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DETAILED MAPPING AND RE-EVALUATION OF THE 'KNEE' ZINC MINERALIZATION, SWIFT RIVER, YUKON

by

Timothy Liverton PhD, FGS, FGAC

Claims: Humbling 1 to 4 (YB93595, 6, 7 & 8). NTS sheet 105B-3, Watson Lake Mining Recorder's District, Yukon. Latitude 60°11' N, Longitude 131° 13' W.

Claims currently held by Doug Brown of Watson Lake.

Fieldwork by T.Liverton and H.Hibbing 10th, 20th August, 25th September 2002

This report has been examined by the Geological Evaluation Unit under Section 53 (4) Yukon Quartz Mining Act and is allowed as representation work in the amount of $ 2000.00 .

for Regional Manager, Exploration and Geological Services for Commissioner of Yukon Territory.

Costs associated with this report have been approved in the amount of $ 2000.00 for assessment credit under Certificate of Work No. QL 25635

Mining Recorder
Watson Lake Mining District

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INTRODUCTION

Access to the claims is possible by four wheel drive roads that continue on from the Pine Lake Airstrip. A road leaves the north side of the Alaska Highway 1km. west of Walker's Continental Divide lodge. The Swift River area has been prospected for base metals since 1946 and isolated high-grade zinc showings have been known since then. During the last 15 years the Dan or Bar (Minfile 027)-Atom (Minfile 026) trend of mineralization has been prospected by First Yukon Silver, during which time the property was optioned to Cominco and subsequently to Birch Mountain Resources. Both of these latter companies drilled geochemical and geophysical targets over the strike length of 7 km, following a marble - volcanic (rhyolitic tuff) contact in metamorphosed and highly deformed sedimentary and volcanic units of the Yukon Tanana Terrane. Claims in the NW part of this trend lapsed and the vacant ground was acquired for Rhyoflow Ltd. by Doug Brown since examination of mineralization exposed at the surface indicated that the drill hole 97-07 of Birch Mountain Resources might not have been deep enough to cut the down-dip extension of all the showings. The present assessment work consists of geological mapping at 1:500 scale to cover the region around DDH 97-07 to test that observation.

REGIONAL GEOLOGY

The upper Swift River valley is at the contact of displaced North American Palaeozoic strata of the Cassiar Platform (i.e., the basal detachment that is correlated with the Inconnu thrust to the NE) with highly deformed and metamorphosed volcano-sedimentary units that are now assigned to the Yukon-Tanana terrane. The Dan-Atom trend of Zn-Ag±Cu mineralization is within the Ram Creek Assemblage, which at this locality consists of metavolcanics, marble or calc-silicate and siliceous cherty sediments that may be exhalites. The Assemblage has been deformed by three generations of folding (D'el-Rey Silva et al., 2001a & b). Isoclinal F_1 structures have transposed bedding and more open NE vergent mesoscopic and macroscopic F_2 folds control the distribution of outcrop-scale units. F_3 structures are a minor warping that do not significantly affect the macroscopic distribution of mapped units. This structural style is seen in the Dorsey Assemblage immediately to the south (Roots et al., 2003), which also contains similar mineralization. Three ages of plutonism have also affected this immediate locality: the Permian Ram stock; intrusion of a

sill-like gabbro to diorite of Jurassic age which shows frequent evidence of shearing and is considered syn-tectonic; and undeformed Cretaceous highly evolved biotite granite stocks satellite to the Seagull batholith. The Ram Creek Assemblage therefore shows evidence of both regional metamorphism to at least upper greenschist facies and contact metamorphism that has produced local pyroxene-garnet mineralogy, with widespread amphibole or amphibole-chlorite retrograde assemblages.

GEOLOGY OF THE HUMBLING CLAIMS: 2002 MAPPING

The Humbling claims cover both volcano-sedimentary units of the Ram Creek Assemblage and a sequence of black chert and often pyritic siltstone (Unit DMEC on map 1C) that might be correlated with continental Earn Group clastics. The present detailed mapping, which was performed using compass, tape and clinometer traverses, covers the exposures of tuff and calc-silicate rocks that are part of the Ram Creek assemblage. The fault contact with the 'black clastics' of unit DMEC (Cassiar terrane) is approximately 50 metres east of the map (Fig. 5). The tuff unit is a pale green to grey aphanitic, finely banded rock that shows a crenulation cleavage (Fig. 7). No unaltered marble (as is common at the tuff contact in the Dan to Lucy showings to the SE) was seen in the old trenches, but a wide range of calc-silicate mineralogy occurs in the units surrounding the tuff. Garnet, pyroxene (close to the hedenbergite end member), actinolite, epidote (pistacite), and vesuvianite are common. Sulphide mineralization consists of massive pyrrhotite to the SW of the area mapped with several units of massive to disseminated sphalerite within a stratigraphic interval of ≈40m to the NE. This mineralization is found both in calc-silicate mineral assemblages and within the tuff unit. A prevailing steep SW dip is seen. Down-dip continuity may not be ubiquitous here due to the F_1 isoclinal folding having transposed bedding. Surface exposure here is not adequate for detailed structural mapping. Many of the textures and the mineralogy of these mineralized rocks indicate replacement by contact metsomatism, but it is considered possible that this mineralization could be of stratiform (exhalative) type that was locally remobilized by Jurassic contact metasomatism.

This mapping indicates that not all of the massive sphalerite mineralization seen in outcrop would have been intersected by the one previous drillhole (Figs. 5 & 6), especially since surface mineralization is still seen some 15m SE of the eastern limit of this year's work.

FURTHER PROSPECTIVE AREAS

In addition to the Zn mineralization seen in the calc-silicate rocks of the Ram Creek Assemblage examination of the exposures of black clastics along the road to Pine Lake (i.e. within 2km SE of the claims) has indicated that a considerable amount of very fine grained bedded sulphides occur in some horizons. This mineralization has neither been properly mapped nor

sampled for assay in the past. The black clastic - tuff/calc-silicate contact is mappable for several hundred metres to the SE and sulphide mineralization in the calc silicates is likely.

RECOMMENDATIONS

It does seem that the Birch Mountain drill hole 97-07 did not intersect the entire down-dip extension of the sphalerite mineralization seen at surface. During the 2003 season the detailed mapping should be extended to cover the whole of the claim block and especially to document exposures of black clastics in the small canyons that drain northward to Crescent Lake and the Swift River. Mineralization should be channel sampled where practicable and in particular, be assayed for gold. Once drill core from DDH 97-07, which is currently in Calgary, becomes available it should be re-logged to enable a better correlation with surface exposures.

BIBLIOGRAPHY

D'el-Rey Silva, L.J.H., Liverton, T., Paradis, S. and Roots, C. 2001. A structural analysis of the upper Swift River area (105B/3), Yukon, Part I: Dan Zn occurrence and implications for sulphide mineralization. *In:* Yukon Exploration and Geology 2000, D.S. Emond and L.H. Weston (eds.), Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada, p. 289-300.

D'el-Rey Silva, L.J.H., Liverton, T., Roots, C. and Paradis, S. 2001. A structural analysis of the upper Swift River area (105B/3), Yukon, Part II: the TBMB claims and implications for the regional geology. *In:* Yukon Exploration and Geology 2000, D.S. Emond and L.H. Weston (eds.), Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada, p. 301-310.

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COST STATEMENT

T. LIVERTON 3 days @ $600.00	$	1800.00
H.HIBBING 3 days @ $200.00	$	600.00
Vehicle 505 km @ $0.42	$	213.00
Meals	$	105.00
Report preparation	$	600.00
Total	$	3318.00

Timothy Liverton

Watson Lake, Yukon
4th. April 2003

STATEMENT OF QUALIFICATIONS: T. LIVERTON

Academic qualifications:

BSc in geology and geophysics, University of Sydney. Conferred 1965.
BSc (Hons) in economic geology, University of Adelaide. Conferred 1968.
PhD in petrology, geochemistry and structural geology, Royal Holloway, University of London 1992. Thesis: 'Tectonics and Metallogeny of the Thirtymile Range, Yukon Territory, Canada' pp. 325.

Professional experience:

29 years' experience in exploration and mine geology in Australia, Brazil, Portugal, Norway, U.S.A., U.K. and Canada. 2 years as Visiting Professor in Economic Geology at the Universidade be Brasília, Brazil. Currently self-employed as a contract/consulting geologist.

Professional Membership:

Fellow of the Geological Society of London
Fellow of the Geological Association of Canada
Member of the Geological Society of America
Member of the Society of Economic Geologists

FIGURES

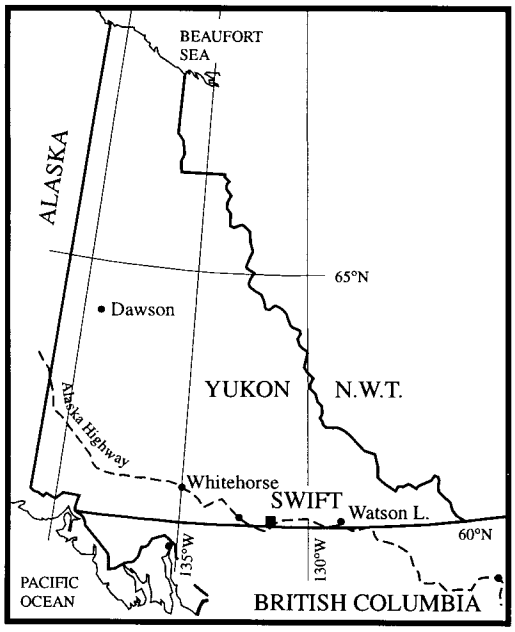


FIGURE 1a

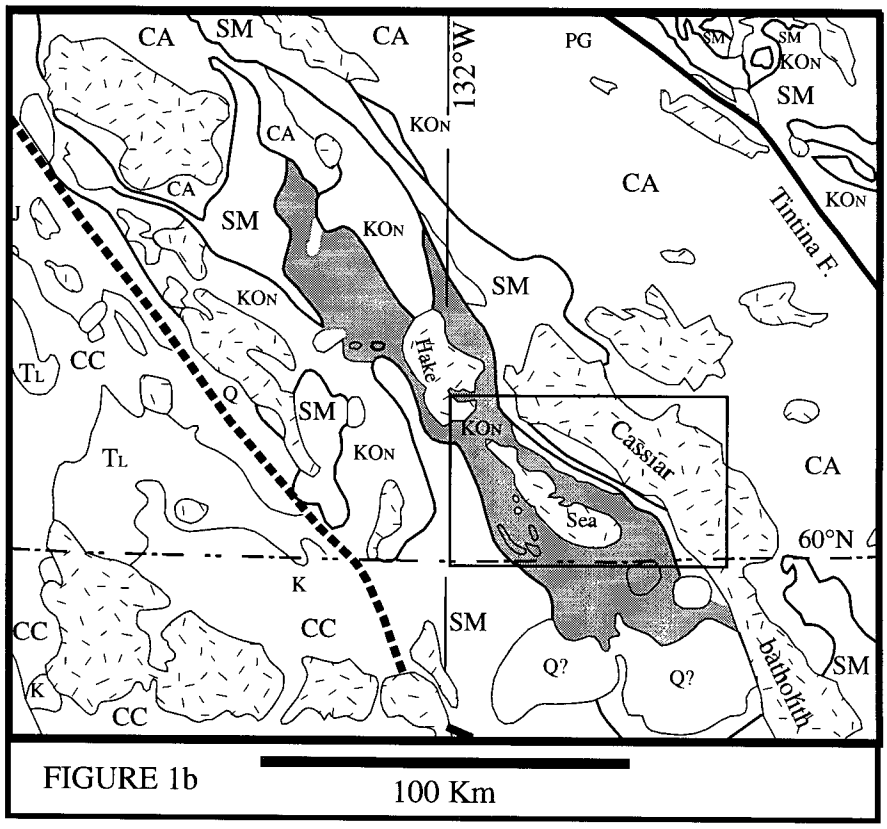


FIGURE 1b

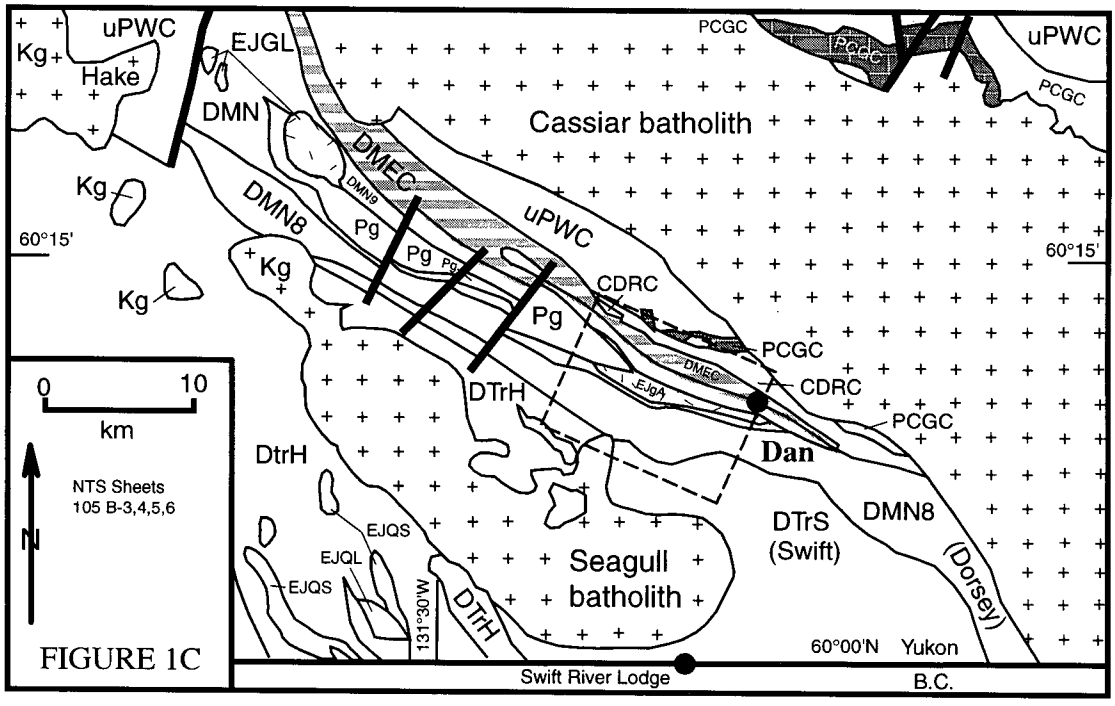


FIGURE 1C

Figure 1a: Location of the Humbling claims (105 B-3) within the Yukon.
Figure 1b: Regional geology at 1:2,000,000 scale from Wheeler et al. (1991). The shaded unit is the 'Dorsey terrane', now considered to be in part Yukon-Tanana equivalent. The rectangle indicates location of map 1c.
Figure 1c: Regional geology, with units as in D'el-Rey Silva et al. (2001). Cassiar Platform rocks are, CDRC, PCGC = Lower Palaeozoic carbonate; uPWC = Late Proterozoic clastics; DTrS = Swift River Assemblage; DMN8 = Dorsey assemblage; DMN9 = Ram Creek Assemblage; DMEC = Mid Palaeozoic argillite. Intrusions are: Pg = Permian Ram Stock; EJGL, EJgA = Jurassic and Kg = Cretaceous. The dashed rectangle indicates location of Fig. 4.

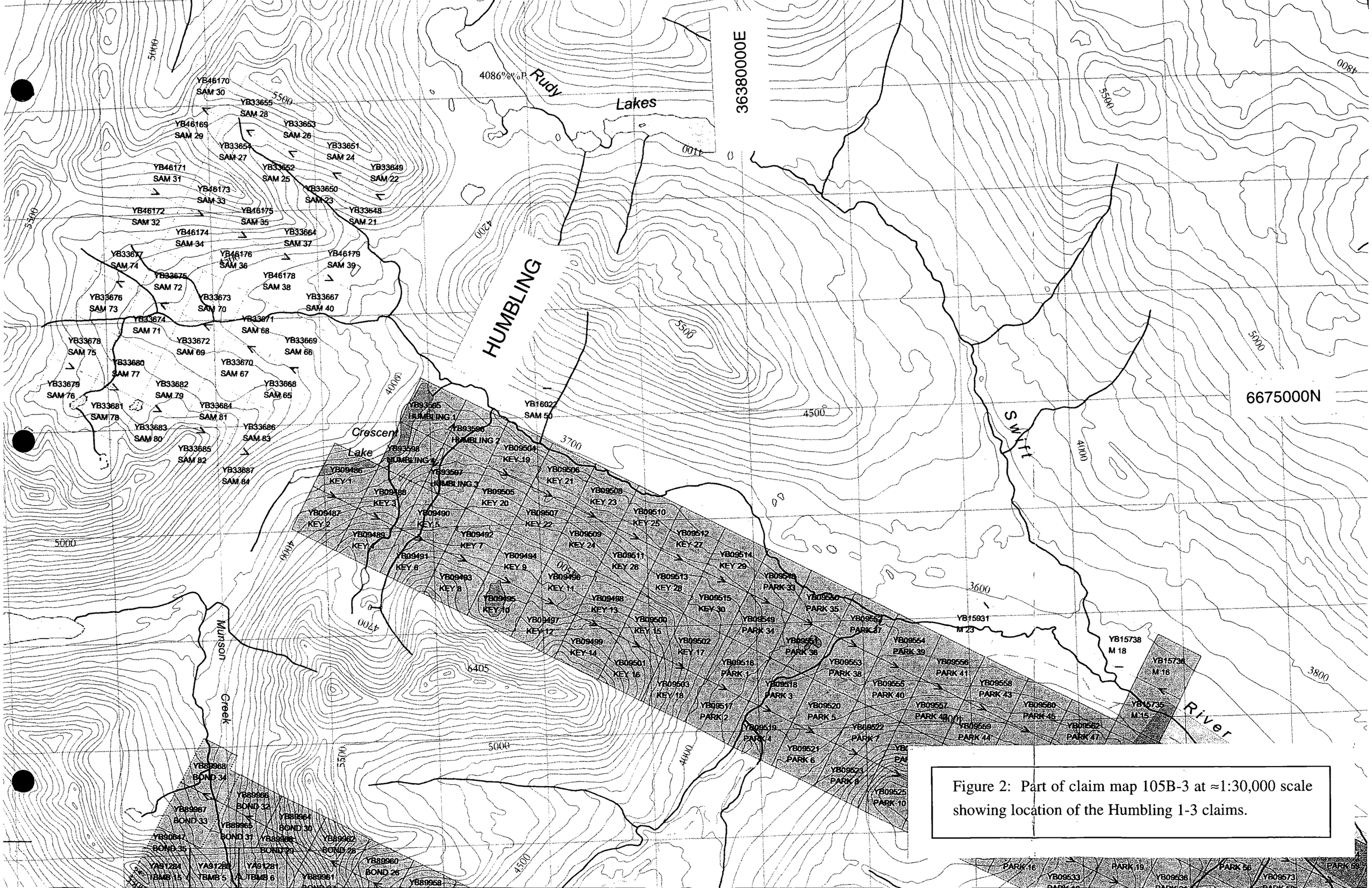
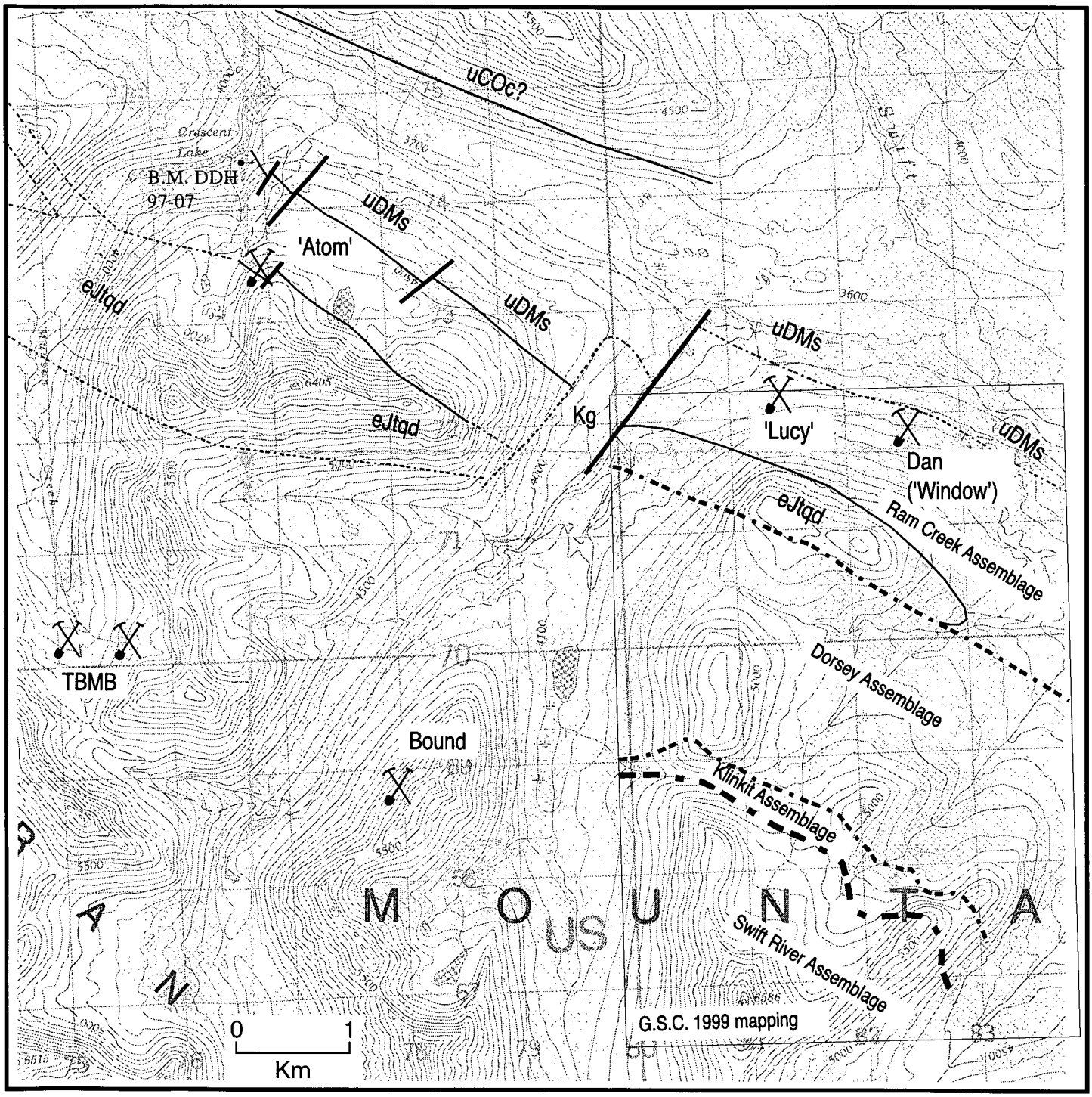
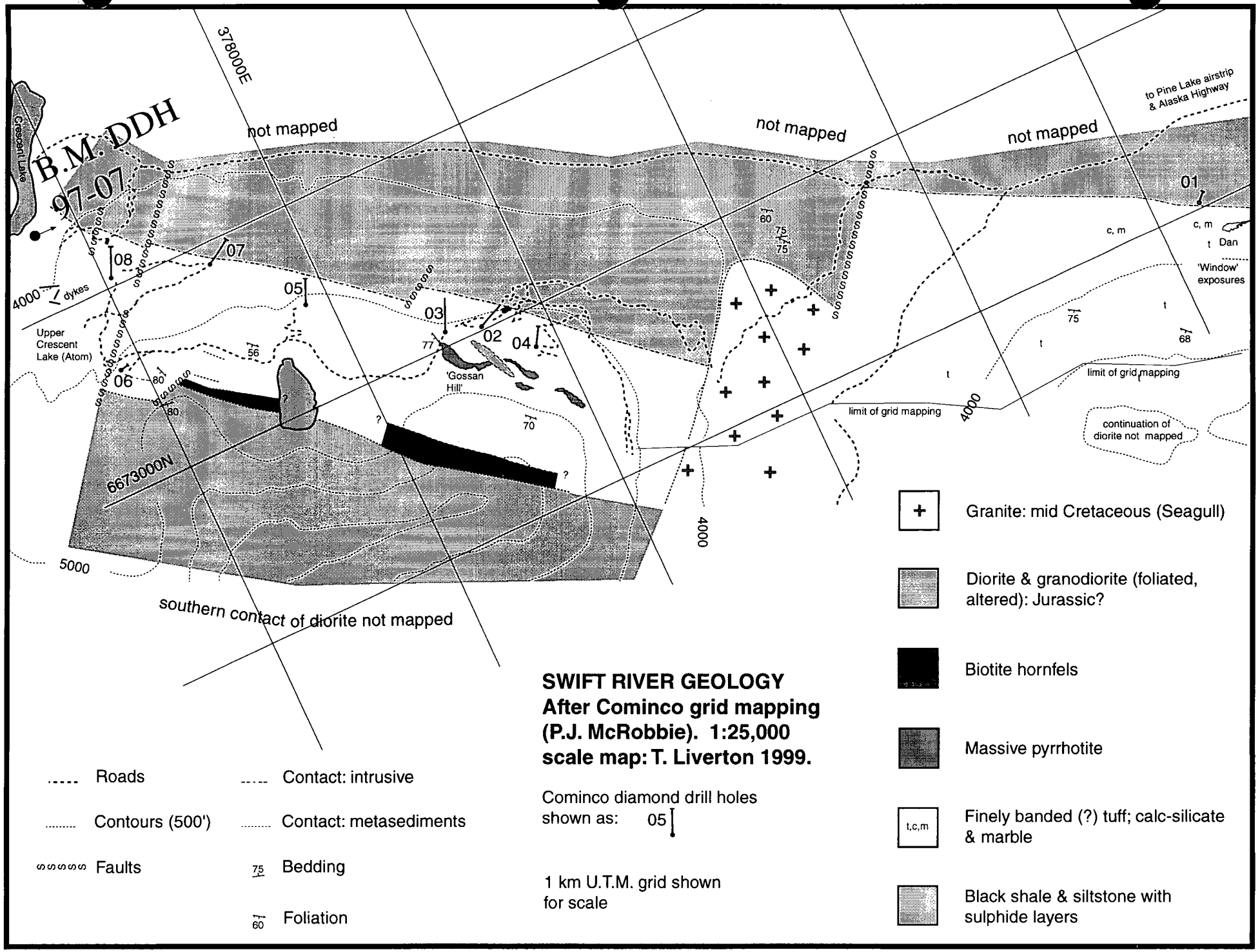
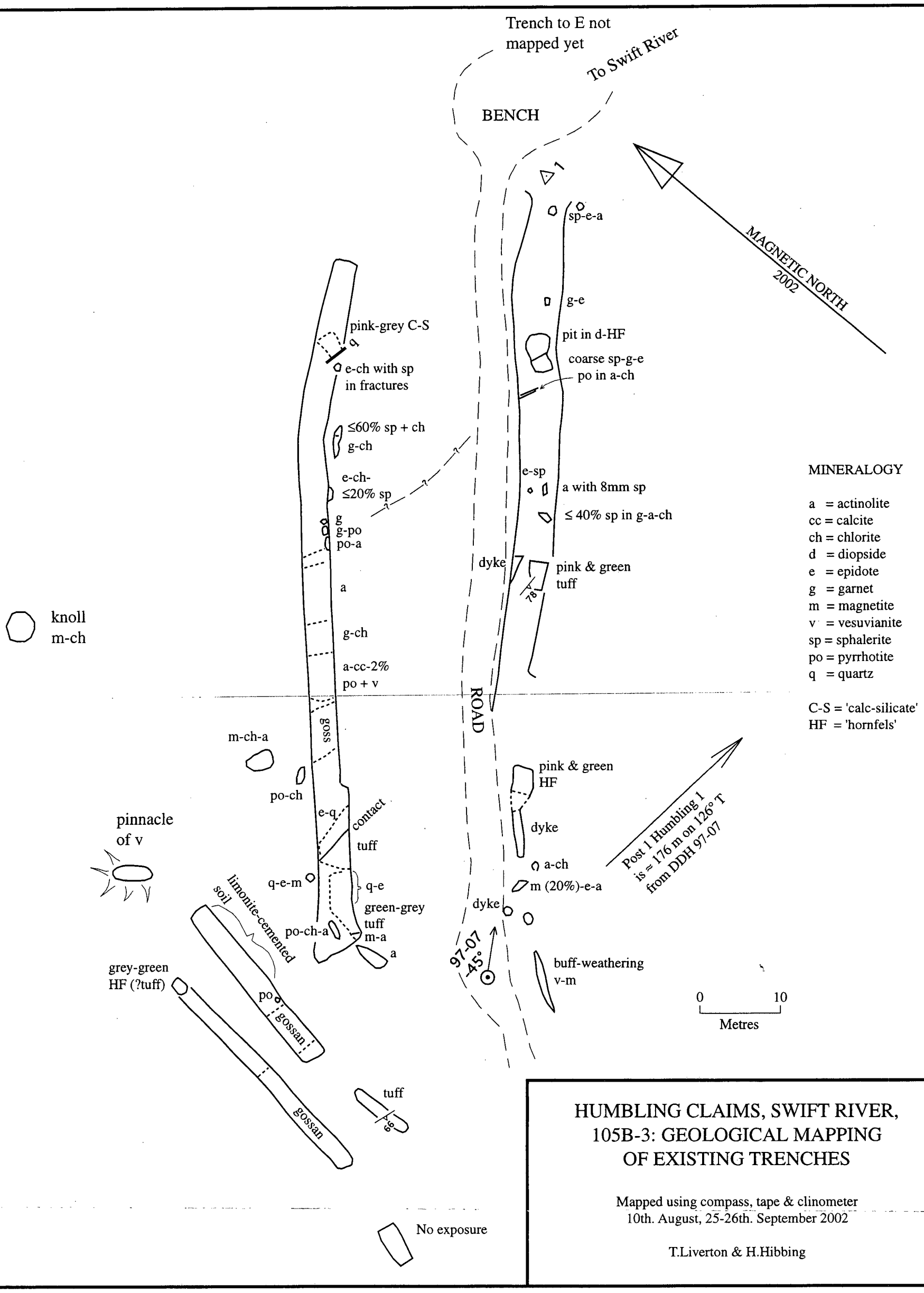


Figure 2: Part of claim map 105B-3 at ≈1:30,000 scale showing location of the Humbling 1-3 claims.


uCOc?
Crescent Lake
B.M. DDH 97-07
'Atom'
uDMs
uDMs
eJtqd
eJtqd
uDMs
Kg
'Lucy'
Dan ('Window')
uDMs
eJtqd
Ram Creek Assemblage
Dorsey Assemblage
Klinkit Assemblage
Swift River Assemblage
TBMB
Bound
G.S.C. 1999 mapping
0
1
Km

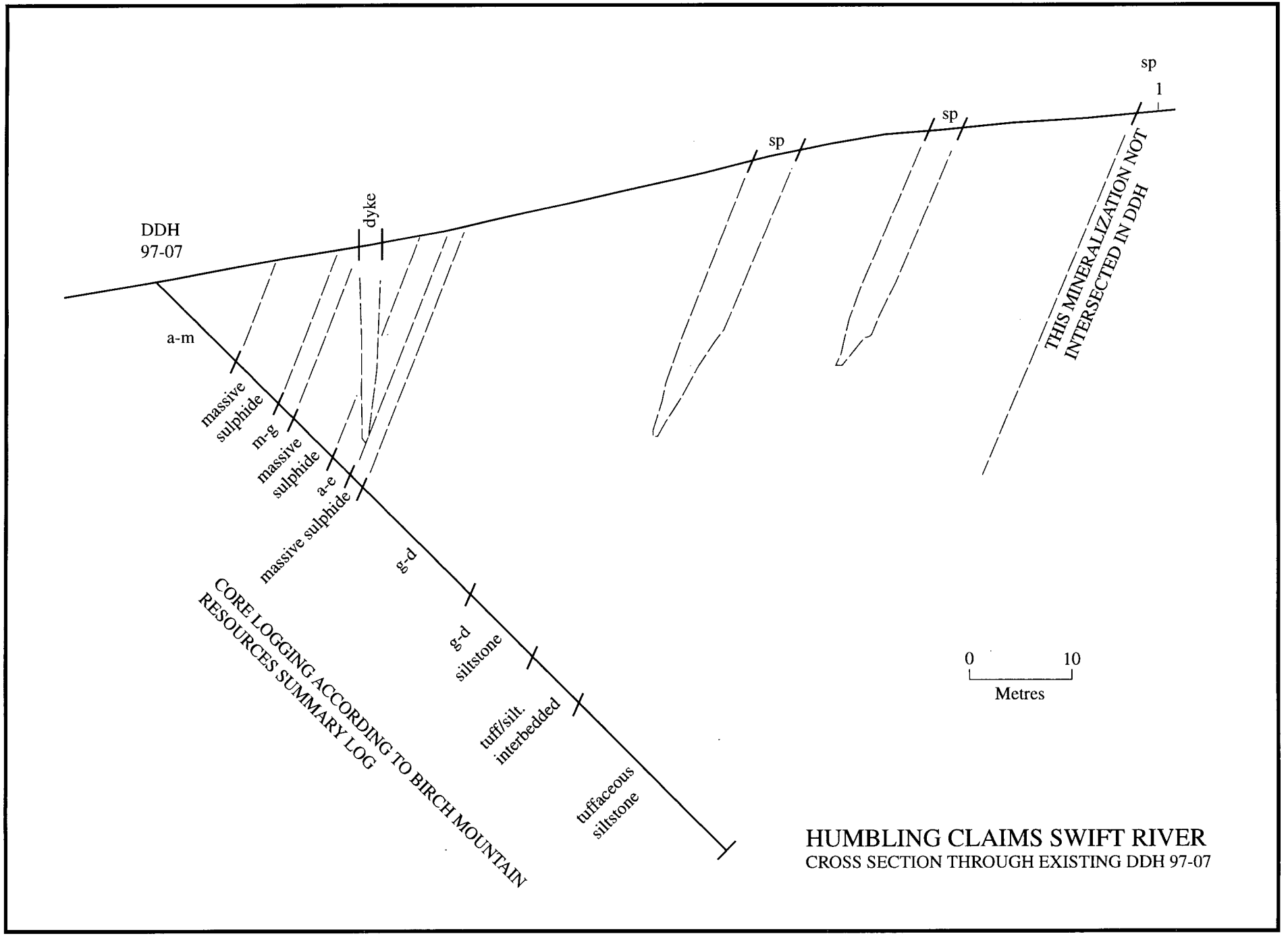

B.M. DDH 97-07
378000E
not mapped
not mapped
not mapped
to Pine Lake airstrip & Alaska Highway
Crescent Lake
01
08
07
05
03
02
04
06
4000
dykes
Upper Crescent Lake (Atom)
'Gossan Hill'
'Window' exposures
c, m
t
Dan
limit of grid mapping
continuation of diorite not mapped
6673000N
5000
southern contact of diorite not mapped
SWIFT RIVER GEOLOGY
After Cominco grid mapping (P.J. McRobbie). 1:25,000 scale map: T. Liverton 1999.
Cominco diamond drill holes shown as: 05
1 km U.T.M. grid shown for scale
Roads
Contours (500')
Faults
Contact: intrusive
Contact: metasediments
Bedding
Foliation
Granite: mid Cretaceous (Seagull)
Diorite & granodiorite (foliated, altered): Jurassic?
Biotite hornfels
Massive pyrrhotite
t,c,m
Finely banded (?) tuff; calc-silicate & marble
Black shale & siltstone with sulphide layers



HUMBLING CLAIMS, SWIFT RIVER, 105B-3: GEOLOGICAL MAPPING OF EXISTING TRENCHES

Mapped using compass, tape & clinometer
10th. August, 25-26th. September 2002

T.Liverton & H.Hibbing



HUMBLING CLAIMS SWIFT RIVER

CROSS SECTION THROUGH EXISTING DDH 97-07

Figure 7. Thin section of tuff from the Humbling claims. Transmitted light, with width of field 40 mm. An incipient crenulation cleavage is developed.