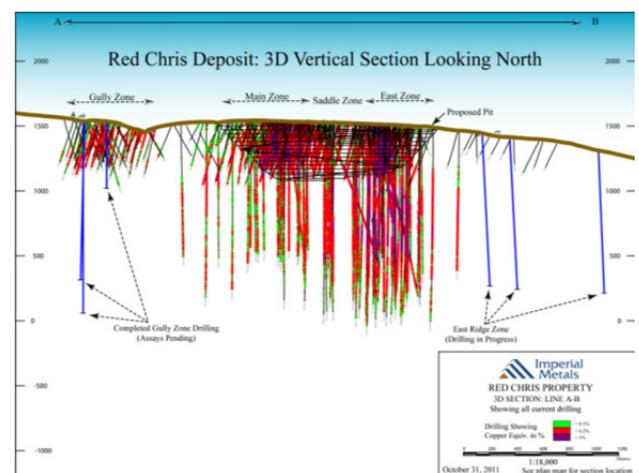


Figure 16. Red Chris deposit cross-section looking northwest with proposed pit design and Cu equivalent drilling intercepts; green > 0.1%, red >0.2%, purple >1.0%.

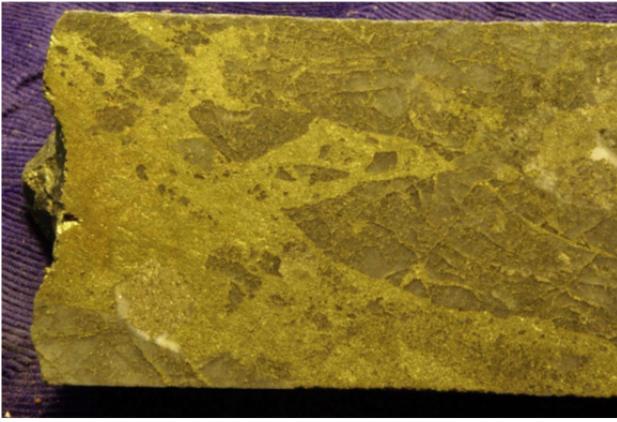


Figure 17. Massive chalcopyrite from Red Chris drill core. Photo courtesy of Imperial Metals.

The East zone (EZ) fault controls both the east-northeast trending Red stock and the most intense quartz vein development, which, in turn, corresponds with the best copper and gold grades. At depth in the porphyry system, alteration comprises K-feldspar, biotite, magnetite and anhydrite. Closer to surface (within the planned open pit) alteration comprises sericite, pyrite, quartz, hematite, ferrodolomite and chlorite. Study of molybdenite distribution, a minor ore component, is ongoing. The occurrence of volcanic rocks between the Main and East zones suggest the Red stock has at least two intrusive centres. Zoning of gold to copper ratio and interpretation of a deep penetrating induced polarization survey suggest a third intrusive centre may lie west of the Main zone, beneath the Gully zone.

Chieftan Metals Inc continues re-development of the past producing **Tulsequah Chief** (MINFILE 104K 002) copper-zinc-lead-silver-gold volcanic hosted massive sulphide 100 km south of Atlin. *Mines Act* permits were successfully transferred from previous operator Redfern Resources early in the year allowing development plans to proceed. Main objectives for 2011 included construction of a water treatment plant, upgrading and increasing resource categories and commencing an updated feasibility study. Initial mine site preparation commenced during the year and includes re-location of historic Potential Acid Generating (PAG) rock and grading the mine site for foundations and construction. The interim water treatment plant is scheduled to be completed later in the year with the remainder of site preparation and construction forecasted to be complete in the second quarter of 2012. The current indicated resource totals 6.0 Mt averaging 1.42% Cu, 1.23% Pb, 6.44% Zn, 2.63 g/t Au and 96 g/t Ag. Additional inferred resources total 1.1 Mt grading 0.94% Cu, 0.93% Pb, 5.0% Zn, 1.63 g/t Au and 72 g/t Ag.

Exploration included drilling on both Tulsequah Chief and satellite past producer **Big Bull** (MINFILE 104K 008). Eighty-two diamond drill holes (50 underground, 32 from surface) were completed totalling 31 181 m. Results will be incorporated into the updated

feasibility study anticipated to be released early 2012. A 2011 preliminary economic assessment using the 2007 feasibility study technical data estimated initial capital expenditure at \$310.1 million. Mine plans detail a 2000 t/d milling operation for a 9 year mine life. The 2012 updated feasibility study will also detail an optimized construction plan including new road access and improved metallurgical recovery.

Tulsequah Chief is a Kuroko-type volcanogenic massive sulphide deposit in which numerous stacked sulphide lenses are present within a rhyolite-dominated sequence of volcanic flows and fragmental units. Mineralization in all lenses consists of massive to semi-massive pyrite, chalcopyrite, sphalerite and galena. Accessory ore minerals include tetrahedrite-tennantite and rare native gold. Gangue mineralogy consists of barite, chert, gypsum, anhydrite, carbonate quartz, chlorite and sericite and silicified volcanoclastics.

Capstone Mining Corporation formally initiated pre-application phase for the **Kutcho Creek** copper-zinc project (MINFILE 104I 060) by submitting a Project Description in May 2011. Wholly owned subsidiary Kutcho Creek Copper Corp operates the project approximately 100 km east of Dease Lake. A pre-feasibility study completed this year identified 10.44 Mt of probable mineral reserves averaging 2.01% Cu, 3.19% Zn, 34.61 g/t Ag and 0.37 g/t Au. Measured and indicated resources total 11.28 Mt averaging 2.19% Cu, 3.28 % Zn, 36.7 g/t Ag and 0.39g/t Au. Additional inferred resources total 1.09 Mt averaging 1.74% Cu, 2.04% Zn, 30.7 g/t Ag and 0.35g/t Au. Proposed mine life is 12 years with a processing capacity of 2500 t/d producing separate copper and zinc concentrates. Capital costs are an estimated \$ 213.5 million, which includes a liquefied natural gas power plant making the project independent of the Northwest Transmission Line. This year's development focussed on environmental and socio-economic assessment and consultations towards permitting and mine development. Work programs included detailed engineering studies and a hydrogeology drilling program to support formal submission of an environmental assessment forecast for late 2011.

Exploration this year targeted electromagnetic anomalies generated by a Versatile Time Domain Electromagnetic ("VTEM") survey flown earlier this year. Nineteen drill holes were completed totalling 4227 m. Results are pending; however, one visually exciting massive sulphide intercept was encountered proximal to the known Sumac resource at shallower depth. Follow up drilling is planned.

The Kutcho property contains three known Kuroko-type volcanogenic massive sulphide (VMS) deposits (Figure 18). These are aligned in a westerly plunging linear trend and from east to west they are referred to as the Main, Sumac, and Esso deposits. The largest of the three, the Main deposit, is exposed near the eastern end of this trend, whereas the Esso deposit occurs at depths about 400-600 m below surface at the western or down

TABLE 2. RED CHRIS DEEP DRILLING HIGHLIGHTS

Drill Hole #	Zone	Depth from (m)	Depth To (m)	Interval Length (m)	Copper %	Gold g/t
RC10-423	East	820.4	1037.3	216.9	1.15	2.44
RC11-431	East	172.5	1250	1077.5	0.44	0.29
RC11-445	Saddle	337.5	1100	762.5	0.43	0.48
RC10-403	Main	337.5	1237.5	900	0.25	0.22
RC10-407	Main	4	1030	1026	0.22	0.2

plunge end of the trend as it is currently known. The Sumac deposit lies between the Main and Esso deposits both laterally and vertically, but has seen only cursory drilling. The mineralized trend is open down plunge but is poorly explored.

Copper Fox Metals Inc received approval in 2011 for its Application Information Requirements as part of the Environmental Assessment Application for the **Schaft Creek** copper-gold-molybdenum project (MINFILE 104G 015) located approximately 60 km northwest of Bob Quinn Lake. An updated resource estimate reported in July will be used to prepare a feasibility study expected to be completed late in 2011. Measured plus indicated resources total 1010 Mt averaging 0.27% Cu, 0.017% Mo and 0.18 g/t Au. Additional inferred resources total 283.6 Mt averaging 0.24% Cu, 0.011% Mo and 0.15 g/t Au. Cut-off grades are 0.2% copper equivalent. The proposed 150 000 t/d mill and accompanying tailings facility would be located 5 km northeast of the deposit near Skeeter Lake. Copper Fox Metals has signed an agreement with Stewart Bulk Terminals Ltd in a move to secure storage and loading of concentrate from Stewart.

Field activities during 2011 included resource, geotechnical and exploration drilling and an airborne geophysical survey. Resource delineation drilling successfully extended the Paramount zone both east and west along strike and at depth. Seventeen holes were drilled totalling 6523 m including geotechnical drilling. Highlight results include 387.8 m averaging 0.49% Cu, 0.3 g/t Au, 0.04% Mo and 2.43 g/t Ag from 287 m in drill hole 2011-CF411. Geotechnical drilling focused on open pit slope design. Exploration focused on searching for high-grade starter-pit options and included five drill holes totalling 1868 m. Results from a TITAN-24 DCIP – MT (deep penetrating induced polarization-magnetotellurics) survey identified multiple extensions to zones of known chargeability. A new area of chargeability identified west of the Liard zone is sparsely drill tested with historic intercepts over 1% Cu over 10 m.

Schaft Creek is a calc-alkalic porphyry copper-gold-molybdenum deposit formed near the eastern contact of

the Hickman granodiorite batholith with Stuhini Group mafic volcanic rocks. The Galore Creek deposit is developed in alkalic rocks near the western margin of the Hickman batholith. Schaft Creek mineralization is dated at 222 Ma, nearly identical to the age of the batholith. Although not an alkalic porphyry deposit, Schaft Creek is similar to Galore Creek in that the deposit occurs in a unique part of a sub-horizontal volcanic sequence consisting of tuff, breccias and epiclastic rocks. The principal Liard zone is fault-bounded by a steep structure to the east and by a 45° east-dipping structure to the west. Recent drilling has linked the Liard and northerly Paramount zones so they are considered now to be a single zone. Thought to represent deeper portions of the porphyry, the Paramount zone is characterized by extensive igneous brecciation of a feldspar porphyry intrusion, primary igneous zoned sulphides and a higher abundance of chalcopyrite and molybdenite. The West Breccia zone lies further west, associated with a sub-vertical fault. The West Breccia zone is 30 to 200 m wide, extends more than 1000 m and consists of angular hematized fragments in a matrix of quartz, tourmaline, chlorite, specularite and sulphide minerals. The Liard zone comprises a sub-horizontal quartz vein stockwork that is developed in volcanic rocks and less abundant granodiorite dikes; this vein orientation accounts for the flat copper grade contours that characterize the deposit. Potassium feldspar alteration is pervasive in intrusive rocks and less intense in volcanic rocks where it is restricted to vein envelopes. Veins in the Liard zone are broken and disrupted on a small scale; veins commonly do not extend 10 cm without being segmented by fault-fractures. Copper mineralization is contained in chalcopyrite and bornite as stockworks, disseminations and in breccias. Molybdenite occurs as disseminated blebs and stringers in stockworks and veins.

Fortune Minerals signed a joint venture agreement with South Korean-based, multinational steel producer POSCO Canada Ltd (POSCAN) to further develop the **Mount Klappan** Coal Project. Respective wholly-owned subsidiaries Fortune Coal and POSCO Klappan Coal Ltd

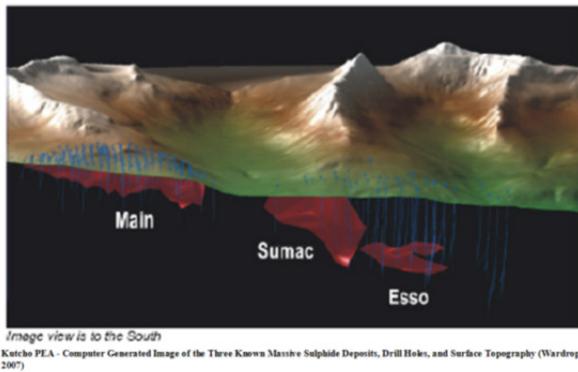


Figure 18. Kutcho Creek digital elevation model looking south with underground massive sulphide bodies Main, Sumac and Esso. Courtesy of Capstone Mining.

plan to accelerate development of the project with Fortune's local operational expertise and POSCAN's financial backing. Fortune Coal will retain 80% project ownership and continue to operate the project for the duration of the mine life. POSCO Klappan Coal Ltd acquired the remaining 20% for \$30 million; of which \$20 million will be directly spent on the joint venture and is anticipated to cover all permitting, consultation and detailed engineering costs. POSCAN is committed to funding 20% of the total development costs forecasted to be a \$154 million contribution to an estimated total \$778 million.

Mount Klappan is a significant extensively explored coal deposit located approximately 330 km northeast of Prince Rupert. The measured resource totals 107.9 Mt with additional indicated resources totalling 123.0 Mt. Inferred resources total 359.5 Mt. Plans to build and operate a 3 million tonne per year facility are financially robust and will likely be reinforced in an updated resource estimate and economic update anticipated for release in 2012. A partially constructed rail bed runs through the project area and lies 150 km north of the current terminus of track at Minaret, where Canadian National Railway operates on long-term lease. Collaboration with CN to extend the railway to the project area would provide bulk-tonnage transport to Ridley shipping terminals in Prince Rupert.

Mount Klappan coal is comprised of 33 coal horizons with a combined thickness of 11.13 m within the Upper Jurassic to Lower Cretaceous Klappan sequence within the Bowser Basin. Twelve of the 33 coal seams are considered minable. In 1985-86 a 200 000 tonne open pit bulk sample was mined and delivered high quality anthracite coal (Figure 19). Processing and washing and heavy media separation produced four main products: coarse and fine with low ash, and fines with medium and high ash content. Recovery was 67%. Updated processing aims to increase recovery.

Avanti Mining continued re-development of the past producing **Kitsault** molybdenum mine (MINFILE 103P 120) located approximately 140 km northeast of Prince

Rupert. Drilling this year totalled 9995 m and was aimed at upgrading inferred to indicated resources. Additional condemnation drilling of the proposed tailings site totalled 558 m. A feasibility study in late 2010 showing proven and probable reserves totalling 232.5 Mt averaging 0.081% Mo equating to 169 598 tonnes contained molybdenum. Measured and indicated resources total 298.8 Mt averaging 0.072% Mo and 4.20g/t Ag with additional inferred resources totalling 157.1 Mt grading 0.050% Mo and 3.65 g/t Ag. Mine life is forecast to be 16 years with an initial capital cost of \$837 million.

Kitsault operated from 1967 to 1972 and again from 1981-82 milling a total of 13.4 Mt grading 0.101% Mo (Figure 20). Total past production was 13.6 tonnes molybdenum. The site old mill site in Patsy Creek is still serviced by a mine access road and power line; however, a less constrained new mill site is required and its location is proposed 1.5 km northeast of the open pit, immediately adjacent to the proposed tailings facility.



Figure 19. 1986, Mount Klappan Coal bulk sampling. Photo courtesy of Fortune Minerals.



Figure 20. Aerial view of Kitsault. Photo courtesy of Avanti Mining.

An environmental assessment is substantially complete including new and historic environmental baseline information and is forecast to be submitted to regulators for review late in 2011.

The Kitsault property is located within the western margin of the Bowser Basin as part of the Intermountain tectonic belt a few kilometres east of the Coast Plutonic Belt contact. Mineralization is hosted within multiphase diorite, quartz monzonite and younger felsic units. Cross-cutting relationships indicate multiple mineralizing events occurred. Geometry of mineralization appears to be annular in plan and arcuate in section. The Lime Creek Intrusive Complex hosts the main Kitsault deposit while satellite deposits **Roundy Creek** and **Bell Moly** are hosted in the Roundy Creek Intrusive complex and the Clary Creek Stock respectively.

Exploration was focussed on the **Roundy Creek** (MINFILE 103P 113) deposit located 5 km west of Kitsault. Drilling this year totalled 2803 m and returned multiple intersections averaging better than 0.1% Mo and 1.3 g/t Ag up to 66 m wide. The best result was a 12 m intersection from drill hole RC11-24 averaging 0.368% Mo and 0.6 g/t Ag including 6 m averaging 0.705% Mo.

The mineralized area is located near the head of steep north-flowing forks of Roundy Creek and, despite detailed historic work, is not well understood. Two granite stocks are present. The western body contains an internal zone of alaskite which comprises quartz porphyry, silicified quartz-feldspar porphyry and minor, but very important, banded feldspar-molybdenite rock. This is likely an unusual form of unidirectional solidification texture (UST) that occurs in some molybdenum deposits but typically consists of alternating quartz and molybdenite bands. The high-grade material at Roundy Creek is discontinuous and varies in attitude. Molybdenite is also present in a quartz stockworks.

Metal Mountain Resources Inc continued development of its **Dome Mountain** underground gold-silver mine located 35 km east of Smithers. Wholly-owned subsidiary and mine operator Gavin Mines Inc completed construction of main infrastructure components including portal re-furbishing, mine road upgrading, a water treatment plant, sediment control pond, equipment storage, office and a dry building. Seven hundred tonnes of ore are ready to be shipped with full-time production awaiting installation of an additional vent raise. Underground development is focussed on re-opening the 1290 and 1370 m levels built in 1991 (Figure 21). Discussions with Mount Polley mine to process Dome Mountain ore by sulphide floatation are ongoing and require permit approvals for additional milling. Metallurgical test work has been completed and returned positive results. The acquired *Mines Act* permit allows for a 205 t/d (up to 75 000 t/y), mechanized cut and fill operation. Over \$5 million was invested in 2011 mine development.



Figure 21. Dome project manager Daryl Hanson and company in the Boulder Vein ore heading.

The Boulder and Boulder footwall veins (MINFILE 93L 276) are current mine targets and contain a probable mineral reserve (including dilution) of 135 131 tonnes grading 11.2 g/t Au at a diluted cut-off grade of 7.9 g/t Au. The undiluted indicated resource is 144 144 tonnes grading 17.7 g/t Au at the same cut-off. The inferred resource is 113 671 tonnes at 13.6 g/t Au. Dome Mountain comprises eight (or more) gold-bearing orogenic quartz veins within volcanic and sedimentary rocks of the Hazelton Group. The mine operated during 1991-1992 and produced 361.4 kg of gold (11 621 oz) from 30 890 tonnes of ore. The Boulder quartz-sulphide vein is in a fault and itself shows evidence of shearing. Principal ore minerals are pyrite and sphalerite with minor chalcopyrite, galena, arsenopyrite and tetrahedrite. Gold occurs in native form but is rarely visible and is generally associated with pyrite.

Eagle Plains Resources Ltd has created wholly owned subsidiary Yellowjacket Resources Ltd to continue mining and development of the **Yellowjacket** gold property (MINFILE 104N 043). Yellowjacket Resources Ltd owns 100% of the mineral and placer rights of the project area. Late 2010 drilling results reported in early January 2011 returned several gold-bearing intercepts. Sixty-four reverse circulation drill holes totalling 2181 m were completed. Best intercept was from drill hole L100E-60B returning 6.09 m grading 26.8 g/t Au. A *Mines Act* permit granted in 2009 allows for open pit mining with an on-site 400 t/d gravity separation mill. Annual processing capacity can be up to 75 000 tonnes. A resource estimate is not available but mine plans include several open pits entirely within an area of disturbed and likely gold-bearing placer workings. Pit depths are approximately 30 m and do not require blasting due to friable, strongly clay altered bed rock. Native gold occurs within sub-vertical quartz veins and enveloping listwanite zone proximal to the 20 m wide Pine Creek Fault.

In November, NovaGold Resources Inc announced its intent to sell part or all of its 50% ownership in the Galore Creek (MINFILE 104G 090) copper-gold project. Project partner, Teck completed their funding obligation of \$373.3 million to attain 50% ownership of the project in June. An updated pre-feasibility study in July detailed an economically viable path to bringing the project closer to fruition. Fundamental changes to the mine plan include relocation of the tailings and processing facilities, realignment of access road and tunnel, and an increase of mill throughput. Total expected capital expenditure including construction and sustaining costs total \$5.84 billion. The study details a 95 000 t/d milling and concentrating facility with a 17.6 year mine life. Planned work for the 2011 season included infill drilling to upgrade inferred to measured and indicated resource categories, and geotechnical drilling on both tunnel realignment and to confirm open pit slopes in areas targeted for conversion of inferred mineral resources. Environmental and engineering work continued in preparation for a planned feasibility study. Galore Creek is a porphyry copper deposit associated with Triassic alkalic intrusive rocks (Figure 22). Proven and probable reserves total 528 Mt averaging 0.58% Cu, 0.32 g/t Au and 6.02 g/t Ag. Additional measured plus indicated resources total 286.7 Mt averaging 0.33% Cu, 0.27 g/t Au and 3.64 g/t Ag. Inferred resources total 346.6 Mt averaging 0.42% Cu, 0.24 g/t Au and 4.28 g/t Ag.

The **Morrison** copper-gold project (MINFILE 93M 007) is located 70 km northeast of Smithers and owned by Pacific Booker Minerals Inc. The project entered the Environmental Assessment process in 2010 but has been suspended due to the need to further study environmental data. An independent review of environmental baseline data acquired by Pacific Booker is being conducted.

Pacific Booker Minerals Inc proposes to build an open pit mine to operate at 30 000 tonnes per day. Measured plus indicated resources total 206.869 Mt grading 0.39% Cu, 0.20 g/t Au and 0.005% Mo. Inferred resources total 56.524 Mt grading 0.40% Cu, 0.21 g/t Au and 0.005% Mo. The deposit is hosted in an Eocene biotite-feldspar porphyry within the Babine Intrusions.

Hawthorne Gold Corp changed names to become China Minerals Mining Corporation in April this year and remains in control of past producing **Table Mountain** gold mine.(MINFILE 104P 012). No significant fieldwork was conducted.

MINERAL EXPLORATION

There were at least 89 active major exploration projects in the Skeena district this year (Table 3). The following exploration section has been sub-divided into deposit type and geological district. All major exploration projects are detailed in table 3. Projects with greater than \$500,000 expenditure in 2011 are summarized in the following text.

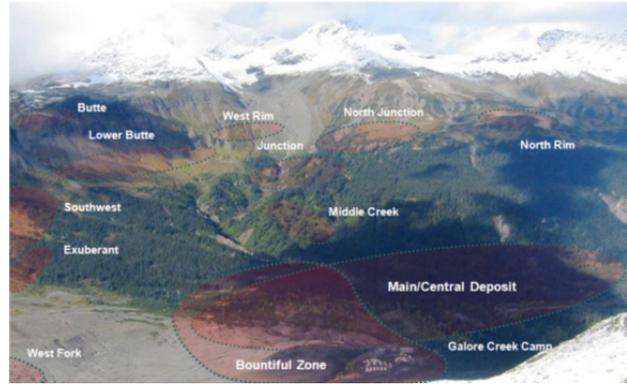


Figure 22. Aerial view of Galore Creek deposits.

Porphyry Copper Projects

“Porphyry copper deposits in the northwest commonly contain significant gold or molybdenum. Few deposits contain all three metals in economically significant amounts. Prospects in the Iskut-Stikine district developed in late Triassic to early Jurassic intrusions within the Stikine terrane prior to accretion to North America. Pre-accretion porphyry prospects are primarily copper-gold deposits; molybdenum is significant only at Schaft Creek. The intrusions are sub-alkalic, potassium-rich and of intermediate composition, typically monzonites and their volcanic equivalent. Potassium feldspar porphyritic rocks are common. Alkalic rocks, syenite and pseudoleucite-bearing trachyte characteristic of the Galore Creek deposit represent an end-member composition. Some porphyry deposits in the Stikine district have an extremely high gold to copper ratio and are referred to as gold-copper porphyries. This includes the Mitchell, Sulphurets, Snowfield and Bronson Slope deposits.

Porphyry copper-molybdenum prospects predominate in the Skeena district. Some copper-gold prospects occur but the gold content is appreciably less relative to the Iskut-Stikine district. Skeena district porphyry prospects are all contained in post-accretion intrusions including the extensive late Cretaceous Bulkley and more localized Eocene Nanika and Babine calkalinic intrusions. The three suites have separate distribution patterns but all occur within the transverse geologic feature known as the Skeena Arch. The Huckleberry deposit is related to a Bulkley intrusion.” (revised from Wojdak, 2010)

Porphyry Copper-Gold Projects in Stikine Terrane, Iskut District

Bolero Resources Corp tested the **Red Chris South** copper-gold porphyry target with three drill holes totalling 1100 m. Targets included induced polarization geophysical anomalies; one of which is coincident with elevated copper-gold Mobile-Metal-Ion (MMI)

TABLE 3. SIGNIFICANT EXPLORATION PROJECTS SKEENA DISTRICT, 2011

Property Name	Operator	MINFILE (or NTS)	Commodity	Deposit Type	Work Program
Ax	Pacific Bay Minerals Ltd.	104P 106	Ag, Pb, Zn, Cu	Skarn	GC, P
BA; George Copper	Great Bear Resources Ltd., Mountain Boy Minerals Ltd.	104A 178	Ag, Zn, Pb	Massive sulphide	GC, G
Babine	Astorius Resources Ltd.	093L 209	Cu	Porphyry	GC
Ball Creek	Paget Minerals Corp.	104G 018	Cu, Au	Porphyry	DD (1060 m, 8 holes)
Bear River; Tide North	Auramex Resources Corp.	104A 024	Au	Vein	GC
Bell Moly	Avanti Mining Inc.	103P 234	Mo	Porphyry	G
Berg	Thompson Creek Metals Company Inc.	093E 046	Cu, Mo	Porphyry	DD (10 678 m, 36 holes)
Big Hammer	Jet Gold Corp.	103O 013	Au, Ag, Te	Vein	DD (830 m, 11 holes), GC, TR
Bonsai	Copper Creek Gold Corp.	104B 383	Au, Ag, Zn, Cu	Massive sulphide	DD (944 m, 4 holes) GC
Bronson Slope	Skyline Gold Corp.	104B 077	Au, Cu, Fe	Porphyry, Vein	DD (1812 m), GC, G, P
Brucejack	Pretium Resources Inc.	104B 193	Au, Cu	Porphyry	DD (73 255 m)
Cassiar	Cassiar Jade Contracting	104P 005	Jade	Shear vein	Mining
Cassiar Gold : Table Mountain	China Minerals Mining Corp.	104P 012	Au	Orogenic Vein	Corporate
Chist Creek	Paget Minerals Corp.	103I 185	Cu, Zn, Au, Ag	Massive sulphide	DD (750 m, 4 holes)
Clone	Teuton Resources Corp.	103P 251	Au	Shear vein	MS, BU(102)
Coles Creek	Callinex Mines Ltd.	093E 041	Cu, Au	Porphyry	DD (4579 m, 11 holes)
Columario	Argonaut Exploration Inc.	103I 077	Au	Vein/ Breccia	DD (2600,), G, A
Copper Creek	Firesteel Resources Inc.	104J 035	Cu, Au	Porphyry	G, P, GC
Davidson	Thompson Creek Metals Company Inc.	093L 110	Mo	Porphyry	Corporate
Deeker Lake	TTM Resources Inc.	104G 014	Mo, Cu	Porphyry	GC, G
Deer horn	Deer Horn Metals Inc.	093E 019	Te, Au, Ag, W, Mo	Vein/ Breccia	DD (3773 m, 55 holes), AB-MG, G, GC, TR (300 m)
Dilworth/ Big Missouri	Ascot Resources Ltd.	104B 092	Au, Ag	Epithermal	DD (36 318 m, 150 holes)
Dirk	Romios Gold Resources Inc.	104B 336	Cu, Au	Massive sulphide	DD (743 m, 4 holes), GP, AB-EM(743KM)

TABLE 3. CONTINUED

Property Name	Operator	MINFILE (or NTS)	Commodity	Deposit Type	Work Program
Dome Mountain	Metal Mountain Resources Inc.	093L 022	Au	Orogenic Vein	MD
Dunwell	Mountain Boy Minerals Ltd.	103P 052	Au, Ag	Vein	DD (30 holes)
Elsiar	Blackrock Resources Ltd.	103I 229	Cu, Mo, Au	Intrusion Vein	IP (10km)
Endako	Thompson Creek Metals Company Inc.	093K 006	Mo	Porphyry	DD (12 824 m)
Engineer	BCGold Corp.	104M 014	Au	Epithermal vein	DD (1500 m), BU(400), AB-EM, -MG (600 km), MS, GC
Fireside	Fireside Minerals Ltd.	094M 003	Barite	Vein	DD (500 m)
Fireweed	Shamrock Entreprises Inc.	093M 151	Ag, Zn, Pb	Manto, vein	DD (1500 m)
Galore Creek	NovaGold Resources Inc., Teck Resources Ltd.	104G 090	Cu, Au	Porphyry	MD
Gj, Kiniskan	NGEx Resources Inc., Teck Resources Ltd	104G 034	Cu, Au	Porphyry	DD (4307 m,10 holes), IP(145 km), G, P, MG(125 km)
Georgie River	Auramex Resources Corp.	103O 013	Au	Vein	GC
Golden Eagle	Troymet Exploration Corp.	104M 044	Au	Vein/ Breccia	DD (867 m, 6 holes), IP(10.5 km)
Granduc	Castle Resources Inc	104B 021	Cu	Massive sulphide	DD (31 000 m, 64 holes), EN, A
Haskins-Reed	Pacific Bay Minerals Ltd.	104P 021	Zn, Pb, Ag, Mo	Skarn	DD (1245 m, 9 holes)G, GC, TR(214 m)
High	Teuton Resources Corp.	104B	Au, Cu	Porphyry	DD (1225 m)
Horseshoe	Castle Resources Inc	104A 011	Au, Ag	Vein	DD (2000 m, 6 holes)
Homestake Ridge	Bravo Gold Corp.	103P 216	Au, Ag, Cu	Epithermal vein	DD (7364 m, 23 holes), GC, GP, IP(15 km), EN
Huckleberry	Huckleberry Mines Ltd.	093E 037	Cu, Mo	Porphyry	TITAN, NSAMT
Icy Lake, Fae, Slam	Paget Minerals Corp.	104K 032	Cu, Mo	Porphyry, Epithermal	DD (1479 m, 4 holes)
Jennings	Agnico-Eagles Mines Ltd.	104O 049	Mo, W	Skarn	GC
Kinskuch	Bravo Gold Corp.	103P 216	Au, Ag	Vein/ Breccia	DD (855 m, 4 holes), AB-GP (3 820 km)
Kitsault	Avanti Mining Inc.	103P 120	Mo	Porphyry	DD (13 350 m, 32 holes), CD(665, 12)

TABLE 3. CONTINUED

Property Name	Operator	MINFILE (or NTS)	Commodity	Deposit Type	Work Program
KSM	Seabridge Gold Inc.	104B 103	Au, Cu	Porphyry	DD (15 188, 44), GD(5530 m, 19 holes)
Kutcho Creek	Capstone Mining Corp.	104I 060	Cu, Zn, Au, Ag	Massive sulphide	DD (4 227 m, 19 holes)
Letain	First Point Minerals Corp.	104I 053	Ni	Magmatic	GC, G
Lone Pine	Bard Ventures Ltd.	093L 027	Mo	Porphyry	DD (2400 m)
MB silver	Mountain Boy Minerals Ltd.	104A 011	Ag, Au	Vein	DD (5000 m)
MC Dalhousie	Reliant Gold Corp.	104A 041	Au	Skarn	DD (710 m, 3 holes)
Morrison	Pacific Booker Minerals Inc.	093M 007	Cu, Au	Porphyry	Enviro
Mount Klappan	Fortune Minerals Ltd.	104H 022		Coal	Corporate
Newmont Lake	Romios Gold Resources Inc.	104B 281	Au, Ag	Skarn	DD (400 m)
Ootsa Lake	Gold Reach Resources Ltd.	093E 105	Cu, Au	Porphyry	DD (10 393 m), IP(44.5km), GP
Poly	Frontline Gold Corp.	104A 177	Au, Ag	Massive sulphide	DD (1170 m, 4 holes), GC, G
Poplar	Lions Gate Metals Inc.	093L 239	Cu, Mo	Porphyry	DD (16 481 m, 42 holes)
Porphyry Creek	Duncastle Gold Corp	093M 061	Cu, Mo	Porphyry	DD (2583 m, 6 holes)
Provencher Lake	Cassiar Jade Contracting	104I 092	Jade		Mining
Red Chris	Imperial Metals Corp.	104H 005	Cu, Au	Porphyry	DD (17 770 m) enviro
Red Chris South	Bolero Resources Corp.	104H 011	Cu, Au	Porphyry	DD (1100 m,3 holes), G, GC
Red Cliff	Decade Resources Ltd.	104A 033	Au	Vein/ Breccia	DD (? , 44), A
Roundy Creek	Avanti Mining Inc.	103P 113	Mo	Porphyry	DD (2803 m, 26 holes)
Schaft Creek	Copper Fox Metals Inc., Teck Resources Ltd	104G 015	Cu, Mo, Au	Porphyry	DD (3444 m)
Shan South	BCM Resources Corp.	103I 114	Mo	Porphyry	DD (3366 m, 13 holes)
SIB	Eskay Mining Corp	104B 376	Au, Ag, Zn, Cu	Massive sulphide	GP
Silver Coin	Jayden Resources Inc.	104B 150	Au, Ag, Pb, Zn	Epithermal vein	DD (17 500 m, 115 holes), MS, EN
Silver Queen	New Nadina Exploration Ltd.	093L 002	Cu, Mo, Au	Porphyry, Vein	DD (5000 m), AB- MG

TABLE 3. CONTINUED

Property Name	Operator	MINFILE (or NTS)	Commodity	Deposit Type	Work Program
Silver Hope	Finlay Minerals Ltd.	093L 256	Cu, Mo, Ag	Porphyry	DD (6090 m, 13 holes), IP(30 km)
Silverknife	Teryl Resources Corp.	104O 048	Ag, Pb, Zn, Au	SedEx	P, GP, G, DD(?)
Silvertip	Silvercorp Metals	104O 038	Ag, Pb, Zn, Au	SedEx	D (3500 m), MS
Snowfield	Pretium Resources Inc.	104B 179	Au, Cu, Mo, Re	Porphyry	MD
Sphinx	Pacific Bay Minerals Ltd.	104I	Au, REE		GC, P
Stewart	Frontline Gold Corp.	104A 177	Au, Cu	Porphyry	GC, G
Storie	Columbia Yukon Explorations Inc.	104P 069	Mo	Porphyry	PEA, EN, GC
Tanzilla	West Cirque Resources Inc.	104I 023	Cu	Porphyry?	G, GC, IP(16km)
Tennyson	Teuton Resources Corp.	104B 167	Cu, Au	Porphyry	DD (3123 m)
Terrace	TTM Resources Inc.	103I 165	Mo	Porphyry	DD
Trapper Gold	Ocean Park Ventures Corp.	104K 078	Au	Unknown	DD (8500 m, 42 holes), GC, G, AB-EM, IP
Trek	Romios Gold Resources Inc.	104G 022	Cu, Au	Porphyry	DD (7342 m, 14 holes, IP (2.4 km)
Troitsa	Callinex Mines Ltd.	93E 005	Au, Cu	Porphyry	DD (? , 8)
Tulsequah Chief	Chieftain Metals Inc.	104K 002	Cu, Zn	Massive sulphide	DD (31 181 m, 82 holes)
Turnagain	Hard Creek Nickel Corp.	104I 119	Ni, Co, Pt	Magmatic	Enviro, Met
Vines Lake	Lomiko Metals Inc.	104P 021	Ag, Pb, Zn, Au	Vein	DD(295 m,1 hole), GC
Wann River	Blind Creek Resources Ltd.	104M 026	Au	Vein	DD(3325 m, 17), GC, G ,P
Wedeeene	Decade Resources Ltd.	103I 169	Cu, Au	Vein, Porphyry	GC, IP
Yellow Chris	Teuton Resources Corp	104H 061	Cu, Au	Porphyry	GC
Yellow Giant	Banks Island Gold Ltd.	103G 021	Au	Vein	DD (563 m, 8 holes), MS, AB-EM (1000 km), PEA, EN
Yellow Jacket	Eagle Plain Resources Ltd.	104N 043	Au	Vein/ Breccia	Mapping
Zymo	Eastfield Resources Ltd, Bearing Resources Ltd.	093L 324	Cu, Au	Porphyry	DD (3454 m, 11 holes), IP (30 km), P, GC

Work Program Abbreviations:

A = access (trail, road construction on claims); AB-EM = airborne electromagnetics; AB-MG = airborne magnetics; AB-RD = airborne radiometrics; BU (X tonnes) = bulk sample (weight in tonnes if known); CD = condemnation drilling; CQ = coal quality testing; CT = carbonization test (coal); DD (Xm)= diamond drilling totalling X metres; EN = environmental baseline studies/monitoring, remediation work; FS = feasibility studies; G = geology, mapping etc.; GC = geochemical sampling (rock, soil, silt etc.); GD = geotech drilling; GP = geophysics (general); IP = Induced Polarization; 3D-IP; MG = magnetics; MK = marketing (primarily for industrial mineral products); MS = metallurgical studies; OB = overburden drilling; OP-BU = open-pit bulk sample; P = prospecting; PD = percussion drilling; PF = pre-feasibility studies; PP = Pilot Plant; R = reclamation; RC = reverse circulation drilling; TR = trenching; UG (Xm) = X metres of underground development; UG-BU= underground bulk sample; UT = UTEM; VLF; WT = washability te

geochemistry. Results are pending. The prospect includes the Ram showing (MINFILE 104H 011) and is underlain by felsic volcanic and volcanoclastic rocks of the Lower Jurassic Hazelton Group.

Western Cirque Resources (formerly Sila Industrial Group Ltd) discovered the **West Gossan Zone** while exploring the company's 100% owned **Tanzilla Property** during their 2011 mapping and sampling campaign (Figure 23). The West Gossan is comprised of epithermal quartz-carbonate stockwork veining with variable concentrations of chalcopyrite, sphalerite and galena. Peripheral chlorite-sericite and localized intense silicification can be traced for over 500 m along strike. Grab samples returned values up to 6.59 g/t Au and 3.6 % Zn. The Tanzilla prospect is a copper-gold porphyry target hosted in Stikine terrane Triassic arc assemblages. The area is defined by two alteration centers within a 7.5 km trend of advanced argillic and phyllic alteration. Elevated copper-in-soil and a newly reported 2.2 by 0.6-1.5 km zone of chargeability continue to make this prospect one of significant interest.

Exploration on the **GJ (Kinaskan)** property was led by Teck under option agreement with NGEx Resources Inc (Figure 24). Mineralization is related to the east-northeast trending Groat stock and is similar to the geologic setting at Red Chris deposit 25 km to the northeast. The Donnelly Zone (MINFILE 104G 086, 034) is the primary showing and hosts disseminated and vein-concordant chalcopyrite. The zone extends over 1600 m in strike-length and up to 300 m wide with highest grades found on the northern margin. Measured plus indicated resources reported in October 2008 total 153.3 Mt averaging 0.321% Cu and 0.369 g/t Au. Additional inferred resources total 23 Mt grading 0.26% Cu and 0.31 g/t Au. All resource estimates use a 0.20% copper cut-off. Ten drill holes totalling 4307 m in 2011 aimed to increase resource estimates through extensions and at depth. One high priority target included a zone of strong potassic alteration east of the resource area with limited drill testing. Significant drilling results included 141.2 m in hole GJK-11-219 averaging 0.38% Cu and 0.53 g/t Au from 506.08 m depth. Further geophysics totalling 125 km of ground magnetics and 145 km of induced polarization were distributed between extensions of the resource area and new targets across the outcrop-poor alpine plateau.

Paget Minerals Corp conducted a review of all historic work completed on the Ball Creek gold-copper-molybdenum-silver project (MINFILE 104G 018) prior to drilling 1060 m in 8 holes. The property consists of 5 gold-copper-molybdenum-silver porphyry targets and 4 gold-silver epithermal vein targets centrally located between Galore Creek, Schaft Creek and Red Chris mine development projects. Drilling objectives included Upper Rainbow epithermal target, the North Rainbow porphyry target and a deep test of the Ball Creek porphyry target. Drill results are pending. The area is underlain by welded tuff, agglomerate lithic tuff, flows and breccias of Upper



Figure 23. Prospecting discovered the West Gossan zone on the Tanzilla property during 2011.



Figure 24. GJ exploration camp. Photo acquired from Unuk River Flickr post.

Triassic age which have been intruded by an early Jurassic monzonite stock.

Paget drilled an additional four holes totalling 1479 m on its **Icy Lake**, **Fae** and **Slam** properties all located within 12 km of each other and approximately 125 km west of Dease Lake. The Icy Lake (MINFILE 104K 032) and Fae projects target copper-molybdenum porphyry-style mineralization hosted in Triassic-Jurassic diorite and monzonite intruding undivided Stikine arc volcanic rocks. The Slam property (MINFILE 104K 082) is a gold-silver prospect hosted in pervasively silicified and locally dolomitized and brecciated Permian limestone. Mineralization is similar to that found at the past producing Golden Bear Mine.

Romios Gold Resources Inc continued to explore the "Golden Triangle" immediately south of the Galore Creek mine development. Romios completed airborne, ground and down-hole geophysical surveys as well as 7342 m of drilling the Trek copper-gold porphyry prospect (MINFILE 104G 022) located 12 km southeast of Galore Creek. Targets were refined from geophysical anomalies

identified from last year's TITAN 24 survey and combined with early 2011 results. The Tangle and North zones were the focal points of activity. The North zone consists of chalcopyrite-bearing veins and fracture zones associated with northeast trending, pink monzonite dikes that are 0.2 to 10 m wide. New pyrite-chalcopyrite-tetrahedrite cemented breccias discovered at depth below the North Zone by drill hole TRK11-32 returned 22.1 m averaging 1.25% Cu, 22.43 g/t Ag and 0.05 g/t Au from 727.16 m depth. Additional follow-up drill results are pending.

Romios completed their first drill program on the **Dirk** copper-gold porphyry project located approximately 40 km west of Bob Quinn Lake. Both the '72 and Telena zones were targeted with four drill holes totalling 743 m. Highlight results include near-surface copper-gold-silver-bearing breccias and intrusive rocks. Drill hole DRK11-01 in the '72 zone returned 63.35 m averaging 0.29% Cu, 0.25 g/t Au and 2.93 g/t Ag from 14.65 m depth.

The **Newmont Lake** project (MINFILE 104B 281) is immediately east of the Dirk property and 30 km southwest of Galore Creek. Romios Gold Resources Inc acquired 100% interest in the project purchasing the outstanding 25% from Gulf International Minerals Ltd in 2011. An inferred resource of 1.406 Mt grading 4.43 g/t Au, 0.22% Cu and 6.4 g/t Ag is estimated to be contained in the Northwest Zone.

Teuton Resources Corp doubled their ground position around the **High** gold-silver property located 50 km north of Stewart and immediately south of Pretium Resources Brucejack project. Teuton continues to search for gold along extensions to the Brucejack fault with plans to drill 1225 m.

Teuton completed 3123 m of drilling in 14 holes on the **Tennyson** (MINFILE 104B 167) copper-gold porphyry project located 40 km north of Stewart. A highlight intercept from hole TN11-14 returned 106.6 m averaging 0.24 g/t Au and 0.42% Cu from 54.6 m. Some sites including TN11-14 collared in glacial ice.

Skyline Gold Corporation drill tested the Fuchsite zone and Johnny Creek showing located in the Snip-Bronson trend and part of the **Iskut River** project (MINFILE 104B 312). The property includes the **Bronson Slope** gold-copper porphyry deposit (MINFILE 104B 077) and is located southeast of the past-producing Snip gold mine. Three holes were completed totalling 1812 m aimed to increase understanding of structural controls and alteration assemblages associated with high-grade gold along the Snip-Bronson trend. Down-hole electromagnetic surveys were scheduled to be performed on all holes before demobilizing for the winter. Drilling results were expected late in 2011. The total measured plus indicated resources of the Bronson porphyry is 186.9 Mt averaging 0.122% Cu, 0.36 g/t Au, 2.19 g/t Ag and 5.3% Fe₂O₃.

Porphyry Copper-(Molybdenum-Gold) Projects in the Skeena Arch

Finlay Minerals Ltd completed two phases of drilling totalling 6180 m in 14 drill holes on its **Silver Hope** project. The property is located 36 km southeast of Houston and immediately south along strike of the past producing Equity Silver mine. Drilling was split between follow-up of a 2010 discovery of a copper-molybdenum-bearing quartz monzonite in the West Horizon and Equity-style gold-silver-copper mineralization in the Main Horizon. Six drill holes focused on defining the boundaries of the porphyry discovery in the West Horizon. Highlights include 101.4 m in hole SH11-05 grading 0.36% Cu and 0.015 % Mo from 51.5m. A separate high-grade intercept, also in SH11-05, returned 5.0 m averaging 1.16% Mo, 1.88 g/t Au and 65 g/t Ag from 296.0 m (Figure 25). Four drill holes targeting the centrally-located Superstition Zone (part of Main Horizon) intersected grades similar to those mined at the nearby Equity Silver Mine. Drill hole SH11-12 returned 76 m grading 0.43 g/t Au, 29 g/t Ag and 0.20% Cu from 204 m including 0.6 m averaging 3.2g/t Au and 747 g/t Ag from 265.4 m. Four holes in the East Horizon targeting a chargeability anomaly intercepted weak pyrite-pyrrhotite mineralization.

In December 2010, Duncastle Gold Corp announced the discovery of a copper-molybdenum porphyry system near the **Sultana** prospect (MINFILE 093M 061) on the southeast portion of the **Porphyry Creek** project located 20 km northwest of Smithers. A follow-up six hole program totalling 2583 m was completed in 2011. Highlights include 226 m averaging 0.09% Cu and 0.01% Mo including 31.0 m averaging 0.14% Cu and 0.02% Mo from hole PC11-06. The porphyry system is at the eastern margin of the Rocher Deboule granodiorite stock, a Cretaceous Bulkley pluton.

Zymo (MINFILE 093L 324) is a copper-gold porphyry prospect discovered in 2007 by Eastfield Resources Ltd and located 45 km west of Smithers. This year, Eastfield completed a 3454 m drill program in eleven holes: seven at the Hobbes zone, two at the FM zone and two at the untested URC zone. Assays are pending. Additional exploration included 30 km of induced polarization surveying, prospecting, soil and stream geochemical sampling. The Zymo prospect is located on the contact between Lower Cretaceous metasedimentary rocks of the Skeena Group and a Cretaceous granodiorite stock.

Silver Queen (MINFILE 093L 002) is located 43 km south of Houston and is known historically as a polymetallic vein system with past production of gold, silver, zinc, lead, copper and cadmium. New Nadina Explorations Ltd drilled 4490 m in thirteen holes in 2011 and discovered copper-molybdenum porphyry mineralization - a possible source to historic vein systems (Figure 26). Drill targets were generated from 3D inversions of geophysical surveys, including airborne



Figure 25. Molybdenum fracture-fill breccias intercepted in drill hole SH11-05; 5.0 m averaging 1.16% Mo, 1.88 g/t Au, 65.4 g/t Ag from 290 m.

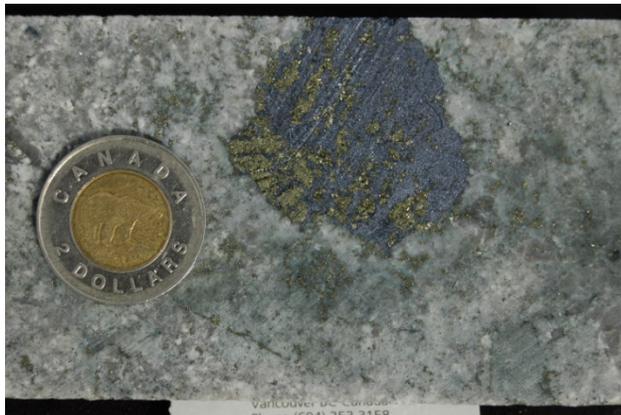


Figure 26. Drilling at Silver Queen intercepted porphyry style Cu-Mo mineralization in three holes including DDH 11S-13 pictured above. Photo courtesy of New Nadina Explorations.

aeromagnetic, ZTEM and follow-up Titan 24 ground surveys. Combined, these surveys identified a 2.5 km long trend extending from the known Silver Queen vein system. Stockwork and porphyry-style mineralization were encountered in holes 11S-01 and 11S-03. Best results include 79.6 m averaging 0.123 g/t au, 0.23% cu and 0.001 % Mo.

The **Poplar** property (MINFILE 093L 239) is located 45 km southwest of Houston and 35 km northeast of the producing Huckleberry Mine. Lions Gate Metals Inc completed 16 481 m of drilling in 42 holes targeting the copper-molybdenum porphyry system associated with the late Cretaceous Poplar intrusive stock. Highlight intercepts include hole 11-PC-88 returning 496.21 m averaging 0.35% Cu, 0.10 g/t Au and 0.015% Mo, including 298.21 m averaging 0.44% Cu, 0.13 g/t Au and 0.022% Mo. In September, the company reported an inferred resource of 245 Mt averaging 0.27% Cu and 0.007% Mo using a 0.15% cut-off. Phase two drilling results will be incorporated into an updated resource estimate which will include gold and silver resource estimates and is expected to be released early 2012. Preliminary metallurgical testing has been initiated.

Gold Reach Resources Ltd owns the **Ootsa Lake** copper-gold-molybdenum porphyry property (MINFILE 093E 105) south of the Huckleberry copper-molybdenum mine. Three target areas make up the Ootsa project: the Seel and Ox lake porphyry deposits and the Damascus silver vein. This year's drilling totalled 10 393 m in 20 holes focused on the Seel deposit. Results identified new mineralization and extended the deposit to 700 m vertical depth. Significant intercepts include hole S11-97 returning 419.5 m averaging 0.23% Cu, 0.15g/t Au, 0.025% Mo and 3.9 g/t Ag from 120 m. An updated resource estimate is forecast for release in early 2012. Additional field work included 44.5 km of line cutting and induced polarization geophysical surveys connecting previously completed grids covering the Ox and Seel deposits. Multiple new anomalies were identified with follow up programs planned for 2012.

The **Berg** property is a copper-molybdenum-silver porphyry deposit (MINFILE 093E 046) located approximately 84 km southwest of Houston and 22 km northwest of the Huckleberry mine. The property is owned by Berg Metals Limited, a wholly-owned subsidiary of Thompson Creek Metals Inc. Activity included 36 holes totalling 10 678 m aiming to increase resources and upgrade indicated to measured resources. Using a 0.3% Cu equivalent cut-off, measured plus indicated resources effective June 2009 totalled 557.8 Mt averaging 0.3% Cu, 0.037% Mo and 3.12 g/t Ag. Inferred resources total 159.4 Mt averaging 0.23% Cu, 0.033% Mo and 2.07 g/t Ag. The area is underlain by volcanic and sedimentary rocks of the Jurassic Hazelton Group intruded by an 800 m diameter circular quartz monzonite porphyry; the Berg stock. Pyrite, chalcopyrite and molybdenite mineralization occurs in a highly fractured zone of hornfelsed andesite, adjacent diorite and to a lesser degree the Berg Stock.

Porphyry Molybdenum Projects

"Molybdenum prospects cluster in Cretaceous to Tertiary plutons postdating terrane accretion to North America. There are two distinct areas of concentration, the Skeena Arch and the Atlin-Cassiar area. Skeena Arch molybdenum deposits are found in a number of intrusive suites: the early Tertiary Alice Arm and Nanika intrusions, late Cretaceous Bulkley intrusions and the Jurassic Francois Lake batholith. In the Atlin-Cassiar area, molybdenum occurs mainly in late Cretaceous batholiths, the Surprise Lake and Cassiar batholiths in particular and also in Tertiary rocks.

Molybdenum deposits can be divided into batholith-hosted and stock-hosted types based on host intrusion, deposit morphology and alteration. Those found in granite batholiths are developed in passive environments and consist of widely spaced molybdenite vein networks containing little quartz. Deposits are laterally extensive, forming tabular shaped bodies. Examples include the

Endako mine and the Ruby Creek and Storie deposits. Stock-hosted molybdenum deposits are associated with small, intermediate to silicic intrusions formed in a high energy, commonly explosive environment. An intense quartz stockwork is developed above the intrusion or as a vertical annular zone around it. Multiple stages of mineralization are common and can lead to higher grade and stacked mineral zones. These include the Davidson, Lucky ship, Lone Pine, Mount Haskins and the Alice Arm deposits including Kitsault.” (revised from Wojdak, 2010).

Molybdenum in the Atlin – Cassiar District

Columbia Yukon Explorations Inc acquired adjacent mineral claims in March as an alternate tailings and mill site for proposed development of the company’s **Storie** molybdenum project (MINFILE 104P 069) located near Cassiar. A preliminary economic assessment is expected in late 2011 with feasibility study work commencing in 2012. Molybdenite mineralization occurs as fracture coatings and vein-concordant disseminations concentrated in a sub-horizontal tabular zone between texturally distinct phases of the Troutline stock, part of the late Cretaceous Cassiar batholith.

Molybdenum in the Skeena Arch

Bard Ventures Ltd completed 2400 m of drilling this summer on its **Lone Pine** molybdenum copper porphyry property (MINFILE 093L 027, 028) located 15 km north-northwest of Houston. Drilling focused on three zones: Alaskite, Quartz Breccia and 61. A preliminary economic assessment released in January for the Alaskite zone reports positive economics. An updated resource estimate released in October reports measured plus indicated resources totalling 146.4 Mt averaging 0.069% Mo and 0.034% Cu. Additional inferred resources total 16.7 Mt averaging 0.081% Mo and 0.034% Cu using a 0.04% Mo cut-off. Forecast mine life is 12 years with a pre-production capital expenditure estimated at \$435 million. Exploration drilling highlights include 573.4 m from hole BD-11-67 averaging 0.10% Mo in the Alaskite zone. Mineralization at Lone Pine is developed in the quartz porphyry marginal phase of a granite stock. The Alaskite zone consists of coarse-grained granite with aplitic vein-hosted disseminated molybdenite. The Quartz Breccia zone consists of highly fragmented hornfelsed rocks interwoven by molybdenum-bearing quartz veins. Bard Ventures earned 100% interest on the adjoining **Grouse Mountain** polymetallic property (MINFILE 093L 026, 251), now included as part of the Lone Pine project.

The **Shan South** property (MINFILE 103I 114), owned by BCM Resources Corp, is located near Terrace. A 3366 m drill program was completed to further define the Las Margaritas deposit and explore for fault offset extensions of mineralization. Las Margaritas infill hole

LM-054 intersected 189 m grading 0.064% Mo from 18 m. Holes LM-048 and LM-049 collared directly east of Las Margaritas targeted the intrusive contact area. No significant mineralization was encountered despite hitting the targeted lithologic contact.

Nickel in ultramafic rocks

Turnagain (MINFILE 104I 014) is a bulk tonnage nickel prospect in a zoned 3 by 8 km Alaskan-type ultramafic complex located 70 km east of Dease Lake. Owner Hard Creek Nickel Corporation released an updated preliminary economic assessment in December 2011 reporting decreased initial capital expenditure from \$2.9 to \$1.319 billion dollars. Capital reduction came as a result of improved metallurgical recovery methods and the ability to produce a saleable nickel concentrate without constructing a costly hydrometallurgical facility. Measured plus indicated resources total 556 Mt averaging 0.228% Ni and 0.014% Co. Inferred resources total 201 Mt averaging 0.235% Ni and 0.013% Co. Current resource estimates do not incorporate platinum or palladium values, although these elements occur on the property in significant amounts. Metallurgical tests on material gathered from the less explored Cliff zone produced concentrate grades up to 19.8 % Ni, 20.1 g/t Pt, and 22.4 g/t Pd from theoretical head grades of 0.35% Ni, 0.281 g/t Pt, and 0.332 g/t Pd. Further PGE related exploration is planned for 2012 (Figure 27).

First Point Minerals Corp owns four properties including **Letain** in the Skeena region, all located approximately 85 km east of Dease Lake. Their target is nickel-iron alloy (awaruite) mineralization in the Cache Creek terrane. Reconnaissance and detailed geological mapping and rock sampling were completed on all four properties following the 2009 discovery of awaruite on the Letain property. Assay results are pending.

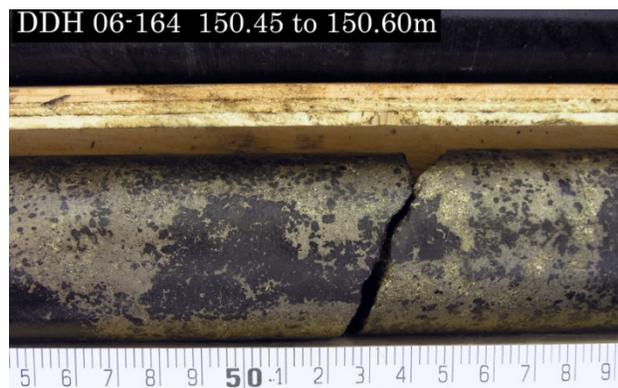


Figure 27. Magmatic pyrrhotite with interstitial pentlandite and PGE's in serpentinized wehrlite.

Massive Sulphide Projects

“Massive sulphide deposits in the Northwest region comprise of volcanogenic deposits, skarns, mantos, and some of undefined deposit type. Volcanogenic deposits occur in strata of varying ages and terrane affiliation. The Tulsequah Chief deposit is in Paleozoic strata; Kutcho Creek is in rocks of early Triassic age and important deposits in the Stewart district are in Jurassic volcanic rocks. The latter include Eskay Creek, Granduc and Anyox. Manto and Skarn deposits occur where Paleozoic limestone of the ancient continental margin are intruded by Cretaceous to Tertiary plutons.” (revised from Wodjak, 2010)

Atlin - Cassiar District

The Silvertip high-grade silver manto prospect is owned by Silvercorp Metals Inc and is located approximately 85 km west of Watson Lake and 25 km south of the Alaska Highway. The Silvertip property reportedly contains three types of mineralization: contact, reef and exhalite. The most important type occurs at the contact between McDame Group limestone and overlying Earn Group black siltstone as sphalerite-galenapyrrhotite-pyrite massive sulphide bodies. Reef-style mineralization occurs in limestone. The exhalite-type mineralization occurs as chert-sulphide-barite beds in the Earn succession. After analyzing 10 913 m drilled in 36 holes completed in 2010, an updated resource estimate at a 200 g/t Ag equivalent cut-off calculates indicated resource totalling 4.2 Mt averaging 261 g/t Ag, 4.87% Pb, 8.5% Zn and 0.38 g/t Au. Additional inferred resources total 0.91 Mt averaging 278 g/t Ag, 4.80% Pb, 9.6% Zn and 0.23 g/t Au. A 5000 m drill program conducted in 2011 tested exhalite grades and satellite geophysical anomalies around the known deposit. Step-out exploration in the DM zone, 8 km to the south, targeted the same lithological contact hosting the Silvertip deposit. Drill results are pending. A February 2011 preliminary assessment proposes a 500 t/d seasonal operation with an estimated start-up capital of \$50 million.

Stewart - Iskut District

Copper Creek Gold Corp explored the Bonsai prospect (MINFILE 104B 383) located 6 km southwest of the past producing Eskay Creek gold mine. Stratabound massive to framboidal pyrite at Bonsai is associated with Salmon River Formation rhyolite and mudstone; a similar stratigraphic position to gold-bearing zones at Eskay Creek. In March, Copper Creek together with Teuton Resources Ltd expanded mineral claims to the north. New claims cover known gossans and areas along strike from other known mineralization at Bonsai. A four hole program totalling 944 m completed in 2011 targeted

down-slope extensions of hole BZ03-08: a hole that was completed in 2003 and returned 64 m averaging 0.38 g/t Au, 27g/t Ag from 90 m. Results are pending.

Eskay Mining Corp earned 70% interest in the **SIB** property (MINFILE 104B 376) and has announced intentions to increase holdings to 80%. Joint venture partner St. Andrew Goldfields optioned SIB to Eskay in 2008. Eskay conducted a deep geophysical survey targeting inferred fault-displaced continuation of Eskay Creek-type stratiform gold-silver massive sulphides. SIB is located south of the past producing Eskay Creek gold mine.

Castle Resources Inc deployed five drill rigs to the past producing **Granduc** mine area (MINFILE 104B 021) for a 31 000 m program. A new resource estimate for the deposit released in February 2011 is based on historical data and 8300 m drilling completed in 2010. Using a 0.8% copper cut-off grade, indicated resources total 3.75 Mt averaging 1.59% Cu from the Main Zone. Additional inferred resources total 15.8 Mt averaging 1.36% Cu from the Main and North Zones. The 2011 surface drill program successfully identified mineralization 900 m down dip and 600 m to the south of the previously mined Main Ore zone. Drilling highlights from the sparsely explored and un-mined South zone include hole GD11-16 that cut 8 m averaging 3.17% Cu, 0.37 g/t Au, 7.50 g/t Ag and 11.98% Fe from 682 m. This year's drilling results will be compiled and applied to an updated resource estimate expected by the end of 2011. Refurbishing of the 17 km long Tide tunnel is nearing completion. The famous “11 mile tunnel” connects the Granduc mine to the mill site and to the 51 km all season road linking the deep sea terminal of Stewart. Underground drilling is scheduled for 2012. A preliminary economic assessment is scheduled to commence early 2012. Baseline environmental surveys have been initiated. Granduc is a volcanogenic massive sulphide with tabular ore zones deformed by at least three phases of folding. Massive sulphide assemblages consist of pyrite, pyrrhotite and chalcopyrite and occur near the contact between mafic pillow basalts and tuffs with overlying chert and argillite.

Pacific North West Capital Corp published a new resource estimate for the Black Dog deposit within its Rock and Roll (MINFILE 104B 377) property located approximately 9 km west of the Bronson airstrip and 37 km from Eskay Creek mine road. Updated indicated resources total 2.16 Mt averaging 0.68 g/t Au and 82.7 g/t Ag using a 0.5 g/t Au equivalent cut - off grade including 0.22% Cu, 0.22% Pb, and 0.94% Zn. Mineralization occurs in multiple stacked sulphide lenses in two zones: Black Dog and SRV. Triassic mudstone and andesite stratigraphy is similar to past-producing Eskay creek gold mine.

Terrace – Smithers District

The **Chist Creek** (MINFILE 103I 185) overlies a large volcanic alteration zone found by the British Columbia Geological Survey in 2007 and is located 15 km east of Lakelse Lake. Paget Minerals Corp discovered additional semi massive-sulphide lenses and stringers with associated quartz-sericite-pyrite alteration at the mafic-felsic contact of Paleozoic volcanics. Follow-up drilling totalling 750 m in four holes was completed in 2011. Results are not currently available.

Decade Resources Ltd pursued exploration on the **Wedene** property (MINFILE 103I 169) located northwest of Kitimat. Copper-gold mineralization encountered in 2010 drilling and geochemical surveys were followed-up with down hole and ground induced polarization surveys and MMI geochemical surveys. Results from 2010 drilling include 109 m averaging 0.48% Cu and 1.0 g/t Au in hole 2010-J-1.

The **Fireweed** (MINFILE 093M 151) property is located near Babine Lake and being worked by Shamrock Enterprises Ltd under an option agreement with Pachamama Resources Ltd. The second year of drilling commenced in December and planned for 1500 m. Targets included follow-up of 2010 highlight results and exploring the West Zone. Hole FW10-1 was drilled in 2010 in the Feeder zone and returned 28.79 m averaging 64.69 g/t Ag and 1.05 g/t Au. Results are pending. Fireweed hosts stratabound, massive and disseminated sulphide mineralization within Skeena Group sedimentary rocks. Mineralization occurs preferentially in grey sandstone interbeds within a thick sequence of black siltstone and shale.

Gold-Silver Projects

“Gold-Silver projects in the region targeted mainly orogenic and intrusion-related veins. In some cases veins have associated base metal values. Gold-silver projects occur in various geologic terranes and are currently concentrated in four areas: the ‘Golden Triangle’ (Stewart district) where most are related to Jurassic intrusions of Stikine terrane; the Atlin area where they are related to orogenic emplacement of Cache Creek terrane, and to the terrane-bounding Llewellyn fault; the Cassiar area where gold veins are related to orogenic emplacement of Slide Mountain terrane; and, the Skeena Arch where gold veins are mainly related to Cretaceous-Tertiary intrusions and secondarily to Cretaceous orogenic events.” (revised from Wojdak, 2010)

Epithermal and orogenic veins in the Atlin District

The historic **Engineer** gold mine (MINFILE 104M 014) located 32 km west of Atlin and explored by BCGold Corporation. Epithermal veins near the Llewellyn fault produced 559 863 grams (18,000 oz) of

gold in the 1920’s with average ore grading 39 g/t Au. An inferred mine resource released in April 2011 totals 14 000 tonnes averaging 52.5 g/t Au at a 25 g/t cut-off. Six bulk samples totalling 300 tonnes were mined and milled from the Engineer and Decker veins. Fine-grained gold was visible in the bulk sample and metallurgical testing is ongoing. Gold mineralization occurs primarily as electrum in association with roscoelite in discrete, vertical high-grade ore shoots. Secondary lower grade gold mineralization occurs in shear structures and hydrothermal breccias. More than 600 m were trenched on the Boulder, Shaft, Double Decker and Shear “B” zones, all of which were previously worked in the 1920s. Infrastructure upgrades include refurbishment of the 30 t/d gravity mill circuit, shaft area refurbishment and dewatering. Underground exploration drilling is planned for 2012. Prospecting and geological mapping were conducted with the assistance of a 600 km SkyTEM airborne geophysical survey. BCGold consolidated its land position around Engineer in 2010 by entering into an Option Agreement to acquire 100% interest in five mineral claims adjacent and partially surrounding the Engineer property

Blind Creek Resources Ltd drilled 17 holes totalling 3325 m at their **Wann River** polymetallic vein project (MINFILE 104M 026) located approximately 15 west of Atlin. Drilling followed up 2010 rock chip and mine dump grab samples that returned up to 263 g/t Au, 1350 g/t Ag, 2.75% Cu, 4.45% Pb and 1.36% Zn. Drilling highlights include hole WR-04-01-11 returning 1.0 m averaging 11.3 g/t Au and 94.8 g/t Ag. An 800 by 180 m area interpreted to be the hanging wall of the Llewellyn fault zone hosts the strongest mineralization and is analogous to the ore zone at the Engineer Mine.

Exploration on the Trapper Gold project was funded by Ocean Parks Ventures Corp as part of a joint venture with Constantine Metal Resources Ltd. The project area is located 45 km north of the Golden Bear mine road and 140 km south of Atlin. A 2 km gold-arsenic soil anomaly identified by previous workers and expanded in 2011, is coincident with pervasive alteration was drill tested with 42 holes totalling 8 500 m. A visible gold-bearing intercept reported in hole TG-11-011 returned 22.86 m grading 2.51 g/t Au including 0.41 m grading 92.8 g/t Au hosted in porphyritic diorite. Additional field programs completed in 2011 included geological mapping, geochemical sampling, and induced polarization and airborne electromagnetic surveys.

Epithermal and Intrusion-related Veins in the Stewart District

Ascot Resources Ltd drilled 36 318 m on the **Big Missouri** and **Dilworth** properties located approximately 25 km north of Stewart. The 150 hole program tested bulk tonnage and high-grade underground gold-silver vein targets. The Big Missouri zone (MINFILE 104B 092)

was drilled on 50 m centres in support of calculating an initial resource. Highlights include 0.81 m in hole PR-11-159 grading 841 g/t Au and 297 g/t Ag. Drilling was also completed in the Province (MINFILE 104B 147) and Unicorn (MINFILE 104B 044) areas following up lower grade gold intercepts. Early drill results from Unicorn returned 62.61 m from hole PR-11-158 grading 3.74 g/t Au and 4.4 g/t Ag. Several drill holes intersected visible gold and electrum.

Jayden Resources Inc (formerly Pinnacle Mines) completed 115 holes totalling 17 500 m on the **Silver Coin** property (also known as Silver Butte, MINFILE 104B 150), located 24 km northwest of Stewart and 5 km north of the former Premier mine. Best intercepts graded 2.86 g/t Au and 23.06 g/t Ag over 44.9 m in hole SC11-415. The Main Breccia zone hosts the strongest gold-silver mineralization and has been traced for over 2 km along strike with varying widths from 20 to 100 m. Vertical definition extends to 700 m. An updated resource estimate released in April 2011 reports a measured resource totalling 4.37 Mt grading 1.55 g/t Au, 6.53 g/t Ag and 0.26% Zn. Indicated resources total 19.76 Mt grading 0.98 g/t Au, 6.41 g/t Ag and 0.18% Zn. Additional inferred resources total 32.44 Mt averaging 0.78 g/t Au, 6.41 g/t Ag and 0.18 % Zn. A composite bulk sample was collected to test and refine metallurgical processes to optimize recoveries. A pre-feasibility study is anticipated for release early in 2012. Gold-silver-zinc-bearing epithermal veins and breccias are hosted in Hazleton volcanics and structurally controlled by faults.

Castle Resources Inc has an option to earn 100% interest over three years on the **Horseshoe** gold-silver property located 14 km southeast of Stewart. A 2000 m drill program tested High Grade (MINFILE 104A 011), Fraser and North Fork occurrences.

The **MB** property is owned by Mountain Boy Minerals Ltd and located about 22 km north of Stewart. The company planned to explore sections of both the High Grade and Mann veins occurring on their property with approximately 5000 m of drilling.

Mountain Boy Minerals Ltd acquired additional mineral claims surrounding its **Dunwell** property located 8 km north of Stewart. These claims cover the inferred structural extension of the past producing Dunwell silver-gold mine (MINFILE 103P 052). A 30 hole program tested potential depth and strike extension of previously mined high-grade veins. Mineralized zones ranging from 3-9 m wide were reported between 170 and 260 m below the original gold mine's lowest No. 4 level. Black pyritic shale hosts steeply west dipping, pyrite-galena-sphalerite-tetrahedrite veins with and local native silver and argentite.

Teuton Resources Corp conducted another bulk sampling program this year on the **Clone** property (MINFILE 103P 251), located 16 km west of Stewart. The sampling focused on the higher grade portion of the H-1 zone. Samples from each 1-tonne lot were analysed

and returned an average grade of 137.1 g/t Au for the total 102 tonnes. Ore will be shipped for processing upon completion of metallurgical testing.

The **Homestake Ridge** property (MINFILE 103P 216) is owned by Bravo Gold Corp and located 35 km southeast of Stewart. An updated resource estimate reported in May 2011 calculated an indicated resource totalling 888 Kt grading 6.69 g/t Au and 47.2 g/t Ag. Additional inferred resources total 4.06 Mt averaging 4.3 g/t Au and 158 g/t Ag. Cut-off grade is 3 g/t gold equivalent. Drilling totalled 7364 m in 23 holes targeting hanging-wall structures to the Homestake Silver zone and the connecting area to the Main Homestake zone. Drilling highlights include 14.2 m averaging 338 g/t Ag and 1.2g/t Au from hole 11HR-228. Other field programs included an induced polarization geophysical survey, channel sampling and geochemical soil sampling. Mineralization consists of quartz-calcite veins and breccias with associated sphalerite, galena, pyrite and chalcopyrite.

Frontline Gold Corp drilled 1170 m on the **Poly** project (MINFILE 104A 177), located just north of Stewart. Frontline acquired the adjacent Lord Nelson Tenures, thereby increasing their mineral holdings to the southeast. A VTEM geophysical survey identified several anomalies some of which are coincident with historical gold and base metal intercepts; these defined 2011 drill targets. Results are pending. Other exploration ground work included rock, stream sediment and MMI soil sampling. The area is underlain by Jurassic Hazleton Group volcanic rocks intruded by a small stock of Eocene quartz monzonite. Mineralization is hosted in brecciated epithermal to mesothermal quartz-sulphide veins.

Intrusion-related Gold in the Skeena Arch

Deer Horn Metals Inc (formerly Golden Odyssey Mining Inc) carried out a 55 hole 3773 m drilling program on its Deer Horn property (MINFILE 093E 019) located 36 km south of the Huckleberry mine. Vein-hosted tellurium-gold-silver mineralization is focused in two structures. Most of this year's drill holes were referenced around the historic Deer Horn adit with the intention of establishing a tellurium resource. Existing indicated plus inferred resource released in 2010, totals 31 000 tonnes averaging 5.905 g/t Au and 184.35 g/t Ag. Cutoff grade is 1 g/t Au. Forty-nine holes targeted the first 70 m of the near-surface gold-silver-tellurium zone. Drill hole DH-117 intercepted 8.69 g/t Au, 316.8 g/t Ag and >225 ppm Te over 12.80 m. An historical tungsten showing identified as scheelite in talus was followed up with six holes. Other field programs included bedrock mapping and sampling, 2000 m of trenching, high resolution aeromagnetic and radiometric surveys.

Callinex completed an 11 hole drill program totalling 4579 m on the Coles Creek property (MINFILE 093E 041) located 100 km south of Houston. Highlights

include 97 m grading 0.068 g/t Au, 36.9 g/t Ag, 0.580% Zn and 0.368% Pb in drill hole COLE 48. Mineralization is hosted in three zones; porphyritic granodiorite, fragmental volcanoclastics and the contact zone between them.

Jet Gold Corp completed 11 drill holes totalling 830 m on its Big Hammer gold-silver-tellurium property located approximately 13 km southeast of Terrace. Polymetallic quartz veins discovered in 2007 by provincial survey geologists prompted follow-up rock chip sampling and trenching. Average values from eight combined rock chip and channel samples with an average width of 1.35 m returned 6.03 g/t Au, 110 g/t Ag and 196.5 g/t Te. This year, seven drill holes spaced at 20 m tested the 380 Vein. Highlight results include 0.4 m averaging 13.3 g/t Au, 112 g/t Ag and 69 g/t Te. Quartz-sulphide-telluride veining intercepted in seven holes increased trend confidence and understanding of vein orientation. Additional drilling is planned for 2012.

Argonaut Exploration Inc initiated work on the Columario mine property (MINFILE 103I 077) located approximately 15 km east of Terrace. Drilling totalled 2601 m in 21 holes targeting vein-hosted polymetallic mineralization over a 1300 by 500 m area. The past producing mine area has never been systematically explored by drilling. Highlight drill results include 2.05 m averaging 8.55 g/t Au and 27.1 g/t Ag from 39.5 m including 0.2 m averaging 85.2 g/t Au and 272.0 g/t Ag from hole COL11-14. An extensive rock chip sampling program returned several results greater than 20 g/t Au and up to 72.4 g/t Au across a 0.3 m vein. Additional field programs included geologic mapping, mine road and underground refurbishment and environmental baseline studies. Argonaut plans to conduct underground exploration in 2012.

Yellow Giant gold project (MINFILE 103G 021) owned by Banks Island Gold Ltd, is located on the west coast of Banks Island, approximately 120 km south of Prince Rupert. An updated inferred resource reported in September sums three deposits (Tel, Bob and Discovery) totalling 115 Kt averaging 22.2 g/t Au and 73.3 g/t Ag, without applied cut-off. Drilling totalled 563 m in eight holes at the Tel Zone in 2011. Highlight intersection from hole BIG-11-07 averaged 18.8 g/t Au, 47.0 g/t Ag, 0.5% Pb and 1.3% Zn over 2.2 m representing an estimated 1.7 m true width. A preliminary economic assessment published in November plans for the sequential mining of the three separate mineral zones with a 200 t/d mining facility totalling 75 000 t/y. Forecast mine life is 25 months for all three deposits. Environmental baseline studies are ongoing in preparation for mine permitting in 2012. Yellow Giant mineralization occurs in steeply dipping, quartz-carbonate massive sulphide veins 0.5 m to 5.0 m wide associated with the Arseno and Hepler faults on immediately west of the Coast Plutonic Complex.

ACKNOWLEDGMENTS

This report is highly dependent on the hospitality and openness of mine staff, exploration geologists and prospectors who work in northwest B.C. A conscientious effort is made throughout the text to acknowledge their many contributions. The author is very appreciative to them and others whose names do not appear. Valuable assistance was also provided by Paul Wojdak, Doug Flynn, Jill Pardoe and Jessy Chaplin and the rest of the Regional Geologists and the entire Smithers office. Assistance was also supplied by Blue Metal Resources who researched the numerous exploration projects. The paper benefited from reviews and edits by John DeGrace, Bruce Madu and GIS support from Robin Chu. Errors or omissions remain the responsibility of the writer.

EXPLORATION AND MINING IN NORTHEAST REGION, BRITISH COLUMBIA

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SUMMARY AND TRENDS

In the Northeast Region, 2011 was a year dominated by takeovers and acquisitions in the coal sector (Figure 1). Anglo Coal plc acquired the balance of interests in the Peace River Coal Limited Partnership to become sole owner. Walter Energy Inc purchased Western Coal Corp, now a wholly-owned subsidiary company, and with it Western's three mines – Perry Creek, Brule and Willow Creek – and all exploration interests. Xstrata Coal acquired First Coal Corp and also 100% of Cline Mining Corp's Lossan deposit. Cardero Resource Corp bought Coalhunter Mining Corp (which now operates as a subsidiary of Cardero), and with it acquired Coalhunter's Carbon Creek deposit.

Mining operations continued at the four operations in the Northeast Region, namely the Trend, Perry Creek, Brule and Willow Creek mines, with a projected total 2011 production of about 5.6 Mt of clean metallurgical and PCI coal, compared to 4.8 Mt in 2010 (see Table 1).

Peace River Coal was stalled in advancing the **Roman Mountain** project adjacent to its Trend Mine because of environmental concerns relating to the mountain caribou population, but continued to work toward expanding the mine along strike. Work also paused on Western and Peace River Coal's **Belcourt Saxon** Coal Limited Partnership project.

The Northeast Region saw an approximate doubling of exploration expenditures over 2009 and 2010 levels to about \$44.3 million (\$39.5 million excluding on-lease exploration). Exploration drilling, at about 66 000 m, was also up substantially. This increase in activity levels occurred in spite of significant environmental and cultural constraints on activities.

Figure 2 offers a year-over-year comparison of exploration expenditures, and Figure 3 sets out the approximate allocation of 2011 expenditures among advanced phase, mine evaluation and on-lease exploration in the region. Figure 4 compares annual drilling statistics. Note that Figures 2 and 4 offer only roughly approximate data for 2010. Figure 5 shows the locations of mines and major exploration projects in the Region, while Table 2 lists details of the major exploration programs in 2011.

COAL MINES AND PLANNED PRODUCERS

In 2011 there were four producing coal mines in the Northeast Region, with more properties in various stages of planning for development. Summary statistics for the producers, and forecast production, are summarized in Table 1.

Coal measures in Northeastern British Columbia are contained within the Gething and the younger Gates formations, both Early Cretaceous in age. All of the currently-producing mines are located in tightly-folded, fault-constrained blocks near the eastern margin of the Cordilleran orogen. All of the mines access bituminous coal, of metallurgical and Pulverized Coal Injection (PCI) quality, by open pit methods from steeply-dipping seams. Projects under consideration for development further to the east commonly are in flat-lying strata, and would be accessed by underground mining methods. Generally, in these mines, coal is won from multiple seams; and in some cases from both formations.

Peace River Coal (PRC) continued production from its **Trend Mine**, located about 25 km south of Tumbler Ridge. Mostly metallurgical coal is being extracted from both the Gates and Gething Formations, tightly-folded at the mine site, and the cumulative coal thickness of the several seams is about 15 m (Figure 6). Production for 2011, mostly from the Gething Formation, is estimated to be about 1.4 Mt – up slightly from 2010 but still well short of intended production, which had been based on bringing the adjacent **Roman Mountain** deposit into production. Environmental concerns have delayed the development of Roman Mountain, on which exploration continues. Once in production, Roman Mountain would have about a 15-year life expectancy, producing between 2 and 3 Mt of clean coal per year. Meanwhile PRC is continuing to develop the Trend Mine along strike to the southwest (Figure 7).

PRC has also been evaluating the **Horizon** project, about 10 km to the west of the Trend Mine. The objective is to produce about 2 Mt per year, mostly underground, over a life span of about 15 years.

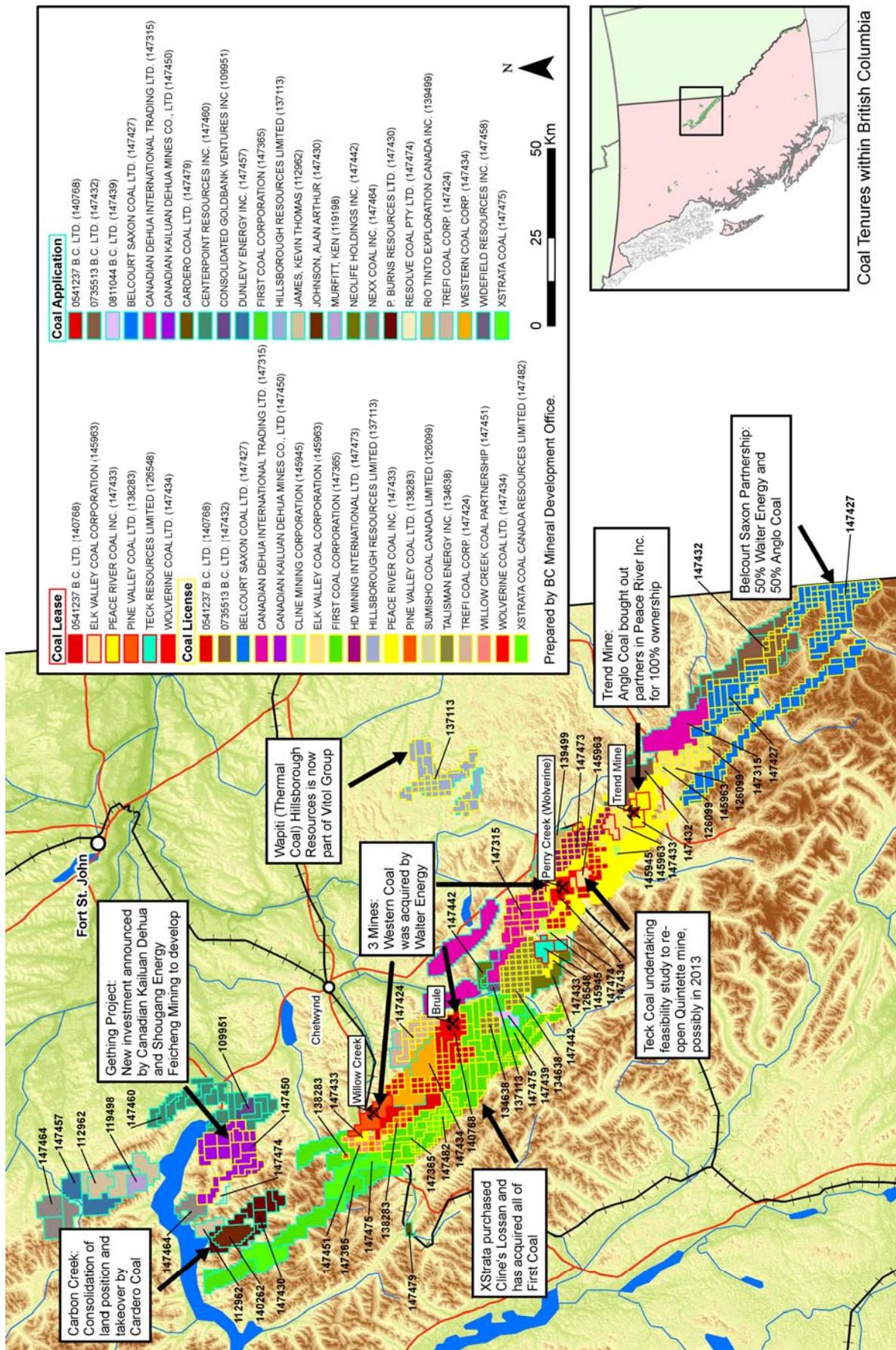


Figure 1. Northeast Region 2011 coal titles, current to 2 November 2011, indicating areas of corporate activity (source: Mineral Titles, Ministry of Energy & Mines).

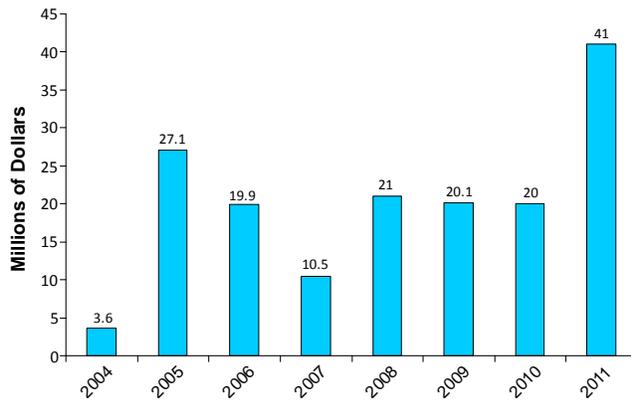


Figure 2. Annual exploration spending estimates in millions of dollars, Northeast Region (amount for 2010 is a rough estimate).

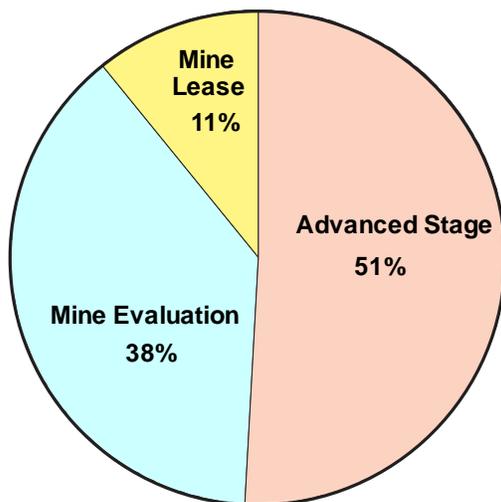


Figure 3. 2011 exploration expenditures by exploration stage (Advanced Stage: resource delineation; Mine Evaluation: focus on environmental and engineering studies, community consultation, and government approvals including EA certification; Mine Lease: on-lease infill and mine development exploration).

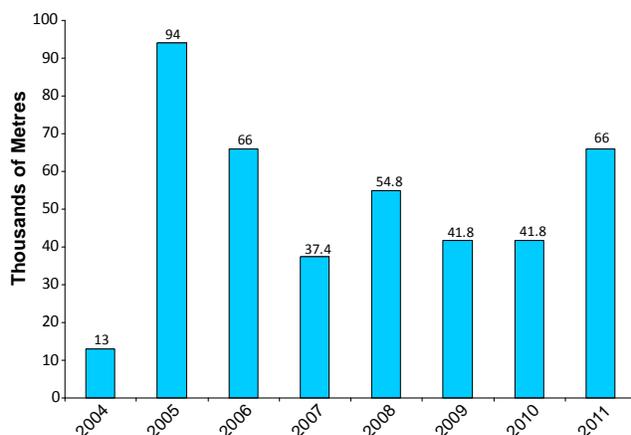


Figure 4. Annual exploration drilling estimates in thousands of metres, Northeast Region (amount for 2010 is rough estimate).

At present the measured resource at the Trend Mine stands at 38.84 Mt, with an additional indicated resource of 8.0 Mt. PRC ships clean coal by rail through Ridley Terminals Inc at Prince Rupert, from a loadout facility that it completed in 2007 a few kilometres to the north of the mine.

The other three open-pit producing mines in the region mines are owned by Western Coal (WC), now a subsidiary of Walter Energy Inc. The largest of these is the **Perry Creek Mine**, part of Western's "**Wolverine Project**" located about 30 km NW of Tumbler Ridge. In 2011, about 1.8 Mt of hard coking coal were produced from four seams, with a cumulative thickness of about 15 m, in the Gates Formation. The coal preparation plant at Perry Creek has a capacity of 3.0 Mt per year, which is expandable to 3.5 Mt. The rail facility can load a 12 500 tonne unit train in about 4.5 hours.

Other components of the Wolverine Project in the vicinity of the Perry Creek Mine include the **EB** and **Hermann** deposits. Both projects have approved Environmental Assessment certificates and are awaiting approvals for production; and production from EB could begin as early as 2013. EB and Hermann have a combined measured resource of 40 Mt.

Western Coal's **Brule Mine** is located about 45 km south-southwest of Chetwynd, and produces "ultra-low volatile" pulverized coal injection (ULV-PCI) coal for the steel industry (Figure 8). Production is from three seams in the Gething formation, with a combined thickness of about 12.2 m. Production in 2011 totalled about 1.3 Mt, up slightly from 2010. Raw coal is trucked to the processing facility at the Willow Creek Mine east of Chetwynd along the recently-completed 60 km Falling Creek haul road, thus avoiding highway travel and cutting hauling distance by about 40 per cent. Only about one-third of the raw coal delivered to Willow Creek actually requires washing, and the rest is loaded directly onto rail cars at Willow Creek for shipment to customers *via* Ridley Terminals.

Finally the **Willow Creek mine**, located about 45 km west of Chetwynd, continued production in 2011 after re-opening in June of 2010. The mine has seen intermittent production since 2004. Western Coal, the current owner, took over the operation in 2008 and began stripping operations that year; but suspended activities later in 2008 without production. Production resumed in 2010, with production from coal seams within the Gething Formation. Deformation is more complex at Willow Creek than at other operations in the Northeast Region, limiting the potential rate of extraction. Production in 2011 was anticipated to be 0.9 Mt of combined PCI and hard coking coal.

The overall processing capacity (coal washing, drying and loadout) at the Willow Creek facility is 0.9 Mt, but Western Coal has applied to increase the capacity to 3.7 Mt per year.

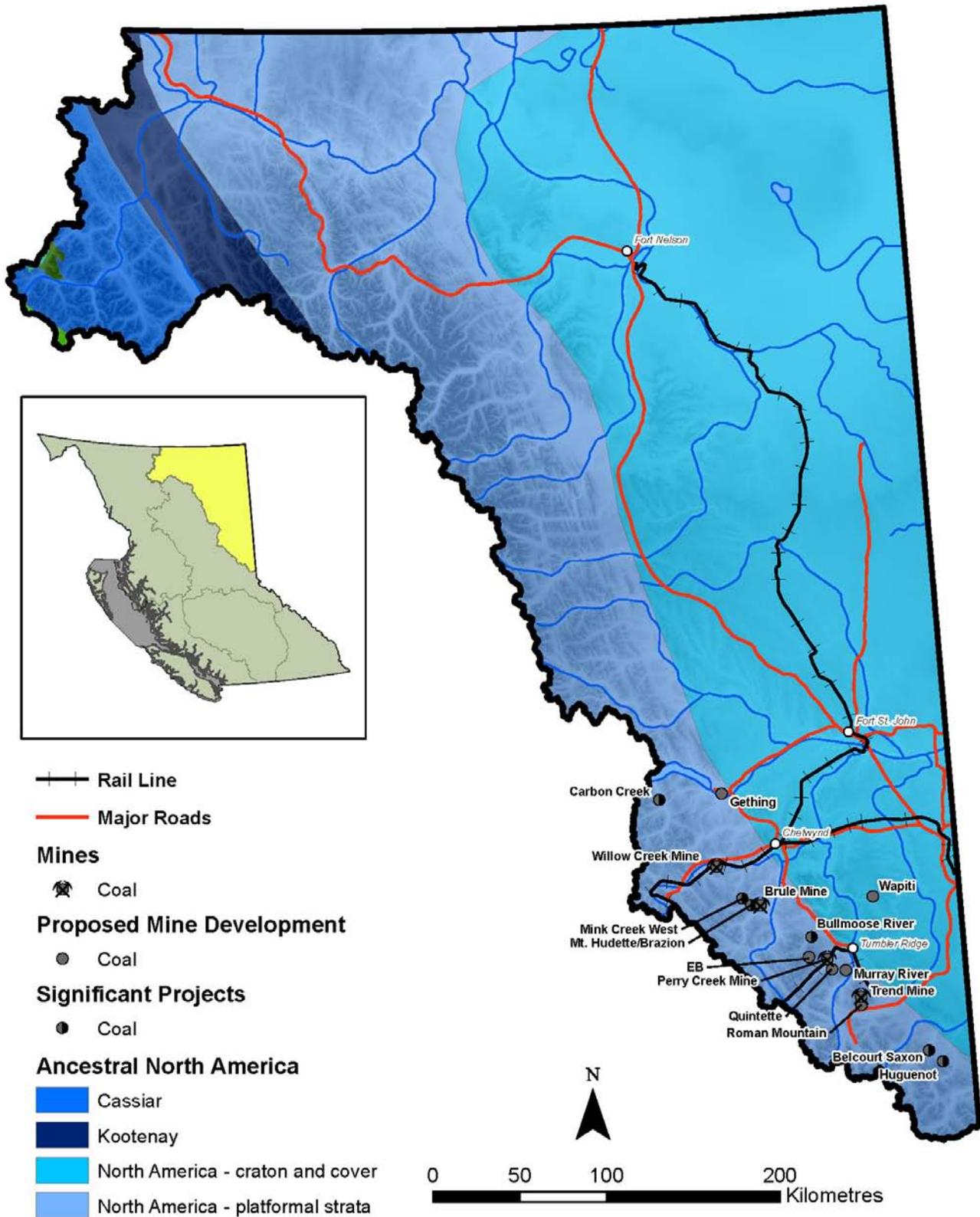


Figure 5. Mines and major exploration projects, Northeast Region, 2011.

TABLE 1. FORECAST MINE PRODUCTION, NORTHEAST REGION, 2011

Mine	Operator	Deposit Type/ Commodity	Actual Production in 2010 (Mtonnes)	Forecast Production in 2011 (Mtonnes)	Number of Employees	Proven and Probable Reserves, Mtonnes (effective date)
Brule	Western Coal Corp	ULV-PCI coal	1.2	0.3	416, includes contract and temporary	33.6 measured + indicated, reserves under review (March 2010)
Perry Creek (Wolverine Project)	Western Coal Corp	Hard coking coal (HCC)	2	1.8	477, includes contract and temporary	28 measured + indicated, reserves under review (March 2010)
Trend	Peace River Coal	Metallurgical coal	1.2	1.4	350	38.84 measured, 8.0 indicated (current Nov 2011)
Willow Creek	Western Coal Corp	PCI, HCC	0.4 (0.3 PCI, 0.1 HCC)	0.9 (0.8 PCI, 0.1 CC)	510 including contract and temporary	Under review

COAL EXPLORATION AND DEVELOPMENT PROJECTS

Exploration expenditures, at an estimated \$41 million, were about double the levels of 2009 and 2010. Major projects are summarized in Table 2. “Major,” in the context of this report, generally refers to 2011 expenditures in excess of \$250 000.

South of Tumbler Ridge

Colonial Coal International Corp continued aggressive exploration on its **Huguenot** property in the extreme south of the Region. Both access trail and heli-support were used in completing 2394 m of diamond drilling and 2190 m of reverse circulation drilling; and testing of samples recovered from large diameter cores is in progress. The Huguenot Coal Project consists of one contiguous block of 13 coal licenses covering a total area of about 7500 ha. The “north block” of the property contains an estimated 45.5 Mt of NI 43-101 compliant metallurgical coal resources (categories unspecified), with the middle and south blocks containing up to 113 Mt of potential resources.

Peace River Coal was idle in 2011 on its **Belcourt-Saxon** 50/50 joint venture with Western Coal. The project has undergone extensive exploration in the past, investigating the potential of coal seams in the Gates Formation. A 2009 NI 43-101 compliant report on the **Belcourt West** portion of the property identified 86 Mt of

proven reserves; contained within 167 Mt of measured resources. Additional work is planned.

A program involving 300 m of diamond drilling and 4000 m of reverse circulation drilling was completed on PRC’s **Roman Mountain** project adjacent to its Trend Mine. Once bought into production, Roman Mountain is expected to have a 15-year life expectancy at an annual production of 2.5 Mt.

Wolverine Valley area

Teck Coal Limited has been actively examining the possibility of re-opening the former **Quintette** mine



Figure 6. Preparing for a blast at the Trend Mine (courtesy Peace River Coal).

TABLE 2. MAJOR EXPLORATION PROJECTS, NORTHEAST REGION, 2011

Property	Operator	MINFILE (NTS ref)	Commodity	Deposit Type	Work Program
Bullmoose River	Canadian Kailuan Dehua Mines Co Ltd	093P 001,012, 013	coal	sedimentary	EN, FS
Carbon Creek	Coalhunter Mining Corp	093O 028	coal	sedimentary	A, EN, BU, CT, WA, DD (8 500 m), RC (6 000 m)
EB	Western Coal Corp	093P 015	coal	sedimentary	TR, RC (150 m)
Huguenot	Colonial Coal International Corp	(093I.049,050)	coal	sedimentary	A, CQ, DD (3401 m), RC (3 109 m)
Mink Creek West	Western Coal Corp	(093P.041)	coal	sedimentary	A, RC (4 320 m)
Mt. Hudette/Brazion	Western Coal Corp	(093P.041)	coal	sedimentary	A, RC (2 300 m)
Murray River	Canadian Kailuan Dehua Mines Co Ltd	(093P.005)	coal	sedimentary	EN, A, DD (18 000 m), RC (2 000 m)
Quintette	Teck Coal Ltd	093P 019	coal	sedimentary	EN, WT, DD (2 491 m), RC (964 m)
Roman Mountain	Peace River coal	093I 030	coal	sedimentary	DD (300 m), RC (4000 m)
Wapiti	Hillsborough Resources Ltd	093P 021	coal	sedimentary	EN, DD (65 m), RC (375 m)
Willow Creek South	Western Coal Corp	(093O.059,060)	coal	sedimentary	DD (450 m), RC (5 800 m)
Willow Creek West	Western Coal Corp	(093O.059,069)	coal	sedimentary	RC (5 000 m)

A = access (trail, road construction on claims); AB-EM = airborne electromagnetics; AB-MG = airborne magnetics; AB-RD = airborne radiometrics; BU (X tonnes) = bulk sample (weight in tonnes if known); CD = condemnation drilling; CQ = coal quality testing; CT = carbonization test (coal); DD (Xm) = diamond drilling totalling X metres; EN = environmental baseline studies/monitoring, remediation work; FS = feasibility studies; G = geology, mapping etc.; GC = geochemical sampling (rock, soil, silt etc.); GD = geotechnical drilling; GP = geophysics (general); IP = induced polarization; 3D-IP; MG = magentics; MK = marketing (primarily for industrial mineral products); MS = metallurgical studies; OB = overburden drilling; OP-BU = open pit bulk sample; P = prospecting; PD = percussion drilling; PF = pre-feasibility studies; PP = pilot plant; R = reclamation; RC (Xm) = reverse circulation drilling totalling X metres; TR = trenching; UG (Xm) = X metres of underground development; UG-BU = underground bulk sample; UT = UTEM;

(Windy and Window pits), located about 20 km south of Tumbler Ridge. The Quintette Mine had been a coal producer for almost 18 years up to August 2000. A feasibility study was expected to be completed during 2011 and, if positive, Quintette might see renewed production as early as 2013. A re-opened mine could see a 15- to 17-year mine life with a production rate of 3 to 3.5 Mt of clean coal per year. Between 350 and 400 direct jobs would be created. Meanwhile, the company conducted environmental baseline studies in support of a

possible re-opening. Almost 2500 m of conventional drilling and 1000 m of reverse circulation drilling were completed, and washability tests conducted on core samples.

Contextually, in September 2011 Teck Resources Ltd and Ridley Terminals Inc announced an agreement extending from 2015 to 2024 (as successor to the current agreement extending to the end of 2014), which contemplates the shipment of 2.5 Mt per year through the port.



Figure 7. Drilling along strike from the Trend Mine. Roman Mountain is in the background to the left (courtesy Peace River Coal).

Close by, Canadian Kailuan Dehua Mines Co Ltd (Dehua), in joint venture with HD Mining International Corp, is developing its **Murray River** metallurgical coal project. Canadian Kailuan Dehua is a partnership formed in July 2010 by the Kailuan Group Co Ltd, the Shougang Group, and Canadian Dehua International Mines Group Inc. Work on Murray River began in 2009 when the tenure was acquired from Kennecott Copper Corp, and in 2011 an extensive program of 18 000 m diamond and 2000 m reverse circulation drilling was completed, exploring mostly Gates Formation seams. An environmental baseline study is underway, and preparation of a formal resource assessment is in progress. The next planned stage in exploration and development is collection of a bulk sample for testing.

A resource of about 780 Mt has been identified at Murray River, and the project is potentially much larger. The resource would be accessed by underground mining methods. An initial production capacity of 6 Mt per year is planned, and the project would include construction of a new coal preparation plant.

Dehua also acquired tenure on the **Bullmoose River** project in 2009. Since then, the company has engaged in extensive consultations with First Nations to seek

accommodation of their concerns, and in the meantime has not carried out further exploration on the property. Bullmoose River would be developed into an underground mine, and a feasibility study is expected to be completed in 2012.

Hillsborough Resources Ltd (part of the Vitol Group since 2009) reactivated its development activities on the **Wapiti** thermal coal project located between the Trend and Perry Creek Mines. Progress had been stalled since 2007 over concerns about the economics of carbon sequestration if the resource were to be consumed locally. Environmental baseline studies were initiated and a small exploration program of 65 m diamond drilling and 375 m reverse circulation was carried out. The Wapiti project has a measured plus indicated coal resource of 80.1 Mt in place, and 35.2 Mt inferred. In October 2011 Hillsborough announced the conclusion of an agreement with Ridley Terminals Inc in Prince Rupert for handling its coal production at least until the end of 2021.

Western Coal Corp continued exploration of its **EB** project, near the Perry Creek mine, with a modest program of trenching and about 150 metres of diamond drilling.



Figure 8. Ex 8000 shovel loading waste at the Brule Mine (courtesy Western Coal).

Chetwynd-Pine River area

Western Coal Corp completed about 2300 m of reverse circulation drilling on its **Mt Hudette/Brazion** property near the Brule Mine. A short distance to the Northwest, the **Mink Creek West** project was the object of exploration by trenching and about 150 m of diamond drilling.

Western Coal mounted an extensive drill program explored at its **Willow Creek South** and **Willow Creek West** areas near the Willow Creek Mine. Totals included about 450 m conventional and 5800 m reverse circulation drilling at Willow Creek South, and 5000 m reverse circulation at Willow Creek West. Five boreholes were installed at Willow Creek South to test water quality.

Hudson's Hope area

Canadian Kailuan Dehua Mines Co Ltd plans to develop its proposed underground **Gething** mine, about 25 km west of Hudson's Hope. The projected mine life would be about 40 years, producing 2 Mt of clean coal per year. A major Chinese-backed funding arrangement was announced in 2011 as part of a total investment of about \$860 million. The neighbouring West Moberly First Nation stands strongly opposed to the development,

however, and the potential for eventual development remains unclear.

Further to the west, Coalhunter Mining Corp has been developing its **Carbon Creek** metallurgical coal property (Figure 9). Carbon Creek has an estimated coal resource of 114.0 Mt in the measured and indicated category, and 89.1 Mt inferred. In 2011 the company initiated an environmental baseline study and began geotechnical investigation for a future wash plant site.



Figure 9. Coal seam exposure at Carbon Creek (courtesy Coalhunter Mining).

Bulk sample collection by large-diameter drilling for washability and carbonization testing was carried out. In all, about 8500 m conventional, and 6000 m reverse circulation drilling were completed.

OUTLOOK FOR 2012

Industry confidence in the long-term outlook for coal was underscored, in 2011, by an approximate doubling in investment for exploration and development in the Northeast Region. Barring global economic turmoil and a loss of confidence in steel production (and therefore of metallurgical coal consumption), there is every reason to expect a very active season in 2012 as companies vie to access currently-underutilized rail and port infrastructure.

ACKNOWLEDGMENTS

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NOTES ON EXPLORATION AND MINING IN THOMPSON-OKANAGAN-CARIBOO REGION

Compiled by Ministry of Forests, Lands and Natural Resources staff, Kamloops

FOREWORD

Mid-summer changes in staff and a mid-autumn decision to prepare *Exploration and Mining in BC 2011* have resulted in reduced scope of this chapter. It is intended as a brief update of *Exploration and Mining in BC 2010* with less discussion and fewer illustrations. Exploration spending and drilling figures are incomplete at press time. All information in this article has been compiled from company web sites, news releases, and reports submitted to regulatory authorities, supplemented by a few telephone or email inquiries.

OVERVIEW

The Thompson-Okanagan-Cariboo has long been an active region for exploration and mining. The Ministry of Energy and Mines lists as “active” no fewer than 16 metal mines, 36 industrial mineral mines, 56 rock quarries, 480 sand and gravel pits, and 704 placer mines. Even though the “active” classification refers more to the status of the mine’s permit than to the nature of the activity at a given site (and thus includes mines that are undergoing reclamation and closure), the numbers are noteworthy.

The region has 6 producing metal mines and more than 15 producing industrial mineral mines.

Metal mines include two underground and four open pit operations. Operating metal mines (and commodities produced) are: **Bralorne** (Au), **Copper Mountain** (Cu, Au, Ag), **Gibraltar** (Cu, Mo), **Highland Valley Copper** (Cu, Mo), **Mount Polley** (Cu, Au, Ag) and **QR** (Au).

Two mining projects (**New Afton** (Cu, Au) and **Bonanza Ledge** (Au)) are in the development stage.

2011 was an active year for exploration and other permitting. At time of writing, 317 Notice of Work applications had been received: 147 applications for mineral and coal (exploration); 6 for mineral and coal (other); 125 for placer; and 39 for sand and gravel.

Porphyry, gold, and stratiform base metal deposits were the focus of exploration interest.

These notes offer some highlights from operating metal and industrial mineral mines, mine development projects, mine evaluation projects, and mineral exploration projects.

MINES AND QUARRIES

Table 1 lists operating metal and industrial mineral mines discussed in this report. Figure 1 shows their locations.

METAL MINES

Two mines (**Bralorne** and **Copper Mountain**) held ceremonies marking the official commencement of operations.

On 27 May 2011 Bralorne Gold Mines Ltd. held what was termed a “grand re-opening” of the **Bralorne** mine which included the pouring of its first gold brick. The company is mining gold-bearing mesothermal quartz veins in relatively undeveloped areas between three former mines: Bralorne, King and Pioneer. Ore is drawn from the BK and North veins, stockpiled and then fed to an 85 ton per day mill. A resource estimate (dated 20 October 2011; not in conformity with NI 43-101) reports 28 833 tonnes grading 9.4 g/t Au in the measured category and 129 491 tonnes grading 8.9 g/t in the indicated category.

On 18 August 2011, **Copper Mountain** mine held its official opening. The event was attended by: representatives of the governments of Japan, British Columbia, the Upper Similkameen Indian Band and the Town of Princeton; executives from mine owners Copper Mountain Mining Corporation (75%) and Mitsubishi Material Corporation (25%); mine staff and over 1700 people from around the province. The mine processed its first ore in May, completed construction in June, and in September shipped its first load of concentrate to Japan (11 200 wet tonnes totalling 2.54 million kg Cu, 1263 kg payable Ag and 76.8 kg payable Au) (Figures 2, 3, 4). Mining has achieved its planned rate of 140 000 tonnes per day. Work is underway to ensure the mill reaches its planned capacity of 70 000 tonnes per day. Reported proven and probable reserves (April 2009) are 211 million tonnes of 0.36% Cu with anticipated gold and silver credits. The mine plan forecasts copper production at 47 600 t/y for the first 12 years and a 17 year mine life.

TABLE 1. THOMPSON-OKANAGAN-CARIBOO REGION MINE PRODUCTION 2011

Mine	Operator	Deposit Type / Commodity	Production (tonnes or kilograms; Estimated by government for 2011, except where noted)	Number of Employees (date)	Proven and Probable Reserves (tonnes; date published)
Metals					
Bralorne	Bralorne Gold Mines Ltd	Vein Au	91 kg Au	47 (October 2011)	Not available (resource estimate 20 Oct 2011):
Copper Mountain	Copper Mountain / Mitsubishi Materials	Alkalic porphyry Cu	8400 t Cu; with Au and Ag credits	270 (18 August 2011)	211 000 000 t at 0.36% Cu (28 July 2009)
Gibraltar	Taseko Mines Limited / Cariboo Copper Corp	Sub-alkalic porphyry Cu, Mo	35 000 t Cu, 560 t Mo	480 (10 May 2011)	727 000 000 t at 0.30% Cu and 0.008% Mo (10 May 2011)
Highland Valley Copper	Teck Highland Valley Copper Partnership	Sub-alkalic porphyry Cu, Mo	93 300 t Cu; 3100 t Mo	1267 (30 Nov 2011)	623 700 000 t at 0.31% Cu and 0.009% Mo (31 Dec 2010)
Mount Polley	Imperial Metals Corporation	Alkalic porphyry, Skarn Cu, Au, Ag	21 500 t Cu, 2000 kg Au, 7863 kg Ag	370 (30 Nov 2011)	37 946 000 t at 0.313% Cu, 0.266 g/t Au and 0.703 g/t Ag (9 Dec 2011)
QR (shut down 9 November 2011)	Barkerville Gold Mines Ltd	Skarn Au	110 000 t at 3.8 g/t Au (Jan to Nov 2011)	~70	Depleted
Coal					
Basin	Coalmont Energy Corp	Thermal coal	0 (mining to resume in 2012)	Not available	Not available
Industrial Minerals					
Ashcroft	IG Machine and Fiber Ltd (IKO Industries Ltd)	Basalt (roofing granules)	350 000 t	55 (plant & quarry)	
Bud	Absorbent Products Ltd	Bentonite		see Red Lake	
Buse Lake	Lafarge Canada Inc	Volcanic ash (alumina-silica)		see Harper Ranch	
Craigmont	Craigmont Mines Joint Venture	Magnetite tailings	60 - 70 000 t	~30 (plant; seasonal)	
Decor	Pacific Bentonite Ltd	Alumina, landscape rock		~2 (including trucking)	
Falkland	Lafarge Canada Inc	Gypsum	6000 t	see Harper Ranch	
Harper Ranch	Lafarge Canada Inc	Limestone	220 000 t	34 plus 10 contractors (plant & 3 quarries)	
Kettle Valley quarries	Kettle Valley Stone Company	Ashlar, flagstone, thin veneer		~40 (plant & quarries)	
Pavilion	Graymont Western Canada Inc	Limestone	190 000 t	~34 (plant & quarry)	
Red Lake	Absorbent Products Ltd	Diatomaceous earth		40 (plant & 3 quarries)	
Zeotech Bromley Creek	Heemskirk Canada Ltd	Zeolite			

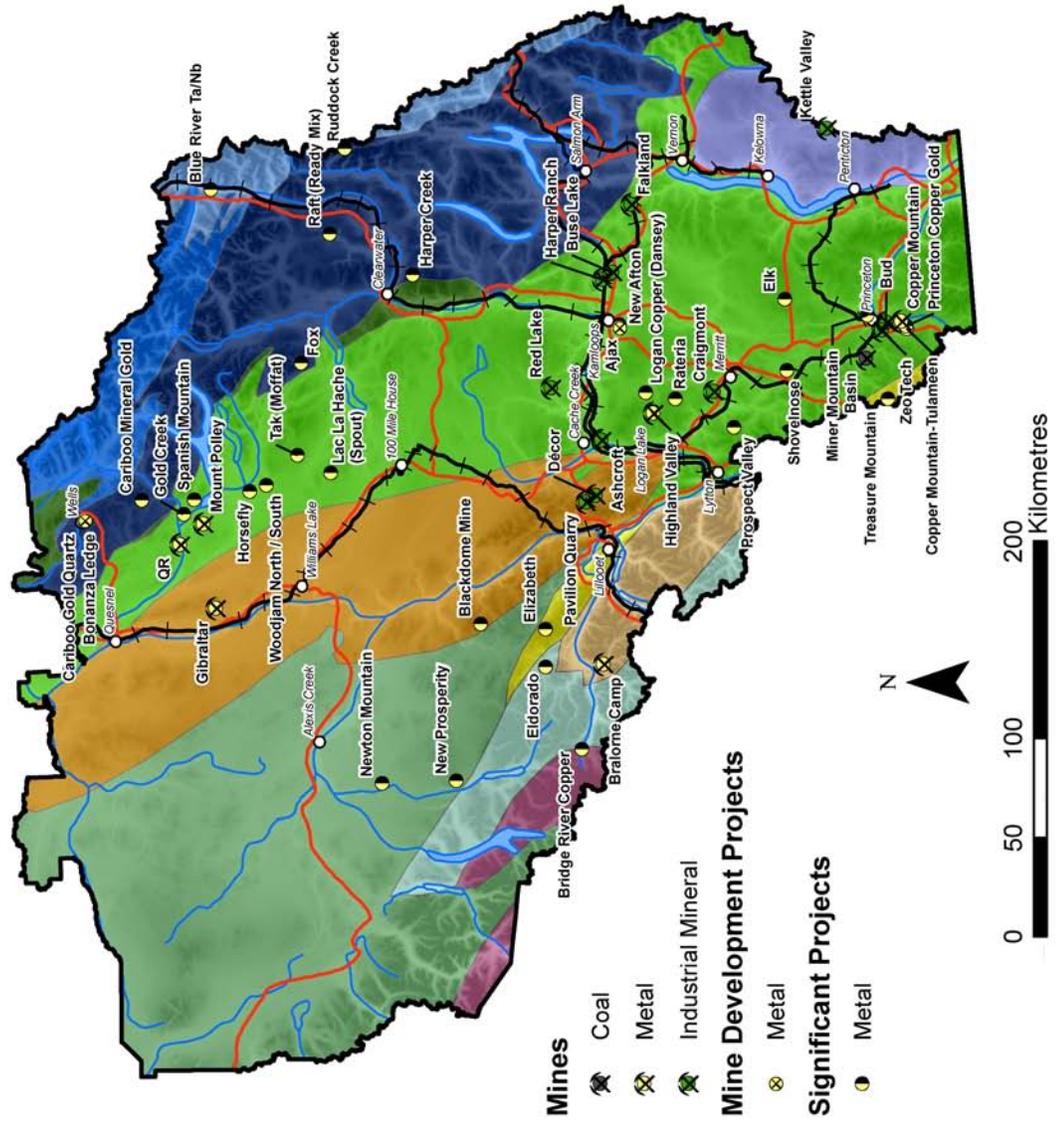
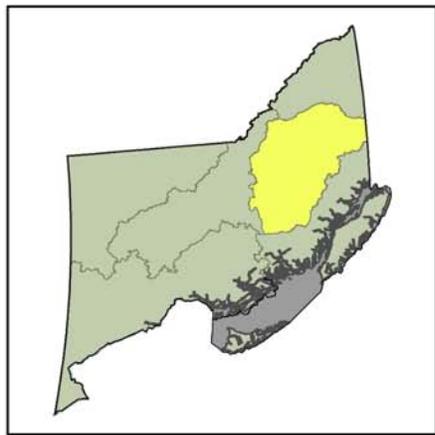


Figure 1. Mines, quarries, mine development evaluation projects, and selected exploration projects Thompson-Okanagan-Cariboo Region, 2011.

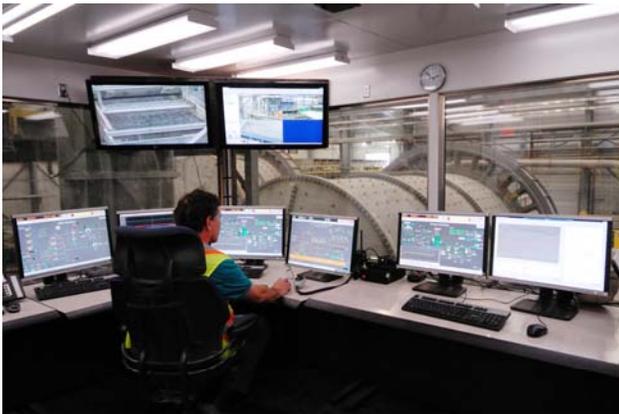


Figure 2. The mill control room at the new Copper Mountain mine near Princeton (courtesy of Copper Mountain Mining Corporation).



Figure 4. Ore concentrate load out facility for the Copper Mountain mine where the first concentrate was shipped (courtesy of Copper Mountain Mining Corporation).



Figure 3. The Copper Mountain mine's new 70 000 tonne per day mill was operational in May (courtesy of Copper Mountain Mining Corporation).

Gibraltar mine is operated by of Taseko Mines Limited and Cariboo Copper Corp. Spring 2011 saw the start of the third phase and final of a multiyear development plan. Construction started on a 55 000 tonne

per day concentrator (to complement the same-size concentrator now operating) and a new molybdenum recovery facility. Once completed, the operation will increase annual production of copper to around 81 600 tonnes and molybdenum to 450 tonnes per year. In May 2011, Taseko announced an 80% increase in reserves, which now stand at 727 million tonnes grading 0.30% Cu and 0.008% Mo (0.20% Cu cut-off) in the proven and probable category.

Highland Valley Copper mine is operated by Teck Highland Valley Copper Partnership (97.5% Teck and 2.5% Highmont Mining Company Ltd.). The Partnership reported that the mine's plan has been approved until 2025. The Partnership also reports successful completion of mine enhancements including the completion of the two-year waste stripping and buttress emplacement project on the east wall of the Valley pit. A \$475 million modernization project was announced in September 2011. The project will replace the existing, 40 year old mill and is expected to be completed by the end of 2013.

Mount Polley mine of Imperial Metals Corporation produced an average of 20 000 tonnes/day in 2011. Most ore came from the Springer pit. Mining has been completed at the Southeast and Pond pits. The Boundary zone has been stripped in preparation for future mining. Underground and surface exploration continued in 2011 (see notes below).

QR mine of Barkerville Gold Mines Ltd. operated for most of 2011 but shut down in early November due to depletion of ore. Approximately 70 people worked at the mine while it was operating. The mill processed 110 000 tonnes of ore grading 3.8 g/t Au at a rate of 800 to 900 tonnes per day. The mill now awaits shipments of ore from the Bonanza Ledge mine, anticipated in April 2012. On-site exploration amounted to approximately 40 short (~100 m) drill holes.

COAL MINE

In mid 2011 Coalmont Energy Corp., a subsidiary of Arthon Industries Limited, acquired the rights to the **Basin** mine near Coalmont which contains thermal-grade coal. The mine had been on care and maintenance since 2007. A company representative stated there was an unpublished resource estimate of 125 million tonnes with an 8:1 stripping ratio. The company intends to put the mine into operation in mid-2012 once they have installed a new wash plant and other equipment.

INDUSTRIAL MINERAL MINES

There are more than fifteen industrial mineral quarries and processing plants employing over 250 people in the region. These operations provide employment in many communities including Kamloops, Kelowna, Lillooet, Cache Creek, Ashcroft, Princeton and Merritt. Opportunities for growth in this sector appear to be good due to the region's variety of rock types and deposits, transportation and power infrastructure and proximity to markets. Obtaining permits for industrial mineral operations is usually easier than for metal mines.

The **Kamloops** cement plant and **Harper Ranch** limestone quarry of Lafarge Canada Inc. continue to supply cement to meet demand in western Canada. Lafarge also draws materials from the **Falkland** and **Buse Lake** quarries, which provide gypsum and alumina-silica rock respectively.

The **Decor** pit of Pacific Bentonite Ltd. supplies alumina-rich burnt shale to the Lafarge cement plant in Kamloops. The shale beds occur directly above the Hat Creek coal deposit, located west of Cache Creek. Although most of the material is sold to Lafarge, other uses exist such as the surfacing of baseball diamonds. The property is also known to host a large bentonite deposit which is being investigated for municipal engineering and tile manufacturing applications. The company has patented a product ("Fibre-clay" panels) which combines pulp fibre and clay. It is nearly impermeable and suitable for liners and covers for mining and municipal water.

Also west of Cache Creek, Graymont Western Canada Inc. operates the **Pavilion** limestone quarry and lime plant on Indian reserves. The operation produces quicklime, high calcium limestone fines, screened high calcium stone products, lime kiln dust and rip rap. Graymont has a forty-year lease with the Ts'kw'aylaxw First Nation. Most of the operation's employees are Ts'kw'aylaxw members.

East of Ashcroft, IG Machine and Fiber Ltd, a subsidiary of IKO Industries Ltd, operates the **Ashcroft** basalt quarry and roofing granule plant. The granules are sized and coated with one of several distinct colours on site, and then shipped by rail and truck to IKO asphalt

shingle plants in Calgary, Alberta; Sumas, Washington; Chicago, Illinois and elsewhere in North America.

Imperial Metals Corporation has installed a recovery plant at its **Mount Polley** concentrator to capture magnetite from its tailings stream. The operation is intended to provide dense media for coal washing operations.

Craigmont Mines Joint Venture operates the **Craigmont** magnetite operation located near Merritt where tailings from the old Craigmont copper mine are processed. These are forecast to be exhausted shortly.

At its plant in Kamloops, Absorbent Products Ltd manufactures cat litter, barn deodorizer, industrial absorbents and carriers for agricultural products. These are prepared from diatomaceous earth mined from the **Red Lake** quarry northwest of Kamloops and bentonite mined from the **Bud** quarry at Princeton.

Heemskirk Canada Ltd continues to market agricultural and absorbent products mined from a stockpile at the **Zeo-Tech/Bromley Creek** zeolite quarry near Princeton. The material is transported to its plant in Lethbridge.

Opal Resources Canada Inc produces attractive fire opal gemstones and jewelry from the **Klinker** property, located west of Vernon. Opal occurs as fracture and vesicle-fillings in andesitic to basaltic laharc breccia of lower members of Eocene Kamloops Group. Gemstone jewelry is sold to visitors and tourists from a retail store in Vernon. The company hopes to develop other North American markets.

Decorative rock and dimension stone are produced at numerous small quarries throughout the region. The best known producer is the Kettle Valley Stone Company of Kelowna which mines gneiss, dacite ash and basalt at the **Nipple Mountain, Kettle Valley, Canyon** and **Gemini** quarries. Kettle Valley's workforce has grown to about 40 people year round, mainly employed in the Kelowna processing facility. Products include flagstone, ashlar, facing stone and landscape rock. Markets include residential and commercial building projects in western USA and Canada.

ROCK QUARRIES, AGGREGATE PITS AND PLACER MINES

Ministry of Energy and Mines staff advise that there are 56 quarries, 480 sand and gravel pits and 704 placer mines (701 surface operations and 3 underground) classified as "active". As noted above, the "active" classification refers to the status of the permit. The number therefore includes mines that are exhausted and undergoing reclamation and closure. It also includes many operations that are small, seasonal or intermittent, and which supply products on an as-needed basis.

Statistical information (e.g., production; reserves; employment) on these operations has not been obtained. Nevertheless the number of operations reflects the magnitude of often-overlooked types of mining. The number also indicates the diversity of opportunities for mineral resource development that exist in the region. One can infer that these types of mines make an important contribution to the region's economy.

MINE DEVELOPMENT PROJECTS

In early December 2011, the **Bonanza Ledge** project of Barkerville Gold Mines Ltd. received approval under the *Mines Act* to develop an open pit gold mine near Wells. Some site preparation occurred in 2011, but it is expected that construction will proceed in 2012 (Figure 5). The company reports that the current mine plan is to extract approximately 73 000 tonnes of gold ore per year (grading 9.05 g/t Au) over a period of four years. Ore would be trucked around 100 km to the QR mill for processing. Ore consists of native gold in quartz veins within carbonaceous and chloritic phyllite.

Stated reserves (as of August 2009) include 130 724 tonnes grading 10.227 g/t Au in the proven category and 166 808 tonnes grading 8.114 g/t Au in the probable category.

Construction of the **New Afton** mine by New Gold Inc. continues on a schedule that should see production in mid-2012 (see Figure 1 for location). New Gold announced that underground mining operations officially started on 9 September 2011 with blasting of its first drawbell. Almost 14 000 tonnes of ore are now stockpiled at surface (Figure 6). Underground workings have been extended 2210 metres. Approximately 600 workers are on site (Figure 7). Project spending by end of third quarter was \$182 million.

Stated reserves (probable category; as of 31 December 2010) are 47.4 million tonnes grading 0.95% Cu, 0.69 g/t Au and 2.03 g/t Ag.

MINE EVALUATION PROJECTS

Six mining projects are in formal review processes. These are: **New Prosperity**, **Harper Creek**, **Ruddock Creek**, **Ajax**, **Spanish Mountain** and **Treasure Mountain**.

New Prosperity gold-copper deposit (owned by Taseko Mines Limited) received an environmental certificate from the BC Environmental Assessment Office in January 2010. In November 2010, however, the Canadian Environmental Assessment Agency (CEAA) determined that the project was "likely to cause significant adverse environmental effects that cannot be justified in the circumstances." In February 2011 Taseko submitted a revised proposal which was accepted for review by the

CEAA in November 2011. The federal review panel is expected to take one year to evaluate the revised project. The deposit is located 125 km southwest of Williams Lake. It is described as a gold-copper porphyry with proven and probable reserves of 830 million tonnes grading 0.42 g/t Au and 0.23 % Cu.

Harper Creek copper-gold-silver deposit (owned by Yellowhead Mining Inc.) is in the pre-application stage of the BC Environmental Assessment Office review process. Its application start date is September 2008. The deposit is located near Vavenby, about 90 km northeast of Kamloops. It is a stratiform copper-gold-silver deposit within metamorphosed volcanic and volcano-sedimentary rocks of the Eagle Bay Formation. Activity in 2011 consisted of a preliminary economic assessment (filed with SEDAR 1 April 2011); initiation of a feasibility study (expected early in 2012); studies required for the environmental review; exploration drilling (4100 m to 31 July 2011); metallurgical and comminution testing; and purchase of land for processing and loading operations near Vavenby.

Ruddock Creek zinc-lead deposit (owned by Imperial Metals Corporation) is in the pre-application stage of the BC Environmental Assessment Office review process. Application start date is February 2009. The deposit is described as sedimentary exhalative, Monashee or Broken Hill type, within marble, gneiss and calc-silicate rocks. The property was actively explored in 2011: see notes below.

Ajax and Spanish Mountain entered the BC Environmental Assessment Office review process in February and August 2011 respectively. These projects are also in the pre-application stage.

Ajax is a copper-gold porphyry deposit operated as a joint venture between Abacus Mining and Exploration Corporation and KGHM Polska Miedz SA. Its location on the outskirts of Kamloops has generated local debate. In 2011 work focused on studies required for environmental review and preparation of a feasibility study which is expected to be published late in 2011. KGHM Ajax opened a community relations office in downtown Kamloops in August, 2011.

Spanish Mountain (owned by Spanish Mountain Gold Ltd.) is a low grade, large tonnage gold-silver deposit within fine grained sedimentary rocks. Drilling in 2011 continued to expand the area of mineralization. More than 18 000 metres were drilled in the Main and North zones. In November the company released a resource estimate with 91 090 000 tonnes grading 0.62 g/t Au and 0.64 g/t Ag (at a 0.30 g/t Au cut-off). A pre-feasibility study, started in August, is scheduled for completion in April 2012. Drilling also occurred at a new zone of mineralization in northern Cedar Creek approximately 2 kilometres west of the Main zone. In this discovery, called the Phoenix Zone, mineralization grading about 0.5 g/t Au can be traced for at least 1 kilometre strike length.



Figure 5. Site preparation is underway on Barkerville Mountain where the new Bonanza Ledge mine has been permitted



Figure 6. The ore conveyor emerges from the New Afton underground mine development scheduled for opening in 2012 after a five leg, 4.5 km long journey from preparatory underground mining operations.



Figure 7. Site work is well underway at the New Afton project where a new tailings storage facility is being constructed and the Afton pit is being dewatered into the former Pothook pit.

Treasure Mountain project (owned by Huldra Silver Inc) entered the *Mines Act* permitting process in April 2011. Treasure Mountain deposit is a high grade silver-lead-zinc vein in Cretaceous sedimentary rocks of the Pasayten Group. A resource estimate (indicated, but not in conformity with NI 43-101) prepared in 2009 was 33 000 tonnes grading 828 g/t Ag, 4.16% Pb, and 3.6%, at a 311 g/t Ag cut-off.

MINERAL EXPLORATION PROJECTS

The following notes provide updates on properties discussed in EMBC 2010. Projects are arranged by deposit type and geography. Table 2 lists exploration projects discussed in this report. Figure 2 shows their locations.

**TABLE 2. SIGNIFICANT EXPLORATION PROJECTS,
THOMPSON-OKANAGAN-CARIBOO REGION, 2011**

Property	Operator	MINFILE (NTS ref.)	Commodity	Deposit Type	Work Program
Afton Area (West Ajax, East Ajax)	Abacus Mining and Exploration Corp. / KGHM	092INE012, 013, 028, 030	Cu, Au, Ag, Pd	Porphyry	FS, EN
Blackdome Mine	Sona Resource Corp.	092O 053, 051, 052	Au, Ag	Vein / Breccia	DD (3176 m), PFS
Blue River Tantalum/Niobium (Upper Fir)	Commerce Resources Corp.	083D 005, 035	Ta, Nb	Magmatic	DD (8715 m), PFS, MS
Bonanza Ledge	Barkerville Gold Mines Ltd.	093H 140	Au	Vein / Breccia	EN, DD, TR, MS,
Bralorne Camp	Bralorne Gold Mines Ltd.	092JNE164, 001	Au, Ag	Vein / Breccia	UG, G, PP, FS
Bridge River Copper	Cresval Capital Corp	092JW 010	Cu, Mo, Au	Porphyry	DD (~2030 m)
Cariboo Gold Quartz	Barkerville Gold Mines Ltd.	093H 019	Au	Vein / Breccia	DD (~55000 m), EN, PFS
Cariboo Mineral Gold	Noble Metal Group		Au	Vein	GC, GP
Copper Mountain-Tulameen	Goldcliff Resource Corp		Cu, Au, Ag	Porphyry	GC, G, 3D-IP
Eldorado	Gold Fields Horsefly Exploration Corp		Au	Vein	DD, GC, G, AB-EM, AB-MG
Elizabeth	Sona Resources Corp.	092O 012	Au, Ag, Cu, Mo	Vein / Breccia	DD (7355 m), UG
Elk (Siwash North)	Almaden Minerals Ltd.	092HNE096	Au, Ag	Vein / Breccia	DD (~14000 m), PF
Fox	Happy Creek Minerals Ltd.		W	Porphyry	DD
Gold Mountain / Horsefly	Tiex Inc				GP-IP, GC, DD (~2000 m)
Harper Creek	Yellowhead Mining Inc.	082M 008, 009	Cu, Ag, Au, Zn, Mo	Massive Sulphide	PF, EN, MS, DD (~30 000 m)
Highland Valley Mine (Exploration)	Teck Highland Valley Copper Partnership	092ISE013	Cu, Mo	Porphyry	DD (~10 000 m)
Lac La Hache (Aurizon, Peach L)	GWR Resources Inc.	092P 001, 002, 034, 035	Cu, Au, Fe, Ag	Porphyry	DD (~25 000 m), TR, GC, GP-MAG, G
Logan Copper (Dansey)	Logan Copper Inc.	092ISE012, 190	Cu, Mo, Ag	Porphyry	DD (2828 m), GP-MAG

TABLE 2. CONTINUED

Property	Operator	MINFILE (NTS ref.)	Commodity	Deposit Type	Work Program
Miner Mountain	Sego Resources Inc	092HSE078, 203	Cu, Au, Ag	Porphyry	PD, GP, G, GC, TR
Mount Polley (Exploration)	Imperial Metals Corp	093A 008, 164	Cu, Au	Porphyry	DD (11 564 m), G, UG
New Prosperity	Taseko Mines Ltd	092O 041	Cu, Mo, Au	Porphyry	FS, EN, GD
Newton Mountain	Amarc Resources Ltd	092O050	Au, Cu	Porphyry	DD
Princeton Copper Gold	Anglo Canadian Mining Corp		Au, Cu	Porphyry	DD
Prospect Valley (Discovery South)	Altair Ventures Inc		Au, Ag	Vein / Breccia	DD (722 m), G, GC, P
QR (Exploration)	Barkerville Gold Mines Ltd	093A 121	Au	Skarn	DD
Raft (Ready Mix)	Newmac Resources Inc	082M 056	Au, Ag, W	Magmatic	GC, GP-IP, GP-EM
Rateria	Happy Creek Minerals Ltd	092ISE092, 150, 060	Cu, Mo	Porphyry	DD (~10 000 m)
Ruddock Creek (Exploration)	Imperial Metals Corp	082M 082, 83	Zn, Pb, Ag	Massive Sulphide	DD (14 133 m), UG (309 m)
Shovelnose	Westhaven Ventures Inc		Au	Vein / Breccia	P, GC, G, DD
Spanish Mountain	Spanish Mountain Gold Ltd	093A 043	Au, Ag	Vein / Breccia	DD (~18 000 m), PFS, MS
Tak (Moffat)	Fjordland		Au, Cu, Mo	Porphyry	DD (739 m)
Treasure Mountain (Exploration)	Huldra Silver Inc	092HSW016 , 018	Ag, Pb, Zn	Vein / Breccia	DD (5073 m)
Woodjam North / South	Gold Fields Horsefly Exploration Corp	093A 078	Cu, Au	Porphyry	DD (26 044 m)

Work Program Abbreviations:

A = access; trail, road construction on claims; AB-EM = airborne electromagnetics; AB-MG = airborne magnetics; AB-RD = airborne radiometrics; BU (X tonnes) = bulk sample (weight in tonnes); CD = condemnation drilling; CQ = coal quality testing; CT = carbonization test (coal); DD (X m) = X metres of diamond drilling; EN = environmental baseline studies/monitoring, remediation work; FS = feasibility studies; G = geology, mapping, etc; GC = geochemical sampling (rock, soil, silt, etc); GD = geotechnical drilling; GP = geophysics (general); IP = Induced Polarization; 3D-IP; MG = magnetics; MK = marketing (primarily for industrial mineral products); MS = metallurgical studies; OB = overburden drilling; OP-BU = open-pit bulk sample; P = prospecting; PD = percussion drilling; PF = pre-feasibility studies; PP = pilot plant, R = reclamation; RC = reverse circulation drilling; TR = trenching, UG (X m) = X metres of underground development; UG-BU = underground bulk sample; UT = UTEM; VLF; WT = washability test (coal)

PORPHYRY PROJECTS***Thompson River - Shuswap Lake***

At **Highland Valley Copper** mine, Teck Highland Valley Copper Partnership reports that, due to permitting delays, exploration was confined to areas under lease. The work consisted of 10 000 metres of diamond drilling. Results have not been published.

Getty Copper Inc. reported it terminated its option with EffiSolar Energy Corp / Zhejiang Guogang Science and Technology Group on 29 December 2010. Results of their 2010 Titan 24 geophysical survey over the **Getty North** deposit, **Getty South** deposit, and **Getty West** zone were released in March 2011. The survey found 39 anomalies, of which 12 were considered high-priority drill targets. No further work was reported.

Happy Creek Minerals Ltd. continued drilling at the **Rateria** porphyry copper-molybdenum property, located 12 km southeast of Highland Valley Copper mine (Figure 8). The focus is on Zone 1 and Zone 2, approximately 2 km apart. In both zones, drilling returned intersections with ~0.5 % Cu over ~100 metres in widely-spaced drill holes. Molybdenum, silver and rhenium values have been reported.

The **Dot** property, 17 kilometres south of Highland Valley Copper mine, owned by Dot Resources Ltd. appears to have been inactive in 2011. A revised resource estimate (conforms with NI 43-101), issued December 2010, increased indicated resources to 5 328 200 tonnes grading 0.45% Cu, 3.28 g/t Ag, 0.05 g/t Au, and 0.006% Mo (at a 0.20% Cu cut-off).

The **Logan Lake** Project, owned by Logan Copper Inc. (formerly SNL Enterprises Ltd.), comprises four main targets: **Dansey (Midway)**, **Duffy**, **Bertha Molly** and **TW**. The 55 000 ha claim block extends from the Guichon batholith in the south-west to the Iron Mask batholith in the north-east (host to Afton and Ajax deposits). Work in 2011 consisted of 112 line kilometres of ground geophysics (VLF and magnetometer) and 2 828 m of diamond drilling (11 holes) on the Dansey prospect. Eight holes intersected copper mineralization grading >0.20% Cu, some with grades >1% Cu over narrow widths. The longest mineralized intersection (hole 11-LCD-24) returned 68.6 metres at 0.20% Cu.



Figure 8. Drilling within the Guichon Batholith at the Rateria copper-molybdenum-rhenium project continues at Zones 1 and 2, located 12 km southeast of the Highland Valley mine.

Cariboo

At the **Mount Polley** mine (owned by Imperial Metals Corporation) surface exploration focused on the C2, Cariboo, Junction and Polley Mountain zones and consisted of 11 564 m of diamond drilling in 24 holes, with 2 rigs. Underground diamond drilling confirmed the continuity of high-grade copper-gold-silver mineralization in a brecciated monzonite. The best hole (NDU11-189) intersected 35 metres with 4.80% Cu, 2.76 g/t Au, and 39.17 g/t Ag. Underground exploration was conducted from a 550 metre decline driven from the Wight pit to about halfway to the Boundary zone. The intent is to ramp down to breccia ore beneath the Boundary zone and ramp up to surface. A resource of about 300 000 tonnes has been blocked out.

Gold Fields Horsefly Exploration Corporation continued to explore the **Woodjam South** and **Woodjam North** properties, comprising 56 150 ha located 45 km east of Williams Lake, under option from Fjordland Exploration Inc (60%) and Cariboo Rose Resources Ltd (40%), now represented by a new company: Consolidated Woodjam Copper Corp (Figure 9). Drilling at Woodjam South totaled 20 065 metres in 78 holes (Figure 10). At Woodjam North: 5979 metres in 21 holes. Analytical results match those released in 2010 but further define the area of mineralization.

Drilling on Fjordland's **Tak** property's Moffat zone consisted of three widely spaced holes totalling 739 metres. The target was a coincident IP and geochemistry anomaly. Chalcopyrite and pyrite mineralization occurs in all three holes as disseminations, fracture fillings and in veins within potassic-altered and magnetite rich diorite to monzodiorite phases of the Takomkane batholith and Nicola Group volcanoclastic rocks. The Tak property is under option to Capstone Mining Corp.

In September, Candorado Operating Company Ltd. optioned its **Murphy Lake** property to GWR Resources Inc.

Tiex Inc. reported the completion of approximately 45 mine-kilometres of IP in two surveys in the Viewland and Elbow areas of the **Horsefly** property (which covers 79 379 ha). Soil geochemical surveys were conducted on 7 targets. A drilling program commenced in October, with plans for 2000 metres of reverse circulation drilling in the Viewland area. Results are pending.

At the **Lac La Hache** property, GWR Resources Inc, focused on the Spout Lake skarn deposit and the Peach Lake area (see notes below). Copper-gold porphyry targets (e.g., Aurizon South SuperGold zone) may be followed up in 2012.

At the **Fox** tungsten property, 75 km northeast of 100 Mile House, Happy Creek Minerals Ltd. reported encouraging results from their first drilling of the Ridley Creek zone. The two best results were from holes F11-07 and F11-08. F11-07 intersected 4.7 m grading 1.02% WO₂, 0.42% Zn, and 2.3 g/t In, with a 0.4 m section of



Figure 9. Intensive drilling continues at the Woodjam project Southeast Zone by Gold Fields Horsefly Exploration Corporation under option from Consolidated Woodjam Copper Corp (photo courtesy of Consolidated Woodjam Copper Corp).



Figure 10. Several years of drilling at the Woodjam projects means large core facilities at Horsefly (photo courtesy of Consolidated Woodjam Copper Corp).

9.6% WO₂. F11-08 intersected 12.4 m grading 0.74% WO₂, 0.15% Zn and 0.9 g/t In, with 0.65 m of 8.15% WO₂.

Chilcotin

Amarc Resources Ltd. continued exploration of its **Newton Joint Venture** property within the **Plateau Gold Copper Belt** (thought to extend from Blackdome gold mine in the south to Blackwater and Capoose deposits in the north). Targets are disseminated gold, copper and molybdenum mineralization with epithermal and porphyry characteristics. In February, the company completed a widely-spaced, 28 hole drilling program across the Newton sulphide system to test IP and soil geochemical targets. In May, Amarc acquired an 80% interest in the Newton property. In October, the company

commenced delineation drilling at the Newton gold deposit. Preliminary results include the thickest mineralized interval encountered to date: 293.6 m of 0.6 g/t Au. Amarc considers there are close lithological and geophysical similarities between the Newton prospect and the Blackwater deposit to the north.

Strongbow Exploration Inc continued to find encouraging results from surface exploration at its **Piltz Mountain** and **Mons Creek** properties located 90 km southwest of Williams Lake. Both properties were expanded, to 5 778 ha and 6 545 ha respectively.

The **Taseko** porphyry copper, gold and molybdenum property of Galore Resources Inc. was inactive in 2011.

In September, private company Highpointe Exploration Inc. announced plans for a 1 000 metre, 3 hole drill program on the **Tasco** property where they were searching for porphyry-style mineralization. Discovery Consultants of Vernon will supervise the program. Results are pending.

Gold Bridge-Bralorne-Lillooet

Cresval Capital Corp. conducted a drilling program at its **Bridge River Copper** project, located 40 kilometres west-northwest of Goldbridge. The property contains at least six showings suggestive of calc-alkaline porphyry-style copper-molybdenum-gold mineralization. These showings include: the Nichol, Russnor, BR, Copper Plateau, Windy Copper, and Canyon. The 2011 program consisted of ~2030 metres in nine holes. Five holes tested the Copper Plateau zone, while four holes tested the Russnor breccia. Drilling intersected broad zones of copper mineralization. Analytical results are pending.

Similkameen River

Copper Mountain Mining Corporation reports that exploration at the **Copper Mountain** mine was on hold for 2011 while efforts focused on mine construction and commissioning. 2012 is anticipated to be an active year, with a focus on the Alabama, Virginia, Voigt and Oriole zones.

Approximately 4 km south of the Copper Mountain project, Anglo Canadian Mining Corp drilled six holes on its **Princeton Copper Gold** project this year. At the Combination Zone hole Pr-11-18 intersected 102.72 metres grading 0.138% copper from surface. A larger drill program is permitted and planned for next year

Sego Resources continued exploration at its **Miner Mountain** property, a porphyry copper-gold project approximately 4 km northeast of Princeton. Several phases of percussion drilling were completed in 2011. Drilling at the Cuba zone, an induced polarization anomaly, yielded highlight holes PDH 66 which intersected 12 m of 1.13% Cu and 0.806 g/t Au and PDH 67 which intersected 2 m of 1.67% Cu and 0.93 g/t Au. Both intersections are less than 8 meters from the top of

the hole. The Cuba zone is currently 200 by 150 m and open in several directions: it is part of the greater Cuba-Granby zone that measures 350 by 1500 m. A third phase of percussion drilling is underway at the time of writing with diamond drilling to follow in early January 2012.

Goldcliff Resource Corporation was active at its **Copper Mountain-Tulameen** project this year where it advanced exploration primarily around the Whipsaw target. The company reports the discovery of the Trojan showing, a noteworthy event in this mature camp. Grab samples along former logging roads yield anomalous values of 0.019-0.655% Cu and significant accompanying Ag values of up to 4.8 g/t. Underlying the Trojan and Eagle showings at the project is the newly surveyed Bolas 3D-induced polarization survey that has highlighted twelve chargeability anomalies. No work has been reported on from its nearby Panorama Ridge gold project where ten gold showings and four zones with significant potential have been delineated over the last decade.

Okanagan

In August Jasper Mining Corp issued a conceptual resource estimate for its **Isintok** property based on drilling done between 2005 and 2008 but assayed in 2010. The potential quantity and grade is 50 to 110 million tonnes with 0.08 to 0.12% Cu, 0.01 to 0.02% Mo, 0.02 to 0.03 g/t Au and 0.80 to 1.10 g/t Ag. No work was done on the property in 2011.

SKARN PROJECTS

Cariboo

GWR Resources Inc. released results from its winter 2010-2011 drilling program at their **Spout Lake** skarn deposit. The drilling program on the **Spout North** zone consisted of 143 holes totaling 15 462 metres. Results to date have extended the strike length of this zone by 500 metres and confirmed the tenor of mineralization. A fall program with a planned 15 000 metres of drilling is underway on the **Spout South** zone. Permit delays resulted in a late start to drilling at the Peach Lake target, which has a geophysical anomaly that is similar to Spout.

VEIN AND BRECCIA PROJECTS

Thompson Rivers and Shuswap Lake

Newmac Resources Inc was active at its **Raft Property** located approximately 35 km northeast of Clearwater. The company completed 34 km of magnetometer and VLF-EM geophysical surveying, 52 km of induced polarization geophysics surveying and a soil sampling program. Although the primary target is

intrusion-related gold, perhaps related to Cretaceous granites in the area, a copper-lead-zinc-nickel-in-soil anomaly has been identified which may be indicative of volcanogenic massive sulphide potential.

American Creek Resources Ltd reports the following results from metallurgical work on samples collected from its **Iron Mist** property located 60 km north of Kamloops: DTR tests indicated weight recovery of 73% at 45 microns with an iron grade of 66.3%, silica at 0.4%, 2.6% Al₂O₃ and 3.4% TiO₂; 57% rejection of tails at 80% passing 500 microns and greater than 20% at the first separation size of 80% passing 3mm; and Vanadium content is between 0.6% and 0.8%. More drilling is required.

Cariboo

A remarkable year has unfolded for Barkerville Gold Mines Ltd at its **Cariboo Gold Quartz** and **Bonanza Ledge** projects located substantially on Cow and Barkerville Mountains near Wells. These projects contain seven past producing mines and two proposed open pit mines in the Barkerville gold camp – a central feature of the province's gold rush history. The company undertook a massive effort this year successfully demonstrating there is outstanding potential for additional discoveries.

An estimated 55 000 m of drilling was directed toward expanding resources in, around and below current resources at the proposed Cariboo Gold Quartz and Bonanza Ledge open pits, BC Vein and additional discoveries the company has made.

Near the Cariboo Gold Quartz proposed pit the company has targeted a large increase in resources by extending the open pit another 100 meters below the current calculated depth. By mid-year up to six drills were making some highly encouraging discoveries such as hole CM11-25B which was located outside and below the current pit design and intersected 19.9 m of 83 g/t Au (Figure 11). Improved understandings of the orientation of the hole indicate it cut structure sub-parallel so the true width will be reduced somewhat, but the discovery is none-the-less significant. The intersection has brought to light the significance of a quartz-cosalite (Pb₂Bi₂S₅) relationship to high-grade gold mineralization in addition to more typical pyrite-quartz relationship. Similarly, hole CM11-102 intersected the zone in a similar orientation and yielded 62.3 m of 14.2 g/t Au. This new zone appears to have a current explored strike length of over 300 m and is subject of ongoing drilling. The huge volume of information on the project makes for challenging interpretations, but the company reports a second zone has been encountered parallel to the one defined by hole CM11-25B. In this second zone hole CM11-85 has cut 3.4 m of 459 g/t Au at a depth of approximately 307 m and reinforces the significance of the visible gold-cosalite-pyrite-quartz mineralization style. Most quartz veins are hosted in quartzite, phyllite and argillite of the Downey Succession.



Figure 11. A remarkable drill intersection outside of the proposed pit limits at the Cariboo Gold Quartz project of Barkerville Gold Mines Ltd. Hole CM11-25B intersected 19.9 m of 83 g/t Au (not true width) of gold-cosalite-pyrite-quartz mineralization.



Figure 12. The very large BC vein in outcrop near the upcoming Bonanza Ledge mine on Barkerville Mountain near Wells. The vein can be traced for over 2.2 km and attain widths of up to 36 m. Gold mineralization is now being explored for and discovered in both hanging and footwall portions of the vein.

Nearby, on Barkerville Mountain, the company has been equally busy bringing the Bonanza Ledge open pit closer to production with site preparation and road improvements while it waited for *Mines Act* permitting. The BC Vein is a major geological feature and centered on gold mineralization in this part of the camp. The vein has been traced for 2.2 km from the vicinity of the Bonanza Ledge deposit on Barkerville Mountain (Figure 12) through to Cow Mountain where it attains widths of up to 36 m. Within the footwall of the vein lies the Bonanza Ledge deposit where the company has announced discoveries of mineralization this year that are extending the potential of the deposit. Encouraging discoveries are also being made in the hangingwall portion of the vein such as hole BCV11-06 that intersected 14.1 m of 6 g/t Au. The company has not closed off the mineral potential of the BC Vein along strike or at depth.

Barkerville Gold Mines Ltd completed the purchase the Goldstream mill, currently located north of Revelstoke, with the intention of relocating it to the Barkerville Gold Camp, refurbishing it and increasing the capacity to 3000 t/d with an eye to bringing it on-stream in 2013. The company purchased several strategic properties this year as well including the Antler Creek, Craze Creek, Roundtop Mountain, Myrtle-Prosperpine and Promise properties to firm up its assets in the camp.

Noble Metal Group Incorporated explored its holdings northwest of Cariboo Lake at the **Cariboo Mineral Gold** Property. Centered on the historical Keithly Creek area, the company is exploring for gold-bearing quartz veins hosted in Hadrynian(?) to Paleozoic aged metasedimentary rocks of the Snowshoe Group. This year the company focussed on the Weaver Creek area where it completed geochemical and geophysical surveys.

Chilcotin

Sona Resources Corp. undertook drilling at both the **Elizabeth** mesothermal gold-vein deposit (developed prospect) and **Blackdome** epithermal gold-vein deposit (past producer). Their intention is to bring Blackdome into production within two years while advancing development potential of the Elizabeth.

At Elizabeth, surface drilling consisted of 3182 metres (in 20 holes) and underground drilling of 4173 metres (in 35 holes). In the surface drilling program, fifteen of the holes tested the southwest and northeast on-strike extensions of the Southwest vein, to add resources to inventory, while the five holes on the No. 9 Vein tested the structure for additional gold mineralization. The 35 holes in the underground drilling program were collared from the Upper Adit and drilled into the West Vein (24 holes), the Main Vein (7 holes), and the Southwest and D veins (4 holes). The company reports that drilling has furthered understanding of structure, continuity, mineralogy and grade.

At Blackdome, surface drilling consisted of 3176 metres (in 16 holes). The exploration program was designed to drill for new gold-bearing structures or extensions of known areas of mineralization, and to outline potential areas for economic development of gold-bearing ore. One highlight of the program is a hole drilled in an area south of any previous drilling (BD11-08) that returned an assay of 13.6g Au/t over 1.50 metres core length. Sona reports that this has opened up a new area of potential high-grade gold mineralization for future drill testing.

Fraser River

Altair Ventures Incorporated has released the first resource calculation for the **Prospect Valley** property located 30 km west of Merritt. Based on 6940 m of drilling the North and South Discovery zones contain 10.08 Mt of 0.511 g/t Au at a 0.3 g/t cut-off grade. At the zones, low-sulphidation epithermal gold mineralization is controlled by a northerly-trending, moderately-dipping fault zone which has been traced over 1500 m in strike length. Further prospecting on the property this year discovered new mineralization and potential outside the Discovery zone, including a grab sample that assayed 6.2 g/t Au in an area uphill from last season's significant Northeastern Extension zone (NEZ) discovery. Last winter an abbreviated 722 m drill program tested the NEZ to discover its mineralization potential and relationship to the Discovery zones: a lack of significant values shows more work is required to better understand how the zones may be related.

Westhaven Ventures Inc conducted the first ever drill program at the **Shovelnose** epithermal gold property located 30 km south of Merritt. The Line 6 and Mik showings were tested in a modest program where previous trenching produced encouraging gold-mineralized intervals. Exploration on the property has generated two new prospective areas that lead to the acquisition of an additional 5287 ha of tenures and follow-up prospecting and geochemical surveying. Mineralization has been previously reported to be related to shallow to moderately west dipping colloform-banded quartz veins hosted within silicified and clay altered felsic volcanic rock of the Cretaceous Spences Bridge Group.

Gold Bridge-Bralorne-Lillooet

The most advanced project in the famous Gold Bridge mesothermal gold-quartz vein camp is at the **Bralorne** mine of Bralorne Gold Mines Ltd. It operated continuously from 1928 to 1971 and was the dominant contributor to the approximately 130 million grams (4.15 million ounces) of gold produced at this camp. Infrastructure on the property includes extensive underground workings, a partially completed tailings pond and a 100 t/d gravity/flotation pilot mill.

Although not fully operational, significant work on the site is being completed in preparation for the resumption of formal production. On May 27 the company celebrated an official opening of operations at the project with the pouring of a gold-silver dore bar estimated to contain 7900 grams of gold and 1835 grams of silver. Since then the mill has been tested with roughly 70-75 t/d of stockpiled ore brought up from several veins being mined. By the third quarter almost 10 000 tonnes of ore grading 7.9 g/t Au had been processed.

Underground exploration work started in earnest in April with the start of a roughly 300 meter decline to access the BK3 zone where several sub-levels and raises

are proposed to test the zone for mill feed. The zone was reached in late November and the first results included an un-cut grade of 10.44 g/t over 4.4 m in horizontal channel samples. Surface drilling of the BK3 Zone was conducted this year as well as other parallel structures in an around the BK zone. In the BK Gap, north of the BK zone, the company intersected the highest grade encountered to date in their exploration of the property: hole SB11-21 cut 1764 g/t over 0.9 m and represents the discovery of a new structure parallel to the BK vein.

After a lengthy period of land-use uncertainty significant exploration occurred at the **Eldorado** gold project which is partially contained within a mining and tourism area established under the *Environment and Land Use Act* (Figure 13). In a portion of the province where the metallic mineral potential was characterized as some of the highest rank having modern exploration is welcomed. Gold Fields Horsefly Exploration Corporation undertook a helicopter supported drill program as part of a first pass exploration effort to test some of the previous high-grade gold mineralization known to exist (Figure 14). Mineralization is genetically related to the Late Cretaceous to Paleogene Eldorado stock, a four by two kilometer quartz diorite to granodiorite body and associated hornfels alteration. Nearby, the Robson deposit was mined in 1939 and 1940 producing a total of 34 tonnes of ore which yielded 18 kg Ag, 2.2 kg Au, 193 kg Cu and 2640 kg Pb. In 1986, a 0.79 m drill interval of the vein structure assayed 469 g/t Ag and 45 g/t Au.

Okanagan

Gold Mountain Mining Corp (formerly Beanstalk Capital Inc) acquired the **Elk** project from Almaden Minerals Ltd in June 2011. The mesothermal gold-quartz vein project is located midway between the towns of Merritt and Peachland. In the 1990s, the Elk deposit produced 1.6 million grams of gold from 16 700 tonnes of ore extracted from open pit and underground operations. The company completed 14 000 m of drilling in 77 holes this year. Highlight intercepts of the first 45 holes included hole SND11-128 returning 1.60 m of 159.9 g/t Au and 118.3 g/t Ag. The positive results demonstrate the potential that a viable mining project could be launched on the Elk property. A resource update, to include the 2010 and 2011 drill results, is to be conducted.

Bitterroot Resources Ltd announced surface exploration plans on the **North Brenda** property near Peachland where the company is exploring for two styles of mineralization: porphyry copper-molybdenum mineralization similar to the closed Brenda Mine and structurally-hosted epithermal gold similar to the nearby Elk deposit.

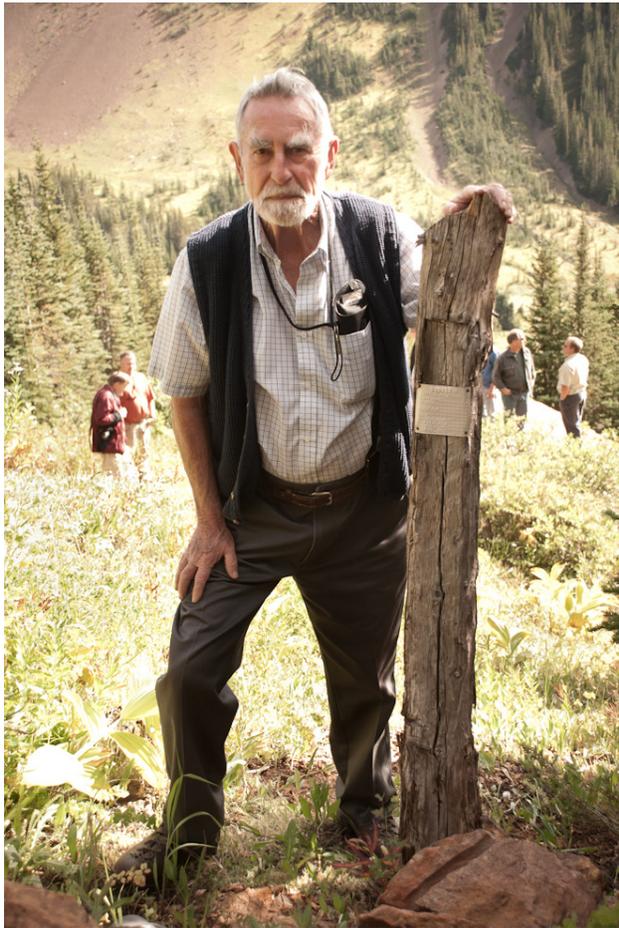


Figure 13. Prospector Mel Stewart persevered many years of land planning to realize the opportunity to explore in the Eldorado Basin near Goldbridge. After the release of this area from protected status, modern exploration is underway (photo courtesy of John Hunter).

Similkameen River

Exploration at the **Treasure Mountain** project of Huldra Silver Inc. consisted of 5073 metres of drilling (51 holes) that was focused on delineating the upper 150 metres of the mine and extension of underground workings. The project is located in the headwaters of Tulameen River.

SEDIMENT-HOSTED GOLD PROJECTS

Cariboo

Spanish Mountain Gold Ltd. announced the discovery of new zone of mineralization in northern Cedar Creek approximately 2 kilometres west of the Main zone. In this discovery, called the **Phoenix Zone**, mineralization grading about 0.5 g/t Au can be traced for at least 1 kilometre strike length.

Tiex Inc, reports that a 7000 metre drill program commenced in October at the **Gold Creek** project. Plans are for 1 000 metres of diamond drilling to be followed by 6000 metres of reverse circulation drilling. Results are pending.

STRATIFORM SULPHIDE PROJECTS

Thompson Rivers - Shuswap Lake

Ruddock Creek zinc-lead deposit (owned by Imperial Metals Corporation) reports that exploration in 2011 consisted of underground drilling (76 holes; 14 133 m), and extension of the decline by 309 m (to a total of 1 303 m from surface) in the E zone, as well as surface drilling (10 841 m) in the Creek, V, Q zones. Exploration data will be used to update the company's July 2009 NI43-101 resource estimate. Underground drilling confirmed that the E zone can be traced continuously over 450 metres (east-west) and 500 metres (north-south). The deposit is described as sedimentary exhalative, Monashee or Broken Hill type, within marble, gneiss and calc-silicate rock.

Yellowhead Mining Inc. reports ongoing exploration at the **Harper Creek** copper-gold-silver deposit (now the BC Environmental Assessment Office review process). Activity in 2011 consisted of definition drilling (30 000 metres planned) to refine the ore zone and provide a basis for further metallurgical and feasibility work. One hole from their winter program (HC11-87) returned the best intersection on the property to date: ~242 metres of 0.39% Cu, 1.6 g/t Ag and 0.037 g/t Au.

Southeast of Barriere, Bitterroot Resources Ltd completed geological mapping and gravity surveys on its **SPN** project this year to define drill targets.

Geologist Leo Lindinger continued exploring his **Argent** property located near the Raft River and northeast of Clearwater. Described as manto-type mineralization, last year's chip results gave some outstanding zinc results such as 905692 which graded 40.5% Zn, 12% Pb and 160 g/t Ag and 905693 that gave 13% Zn, 5.1% Pb and 75 g/t Ag.

Cullen Resources reports the discovery of high-grade zinc mineralization on the **TL** property located 5 km east of Mabel Lake on Tsulus Creek. The discovery results from follow-up work on thallium and cadmium anomalies in Douglas fir needles collected from helicopter. Trench results have yielded up to 3 m of 8.98% Zn in a pyrite-pyrrhotite-sphalerite-zone within calc-silicate marble, biotite schist and micaceous quartzite. Anomalous molybdenum and rhenium are also reported but may be related to more recent granitic intrusive rocks in the area. In October, a HeliTEM (helicopter borne electromagnetic) survey was flown over the project area in order to characterize the known mineralization and prioritize targets.



Figure 14. Examining a geological map of the Eldorado gold project which was drilled using helicopter support this year: the first intense exploration of this high-grade gold project since the mid-1980's (photo courtesy of John Hunter).

Cariboo

Barker Minerals proposed drilling its **Blackbear** high-grade silver-gold-lead vein prospect located 74 kilometres northeast of Williams Lake. The program is a follow-up to last year's program that included grab samples reporting up to 3976 g/t Ag, 7.5 g/t Au, and 59 % Pb at the Providence target and 2.1 g/t Au at the Hunt vein. Chip samples from the Hunt vein reported 1165 g/t Ag and 37.1% Pb over a 1 metre width. The company also released results from 2010 trenching at its **Cariboo Zinc** project, located approximately 35 kilometres northeast of Likely. Chip sampling of this Kuroko-style polymetallic sulphide (VMS) target returned values of 29 g/t Ag, 20% Zn, and 6% Pb, over an 8 metre length in a section of the Main zone.

MAGMATIC PROJECTS

Thompson Rivers and Shuswap Lake

In November 2011, Commerce Resources Corp. released a preliminary economic assessment **Blue River** tantalum and niobium project, 30 km north of Blue River. The assessment concludes that the deposit can be developed economically as an underground mine and recommends further work to support a pre-feasibility study. The company carried out definition drilling (8715 metres; 34 holes) on the Upper Fir zone. Work in preparation for a revised resource estimate is underway.

Similkameen River

Near Tulameen, private company Magnetite Ridge Metals and Minerals Ltd of Kamloops, continued to investigate its large magnetite deposit located at its

Magnetite Ridge project within the Tulameen Ultramafic Complex. The company plans to apply for permits to allow small scale mining and build a pilot plant on-site to experiment with ore processing.

OUTLOOK FOR 2012

Mining operations should officially commence at the New Afton and Bonanza Ledge projects.

As mine evaluation projects submit required baseline studies, the next stages of the review process will be triggered. A Federal decision on New Prosperity is expected towards the end of 2012.

Most of the exploration projects that were active in 2011 have generated positive results and thus remain on track for advancement, barring downturns in metal markets or crises in international finance.

GEOSCIENCE NOTES

The terranes used in base maps are from a new interpretation for the northern Cordillera that was published in December 2011 (Colpron and Nelson, 2011). Digital files are available from web sites of the BC Geological Survey and Yukon Geological Survey.

Of interest to the Thompson-Okanagan-Cariboo and Kootenay-Boundary regions is a new terrane, the Okanagan, that extends between Kelowna and Castlegar. For a discussion of the Okanagan terrane, its genesis and rationale, see Colpron and Nelson (2009).

In December 2011, Geoscience BC announced the release of regional 3D inversion modeling of airborne gravity and magnetic data in its QUEST-South Project.

EXPLORATION AND MINING IN COAST AREA, BRITISH COLUMBIA

By Bruce Northcote, PGeo
Regional Geologist, Vancouver

SUMMARY AND TRENDS

This report will cover the provincial government's Coast Area natural resource sector, comprising the South Coast and West Coast Regions including Haida Gwaii. This area has one major metal mine and one coal mine, both long-lived operations (45 years and 25 years respectively), and both have active exploration programs. Neither has stated an anticipated date of closure due to exhaustion of reserves. There are also numerous industrial minerals and aggregates operations in the Regions serving local and international markets. Active in 2011 were at least seven industrial minerals quarries, more than ten stone quarries and hundreds of aggregate mines, including some of the largest in Canada. There is one proposed coal mine progressing through the federal and provincial environmental assessment processes and one large gravel quarry also pursuing federal and provincial environmental certifications.

Exploration expenditures in the Coast Area were at a record high in 2011 at more than \$16 million (Figure 1). Exploration drilling totalled almost 50 000 m (Figure 2). Recently spending in the region has been dominated by programs at the major mines together with five to ten large projects (Figure 3). The past year was no exception with large programs at Myra Falls Operations and Quinsam coal, as well as ongoing environmental and feasibility work on the Raven coal project, major drill programs at the Pearson and Brynnor iron ore projects and significant expenditures on several porphyry prospects (Figures 4 and 5). Six projects in the region had expenditures of approximately \$1 million or more. Gold exploration projects were smaller on average. Some gold vein projects could be brought into production with relatively modest investments of capital.

Based on a survey of the Area's largest producers, the construction aggregates industry shows a continuing recovery in sales over 2009-2010. Those supplying industrial minerals, including those to the local cement industry, generally report production and sales similar to 2010.

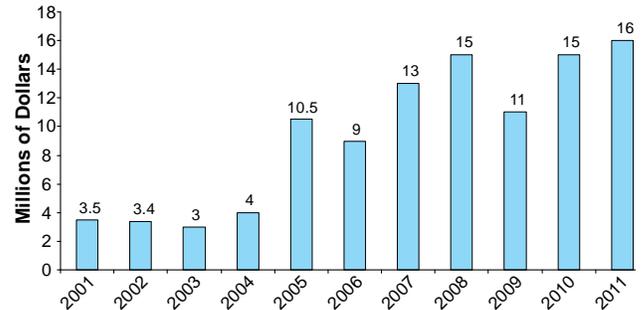


Figure 1. Exploration spending estimates for the Coast Area 2001-2011. The addition of Haida Gwaii to the region in 2010 had negligible impact on the statistics.

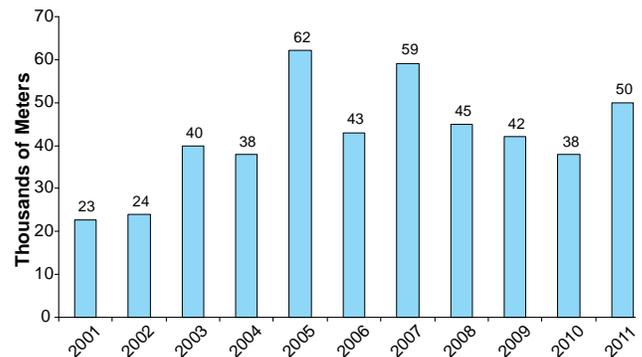


Figure 2. Exploration drilling in the Coast Area 2001-2011.

MINES AND QUARRIES

The location of operating mines and selected exploration projects are shown in Figure 3. Mine production and reserves statistics are given in Table 1.

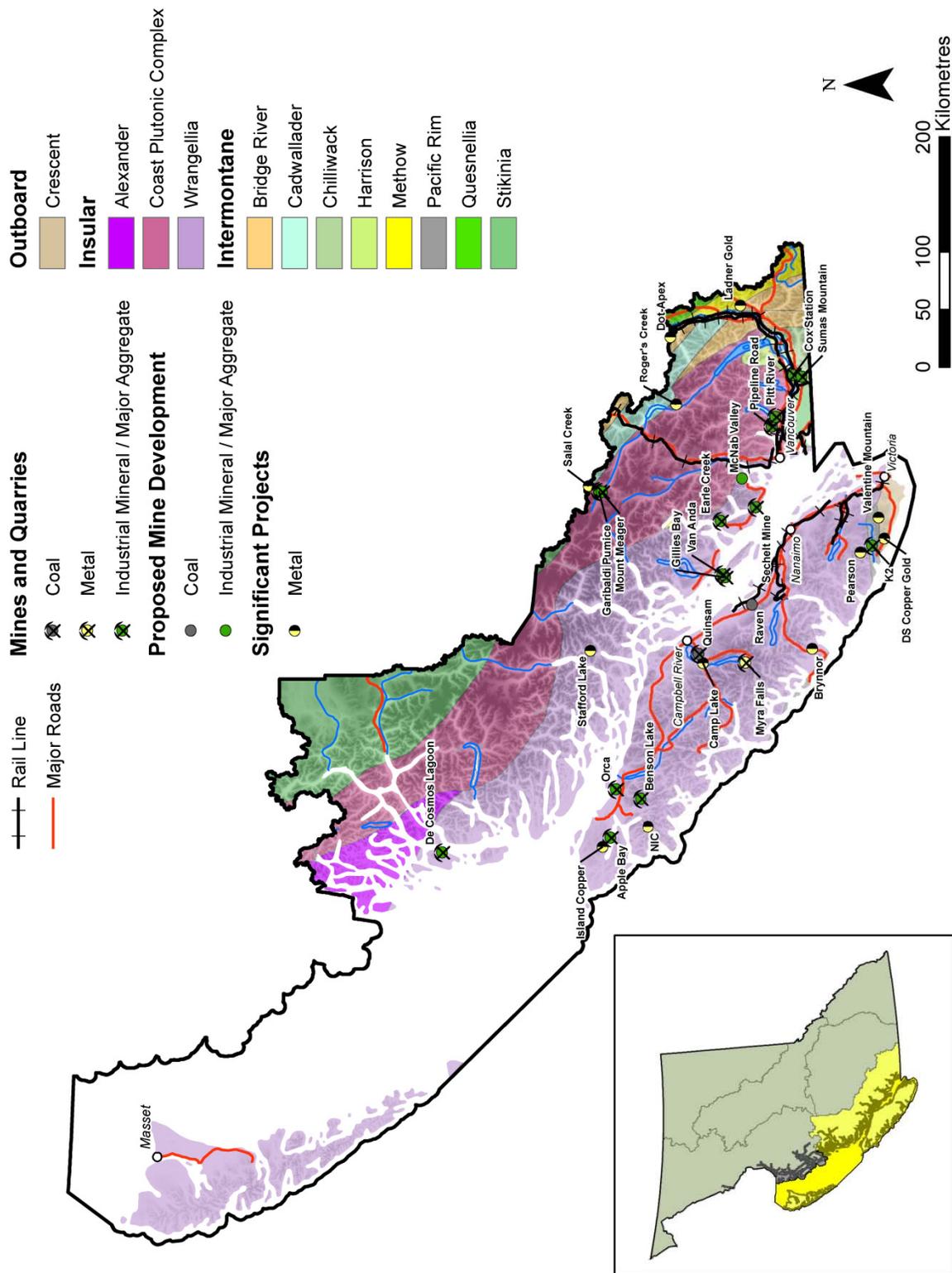


Figure 3. Operating mines and selected major exploration projects in the Coast Area, 2011.

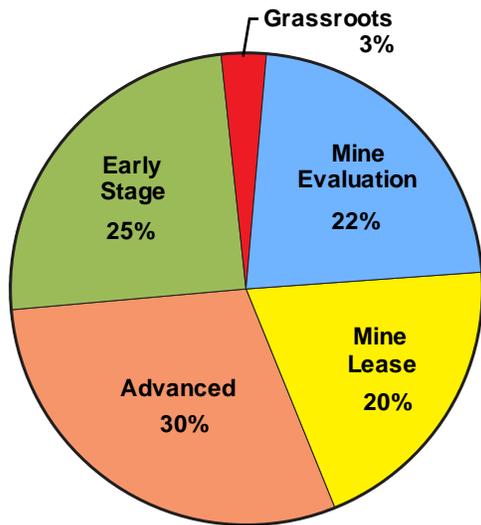


Figure 4. Coast Area exploration spending by exploration stage, 2011.

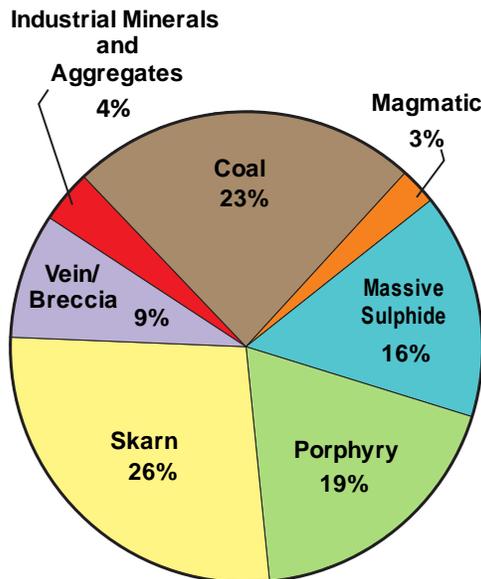


Figure 5. Coast Area exploration spending by primary target type.

METAL

The Coast Area has one metal mine, **Myra Falls Operations** (MINFILE 092F 071,72,73,330), now owned by Nyrstar, N.V, a large vertically integrated zinc mining and smelting company with head offices in Zurich. Formed through a combination of materials and smelting companies in 2007, Nyrstar began expanding upstream into zinc mining in 2009. It acquired Breakwater Resources Ltd, owner of Myra Falls Operations, in 2011. Located in Strathcona-Westmin Class B Provincial Park, this underground mine continued to perform well through 2011. Strong metals prices, recent efficiency

improvements and exploration successes have all contributed to a turnaround in the mine's prospects. A new 20-year mine plan is under consideration. The camp has a history of replacing reserves and there remains significant exploration potential. Once again, management indicates that over the course of the year, mined reserves have been replaced through exploration and suggests that in the long term the factor limiting operational life is more likely to be space for tailings disposal than exhaustion of ore reserves. Proven and probable reserves as of Dec 31 2010 were 6 255 million tonnes 4.9% Zn, 0.5% Pb, 0.9% Cu, 43 g/t Ag and 1.3 g/t Au.

The mill was designed for throughput in excess of one million tonnes per year, but since 2008 the mine has intentionally operated closer to half a million tonnes, recognizing limitations imposed by current underground infrastructure. This has improved overall efficiency. As of late 2011, the mine employed 253 people plus seasonal and some full time contractors. (Figure 6)

Another change since 2008 has been an exploration program focused less on known but undefined outlying deposits and focused more on identifying lenses and extensions closer to existing underground infrastructure. This effort proved successful and in several cases, newly-discovered lenses of high grade ore could be mined within a short time, averting an anticipated 2009 closure. (Figure 7).

In 2011, a significant part of the operation's ongoing exploration effort focused on the Marshall Zone, located northwest of current mining operations. An exploration track drift on 2400 level reached the deposit and drilling from platforms near the Marshall Zone began defining the resource, upgrading it from inferred to measured and indicated categories. The drift also passed through part of the ore body, and approximately 1000 tonnes were mined and milled successfully. There was also underground development at the Price Mine. Exploration is expected to proceed at about the same levels in 2012 as 2011. There is to be development toward the Marshall Zone on 18 level and to another zone (Ridge West) on 18 and 24 levels.

Myra Falls was the site of proof-of-concept testing of muon geotomography by Advanced Applied Physics Solutions (AAPS), affiliated with the TRIUMF particle physics laboratory. Using the natural flux of cosmic particles and sensors placed underground, hidden ore bodies can be detected on the basis of their density. Testing was a technical success and AAPS announced plans to commercialize the new geophysical exploration technique. The muon project will also continue at the mine.

The Myra Falls camp comprises a number of Kuroko type, or bimodal felsic type VMS deposits, mined since 1966, mostly by selective underground methods. Lenses are typically dominated by zinc (sphalerite) mineralization with significant copper, gold and silver mineralization. A lead concentrate is also produced.

TABLE 1. FORECAST MINE PRODUCTION, COAST AREA, 2011

Mine	Operator	Commodities	Mine Workforce	Forecast Production 2011	Production 2010	Reserves as of Dec 31, 2010
Metals						
Myra Falls Operations	NVI Mining Ltd (Nyrstar N.V.)	Zn-Cu-Pb-Au-Ag	253 +contractors	N/A (approximately) 0.5 Mt mill throughput)	32 686 t Zn 4769 t Cu 511 t Pb 622.2 kg Au 22 793 kg Ag (metal in concentrate)	6.255 Mt 4.9% Zn 0.5% Pb 0.9% Cu 1.3 g/t Au 43 g/t Ag (proven and probable)
Coal						
Quinsam	Quinsam Coal Corporation (Hillsborough Resources Ltd.)	Thermal coal	approx 140	480 000 t clean coal	445 000 t clean coal	N/A (Developing 5,10,15 year plans)
Industrial Minerals						
Apple Bay (PEM 100)	Electra Gold Ltd.	Chalky geyselite	8	N/A	55 112 t	~5 million t
Benson Lake	Imasco Minerals Inc.	White marble	4	26 000 t	29 000	100+ years
Blubber Bay	Ash Grove Cement Company	Limestone aggregate, dolomitic limestone	Care and Maintenance most of 2011 - re-opening for indiv. contracts			100+ years
Garibaldi Pumice	Garibaldi Pumice Ltd.	Pumice	4	5200 t	30 000 m3	100+ years
Gillies Bay	Texada Quarrying Ltd. (Lafarge North America Inc)	Limestone, aggregate	65	3.3 Mt	3.5 Mt	100+ years
K2	K2 Stone Quarries Inc	Building Stone	4	16 000 t	16 000 t	N/A
Monteith Bay	Lehigh Hanson Inc.	Geyselite	Care and Maintenance 2008-2011			
Mount Meager	Great Pacific Pumice Ltd	Pumice	2	500 t	5500 m3	100+ years
Sumas Mountain	Sumas Shale Ltd. (Clayburn Industrial Group and cement manufacturer partners)	Sandstone and shale	10	381 000 t	365 000 t	~70 years
Van Anda	Imperial Limestone Company Ltd (JA Jack & Sons Inc.)	Limestone	8	227 000 t	230 000 t	~50 years



Figure 6. A scoop leaves the underground shop at Myra Falls. The mine has a new owner, Nyrstar N.V. In the past few years the mine's efficiency has improved to the point where not only has early closure been averted, but a long-term mine plan is in preparation.

Devonian Sicker Group rocks host the mineralization at Myra Falls, which is in the Buttle Lake uplift, where Sicker Group basement is exposed along a northwest trending antiform roughly in the centre of Vancouver Island. Ore bodies are found in two horizons in the Myra Formation.

Sicker Group forms the basement of Wrangellia on Vancouver Island and hosts over 30 VMS occurrences, including past producers at Mount Sicker (MINFILE 092B 001-3). The Lara property, located 8 km west-northwest of Mt Sicker has a modern resource estimate for the Coronation zone (MINFILE 092B 129), but remains undeveloped. Other VMS occurrences within the Sicker Group have been the subject of exploration programs in recent years.

COAL

The **Quinsam** coal mine (MINFILE 092F 319) of Hillsborough Resources Ltd. is located approximately 20 km south west of Campbell River on central Vancouver Island (Figure 8). It has produced thermal coal since 1986 from coal measures within the Comox Formation, part of the Upper Cretaceous Nanaimo Group. Currently it is an underground room and pillar operation employing continuous miners. The yearly target is approximately half a million tonnes clean coal; actual 2011 production is forecast at 480 000 tonnes. The mine workforce is about 140.

The mine began as a small open pit operation, but became exclusively an underground operation by 1994. British Columbia does not generate coal fired electricity, and the thermal coal is shipped to local cement plants as fuel for the kilns and shipped around the Pacific to the power industry. Sales in 2011 are roughly one third to the cement plants, similar to 2010, with the majority of product now exported by freighter from facilities on Texada Island and Neptune Terminals in North Vancouver.



Figure 7. A face at Myra Falls in the North Slope zone, showing a contact between bedded tuff (below) and ore clast breccia.

Hillsborough Resources Ltd is owned by private energy trader Vitol B.V., and as such, details relating to reserves are not routinely made public. Prior to the 2009 takeover by Vitol, Hillsborough Resources published an estimate of 22 million tonnes proven and probable in situ reserves, but this figure is no longer cited by the current company, which is in the process of developing new five, ten and fifteen-year mine plans.

Approval of a mine plan for 7-South Area is pending (as of December 2011), although a decision is anticipated shortly, subject to final environmental testing. The 7-South is a higher sulphur coal (1.5-2% as compared to 0.5% mined to present). A key consideration in development and approval of the 7-South mine plan is the disposal of potentially acid generating rejects. Quinsam is permitted to store coarse rock rejects underground and is currently studying underground tailings disposal whereby potentially acid generating material could be injected into caved workings and flooded. The 7-South area is to produce for 1 ½ years at approximately the current rate of mining. Additional reserves have been delineated at the 242 area to the southeast. The area between 7-South and 242 was subject of on-site exploration drilling in 2011 (approximately 3500 m in 35 holes). Another area,



Figure 8. The preparation plant at Quinsam coal mine near Campbell River. The mine produces and ships approximately half a million tonnes clean coal per year. Photo courtesy Hillsborough resources Ltd.

Quinsam North, lies to the north across the Quinsam River from 7-South and represents an undeveloped resource, which was subject of exploration and resource definition approximately five years ago under previous ownership. Current ownership has not announced plans for the area. They have supported off-site exploration as well as on-site, beginning last year at Quinsam East, about 8 km from the mine site. Further drilling there is planned early in 2012, subject to permitting.

INDUSTRIAL MINERALS AND AGGREGATES

Industrial minerals and aggregates are major components of the mining industry in the Coast Area and are for the most part linked to the local construction industry and to a lesser extent also in targeted export markets.

INDUSTRIAL MINERALS

Electra Gold Ltd.'s **Apple Bay** chalky geysirite quarry (MINFILE 092L 150) on northern Vancouver Island is expected to ship lower volumes in 2011, as compared to 2009 and earlier. The company is considering a port facility on the west coast of Vancouver Island, which could reduce hauling costs. The silica-alumina products are sold to Ash Grove and Lafarge cement plants in Seattle and Richmond. During the exploration phase of the project there were several million tonnes of material outlined (not represented as a compliant resource), with surface and subsurface samples averaging 83.26% SiO₂, 12.90% Al₂O₃ and 0.08% SO₃.

For more than 25 years, Imasco Minerals Inc has mined a high-brightness white calcium carbonate at its **Benson Lake** quarry (MINFILE 092L 295) on northern Vancouver Island. A typical analysis is 95% CaCO₃, 4.4% MgCO₃, 0.1% Fe₂O₃ and a dry brightness of 95. Most of the product finds application as high-brightness white filler in paints, coating and PVC among other products. Production and shipments remain very similar to 2010. They expect to produce just over 26 000 tonnes in 2011 and have shipped 28 300 t. The product is barged from Port Alice to Imasco's Surrey location. The quarry has three employees plus contractors.

Ash Grove Cement Company's **Blubber Bay** quarry (MINFILE 092F 479) was placed on care and maintenance in early 2011, temporarily resuming production to fulfill an order between February and May 2011. Currently, workers can be called back and production will be resumed as new contracts are obtained. The quarry produces limestone for aggregate as well as a dolomite product. In recent years it has shipped up to a million tonnes annually from a barge facility at the site. It dates back to 1907, when the Blubber Bay Syndicate constructed a lime kiln at the site.

Lafarge North America operates a large limestone quarry near **Gillies Bay** (MINFILE 092F 395) on Texada

Island, under a subsidiary Texada Quarrying Ltd. It is expected to ship just over 3.3 million tonnes in 2011, similar to 2009 and 2010. The number of hourly workers is currently 66 plus 17 salaried staff. The large majority of its limestone product is limestone used in cement manufacture and shipped to area cement plants, while some limestone and dyke-rock are sold as aggregate. In addition to barges, the out-loading facility can accommodate Panamax freighters and has the capacity to serve other customers, such as Quinsam Coal, which requires reloading of products from barge to freighter for export.

The Imperial Limestone Co Ltd quarry near **Van Anda** (MINFILE 092F 394) is owned by J.A. Jack & Sons Inc of Seattle. It expects to produce and ship approximately 227 000 t. At current rates of production, reserves are sufficient for approximately 50 years. Nearly all shipments go to the Seattle parent company, a processor and supplier of industrial and agricultural calcium carbonate products. The majority is used in the construction industry, but a significant amount of the product is also used in the manufacture of glass containers. There are a number of other applications. Their chemical grade products have a CaCO₃ content of 97% or better. Sulphide mineralization has in the past been observed and sampled by quarry staff around the edges of the quarry, returning zinc, silver, lead, copper and gold values. Northstar Mining Ltd has also investigated reported gold concentrations in the limestone.

There are two fully-permitted pumice quarries in the **Mount Meager** (MINFILE 092JW 040) area north of Pemberton. These operate seasonally, closing in the mid to late autumn, when snowfall at that location makes mining and truck transport impractical. Both quarries experienced lower sales in 2011 as compared to 2010, citing lower demand for lightweight aggregate, high fuel costs and competition from other sources. There is optimism for the coming year and continuing effort to expand the market beyond lightweight aggregate. Potential uses of the product are many, but as with many industrial minerals products, markets must be identified and developed. Garibaldi Pumice Ltd. reports sales for horticultural uses, concrete uses (including fire-resistant products) and cosmetics. Research continues into pozzolanic properties of the Mount Meager pumice. In 2011 Garibaldi Pumice reports production of 5200 tonnes. Great Pacific Pumice Inc. had production and sales of approximately 500 tonnes, mainly for use as lightweight aggregate.

The **Sumas Shale** quarry on Sumas Mountain (MINFILE 092GSE024, 092GSE004) is owned by Clayburn Industrial Group Ltd, operated by contractor Fraser Pacific Enterprises Inc. and delivers most of its sandstone and shale product to cement plants in Richmond and Seattle through a joint venture with Lafarge North America (Sumas Shale Ltd). The quarry is on track to produce over 381 000 t in 2011. Clayburn's

brick and refractory products plant in Abbotsford closed in the summer of 2011. The company will continue to manufacture brick and refractory products at plants in China, India and the US. It has not announced plans to close the Sumas quarry.

Glacial Marine Clay

The largest producer and supplier of glacial marine clay in BC (and possibly the world) is the Ironwood Clay Company with a quarry at **De Cosmos Lagoon** (MINFILE 092M 019) on the Central Coast, approximately 25 km south of Bella Bella. They removed 340 tonnes of material in early 2011. Glacial marine clay has applications in medical, skin care and cosmetic products. Ironwood supplies a number of skin care and cosmetic companies. The manufacturing facility is located in Richmond, British Columbia.

There are other companies and individuals who collect glacial clays periodically on a smaller scale, in some cases by hand such as Precision Laboratories Ltd. King Island clay is sold through Aviva Natural Health Solutions Inc. Glacial Marine Clay Inc (formerly Carrie Cove Cosmetics) ceased supplying cosmetic clay in 2010, but is developing another deposit and can reportedly once again supply cosmetic grade clay in limited quantities.

Dimension Stone, Landscaping Stone

A number of quarries produce decorative stone in the Coast Area. Proximity to road infrastructure and growing population centres makes these operations feasible. Some are small and operate intermittently or seasonally. There is in many cases a local value-added aspect to the business as stone is dressed and polished.

Adera Natural Stone Supply Ltd supplies **Haddington Island** andesite (MINFILE 092L 146) from a historic quarry that re-opened in 2004. The product is a durable, resistant Miocene volcanic rock (70.5% silica) with a dry crushing strength of 18 428 psi, valued for its ability to sustain carving and hold edges. They shipped approximately 850-1000 tonnes in 2011, similar to 2010. The finished product can be found on many prominent buildings (notably the British Columbia Parliament Buildings) and is being used for several restoration projects in Vancouver: City Hall, Sinclair Centre, Hotel Vancouver, Holy Rosary Cathedral and the Via Rail Building.

The **K2 Quarry** (MINFILE 092C 159) near Port Renfrew on Vancouver Island, operated by K2 Stone Inc. is expected to ship over 16 000 t in 2011, similar to 2010. The product is a fine metasediment with slaty partings used as building stone and as landscaping stone. The quarry employs 4 directly, but the growing company has generated more than 60 other jobs. It has recently acquired another quarry in Montana.

There are other smaller producers making use of the Leech River Complex slates, for example **Van Isle Slate**

(MINFILE 092C 154) whose quarry is approximately 21 km east of Port Renfrew. VanIsle Slate reports growing sales and over the past few years they have moved from a successful test marketing phase into more regular though small scale production. To date they have served the local market on Vancouver Island.

Matrix Marble & Stone quarries marble on Vancouver Island to produce value-added products such as countertops, sinks, tiles, slabs and blocks at their Duncan shop (Figure 9). They currently have two quarries producing three colours: Black Carmanah from the **Gordon River** quarry (MINFILE 092C 086), and Tlupana Blue and Island White from the **Hisnet** quarry (MINFILE 092E 020, 070). Production in 2011 is similar to 2010's 230 tonnes. They mainly serve the local market.

Northwest Landscape & Stone Supply Ltd. is among the companies quarrying Quaternary Garibaldi basalt-dacite from the sea-to-sky region and probably the largest producer most years. The rock is very fresh (little weathering or alteration) and natural jointing forms slabs and columns desirable for landscaping purposes. They produce from two quarries (**Huckleberry** and **Spumoni** MINFILE 092GNW100) and bulk sample sites.

Bedrock Granite Sales supplies **Hardy Island** Granite (MINFILE 092F 425), mainly for residential and commercial construction. The product is a uniform grey Coast Plutonic Complex granodiorite with widely spaced fractures. Bedrock Granite also supplies other local stone, including volcanics from the sea-to-sky region. Alpine Natural Stone Ltd also quarries stone in the Squamish-Whistler corridor at several locations.

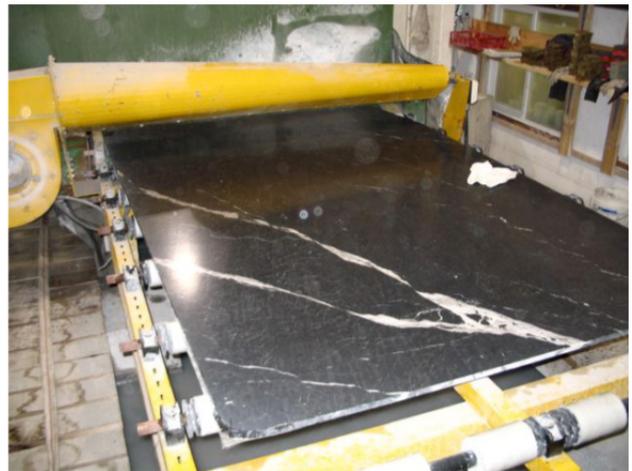


Figure 9. A slab of Black Carmanah is prepared at Matrix Marble and Stone's facilities in Duncan. Matrix in one of several Vancouver Island and Lower Mainland companies offering locally-sourced stone products. Photo courtesy of Matrix Marble and Stone.

MAJOR AGGREGATE MINES

For competitive reasons, not all aggregate producers in the area wish to release details of production, shipments and employment. However, voluntary responses to an informal survey demonstrate that the region continues to support some of the largest quarries in Canada, and that production at these large operations is generally up over 2010 – roughly by about 10%. Although highly mechanized, the ten largest aggregate quarries together generate direct employment for approximately 300 people; this figure does not include transportation and the end use of the product in construction, mostly in local markets (Figure 10). The largest quarries make use of efficient water-borne transportation. Two large sand and gravel producers on the coast have outloading facilities that will accommodate freighters and they routinely export to markets in California and Hawaii.

Polaris Minerals Corporation operates one of the exporters, the **Orca** sand and gravel quarry (MINFILE 092L 220), located near Port McNeill. The company reported a significant increase in sales in the third quarter 2011 over the previous year. Should projected sales meet expectations in the last quarter, 2011 sales will be over 1.6 million tonnes. At rates approaching its full permitted output of 6 million tonnes per year, Orca would have approximately 25 years of reserves. There are also exploration areas which could eventually add to resources.

After several difficult years, recent increases in the San Francisco area infrastructure and commercial building activity have benefited the Orca Quarry, whose business model relies on sales to the California market. They also supply Hawaii and the Lower Mainland. The company estimates their break even volume is in the neighbourhood of 2-2.2 million tons (1.8-2 million tonnes), though this is dependent on changing factors. Polaris has port facilities both at the quarry and in northern California capable of accommodating Panamax class ships.

Jack Cewe Ltd does not wish to publish individual production figures here, but its **Jervis Inlet** operation ranks among the larger producers in the region. Sand and gravel and crushed product are shipped by barge to the Lower Mainland market.

The **Earle Creek** (MINFILE 092GNW102) operation of Lafarge North America is among the largest producers in BC, with 1.15 million tonnes in 2011. Sand and gravel are shipped by barge from the location near Skookumchuck Narrows on Sechelt Inlet. Earl Creek employs 30 people.

The **Sechelt Mine** of Lehigh Hanson, Inc. is one the region's largest sand and gravel operations and produced and shipped approximately 3 million tonnes in 2010 (a forecast for 2011 is not available). In recent years the majority of the product went to the Lower Mainland and Victoria, roughly 20% was exported to California and less than 5% goes to the local Sunshine Coast market. Employment is approximately eighty including contractors. The loadout facility can accommodate



Figure 10. Supporting demand: infrastructure projects such as the Port Mann project, part of the Gateway Program established in 2003, contribute substantially to demand for aggregates in the Lower Mainland market.

Panamax class freighters.

Pipeline Road (MINFILE 092GSE046) in Coquitlam is a major sand and gravel production area with Allard Contractors Ltd, Jack Cewe Ltd and Lafarge North America all producing significant quantities. Jack Cewe Operates the largest, for which production data is not published. Possibly 2 million tonnes or more would be shipped from all quarries combined. The Allard operation alone will produce approximately half a million tonnes, mainly for its own ready-mix plant. They employ thirty directly.

Lafarge's **Pitt River Quarry** (MINFILE 092GSE007) will produce approximately 1.4 million tonnes in 2011. This operation produces crushed rock products and ships both by truck and by barge on the Pitt and Fraser Rivers. This quarry employs forty-five people

Mainland Sand and Gravel Ltd. is a family-owned local business and the third largest aggregate producer in the Coast Area. **Cox Station Quarry**, the largest of Mainland's operations, is expected to ship approximately 2.5 million tonnes in 2011, roughly 10% more than in 2010. Located on the north side of Sumas Mountain, it employs 50 people directly and ships the large majority of product by barge on the Fraser River. The product is a crushed quartz diorite. They estimate very roughly 50+ years of reserves within the current land holdings and at current rates of production.

There are 5 aggregate operations on the south side of Sumas Mountain. Production data are not released for all of these. In total they will probably produce between 2-3 million tonnes in 2011. For example Lafarge's Ward Road Quarry is increasing production and expected to produce 675 000 t in 2011. That operation has twenty direct employees.

MINE DEVELOPMENT AND MINE EVALUATION PROJECTS

Projects in Environmental Assessment

Compliance Coal Corporation continued to advance its **Raven** (MINFILE 092F 333) coal project with a positive feasibility study in 2011. Compliance is majority partner in the Comox Joint Venture, formed to advance the project. Subsidiaries of Itochu Corporation and LG Corp. each hold 20% interest. The project continues in the concurrent British Columbia Environmental Assessment and Canadian Environmental Assessment processes, collecting public comments and working toward finalized application information requirements.

Activity in the field in 2011 focused mainly on environmental studies including groundwater monitoring, for which additional wells were drilled. In total, the Raven resource is included within an area of approximately 3100 ha of largely freehold coal rights in

the Comox Valley, overlying a measured and indicated resource of 97.5 million tonnes of high-volatile A bituminous coal. The Cumberland Member of the Upper Cretaceous Comox Formation contains the economic coal seams, including the two currently considered for underground mining. The regional dip is approximately 10° to 15° to the northeast

A May 2011 feasibility study considers an underground room and pillar operation producing 1.93 million tonnes per year run-of-mine with average annual production of 0.85 million tonnes clean coal. The majority of the product (88%) is to be sold as semi-soft coking coal, with 12% thermal by-product consisting of wash plant middlings of higher ash content. Proven and probable reserves are 29.9 million tonnes. As designed, the mine would have an approximate 17 year project life span, including one year of construction. Total capital outlay is estimated at \$292 million over the life of the mine, which includes initial mine facilities of approximately \$154 million and port facilities of almost \$60 million, assuming the preferred, base case with a travelling ship loader constructed at Port Alberni (Figure 11).

BURNCO Rock Products Ltd's **McNab Valley Aggregate** project on Howe Sound remains in the pre-application phase of the British Columbia Environmental Assessment process and concurrently in the federal process as a project description is finalized. BURNCO's proposal is for initial extraction of approximately 400 000 tonnes of sand and gravel per year from a glacial alluvial fan in the McNab Valley. Production would ramp up to between 1 and 1.6 million tonnes, with possible temporary increases to 4 million tonnes for special projects. The product would be barged from a marine loading facility on the site to BURNCO's ready mix concrete plants in the Lower Mainland. They currently obtain material from the Orca quarry, among others.



Figure 11. The Eukor Morning Spruce roll on/roll off freighter taking on lumber at Port Alberni Terminals. The Raven project's 2011 feasibility study base case includes almost \$60 million for construction of bulk loading facilities and a coal storage area at Port Alberni.

Advancement of the project in 2011 consisted largely of environmental work toward satisfying application information requirements for BC EAO and CEAA certification. There was also a seismic survey in the valley bottom.

Cogburn Magnesium Project (MINFILE 092HSW081) received its section 11 order under the Environmental Assessment Act in 2006. The proponent (at that time North Pacific Alloys Limited) indicated an intention to suspend environmental assessment activities in 2007. There has not been a resumption of the environmental assessment process, however there has been new exploration activity at the property in 2011 by new optionees not focused on magnesium, but seeking Ni-Cu-PGE mineralization. A separate company is re-considering the property's magnesium potential without conducting additional exploration.

The **Hillsbar Aggregate** Project as proposed in 2003 by Qualark Resources Inc. remains in the EAO project list. However, the corporate proponent Qualark is no longer a going concern. The Yale First Nation and other proponents could choose to advance a different project at the same site. At this point placer gold and sand and gravel rights are severed. There have been archaeological studies and recent exploration work by Lehigh Hanson Inc., though none is reported in 2011.

The **Sechelt Carbonate** (MINFILE 092GNW031) project of Pan Pacific Aggregates Ltd also remains on the EAO project list in the pre-application phase, and Pan Pacific Aggregates retains a large mineral tenure land position on the Sechelt Peninsula. A multi-year exploration campaign at the site terminated in 2006. The 2005 project description filed with the BC EAO describes a calcium and magnesium carbonate quarry operating at a rate of 4 to 6 million tonnes per year.

The **Eagle Rock Quarry** (MINFILE 092F 567) of Polaris Minerals Corporation remains undeveloped, though it has a British Columbia environmental certification and a mine permit for up to 6 million tonnes per year. Polaris, operator of the producing Orca quarry, would advance this additional project when demand warrants. Total measured and indicated granodiorite resources are estimated at 757 million tonnes.

EXPLORATION HIGHLIGHTS

This section progresses geographically through the Coast Area in a roughly west-to east and north to south pattern. Of approximately 50 active projects for which information is available, only the largest plus a small selection of other projects are mentioned here. Significant exploration projects are given in Table 2.

Haida Gwaii and Central Coast

In terms of exploration and mining, the Islands of Haida Gwaii and the Central Coast have remained relatively quiet in recent years. There is a proposal by Coastal Construction Aggregates Ltd to ship crushed rock construction aggregate from the site of the former **Tasu** Iron Mine (MINFILE 103C 003). Production would begin with existing waste piles, moving to bedrock quarrying at a later stage. Material would be transported by barge to coastal markets. Taseko's **Harmony Gold** (MINFILE 103F 034) project remains undeveloped with a measured an indicated resource of 64 million tonnes grading 1.35 g/t Au. There are at least two other early stage epithermal gold prospects for which work was reported in 2010, but not for 2011.

On the Central Coast in 2011 is the Yellow Giant project, which lies north of the region covered by this report. South of that property and north of Vancouver Island's inside coast, mineral tenure coverage on the coast is sparse, as is road access and significant exploration projects have not come to the attention of the Regional Geologists in 2011.

Northern Vancouver Island

Western Copper Corporation formed a spin-out company, Northisle Copper and Gold Inc. to explore and develop the **Island Copper-Gold** project on Northern Vancouver Island. The associated property comprises a large position surrounding the former Island Copper mine and extending to prospective areas east and west-northwest of that location. The **Hushamu** (MINFILE 092L 240) deposit is a Cu-Mo-Au porphyry occurrence with a historical resource estimate (Northisle is not representing it as NI-43-101 compliant). The measured+indicated resources are 231 Mt grading 0.27% Cu and 0.31 g/t Au. The inferred resource is 53 Mt grading 0.28% Cu and 0.38 g/t Au.

The fall exploration program included an IP survey on the eastern block, and preparation made for an extensive IP survey on the western block. Approximately 20 km of historic drill core was re-housed on site, re-logged and where analyses had not been obtained historically for some commodities of current interest (gold, molybdenum, rhenium), core was re-sampled. This effort is directed toward updating the Hushamu resource model. While significant molybdenum and rhenium analyses have been reported in the past (see results of the 2008-9 program for example), data for these potential by-products have not been collected consistently over more than forty years of exploration.

Permitting remains in process for the remainder of the planned 2011 program, which will include geophysics and drilling to test possible extensions of the Hushamu deposit. The company has not yet released results of work

TABLE 2. SIGNIFICANT EXPLORATION PROJECTS COAST AREA, 2011

Property	Operator	MINFILE (NTS ref.)	Commodity	Deposit Type	Work Program	Meters Drilled
Brynnor	Ridgemont Iron Ore Corporation	092F 001	Fe (magnetite)	Fe skarn	MG; DD (in prog.)	~11 000
Camp lake	Compliance Energy Corporation	092F 571	Fe (magnetite)	Fe skarn	GC (rock, moss mat); DD (9 holes)	1000
Dot-Apex	Electra Gold Ltd	092ISW055 , 065, 090	Au	veins	DD (5 holes); GC (hist. core)	454.57
DS Copper- Gold	New Shoshoni Ventures Ltd	(092C.050)	Cu, Au	breccia	DD (3 holes)	~300
Island Copper	Northisle Copper and Gold Inc.	092L 173, 177 200, 240, 273	Cu, Mo, Au, Re	Porphyry Cu-Mo- Au	IP; G; GC (core re- log and analysis)	N/A
Ladner Gold	New Carolin Gold Corp	092HNW00 7, 003, 018	Au	veins	GC; AB (762 line km);	N/A
McNab Valley	BURNCO Rock Products Ltd	(092G.053)	Aggregate	sand and gravel	GP (seismic); EN; FS	N/A
Myra Falls	NVI Mining Ltd (Nyrstar Mining N.V.)	092F 071,072,07 3, 330	Zn, Cu, Pb, Au, Ag	VMS	DD; UG: GP (experime ntal)	20 000
NIC	Compliance Energy Corporation	092L 266	Cu, Mo	Porphyry Cu-Mo	IP; GC rock, moss mat); DD (17 holes)	3100
Pearson	Pacific Iron Ore Corporation	092C 022, 023, 025, 027, 091	Fe (magnetite)	Fe skarn	DD (17 holes); EN	~4500
Quinsam Mine	Hillsborough Resources Ltd	092F 319	Coal	sediment ary	DD; PD (35 holes)	3500
Raven	Comox Joint Venture (Compliance Energy Corporation, Itochu Corporation, LG International Corp)	092F 333	Coal	sediment ary	EN; FS	n/a

TABLE 2. CONTINUED

Property	Operator	MINFILE (NTS ref.)	Commodity	Deposit Type	Work Program	Meters Drilled
Rogers Creek	Miocene Metals Limited	(092J.008, 009)	Cu, Au, Ag, Mo	porphyry Cu	GC (rock channel, soil, silt); DD (5 holes)	2070
Salal Creek	Miocene Metals Limited	092JW 005	Mo	porphyry Mo	P;G;GC;D D (two holes)	711
Stafford Lake	Dentonia Resources Ltd	(092K.073, 074, 083, 084)	W, Cu	W skarn	DD (4 holes)	352
Valentine Mountain	Mill Bay Ventures Inc	092B 108	Au	veins	DD (9 holes); TR; GC (rock, soil)	2714

Work Program Abbreviations:

A = access (trail, road construction on claims); AB-EM = airborne electromagnetics; AB-MG = airborne magnetics; AB-RD = airborne radiometrics; BU (X tonnes) = bulk sample (weight in tonnes if known); CD = condemnation drilling; CQ = coal quality testing; CT = carbonization test (coal); DD (Xm) = diamond drilling totalling X metres; EN = environmental baseline studies/monitoring, remediation work; FS = feasibility studies; G = geology, mapping etc.; GC = geochemical sampling (rock, soil, silt etc.); GD = geotech drilling; GP = geophysics (general); IP = Induced Polarization; 3D-IP; MG = magnetics; MK = marketing (primarily for industrial mineral products); MS = metallurgical studies; OB = overburden drilling; OP-BU = open-pit bulk sample; P = prospecting; PD = percussion drilling; PF = pre-feasibility studies; PP = Pilot Plant; R = reclamation; RC = reverse circulation drilling; TR = trenching; UG (Xm) = X metres of underground development; UG-BU= underground bulk sample; UT = UTEM; VLF; WT = washability test (coal)

to date. In addition to the past-producing Island Copper mine, the Hushamu, Red Dog and NW Expo deposits (MINFILE 092L 240, 092L 200) are among several Cu-Mo-Au occurrences along the Island Copper trend north of Rupert and Holberg Inlets (and the Holberg fault).

Compliance Energy returned to the **NIC** property (MINFILE092L 266) in 2011 with a 17-hole, 3100 m drill program (Figure 12); rock and moss mat geochemical sampling; and an IP survey. The principal target at the property is porphyry Cu-Mo mineralization associated with the Late Miocene- Early Pliocene Klaskish River Pluton. This is the youngest porphyry-style mineralization identified on Vancouver Island. The associated plutonic is distinguished by its age, is known to host mineralization, and as such its small, young plutons represent a previously unrecognized target type.

Grande Portage Resources Ltd conducted a ground based geophysical survey at its **Merry Widow** property (MINFILE 092L 044-47, 49, 50) using a proprietary ULF-EM method. The survey was centered on the Merry Widow deposit area. Rock samples were collected from target areas. The company acquired an additional 5111 hectares of mineral tenures following the survey, designed to identify possible extensions to known mineralization in addition to potential new ore bodies. The two main past-

producers on the property were the Merry Widow iron mine, a magnetite skarn, and the **Benson Lake Mine** (MINFILE 092L 091), a copper skarn with silver and gold by products. Grande Portage's current targets are the remaining precious metal enriched skarn deposits. The skarns occur along the eastern intrusive contact of the Merry Widow Pluton (Island Plutonic Suite quartz



Figure 12. Examining drill core at the NIC property, Northern Vancouver Island. Left to right are Jacques Houle, Michelle Ickringill, and Dan Berkshire.

monzodiorite-diorite- gabbro) with Bonanza (Parson Bay Fm) and Vancouver group rocks (Karmutsen volcanics , Quatsino limestones).

Central Vancouver Island

In fall 2011 Compliance Energy Corporation returned to its **Camp Lake** (MINFILE 092F 571) project west of Campbell River with a drill program. The property includes a magnetite skarn as well as a recently discovered occurrence of porphyry style mineralization. The 9-hole 1000 m program tested the thickness of a near-surface magnetite body.

Western Gateway Minerals Inc. undertook soil geochemical surveys at two of its properties west of Campbell River. **Bacon Lake** (MINFILE 092F 256) is an iron skarn with cobalt and gold values. **Gooseneck Lake** is a porphyry copper prospect. The company has submitted Notices of Work for drilling at these two properties. To the northwest, there was a third soil survey at the **Memekay** (MINFILE 092K 163) property, which hosts Zn-Cu-Ag mineralization interpreted as Besshi type and/or skarn.

There has been some renewed interest in the historic **Mount Sicker Belt** by Rock-Con Resources Inc and Westridge Resources Inc. Exploration programs have been of a preliminary nature. Westridge Resources has carried out mapping of its **Fortuna** Property (MINFILE 092B 099) and selected targets for drilling.

G4G resources conducted a program of rock and soil geochemistry at the **Rex** (MINFILE 092F 221) target on the **Macktush** property near Port Alberni. A 1 km x 1 km soil survey produced a large central north-south molybdenum anomaly coincident with a 2005 airborne resistivity and magnetic low. Mapping and grab samples were described as displaying porphyry style mineralization. Veins are known in other areas of the property.

At the **Mineral Creek** (092F 079, 331) property, Mineral Creek Ventures Inc continued bulk sampling of the Linda Vein. Quantity of gold recovered is not reported. Property owner Bitterroot Resources Ltd. reported minor additional field work in 2011 following a VTEM survey late in 2010.

Snowfield Development Corp. Is returning to the Snow property and began work on the **Nahmint** on Alberni Inlet. Their preliminary work consisted of a 121 Line km aeromagnetic survey, following up a magnetic anomaly north of the **Three Jays** (MINFILE 092F 140), identified in a 2009 survey. Three Jays produced copper gold and silver between 1898 and 1902 from skarn deposits in Quatsino limestone, extending into overlying Bonanza group and also upper parts of the Karmutsen Formation. Highly anomalous tellurium values have been reported in rock samples from the property which hosts a number of skarn occurrences.

Gonzaga Resources Ltd conducted a program on its **Kennedy River** Project (MINFILE 092F 032,392,448) in 2011. Consisting of geological mapping and soil surveys, work is designed as follow up to a coincident soil and chargeability anomaly identified in 2010. The targets are sheeted gold bearing veins.

Ridgemont Iron Ore Corporation undertook an 11,000 m drilling campaign (Figure 13) at the **Brynnor** Iron Mine (MINFILE 092F 001) near Ucluelet in 2011. This follows ground magnetometer surveys earlier this year and previous years. Brynnor is a past producer, formerly operated by Noranda, with direct shipments of just over 3 million tonnes of concentrate averaging 63.8% iron from 4.48 million tonnes mined. An open pit mine operated at the site from 1962 to 1968, leaving an underground resource unexploited. The current drilling is directed at augmenting the remaining resource and bringing it into compliance with NI-43-101 standards. The goal is another direct-shipping operation, potentially from nearby Toquart Inlet. Brynnor is a magnetite skarn occurring in limestones and tuffs of the Upper Triassic Quatsino Formation. The Quatsino Formation has been intruded by a quartz diorite stock of the Jurassic Island Plutonic Suite and also by later (Tertiary) syenite porphyry and diorite dykes. The Brynnor mine is the focus of current exploration efforts, although the larger, surrounding Redford property has also been explored for gold veins in the past.

Southern Vancouver Island

To the south, Pacific Iron Ore Corp. was active again at its Port Renfrew property in 2011, with the focus on the **Bugaboo Creek** (MINFILE 092C 022) magnetite skarn resource. They drilled 17 holes for roughly 4500 m. Prior to this drilling, the company announced an inferred resource of 14.3 million tonnes grading 60% recoverable magnetite (20% cut-off), based on work up to and including 2010.



Figure 13. Massive magnetite at the Brynnor project. Brynnor is a 1960s past-producer of iron ore, one of several magnetite skarns on the coast that are subject to re-examination in light of recent demand for iron ore.

The Wrangell Terrane magnetite skarns represent small iron resources (typically < 20 Mt) by current world standards, however when potential for direct shipping of magnetite concentrate from an operation near tidewater, road and power infrastructure are considered, they become attractive targets.

In October 2011, Nitinat Minerals Corporation conducted an October 2011 drilling, trenching and geochemical program at its **Jasper** (MINFILE 092C 080, 081) property west of Cowichan Lake, following up rock sampling results at 5 targets in the Jasper Main Grid area. Initial drilling (162 m) focused on the Pan target. Results of drilling are unavailable at time of writing, but chip samples across a vein structure at Pan South averaged 0.063 ppm gold, 12.07 ppm silver, 0.61% copper, 10.91% lead, 7.51% Zinc over 0.9 m. The area is underlain by volcanic rock and sediments of the Lower Jurassic Bonanza Group and locally by Vancouver Group limestone. Both are intruded by Island Plutonic Suite granodiorites. In addition to lenses and veins of apparent VMS association, skarn and porphyry style occurrences are also reported in the property's exploration history.

New Shoshoni Ventures Ltd continued exploration of the **DS Copper-Gold** prospect near Port Renfrew in 2011 with a 300 m 3-hole drill program. The target was a magnetic and IP anomaly north of the DS pit zone where copper-gold mineralization in breccia exposed in a borrow pit prompted an exploration program beginning in 2009 leading to drilling in 2010.

Valentine Mountain (MINFILE 092B 108) is a gold quartz vein property approximately 20 km northwest of Sooke, currently subject of an exploration program by Mill Bay Ventures Inc. An April 2011 resource estimate has 54 763 tonnes in the indicated category in two veins, with uncut grade of 16.4 g/t Au, cut grade 9.3 g/t. A further 20 700 tonnes at 22.6 g/t is in inferred categories (uncut, two veins). November 2011 they completed a three-hole 1250 m drill program testing the Discovery Zone at depth, with the objective of expanding the inferred resource at that zone. Earlier in the year they completed geochemical rock chip sampling and soil surveys and a separate 1464 m drill program. A 3000 tonne bulk sample was proposed, but at time of writing it had been deferred in pending results of the latest drill program. There is a 5 tonne-per day test mill and tailings facility constructed in 1988.

The Valentine Mountain project consists of a number of orogenic gold veins hosted by amphibolite facies metamorphic rocks of the Pacific Rim Terrane. Prospector Bob Beaupre first described the Discovery zone in the late 1970's.

Inside Coast, Sunshine Coast

Dentonia Resources Ltd conducted an initial 4-hole 352 m drill program on its **Stafford Tungsten** Project near Knight Inlet in 2011. The project is focused on a

scheelite-bearing skarn first reported in 2009. The short holes were drilled in the vicinity of the main showing but interpreted to have intersected different lenses. Results include multiple intersections of 0.12-0.22% WO₃ over intervals of 1 to 5 m. Copper mineralization was also intersected. Additional targets generated by a 2010 airborne magnetometer survey remain untested.

The **OK** property is 60% controlled by Prophecy Coal Corp and 40% by Eastfield Resources Ltd. Located 25 km north-west of Powell River near Okeover inlet, it is a porphyry-style copper-molybdenum prospect related to probable Tertiary quartz feldspar porphyry and granodiorite intrusions in the Coast Plutonic Complex. The most advanced target is the **North Lake Zone** (MINFILE 092K 008), which has a 2006 inferred resource of 86.8 million tonnes 0.31% Cu and 0.014% MoS₂. Soil anomalies were reported in 2010 and followed up with a 20 km IP survey in 2011. The combined surveys have resulted in drill targets; a permit for drilling is in place, but had not commenced at the time of writing.

Northern Cascades, Southeastern Coast Ranges

Miocene Metals Limited carried out exploration on seven properties in southwestern BC in 2011. The two northernmost, **MacKenzie** and **Shulaps**, lie outside the boundaries of the Coast Area. They are grassroots properties with mineralization suspected to be related to tertiary Cascades magmatism. Programs at these consisted of prospecting and rock, soil and silt sampling at Shulaps and prospecting, sampling and construction of a drill platform at MacKenzie. The **Salal** (MINFILE 092JW 005) property, a porphyry molybdenum prospect north of Pemberton, has a longer exploration history, spanning more than 50 years. The 2011 program occurred late in the season, consisting of prospecting, mapping, sampling and a two-hole 711 m drill program. An intersection of 20.6 m of 0.057% Mo, 0.46 g/t Ag and 0.035 ppm Re is reported.

Approximately 20 km north of Pemberton is the **Sylvan** (MINFILE 092JSE020) project. A 10 000 tonne underground bulk sample is permitted at the site, part of which has been taken. There was also preparation for a new adit in 2011. Following initial bulk sampling, Sylvan Resources Ltd proposed a small open pit mining operation at the site. The enterprise is privately funded and details relating to exploration or bulk sample results have not been published. Sylvan is a skarn occurrence with anomalous gold assays reported in assessment reports dating from the 1980's. At least one such report mentions platinum group elements, though assays were not published. The **Eagle Claims** (MINFILE 092JSE012) located approximately 12 km south are also considered for a program of bulk sampling.

There was a late season program at Miocene Metals **Roger's Creek** project, consisting of 65 channel samples,

soil and silt sampling and a 5-hole approximately 2070 m drill program. The Rogers Creek project began with a 2007 discovery of porphyry style mineralization and alteration along a new logging road. The project remains in early stages, with continuing surface discoveries, including this year's report of gold-copper-silver values in a series of samples from the Rogers Creek Valley.

Following a 2010 field program, Electra Gold Ltd. drilled its **Dot-Apex** (MINFILE 092ISW 055, 065, 090), project 25 km north of Boston Bar in 2011. The initial drilling consisted of 454.57 m in five holes in the Dot zone. All holes had intervals of 2.0-8.2 m with 1 g/t or more Au. Highlights were 2.067g/t Au over 5.59m, 1.391 g/t Au over 8.20m and 1.291 g/t Au over 4.3m. Historical drill core was also assayed.

Several properties in the Hope Nickel Belt east of Harrison Lake were re-activated in 2011. Targets were magmatic Ni-Cu-PGE mineralization in ultramafic rocks. Four companies shared management of their programs, consisting mainly of 3D IP surveys with prospecting mapping and sampling. Bridge River Resources Ltd conducted surveys over the **AL** (MINFILE 092HNW040) and **Anomaly Creek** showings on the **Jason** property (Figure 14), Teuton Resources on its **Roman-Andy** property, Monster Uranium Corp. at the **Cogburn** property and APAC Resources Inc at the **Swede** (MINFILE 092HSW082) and **Big Nic** showings on the **Leckcin** property. Coincident IP and nickel-in-soil anomalies have resulted in proposed drill targets.

British Columbia's only nickel mine, the **Giant Mascot**, or **Pacific Nickel Mine** (MINFILE 092HSW 004,093, 125) operated in the area between 1958 and 1974 (Figure 15), exploiting a number of pipe-like ore bodies. In total more than 4.3 million tonnes of ore were mined yielding 26.6 million kilograms of nickel, 13.2 million kilograms of copper and cobalt, silver and gold by-products.

New Carolin Gold Corp's (formerly Module Resources Incorporated) **Ladner Gold Project** has three principal target areas plus a regional component. One of the target areas is the tailings pond (Figure 16) of the former **Carolin Mine** (MINFILE 092HNW007). In 2011 the company released a modern resource estimate based on results of a 1995 drill program on the tailings pond by Athabaska Gold Resources Ltd. A 2009 drill program by New Carolin (then called Module Resources) served to replicate gold values reported in the earlier, larger survey and provided material for metallurgical testing. A Preliminary Economic Assessment in preparation is to consider the economics of processing this resource. At a cutoff grade of 1.0 g/t Au, the new resource estimate is an indicated 404 500 tonnes grading 1.83 g/t Au. There is a further inferred 84 500 inferred at 1.85 g/t Au. This covers approximately 60% of the tailings dump. Advancing the tailings project is seen as a potential means of generating cash flow in the near term.



Figure 14. Geologist Peter Daubeny examining the Anomaly Creek showing at the Jason property, one of five adjacent properties east of Harrison Lake which saw renewed Ni-Cu-PGE exploration activity in 2011.



Figure 15. Mill foundations at the site of the past-producing Giant Mascot nickel-copper mine north of Hope. The mine operated mainly between 1958 and 1974. Exploration for nickel-copper-platinum group targets resumed on several neighbouring properties in 2011. Geoscience work on Giant Mascot is part of the federal Targeted Geoscience Initiative 4, involving GSC, BCGS and university partners.



Figure 16. The tailings dam at the Ladner Gold project. Part of New Carolin Gold's program focuses on unrecovered gold in tailings of the former Carolin Mine.

Two other targets are the underground historical resource at the Carolin Mine and a historical surface resource at the **McMaster Zone** (MINFILE 092HNW018). Both have exploration potential. Historical underground resources at the Carolin Mine are estimated at approximately 2.52 million tonnes at 4.29 g/t in measured and indicated categories and 2.57 million tonnes at 4.61 g/t in the inferred category. (2.5 g/t cut off, no adjustment for mining dilution. The company does not present these estimates as NI 43-101 compliant). The original mine permit remains valid

There are a number of other gold occurrences in the Coquihalla Gold Belt, including small past producers **Emancipation** (MINFILE 092HSW034), **Pipestem** (MINFILE 092HNW011) **Aurum** (MINFILE 092HNW003). An airborne magnetic and radiometric survey covered 762 line km in 2011, an initial step in a regional exploration project. Known gold mineralization in the belt is spatially associated with the Hozameen fault and serpentinized ultramafic rocks.

Homegold Resources Ltd began the underground bulk sampling program at the **Silver Peak** project in 2011. This is the site of the Historic **Eureka-Victoria** (MINFILE 092HSW011) silver mine which operated between 1868 and 1874. The principal ore mineral in high grade veins is a silver-rich tetrahedrite. There was approximately 30 m of underground development in 2011. A 9000 t bulk sample is currently permitted. Initial leach tests are reported to be encouraging. The site is located over 1500 m elevation (Figure 17). Road access was restored in 2009-2010.

Grassroots exploration continued in 2011 at Miocene's southern properties, **Mount Barr**, **Sunshine** and **Custer Ridge**, following 2010 silt sampling and prospecting. All three properties had follow-up silt sampling and prospecting programs in 2011. In addition there were airborne geophysical surveys (total 400 line km magnetic, radiometric, VLF) over eastern portions of the Mount Barr property. This follows anomalous gold in silts in the 2010 program. The Mount Barr property lies

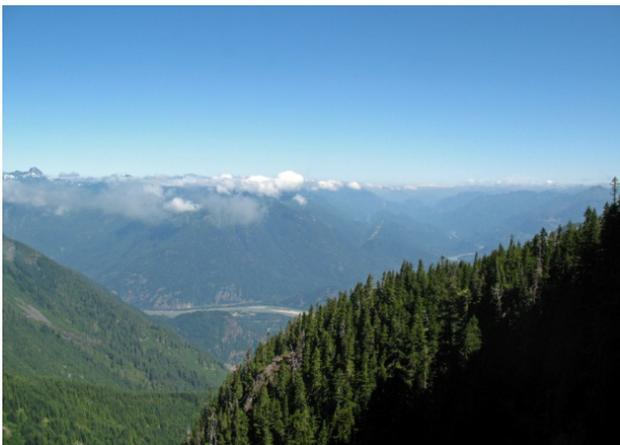


Figure 17. Looking north from the historic Eureka-Victoria silver mine, part of the Silver Peak project. Across the Fraser River is the southeastern extent of the Coast Ranges.

immediately south of the Eureka-Victoria, or Silver Peak project.

OUTLOOK

Exploration and mining plans and decisions are made in the context of venture capital market conditions, commodities prices, demand for specific products and operating costs. Barring drastic changes in circumstances, the major mines and quarries in the region should continue to operate at or near current output, however there are some industrial minerals producers expressing concerns: for example that fuel costs are damaging their competitiveness.

The magnetite iron ore projects had not released complete results at the time of writing, and in some cases work is ongoing into December 2011. There was iron ore production on the coast until the early 1980's when these relatively small deposits no longer appeared competitive. If recent high iron ore prices are sustained, however, the economics of small, direct-shipping operations will continue to be re-evaluated.

Exploration at several of the Area's porphyry prospects is expected to resume or continue in the year or years to come. NorthIsle Copper and Gold only got part-way through its planned Island Copper program in 2011, Imperial Metals deferred a program at Giant Copper, Prophecy Coal and Eastfield Resources expect to drill the targets identified at the OK property. The scope of future programs at the less-advanced projects such as NIC, Rogers Creel and Salal will depend on funding and results of 2011 work, some of which are pending.

In gold exploration, management of New Carolin Mines expresses every intention of continuing to advance the tailings project as well as evaluation of surface and underground resources at the Ladner project. Drilling and trenching at Imperial's Fandora project may proceed, subject to ongoing permitting.

Planned and ongoing exploration programs at Quinsam mine and Myra Falls Operations are presumably less vulnerable to the vagaries of the venture capital market and are expected to continue in 2012.

ACKNOWLEDGMENTS

Thanks to everyone who generously provided information and access to their properties. It is their participation that makes these publications possible and allows the authors to provide investors, branches of government, industry and the public with a basic summary of exploration and mining activity and trends in the province. Francesca Paladino edited a draft of the report for grammar and readability. Denis Collins reviewed the report and corrected several errors. Any remaining errors and omissions are the responsibility of the author. Garry Payie and George Owsiacski did the desktop publishing.

EXPLORATION AND MINING IN THE KOOTENAY-BOUNDARY REGION, BRITISH COLUMBIA

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SUMMARY AND TRENDS

Activity and output levels for exploration and mining in the Kootenay-Boundary Region of British Columbia continued their upward trend in 2011.

Highlight industry events in 2011 included:

- encouraging gold and copper-gold drill intersections on properties near Greenwood (Golden Dawn Minerals Inc, Grizzly Discoveries Inc, and Open Gold Corp);
- exploration programs in Proterozoic-age Purcell Supergroup rocks for base and precious metals in the southern Purcell Mountains and adjacent areas (Eagle Plains Resources Ltd, Providence Capital Corp, Fjordland Exploration Inc, Active Growth Capital Inc, PJX Resources Inc, Kootenay Gold Inc, Silver Mountain Mines Inc, and Bearclaw Capital Corp);
- strong prices for metallurgical coal;
- increased production at four of the five metallurgical coal mines in the Elk Valley (Teck Coal Limited);
- large exploration rotary drilling programs at three of Teck Coal's five mines;
- approval of the BR-2 Pit expansion at Elkview Operations (Teck Coal Limited);
- submission of an Environmental Assessment Process (EAP) application for the Line Creek Operations Phase 2 Expansion (Teck Coal Limited);
- entry of the Swift Project at Fording River Operations into the EAP;
- increased production at the Mount Brussilof magnesite mine (Baymag Inc);
- positive feasibility study for the Moberly silica mine and processing facility for modifications to support the development of a frac sand operation (HCA Mountain Minerals (Moberly) Ltd).

As in previous years, past-producing, historic mining camps and mines were the sites of important exploration programs, spurred mainly by high gold and silver prices. These included projects in the Beaverdell, Greenwood, Nelson, Salmo, Ainsworth, Slocan and Lardeau areas.

Exploration expenditures in 2011 are projected to total about \$38.5 million, an increase of more than 35% over the previous year (Figure 1). This total was divided between metals (about 58%), coal (39.5%) and industrial minerals (2.5%).

The commodities with the highest exploration expenditures were coal and gold. Exploration expenditures in 2011 can be broken down into stages as shown in Figure 2.

An estimated 126 km of exploration drilling was carried out in the Kootenay-Boundary Region in 2011 (Figure 3). Of this total, approximately 42% represented drilling for metals, compared with 57% for coal.

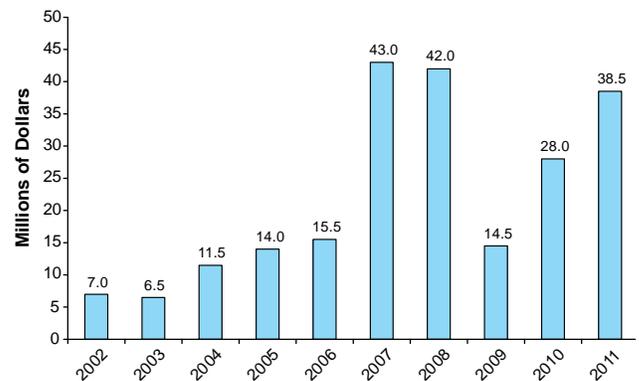


Figure 1. Annual exploration spending in millions of dollars, 2002 to 2011, Kootenay-Boundary Region. The Revelstoke area was added to the region in 2010.

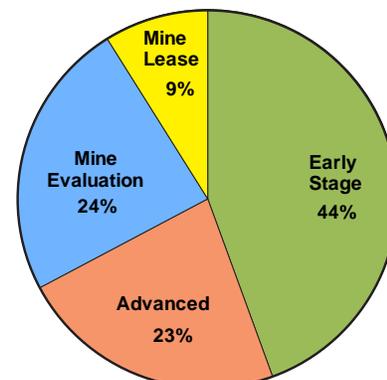


Figure 2. 2011 exploration expenditures by category, Kootenay-Boundary Region.

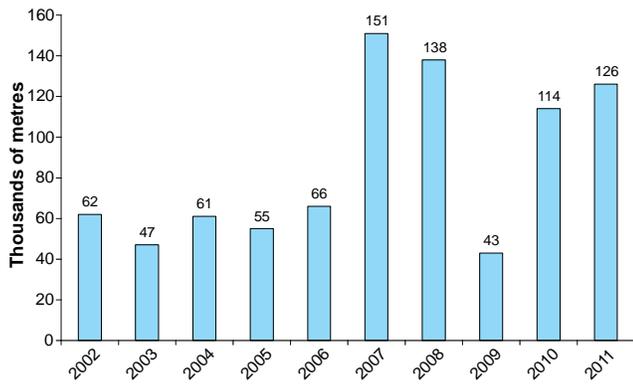


Figure 3. Annual exploration drilling in thousands of metres, 2002 to 2011, Kootenay-Boundary Region. Note that prior to 2004 in-pit drilling at operating coal mines was included in the total.

MINES

The Kootenay-Boundary Region hosts five large coal mines, and smaller operations for various industrial minerals including gypsum, magnesite, silica and dolomite. Operations at the region's only metal mine were suspended for most of the year. Selected current producing mine locations in the Kootenay-Boundary Region are shown on Figure 4 and basic information concerning these operations is listed in Table 1 and outlined below.

COAL

Teck Coal Limited, the world's second-largest exporter of metallurgical coal, operates five large open-pit coal mines in the Elk Valley area. Projected combined total 2011 coal production at the company's **Coal Mountain, Elkview, Line Creek, Greenhills** and **Fording River** operations is approximately 23.2 Mt of clean coal. This compares with an actual production total of 22.64 Mt in 2010. The mines directly employ 3650 people and make a major contribution to the East Kootenay and provincial economies.

Hard coking coal is the predominant output at four of the five Elk valley mines, the exception being Coal Mountain Operations. A range of two or more products is marketed by each of these four operations, based on variations in volatile matter and/or ash contents. In addition to hard coking coal, Teck Coal Limited produces PCI or pulverized coal injection coal, mainly from Coal Mountain and Elkview operations in 2011. Oxidized coal is marketed as thermal coal from most of these sites.

Proven and probable raw coal reserves at the five mines are listed in Table 1. With the exception of Coal Mountain Operations, all of the mines produce from multiple seams. Currently productive coal seams are typically medium-volatile bituminous in rank, and are low in sulphur. Clean metallurgical product coal ash contents

are typically in the 8.6 to 9.5% range. Other attractive quality parameters include high Coke Strength after Reaction (CSR), which is an indicator of the strength of the coke in the blast furnace.

Commercially mineable coals in southeast BC occur in the Mist Mountain Formation of the Jurassic-Cretaceous Kootenay Group. They are contained in three structurally separate coalfields, known collectively as the East Kootenay coalfields, in the Front Ranges of the Rocky Mountains. From north to south they are the Elk Valley, Crowsnest and Flathead coalfields. The Elk Valley Coalfield is formed by the Alexander Creek and Greenhills synclines, and includes the Fording River, Greenhills and Line Creek operations. The Crowsnest Coalfield coincides with the Fernie Basin, a broad synclinal structure. It has hosted coal mining since before the turn of the twentieth century and includes the current Elkview and Coal Mountain operations. The Flathead Coalfield consists of four relatively small, isolated exposures of Kootenay Group in the extreme southeast corner of the region.

A portion of the Crowsnest Coalfield and the entire Flathead Coalfield are now legally off-limits to coal exploration and development based on 2011 provincial legislation that prohibits all mining-related activities in the Flathead River drainage.

Fording River Operations (MINFILE 082FSE009, 010 and 012) is 17 km north of Elkford. Production is projected to be 8.3 Mt of clean coal in 2011. Production occurs mainly at Eagle Mountain 6-Pit and 4-Pit (Figure 5), Turnbull Pit, and Henretta Pit, east of the Fording River. Teck Coal Limited is currently assessing the Swift Project area, west of the Fording River, for future expansion (see Mine Evaluation Projects and Exploration Projects, below).

Greenhills Operations (MINFILE 082JSE007) is 7 km northeast of Elkford. Production is projected to be 5.1 Mt in 2011. There are three active pits, known as Phases 3, 4/5 and 6 (Figure 6).

Line Creek Operations (MINFILE 082GNE020 and 021) is 25 km northeast of Sparwood. Production is projected to be 2.8 Mt in 2011. Production occurs mainly in the Burnt Ridge South, North Line Creek and Horseshoe Ridge pits. Teck Coal Limited continued to evaluate the **Line Creek Operations' Phase 2 Expansion Project** to the north of the currently active mine area, and submitted an application to the Environmental Assessment Office in December (see Mine Evaluation Projects, below).

Elkview Operations (MINFILE 082GNE013 to 017 and 023) is 5 km east of Sparwood. Production is projected to be 4.2 Mt in 2011, a decrease from 2010. Production occurs mainly in the BR-1 (Figure 7), and Natal 1 and Natal 2 pits, on Baldy and Natal ridges, respectively. In addition, thermal and PCI coal are produced from the Cedar North Pit on the west side of Harmer Ridge. Teck Coal Limited applied for and

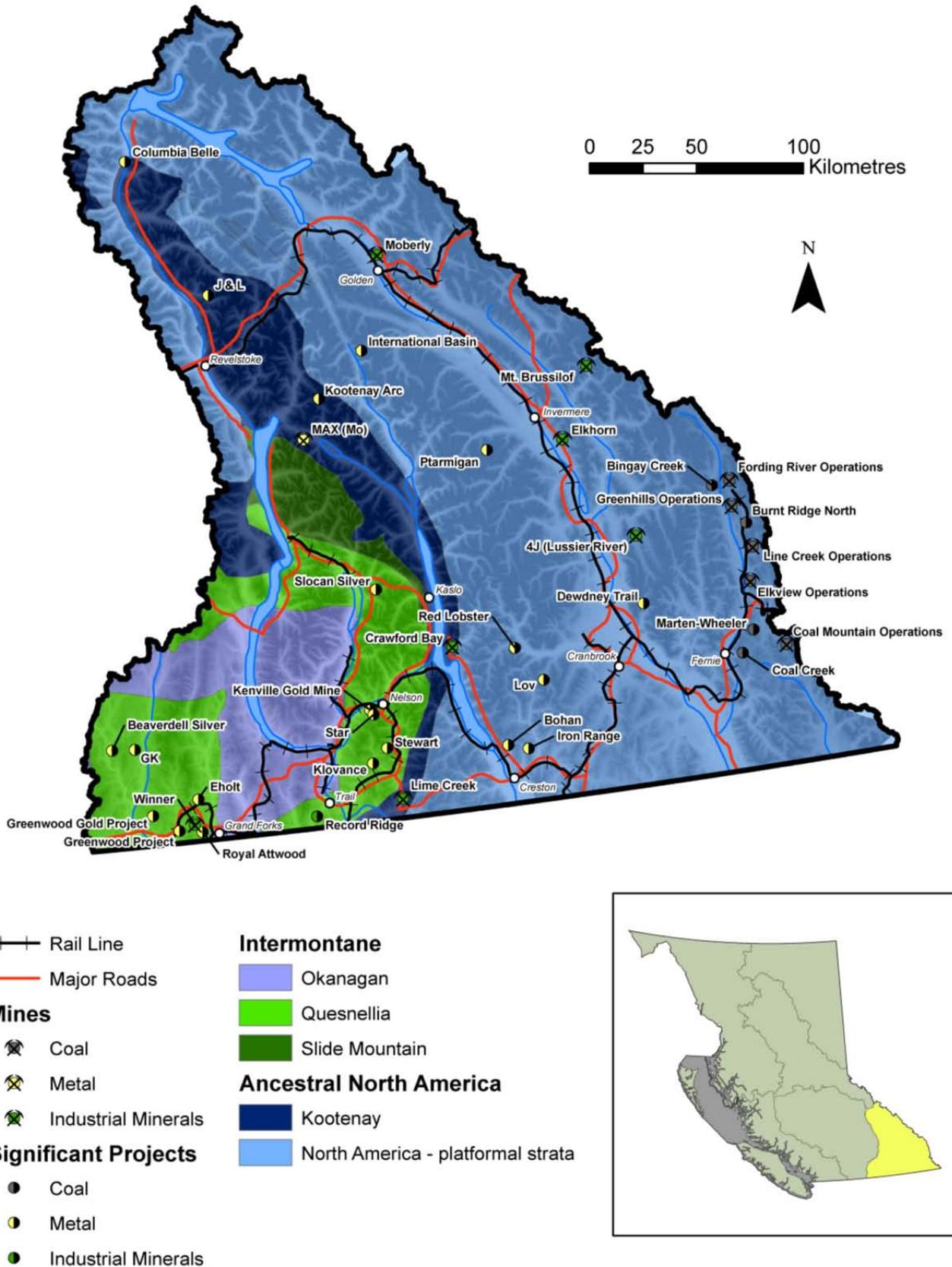


Figure 4. Locations of selected operating mines and exploration projects, Kootenay-Boundary Region, 2011. On-lease exploration drilling programs at three operating mines (Fording River, Greenhills and Elkview) are not indicated separately.

TABLE 1. SELECTED PRODUCING MINES, KOOTENAY-BOUNDARY REGION, 2011

Mine	Operator	Commodity	Employment	Actual 2010 Production	Projected 2011 Production	Proven and Probable Reserves as of December 31, 2010 or as indicated
Coal						
Coal Mountain	Teck Coal Limited	PCI and thermal coal	314	2.19 Mt	2.78 Mt	19.5 million tonnes
Elkview	Teck Coal Limited	Metallurgical coal	984	5.41 Mt	4.19 Mt	220.6 million tonnes
Fording River	Teck Coal Limited	Metallurgical and thermal coal	1238	7.93 Mt	8.34 Mt	263.8 million tonnes
Greenhills	Teck Coal Limited	Metallurgical, PCI and thermal coal	613	4.51 Mt	5.10 Mt	80.6 million tonnes
Line Creek	Teck Coal Limited	Metallurgical, PCI and thermal coal	502	2.60 Mt	2.76 Mt	38.6 million tonnes
Metals						
MAX	Roca Mines Inc	Mo				Measured and indicated resource of 1.7 million tonnes at 0.73% Mo (December 2009)
Industrial Minerals (selected)						
4J	Georgia-Pacific Canada Inc	Gypsum				
Crawford Bay	Imasco Minerals Inc	Dolomite				
Elkhorn	CertainTeed Gypsum Canada	Gypsum	17	445 000 t	430 000 t	
Lime Creek	Imasco Minerals Inc	Limestone				
Moberly	HCA Mountain Minerals (Moberly) Ltd	Silica sand				
Mount Brussilof	Baymag Inc	Magnesite	40	159 000 t	180 000 t	
Winner	Roxul Inc	Gabbro (mineral wool)	.			



Figure 5. View looking east at Fording River Operations (Teck Coal Limited). Pits on Eagle Mountain and associated rock dumps are in the middle distance. The coal preparation, clean coal storage, rail load out and tailings facilities are also visible.

received approval for the **BR-2 Pit** expansion on Baldy Ridge within the current active mine area (see Mine Evaluation Projects and Exploration Projects, below).



Figure 6. View looking north at Greenhills Operations (Teck Coal Limited) along the Greenhills Range. North of the visible highwall are the Cougar North Extension and Swift Project exploration areas (Greenhills and Fording River operations, respectively).



Figure 7. Elkview Operations of Teck Coal Limited. The BR-1 Pit high-wall at the south end of Baldy Ridge is visible in the distance. The new BR2 expansion area, approved in late 2011, will be north of BR1.

Coal Mountain Operations (MINFILE 082GNE001) is 32 km southeast of Sparwood. Production is projected to be 2.8 Mt in 2011. Production occurs mainly in 6-Pit, 34-Pit and 37-Pit (Figure 8). Unlike the other four Teck Coal mines in the Elk valley, the predominant product at Coal Mountain is PCI coal, not hard coking coal.

METAL

Roca Mines Inc's **MAX** underground molybdenum mine at Trout Lake was the only producing metal mine in the region, but only operated for a few months in 2011.

The MAX Mine began shipping concentrate in November 2007 and achieved full commercial production in April 2008 at a rate of 72 000 t/y. In April 2010 Roca received approval to expand its production rate to 1000 t/d. This Phase 2 expansion has been partially implemented, but full production rates have not been achieved.

The MAX operation was shut down from the beginning of the year until late July in order to address sill pillar stability problems. The work included: constructing a by-pass on the main access ramp; drilling of a new stope; and geotechnical investigations, modeling and monitoring. The mine restarted at the end of July at a rate of 500 t/d. Unfortunately, due to economic factors, production was suspended again in the first week of October. The mine remained shut down for the rest of the year.

The MAX deposit (MINFILE 082KNW087) contains measured plus indicated resources of 42.9 Mt grading 0.20% MoS₂ using a 0.10% MoS₂ cut-off. The Phase 1 mine has been producing from the HG zone, with an initial resource of 280 000 tonnes (measured and indicated) grading 1.95% MoS₂ at a 1.00% cut-off. The



Figure 8. Coal preparation facilities at Coal Mountain (Teck Coal Limited).

Phase 2 expansion is based on a measured plus indicated resource of 1.7 Mt at 0.73% Mo.

MAX property geology comprises metasediments of the Paleozoic Lardeau Group that are intruded by the Cretaceous Trout Lake stock. The deposit is a pipe-like quartz-vein stockwork that extends from surface to a depth of at least 1000 m, in which molybdenite occurs mainly along margins of veins. The vein stockwork is best developed in close proximity to the margins of the intrusive body and its associated offshoots. Potential exists for additional high-grade zones, as well as a deeper large porphyry system.

INDUSTRIAL MINERALS

The Kootenay-Boundary Region continues to be an important source of industrial minerals and related products, including gypsum, magnesite, silica sand, mineral wool, dolomite, limestone, tufa, flagstone, railroad ballast, rip rap, smelter slag and aggregate. Selected larger operations are described below and listed in Table 1, and their locations are shown on Figure 4.

Baymag Inc produces high-quality magnesite from its open pit mine near **Mount Brussilof** (MINFILE 082JNW001), in the Rocky Mountains northeast of Radium. The Mount Brussilof deposit represents a large magnesium alteration zone in Cambrian carbonates. The operation has been in production since 1982. Ore is transported by truck to the company's processing facilities in Exshaw, Alberta for production of magnesium oxide (magnesia or MgO) and magnesium hydroxide (MgOH). Production in 2011 is projected to be approximately 180 000 tonnes, a 13 per cent increase over 2010. The processed products have a variety of environmental, industrial and agricultural uses. A recent and growing market for an environmental application has been the Alberta oil sands mining operations, where magnesia in suspension is used to promote precipitation of silica from waste waters.

There are two gypsum mines in the Rocky Mountains portion of the Kootenay-Boundary region, both producing from an evaporite unit in the Devonian Burnais Formation. CertainTeed Gypsum Canada operates the **Elkhorn** Mine (MINFILE 082JSW021) east of Windermere, where production is mainly from the Elkhorn West Extension Pit (Figure 9). Production is projected to be approximately 430 000 tonnes in 2011, a slight decrease compared with 2010. Georgia-Pacific Canada Inc operates the **4J** gypsum mine and rail load out facility (082JSW009) southeast of Canal Flats.

Silica sand is produced from friable quartzite of the Ordovician Mt Wilson Formation by HCA Mountain Minerals (Moberly) Ltd at the **Moberly Mine** (MINFILE 082N001) and plant, in the Rocky Mountains 8 km north of Golden. Stockpiled material was shipped to several markets in 2010.

In late 2011 the company reported the outcomes of a feasibility study looking into the potential of producing frac sand for the western Canadian oil and gas industry. The study concluded that a commercial frac sand operation at the Moberly Mine and plant site is economically viable with a relatively small capital investment (estimated at \$20 million). The investment is based on redevelopment of the current operation, including upgrading of the haul road and construction of a new processing plant.

Measured plus indicated resources at the Moberly Mine site are estimated at 43 Mt of silica suitable for glass making, silica flour and related uses. Within this overall resource is an estimated measured and indicated resource of 32.4 Mt of 64% frac sand (estimates consistent with the Australasian Joint Ore Reserves Committee [JORC] Code). The Mt Wilson Formation extends along strike to the southeast and northwest beyond the current resource boundary.

Imasco Minerals Inc produces a variety of crushed and ground rock products at its Creston Operations Plant at **Sirdar** from limestone, dolomite, granite and quartzite rock types. Raw sources for these products include an underground dolomite mine at **Crawford Bay** (MINFILE 082FNE113), a limestone quarry at **Lime Creek** (MINFILE 082FSW307) southeast of Salmo, and a granite quarry at **Sirdar** (MINFILE 082FSE072). The carbonate units are Cambrian in age, while the granite is part of the Cretaceous Bayonne batholiths.

The **Winner** gabbro quarry (MINFILE 082ESE265) west of Grand Forks supplies feed for the Roxul Inc mineral wool insulation manufacturing plant in Grand Forks.

MINE EVALUATION PROJECTS

Mine evaluation refers to the stage when environmental, social, financial and engineering assessments and studies are undertaken, and applications



Figure 9. Elkhorn gypsum mine (CertainTeed Gypsum Canada).

are prepared and submitted for the Environmental Assessment Process (EAP) and/or the various permits required for statutory approval of a mining project. It includes technical assessment of the project, identification of potential impacts, and design of mitigation measures, and requires studies that examine wildlife, surface water, groundwater, geotechnical and other issues.

Elk Valley coal mine evaluation projects in the region during 2011 included Line Creek Operations Phase 2, Baldy Ridge BR-2 Pit, and the Swift Project, all of which are potential expansion projects at existing coal operations. More detailed descriptions of the projects are found with the corresponding mine and/or exploration property descriptions.

- **Line Creek Phase 2 Expansion** (Line Creek Operations) – An application for the Phase 2 Expansion was submitted to the Environmental Assessment Office, and permit applications were submitted to government agencies, in December 2011. This expansion, which encompasses Mount Michael (MINFILE 082GNE022) on the east limb of the Alexander Creek Syncline and Burnt Ridge North (082JSE001) on the west limb, will extend Line Creek’s production activities to the north of currently active pits.
- **Baldy Ridge BR-2** (Elkview Operations) – An application for the BR-2 Pit was submitted in the summer of 2011, and approvals were granted in December 2011. This project did not trigger the EAP. BR-2 is on Baldy Ridge (MINFILE 082GNE016), and is immediately north of the BR-1 Pit highwall (Figure 7) within the current mine area.
- **Swift Project** (Fording River Operations) – This project, which entered the EAP in 2011 and is in the pre-application stage, is located west of the Fording River and partially encompasses previous mine areas on the Greenhills Range.

EXPLORATION HIGHLIGHTS

Selected 2011 mineral and coal exploration projects in the Kootenay-Boundary Region are listed in Table 2, and their locations are shown on Figure 4. Generally the selected exploration programs involved expenditures in excess of about \$250 000 in 2011 on work that included drilling or trenching or other mechanized ground disturbance. The following text also includes updates on some other important projects in the region that did not undertake major physical exploration programs in 2011. The information in this section was derived mainly from company reports, presentations, press releases and websites, as well as discussions with exploration project staff.

Gold Projects

BOUNDARY DISTRICT

Grizzly Discoveries Ltd’s extensive **Greenwood Gold** Project was active again this year. The company’s holdings extend from east of Greenwood to west of Anarchist Summit, and cover an area roughly 70 km by 25 to 30 km. The project area is underlain by a range of rock units, including the Paleozoic Knob Hill and Anarchist groups, Triassic Brooklyn Formation, and Eocene Penticton Group. Intrusions of Jurassic, Cretaceous and Eocene rocks occur throughout the area.

The project area includes many known mineral occurrences and deposit types, among them gold-quartz veins, polymetallic veins, skarns, and intrusion-related precious metals. A common theme for Grizzly Discoveries’ targets is the proximity of intrusive rocks, notably Eocene syenites. The emphasis has generally been on gold, with or without copper. High gold prices and the proximity to Kinross’ Buckhorn Mine and concentrator in northern Washington are factors favouring the region with respect to gold exploration. A focus in 2011 was on the identification of drill targets similar to Buckhorn gold skarn and Midway Golden Eagle epithermal gold deposits. Recently the company has begun to focus on the silver potential of some of its holdings, particularly at sites where there was past silver production.

Activities in 2011 included diamond drilling, ground geophysics, soil geochemistry, geological mapping, prospecting, and rock sampling at the Dayton, Motherlode, Ket 28, Overlander and Copper Mountain areas. These properties, with the exception of Copper Mountain, were also slated for drilling in 2011.

Drilling at the **Dayton** (MINFILE 082ESW022), 6 km north of Bridesville near the Mt McKinney gold camp, was intended to follow up on the recent discovery of widespread copper-gold mineralization and investigate the potential for large tonnage, porphyry-style copper-

TABLE 2. SELECTED EXPLORATION PROJECTS, KOOTENAY-BOUNDARY REGION, 2011

Property	Operator	MINFILE (or TRIM sheet)	Commodities	Target Type	Work program	Metres of drilling where available (approximate in some cases)
Beaverdell Silver	Molycor Gold Corp	082ESW032, 067, 072	Ag, Pb, Zn, Cu, Au	polymetallic veins	DD	2457
Bingay Creek	Centremount Coal Ltd	082JSE011	coal	sedimentary	DD, RC	909
Bohan	Active Growth Capital Inc	(82F.028)	Pb, Zn	SEDEX, manto	DD	380
Coal Creek	Crowsnest Pass Coal Mining Ltd	(82G.046)	coal	sedimentary	RC, DD	1447
Columbia Belle	Goldstar Minerals Inc	082M 190	Zn, Pb, Cu, Ag, Au	SEDEX	DD	750
Dewdney Trail	PJX Resources Inc	(82G.073)	Au	sediment- hosted vein	DD, TR, G	750
Eholt	Open Gold Corp	082ESE187	Au, Cu	skarn, epithermal, massive sulphide	DD	1919
Elkview Operations (includes Baldy Ridge BR-2 Pit)	Teck Coal Limited	082GNE017	coal	sedimentary	RC	18 164
Fording River Operations (includes Swift Project)	Teck Coal Limited	082JSE010	coal	sedimentary	A, RC	40 417
GK	Bitterroot Resources Ltd	082ESE175	Au, Cu, Ag	intrusion-related veins	A, DD	2051
Greenhills Operations (Cougar North Extension)	Teck Coal Limited	082JSE007	coal	sedimentary	A, RC, DD	5248
Greenwood Project (includes Wild Rose and Boundary Falls)	Golden Dawn Minerals Inc	082ESE045, 116, 130, 171	Au, Cu, Ag	vein, porphyry	DD, GC	
Greenwood Gold (includes Motherlode, Ket 28, Dayton, Overlander, Copper Mountain)	Grizzly Discoveries Inc	082ESE034, 147, 174, 255, 082ESW022, 210, 231	Au, Cu, Ag, Mo, Zn, Pt	vein, skarn, intrusion- related, porphyry	DD, GC, GP, G	
International Basin	Kingsman Resources Inc	082KNW094	Au, Ag, Pb, Cu, Zn	polymetallic veins	DD	1087

TABLE 2. CONTINUED

Property	Operator	MINFILE (or TRIM sheet)	Commodities	Target Type	Work program	Metres of drilling where available (approximate in some cases)
Iron Range	Providence Resources Corp	082FSE014 to 028	Au, Zn, Pb, Fe, Cu	SEDEX, IOCG	DD, GC, G, IP, AB-EM, AB-gravity	6300
J & L	Merit Mining Corp	082M 003	Au, Ag, Pb, Zn	SEDEX, replacement vein	UG, UG-DD	2800
Kenville Gold Mine (Nelson Mining Camp project)	Anglo Swiss Resources Inc	082FSW086	Au, Cu		DD	4400
Klovance (Castlegar project)	Swift Resources Inc	(82F.023)	Ag, Cu, Pb, Zn, Au	polymetallic veins	DD, TR, G	2057
Kootenay Arc	Mineral Mountain Resources Ltd	082KNW095, 110, 112	Au, Ag, Pb, Cu, Zn	polymetallic veins, Carlin?	DD, GC	2940
Lov	Bearclaw Capital Corp	082FSE124	Mo, W, Au, Pb, Cu	skarn?, porphyry?	GC, DD	653
Marten-Wheeler Ptarmigan	Teck Coal Limited	082GNE006	coal	sedimentary	A, RC	5134
Record Ridge (Rossland project)	Silver Mountain Mines Inc	082KSE030, 036	Ag, Au, Cu, Zn	polymetallic veins, manto?	DD	3712
Red Lobster (Kimberley Gold Trend Project)	West High Yield (WHY) Resources Ltd	082FSW119, 116, 117	Mg, Au, Ni, Co	ultramafic; vein	DD	4001
Royal Attwood	Fjordland Exploration Inc	(82F.068)	Pb, Zn	SEDEX	DD	1400
Slocan Silver Star	Golden Dawn Minerals Inc/Hi Ho Silver Resources Inc	082ESE206	Cu, Au	skarn	DD, GP, GC, G	
Stewart	Klondike Silver Corp	082FNW050	Ag, Pb, Zn	vein	TR, UG (25m)	N/A
	Valterra Resource Corporation	082FSW083, 084, 294	Au, Ag, Cu	vein, porphyry	P, DD	1362
	Emgold Mining Corporation	082FSW229	Mo, W, Au, Ag, Cu, Pb, Zn	vein, skarn	DD	2526

A = access (trail, road construction on claims); AB-EM = airborne electromagnetics; AB-MG = airborne magnetics; AB-RD = airborne radiometrics; BU (X tonnes) = bulk sample (weight in tonnes if known); CD = condemnation drilling; CQ = coal quality testing; CT = carbonization test (coal); DD (Xm) = diamond drilling totalling X metres; EN = environmental baseline studies/monitoring, remediation work; FS = feasibility studies; G = geology, mapping etc.; GC = geochemical sampling (rock, soil, silt etc.); GD = geotechnical drilling; GP = geophysics (general); IP = induced polarization; 3D-IP; MG = magnetics; MK = marketing (primarily for industrial mineral products); MS = metallurgical studies; OB = overburden drilling; OP-BU = open pit bulk sample; P = prospecting; PD = percussion drilling; PF = pre-feasibility studies; PP = pilot plant; R = reclamation; RC (Xm) = reverse circulation drilling totalling X metres; TR = trenching; UG (Xm) = X metres of underground development; UG-BU = underground bulk sample; UT = UTEM;

-gold. Recent work at the Dayton has identified a new bulk tonnage, low-grade copper-gold zone, coincident with gold-in-soil and induced polarization anomalies. Early 2011 results include 0.43 g/t Au and 0.15% Cu over 51 m (drill hole 11DA09). Gold mineralization at the Dayton is also known to occur in quartz veins, and associated with copper-gold skarns. Alkalic intrusions appear to be spatially related to mineralization.

Ket 28 (MINFILE 082ESW210) is a gold prospect 8 km west of Rock Creek. Mineralization is associated with zones of brecciation, quartz veins and hornfels alteration in proximity to a southeast-northwest trending shear zone. Recently the company has discovered widespread copper and low-grade gold associated with skarn-type alteration.

The **Motherlode** (MINFILE 082ESE034) is a copper-gold skarn past producer 3 km west of Greenwood. Production occurred at various time intervals up until 1962.

At the **Overlander** (MINFILE 082ESE174), 9 km southeast of Greenwood, strong geophysical anomalies spatially associated with gold-in-soil anomalies adjacent to old workings have never been drilled. The property is known for gold-quartz veins and skarns; sulphides are reported to include chalcopyrite, pyrrhotite and bornite, with lesser sphalerite, galena and molybdenite.

The **Copper Mountain** area is 13 km west of Greenwood. It is a gold-silver vein-related target (with or without copper and zinc) in siliceous biotite hornfelsed rock in proximity to intrusive contacts. Gold at Copper Mountain is associated with a wide zone of pyrite and arsenopyrite; sulphides are most concentrated adjacent to syenite dykes. A strong gold intersection (1 g/t over 30m) at the **Prince of Wales** target (MINFILE 082ESE255) was reported in 2010.

Golden Dawn Minerals undertook a diamond drilling program on the **Wild Rose** property, which includes the adjacent **Tam O-Shanter**, 3.5 km southwest of Greenwood. The Wild Rose is part of Golden Dawn's **Greenwood** Project (also see the Boundary Falls polymetallic project, below).

The Paleozoic Knob Hill Group, comprising chert, chert breccias, argillite and greenstone, underlies the property. Gold-silver-copper mineralization on the Wild Rose (MINFILE 082ESE116) and Tam O-Shanter (082ESE130) occurrences is hosted by the Wild Rose quartz vein system, which has been explored through underground workings and previous drilling campaigns. Wild Rose veins trend north northwest, and occur both within the Wild Rose fault zone and its hangingwall.

A recent focus at the Wild Rose has been a system of lower-grade, bulk tonnage gold-copper targets (porphyry-style) in zones to the east and west of the old workings. The Deadwood gold zone, an example of one of these targets, trends northwest-southeast and coincides with a magnetic anomaly. The zone has been drilled over a strike length of 1000 m and is believed to extend 1500 m

in length, 300 m in width and to a depth of 300 m. An inferred resource estimate of 19.4 Mt grading 0.45 g/t Au was released in 2011 (cut-off grade of 0.3 g/t). A new zone of silver-bearing mineralization about 300 m north of the main Deadwood zone was discovered by drilling in 2011. Results included 166.5 g/t Ag over 12 m (drill hole 11WR19).

Golden Dawn Minerals Inc and Hi Ho Silver Resources Inc carried out a diamond drilling program on the **Royal Attwood** property (MINFILE 082ESE206), 9 km west of Grand Forks. The program was intended to target some of the numerous geochemical gold and copper anomalies that are coincident with airborne geophysical anomalies. The Royal Attwood property is underlain by the Devonian to Permian Knob Hill Group and Triassic Brooklyn Formation rocks that are intruded by diorite and granodiorite of the Jurassic to Cretaceous Nelson Intrusions and syenitic rocks of the Eocene Coryell Plutonic Suite. Previous exploration on the property has identified potential for skarn Cu-Au, as well as vein, breccia and intrusion-related mineralization.

Open Gold Corp's **Eholt** copper-gold property (MINFILE 082ESE187) is roughly 15 km north of Grand Forks. Numerous mineralized zones are known on the property, representing various styles of mineralization, including skarn, mineralized shear zones, possible volcanogenic massive sulphide mineralization, and epithermal style mineralization (Assessment Report 29702). Open Gold drilled the Dead Honda skarn and Senator massive sulphide showings in 2011, two of six priority targets. Host rocks for skarn mineralization on the property include calcareous and other sediments of the Triassic Brooklyn Formation. Triassic, Jurassic and Eocene intrusive rocks are widespread.

Bitterroot Resources Ltd carried out a diamond drilling program at the **GK** gold property (MINFILE 082ESE175, 217, 252 and 256). The GK is immediately east of Beaverdell and 65 km southeast of Kelowna. Gold mineralization is related to a high-level magmatic-hydrothermal system (see Assessment Report 28179). Host rocks belong to the Upper Paleozoic Anarchist Group, and consist predominantly of an assemblage of tuffaceous volcanic and sedimentary rocks cut by diorite intrusions and dykes of alkaline to calc-alkaline affinity. Anomalous gold values on the property occur within brecciated and silicified intervals associated with intrusive contact zones. Mineralization consists of sulphide-enriched vein-breccias and stockworks containing pyrite, arsenopyrite, quartz and carbonate. Previous work focused on gold-bearing quartz veins. Drilling in 2011 was intended to test for bulk-mineable, stockwork-hosted gold-copper mineralization.

Recent activities at the **Jumping Josephine** or **JJ** property undertaken by joint-venture partners Astral Mining Corporation and Kootenay Gold Inc, have been centred on a 2003 discovery of high-grade gold mineralization known as the JJ Main zone. The JJ Main zone (MINFILE 082ESE275) is 22 km west of Castlegar

and just north of Highway 3. Mineralization in this zone is hosted by monzonitic rocks of the Jurassic Nelson Plutonic Suite, and may be related to a later-phase Jurassic intrusion that does not reach surface. Occurrences of Eocene Coryell syenite are also widespread locally. Mineralization (chiefly pyrite and arsenopyrite) occurs with quartz in stockworks, vein-breccias, ladder veins and sheeted veins, and is associated with a prominent northeast-trending shear zone. The mineralized structure in the vicinity of the JJ Main zone has been intersected in trenching and drilling over a strike length of greater than 900 m and at up to 240 m vertical depth in drill holes.

Although there was no physical work carried out at the Jumping Josephine property this year, an initial resource estimation for the JJ Main zone was released. The estimate includes an indicated resource of 363 000 t grading 2.95 g/t Au at a cut-off grade of 0.05 g/t.

WEST KOOTENAYS

Valterra Resource Corporation's gold-silver-copper **Star** Project is 7 km southwest of Nelson, and includes both the Star and the Toughnut properties. The project area contains five known gold zones in proximity to the prospective Silver King shear zone, including the Star and Eureka past producers, the Alma N zone (immediately to the south of the Star), the Toughnut occurrence, and the Gold Eagle zone further to the southeast.

Production from the Eureka Mine (MINFILE 082FSW084) between 1905 and 1954 totalled about 9000 t of ore averaging over 2 g/t Au, 125 g/t Ag and 1.77% Cu. Gold-silver-copper mineralization at the Star Project is hosted by both the Jurassic Elise Formation volcanic rocks (Rossland Group) and Jurassic Eagle Creek pluton, and has both alkali porphyry (disseminated) and shear-hosted (higher-grade) affinities. Mineralization consists mainly of pyrite, with or without chalcopyrite, within sericite and K-feldspar alteration zones.

A mineralized trend has now been defined by drilling, geochemistry and geophysics over a potential strike length of 3.5 km. Mineralization is consistent with a zoned porphyry model, subjected to shortening and shearing and related hydrothermal activity that generated zones of higher grade. Drilling in 2011 targeted the Gold Eagle, Alma N and Eureka zones. Results included 1.23 g/t Au, 2.17 g/t Ag and 0.24% Cu over 15.52 m (drill hole VST11-014, Eureka zone).

Anglo Swiss Resources Inc was active again on its **Kenville Gold Mine** property, roughly 6 km west of Nelson. The past-producing Kenville Mine, also known as the Granite-Poorman, operated intermittently between 1890 and 1954, with the bulk of production prior to 1912. More than 180 000 t of ore was mined, yielding over 2 t Au and 861 kg Ag, along with significant amounts of copper, lead and zinc. Production averaged more than 17 g/t Au, from a series of northeast-dipping quartz veins (Figure 10).



Figure 10. Recent drill-core from the Kenville Gold Mine Project (Anglo Swiss Resources Inc). High-grade gold in the core is associated with pyrite and chalcopyrite in a quartz vein. "Pseudodiorite" of the Eagle Creek pluton is also visible.

Host rocks at the Kenville (MINFILE 082FSW086) are within the Jurassic Eagle Creek plutonic complex which is intruded into, and may be the intrusive equivalent of, basalts of the Jurassic Elise Formation of the Rossland Group. Jurassic (Nelson Suite) and Tertiary intrusive rocks are also common in the immediate area. The property lies on the Silver King shear zone.

The company's most recent objective has been to explore for extensions of known ore-grade material and new mineralization. The current focus is to follow up on recent vein intersections at depth and to the south and southwest of the underground workings, and the late 2010-2011 and 2011 drill programs were specifically focused on the Kenville Mine area, testing possible southerly extensions of veins. Strike and dip extensions of economic high-grade gold and silver veins, characteristic of the Kenville, have been intersected up to approximately 500 m to the south. Results include 1.46 m grading 49.91 g/t Au (drill hole KE11-22).

The Kenville Gold Mine property is part of a larger Anglo Swiss project area, referred to as the Nelson Mining Camp. This area contains numerous examples of gold, silver and base metal mineralization, including other past producers. One of the objectives of the overall Nelson Mining Camp program has been to identify potential deep source areas and/or disseminated mineralization. Efforts devoted to the overall Nelson Mining Camp were reduced in 2011, in favour of focus on the Kenville Mine.

Sultan Minerals Inc's **Kena** property is 8 km south of Nelson and includes the Gold Mountain, Kena Gold, Kena Copper King and South Gold zones. Porphyry-style gold and gold-copper mineralization is associated with both the Jurassic Elise Formation volcanic rocks (Rossland Group) and the co-magmatic Jurassic Silver King Porphyry intrusions. The belt comprising these zones trends northwest-southeast and is sub-parallel to

and east of the Silver King shear zone. Gold mineralization tends to occur in four settings: a high-grade corridor, associated with volcanics and intrusives; volcanic-intrusive contact areas; bonanza shoots; and, bulk tonnage haloes around shoots. Gold-copper mineralization in the belt referred to above occurs in bulk tonnage (low-grade) settings, particularly in the Kena Copper King zone, while gold mineralization occurs in both bulk tonnage and bonanza (high-grade) settings. All these styles of mineralization have been a target of recent exploration efforts.

While there was no physical exploration activity at the Kena in 2011, an updated 43-101 report recommends major follow-up drilling on the Gold Mountain zone (gold) and the Kena Copper King zone (copper-gold).

EAST KOOTENAYS

PJX Resources Inc carried out trenching and initial diamond drilling on the **Dewdney Trail** gold property (Figure 11), in the Hughes Range approximately 33 km northeast of Cranbrook. Target areas on this extensive property have been identified by prospecting, geological mapping and airborne geophysics. Known gold occurrences to date are associated with quartz veins in quartzites of the middle Aldridge Formation of the Proterozoic Purcell Supergroup. The quartz veins are thin and closely-spaced, and typically form a box-work texture. The favourable stratigraphic horizon, which consists of interbedded quartzite and argillite over 200 m in true thickness, extends over 12 km in strike length in two thrust sheets. Mineralization is associated with sericite, quartz-pyrite, iron-carbonate and iron-oxide alteration, and is being likened to the sediment-hosted vein (SHV) model. The Dewdney Trail property is part of the so-called Kimberley Gold Trend.



Figure 11. Diamond drilling on the Dewdney Trail Project. PJX Resources Inc President John Keating examines drill core with PJX Chief Financial Officer Linda Brennan (left), and BC Ministry of Forests, Lands and Natural Resources Operations Regional Director of Authorizations, Jeremy Zandbergen (back to camera).

Base Metals Projects

WEST KOOTENAYS

Emgold Mining Corporation's **Stewart** property is in the Ymir area about 9 km north of Salmo. The property has potential for tungsten, copper, molybdenum, gold and silver. It has two distinct components, the Stewart molybdenum zone (MINFILE 082FSW229) in the east and the Craigtown gold zone further to the west. Most of the work to date, including the 2011 drilling campaign, has focused on the Stewart molybdenum zone (SMZ).

The project area is underlain by the Elise and Hall formations of the Lower Jurassic Rosslund Group, intruded by the middle to late Jurassic Nelson Suite and Tertiary plugs and dykes. Molybdenum is associated with quartz-stockwork and breccia zones, while tungsten-bearing skarns and lead-zinc-silver veins are also known. The SMZ has an historic molybdenum resource within a podiform breccia. Overall the SMZ is about 200 m by 80 m in extent, and has been drilled previously to a depth of 150m. The objective in 2011 was to fill in previous drilling in the breccia zone, and to look for easterly extensions of the mineralization.

The **Columbia Belle** lead-zinc-silver-copper property (MINFILE 082M 190) is located 100 km north of Revelstoke. In 2011 Goldstar Minerals Inc carried out a diamond drilling program. Mineralization at the Columbia Belle consists predominantly of stratiform (possibly SEDEX) massive galena and sphalerite. Host meta-sedimentary rocks belong to the Cambrian Index Formation; they are intruded by quartz monzonitic sills and dykes.

There were no physical exploration activities at the Sultan Minerals Inc **Jersey-Emerald** property, 10 km south of Salmo, in 2011. The property, which is situated near the south end of the Kootenay Arc, is host to a variety of different types and styles of mineralization. Replacement-style, stratabound lead-zinc mineralization is associated with Paleozoic carbonates. Tungsten is associated with the contact between Paleozoic sedimentary rocks and Cretaceous intrusions. It is hosted by both skarn and massive pyrrhotite bodies. Gold is also associated with skarn. Molybdenum-bearing, granitic intrusion-hosted quartz stockworks lie beneath some of the old tungsten mine workings and in some cases molybdenum is also associated with tungsten.

The underground Jersey lead-zinc and Emerald tungsten mines (MINFILE 082FSW009, 010, 011 and 218) closed in 1973. The Jersey Mine was historically British Columbia's second largest lead-zinc producer, and the Emerald was Canada's second largest tungsten producer. The HB-Garnet Mine (MINFILE 082FSW004 and 082FSW249), which closed in 1978 and is also part of the Jersey-Emerald property, was the province's third largest lead-zinc producer.

The property includes an estimated tungsten resource of 2.72 Mt averaging 0.358% WO₃ (measured plus indicated) using a 0.15% cut-off. Further, there is a lead-zinc indicated resource estimated at 1.9 Mt averaging 1.96% Pb and 4.10% Zn, using a cut-off grade of 3.5% combined lead-zinc. These resources are located in the areas of the old Jersey and Emerald Mine workings.

Late in the year Sultan Minerals signed a Letter of Intent with Tunxsten Resources Ltd, granting Tunxsten the exclusive option to acquire up to 65 per cent interest in the property, with the overall objective of moving the Jersey-Emerald property toward production.

Klondike Silver Corp's **Slocan Silver Project**, east of New Denver, is in a rich historic silver-lead-zinc mining area. Klondike's holdings are divided into various areas, each of which encompasses past producers of vein-style mineralization. These include the Sandon, Hewitt, Silverton Creek, Cody Creek, Payne and Jackson Basin camps. The company's Silvana mill at Sandon, a 100 t/day concentrator, is operational, and the company has an arrangement for a smelter to accept concentrates from the mill.

Mineral occurrences in the Slocan are hosted by sheared and brecciated argillite and slate of the Triassic Slocan Group intruded by granodiorite and quartz monzonite dikes.

The overall goal of the company is to locate sufficient ore to operate the mill at its maximum capacity. This includes the search for remnant and new ore in the Silvana Mine (MINFILE 082FNW050). Underground drifting and other activities in 2011 were focused on remnant Silvana ore. There was some surface exploration on the Slocan Silver Project in 2011, including work at Sandon Creek and Cody Creek.

EAST KOOTENAYS

Providence Capital Corp continued a diamond-drilling program begun in the fall of 2010 on the **Iron Range** property, roughly 15 km northeast of Creston. Providence Capital holds the option to earn a 60 per cent interest in the property from Eagle Plains Resources Ltd. There are two settings for mineralization at the Iron Range. One is gold mineralization associated with iron oxide breccias along the Iron Range fault. These known occurrences (MINFILE 082FSE014 to 028) have possible affinities with iron oxide-copper-gold (IOCG) mineralization. The second style is sedimentary exhalative (SEDEX) mineralization associated with the contact between the lower and middle members of the Aldridge Formation (known as the Sullivan horizon) in the Proterozoic Purcell Supergroup. This latter style is directly analogous to the Sullivan Mine ore body at Kimberley.

Most recent exploration, including the 2010-2011 drilling campaign and associated airborne geophysical surveys and geological mapping, has been focused on a

potential SEDEX target at the Sullivan horizon near the south end of the Iron Range, in an area of pervasive albite alteration. Results have been encouraging and suggest the presence of a hydrothermal vent system at Sullivan time, and also indicate that there are significant levels of gold in association with the typical SEDEX minerals. This new discovery is termed the Talon zone. For example, drillhole IR10-010, drilled late in 2010, intersected two intervals of gold-bearing massive sulphide mineralization, the lower of which is believed to be at or near the lower-middle Aldridge contact. Results from the upper zone included grades of 5.1 g/t Au, 1.86% Pb, 2.1% Zn and 75.3 g/t Ag over 14 m. This and other drill holes in the vicinity display a distinctive brecciated "net" texture with albite alteration (Figure 12).

The **Bohan** property, 20 km north of Creston, is prospective for Pb-Zn SEDEX and Manto-style replacement mineralization. Active Growth Capital Inc, under an option from Eagle Plains Resources Ltd, carried out a helicopter-supported diamond drilling program in 2011. The target was an untested lead and zinc coincident soil anomaly. Host rocks on the property are part of the upper Purcell Supergroup (Proterozoic).

Fjordland Exploration Inc carried out a diamond drilling program on the **Red Lobster** property, 30 km west of Kimberley. It is one of several properties held under option from Kootenay Gold Inc collectively called the Kimberley Gold Trend Project. The Red Lobster is probably on trend to the north with the Iron Range Fault, and the target on the property is SEDEX lead-zinc and gold mineralization associated with silicified sediments. The property hosts three known zones of mineralization in the Aldridge Formation with corresponding soil geochemical anomalies. The drill holes targeted the Cominco and Shado zones, and all intersected sulphide minerals. Based on initial observations, mineralization may have been remobilized from deeper zones.

Bearclaw Capital Corp undertook a helicopter-supported drill program on the **Lov** property 37 km west of Cranbrook. Drilling followed up on geochemical sampling completed earlier in the year, and previous airborne geophysical surveys. The Lov property appears



Figure 12. Recent drill-core from the Talon zone on the Iron Range property (Providence Resources Corp). Albite alteration and breccia textures suggest the possible existence of a hydrothermal vent at Sullivan time in the Aldridge Formation.

to have potential for molybdenum, tungsten, gold, lead, copper and other mineralization, related to Cretaceous granitic intrusions (perhaps porphyry and/or skarn systems). Cambrian sedimentary rocks of the Eager Formation, which include argillites and limy argillites, are intruded by coarse crystalline granite to granodiorite. Where it crops out, the intrusive is cut by networked quartz veins which contain galena, pyrite, molybdenite and chalcopyrite (see Assessment Report 26971).

Polymetallic Projects

BOUNDARY DISTRICT

Golden Dawn Minerals Inc continued to assess its **Boundary Falls** gold-silver-lead-zinc property (MINFILE 082ESE171 and 045), 4.5 km southwest of Greenwood. Along with the Wild Rose property (see Gold projects, above), which is adjacent to the north, Boundary Falls is part of Golden Dawn's **Greenwood** Project. The Boundary Falls property includes the Skomac Mine past producer (also known as the May Mac Mine) and is host to a 120 t/day mill referred to as the "Roberts Mill".

On the Boundary Falls property a quartz vein system trends northwest, subparallel to the fault contact between Permo-Carboniferous Attwood Group argillite and shale and metamorphosed Triassic diorite. Veins average about 0.9 m in width, but swell to 1.8 m locally. They are hosted within a thinly-bedded, carbonaceous, sheared argillaceous zone. The shear zone varies between 3 and 4 m in width. Mineralization consists of pyrite, galena, sphalerite, chalcopyrite, accessory tetrahedrite and some native silver. The favourable belt appears to extend over one kilometre in length and has a width of 200 m. Intermittent production from this property took place between 1903 and 1983 on the upper and lower Skomac veins. Average grades were 5.19 g/t Au, 238 g/t Ag, 1.64% Pb and 1.00% Zn.

A letter of intent with Lichtfield del Peru SAC was signed in September 2011, whereby Lichtfield may earn a 50 per cent interest in the Boundary Falls property. This arrangement will facilitate underground exploration, including a potential bulk sample, and development.

Molycor Gold Corp drilled its **Beaverdell Silver** polymetallic property, 4 km south of Beaverdell. The property is roughly 1.5 km southwest of the past-producing Beaverdell Mine (MINFILE 082ESW030), and includes several small past producers including the Wellington (082ESW072), Duncan (082ESW032) and Tiger (082ESW067). Production from the Wellington averaged 6456 g/t Ag, 9.0% Zn and 6.0% Pb.

Vein-type mineralization of the Beaverdell Camp in general is characterized by a high silver content. Mineralization is composed of galena, sphalerite and pyrite with lesser amounts of arsenopyrite, tetrahedrite, pyrrhopyrite, chalcopyrite, polybasite, acanthite, native

silver and pyrrhotite. Five separate quartz vein systems are arranged roughly *en echelon* in the belt. Westkettle granodiorite (middle Jurassic) and Beaverdell quartz monzonite (Eocene) are the dominant hostrocks.

Molycor drilled both the Duncan-Bounty and North Kokomo-Tiger zones in 2011. The objective was to intersect extensions of known silver-lead-zinc-copper-gold mineralization to a depth of 200 m. Sulphide-bearing quartz veins in the Duncan-Bounty and Kokomo-Tiger zones on the property range from 0.1 to 3.0 m in thickness. There appear to be at least three separate vein systems in the Kokomo-Tiger zone. The overall length of the Duncan Bounty veins has been demonstrated to exceed 1000 m.

WEST KOOTENAYS

Huakan International Mining Inc carried out underground drilling at the **J&L** gold-silver-zinc-lead property, 35 km north of Revelstoke. The polymetallic mineral zones at the J&L (MINFILE 082M 003) are stratabound, massive sulphide-bearing units. Mineralization of the Main zone is believed to represent shear-hosted replacement overprinting a SEDEX deposit. Stratabound zinc-lead-silver mineralization observed in the overlying Yellowjacket zone may be a remnant of original SEDEX deposition.

The property lies near the north end of the Kootenay Arc. Mineralization is hosted by the late Proterozoic to early Cambrian Hamill Group metasedimentary rocks, and occurs in two significant zones, one of which, the Main zone, is described as a stratiform, structurally-controlled precious metal and polymetallic-base metal massive sulphide deposit. The Main zone averages 2.5 m in thickness and has been exposed over 850 m along strike in underground drifting. Previous underground drilling has defined the zone over a 1.2 km strike length, while on surface it has been traced for a total of 1.6 km. It has been traced down-dip for 800 m. The subparallel Yellowjacket zone is a siliceous zinc-lead-silver stratabound zone in the immediate hangingwall of the Main zone.

A major underground drilling campaign over the winter of 2010/2011 (Phase 1) totalled 7900 m. Results included 8.47 g/t Au, 48.17 g/t Ag, 1.65% Pb and 5.76% Zn over 2.49 m (2.16 m estimated true thickness, drill hole MM11-51). It was focused on the Main zone, for which a new NI 43-101 resource estimate was derived in 2011. This includes 2.368 Mt measured plus indicated resource grading 6.81 g/t Au, 67.8 g/t Ag, 2.16% Pb and 2.99% Zn. Late in the year work had begun to extend the underground drift by 450 m, in preparation for another campaign of underground drilling over the winter months (Phase 2).

Mineral Mountain Resources Ltd continued to evaluate a series of gold-bearing polymetallic properties in the Selkirk Mountains approximately 65 km southeast of Revelstoke known collectively as the **Kootenay Arc**

Project. The properties are in general underlain by metasedimentary and volcanic rocks of the Paleozoic Lardeau Group. This area is known for polymetallic vein occurrences, but potential for sediment-hosted types of mineralization is also being investigated.

Based on a large geochemical sampling program in 2010, the properties with the four highest priority gold and silver anomalies were the focus in 2011 of follow-up airborne geophysics, geochemical sampling, and geological mapping. These were the Black Warrior (MINFILE 082KNW110), Butte Bonanza (082KNW095 and 112), Pulley Creek and Spine Mountain properties. In addition, diamond drilling was carried out on the Black Warrior and Butte Bonanza properties.

The **Black Warrior** is 18 km northeast of the community of Trout Lake. The property contains a series of polymetallic showings which are proximal to the vertically dipping Black Warrior limestone, and are part of an 8 km-long trend over which sulphide-bearing veins occur at the contact between the limestone and a graphitic argillite unit. At the main Black Warrior occurrence there are intersecting vertical and horizontal veins containing massive galena and some chalcopyrite and sphalerite, with variable amounts of gold and silver. The occurrence is centered on a near-vertical mineralized quartz vein that ranges from 0.6 to 2.4 m in thickness. Drilling results included 1.0 g/t Au, 47.0 g/t Ag and 1.33% Zn over 1 m (drill hole BW 11001).

At the **Butte Bonanza** property, 20 km southeast of Trout Lake, vertically dipping phyllites and argillites are crosscut by stacked faults which are host to gold and silver-bearing quartz-carbonate vein sets. The property is being investigated for its Carlin-style mineralization potential. A 950 m-long gold-silver-arsenic geochemical anomaly is attracting further attention, including the 2011 drilling program. Results included 0.9 g/t Au and 14.1 g/t Ag over 3.44 m (drill hole BB11011).

At the **Klovance** polymetallic property (Figure 13), 11 km northwest of Salmo, Swift Resources undertook an initial drilling program. The property is part of the company's **Castlegar** Project, which includes the Amazing Grace (also drilled in 2011) and Skarn properties.

The Klovance property encompasses the contact zone of the Bonnington pluton (mid Jurassic Nelson suite) and Jurassic Rossland Group volcanic and sedimentary rocks; Cretaceous intrusives also occur in the general area.

Trenching has now exposed a zone of shear-hosted polymetallic mineralization intermittently over a strike length of 400m. The zone ranges from less than a metre to more than 4 m, and it contains narrow veins and veinlets of massive to semi-massive sulphide mineralization.



Figure 13. Old workings on the Klovance property (Swift Resources Inc).

EAST KOOTENAYS

Silver Mountain Mines Inc drilled the **Ptarmigan** polymetallic property, 27 km west of Invermere in the Purcell Mountains, in 2011. The property includes the past-producing Ptarmigan (MINFILE 082KSE030) and Iron Cap (082KSE036) occurrences. Mineralization occurs in veins or in massive sulphide replacements in carbonates, and generally consists of pyrite, galena, sphalerite and tetrahedrite.

The Ptarmigan Mine itself consisted of a series of adits driven along the fault contact between Windermere Supergroup strata to the east and the upper Purcell Supergroup strata to the west. Mineralization is situated stratigraphically below the Windermere unconformity, in other words within strata of the Purcell Supergroup. Selective mining of the Ptarmigan yielded over 4000 g/t Ag, 5.4 g/t Au, 0.6% Cu and 0.5% Zn.

The goal of the 2011 drilling campaign was to determine the size and potential of the Ptarmigan-Iron Cap Basin, and to continue to explore and carry out work on new discoveries. The program targets included the Upper Ptarmigan massive sulphide trend and the Iron Cap lead-silver trend. The Upper Ptarmigan is located about 300 m from the original Ptarmigan Mine. Observed textures reflect extensive massive sulphide comparable to manto-style carbonate replacement deposits. Drilling

results in 2011 included 6.4 m grading 0.36 g/t Au, 95.5 g/t Ag and 3.70% Pb (hole PT11-37).

Kingsman Resources Inc's **International Basin** polymetallic property (MINFILE 082KNW094) is located about 35 km southwest of Golden in the Purcell Mountains at the headwaters of Bobbie Burns Creek. Mineralized quartz veins, with or without Fe-carbonate, occur within a northwest-trending structural corridor which extends at least 3.5 km (Figure 14). This corridor is marked by variable and locally intense alteration (quartz, sericite, Fe-carbonate and pyrite) and coincides with the axis of an anticlinal fold system. Mineralization consists mainly of galena and pyrite, with minor tetrahedrite, chalcopyrite and sphalerite. Gold is associated with pyrite. A sheeted vein model has also been proposed for the property.

The area is underlain by northwest trending metasediments of the Upper Proterozoic Horsethief Creek Group (Windermere Supergroup). Rock types include greenish grey chloritic schists, dark slaty schists, quartzites, slates and conglomerates.

The objective of the 2011 helicopter-supported drill program was to test lateral and downdip continuity of some of the mineralized veins and vein systems. Results included 8.71 g/t Au over 0.5 m (BB11-01) and 265 g/t Ag over 1.25 m (drill hole BB11-03).

East Kootenay Coalfields Projects

As indicated previously, the Elk Valley coal mines of Teck Coal Limited are involved in programs to outline new coal resources and reserves, as either expansions or replacements of current operations. All are in areas with potential for open-pit mining, and represent potential sources of metallurgical coal. Swift Project and Cougar North Extension are in the Elk Valley Coalfield, while Marten-Wheeler is in the Crowsnest Coalfield.

The Mist Mountain Formation of the Jurassic-Cretaceous Kootenay Group averages 500 to 550 m in thickness in the Elk Valley and Crowsnest coalfields, and at almost any location includes several coal seams of potentially mineable thicknesses. The coals are typically medium-volatile bituminous in rank, with some high volatile-A bituminous coals near the top of the section. At a few locations, low-volatile bituminous coals occur near the base of the section.

Exploration drilling at Fording River Operations was carried out at the **Swift Project, Swift RX2 and Henretta Phase 4** areas. The Swift Project is west of the Fording River and adjacent to current workings and mine facilities (Figure 15). Swift represents the next major potential future expansion area for Fording River Operations, as a replacement for the Eagle Mountain pits. The objective of the large drilling 2011 program (21 741 m) in the Swift

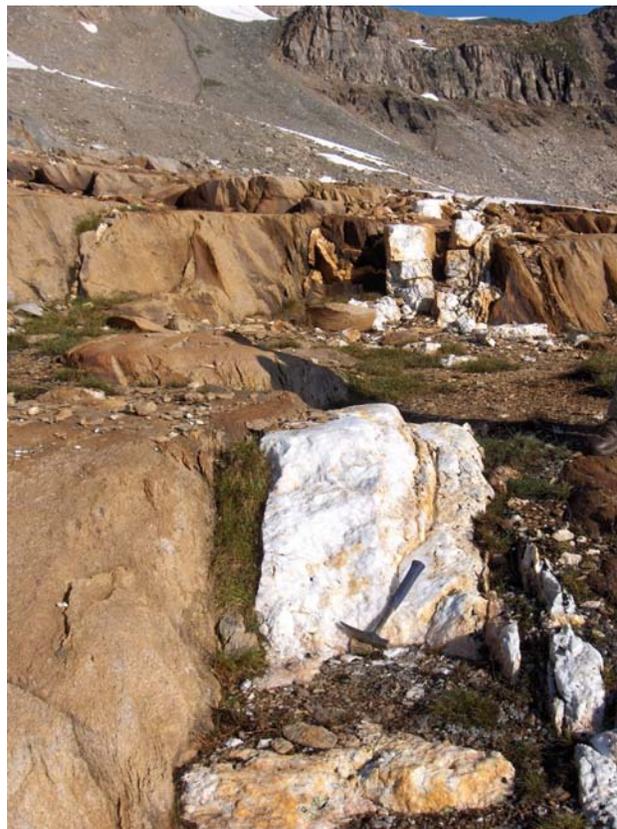


Figure 14. Mineralized quartz vein on the International Basin property (Kingsman Resources Inc).



Figure 15. Rotary drilling on the Swift Project, Fording River Operations (Teck Coal Limited).

phases 1 and 2 areas was to improve resource and reserve confidence levels.

The Swift Project is in the North Greenhills Range (MINFILE 082JSE010), and represents both previously mined and unmined zones in the Greenhills portion of the Fording River property. It is along strike to the north from Teck's Greenhills Operations. Swift Project expansion will be based on mining multiple coal seams on both limbs of the Greenhills Syncline. Mine development

will progress to the west and upward from previous open pits.

The Swift Project entered the Environmental Assessment Process in 2011 and is currently in the pre-application stage.

At Greenhills Operations rotary and diamond drilling was carried out in the **Cougar North Extension area** (Figure 16), north of the existing operations and immediately adjacent to the Swift Project exploration area of Fording River Operations described above. This site is a proposed expansion area for the Greenhills Operations. As with the Greenhills Mine as a whole, the exploration project area is part of the Greenhills Range and is underlain by the Greenhills Syncline. Coal seams above 7-seam are current targets for the expansion, with 7-seam and 10-seam most likely representing the greatest potential sources of coal reserves.

Teck Coal continued to assess sites within the general Elkview Operations area immediately east of Sparwood. These included the Baldy Ridge (proposed BR-2 Pit), Natal Ridge (Natal Phase 2) and Adit Ridge areas. Coal seams from the lower half of the stratigraphic section, especially the 10-seam or Balmer seam, are the targets at B-2 and Adit Ridge, while Natal Phase 2 encompasses coal seams from throughout the section.

The BR-2 Pit Project received its approval and permits in December.

Teck Coal also continued to assess the potential of the **Marten-Wheeler** property (MINFILE 082GNE006 & 7), roughly 19 km northeast of Fernie and immediately south of Parcel 73 of the Dominion Coal Block (082GNE008). This site represents a possible future expansion area for Coal Mountain Operations, although it is approximately 18 km distant and is not contiguous geographically or geologically. It encompasses Marten, Wheeler and Hosmer ridges in the western part of the the Crowsnest Coalfield. Although potentially hard coking

coal products, coals in the Marten-Wheeler area tend to be of somewhat higher volatile-matter content (lower rank) than current typical products from most of from Teck's mines. A major rotary drilling program was carried out in 2011 (Figure 17).

Crows Nest Pass Coal Mining Ltd carried out a rotary and partial core drilling program on its **Coal Creek** property, 8 km east of Fernie (Figures 18 and 19). The Mist Mountain Formation on the property is overlain by younger Kootenay Group and Blairmore Group strata, and occurs mainly at depth. Coal seams at Coal Creek are on the west limb of the Fernie Basin in the Crowsnest Coalfield. Individual seams are down-dip extensions of coal seams which were accessed from their surface outcrops at the underground Coal Creek Colliery, which closed in 1958. The company is targeting three seams in the uppermost part of the Mist Mountain Formation (B, 10 and 9), and is evaluating underground room-and-pillar mining potential.

Centremount Coal Ltd followed up on its large 2010 diamond and rotary-drilling program on the **Bingay Creek** property with a smaller drilling program in 2011. Bingay Creek (MINFILE 082JSE011) is 20 km north of Elkford on the floor of the Elk Valley, within the Elk Valley Coalfield. The Mist Mountain Formation at Bingay Creek is preserved in the Bingay Creek Syncline, a tight, overturned syncline in the immediate footwall of the west-dipping Bourgeau thrust fault.

Industrial Minerals Projects

West High Yield (WHY) Resources Ltd carried out diamond drilling on its **Record Ridge Magnesium Project** (MINFILE 082FSW214) 3.5 km west of Rosland. Host rocks at the site are variably serpentinized and locally carbonatized ultramafic cumulates, most likely belonging to the Slide Mountain Terrane. This



Figure 16. Rotary drilling on Cougar North Extension, Greenhills Operations (Teck Coal Limited). Photo courtesy of Chris Lane.



Figure 17. Rotary drilling on the Marten-Wheeler Project (Teck Coal Limited).



Figure 18. Rotary drilling on the Coal Creek Project (Crowsnest Pass Coal Mining Ltd).



Figure 19. Geologist Gordon Shewchuk examining drill core on the Coal Creek Project (Crowsnest Pass Coal Mining Ltd).

close-spaced drilling program was designed to upgrade the resource estimate, as well as to provide geotechnical information for a preliminary economic assessment. A measured-plus-indicated resource of 39.8 Mt grading 23.1% Mg at a 12% cut-off was estimated previously. There is also a second, larger ultramafic body in the area. The company is also interested in the Ni, Cr and Co potential of the ultramafics.

Record Ridge is within the company's overall **Rossland** Project area, which includes the the **Midnight, OK** and **IXL** properties (MINFILE 082FSW119, 116 and 117), all gold past producers. Gold mineralization is associated with ultramafic contacts and a regional tectonic boundary, and consists of gold-bearing quartz-carbonate veins, in contrast to the more typical Rossland-style sulphide-rich veins.

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