

# 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.

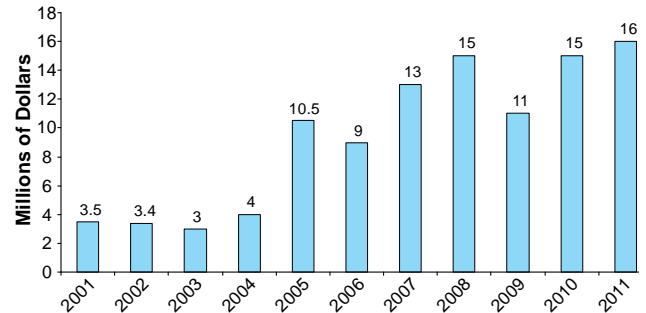


Figure 1. Exploration spending estimates for the Coast Area 2001-2011. The addition of Haida Gwaii to the region in 2010 had negligible impact on the statistics.

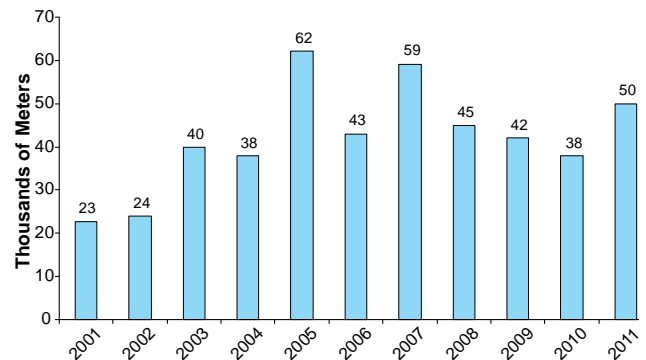


Figure 2. Exploration drilling in the Coast Area 2001-2011.

## 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.

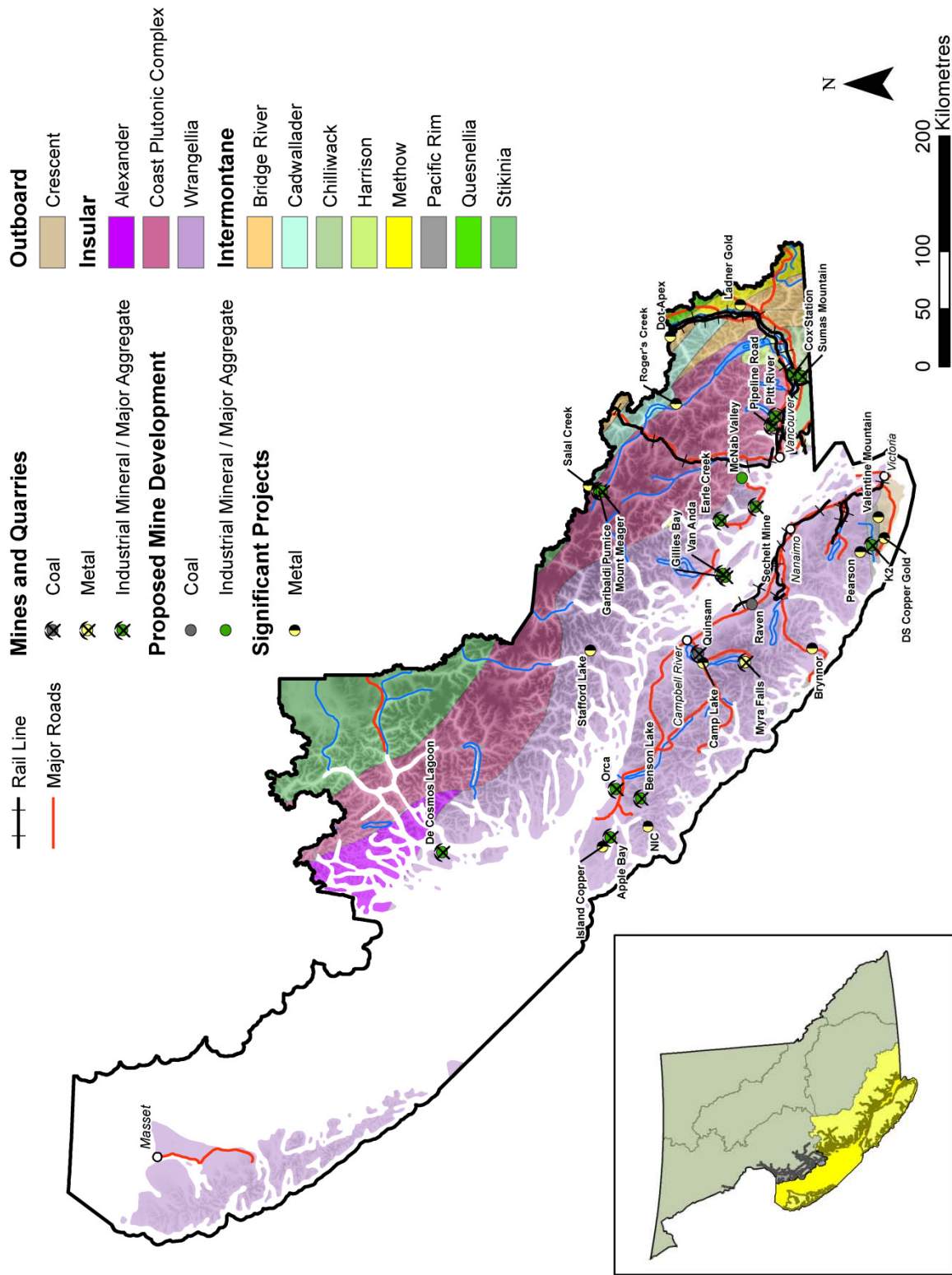


Figure 3. Operating mines and selected major exploration projects in the Coast Area, 2011.

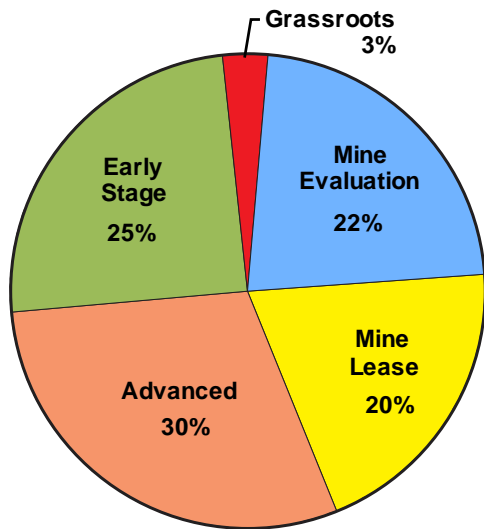


Figure 4. Coast Area exploration spending by exploration stage, 2011.

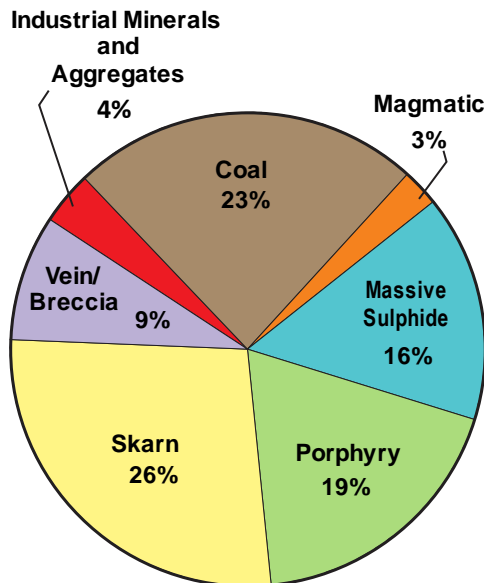


Figure 5. Coast Area exploration spending by primary target type.

## 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**

<b>Mine</b>	<b>Operator</b>	<b>Commodities</b>	<b>Mine Workforce</b>	<b>Forecast Production 2011</b>	<b>Production 2010</b>	<b>Reserves as of Dec 31, 2010</b>
<b>Metals</b>						
<b>Myra Falls Operations</b>	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)
<b>Coal</b>						
<b>Quinsam</b>	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)
<b>Industrial Minerals</b>						
<b>Apple Bay (PEM 100)</b>	Electra Gold Ltd.	Chalky geyselite	8	N/A	55 112 t	~5 million t
<b>Benson Lake</b>	Imasco Minerals Inc.	White marble	4	26 000 t	29 000	100+ years
<b>Blubber Bay</b>	Ash Grove Cement Company	Limestone aggregate, dolomitic limestone	Care and Maintenance most of 2011 - re-opening for indiv. contracts			100+ years
<b>Garibaldi Pumice</b>	Garibaldi Pumice Ltd.	Pumice	4	5200 t	30 000 m3	100+ years
<b>Gillies Bay</b>	Texada Quarrying Ltd. (Lafarge North America Inc)	Limestone, aggregate	65	3.3 Mt	3.5 Mt	100+ years
<b>K2</b>	K2 Stone Quarries Inc	Building Stone	4	16 000 t	16 000 t	N/A
<b>Monteith Bay</b>	Lehigh Hanson Inc.	Geyselite	Care and Maintenance 2008-2011			
<b>Mount Meager</b>	Great Pacific Pumice Ltd	Pumice	2	500 t	5500 m3	100+ years
<b>Sumas Mountain</b>	Sumas Shale Ltd.  (Clayburn Industrial Group and cement manufacturer partners)	Sandstone and shale	10	381 000 t	365 000 t	~70 years
<b>Van Anda</b>	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-north-west 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.

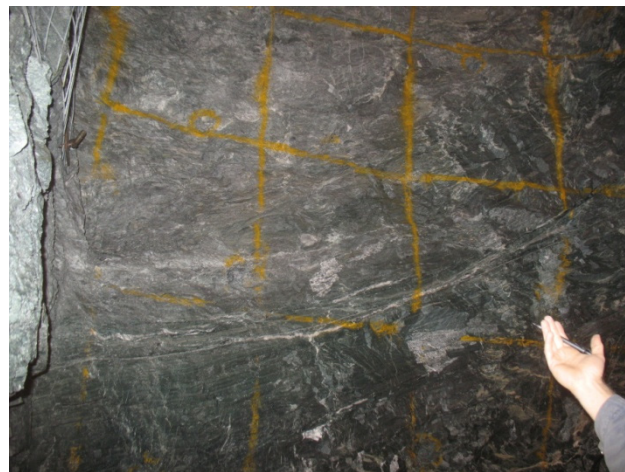


Figure 7. A face at Myra Falls in the North Slope zone, showing a contact between bedded tuff (below) and ore clast breccia.

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% SiO<sub>2</sub>, 12.90% Al<sub>2</sub>O<sub>3</sub> and 0.08% SO<sub>3</sub>.

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% CaCO<sub>3</sub>, 4.4% MgCO<sub>3</sub>, 0.1% Fe<sub>2</sub>O<sub>3</sub> 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 CaCO<sub>3</sub> 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.

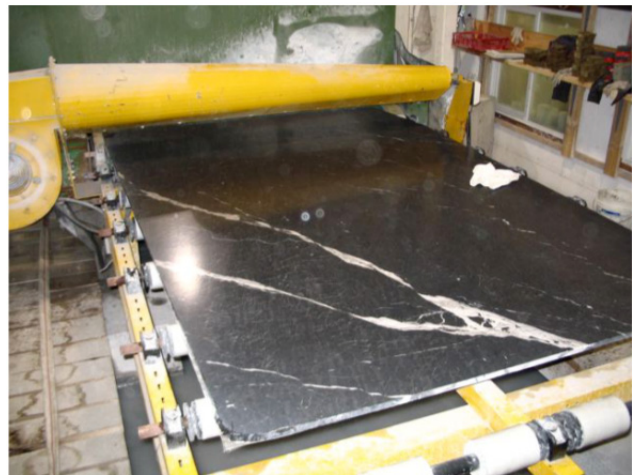


Figure 9. A slab of Black Carmanah is prepared at Matrix Marble and Stone's facilities in Duncan. Matrix in one of several Vancouver Island and Lower Mainland companies offering locally-sourced stone products. Photo courtesy of Matrix Marble and Stone.



## 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**

<b>Property</b>	<b>Operator</b>	<b>MINFILE (NTS ref.)</b>	<b>Commodity</b>	<b>Deposit Type</b>	<b>Work Program</b>	<b>Meters Drilled</b>
<b>Brynnor</b>	Ridgemont Iron Ore Corporation	092F 001	Fe (magnetite)	Fe skarn	MG; DD (in prog.)	~11 000
<b>Camp lake</b>	Compliance Energy Corporation	092F 571	Fe (magnetite)	Fe skarn	GC (rock, moss mat); DD (9 holes)	1000
<b>Dot-Apex</b>	Electra Gold Ltd	092ISW055 , 065, 090	Au	veins	DD (5 holes); GC (hist. core)	454.57
<b>DS Copper- Gold</b>	New Shoshoni Ventures Ltd	(092C.050)	Cu, Au	breccia	DD (3 holes)	~300
<b>Island Copper</b>	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
<b>Ladner Gold</b>	New Carolin Gold Corp	092HNW00 7, 003, 018	Au	veins	GC; AB (762 line km);	N/A
<b>McNab Valley</b>	BURNCO Rock Products Ltd	(092G.053)	Aggregate	sand and gravel	GP (seismic); EN; FS	N/A
<b>Myra Falls</b>	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
<b>NIC</b>	Compliance Energy Corporation	092L 266	Cu, Mo	Porphyry Cu-Mo	IP; GC rock, moss mat); DD (17 holes)	3100
<b>Pearson</b>	Pacific Iron Ore Corporation	092C 022, 023, 025, 027, 091	Fe (magnetite)	Fe skarn	DD (17 holes); EN	~4500
<b>Quinsam Mine</b>	Hillsborough Resources Ltd	092F 319	Coal	sediment ary	DD; PD (35 holes)	3500
<b>Raven</b>	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
<b>Rogers Creek</b>	Miocene Metals Limited	(092J.008, 009)	Cu, Au, Ag, Mo	porphyry Cu	GC (rock channel, soil, silt); DD (5 holes)	2070
<b>Salal Creek</b>	Miocene Metals Limited	092JW 005	Mo	porphyry Mo	P;G;GC;D D (two holes)	711
<b>Stafford Lake</b>	Dentonia Resources Ltd	(092K.073, 074, 083, 084)	W, Cu	W skarn	DD (4 holes)	352
<b>Valentine Mountain</b>	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 (MINFILE 092L 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% WO<sub>3</sub> 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% MoS<sub>2</sub>. 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.

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