

Natural Resources Ressources naturelles Canada

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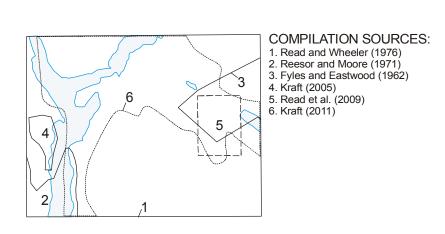
MINERAL OCCURRENCE INDEX

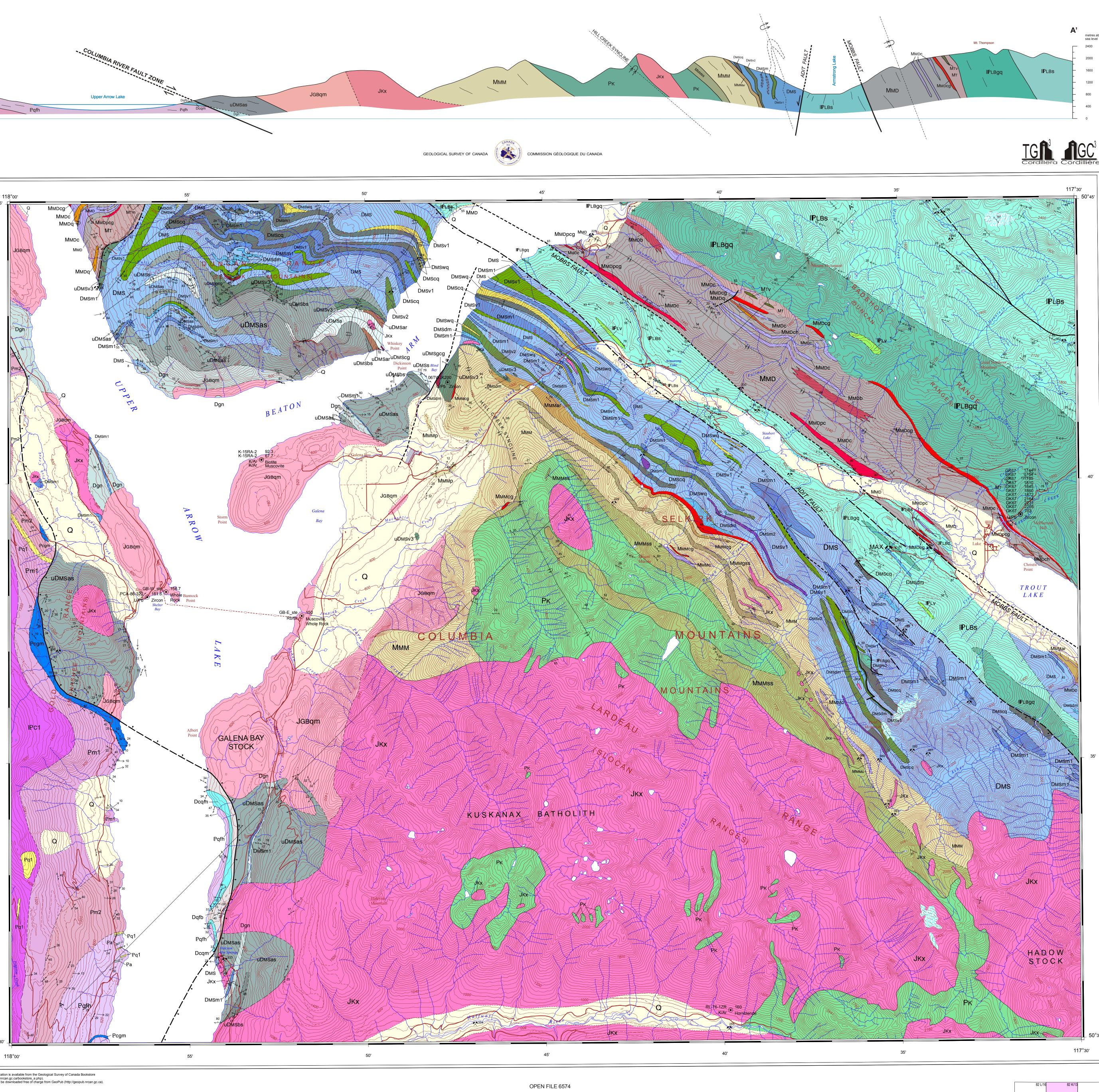
MINFILE #	NAME	COMMODITY
082KNW002	STAUBERT LAKE	PB,ZN
082KNW003	LUCKY BOY (L.5423)	AG,PB,CU,ZN,WO,AU,MO
082KNW004	COPPER CHIEF (L.4584)	AG,PB,CU,WO,ZN,MO,AU
082KNW005	FISSURE	AG,CU,ZN,FE
082KNW030	TRUE FISSURE (L.1097)	AG,PB,ZN,AU,CU
082KNW040	BEATRICE (L.4586)	AG,PB,ZN,AU
082KNW059	ETHEL	AG,PB,ZN
082KNW061	GREAT NORTHERN (L.1099)	AG,AU,PB,ZN,CU
082KNW062	ST. ELMO, (L.4581)	AG,AU,PB,ZN,CU
082KNW087	MAX	MO,WO,PB,ZN,CU
082KNW088	VMS 9	CU
082KNW089	VMS 19, 20	CU
082KNW090	VMS 21	PB,ZN,CU
082KNW091	VMS 23	PB,ZN,MO
082KNW092	VMS 1	PB,ZN,AG
082KNW093	VMS 2	PB,ZN,MO,AG
082KNW096	MURRAY	CU,AU,PB,ZN
082KNW097	MIKE	PB,ZN,AG,AU
082KNW101	SILVER DOLLAR	AG,PB,ZN,AU,CU
082KNW105	MAR	MO,PB
082KNW123	HOMESTAKE	PB
082KNW127	GILLMAN	AU,AG,PB,ZN
082KNW131	MO,UNTAIN BOY (L. 2495)	AG,PB
082KNW136	IRON DOLLAR (L.7059)	PB,AU,AG,CU
082KNW147	CRAIG	AG,PB,AU
082KNW149	RAINY DAY	CU
082KNW189	ROYAL CANADIAN	AU
082KNW213	GREAT WESTERN (L.4503)	PB,AG
082KNW224	UPPER ARROW TALC	TC
082KNW226	SIDMO,UTH	LS,MB,BS
082KNW228	RATH	PB,ZN,AG
082KNW229	LEMAR	MO
082KNW230	POLLMAN CREEK	PB
082KNW231	STAU,BERT TRENCH	PB,ZN
082KNW233	HALCYON HOT SPRINGS	HS
082KNW234	HALFWAY RIVER HOTSPRINGS	HS
082KNW235	UPPER HALFWAY RIVER HOTSPRINGS	HS
082KSW099	PINGSTON	ZN,AG,PB,CU
* Abbreviations for co	• ommodities: AG – silver; AU - gold; BS - building stone; CU -	copper; FE - iron;
HS - batspring: LS - limestage: MB - marble: MO - molybdenum: PB - lead: SB - antimony TC - tale		

HS - hotspring; LS - limestone; MB - marble; MO - molybdenum; PB - lead; SB - antimony; TC - talc SN - tin; TC - talc; TE - tellurium; WO - tungsten; ZN - zinc

Source: British Columbia Ministry of Energy and Mines, MINFILE database available at:

http://www.em.gov.bc.ca/Mining/Geolsurv/Minfile/







Compilers: J.L. Kraft, R.I. Thompson and P. Dhesi Geology by: J.E. Reesor and J.M. Moore, 1963-65; J.O. Wheeler, 1965,67; P.B Read 1971-76; R.I. Thompson, 2002-04, Y. Lemieux, 2003-06; J.L. Kraft, 2004, 2006-08 Geological compilation by R.I. Thompson, 2002 and J. Kraft, 2010 Digital cartography by P. Dhesi, Geological Survey of Canada, Pacific Division Any revisions or additional information known to the user would be welcomed by the Geological Survey of Canada



BEATON BRITISH COLUMBIA Scale 1:50 000/Echelle 1/50 000 kilometres 1 0 1 2 3 4 kilomètres Universal Transverse Mercator Projection North American Datum 1983

GEOLOGY

Projection transverse universelle de Mercator Système de référence géodésique nord-américain 1983 © Her Majesty the Queen in Right of Canada 2011 © Sa Majesté la Reine du chef du Canada 2011

Digital base map from data compiled by Geomatics Canada, modified by the Geological Survey of Canada - Pacific Division Magnetic declination 2011, 16°43' E, decreasing 13.3' annually Elevations in metres above mean sea level

> Universal Transverse Mercator Grid North American Datum 1983 Zone 11

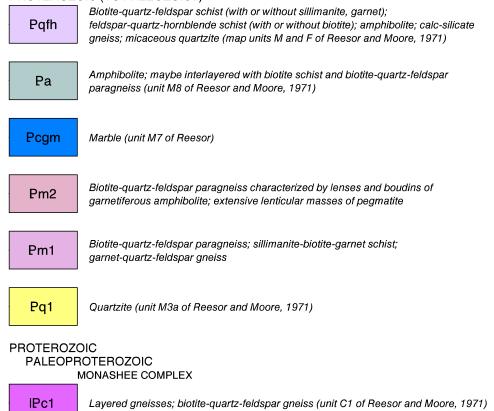
Contour interval 40 metres

82 L/16	82 K/13	82 K14
	OF 6573	
82 L/9	82 K/12	82 K/11
	OF 6574	OF 6572
82 L/8	82 K/5	82 K/6
OF 4377	OF 6185	OF 6184
NATIONAL TOPOGRAPHIC SYSTEM REFERENCE AND INDEX TO ADJOINING GEOLOGICAL SURVEY OF CANADA MAPS		

SYMBOLS	
Foliation (unclassified): inclined, horizontal, vertical	
Foliation (1st generation): inclined, horizontal, vertical	⁴⁵ ZZ
Bedding: inclined, horizontal, vertical, overturned	⁴⁵ / + × ⁴¹
Fold: axis plane (unknown generation) s-verging, z-verging	⁴⁵
Cleavage	4
Mineral lineation	
Fold hinge: crenulation lineation	
Geochronology sample (http://gdr.nrcan.gc.ca/geochron/index_e.php)	
Mineral Occurrence	🛠 ^{data}
Geological boundary defined, approximate, assumed	~
Geological boundary: arbitrary	·····
Quaternary limit	•••••••••••••••••••••••••••••••••••••••
Fault, reverse (teeth indicate upthrust side): defined, approximate, assumed	
Fault, normal (balls indicate downthrown side): defined, approximate	
Fault, normal (balls indicate downthrown side): assumed	
Fault, unclassified: defined, approximate, assumed	
Anticline (2nd generation) upright, overturned, plunging	
Syncline (2nd generation) upright, overturned, plunging	
Anticline (2nd generation) (approximate): upright, overturned, plunging	
Syncline (2nd generation) (approximate): upright, overturned, plunging	
Anticline (3rd generation): upright	
Syncline (3rd generation): upright	
Cross-section line	

ROCKS WEST OF COLUMBIA RIVER FAULT ZONE

Silver Creek Schist?: purplish biotite-feldspar-quartz schist with or without muscovite, Dqfb garnet and sillimanite; minor white to grey marble and amphibolitic schist Calcareous Quartzite Marker (Chase Quartzite?): pitted, calcareous quartzite; diopside-bearing calcareous quartzite; quartzite; marble PROTEROZOIC (TO PALEOZOIC?) Biotite-quartz-feldspar schist (with or without sillimanite, garnet); gneiss; micaceous quartzite (map units M and F of Reesor and Moore, 1971)



CENOZOIC		
Q	Unconsolidated sediments; glacial deposits, colluvium and alluvium; few if any outcrops	
MESOZOIC JURASSIC MIDDLE JUF	RASSIC	
JGBm	Galena Bay Stock: muscovite-biotite quartz monzonite, granodiorite and monzogranite	
EARLY AND	MIDDLE JURASSIC	
ЈКх	Kuskanax batholith: biotite or augite granodiorite; leuco-quartz monzonite; minor leucosyenite and leucogranite	
PALEOZOIC PERMIAN	KASLO GROUP	
Рк	Meta-basalt flows; minor volcanic breccia and tuff; local gabbro	
	ROUS SISSIPPIAN AND PENNSYLVANIAN MILFORD GROUP (MCHARDY ASSEMBLAGE)	
MMMss	Banded tan, purple and white metasandstone, commonly rhythmically interbedded with thinner layers of black metasiltstone at centimetres- to decimetres-scale.	
Ммм	Medium grey to black phyllite and bedded or massive metasiltstone; argillaceous phyllite	
MMMg	SS Poorly sorted lithic metasandstone and grit; local conglomerate lenses	
Ммма	Carbonaceous and siliceous argillite and metasiltstone weathering rusty brown and orange; pyritiferous	
Мммо	Medium grey to black crystalline limestone or argillaceous limestone	
Мммс	g Oligomict pebble orthoconglomerate with argillaceous clasts; grey quartzite	

DEVONIAN UPPER DEVO	ONIAN IOUNT SPROAT ASSEMBLAGE
uDMSs	Pelitic schist and phyllite: fine grained quartzose muscovite schist; black la metasiltstone and phyllite; garnet-hornblende-muscovite schist; biotite \pm st schist
uDMSar	Rusty weathering black siliceous argillite and argillaceous phyllite
uDMScg	Quartz pebble conglomerate
uDMSas	Amphibolitic schist: biotite-hornblende±muscovite schist; chorite-sericite sc locally calcareous
uDMSv3	Calc-alkaline metabasaltic rocks. Massive, fragmental or plagioclase porph textures; commonly with buff carbonate pods
uDMSbs	Medium-grained grey biotite-quartz-plagioclase±hornblende schist
uDMSgcg	Pebble to cobble paraconglomerate with matrix of biotite-muscovite-chlorit schist; angular to rounded clasts of crystalline quartz and gritty quartzite
	(OR) UPPER DEVONIAN IOUNT SPROAT ASSEMBLAGE
DMS	Dark grey, carbonaceous quartz-mica schist to quartzite; grey and brown w fine- to- medium-grained biotite-quartz-feldspar schist and micaceous (muscovite-biotite) quartzite; micaceous grey phyllite; phyllitic greenstone;
Dgn	Quartzofeldspathic and pelitic paragneiss with or without muscovite, gas sillimanite; minor white to grey marble and amphibolitic schist; metamorequivalent of IPMSu?
DMSm2	Differentially weathering light grey to white calc-silicate and marble with cm-scale phyllitic laminations; local tremolite \pm grossular \pm diopside
DMSv2	Metabasaltic rocks of island arc tholeiite affinity.
DMSdm	Buff weathering, fine-grained white or light grey dolomitic marble and (marble; massive and pervasively fractured
DMSv1	Metabasaltic rocks of enriched mid-ocean ridge basalt, or rarely ocean basalt, affinity
DMSwq	Fine-grained white quartzite to light grey phyllitic quartzite with light rus weathering
DMSm1	Medium to dark grey platy marble and argillaceous marble; limy carbor phyllite
DMScq	Rusty-weathering, fine-grained carbonaceous quartzite to sooty quartz schist; contorted quartz veinlets (sweats) define transposition foliation,
CAMBRIAN T	O DEVONIAN ARDEAU GROUP BROADVIEW FORMATION
IPLBgq	Light green or grey phyllitic quartzite to subarkosic wacke with blue-quartz millimetre-scale phyllitic partings define transposition foliation
IPLBS	Graphitic grey quartzose phyllite or schist with common blue-quartz granule veinlets along undulatory foliation
	FORMATION NOT ASSIGNED
IPLv	Green phyllite and phyllitic greenstone

LEGEND

ic breccia and tuff; local gabbro

ROCKS NORTHEAST OF MOBBS FAULT ΔΝΠΔΝ

d		JS IPPIAN AND PENNSYLVANIAN ORD GROUP (DAVIS ASSEMBLAGE)
		edium and dark grey silty phyllite with minor metasiltstone and metasandstone; cally pyritiferous
	MMDb	Thinly bedded (<5 m) assemblage of limy phyllite, metasiltstone, metasandstone and limestone
n	MMDch	Grey to black bedded chert and cherty quartzite
	MMDq	Massive grey quartzite, minor limy quartzite to limestone
	MMDc	Medium grey to black crystalline limestone; locally fossiliferous
	МмDрсд	Oligomict, locally polymict, pebble conglomerate with grey or green phyllite matrix
	MMDcg	Oligomict pebble to cobble orthoconglomerate with quartzitic matrix
		DLE MISSISSIPPIAN MPSON ASSEMBLAGE
	MT ba	MPSON ASSEMBLAGE eenish phyllitic grit with graded bedding; greenish grey phyllite; green and maroon nded phyllite and phyllitic argillite; grey crystalline limestone and testone-dolostone breccia; sandy marble; rare, thin beds of whitish chert
	MTv	Purple and dark green amygdaloidal metabasalt of enriched mid-ocean ridge

MTm Medium to dark grey platy marble and argillaceous marble; limy carbonaceous phyllite; crinoid ossicles on ridge west-southwest of McCrae Peak

basalt geochemical affinity

rained quartzose muscovite schist; black laminated t-hornblende-muscovite schist; biotite ± staurolite

s argillite and argillaceous phyllite

blende±muscovite schist; chorite-sericite schist;

s. Massive, fragmental or plagioclase porphyritic rbonate pods artz-plagioclase±hornblende schist

erate with matrix of biotite-muscovite-chlorite-quartz of crystalline quartz and gritty quartzite z-mica schist to quartzite; grey and brown weathering,

caceous grey phyllite; phyllitic greenstone; marble ic paragneiss with or without muscovite, garnet and ey marble and amphibolitic schist; metamorphosed

ht grey to white calc-silicate and marble with abundant s; local tremolite \pm grossular \pm diopside

ed white or light grey dolomitic marble and (or) calcitic sively fractured

hed mid-ocean ridge basalt, or rarely ocean island

e to light grey phyllitic quartzite with light rusty orange

narble and argillaceous marble; limy carbonaceous

ned carbonaceous quartzite to sooty quartz-mica nlets (sweats) define transposition foliation, S1

rtzite to subarkosic wacke with blue-quartz granules;

e or schist with common blue-quartz granules; quartz

CAMBRIAN TO DEVONIAN

LARDEAU GROUP

BROADVIEW FORMATION

IPLBS Graphitic grey quartzose phyllite or schist with common blue-quartz granules; quartz veinlets along undulatory foliation **IPLBC** Medium or dark grey marble and argillaceous marble FORMATION NOT ASSIGNED

Light green or grey phyllitic quartzite to subarkosic wacke with blue-quartz granules;

millimetre-scale phyllitic partings define transposition foliation

Green phyllite and phyllitic greenstone

DESCRIPTIVE NOTES The Beaton map area in the southern Canadian Cordillera is underlain by portions of the Shuswap Metamorphic Complex and the northern Kootenay Arc, and hosts the MAX Molybdenum Mine at Trout Lake. The reader is referred to Read et al. (2009) for detailed geology of the MAX mine. Rocks in the Beaton map area range from the Paleoproterozoic through the Neoproterozoic (?), Paleozoic, and Mesozoic eras. All units were involved in the Cordilleran Orogeny. PHYSIOGRAPHY The map area is accessible via provincial highways 3, 6 and 23. The nearest incorporated communities, Nakusp and Revelstoke, are approximately 30 km south and 40 km north of the map limits, respectively. Upper Arrow Lake, a major reservoir on the south flowing Columbia River, separates the Monashee Mountains (Gold Range) in the west from the Selkirk Mountains in the east. The Selkirk Mountains are subdivided into the Lardeau Range and Badshot Range to the respective west and east of Trout Lake and its valley. To some extent, these physiographic divisions reflect underlying geology. As part of the Interior temperate rain forest, slopes are densely forested with cedar, hemlock, Douglas-fir, larch, maple, aspen and mountain alder at low and moderate elevations, and with spruce and subalpine fir above ~1600 m. Alpine areas become largely free of heavy winter snow in July. Outcrop exposure is best along the generally subdued, sub-alpine ridge lines and during low water (April-May) on the shore of the Arrow Lakes reservoir. TECTONOSTRATIGRAPHIC FRAMEWORK In the Monashee Mountains, Paleoproterozoic orthogneiss (unit IPc1) and unconformably overlying Proterozoic paragneisses (units Pq1, Pm1, Pm2) are part of the Thor-Odin dome of the Monashee Complex- a migmatitic structural-

metamorphic culmination in the metamorphic hinterland of the Cordilleran Orogen (Reesor and Moore, 1971). Orthogneiss in the core of the culmination is exhumed North American continental crust, making it the deepest exposed structural level in the southern Canadian Cordillera. The Monashee Complex and Proterozoic to Paleozoic paragneiss overlying it are part of the regional-scale Shuswap Metamorphic Complex (Jones, 1959; Reesor and Moore, 1971). Multiple nomenclatures describing the gneisses and models explaining genesis of the metamorphic culmination have been proposed (i.e. Reesor and Moore, 1971; Read and Brown, 1981; Brown and Journeay, 1987; Carr, 1991; been proposed (i.e. Reesor and Moore, 1971; Read and Brown, 1981; Brown and Journeay, 1987; Carr, 1991; been proposed (i.e. Reesor and Moore, 1971; Read and Brown, 1981; Brown and Journeay, 1987; Carr, 1991; been proposed (i.e. Reesor and Moore, 1971; Read and Brown, 1981; Brown and Journeay, 1987; Carr, 1991; been proposed (i.e. Reesor and Moore, 1971; Read and Brown, 1981; Brown and Journeay, 1987; Carr, 1991; been proposed (i.e. Reesor and Moore, 1971; Read and Brown, 1981; Brown and Journeay, 1987; Carr, 1991; been proposed (i.e. Reesor and Moore, 1971; Read and Brown, 1981; Brown and Journeay, 1987; Carr, 1991; been proposed (i.e. Reesor and Moore, 1971; Read and Brown, 1981; Brown and Journeay, 1987; Carr, 1991; been proposed (i.e. Reesor and Moore, 1971; Read and Brown, 1981; Brown and Journeay, 1987; Carr, 1991; been proposed (i.e. Reesor and Moore, 1971; Read and Brown, 1981; Brown and Journeay, 1987; Carr, 1991; been proposed (i.e. Reesor and Moore, 1971; Read and Brown, 1981; Brown and Journeay, 1987; Carr, 1991; been proposed (i.e. Reesor and Vanderhaeghe and Teyssier, 2001; Teyssier et al., 2005; Glombick, 2005; Brown and Gibson, 2006; Kruse and Williams, 2007; Gervais et al., 2010). The Shuswap complex here is bounded to the east and was partially exhumed by the Eocer Columbia River Fault Zone (CRFZ; Read and Brown, 1981; Lane, 1984; Carr, 1991; Lemieux, 2006), which approximately follows the trace of the Columbia River valley. Within the Beaton map area, the eastern hanging wall of the CRFZ comprises Paleozoic continental margin strata that were deformed and metamorphosed to greenschist facies, and locally to amphibolite-facies, in Jurassic (and Cretaceous?) phases of the Cordilleran Orogeny. Paleozoic strata form two first-order successions that are separated by an angular unconformity corresponding to a Late Devonian and (or) Early Mississippian deformation event, regional The lower succession consists of phyllite and grit of the lower or mid-Paleozoic Broadview Formation, Lardeau Group (unit IPLB; Fyles and Eastwood, 1962), and the lithologically heterogeneous Mount Sproat assemblage (new term; formerly assigned in part to Lardeau, Milford and Kaslo groups by Read and Wheeler, 1976), which comprises broadly disparate lower and upper subdivisions. The lower Mount Sproat assemblage is composed of carbonaceous phyllite to quartzite with abundant carbonate and mafic volcanic horizons in the greenschist-facies, overturned eastern limb of the

element geochemical characteristics of mid-ocean ridge and island arc tholeiitic basalt. Lithologies within the lower MSA are repeated in metres- to decametres-thick layers. A horizon of discontinuous quartzite cobble conglomerate with green phyllitic matrix (unit uDMSgcg) near Mount Sproat marks the apparently conformable transition to the upper MSA, which is dominated by basaltic to andesitic amphibolitic schist and greenstone (units uDMSas and uDMSv3, respectively) with minor metapelite and carbonate. The upper MSA outcrops north and west of the Kuskanax batholith in the upright western limb of the Hill Creek syncline at greenschist and amphibolite-facies. Foliated greenstone stratigraphically above the green conglomerate has calc-alkaline basalt trace element signatures and yielded concordant Late Devonian zircons near Blind Bay in Beaton Arm (Kraft, unpublished data). In a bowl on the northwest flank of Trout Mountain, the contact between carbonaceous quartzite basal to the MSA (unit DMScg) and guartzite correlated with the Broadview Formation (unit IPLBgq) is a mixed gradation over several metres of outcrop. A gradational transition between the Broadview Formation and the MSA is also apparent where outcrop is discontinuous along the deactivated Asher Creek road on the west side of Trout Lake. The contact between the MSA and the Broadview Formation is not exposed elsewhere; it is placed at an inferred continuation of the brittle, normal Adit fault, which was defined at the MAX molybdenum mine (Read et al., 2009).

Jurassic Hill Creek syncline between Trout Lake and Mount Sproat. Metavolcanic members of the lower MSA have trace

Upper Mississippian to Pennsylvanian strata in the map area belong to the Milford Group and form two lithologically distinct assemblages separated by a northern extension of the mid-Jurassic Mobbs fault, which was originally mapped in the Poplar Creek map area (NTS 82K/06; Read, 1973). In the Lardeau Range, the McHardy Assemblage of the Milford Group (Klepacki, 1985) unconformably overlies the MSA. McHardy Assemblage here consists of lensoidal beds of quartz pebble conglomerate overlain by monotonous black argillaceous phyllite and metasiltstone (unit MMM). A rhythmically banded metasandstone-metasiltstone member (unit MMMss) above the argillaceous rocks represents the top of the McHardy Assemblage. The transition from the McHardy Assemblage to overlying mid-ocean ridge basalt and gabbro of the Permian Kaslo Group (unit PK; Orchard, 1985; Klepacki, 1985) is a locally faulted interval of interlayered metasandstone and metabasalt. Milford Group strata in the Badshot Range northeast of Trout Lake form the Davis Assemblage (Klepacki, 1985), which unconformably overlies the Broadview Formation. Davis Assemblage comprises pebble (rarely boulder) conglomerate with sandy phyllitic matrix, fossiliferous limestone and minor chert near its base. The remainder is largely silver coloured silty phyllite (unit MMD). Its top is not exposed because of its occurrence in a syncline. Immediately beneath that conglomerate, a sedimentary sequence up to ~300 m thick has been preserved between Milford and Broadview strata. This sequence, informally named the Thompson assemblage for superior exposure at that locality (new term; unit MT), comprises basal phyllitic conglomerate and grit, maroon phyllite, minor marble, sandy marble, amygdaloidal basalt and rare, thinly bedded chert. Coarse clastic Thompson assemblage units are apparently derived from underlying Broadview Formation. Graded beds with scoured bases indicate younging is toward Milford strata. Fragments of distinctive Thompson assemblage chert and maroon phyllite occur in overlying

Davis Assemblage conglomerate. The Thompson assemblage can be traced northwestward onto map 82K/13 (Camborne), where it becomes more strongly deformed and metamorphosed. Equivalent green phyllite and pebble conglomerate are also present stratigraphically below Davis Assemblage along Lardeau Creek at the head of Trout Lake. The Thompson assemblage was not affected by regional D1, thus it is assigned a pre-Milford Mississippian age. INTRUSIVE ROCKS Multiple phases of granodiorite, quartz monzonite and minor syenite constituting the Early to Middle Jurassic Kuskanax Batholith (unit JKx) and its peripheral dikes and sills were emplaced early in, during, and after deformation of Paleozoic

host strata between ca. 190-170 Ma (Read, 1973; Roback, 1993). The peraluminous, ca. 162 Ma Galena Bay Stock (unit JGBm) post-dates tectonometamorphism in its host rocks (Parrish and Armstrong, 1987). The surface expression of the ca. 80 Ma Trout Lake Stock granodiorite (Lawley, 2009) is too small to appear on this map, but it increases in volume in the subsurface at the MAX Molybdenum Mine (Read et al., 2009). Early Tertiary syntectonic pegmatite sills of the Ladybird Leucogranite Suite (Carr, 1992) are abundant in the footwall of the CRFZ near Upper Arrow Lake. STRUCTURAL GEOLOGY

zone metamorphism.

Devonian and older strata east of the trace of the Columbia River Fault Zone were strongly deformed at greenschistfacies by regional event D1, which formed a transposition foliation, S1, defined by compositional layering and phyllitic foliation. Quartz veinlets parallel to S1 in carbonaceous schist and centimetre-scale F1 isoclines or rootless folds are present in this succession. S1 foliations are most apparent in quartzose rock types, and appear to diminish in strength in upper units of the MSA. Map-scale F1 folds have not been identified. Upper Mississippian Davis Assemblage conglomerate on the west flank of Mount Thompson contains cobbles of underlying Broadview grit with randomly oriented S1 foliations that pre-date deposition of the conglomerate (Wheeler, 1966; Read, 1975). A pre-depositional fabric in clasts within Mount Sproat assemblage conglomerate was not observed. All strata east of the CRFZ experienced Jurassic D2 deformation that changes in intensity, style, and metamorphic grade from east to west. In the Kootenay Arc east of the Kuskanax Batholith, greenschist-facies cleavage, S2, is associated

with tight upright to inclined folding with northwest or southeast trending axes. D2 features define the structural grain east of Upper Arrow Lake. S2 cleavage in the Mississippian Thompson and Davis assemblages transects bedding, which has not been transposed. On the south flank of Mount Sproat and west of the Kuskanax Batholith, S1 or bedding was transposed into S2 as metamorphic grade increases westward. Still in the hanging wall of the CRFZ, S2 schistosity along Upper Arrow Lake is defined by garnet zone minerals and dips moderately or shallowly. Dykes peripheral to either the Galena Bay Stock or the Kuskanax Batholith are isoclinally folded into S2 in Beaton Arm west of Whiskey Point. A metamorphic overprint with roughly north-south trending isograds normal to layering occurs on the west flank of Mount Sproat in the immediate hanging wall of the Columbia River fault zone. This local metamorphism formed euhedral garnet, kyanite and staurolite in metapelite along Crawford Forest Service Road and post-dates Jurassic F2 folding. Also north of Beaton Arm, upright F2 folds defined by Mount Sproat assemblage strata are folded by map-scale close recumbent F3 folds that produced southeasterly trending crenulation lineations and outcrop-scale folds after garnet

Monashee Complex gneisses have strikingly different structure and tectonic history than strata east of the CRFZ. Gneisses of the Monashee and Shuswap complexes and in the footwall of the CRFZ consistently dip gently eastward and have strong east-trending stretching and mineral lineations. Mesoscopic fold axes trend easterly. These gneisses experienced strong ductile deformation, migmatization and felsic plutonism in the Late Cretaceous-Paleocene phase of the main Cordilleran Orogeny (Carr, 1991). The gneisses were rapidly exhumed and quenched in the late Paleocene to Eocene by a combination of ductile and brittle crustal deformation (i.e. Carr, 1991; Vanderhaeghe et al., 1999; Johnston et al., 2000; Hinchey et al., 2006). FAULTING

fault is inferred to extend into Beaton map area from the southeast (82K/11: Trout Lake; and 82K/6: Poplar Creek), where its significant displacement of unknown sense at least partly post-dates Jurassic F2 folds. Mobbs fault appears not to offset metamorphic isograds associated with intrusion of late phases of the mid-Jurassic Kuskanax suite (Read, 1973). Large displacement inferred to be west-side down, and probably with a strike-slip component, on the Adit fault postdates ca. 80 Ma mineralization at the MAX Molybdenum Mine (Read et al., 2009; Lawley, 2009). The extensional Eocene Columbia River fault zone juxtaposes amphibolite facies Upper Devonian MSA strata against footwall Middle or Upper Devonian (units Dcqm and Dqfb) paragneiss and older gneisses of the Monashee Complex. The CRFZ is characterized by mylonitic top-to-the-east fabrics overprinted by chloritic and cataclastic brittle fault rock concentrated in the immediate hanging wall. ECONOMIC GEOLOGY

East of the Kuskanax Batholith, steeply dipping, northwest striking brittle faults tend to post-date F2 folds. The Mobbs

Porphyry molybdenum mineralization and peripheral base metal-mineralized veins at the MAX Molybdenum Mine derive from the ca. 80 Ma Trout Lake granodiorite stock (Lawley, 2009), which is too small at surface to appear on this map.The stock has no known age equivalents in the area. Neither the Kuskanax batholith nor Galena Bay stock are known to have produced mineral deposits. A number of vein-hosted base metal with or without gold or silver showings occur in Paleozoic strata near Trout Lake (see Mineral Occurrence Index). Upper Devonian Mount Sproat assemblage amphibolitic schist hosts Cu-Au-Pb-Zn mineralization at the Murray property near Shelter Bay. ACKNOWLEDGMENTS Although many geological contacts have been refined by Kraft, an accurate geological framework was established by earlier mapping by D.W. Hyndman, P.B. Read, J.E. Reesor, and J.O. Wheeler. More recently, contributions by Y. Lemieux and R.I. Thompson include recognition of Devonian strata along the shore of Upper Arrow Lake at Halcyon Hot

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