Geological Survey Branch
Open File 2001-3

GEOLOGICAL COMPILATION MAP BABINE PORPHRY COPPER DISTRICT CENTRAL BRITISH COLUMBIA

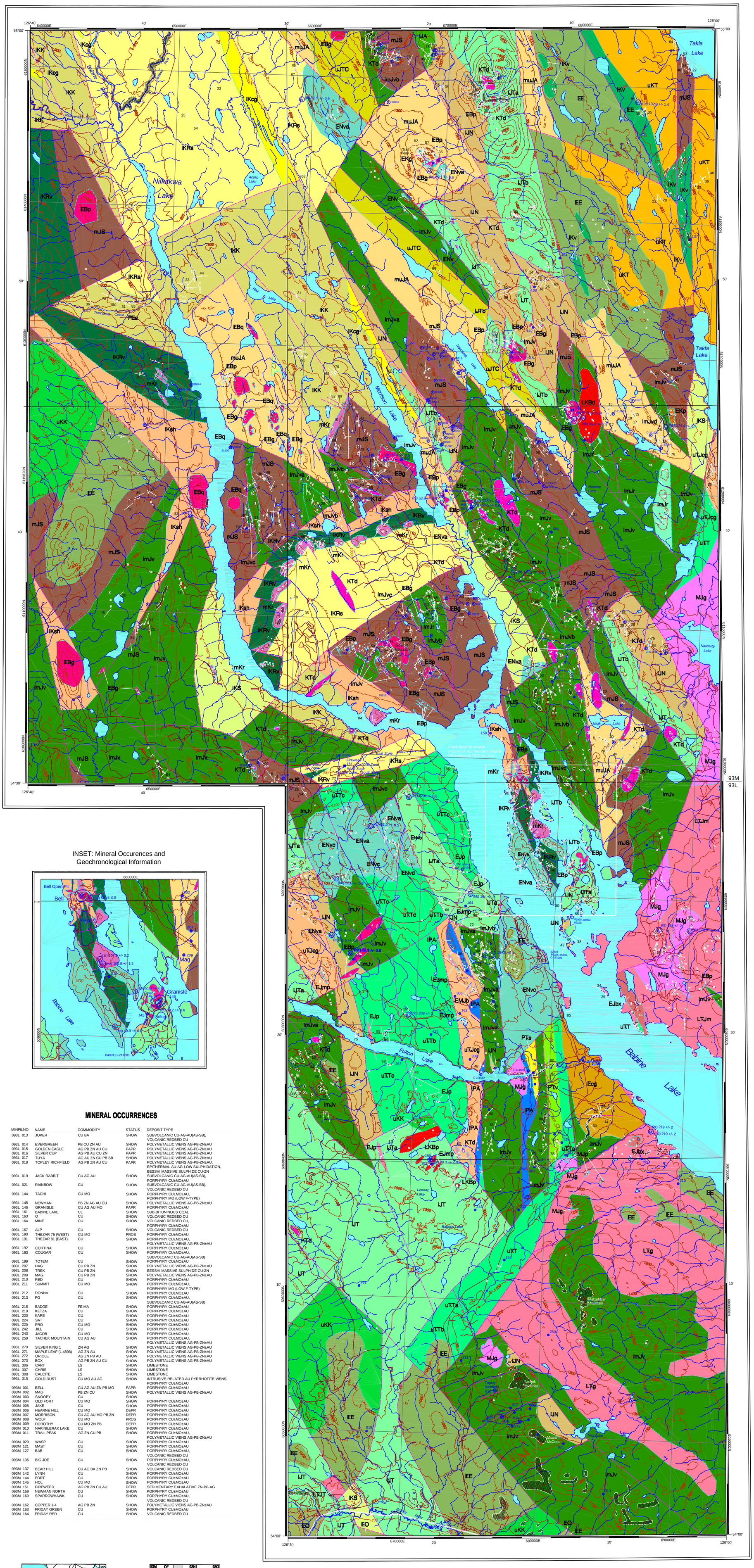
NTS 93L/9,16; 93M/1,2E,7E,8

Geology compiled by D. MacIntyre

Mapping by: D. MacIntyre, I. Webster, K. Bellefontaine, P. Desjardins, R. Metcalf, S. Munzar, D. Tackaberry, A. Justason and P. Wojdak (1995-1998); N.C. Carter (1965-1972); T.A. Richards, and H.W. Tipper (1972-1977)

SCALE 1:100 000

0 2 4 6 8 10
Kilometres



INSET: Mineral Occurences and Geochronological Information

MINERAL OCCURRENCES

MINFILNO	NAME	COMMODITY	STATUS	DEPOSIT TYPE
093L 013	JOKER	CU BA	SHOW	SUBVOLCANIC CU-AG-AU(AS-SB), VOLCANIC REDBED CU
093L 014	EVERGREEN	PB CU ZN AU	SHOW	POLYMETALLIC VIENS AG-PB-ZN±AU
093L 015	GOLDEN EAGLE	AG PB ZN AU CU	PAPR	POLYMETALLIC VIENS AG-PB-ZN±AU
093L 016	SILVER CUP	AG PB AU CU ZN	PAPR	POLYMETALLIC VIENS AG-PB-ZN±AU
093L 017	TUYA	AG AU ZN CU PB SB	SHOW	POLYMETALLIC VIENS AG-PB-ZN±AU
093L 018	TOPLEY RICHFIELD	AG PB ZN AU CU	PAPR	POLYMETALLIC VIENS AG-PB-ZN±AU, EPITHERMAL AU-AG LOW SULPHIDATION, BESSHI MASSIVE SULPHIDE CU-ZN
093L 019	JACK RABBIT	CU AG AU	SHOW	SUBVOLCANIC CU-AG-AU(AS-SB), PORPHYRY CU±MO±AU
093L 021	RAINBOW	CU	SHOW	SUBVOLCANIC CU-AG-AU(AS-SB), VOLCANIC REDBED CU
093L 144	TACHI	CU MO	SHOW	PORPHYRY CU±MO±AU, PORPHYRY MO (LOW F-TYPE)
093L 145	NEWMAN	PB ZN AG AU CU	SHOW	POLYMETALLIC VIENS AG-PB-ZN±AU
093L 146	GRANISLE	CU AG AU MO	PAPR	PORPHYRY CU±MO±AU
093L 161	BABINE LAKE	CL	SHOW	SUB-BITUMINOUS COAL
093L 163	O	CU	SHOW	VOLCANIC REDBED CU
093L 164	MINE	CU	SHOW	VOLCANIC REDBED CU, PORPHYRY CU±MO±AU
093L 167	ALP	CU	SHOW	VOLCANIC REDBED CU
093L 190	THEZAR 75 (WEST)	CU MO	PROS	PORPHYRY CU±MO±AU
093L 191	THEZAR 81 (EAST)	CU	SHOW	PORPHYRY CU±MO±AU, POLYMETALLIC VIENS AG-PB-ZN±AU
093L 192	CORTINA	CU	SHOW	PORPHYRY CU±MO±AU
093L 193	COUGAR	CU	SHOW	PORPHYRY CU±MO±AU, SUBVOLCANIC CU-AG-AU(AS-SB)
093L 199	TOTEM	CU	SHOW	PORPHYRY CU±MO±AU
093L 207	HAG	CU PB ZN	SHOW	POLYMETALLIC VIENS AG-PB-ZN±AU
093L 208	TREK	CU PB ZN	SHOW	BESSHI MASSIVE SULPHIDE CU-ZN
093L 209	MAG	CU PB ZN	SHOW	POLYMETALLIC VIENS AG-PB-ZN±AU
093L 210	RED	CU	SHOW	PORPHYRY CU±MO±AU
093L 211	SUMMIT	CU MO	SHOW	PORPHYRY CU±MO±AU, PORPHYRY MO (LOW F-TYPE)
093L 212	DONNA	CU	SHOW	PORPHYRY CU±MO±AU
093L 213	FG	CU	SHOW	PORPHYRY CU±MO±AU, SUBVOLCANIC CU-AG-AU(AS-SB)
093L 215	BADGE	FE MA	SHOW	PORPHYRY CU±MO±AU
093L 219	KETZA	CU	SHOW	PORPHYRY CU±MO±AU
093L 220	KARE	CU	SHOW	PORPHYRY CU±MO±AU
093L 224	SAT	CU	SHOW	PORPHYRY CU±MO±AU
093L 225	PRO	CU MO	SHOW	PORPHYRY CU±MO±AU
093L 242	JILL	CU	SHOW	PORPHYRY CU±MO±AU
093L 243	JACOB	CU MO	SHOW	PORPHYRY CU±MO±AU
093L 259	TACHEK MOUNTAIN	CU AG AU	SHOW	PORPHYRY CU±MO±AU, POLYMETALLIC VIENS AG-PB-ZN±AU
093L 270	SILVER KING 1	ZN AG	SHOW	POLYMETALLIC VIENS AG-PB-ZN±AU
093L 271	MAPLE LEAF (L.4898)	AG ZN AU	SHOW	POLYMETALLIC VIENS AG-PB-ZN±AU
093L 272	ORIOLE	AG ZN PB AU	SHOW	POLYMETALLIC VIENS AG-PB-ZN±AU
093L 273	BOX	AG PB ZN AU CU	SHOW	POLYMETALLIC VIENS AG-PB-ZN±AU
093L 306	CART	LS	SHOW	LIMESTONE
093L 307	CHRIS	LS	SHOW	LIMESTONE
093L 308	CALCITE	LS	SHOW	LIMESTONE
093L 315	GOLD DUST	CU MO AU AG	SHOW	INTRUSIVE-RELATED AU PYRRHOTITE VIENS, PORPHYRY CU±MO±AU
093M 001	BELL	CU AG AU ZN PB MO	PAPR	PORPHYRY CU±MO±AU
093M 002	MAG	PB ZN CU	SHOW	POLYMETALLIC VIENS AG-PB-ZN±AU
093M 003	SNOOPY	CU	SHOW	
093M 004	OLD FORT	CU MO	SHOW	PORPHYRY CU±MO±AU
093M 005	JAKE	CU	SHOW	PORPHYRY CU±MO±AU
093M 006	HEARNE HILL	CU MO	DEPR	PORPHYRY CU±MO±AU
093M 007	MORRISON	CU AG AU MO PB ZN	DEPR	PORPHYRY CU±MO±AU
093M 008	WOLF	CU MO	PROS	PORPHYRY CU±MO±AU
093M 009	DOROTHY	CU MO ZN PB	DEPR	PORPHYRY CU±MO±AU
093M 010	NAKINILERAK LAKE	CU	SHOW	PORPHYRY CU±MO±AU
093M 011	TRAIL PEAK	AG ZN CU PB	SHOW	PORPHYRY CU±MO±AU, POLYMETALLIC VIENS AG-PB-ZN±AU
093M 020	WASP	CU	SHOW	PORPHYRY CU±MO±AU
093M 121	MAST	CU	SHOW	PORPHYRY CU±MO±AU
093M 127	BAB	CU	SHOW	PORPHYRY CU±MO±AU, VOLCANIC REDBED CU
093M 135	BIG JOE	CU	SHOW	PORPHYRY CU±MO±AU, VOLCANIC REDBED CU
093M 137	BEAR HILL	CU AG BA ZN PB	SHOW	VOLCANIC REDBED CU
093M 142	LYNN	CU	SHOW	PORPHYRY CU±MO±AU
093M 144	FORT	CU	SHOW	PORPHYRY CU±MO±AU
093M 145	HOL	CU MO	SHOW	PORPHYRY CU±MO±AU
093M 151	FIREWEED	AG PB ZN CU AU	DEPR	SEDIMENTARY EXHALATIVE ZN-PB-AG
093M 159	NEWMAN NORTH	CU	SHOW	PORPHYRY CU±MO±AU
093M 160	SPARROWHAWK	CU	SHOW	PORPHYRY CU±MO±AU, VOLCANIC REDBED CU
093M 162	COPPER 1-4	AG PB ZN	SHOW	POLYMETALLIC VIENS AG-PB-ZN±AU
093M 163	FRIDAY GREEN	CU	SHOW	PORPHYRY CU±MO±AU
093M 164	FRIDAY RED	CU	SHOW	VOLCANIC REDBED CU

LEGEND

EOCENE

EE — *Endako Group: dark grey, aphyric, amygdaloidal and vesicular basalt flows, minor flow top breccia; bladed plagioclase phyric andesite*

EO — *Ootsa Lake Group: undivided felsic volcanic rocks*

ENv — *Newman Formation: hornblende±biotite-feldspar phyric andesite to dacite flows, breccia and lahar; minor basalt; extrusive equivalent of the Babine Intrusions; isotopic ages 54-50 Ma; ENva. massive, sheet to columnar jointed flows; may include subvolcanic plugs and necks; ENvb. volcanic breccia; ENvc. stratified lahar and volcanic conglomerate; ENvd. fine-grained feldspar phyric andesite or basalt.*

Ecg — *heterolithic boulder to pebble conglomerate, poorly sorted; basal conglomerate to the Newman Formation*

BABINE INTRUSIONS

EBq — *quartz-biotite-plagioclase porphyritic granodiorite to quartz monzonite*

EBp — *biotite±hornblende-plagioclase porphyritic granodiorite; 54-60 Ma Ar-Ar isotopic ages*

EBg — *biotite-hornblende granodiorite to quartz diorite; equigranular to sub-porphyritic*

PALEOCENE TO EOCENE

PEs — *sandstone, siltstone, conglomerate, shale, coaly shale, coal; interbedded tuff, tuffaceous siltstone and fanglomerate; continental, fluvial origin; polymictic; clasts of feldspar and hornblende porphyry, rhyolite, chert, argillite. Eocene palynomorphs*

LATE CRETACEOUS or TERTIARY

KTd — *hornblende±biotite diorite to quartz diorite; minor gabbro; fine to coarse grained*

LATE CRETACEOUS

BULKLEY INTRUSIONS

LKBq — *quartz-biotite-plagioclase porphyritic quartz monzonite, quartz phyric subvolcanic rhyodacite to rhyolite*

LKBp — *biotite-hornblende-plagioclase porphyritic granodiorite to quartz diorite; medium to coarse-grained; 4-8 millimetre biotite "books" common; 78 Ma Ar-Ar and K-Ar isotopic ages at Lennac Lake*

LKBd — *hornblende diorite to gabbro; 83 Ma Ar-Ar isotopic age at the Dorothy prospect*

UPPER CRETACEOUS

KASALKA GROUP

uKK — *hornblende-plagioclase phyric andesite to dacite flows, volcanic breccia and lahar; medium to coarse grained; locally contains clasts of biotite-plagioclase porphyritic granodiorite of the Bulkley Intrusions*

LOWER TO UPPER CRETACEOUS

SUSTUT GROUP

uKT — *Tango Creek Formation: chert pebble conglomerate, fluvial; locally cross-bedded and channeled; minor quartz sandstone, siltstone and hematitic tuffaceous beds*

SKEENA GROUP

lKS — *undivided Skeena Group; sandstone, siltstone, shale, mudstone, pebble conglomerate*

lKRs — *Red Rose Formation: medium to thick-bedded quartzo-feldspathic sandstone, siltstone, chert-pebble conglomerate; local red weathering siltstone and mudstone interbeds; fluvial to fluvial-deltaic, common detrital muscovite; lower Albian to Cenomanian; in part correlative with the Tango Creek Formation*

mKr — *flow banded feldspar phyric to aphyric rhyolite to rhyodacite, submarine flows, flow breccia and subvolcanic domes*

lKRv — *Rocky Ridge Formation: subaerial to subaqueous augite-plagioclase phyric alkaline basalt to basaltic andesite, plagioclase phyric greenish grey andesite to dacite; dark grey aphyric basalt, green to maroon mafic lapilli tuff, volcanic breccia, minor interbedded shale, siltstone, sandstone and chert pebble conglomerate locally with angular rhyolitic clasts; shale contains Albian macrofossils; 104-108 Ma isotopic ages*

lKsh — *Kitsumkalum shale: black shale with interbedded sandstone, siltstone; locally concretionary and pyritic; Hauterivian to Albian*

lKcg — *Hanawald conglomerate: chert-pebble conglomerate; minor interbedded quartz sandstone and siltstone; fluvial deltaic; locally cross-bedded*

lKK — *Kitsuns Creek Formation: feldspathic and volcanic sandstone, siltstone, shale, mudstone, locally carbonaceous to coal bearing; minor polymictic volcanic clast conglomerate; fluvial to fluvial-deltaic; Berriasian to Hauterivian*

lKv — *undivided felsic and intermediate volcanic rocks; a. biotite-hornblende-plagioclase phyric rhyodacite to dacite flows, subvolcanic intrusions, locally welded; 134 Ma isotopic age*

EARLY CRETACEOUS

EKg — *biotite±hornblende granodiorite to quartz diorite; 104 Ma K-Ar age at Trail Peak*

EKp — *biotite-plagioclase porphyritic quartz monzonite, monzonite and rhyodacite; pink weathering; 124 Ma Ar-Ar age estimate at Wedge Mountain*

MIDDLE TO UPPER JURASSIC

BOWSER LAKE GROUP

uJTC — *Trout Creek Formation: polymictic pebble to boulder conglomerate containing chert, quartz, volcanic and granitic clasts; minor interbedded wacke, siltstone, shale and coal; fluvial-deltaic to shallow marine; locally contains Upper Oxfordian macrofossils*

muJA — *Ashman Formation: feldspathic wacke to dark grey, thin-bedded siltstone and shale; coarse-grained, shallow water marine facies containing latest Bathonian to early Oxfordian ammonites and bivalves*

EARLY TO MIDDLE JURASSIC

SPIKE PEAK INTRUSIVE SUITE

EMJb — *basalt dikes; possible feeders to Saddle Hill volcanics; strong epidote alteration typical*

MJd — *hornblende diorite to quartz diorite; medium grained, greenish grey, locally foliated (178 Ma)*

MJg — *biotite-hornblende granodiorite to quartz monzonite; medium to coarse grained; grey to salmon weathering (179-176 Ma)*

MJp — *Tachek Creek Phase: biotite-hornblende-plagioclase porphyritic granodiorite to quartz diorite, (178-176 Ma)*

LOWER TO MIDDLE JURASSIC

HAZELTON GROUP

mJS — *Smithers Formation: marine, shallow-water feldspathic sandstone, siltstone, feldspathic wacke; locally glauconitic and limy; minor ash, crystal and lapilli tuff, volcanic breccia, volcanic-pebble conglomerate, limestone; very fossiliferous; early Bajocian to early Bathonian*

lmJr — *white weathering, flow banded feldspar phyric dacite to rhyolite domes, flows and extrusive breccia; part of Saddle Hill volcanic succession*

lmJv — *Saddle Hill volcanics: undivided subaerial to submarine basalt, andesite, dacite and rhyolite flows, tuffs and related volcaniclastic rocks; lmJva. maroon to greenish grey weathering feldspar phyric lapilli, crystal and ash tuff, volcanic breccia, lahar, tuffaceous mudstone, siltstone and conglomerate, grey ash flow tuff and feldspar phyric dacite to rhyolite domes and flows, locally contains angular clasts of flow banded rhyolite and pink weathering Topley intrusions (Wright Bay facies); lmJvb. brown weathering, green to greenish grey feldspar phyric basaltic flows, volcanic breccia, aquagene tuff, hyaloclastite, peperite breccia,locally amygdaloidal and pillowed; local flow banded rhyolite domes and interbeds of limy siltstone and limestone containing Toarcian macrofossils; intense epidote and chlorite alteration in places; lmJvc. green, brown and maroon weathering mafic and felsic volcanic clast conglomerate, feldspathic wacke, dark grey siltstone, chert, lapilli tuff; lmJvd. thick bedded, hornblende-augite-plagioclase phyric amygdaloidal andesite flows with trachytic texture defined by bladed plagioclase phenocrysts to 3 centimetres (Wedge Mountain facies); Toarcian to Aalenian, 184 to 174 Ma isotopic ages*

lJA — *Nilkitkwa Formation, Ankwell Member: subaqueous greenstone, basalt breccia, flows, tuffs, interbedded Toarcian sedimentary rocks*

lJN — *Nilkitkwa Formation: shallow to deep marine feldspathic wacke, siltstone and conglomerate; well-bedded; contains upper Sinemurian to Toarcian macrofossils*

lJT — *Telkwa Formation: undivided maroon air fall tuffs, feldspar phyric andesite flows and volcanic breccia, amygdaloidal basalt flows, related epiclastic and volcaniclastic rocks; Sinemurian; a. andesitic lapilli, crystal and ash tuff, maroon to greenish grey, medium to thick bedded, minor feldspar phyric andesite flows; b. dark grey to maroon amygdaloidal basalt flows and flow top breccia*

UPPER TRIASSIC TO LOWER JURASSIC

uTJcg — *polymictic pebble to boulder conglomerate, brown, maroon and red weathering, poorly-sorted, matrix supported, contains rounded to subrounded augite-plagioclase phyric basalt, limestone, chert and granitic clasts; locally contains brown siltstone rip up clasts; clasts derived from Takla and Asitka groups; interbedded with maroon to red weathering feldspathic wacke and siltstone*

LATE TRIASSIC TO EARLY JURASSIC

TOPLEY INTRUSIVE SUITE

EJbx — *Nose Bay intrusive breccia; clasts of Topley intrusive suite and Takla volcanics in a greenish grey, chloritic basalt matrix*

EJmp — *megacrystic feldspar porphyry dikes; probably comagmatic with porphyritic flows in the upper Takla volcanic succession; may also be comagmatic with megacrystic flows in the Saddle Hill volcanic succession*

EJp — *biotite-hornblende-plagioclase porphyritic granodiorite; 194 Ar-Ar isotopic age*

LTJm — *granodiorite to monzonite, fine-grained, equigranular to feldspar porphyritic; pink to salmon weathering*

LTJT — *undivided granitic rocks*

LTg — *biotite-hornblende-plagioclase granodiorite, quartz diorite; medium to coarse grained; equigranular to megacrystic; equant feldspar phenocrysts to 3 centimetres, grey to pink weathering; 218 Ma U-Pb isotopic age*

UPPER TRIASSIC

TAKLA GROUP

uTT — *undivided pyroxene phyric basalt, andesite, marine sedimentary rocks; uTTa. siltstone, mudstone, minor limestone, dark grey to black, graphitic and calcareous, medium-bedded (=Dewar Peak Formation); uTTb. pyroxene-plagioclase and pyroxene-hornblende-plagioclase phyric basalt to andesite flows, volcanic breccia and volcanic conglomerate, thick bedded, green to greenish grey, 208 Ar-Ar isotopic age (=Savage Mountain Formation); uTTc. graphitic siltstone, feldspathic wacke, argillaceous limestone, siliceous mudstone, chert-limestone clast conglomerate, andesite lapilli tuff; medium to thin bedded, brown and dark grey weathering (=Moosevale Formation); mainly Norian in age*

PERMIAN TO TRIASSIC

PTs — *medium bedded chert, siltstone, limestone, graphitic phyllite, chlorite schist; Middle Triassic radiolarians in chert (may be lower Takla Group)*

PTv — *metavolcanic rocks; chlorite and chlorite-sericite phyllite and schist, minor argillaceous limestone, graphitic schist; moderate to strong foliation; in whole or in part deformed Takla and/or Asitka Group volcanics*

LOWER PERMIAN

ASITKA GROUP

lPA — *massive, grey, bioclastic limestone; argillaceous, thin bedded, recrystallized limestone with chert nodules; Sakmarian and Artinskian conodonts*

SYMBOLS

Stratigraphic contact
- defined
- approximate
- inferred

Fault contact
- defined
- approximate
- inferred

Anticline
Syncline
Bedding: overturned
Bedding: inclined, vertical
Slaty cleavage, schistosity: inclined, vertical
Joints: inclined, vertical
Minor fold axis
Flow banding
Fossil location: age determined (with GSC number)
- macrofossil, conodonts, radiolarian

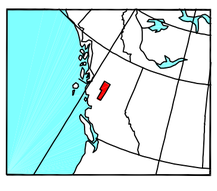
Field station
Mineral occurrence with MINFILE number (prefix 93M or 93L)
- past producer (abandoned mine)
- developed prospect
- prospect
- showing

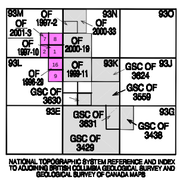
Stratabound Sulphide Zone
Isotopic age locality (age in millions of years before present)
- U-Pb zircon
- Ar-Ar (hb=hornblende; bt=biotite; wr=whole rock)

Area of outcrop
Roads
Railway

REFERENCES

Carter, N.C. (1973): Geology of the Northern Babine Lake Area, B.C. Ministry of Energy, Mines and Petroleum Resources, Preliminary Map 12, (93L).
Carter, N.C. (1981): Porphyry Copper and Molybdenum Deposits West Central British Columbia; B.C. Ministry of Energy, Mines and Petroleum Resources, Bulletin 64.
Carter, N.C. and Kirkham, R.V. (1969), Geological Compilation Map of the Smithers, Hazelton and Terrace Area, B.C. Ministry of Energy, Mines and Petroleum Resources, Preliminary Map 69-1, (93L, 93M).
MacIntyre, D.G., and Villeneuve, M.E. 2001. Geochronology and tectonic setting of Mid Cretaceous to Eocene magmatism, Babine porphyry copper district, central British Columbia. Canadian Journal of Earth Sciences, 38.
MacIntyre, D.G., Webster, I.C.L., and Bellefontaine, K. 1996a. Babine Porphyry District project: Bedrock Geology of the Fulton Lake map area (NTS 93L16). In Geological Fieldwork 1995. British Columbia Ministry of Energy, Mines and Petroleum Resources, Paper 1996-1, pp. 11-35.
MacIntyre, D.G., Webster, I.C.L., and Bellefontaine, K. 1996b. Geology of the Fulton Lake Map Sheet (93L/16), British Columbia Ministry of Energy, Mines and Petroleum Resources, Open File Map, 1996-29.
MacIntyre, D.G., Webster, I.C.L., and Villeneuve, M. 1997. Babine Porphyry District project: Bedrock Geology of the Old Fort Mountain Area (93M/1), British Columbia In Geological Fieldwork 1996. British Columbia Ministry of Employment and Investment, Paper 1997-1, pp. 47-68.
MacIntyre, D., Webster, I., and Desjardins, P. 1998a. Bedrock Geology of the Old Fort Mountain Map Area, North-central B.C. British Columbia Ministry of Employment and Investment, Open File Map 1997-10.
MacIntyre, D.G., Villeneuve, M.E., and Schiarizza, P. 2001. Timing and tectonic setting of Stikine Terrane magmatism, Babine-Takla lakes area, central British Columbia. Canadian Journal of Earth Sciences, 38.
Malott, M.L. (1988): Fireweed (093M151); B.C. in Exploration in British Columbia 1988, B.C. Ministry of Energy, Mines and Petroleum Resources, pages B127-131.
MINFILE 93L (1989): Smithers Mineral Occurrence Map (NTS 93L); Ministry of Energy, Mines and Petroleum Resources, MINFILE, released September 1989.
MINFILE 93M (1992): Hazelton Mineral Occurrence Map (NTS 93M); Ministry of Energy, Mines and Petroleum Resources, MINFILE, released March 1992.
Richards, T.A. (1980): Geology of the Hazelton (93M) Map Area; GSC, Open File 720.
Richards, T.A. (unpublished): Geologic map and mineral deposit tables for the Smithers Area (93L); GSC.
Richards, T.A. (1990): Geology of the Hazelton Map Area (93M); GSC, Open File 2322.
Tipper, H.W. and Richards, T.A. (1976): Geology of the Smithers Area, GSC, Open File 351. Scale 1:125,000.





Digital cartography by D. MacIntyre and A. Olson

Digital base map from British Columbia Ministry of Environment, Lands and Parks. Generalized and modified from 1:20000 TRIM digital base maps.

Magnetic declination 2001, 22°28.5' East, currently decreasing 11.9' annually. Readings vary from 22°9.6' E in the SE corner to 22°47.4' E in the NW corner of the map.

North American Datum 1983

Elevation in metres above mean sea level

Contour interval 100 metres

NATMAP
CARTNAT
Canada's National Geoscience Mapping Program
La Programme national de cartographie géoscientifique du Canada