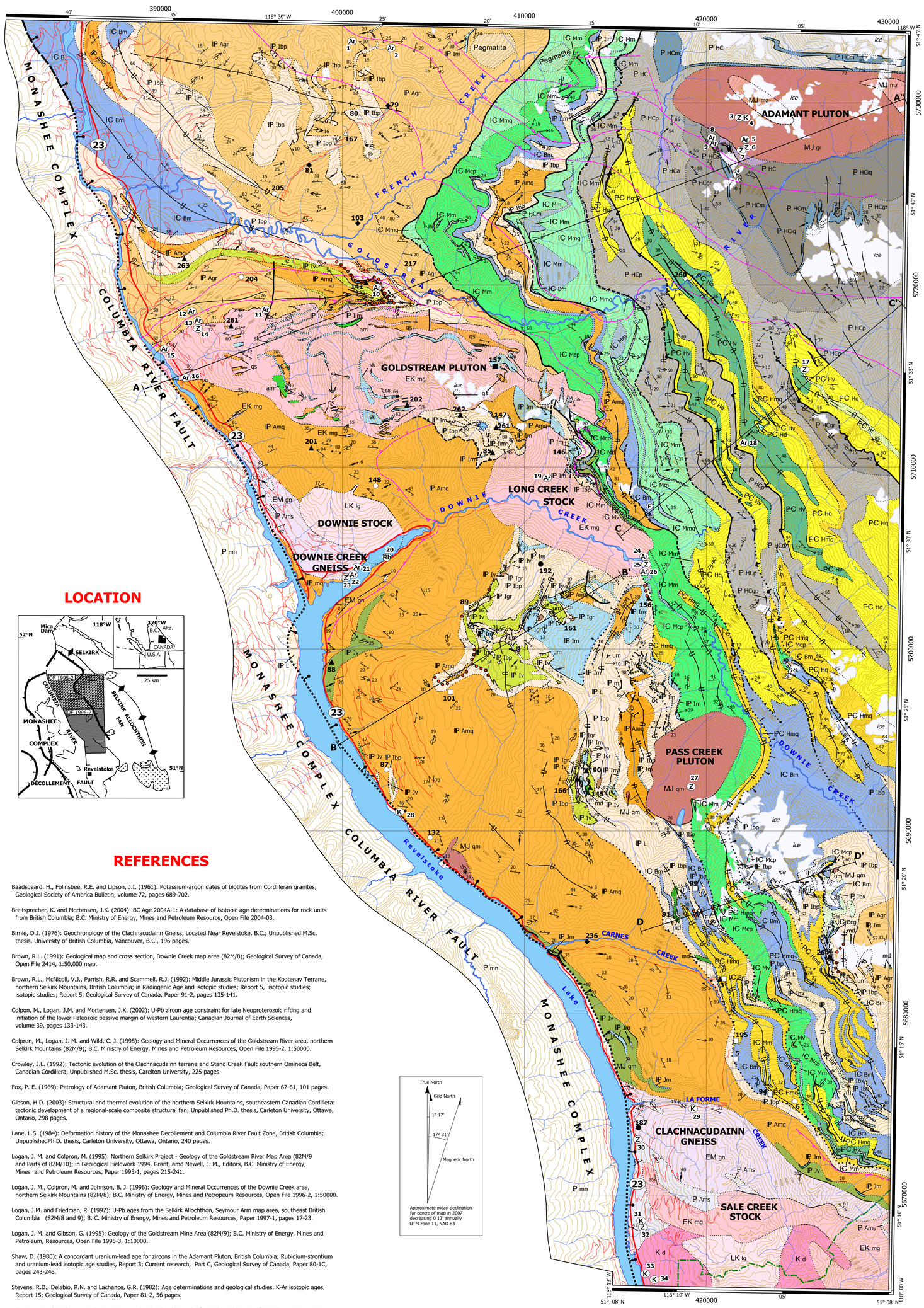

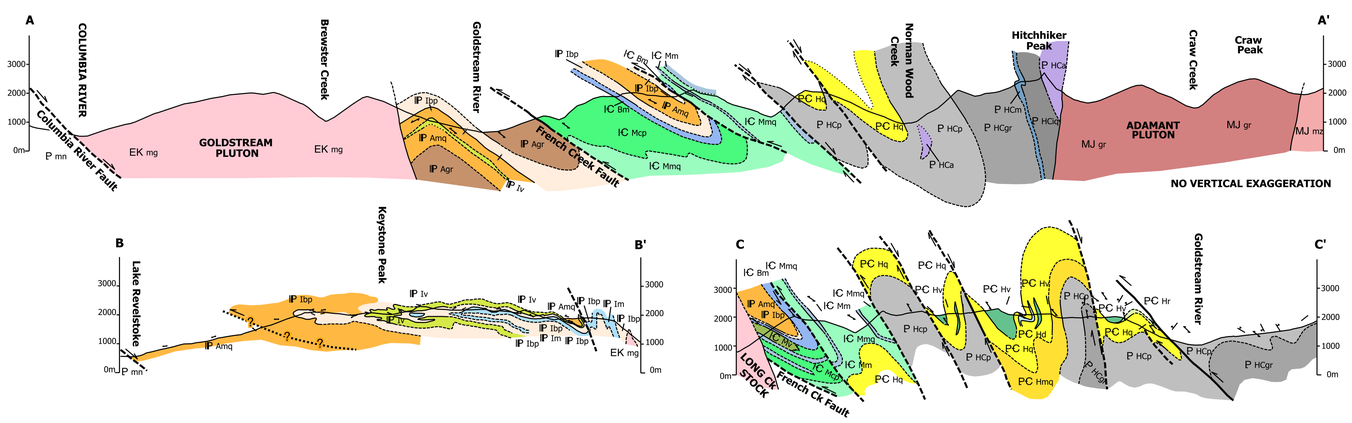

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BRITISH COLUMBIA
Ministry of Energy, Mines and Petroleum Resources

British Columbia Geological Survey

Geoscience Map 2008-1

Geology and Mineral Occurrences northern Selkirk Mountains

NTS 82M/8,9 & Parts of 1 and 10

Compilation by J. M. Logan

Geology by J. M. Logan, M. Colpron, G. Gibson, B. J. Johnson and C. J. Wild

Geochronology by D. A. Archibald, Queen's University;
R. M. Friedman and J. K. Mortensen, University of British Columbia

Cartography by C.-Y. M. Lin

2 0 2 4 6 8
Kilometers

Scale 1:100,000

LEGEND

INTRUSIVE ROCKS

LATE CRETACEOUS (?)
DOWNIE STOCK
- LK lg — Muscovite-biotite leucogranite, locally garnet-bearing

EARLY-CRETACEOUS
GOLDSTREAM PLUTON, LONG CREEK STOCK, SALE CREEK STOCK
- EK mg — Hornblende-biotite quartz monzodiorite, biotite granite, locally potassium feldspar megacrystic granite

CRETACEOUS (?)
- K d — Biotite-hornblende diorite

MIDDLE JURASSIC
PASS CREEK PLUTON
- MJ qm — Potassium feldspar megacrystic, hornblende-biotite quartz monzonite

ADAMANT PLUTON
- MJ gr — Hornblende (biotite) granodiorite
- MJ mz — Hypersthene-augite (hornblende-biotite) monzonite

EARLY MISSISSIPPIAN
DOWNIE CREEK GNEISS, CLACHNACUDAINN GNEISS
- EM gn — Foliated biotite granite, quartz monzonite and granodiorite gneiss

AGE UNCERTAIN
- um — Ultramafic intrusions, talc schist, serpentinite
- md — Metadiorite, metagabbro

LAYERED ROCKS

CAMBRIAN (?) TO DEVONIAN (?)
LARDEAU GROUP
- IP L — Undivided graphitic phyllite, micaceous quartzite, marble and greenstone

JOWETT FORMATION
- IP Jv — Dark green actinolite schist, green phyllite, includes white and grey dolomitic marble (IP Jm)

AKOLKOLEX FORMATION
- IP Agr — Medium to coarse-grained quartz grit, dark grey phyllite, brown-weathering calcareous grit, light to medium green siliceous phyllite with buff-weathering dolomitic horizons
- IP Amq — Micaceous quartzite and interbedded rusty-weathering phyllite, quartz-feldspar grit, muscovite-quartz (biotite±garnet) schist.

INDEX FORMATION
- IP Igr — Light green phyllite, quartz grit, minor phyllitic carbonate
- IP Iv — Green, mafic metavolcanic flows; includes massive and pillowed breccia flows, diorite sills and minor green phyllite.
- IP Im — Light grey marble, buff-weathering dolomitic marble and phyllitic carbonate.
- IP Ibp — Graphitic phyllite, dark grey to black calcareous phyllite, minor dark grey limestone (IP lim)
- IP Ibx — White orthoquartzite breccia

LOWER CAMBRIAN
BADSHOT FORMATION
- IC Bm — Light grey and white dolomitic marble; includes dolostone breccia unit (ICB cg)

MOHICAN FORMATION
- IC Mm — Light grey marble and white dolostone, locally pisolitic dolomite (IC Md)
- IC Mv — Dark green, massive greenstone and light green volcaniclastic rocks
- IC Mmq — Light green siliceous phyllite, micaceous quartzite and calcareous quartz grit intercalated with orange-weathering dolostone
- IC Mcp — Grey, black and green calcareous phyllite and fine grained grit, locally intercalated with dark grey and brown weathering marble; includes light grey marble units (IC Mm), and light green volcaniclastic rocks (IC Mv)

NEOPROTEROZOIC TO LOWER CAMBRIAN
HAMILL GROUP
- PC Hv — Massive and amygdaloidal mafic metavolcanic flow and epiclastic rocks, minor intermediate metavolcanic rocks
- PC Hr — Fine-grained, medium grey, rhythmically laminated sandstone and siltstone, minor brown weathering dolostone
- PC Hd — Brown-weathering dolomitic marble
- PC Hq — Massive and cross-bedded white quartzite, light grey to light green micaceous quartzite, medium to coarse-grained quartz grit, intercalated with grey and green phyllite
- PC Hmq — Light grey and brown, finely laminated micaceous quartzite interlayered with green and dark grey phyllite, minor brown-weathering carbonate

NEOPROTEROZOIC
HORSETHIEF CREEK GROUP
- P HC — Undivided
- P HCd — Buff-weathering phyllitic dolostone, interlayered with tan-weathering phyllite and minor pink quartzite
- P HCgp — Medium to dark green phyllite, locally interbedded with thin, brown dolostone
- P HCp — Rhythmically laminated, light to medium grey phyllite and siltstone interlayered with pink and green micaceous quartzite and brown siliceous dolostone
- P HCgr — Coarse grained feldspathic grit, grey laminated phyllite
- P HCm — Light grey marble, near Goldstream Mountain limestone pebble to boulder conglomerate, calcareous sandstone, dark grey marble,dark grey pelitic schist intercalated with buff weathering marble
- P HCa — Coarse-grained amphibolite
- P HCiq — Fine grained quartz grit, impure quartzite and pelite schists, actinolite-bearing calcsilicate, minor amphibolite and brown weathering marble

PALEOZOIC (?)
UNDIVIDED METASEDIMENTS
- ms — Sillimanite, kyanite and amphibolite-bearing quartzite, amphibolite and calcareous schist
- P Ams — Muscovite, quartz, andalusite schist, quartzite, garnet amphibolite

XENOLITHS AND PENDANTS IN GOLDSTREAM PLUTON
- sk — Garnet-diopside skarn; marble; minor biotite schists and quartzite
- qs — Dark grey quartzite; dark grey and lavender quartz-biotite schist
- am — Amphibolite

PROTEROZOIC (?) - PALEOZOIC (?)
MONASHEE COMPLEX
- P mn — Amphibolite-bearing pegmatitic gneiss and micaceous schist; minor calcsilicate

SYMBOLS

- Geological contact (defined, approximate, assumed)
- Fault (defined, approximate, assumed)
- Bedding (inclined, upright, overturned)
- Compositional layering (inclined, vertical)
- Igneous foliation (inclined, vertical)
- Dominant foliation (inclined, vertical)
- First crenulation cleavage (inclined, vertical)
- Second crenulation cleavage (inclined, vertical)
- Intersection lineation (vergence determined by bedding/cleavage: vergence unknown, counterclockwise, clockwise, symmetrical)
- First crenulation lineation (plunge indicated)
- Second crenulation lineation (plunge indicated)
- Axis of tight-isoclinal folds (vergence unknown, counterclockwise, clockwise, symmetrical)
- Axis of late, open folds (vergence unknown, counterclockwise, clockwise, symmetrical)
- Mineral or stretching lineation (plunge indicated)
- Apparent dip of bedding (in cross section: top unknown, top known)
- Apparent dip of dominant foliation (in cross section)
- Extension fault; downthrown side indicated (defined, approximate, assumed)
- Thrust fault; teeth indicated upthrust side (defined, approximate, assumed)
- Overturned thrust fault; (defined, approximate, assumed)
- Axial trace of overturned anticline, syncline
- Axial trace of upright antiform, synform
- Isograds (biotite, garnet, staurolite, kyanite-staurolite, sillimanite-staurolite) I II III IV V
- Provincial Park Boundary
- Garnet Zone
- Archaeocyathid locality (F)
- 40/39 Argon isotopic age determination site 1 (Ar)
- Potassium-Argon isotopic age determination site 13 (K)
- Uranium/Lead isotopic age determination site 23 (Z)
- Rubidium/Strontium isotopic age determination site 20 (Rb)

ISOTOPIC DATA

Number	Method	Age	Source
1	Ar/Ar muscovite	76.09 ± 0.84	Breitsprecher and Mortensen, 2004
2	Ar/Ar biotite	76.11 ± 0.74	Breitsprecher and Mortensen, 2004
3	U/Pb zircon	168 ± 3	Shaw, 1980
4	K/Ar hornblende	152 ± 9	Stevens et al., 1982
5	Ar/Ar hornblende	131.82 ± 1.54	Breitsprecher and Mortensen, 2004
6	U/Pb zircon	166.8 ± 0.3	Gibson, 2003
7	U/Pb zircon	167 ± 0.2	Gibson, 2003
8	Ar/Ar muscovite	75.25 ± 0.73	Breitsprecher and Mortensen, 2004
9	Ar/Ar biotite	90 ± 0.96	Breitsprecher and Mortensen, 2004
10	Ar/Ar muscovite	96.92 ± 0.93	Breitsprecher and Mortensen, 2004
11	Ar/Ar muscovite	100.83 ± 1.01	Breitsprecher and Mortensen, 2004
12	Ar/Ar biotite	100 ± 1	Logan and Colpron, 1995
13	Ar/Ar hornblende	114 ± 4.5	Logan and Colpron, 1995
14	U/Pb zircon	104 ± 1.4	Logan and Friedman, 1997
15	Ar/Ar biotite	100.84 ± 0.98	Breitsprecher and Mortensen, 2004
16	Ar/Ar muscovite	96.18 ± 0.96	Breitsprecher and Mortensen, 2004
17	U/Pb zircon	569.6 ± 5.3	Colpon, Logan and Mortensen, 2002
18	Ar/Ar muscovite	142.54 ± 1.34	Breitsprecher and Mortensen, 2004
19	Ar/Ar biotite	99.69 ± 0.96	Breitsprecher and Mortensen, 2004
20	Rb/Sr WR-biotite	66 ± 3	Lane, 1984
21	Ar/Ar muscovite	73.61 ± 0.91	Breitsprecher and Mortensen, 2004
22	Ar/Ar biotite	60.54 ± 0.64	Breitsprecher and Mortensen, 2004
23	U/Pb zircon	354.4 ± 1	Logan and Friedman, 1997
24	Ar/Ar muscovite	100.7 ± 0.56	Logan, unpublished
25	U/Pb zircon	103.2 ± 0.4	Logan, unpublished
26	Ar/Ar biotite	101.77 ± 0.59	Logan, unpublished
27	U/Pb zircon+titanite	168 ± 3	Brown, et al., 1992
28	K/Ar hornblende	104 ± 8	Lane, 1984
29	K/Ar biotite	56.3 ± 3.3	Birnie, 1976
30	U/Pb zircon	99 ± 2	Lane, 1984
31	K/Ar hornblende	127 ± 10	Lane, 1984
32	U/Pb zircon	100 ± 2	Lane, 1984
33	K/Ar biotite	52.3 ± 3.4	Birnie, 1976
34	K/Ar biotite	59 ± 5.7	Baadsgaard et al., 1961

MINERAL OCCURRENCE

MINFILE No.82M	PROPERTY NAME	COMMODITY	COMMENTS
▲ Volcanogenic massive sulphide			
3	J&L (Main Zone)	Au, Ag, Pb, Zn	developed prospect; massive and disseminated sulphides
85	Montgomery	Cu, Zn, Ag, Au	disseminated and massive sulphide lenses
88	King	Zn, Cu	stratabound massive sulphide horizon
90	Standard Basin	Cu, Ag, Au, Zn	discontinuous massive and disseminated sulphide lenses
141	Goldstream	Cu, Zn, Ag	past producing mine
145	Standard 4	Cu, Ag, Au, Zn	discontinuous massive and disseminated sulphide lenses
156	Rain	Cu, Zn, Pb	semimassive sulphides and Mn-rich exhalite
166	Standard	Cu, Ag, Au, Zn	discontinuous massive and disseminated sulphide lenses
201	Mel 1200	Cu, Zn	disseminated sulphide
202	Brew	Cu	massive pyrrhotite lenses in pendant
261	Upper Montgomery	Cu, Zn	disseminated sulphide horizon
262	Ice	Au, Cu	massive pyrrhotite layer
263	C-1	Cu, Zn	disseminated and banded, semimassive sulphide
264	LOCOJO	Cu, Zn	massive sulphide lenses 30 cm X 1 m; barite
□ Carbonate replacement/stratabound			
3	J&L (Yellowjacket)	Pb, Zn, Ag	disseminated sphalerite and galena
5	Mastodon	Zn, Pb, Cd, Ag	past-producer; disseminated and massive replacements
89	Keystone	Pb, Zn, Cu	foliation-parallel pods of massive and coarse sulphides
94	Lead King	Pb, Zn, Ag	foliation-parallel replacements in silicified marble
99	A&E	Zn, Pb, Ag, Au	two 1-metre zones of coarse crystalline marble
101	Carbonate Chief	Au, Ag, Pb, Zn	narrow quartz veins
147	KJ	Pb, Zn, Ag, Au	pods of galenas in silicified breccia zones
195	Mastodon North	Zn, Pb, Ag	disseminated sphalerite and galena
○ Base Metal Veins			
6	Little Slide (Adair)	Pb, Zn, Ag, Cu	disseminated sulphides, in steep, boudinaged quartz veins
87	Sterling	Mo, Pb, Zn, Ag	disseminated molybdenite and galena
91	Roseberry	Au, Ag, Pb, Zn	approx. location; diss. and podiform massive sulphides
132	Mars Creek	Zn, Pb, Cd	
148	O'Reilly	Cu	sparse pockets of massive sulphide in quartz veins
161	Silver Shield	Pb, Zn	
204	Next 1	Cu	disseminated chalcopyrite
205	Stan	Pb	galena in narrow quartz stringers
217	Pat 700	Pb, Cu, Ag	minor galena and chalcopyrite in discordant quartz veins
■ Cu, Au, Ag Skarns			
157	Pat 1300	Zn, Cu, Ag	disseminated; skarn pendant
● W, Au Skarns			
187	Thanksgiving	W	disseminated scheelite and pyrrhotite in calcsilicate
192	Beartree	W, Mo, Cu	scheelite-bearing skarns
△ W, Au Base Metal Veins			
80	Stanmack (Ole Bull)	Au, Ag, W	north-northeast-trending, subvertical quartz veins
146	Fim	W	
167	Orphan Bay	Au, W	north-northeast-trending, subvertical quartz veins
◆ Placer Au			
79	Graham Creek	Au	past producer
81	McCullock Creek	Au	intermittent production
103	French Creek	Au	intermittent production
236	Carnes Creek	Au	past producer
◇ Industrial Mineral			
260	Stitt Creek	Garnet	placer deposit