New geological mapping and implications for mineralization potential in southern and western Whitesail Lake map area (NTS 93E)

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INTRODUCTION

This investigation focuses on detailed bedrock mapping and economic mineralization potential in the southern and western Whitesail Lake map area (NTS 93E; Fig. 1). The primary focus of mapping during the 2006 field season was the western and southwestern portions of the Whitesail Lake map area, including portions of the Kitlope Lake (93E/04), Tsaytis River (93E/05), Chikamin Mountain (93E/06), Troitsa Peak (93E/11), and Tahtsa Peak (93E/12) 1:50,000 map areas (Figs. 1-3). Mapping in these areas provides linkage to work completed in the southern portion of the Whitesail Lake map area under the auspices of the Rocks to Riches Program (Mahoney *et al.*, 2005; Gordee *et al.*, 2005), and attempts to tie in with pre-existing mapping in the central portion of the map area (Fig. 2). The primary objective of this investigation is to provide a comprehensive evaluation of economic mineralization potential of the southern and western Whitesail Lake map area.

The region is underlain by Triassic, Jurassic, and Cretaceous volcanic and sedimentary successions on the western edge of Stikinia that have volcanogenic massive sulphide potential, and by Jurassic to Eocene plutonic bodies along the eastern margin of the Coast Plutonic Complex, which are known hosts for a variety of porphyry deposits (Woodsworth, 1980; Dawson *et al.*, 1991; Diakow *et al.*, 2002). This report briefly describes the geology of this region, documented by detailed bedrock mapping during the 2006 field season (Fig. 3). This investigation integrates regional bedrock mapping, stratigraphic and structural analyses, geochronology, plutonic and volcanic geochemistry, isotopic analyses, and mineral assays into a comprehensive assessment of the geological framework and economic mineral potential of the region.

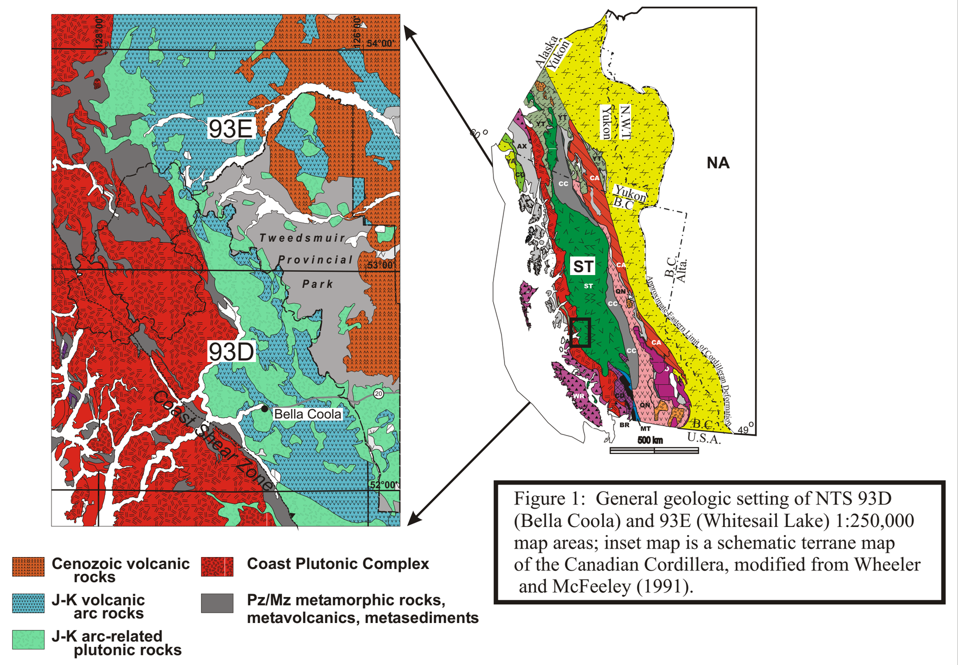


Figure 1: General geologic setting of NTS 93D (Bella Coola) and 93E (Whitesail Lake) 1:250,000 map areas; inset map is a schematic terrane map of the Canadian Cordillera, modified from Wheeler and McFeeley (1991).

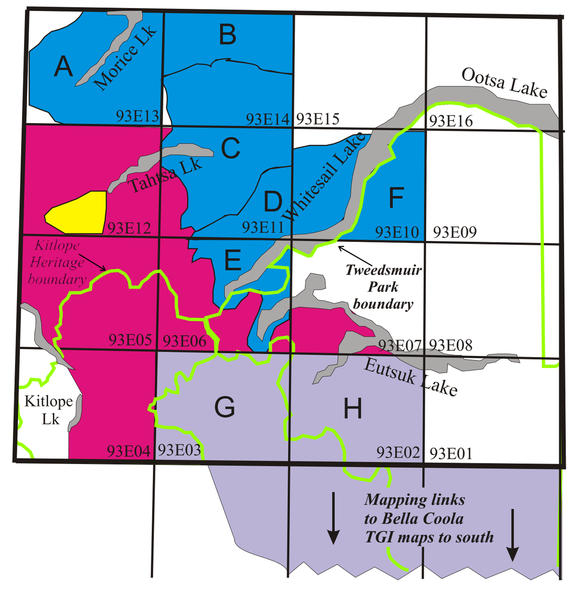
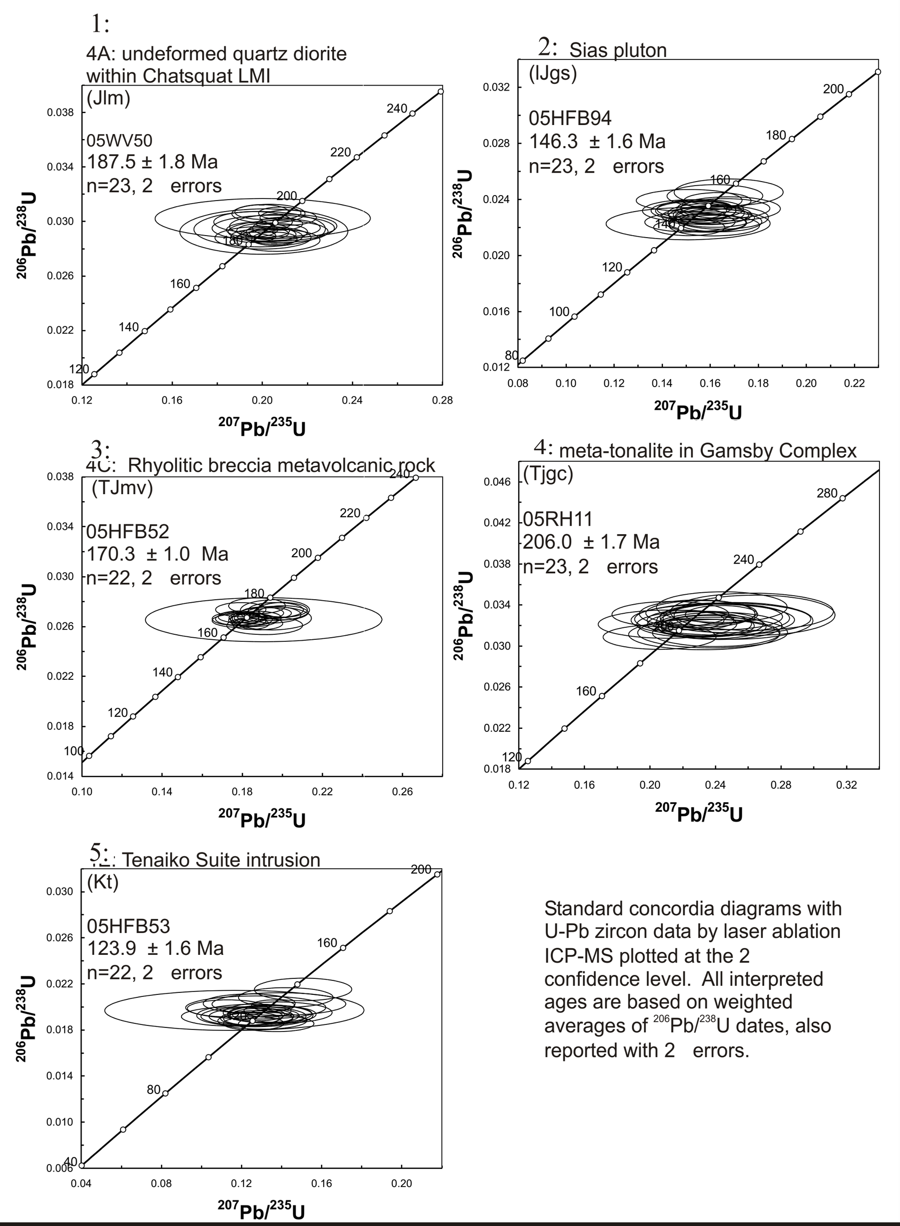
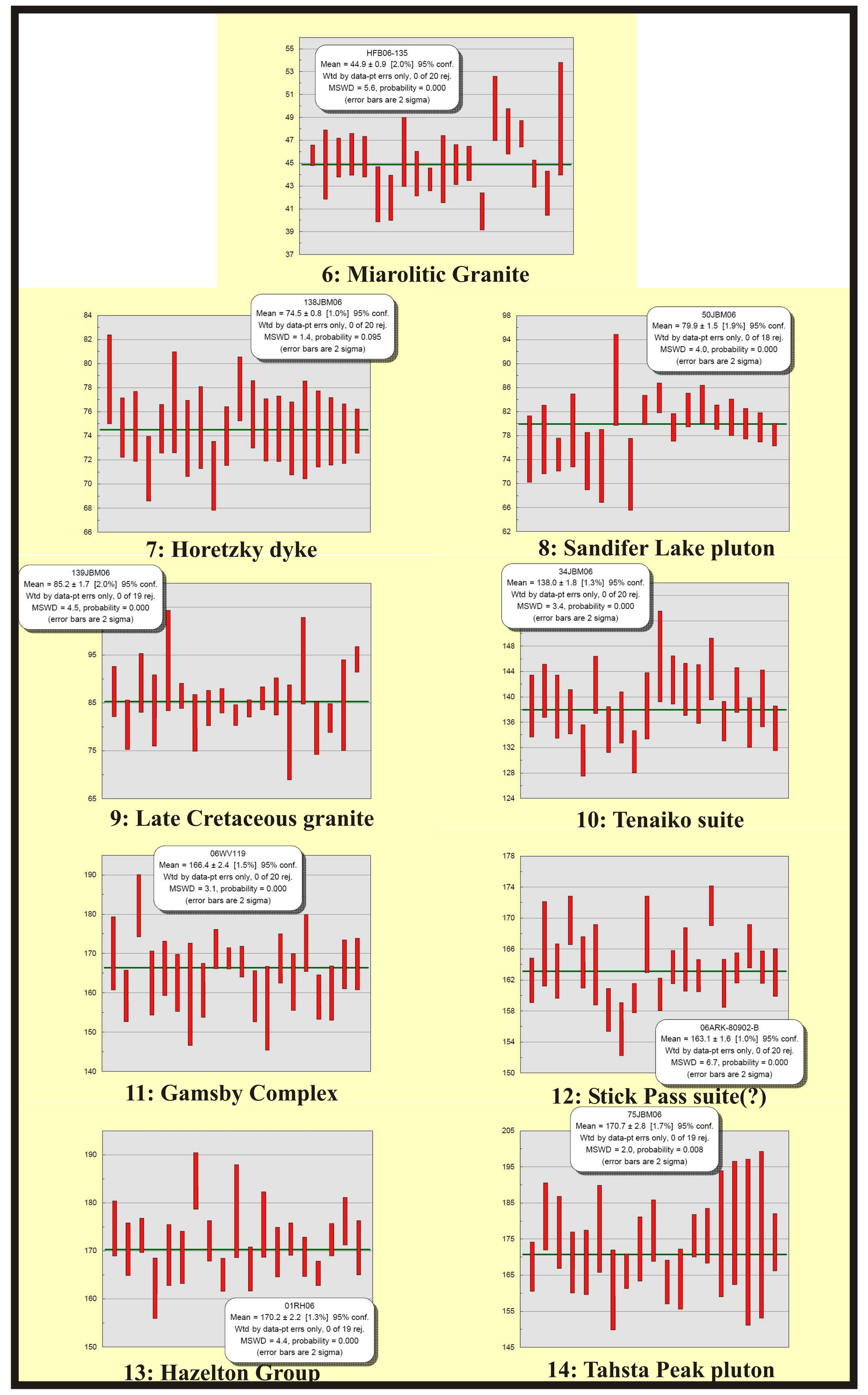
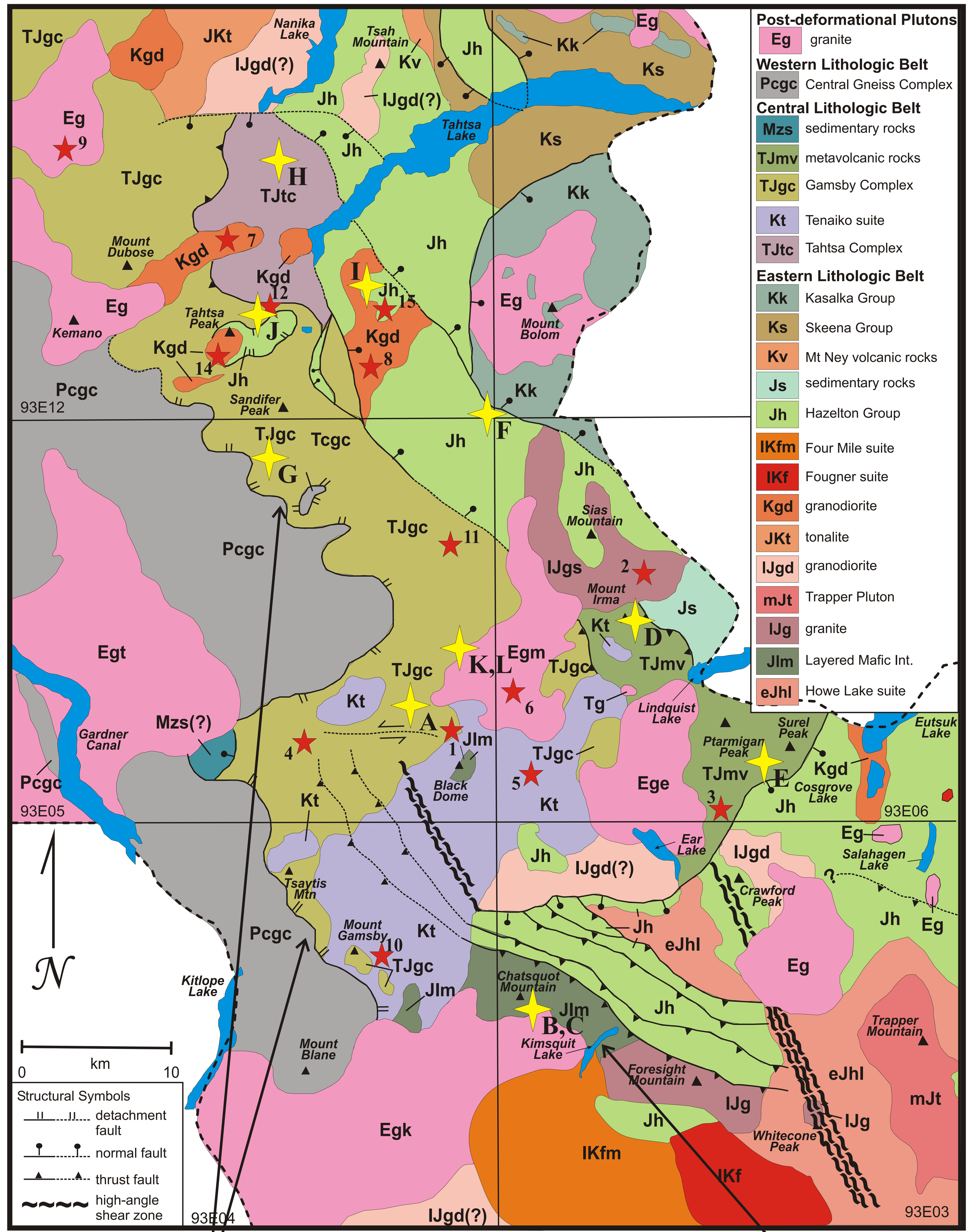


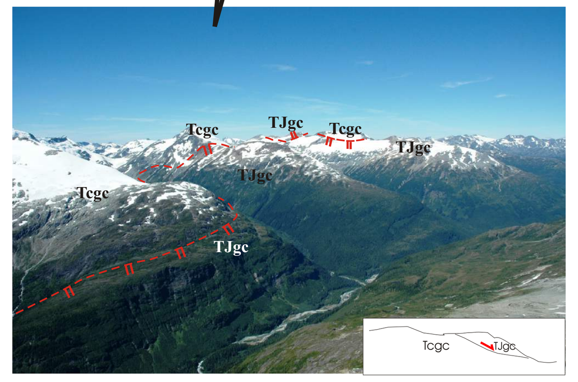
Figure 2: Geographic distribution of existing 1:50,000 geologic maps in the Whitesail Lake map area, and distribution of new mapping (shown in red). Blue areas were mapped by BCGS teams (ca 1985-1990; letters keyed to reference list); yellow area is thesis map of van der Heyden (1982); purple area was mapped by Bella Coola TGI project (93D; 2001-2003(Haggart et al., 2006), and 93E2/3 were mapped under auspices of Rocks to Riches program (2004)



Standard concordia diagrams with U-Pb zircon data by laser ablation ICP-MS plotted at the 2 confidence level. All interpreted ages are based on weighted averages of $^{206}Pb/^{238}U$ dates, also reported with 2 errors.

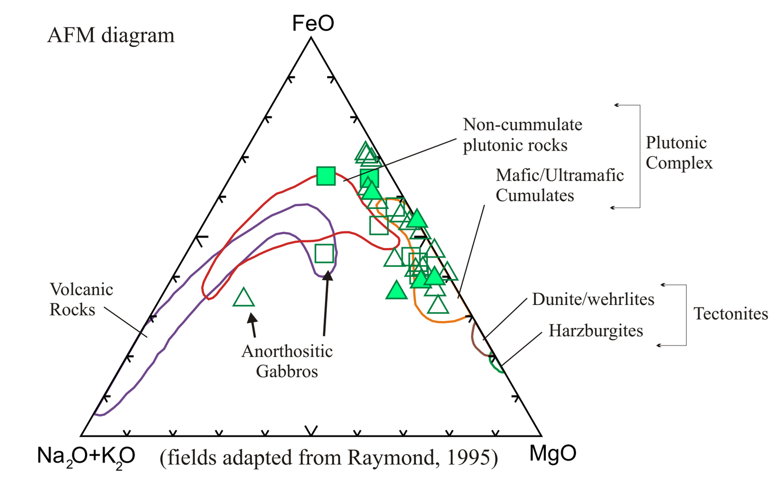






View to the northwest from east of the Tsaytis River of the Central Gneiss detachment, a low angle extensional fault that juxtaposes primarily low grade metavolcanic rocks and associated plutonic rocks from high grade Central Gneiss Complex. This structure is effectively the western limit of potential economic mineralization in the region

Geochemistry of the Chatsquot Layered Mafic Intrusion



Geochemical analysis of samples from the Chatsquot LMI show strong Fe-Mg enrichment and alkali deficiency typical of mafic/ultramafic cumulates. Only samples from anorthositic gabbros selected specifically for geochronological analysis (U-Pb dating) plot significantly outside the field of cumulates.

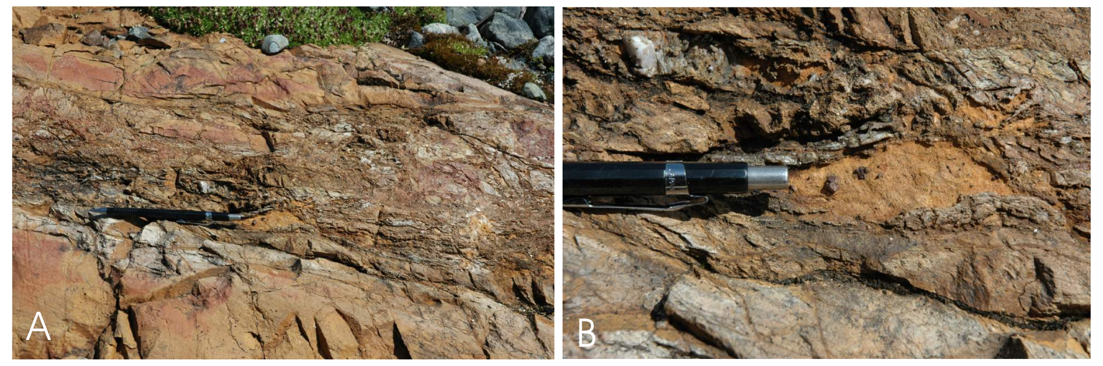
Potential Economic Mineralization Targets:

Known mineral occurrences (MINFILE), stream sediment geochemistry (Lefebure and Gunning, 1988), and regional bedrock mapping suggest that the western and southwestern Whitesail Lake map may hold potential for volcanogenic massive sulphide, Cu±Mo±Au porphyry, and Ni-Cu-Cr-PGE mineralization. Detailed geologic mapping and systematic geochemistry, geochronology, petrology and economic mineral evaluation studies are assessing the distribution of, and controls on, potential economic mineralization in the region. Bedrock geological mapping and preliminary geochemical data suggest that there are several potential targets of economic importance, including:

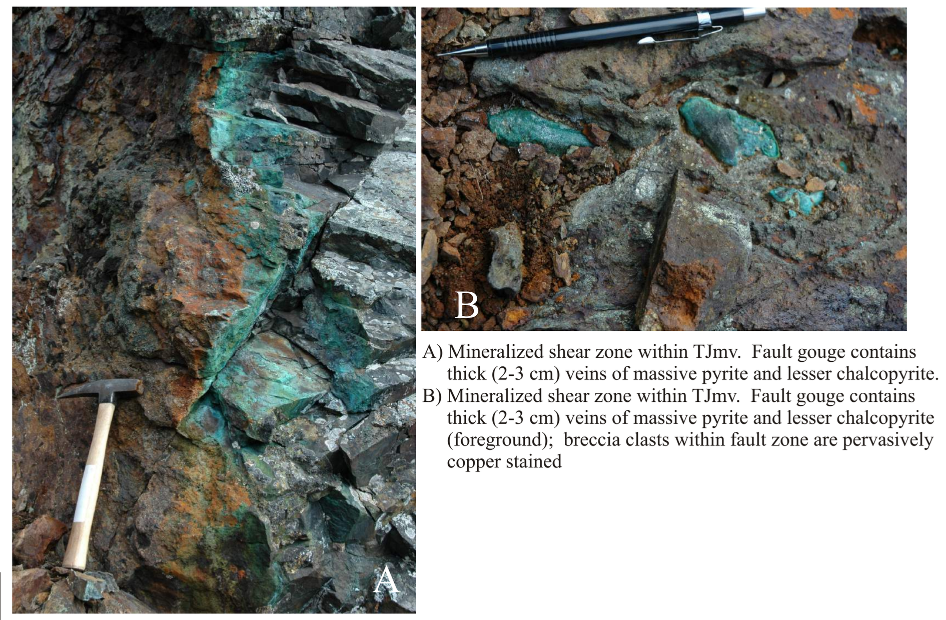
1. Volcanogenic Massive Sulphide Deposits Within the Hazelton Group
(and its metamorphosed equivalents (e.g. Gamsby Group)
2. Chatsquot Layered Mafic Intrusion
(potential PGE target)
3. Cu±Mo±Au Porphyry Mineralization
(associated with Eocene intrusions)
4. Fault-controlled Mineralization
(includes fractures and veins in JK plutonic units)

Low angle extension fault juxtaposing Jurassic Hazelton Group volcanic rocks over Jurassic Tahsta instrusive complex. Decollement surface is an argillite succession that is heavily pyritized. Photograph on right shows location of assay sample **J** (25-RH-06) along the Moraine Lake extensional fault.

Hydrothermal quartz vein (30-35 cm) with copper staining along margins cutting chloritic schists of the Gamsby Complex.



A and B) Calcite, siderite, quartz and pyrite veins within the Tahtsa Complex. Veins are light brown, 5 to 30 cm in width and are commonly associated with minor faults and chloritic shear zones. Veins locally yield elevated Ag and Cu values; additional assays are underway.



A) Mineralized shear zone within TJmv. Fault gouge contains thick (2-3 cm) veins of massive pyrite and lesser chalcopyrite.
B) Mineralized shear zone within TJmv. Fault gouge contains thick (2-3 cm) veins of massive pyrite and lesser chalcopyrite (foreground); breccia clasts within fault zone are pervasively copper stained

Initial Assay Values

Map site	SAMPLE	Au(ppm)	Ag(ppm)	Cu(wt%)	S(wt%)	Unit	Type
A	05-RH-10	0.008	1	0.12	5	TJgc	VMS
B	05-RH-22	0.012	3	0.36	5	Jlm	LMI
C	05-RH-23	BD	3	0.22	3	Jlm	LMI
D	HFB-05-81	0.596	998	1.11	3	TJmv	Vein
E	33-JBM-06	2.730	248	2.07	>10.0	TJmv	Vein
F	73-JBM-06	0.141	3	0.23	>10.0	Jh	Vein
J	06-LS-34	0.025	4	0.19	1	TJgc	Vein
H	06-LS-95	0.143	1195	0.25	1	TJtc	Siderite/Fault
I	07-RH-06	0.005	1	0.10	7	Jh	Vein
J	25-RH-06	0.107	2	0.01	>10.0	Jh	Fault
K	66-RH-06	0.001	2	0.12	3	Eg	Vein
L	HFB-06-132	0.106	15	0.28	7	TJgc	Vein

ONGOING RESEARCH

Finalize all 1:50,000 quadrangles and develop 1:125,000 compilation map
Complete geochronologic analysis of all major volcanogenic and plutonic units
Comprehensive geochemical assessment of magmatic bodies throughout the study area
Completion of metallogenic assays of potential economic mineralization prospects
Development of a comprehensive model of the tectonic evolution of the southern and western portions of the Whitesail Lake map area
Detailed geologic analysis of potential economic targets in the study area, including:
- PGE potential of Chatsquot layered mafic intrusion
- VMS potential of southernmost Hazelton Group
- intrusion related post-depositional mineralization of Hazelton Group
- Cu+Mo+Au potential of Tertiary intrusions

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