Indian and Northern Affairs Canada
Northern Affairs: Yukon Region
Open File 1987-3

GEOLOGY OF COLORADO CREEK (115-J/10), SELWYN RIVER (115-J/9), AND PROSPECTOR MOUNTAIN (115-I/5) MAP AREAS

WESTERN DAWSON RANGE, WEST-CENTRAL YUKON

(Text with three 1:30000 scale maps)
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by

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This report is complimentary
and available from Exploration
and Geological Services Division,
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PREFACE

This report describes the bedrock geology and mineral occurrences of the Colorado Creek (115 J 10), Selwyn River (115 J 9), and Prospector Mountain (115 I 5) map areas in the western Dawson Range, west-central Yukon.

Metamorphosed Proterozoic(?) to Paleozoic sedimentary and igneous rocks of the Yukon Metamorphic Complex are intruded by three plutonic suites. They consist of the Triassic(?) Klotassin hornblende and/or biotite granodiorite, the Jurassic(?) Big Creek monzonite, and the Cretaceous Dawson Range quartz monzonite. Extrusive equivalents include mid Cretaceous felsic intermediate volcanic and subvolcanic rocks of the Mount Nansen Group, and Late Cretaceous to Early Tertiary extrusive andesite, basalt and minor rhyodacite of the Carmacks Group. All are intruded by monzonite to quartz monzonite of the Prospector Mountain Suite. Numerous porphyry, vein and skarn mineral occurrences are associated with the Dawson Range and Prospector Mountain Suites.

This work was funded under the Sub-Agreement of the Canada-Yukon Economic Development Agreement, Contract YEDA 02/86.

ABSTRACT

The project area, covering 2,142 km^2, includes the following three map areas: Colorado Creek (115 J/10), Selwyn River (115 J/9), and Prospector Mountain (115 I/5). Most of the area is in the Dawson Range subdivision of the Yukon Plateau in west-central Yukon Territory. In this study, the bedrock geology of the area was mapped at a scale of 1:30,000.

The oldest rocks in the region are metamorphosed Proterozoic to Paleozoic(?) sedimentary and igneous rocks of the Yukon Metamorphic Complex. They are intruded by batholiths and plutons of hornblende and (or) biotite granodiorite, monzonite, and quartz monzonite of three Mesozoic suites. The older two, which show penetrative metamorphic textures, are the Triassic(?) Klotassin Suite and the Jurassic(?) Big Creek Suite. The third is the unmetamorphosed Dawson Range Suite of Middle Cretaceous age. Slightly younger igneous units consist of felsic to intermediate volcanic and subvolcanic rocks of the Mount Nansen Suite. Early Tertiary igneous rocks include extrusive andesite, basalt, and minor rhyodacite of the Carmacks Suite, and the slightly younger monzonite to quartz monzonite of the Prospector Mountain Suite.

The district contains numerous mineral deposits and occurrences of economic interest. Copper and molybdenum deposits are associated with felsic plutons of at least two ages. Lode gold deposits and one gold-bismuth vein are associated with felsic volcanic rocks and associated subvolcanic intrusions of the Mount Nansen Suite. Placer gold deposits are derived from these rocks. Lead-zinc-silver veins are associated with late-stage intrusions of the Dawson Range and Prospector Mountain Suites. Skarn deposits occur in rocks of the Yukon Metamorphic Complex along borders of younger plutonic rocks.

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1. INTRODUCTION

1.1 Scope of Study

The **Colorado Creek** (115-J/10), **Selwyn River** (115-J/9), and **Prospector Mountain** (115-I/5) map sheets, comprising a total of 2,142 km^2, were mapped geologically during the field season of 1986 (Figure 1.1) by Archean Engineering Limited. In a similar, concurrent project, Carlson (1987) mapped the **Stoddart Creek** (115-I/6) and **Mount Nansen** (115-I/3) sheets, east and southeast, respectively of the Prospector Mountain sheet. The projects were correlated, and a unified legend produced for the major geological units. A few major rock units occur in only one area.

A few important mineral deposits and numerous minor showings are scattered through the project area. These were classified according to deposit type, and important features were described (ref. Chapter 6).

Field work was supplemented by thin section petrography of 117 rocks, whole rock chemical analysis of 76 samples and minor element analysis of 40 samples. Thin section and whole rock studies focused on characterization of major units, whereas minor element studies focused on mineral deposits and alteration assemblages.

Radiometric age dating of samples collected during the field study will be presented in a later report. Because of the lack of sufficient radiometric dates, and the absence of crosscutting relations between certain units, ages of some units and age relations among some units are uncertain. Most critical of these are the ages of volcanic and plutonic rocks at Mount Cockfield, several small felsic plugs, and many of the dykes. These intrusions have been classified as belonging to the Mount Nansen Suite, but some may be younger, perhaps as young as the Prospector Mountain Suite.

Total intensity, aeromagnetic data covering the project area was of some use in the interpretation of geological boundaries in areas of limited outcrop. Although lithologic boundaries cannot be determined exactly using aeromagnetic data, the character and location of geologic contacts can be inferred where the differences in magnetic properties between adjacent rock types are substantial. In general, metamorphic rocks, characterized by low magnetic intensity and relief, contrast with plutonic rocks, characterized by moderate magnetic intensity and relief, and with volcanic rocks, characterized by high to extreme magnetic relief.

1.2 Access

The map area is in one of the most inaccessable regions in west-central Yukon, and helicopter support was required for all camp moves and logistical support. Although several dirt and gravel airstrips exist in the region, only those at Casino, Rude Creek, and Sonora Gulch were useable. The Revenue Creek airstrip, several kilometres east of the Prospector Mountain map area, can be reached from Carmacks by a 50-km, low-maintenance, gravel road.

1.3 Field Methods

Systematic, daily, ground traverses were conducted by a team of four geologists from a mobile camp. One hundred and fifty traverses covered 1800 linear km (Figures 1.2a, 1.2b, and 1.2c). Field mapping was designed to produce a bedrock geological outcrop map at a scale of 1:30,000. Daily traverses were selected, with the aid of aerial photographs, to maximize the number of outcrops investigated. The quality of outcrop was classified according to the following criteria:

1. **Outcrop:**	structural data measurable.
2. **Felsenmeer:**	bedrock weathered by frost action to produce a surface of disoriented, angular blocks. Principal characteristics are the lack of significant downslope movement and impossibility of measurement of orientation of structural data because of unknown amount of rotation of blocks.
3. **Rubble:**	Scattered rubble similar to Code 2, but much less abundant rock fragments. Rock fragments commonly smaller than in Code 2.
4. **Talus:**	patches of angular to subangular rock fragments which have moved downslope.

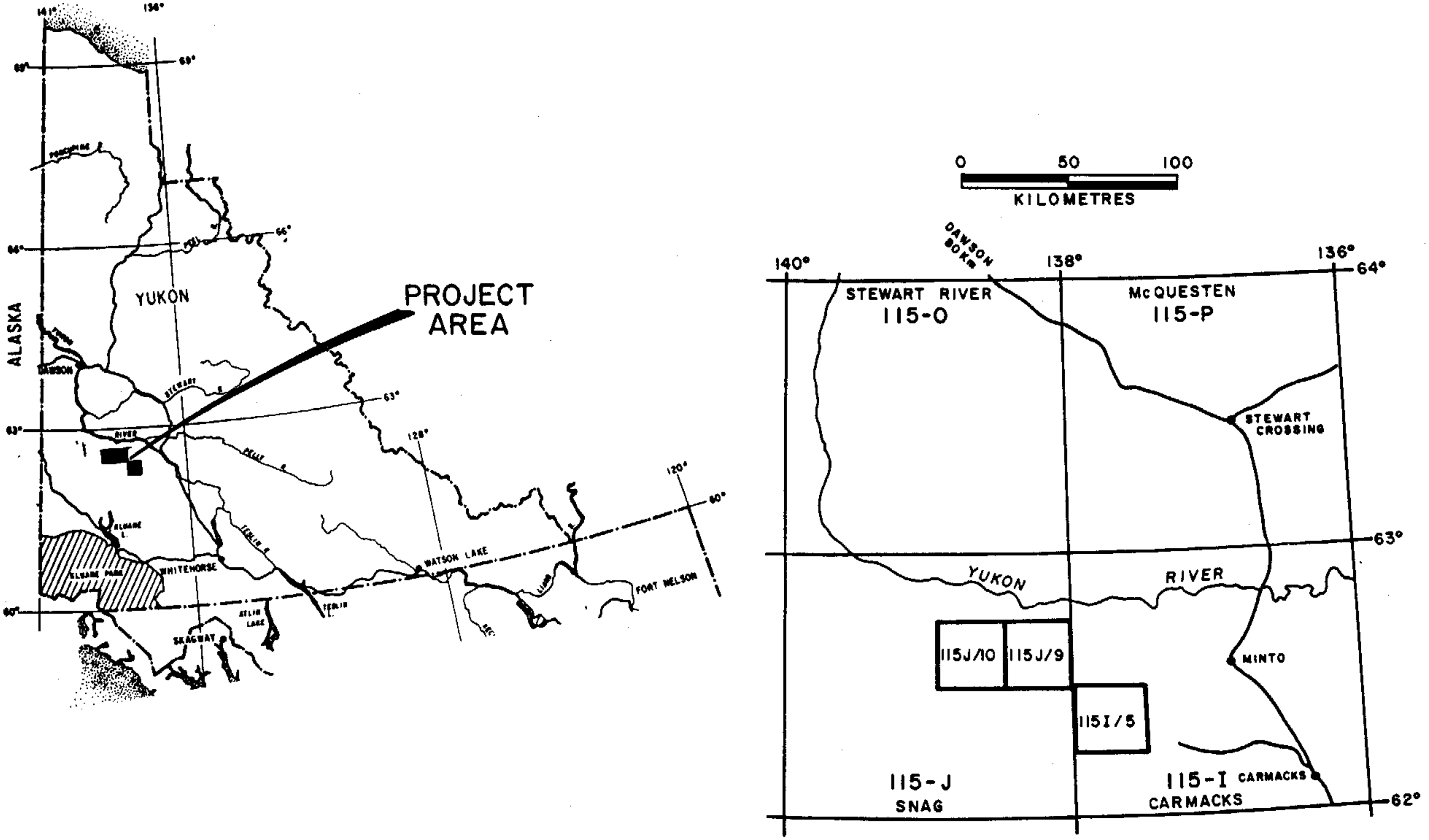


Figure 1.1 Location Map

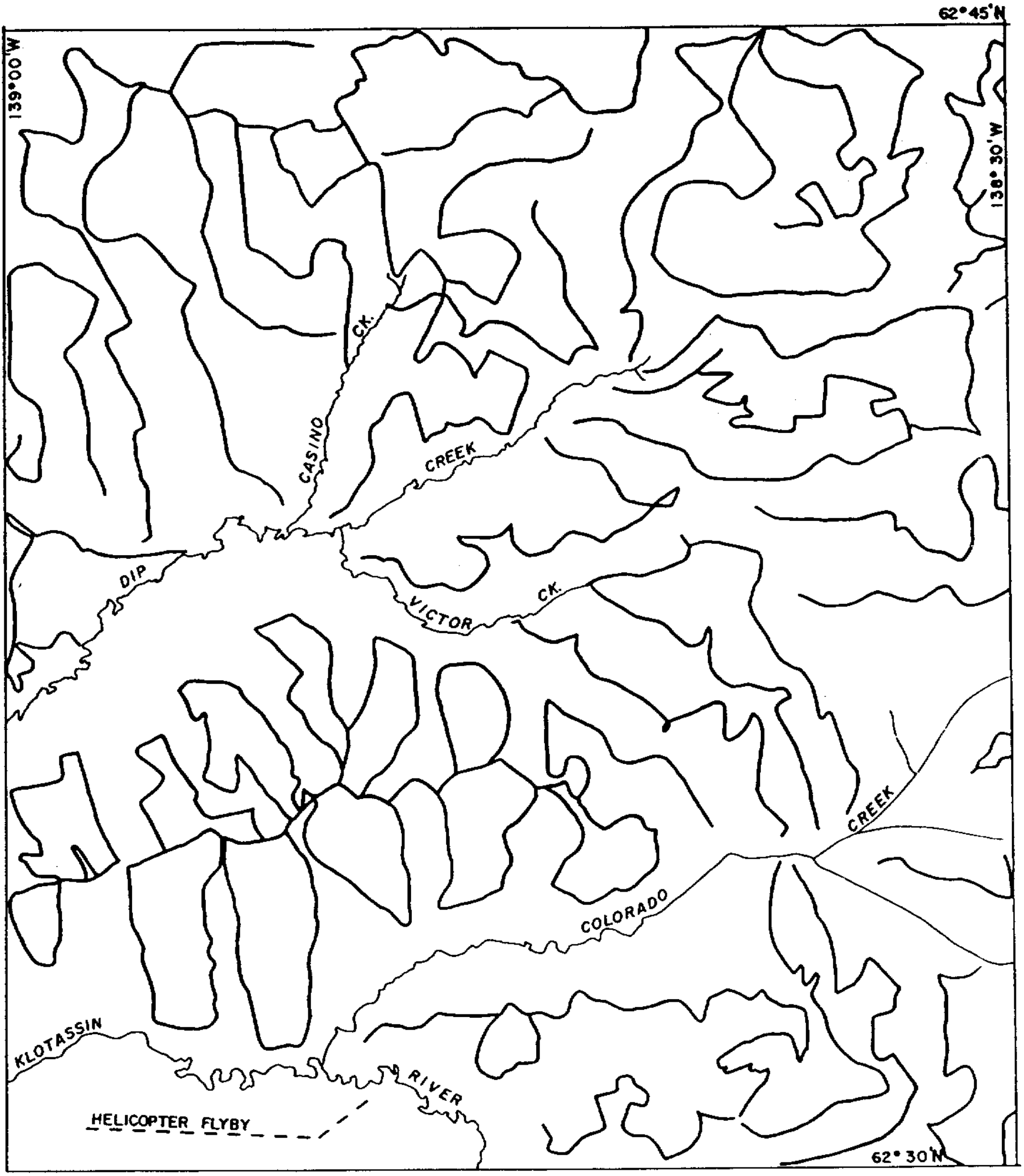
Commonly, boundaries are gradational between regions of different quality of bedrock; in such regions, the lines of demarcation are somewhat subjective. Areas of outcrop or felsenmeer more closely spaced than 15 m were grouped on the map. Data of Code 3 or 4 were plotted only in regions where data of Codes 1 and 2 were absent or sparse. Areas of bedrock seen only from a distance or located from air photographs are indicated by a letter '**A**' on the geology maps. Geological data taken from previous studies are indicated by the letter '**G**' (Godwin, 1976) in the Casino area, by the letter '**C**' (Archer-Cathro, 1975) in the Big Creek area, and by the letter '**H**' (Hayes Creek Resources, 1985) in the Sonora Gulch area.

1.4 Physiography

Bostock (1938) classified the area as the Dawson Range subdivision of the Klondike Plateau (the Yukon Plateau of Tempelman-Kluit, 1973). The topography is dominated by a plateau remnant of an uplifted Late Tertiary erosion surface, which is dissected by youthful river valleys. This plateau now stands at elevations of 1200 to 1400 m. Above the plateau, rounded ridges rise to peaks at elevations between 1600 and 1950 m. The youthful valleys merge into the wide, flat-bottomed glacial valleys which contain the principal rivers draining the area. These include the Klotassin River and its major tributaries, Colorado Creek and Dip Creek, draining to the west; the Selwyn River and its main tributary, Hayes Creek, draining to the north; and Big Creek, draining to the east.

The map area is in an 'unglaciated' region equidistant from the McConnell Advance of both the St. Elias and Cordilleran Ice Sheets. Although the area escaped continental glaciation, the activity of valley glaciers is testified by major 'U-shaped' valleys containing incised kame terraces and small terminal and lateral moraines, in part with kettled surfaces. At lower elevations, medium-textured glacial till is overlain by coarser textured, glacio-fluvial material.

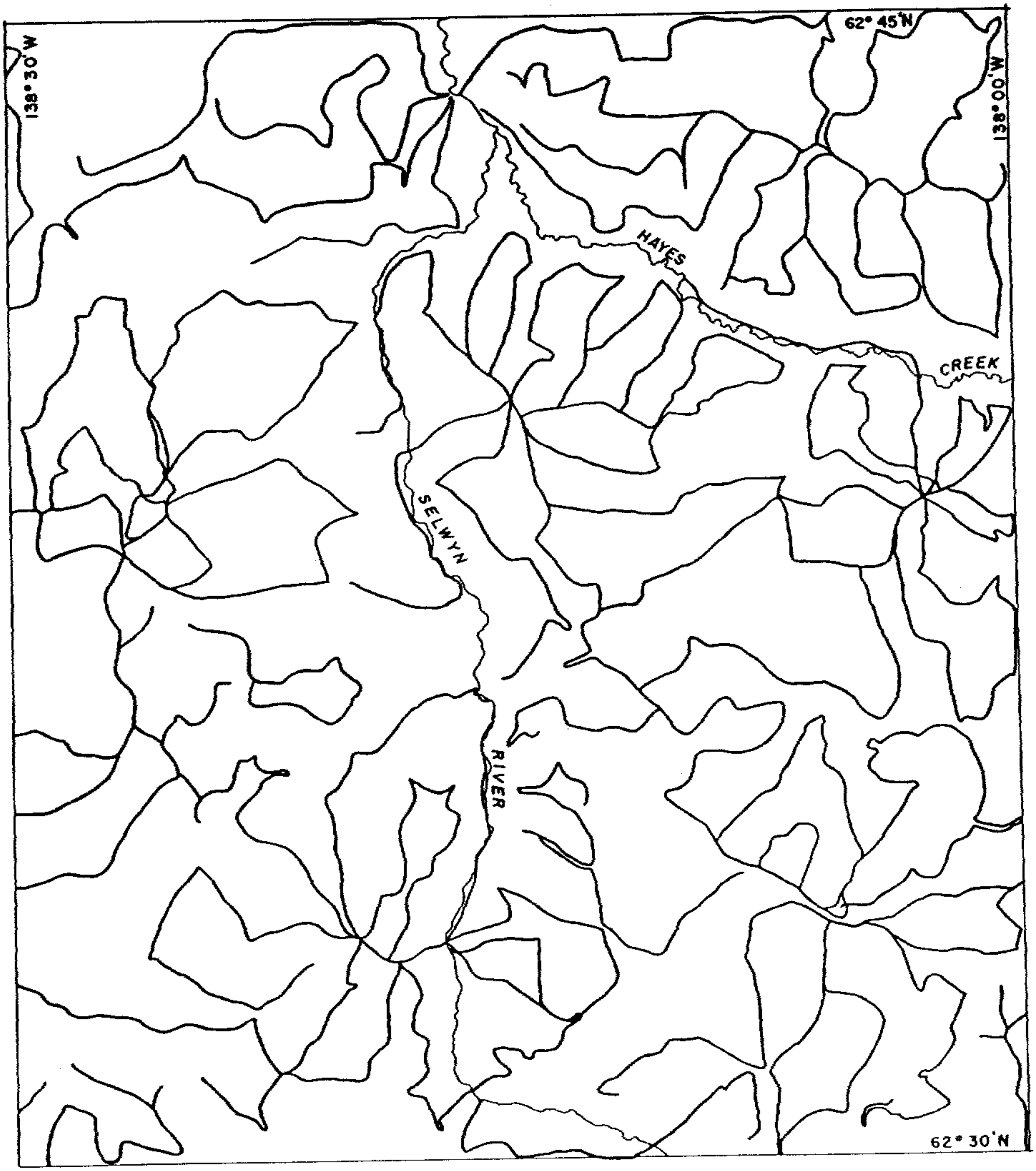
Dry, south-facing slopes are characterized by open, willow or poplar groves which, with increasing wetness, blend into groves of white and black spruce. These grade upwards at elevations of about 1200 to 1300 m to buckbrush and then to barren alpine meadows and boulder fields. North-facing slopes are underlain by permafrost, and are covered by thick peat and moss growths spotted with scrub black spruce. Most gentle slopes at moderate elevations and alluvial valleys are dominated by hummocky sedge tussock fields.



Legend

— Traverse lines

Figure 1.2a Traverse Location Map - Colorado Creek (115J/10)



Legend

Traverse lines

Figure 1.2b Traverse Location Map - Selwyn River (115J/9)

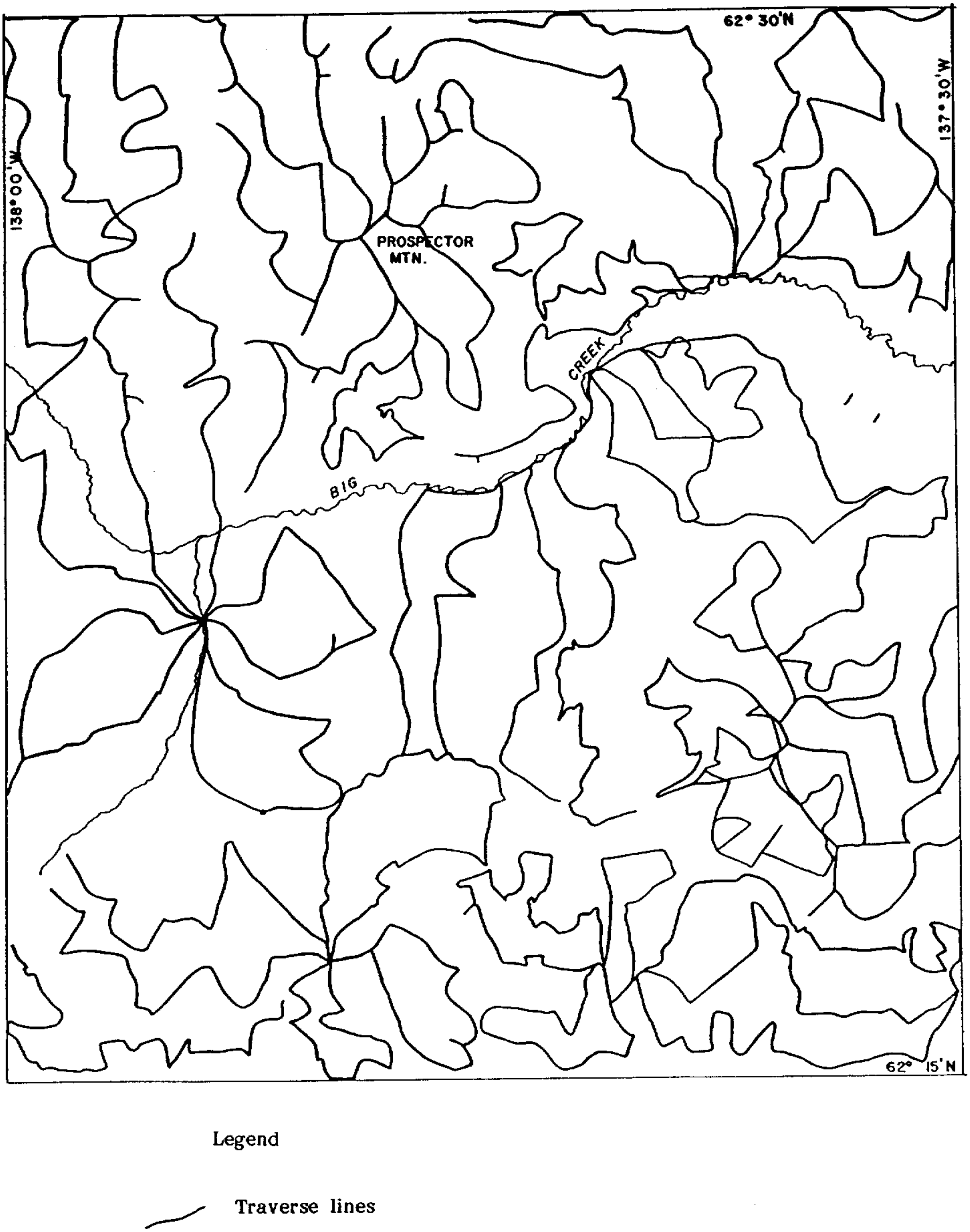


Figure 1.2c Traverse Location Map - Prospector Mountain (115I/5)

With the exception of the canyon portions of the Selwyn River Valley, and shorter, similar stretches along Big Creek and Hayes Creek, most outcrops are confined to ridge tops and the upper portions of higher mountains. Castles (tors) are prominent in well-jointed units (mainly plutonic) along ridge crests and to a much lesser extent along the flanks of ridges. At higher elevations, mostly above treeline, felsenmeer is common. This grades downslope into patches of sparser rubble, talus, and solifluxion lobes. North-facing slopes below an elevation of 1400 m and broad valleys are almost entirely devoid of any indication of bedrock.

1.5 Previous Work

Cairnes (1917) studied part of the Dawson Range near the Klotassin River. Bostock published a map of the Carmacks sheet (115-I) in 1936 and of the Selwyn River area in 1944. In 1957, he summarized earlier field reports of the Geological Survey of Canada, some of which pertain to the project area. Tempelman-Kluit mapped the Snag sheet (115-J) in 1974 and the Carmacks sheet in 1984 as parts of regional projects. He also included the project area in other regional studies (1976, 1977, and 1979). Godwin (1976) mapped the Casino deposit and surrounding area. Assessment reports, mainly by Archer-Cathro & Associates (1981) Ltd. and Kerr Addison Mines Ltd., contain maps and reports of areas around Casino, Mount Cockfield, Prospector Mountain, and the lower stretch of Big Creek.

1.6 Acknowledgements

The authors thank Lance Fraser, who acted as camp attendant, co-ordinated camp moves and construction, prepared meals, and stained rock samples. The progress of the study was enhanced by the co-operation of Archer, Cathro & Associates (1981) Ltd., especially A.R. Archer and Rob Carne who provided logistical support, hospitality during our stay in their Casino camp, and shared information on the geology and mineralization in the area. Archean Engineering Limited provided logistical support and library facilities. Mrs. Victoria M. Troup, of Archean Engineering, edited an earlier version of the manuscript.

The authors appreciate the helpful comments regarding the geological interpretation and manuscript preparation offered by Dirk Tempelman-Kluit, Gerald Carlson, and Jim Morin. However, the authors accept full responsibility for all data and interpretations.

This project was funded under the Minerals Sub-Agreement of the Canada-Yukon Economic Development Agreement, Contract YEDA-01/85. The help of their representative, Jim Morin, is gratefully acknowledged.

2.0 GEOLOGY

2.1 Tectonic Setting

The map area is along the border between the Yukon Crystalline Terrane and the Yukon Cataclastic Terrane (Tempelman-Kluit, 1977) (Figure 2.1). To the north, metamorphic rocks of the Yukon Metamorphic Complex are dominated by quartzofeldspathic gneisses and schists, including the previously defined Pelly Gneiss and Klondike Schist. To the south, the metamorphic basement is dominated by quartzite (previously described as the Nasina Quartzite) and quartz-mica schist. In the project area, these two terranes overlap. The only part of the project area containing rock types and deformation styles typical of the Yukon Cataclastic Terrane is in the Selwyn map area north of Hayes Creek. This suggests that the contact of the two terranes may be along the western projection of the Hoochekoo Fault.

In the Laberge map area to the southeast, Tempelman-Kluit (1979) suggested that the Yukon Cataclastic Terrane might represent allochthonous material structurally imbricated before or during juxtaposition of the Intermontane and Omineca structural belts in the Teslin Suture Zone (Figure 2.2). The allochthonous material consists of three main lithologic units which show a consistent structural relationship. At the base is a siliceous cataclasite (Nisutlin Allochthon), which represents synorogenic clastic sediments. In the middle is a mafic to ultramafic ophiolite assemblage (Anvil Allochthon). At the structural top is a granitic cataclasite (Simpson Allochthon), which might be the plutonic root of a dismembered island arc. These units and this sequence are similar to those in the Selwyn River sheet north of Hayes Creek (Unit 1, Subunit 2e, and Subunit 2f, respectively).

2.2 General Geology

In this project, 17 units and 67 subunits were defined (Table 2.1). These range in age from Precambrian to Quaternary in age and include a wide variety of igneous and metamorphic rocks and a few minor sedimentary rocks.

The oldest units contain metamorphosed sedimentary rocks, predominantly felsic volcanic rocks, and, locally, plutonic rocks and amphibolite of the Yukon Metamorphic Complex. In this study, the metamorphic terrain was divided into two main units, roughly equivalent to the two main units defined by Templeman-Kluit (1974). Unit 1 is a metasedimentary

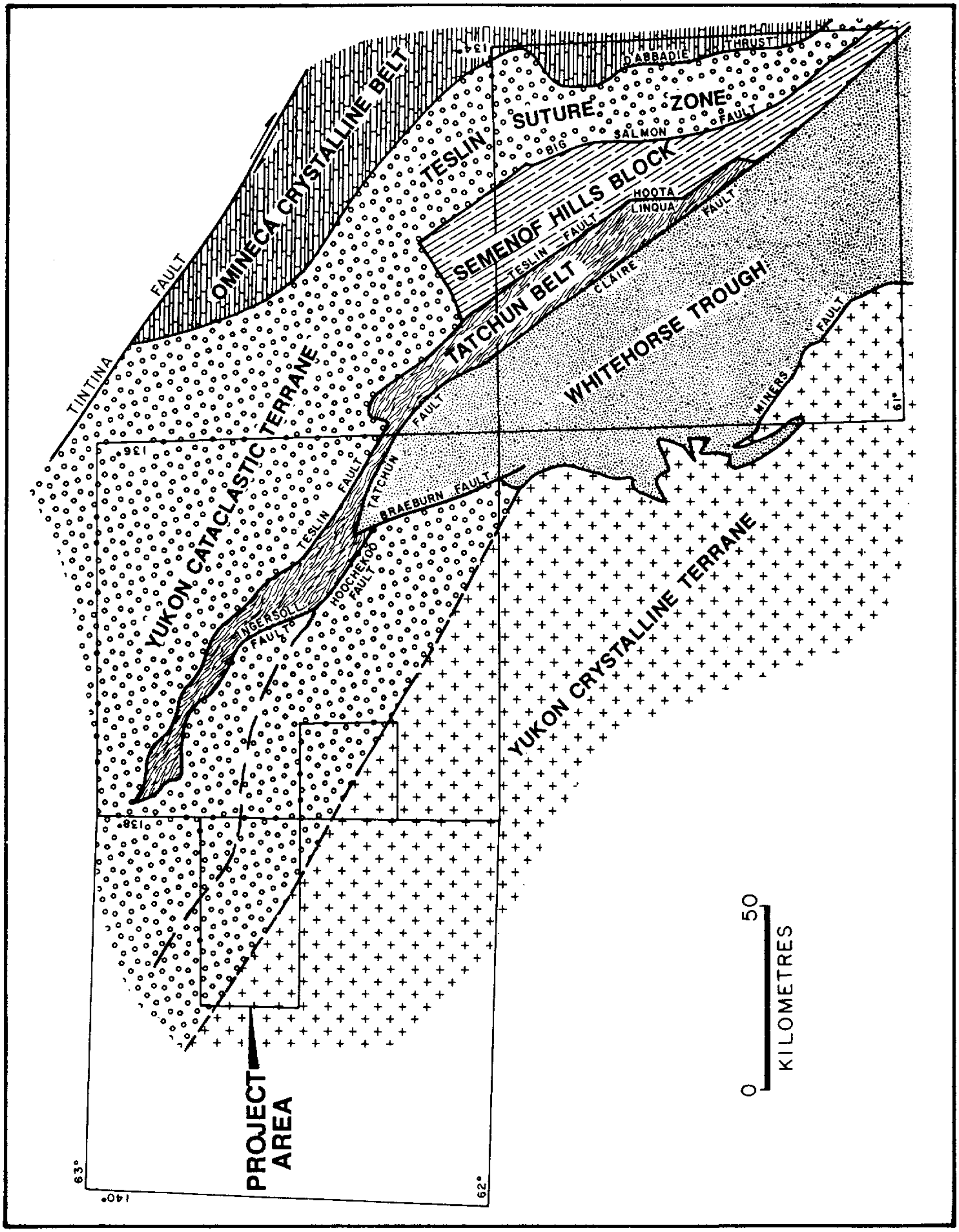


Figure 2.1 Tectonic Setting (MODIFIED FROM TEMPELMAN - KLUIT, 1984)

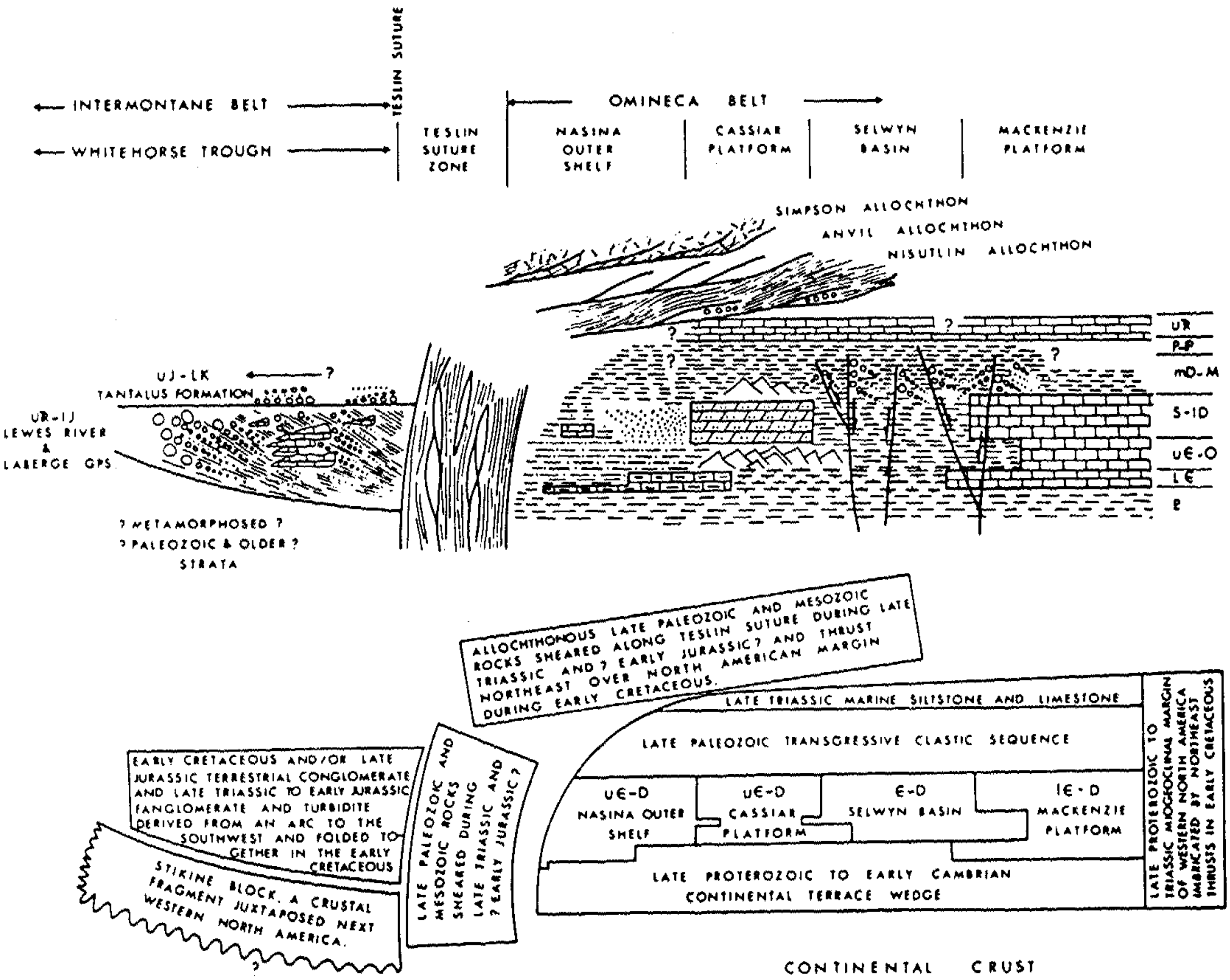


Figure 2.2 Development of Yukon Cataclastic Terrane (after Tempelman-Kluit, 1979)

sequence dominated by quartzite and quartz-mica schist. Unit 2 is dominated by quartzofeldspathic schists and gneisses, mainly of volcanic and volcano-sedimentary origin, with minor intercalated beds and thin sequences of limestone, amphibolite, and rocks of Unit 1. The parentage is less certain for some of the higher-grade metamorphic rocks of Unit 2 north of Hayes Creek; in this region, one major subunit is of plutonic origin.

Age relations between the two units are uncertain. In places Unit 1 appears to be older, and in others they are interfingered, suggesting a lateral facies change. The degree of metamorphism of the rocks varies from greenschist to lower amphibolite, the higher grade metamorphism being mainly north of Hayes Creek and along contacts of younger plutonic bodies.

The rocks of the Yukon Metamorphic Complex are complexly deformed. Because of this and the paucity of outcrop in many areas, a comprehensive structural analysis is impossible. Features of an early penetrative deformation (D_1) were warped during a second, milder deformation event (D_2); during which, more local intense deformation and metamorphism occurred near contacts of younger intrusive rocks. D_1 is most likely a Late Triassic to Early Jurassic event, although some of the deformation may be as old as Upper Paleozoic. D_2 is probably a Cretaceous event, related to the intrusion of the Dawson Range Batholith.

In the eastern part of the region, the basement rocks were intruded by intermediate to felsic plutonic rocks, upon which was superimposed a penetrative metamorphic fabric of variable intensity. The intrusions include rocks of the Triassic(?) **Klotassin Suite (Unit 3)** and of the Jurassic(?) **Big Creek Suite (Unit 4)**. Age relations among some of these rocks are difficult to determine because of scattered and partly conflicting radiometric dates and paucity of crosscutting relations. Only locally do these units form outcrops; instead, broad ridges underlain by them are coated with coarse felsenmeer. Along contacts between some units are diffuse zones of mixed felsenmeer, including moderately abundant remnants of amphibolite and gneiss from the Yukon Metamorphic Complex, and hybridized plutonic rocks showing a variety of textures and compositions, some of which are unlike those of the main plutonic units. Units 3 and 4 were deformed and partly recrystallized during the later stages of D_1, and probably are synorogenic with respect to that event.

A major plutonic event produced the Cretaceous **Dawson Range Batholith (Unit 5)**, dated at 110-99 Ma (Godwin, 1976 and Tempelman-Kluit, 1969), and smaller, late-stage **Casino Intrusions (Unit 6)**, dated at about 100 Ma (Godwin, 1976). The batholith is dominantly a massive, medium- to coarse-grained intrusion, in which three main lithological subunits were distinguished on the basis of the type and abundance of mafic minerals. In much of the batholith, the subunits form mappable bodies. Elsewhere, especially in areas of poor exposure, and where the subunits are more intimately intermixed or gradational in nature, the demarcation of contacts is more subjective and their position less significant. In places, mappable zones contain moderately abundant, subrounded, metasomatized mafic inclusions.

The Casino intrusions are stocks and plutons up to 4 km across of biotitic to leucocratic quartz monzonite. They are hosts for Cu-Mo porphyry deposits and associated alteration assemblages at the Casino and Pattison (Patt) properties. At Casino, the mineralization is centered around a subvertical breccia pipe, whose age may be as young as 70.3 Ma (Godwin, 1976).

Shortly following the emplacement of these plutonic rocks, and following a period of rapid uplift and erosion to expose them, felsic and intermediate volcanic rocks of the **Mount Nansen Suite (Unit 7)** were extruded at several localities. Scattered subvolcanic plugs and domes represent late stages of this activity. Southeast of the project area, where Mount Nansen volcanic rocks are most abundant, they have been dated between 109 and 100 Ma (Tempelman-Kluit, 1969; K/Ar whole rock) This is very close to the radiometric dates from the Dawson Range Batholith. Ages are uncertain for some of the felsic volcanic stocks and dykes well away from the main volcanic centers near Mount Nansen (e.g., at Mount Cockfield). Many of the lode gold deposits in the region are associated with the Mount Nansen volcanic rocks and near-surface intrusions.

East of the project area, Mount Nansen flows are intruded by a miarolitic granite, the **Bow Creek Granite (Unit 8).**

Dyke swarms and isolated dykes of the **Mount Nansen Suite (Unit 9)** consist of three main types, distinguished on the basis of type and abundance of phenocrysts, and overall composition. The dykes may be of more than one age. Leucocratic dykes, possibly younger than the other types, cut the Bow Creek Granite. No contact relations were seen between the Bow Creek Granite and the other types of Mount Nansen dykes. All types of Mount Nansen dykes and dyke swarms cut rocks of the Dawson Range Suite. Just north of Mount Cockfield, the Mount Nansen volcanic rocks are intruded by the **Mount Cockfield Stock**, a biotite quartz-bearing monzonite of similar composition and texture to some of the Mount Nansen dykes. The stock hosts a small Mo-Cu porphyry deposit.

ERA OR PERIOD	UNIT NAME	MAP SYMBOL	LITHOLOGY
Pleistocene to Recent	SURFICIAL DEPOSITS:	17	Alluvium, undifferentiated.
	LANDSLIDE DEPOSIT:	17a	Landslide deposits.
	GLACIAL DEPOSIT:	17g	Unconsolidated glacial, glaciofluvial, or glaciolacustrine deposits.
	UNCONFORMITY		
Late Cretaceous to Early Tertiary	PROSPECTOR MOUNTAIN SUITE		
	QUARTZ-BEARING MONZONITE:	16a	Quartz-bearing monzonite.
	FINE GRAINED VARIETY:	16af	Fine grained quartz-bearing monzonite.
	QUARTZ MONZONITE:	16b	Quartz monzonite.
	QUARTZ-BEARING LATITE LATITE DYKES:	16c	Latite, quartz-bearing latite dykes; phenocrysts of plagioclase, K-feldspar, and biotite.
	INTRUSIVE CONTACT		
	CARMACKS SUITE		
	LATE DYKES, INTRUSIONS:	15	Genetically related to the Carmacks flows.
	ANDESITE TO BASALT DYKES:	15a	Aphanitic andesite and basalt dykes varying in width from less than a metre to a few tens of metres in thickness.
	VERY FINE ANDESITE TO LATITE DYKES:	15b	Very-fine to fine-grained andesite to latite to quartz-bearing monzodiorite dykes.
	GABBRO TO MONZOGABBRO:	15c	Potassic gabbro to monzogabbro dykes.
	DIABASE:	15d	Diabase dykes, sills.
	INTRUSIVE CONTACT		
	UPPER VOLCANIC SECTION:	14	Dominated by basaltic flows.
	ANDESITE FLOW:	14a	Small lenticular flows of porphyritic andesite.
	BASALT FLOW:	14b	Massive basaltic lava flows several metres to a few tens of metres in thickness; olivine and clinopyroxene phenocrysts.
	UPPER, VESICULAR PART OF 14b	14bv	Highly vesicular, basaltic flow top, plagioclase and clinopyroxene phenocrysts.
	BRECCIA, DEBRIS FLOW WITH FRAGMENTS OF BASEMENT ROCK:	14x	Coarse basaltic debris flow with fragments of basement rocks.
	LOWER VOLCANIC SECTION:	13	Dominated by andesite pyroclastic, flow, and minor sedimentary rocks.
	ANDESITE FLOWS:	13a	Andesitic flows.
	ANDESITIC, TUFFACEOUS SEDIMENTS AND SHALE:	13as	Andesitic, tuffaceous sediments interlayered with shales.
	ANDESITIC TUFF:	13at	Andesitic tuffaceous rocks.
	ANDESITE FLOW BRECCIA:	13ax	Coarse debris flows, containing rounded to angular fragments of andesite flow rocks and rounded fragments of basement rocks.
	BASALT, BASALTIC ANDESITIC FLOW:	13b	Basalt to basaltic andesite flows.
	BRECCIA, DEBRIS FLOW WITH FRAGMENTS OF BASEMENT ROCK:	13x	Basalt to basaltic andesite flow-breccia, breccia, containing fragments of Carmacks volcanic rocks and basement rocks.
	BASAL VOLCANIC SECTION:	12	
	RHYODACITE TUFF:	12	Thin sequence of rhyodacite tuff thickening to the southeast.
	UNCONFORMITY		

Table 2.1 Table of Formations

ERA OR PERIOD	UNIT NAME	MAP SYMBOL	LITHOLOGY
Late Cretaceous	COLORADO CREEK BRECCIA		
	LANDSLIDE, TALUS BRECCIA:	11	Landslide or talus breccia containing fragments, up to one metre across, of rocks of the Yukon Metamorphic Complex and Mount Nansen Suite.
	CARIBOU CREEK CONGLOMERATE		
	CONGLOMERATE, SANDSTONE:	10	Poorly sorted conglomerate, up to 130 m thick, containing boulders, cobbles, and pebbles of metamorphic basement rocks and plutonic rocks from Units 5 and 9.
	UNCONFORMITY		
Early Cretaceous	MOUNT NANSEN SUITE		
	LATE DYKES, INTRUSIONS:	9	
	LATITE; PLAGIOCLASE, HORNBLENDE PHENOCRYSTS:	9a	Latite dykes with abundant plagioclase and hornblende phenocrysts in very fine- to fine-grained felsic groundmass.
	QUARTZ-BEARING LATITE OR DACITE: PLAGIOCLASE, QUARTZ, HORNBLENDE, AND BIOTITE PHENOCRYSTS:	9b	Similar to 9a but with plagioclase, hornblende, quartz, and biotite phenocrysts in a pink to cream-coloured groundmass.
	LEUCOCRATIC RHYODACITE, OR QUARTZ-BEARING LATITE WITH PLAGIOCLASE, QUARTZ, AND K-FELDSPAR PHENOCRYSTS:	9c	Quartz and feldspar phenocrysts in a leucocratic groundmass.
	QUARTZ-BEARING MONZONITE (MOUNT COCKFIELD STOCK AND ASSOCIATED DYKES):	9d	Moderately porphyritic granodiorite; plagioclase and biotite phenocrysts.
	INTRUSIVE CONTACT		
	BOW CREEK GRANITE	8	(only east of project area)
	INTRUSIVE CONTACT		
	VOLCANIC ROCKS:	7	
	LATITE, ANDESITE FLOW:	7a	Massive, porphyritic latite to andesite flows.
	TUFF	7at	Latite to andesite tuffs.
	FLOW BRECCIA:	7ax	Latite to andesite flow-breccias and breccias.
	LATITE, RHYODACITE FLOW:	7b	Felsic latite to rhyodacite flows.
	TUFF:	7bt	Felsic latite to rhyodacite tuffs.
	LATITE, RHYODACITE DOME, PLUG:	7c	Felsic domes or subvolcanic intrusions.
	ANDESITE FLOW (MOUNT COCKFIELD)	7d	Andesite lava flows.
	TUFF:	7dt	Andesite tuffs.
	FELSIC TUFF INTERLAYERED WITH 7dt AND 7d:	7dft	Thin sequence of siliceous, felsic tuffs and fine breccias.
	UNCONFORMITY, FAULTED CONTACT		

Table 2.1 Table of Formations (continued)

ERA OR PERIOD	UNIT NAME	MAP SYMBOL	LITHOLOGY
Early Cretaceous	DAWSON RANGE SUITE		
	CASINO INTRUSIONS:	6	
	FINE GRAINED QUARTZ-MONZONITE:	6a	Fine grained quartz monzonite.
	MEDIUM GRAINED, LEUCOCRATIC QUARTZ MONZONITE:	6b	Coarser grained than 6a with 10-15% quartz and K-feldspar.
	PORPHYRITIC, LEUCOCRATIC QUARTZ MONZONITE (CASINO AREA):	6c	Very fine- to fine-grained, leucocratic quartz monzonite with 10-15% quartz phenocrysts.
	APLITIC QUARTZ MONZONITE:	6d	Forms as small patches or dykes of aplitic quartz monzonite.
	BRECCIA PIPE (CASINO):	6x	Breccia pipe a few tens of metres across.
	COARSE BRECCIA:	6xc	Coarse breccia phase of 6x.
	FINE BRECCIA:	6xf	Fine breccia phase of 6x.
	INTRUSIVE CONTACT		
	DAWSON RANGE BATHOLITH:	5	
	HORNBLENDE > BIOTITE POTASSIC QUARTZ DIORITE:	5a	Potassic quartz diorite dominated by hornblende.
	BIOTITE-HORNBLENDE GRANODIORITE:	5b	Granodiorite to potassic quartz diorite with biotite greater than hornblende.
	BIOTITE RICH, LEUCOCRATIC, QUARTZ MONZONITE OR GRANODIORITE:	5c	Biotite > hornblende, leucocratic granodiorite to quartz monzonite.
	HORNBLENDE- BIOTITE DIORITE:	5d	Fine- to medium-grained quartz diorite.
INTRUSIVE CONTACT			
Jurassic	BIG CREEK SUITE		
	HORNBLENDE MONZONITE OR QUARTZ-BEARING MONZONITE WITH K-FELDSPAR PHENOCRYSTS; WITH K-FELDSPAR PHENOCRYSTS:	4a	Dominated by medium- to very coarse-grained, massive to moderately foliated, hornblende monzonite to quartz-bearing monzonite.
	HORNBLENDE MONZONITE TO DIORITE:	4b	Finer grained, non-porphyritic granodiorite.
	HORNBLENDITE:	4c	Segregations of hornblende diorite parallel to foliation in rocks of Subunit 4a.
INTRUSIVE CONTACT			
Triassic	KLOTASSIN SUITE		
	HORNBLENDE-BIOTITE GRANODIORITE TO DIORITE:	3a	Medium- to coarse-grained, slightly to strongly foliated, hornblende to hornblende-biotite granodiorite.
	LEUCOCRATIC GRANODIORITE:	3b	Leucocratic, slightly foliated, granodiorite to quartz diorite.
	STRONG CATACLASTIC DEFORMATION:	3bd	Cataclastically deformed, foliated leucocratic granodiorite.
INTRUSIVE CONTACT			

Table 2.1 Table of Formations (continued)

ERA OR PERIOD	UNIT NAME	MAP SYMBOL	LITHOLOGY
Proterozoic to Paleozoic	YUKON METAMORPHIC COMPLEX		
	QUARTZO-FELDSPATHIC GNEISS/SCHIST UNIT:		
	META-LATITE TO META-DACITE FLOW OR WELDED' TUFF:	2a	Blocky weathering, cataclastically (?) deformed meta-latite to meta-dacite flow or tuff, commonly with K-feldspar porphyroblasts.
	META-LATITE TO META-DACITE FLOWS AND TUFFS:	2b	Finer textured, foliated meta-latite to meta-dacite flows or tuffs.
	LATITIC, DACITIC, AND ANDESITIC METASEDIMENTARY AND META-TUFFACEOUS ROCKS:	2c	Well-banded, meta-latite to meta-dacite tuff, tuffaceous sedimentary rocks; minor to abundant interlayered limestone, andesitic tuff, and amphibolites.
	META-ANDESITE FLOWS AND TUFFS:	2d	Meta-andesite flows and tuffs.
	AMPHIBOLITE:	2e	Amphibolite and banded rocks containing abundant amphibolite interlayered with more felsic gneiss.
	ORTHOGNEISS; BIOTITE-HORNBLENDE QUARTZ DIORITE TO QUARTZ MONZONITE:	2f	Uniform quartzofeldspathic gneiss with 10-15% metasediments.
	RECRYSTALLIZED LIMESTONE:	2L	Lenses of limestone interlayered mainly in subunits 2b and 2c.
	GNEISS:	2g	Gneiss, derived from unit 2, parentage uncertain.
	MIGMATITE:	2m	Mixture of 2g and plutonic rocks.
	SKARN, CALCSILICATE ROCK:	2s	Skarn and calcsilicates along contacts with younger plutonic rocks (with minor to abundant magnetite) derived from rocks of Unit 2.
	AGE RELATION UNCERTAIN		
	METASEDIMENTARY UNIT:		
	QUARTZITE, MICACEOUS QUARTZITE:	1a	Dominated by quartzite and micaceous quartzite.
	QUARTZ-MICA SCHIST, AFTER IMPURE QUARTZITE AND SILTSTONE:	1b	Quartz-mica schist.
	META-GREYWACKE:	1c	Meta-greywacke.
	ARGILLITE, SLATE:	1d	Argillite to slate.
	METAMORPHOSED PEBBLE CONGLOMERATE:	1e	Fine-pebble conglomerate.
	META-ANDESITE, TUFF, AND TUFFACEOUS SEDIMENTS:	1f	Meta-andesite flow, tuff, and tuffaceous sediments.
	RECRYSTALLIZED LIMESTONE:	1L	Lenses and pods of recrystallized limestone.
	GNEISS:	1g	Highly metamorphosed rocks of Unit 1, along the borders of younger plutonic rocks.
	MIGMATITE:	1m	Occurs along the contacts with younger plutonic rocks gradational from subunit 1g.
	SKARN, CALCSILICATE ROCK:	1s	Skarn and calcsilicate rocks derived from Unit 1 along borders of younger plutonic rocks, locally abundant magnetite.

Table 2.1 Table of Formations (continued)

After cessation of the Mount Nansen volcanism, during a period of uplift and erosion, the **Caribou Creek Conglomerate (Unit 10)** was deposited. It occurs mainly to the east of the project area, and forms one outcrop zone in the southeast corner of the Colorado Creek map area.

Some time after emplacement of the Mount Nansen dykes, a landslide or talus breccia, the **Colorado Creek Breccia (Unit 11)**, was formed in the southeast corner of the Colorado Creek map area. The breccia consists of angular fragments of Unit 1, and widely scattered fragments of Units 2 and 9 in a sparse matrix of comminuted rock fragments, mainly of Unit 1, cemented in part by hematite. It may have formed during tectonic movement accompanying or preceding eruption of the Carmacks volcanic rocks.

In Late Cretaceous to Early Tertiary time, volcanic rocks of the **Carmacks Suite** were extruded. These include a discontinuous basal rhyodacite (Unit 12), a lower sequence dominated by andesitic pyroclastic, flow, and minor sedimentary rocks (Unit 13), radiometrically dated at about 70 Ma (Grond et. al., 1984; whole rocks and biotite, Rb/Sr), and an upper sequence dominated by basaltic lava flows (Unit 14). Rocks in all units of the Carmacks Suite are characterized by unusually high content of K_2O, suggesting contamination of the mafic magmas by crustal rocks rich in K_2O. Locally at the bases of Units 13 and 14 are debris flows containing fragments of Carmacks volcanic rocks and of basement rocks. Exotic fragments in the debris flows come from unconsolidated sediments (as in those which consolidated to form Unit 10), and were picked up during extrusion of the lowermost Carmacks flow.

A few types of small intrusions, mainly dykes, are associated with or younger than the Carmacks Suite. Some cut Carmacks volcanic rocks, and others are linked with the Carmacks Suite on the basis of similarities in composition and texture. Grouped as Unit 15, these include aphanitic andesite and basalt feeder dykes, andesite to latite dykes, potassic gabbro to monzogabbro dykes and plugs, and diabase plugs and sills.

Intrusive into Unit 13 at Prospector and Apex Mountains are felsic rocks of the **Prospector Mountain Suite (Unit 16)**. Underlying the core of the mountains is a medium- to coarse-grained, partly porphyritic quartz-bearing monzonite, dated radiometrically at 68.2 Ma (Tempelman-Kluit, 1969; biotite, K/Ar). Southwest of Prospector Mountain is a small outcrop zone of leucocratic quartz monzonite containing abundant quartz veins. Associated with rocks of the Prospector Mountain Suite are vein deposits, in which metallic minerals are dominated by specular hematite, with scattered concentrations of pyrite and lead-zinc-silver sulphides. Veins occupy small faults in the overlying andesite of Unit 13 and locally in quartz-bearing monzonite of Unit 16. Previous workers considered the quartz monzonite of Unit 16 to be part of Unit 5, and thus unrelated to the vein deposits. Because of the abundance of quartz veins and alteration in the quartz monzonite and in the overlying andesite of the Carmacks Suite, the quartz monzonite is considered to be associated genetically with the solutions from which the veins were deposited. A few late dykes of latite to rhyodacite composition cut Carmacks volcanic and older rocks; these dykes may be related genetically to the Prospector Mountain intrusions.

The project area is cut by a few major faults, the nature and extent of displacement along which is uncertain. The **Big Creek Fault** extends along the broad, lower stretch of Big Creek and continues northwest along Valerie Creek and a branch of Hayes Creek. It merges with one strand of the **Hoochekoo Fault** along Hayes Creek and these faults extend to the northwest beyond the edge of the project area. They separate more highly metamorphosed rocks of the Yukon Cataclastic Terrane to the north from less highly metamorphosed rocks of the Yukon Crystalline Terrane and rocks of the Dawson Range Batholith to the south. Tempelman-Kluit (pers. comm.) suggested that the Big Creek Fault was normal and dipping to the south. The **Dip Creek Fault**, a major linear feature along Dip and Isaac Creeks, probably has minor displacement. At Mount Cockfield, the volcanic and plutonic rocks of the Mount Nansen Suite occupy a narrow but deep, northwest-trending graben, the **Mount Cockfield Graben.**

Surficial deposits (Unit 17) were formed in major valleys by Pleistocene valley glaciation and recent erosion and stream action.

2.3 Detailed Geology

Detailed geology is shown on Maps 2.1, 2.2, and 2.3 (in pocket).

2.3.1 Yukon Metamorphic Complex

Unit 1 is a metasedimentary sequence dominated by quartzite and micaceous quartzite (1a), and quartz-mica schist (1b). Minor subunits include meta-greywacke (1c), argillite to slate (1d), pebble conglomerate (1e), meta-andesite (1f), and limestone (1L). In contact metamorphic zones are pods of skarn and calc-silicate (1s), gneiss (1g), and migmatite (1m). Rocks of Unit 1 underlie much of Stevenson Ridge, and form smaller patches throughout the rest of the project area, commonly associated with rocks of Unit 2. Deformed quartz veinlets and knots are common, especially in Subunit 1a; these may have formed during metamorphism by mobilization and recrystallization of quartz from the rock.

Subunit 1a is a fine- to very fine-grained, generally well-banded orthoquartzite, which grades into quartzite with minor to moderately abundant micaceous partings. Colour ranges from white to cream to light grey. As the density of partings increases, the colour generally becomes darker grey and the grain size of quartz decreases. Some very fine grained quartzite is black from disseminated carbonaceous material and opaque oxides. Locally, it grades into slate of subunit 1d.

In thin section, the quartzite shows a prominent foliation, defined by layers of different grain size of quartz; by parallel orientation of quartz grains, especially in finer grained layers; and by seams containing concentrations of micas (muscovite, biotite, and extremely fine grained patches of sericite), opaque oxide, carbonaceous opaque, and hematite. The seams also contain local concentrations of apatite, zircon, and tourmaline. Opaque is much more common in layers of finer grained than coarser grained quartz. Incipient granulation and strain textures in layers of coarser grained quartz suggest mild cataclastic deformation (Figure 2.3). Some layers of fine-grained quartz probably were formed by cataclastic recrystallization of coarser grained layers.

Subunit 1b is a very fine- to medium-grained schist, consisting of quartz (50-80%), mica (muscovite and (or) biotite) (20-50%), feldspar (1-5%), and opaque (0-5%). It is recessive relative to Subunit 1a. In places, especially on Stevenson Ridge, Subunits 1a and 1b form separate, mappable, stratigraphic intervals, but in other parts of the region, they are interlayered on a scale too fine to be shown on the map. Such interlayered zones are designated 1a,b or 1b,a,; in each case the dominant subunit is listed first. In some other regions, rocks are gradational between the two end-members and contacts were chosen arbitrarily. Outcrop patterns suggest moderate to rapid facies changes between the two subunits.

Textures of rocks in Subunit 1b depend on location relative to deformation structures. On fold limbs, most rocks are very fine- to extremely fine-grained and strongly foliated (Figure 2.4). Phyllosilicates are concentrated in ragged lenses parallel to foliation; muscovite is the dominant mineral; however, biotite and chlorite are also present. Plagioclase forms scattered, very fine grains intergrown with micas. Rocks usually contain

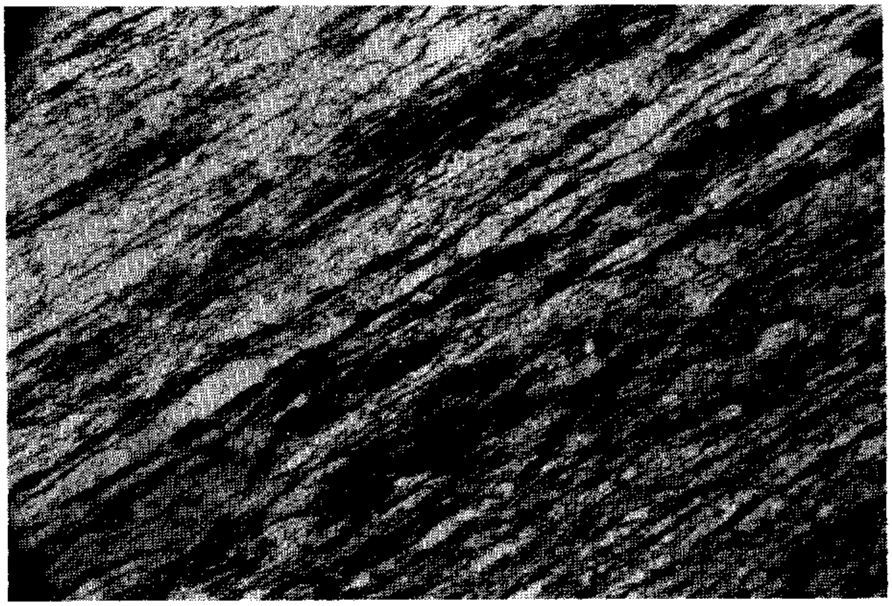


Figure 2.3. Photomicrograph of Subunit 1a (quartzite): recrystallized quartzite, showing partial granulation of coarser grains. Station S 67; crossed nicols, length of photograph, 3.0 mm.

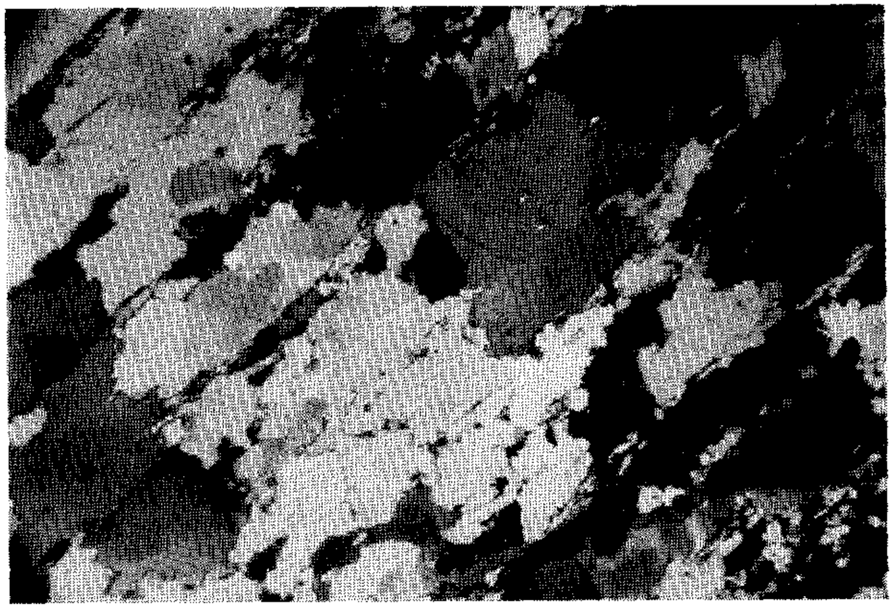


Figure 2.4. Photomicrograph of Subunit 1b (quartz-mica schist): schist containing quartz lenses and micaceous seams along a fold limb. Station W 48; plane light, length of photograph, 3.0 mm.

scattered, deformed coarser grained quartz lenses and knots. The texture suggests cataclastic deformation and recrystallization of a coarser grained rock. In fold noses, the rock is very fine- to fine-grained, and micas are concentrated in seams parallel to foliation. The foliation is warped around microscopic folds (Figure 2.5), and only locally are micas recrystallized along axial planes of these folds. Plagioclase forms scattered fine to medium grains, commonly moderately altered to sericite. In some samples, patches of extremely fine grained sericite may represent altered plagioclase. Microcline forms scattered grains in one thin section. The feldspars may be detrital grains which were partly recrystallized. Tourmaline and apatite occur in trace amounts.

Subunit 1c is a very fine- to fine-grained, light- to medium-brownish grey, metagreywacke dominated by feldspars and quartz. Micas are less abundant. Because of the low content of platy minerals, foliation is weak. The subunit forms mappable bodies locally in the southern part of the Selwyn River map-area.

Subunit 1d forms minor interlayers with, and more abundant gradations to, Subunit 1a. It is an extremely fine- to very fine- grained, fissile, pale grey to black rock dominated by quartz and micas. The darkness of colour increases with increasing content of carbonaceous material and dusty opaque oxides.

Subunit 1e is a fine-pebble conglomerate, which occurs locally on the north flank of Stevenson Ridge near the Dip Creek Fault. The rock contains sheared pebbles, up to a few mm across, of coarser grained quartz and quartzite. The much finer grained, foliated groundmass is dominated by quartz and contains irregular seams of muscovite and light green biotite are also present. Pebbles and groundmass show a variety of recrystallized textures indicative of moderate cataclastic deformation (Figure 2.6).

Subunit 1f includes metamorphosed andesitic rocks, dominated by tuffs, and containing lesser flows and tuffaceous sediments. The subunit forms a thin, discontinuous sequence on the north flank of Stevenson Ridge. It is dominated by fissile, chlorite-rich schists (after tuffs), and lesser, more-massive, metamorphosed flows. The latter resemble some of the later, undeformed andesite dykes.

Subunit 1L consists of small lenses and pods of recrystallized limestone, which locally are interlayered with rocks of Unit 1. Limestone is much less abundant in Unit 1 than in Unit 2.

Figure 2.5. Photomicrograph of Subunit 1b (quartz-mica schist): foliated quartz and mica in the nose of a minor fold. Station J 100; plane light, length of photograph, 3.0 mm.

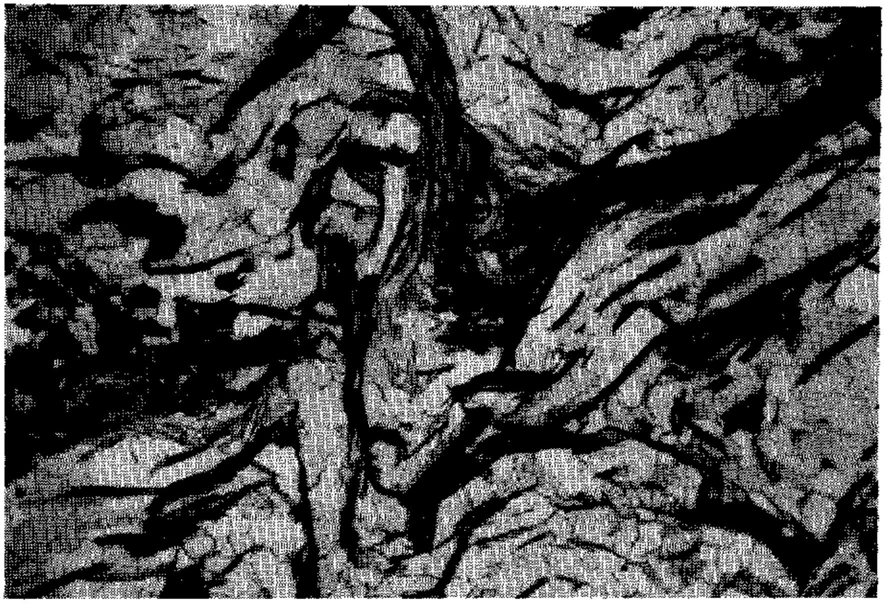


Figure 2.6. Photomicrograph of Subunit 1e (metamorphosed pebble-conglomerate): cataclastically deformed pebble of quartzite in quartz rich groundmass. Station J 18; plane light, length of photograph, 3.0 mm.

Subunit 1s includes skarn and calc-silicate rocks, derived from rocks of Unit 1, along borders of younger plutonic rocks. One zone occurs in the Cash Claim Group, south of Big Creek, along the contact of Unit 1 with Units 3 and 4. A lone outcrop consists of massive magnetite. Associated with it is a broad, positive, ground-magnetometer anomaly. Nearby trenches contain rubble of calc-silicate rocks derived from rocks of Unit 1, mixed with typical rocks of Unit 1. On the north bank of Big Creek, a second, prominent ground-magnetometer anomaly indicates another unexposed magnetite-bearing skarn. Near the magnetic highs are several stream geochemical, base metal anomalies, the source of which may be veins associated with a buried felsic intrusion.

Subunit 1g includes rocks of Unit 1 which were metamorphosed more highly than normal along the borders of younger plutonic rocks, in particular, the Dawson Range Batholith. Rocks are fine- to medium-grained, gneisses and schists containing metamorphic biotite and (or) actinolite. Quartz-rich and granitic segregations are common. The adjacent plutonic rocks are variable in composition and texture, suggesting moderate assimilation of country rock. Where the parentage is known, the subscript '**g**' is added on the maps to the parent rock symbol (e.g., 1bg).

Subunit 1m occurs along contacts with younger plutonic rocks and is gradational into Subunit 1g. It is a migmatite zone containing irregular, usually tightly folded bands, and patches of Subunit 1g, mixed in highly variable proportions with contact phases of the plutonic rocks as described under Subunit 1g. Dykes of plutonic material cut sharply to irregularly across the patches of gneiss.

Unit 2 shows a wide variation in composition and intensity of metamorphism. For much of the more highly metamorphosed parts of the unit, the parent is difficult or even impossible to determine. On outcrop ridges south of Mount Cockfield, three major subunits were distinguished as follows:

Subunit 2a:	blocky weathering, cataclastically(?) deformed latite to rhyodacite and dacite flow or tuff, commonly with K-feldspar porphyroblasts.
Subunit 2b:	finer textured than Subunit 2a, foliated meta-latite to meta-dacite flow or tuff; uniform composition within a given outcrop, but moderate variation among outcrops and among different parts of the project area. This subunit includes many felsic schists and

gneisses which do not show fine compositional banding; some of these may be of sedimentary or plutonic origin.

Subunit 2c: well-banded, metamorphosed latite to dacite tuff, tuffaceous sedimentary rocks, minor to abundant interlayered limestone, andesite tuff, amphibolite.

These subunits can be recognized throughout much of the project area. Other, generally less abundant subunits are as follows:

Subunit 2d: meta-andesite flow, tuff.

Subunit 2e: amphibolite (probably meta-basalt) and banded rock containing amphibolite interlayered with more felsic gneiss, in part gradational to Subunit 2c.

Subunit 2f: uniform quartzofeldspathic gneiss (previously designated Pelly Gneiss), 10-15% mafic minerals dominated by biotite. This subunit occurs only north of Hayes Creek on the Selwyn River map-sheet. It may be a meta-plutonic rock or a more highly metamorphosed equivalent of Subunit 2b.

Subunit 2L: limestone lenses and pods, and interlayers, mainly in Subunit 2c, but also locally in Subunit 2b.

Subunit 2a is a pale cream-coloured, quartzofeldspathic rock, which forms stratigraphic intervals up to 100 m thick, mainly south of Mount Cockfield. Outcrop is minor; rather, the surface is covered by very coarse, blocky felsenmeer. Characteristically, the rock contains scattered to moderately abundant, ragged augen of K-feldspar, up to 2 cm in length, set in a very fine- to fine-grained groundmass with a prominent foliation and cataclastic appearance (Figure 2.7). If it were not for the association with rocks of Subunits 2b and 2c, Subunit 2a might be interpreted as a meta-plutonic rock. However, the gradational contacts with Subunit 2b and the interlayering with Subunits 2b, and less commonly with 2c, are more compatible with the parent rock being a quartz-bearing latite to rhyodacite flow or the massive, welded portion of a tuff of similar composition.

K-feldspar commonly is more abundant than plagioclase, and occurs both as anhedral porphyroblasts and as intergrowths with plagioclase in the groundmass. Much of the K-feldspar is perthitic. Plagioclase forms very fine, anhedral, commonly corroded, grains in the groundmass, and locally forms coarser porphyroblasts up to 1 mm in size. Many of the latter are replaced slightly to moderately by patches of K-feldspar. Locally, myrmekite is present in plagioclase adjacent to K-feldspar porphyroblasts. Quartz (10-20%) is moderately concentrated in quartz-rich seams parallel to foliation. The grain size of quartz varies widely, the coarser grained aggregates generally showing moderately strained extinction and features typical of weak cataclastic deformation. Biotite (3-4%) forms scattered very fine- to fine-grained clusters, vaguely oriented parallel to foliation. In some samples, it is altered to intergrowths of pseudomorphic chlorite and clusters of Ti-oxide and (or) epidote. Zircon is common in biotite clusters as subhedral to euhedral grains averaging 0.05 mm in size.

Subunit 2b ranges in colour from pale grey to cream, pink, and pale green. The texture is finer than that in Subunit 2a, and porphyroblasts generally are lacking, but otherwise, the subunits are similar in appearance and composition. Scattered through Subunit 2b (and also in Subunit 2c) are stratigraphic intervals up to several metres thick of augen gneiss containing 5-10% subhedral to euhedral K-feldspar porphyroblasts up to 1 cm in diameter (Figure 2.8). Much of the subunit is interpreted as a metamorphosed dacite to quartz-bearing latite tuff or flow.

It is dominated by feldspars (very variable ratio of K-feldspar to plagioclase), with much less quartz (10-20%) and mafic minerals. Biotite (3-7%) forms ragged to subhedral aggregates, in part intergrown with muscovite (2-4%) and epidote (1-3%), and minor to moderately abundant accessory opaque, apatite, sphene, and zircon. Metamorphic foliation is defined by elongation of quartz-rich lenses and of mica aggregates. Locally, quartz is strongly sheared and partly recrystallized.

Subunit 2c consists of thinly laminated (commonly less than 5 mm), metamorphosed dacite to andesite tuffs and tuffaceous sediments, with minor to locally abundant interlayers of limestone (Subunit 2L). In places, Subunit 2c contains moderately abundant interlayers of amphibolite; some of these are thick enough to be mapped as a separate subunit. Locally, Subunit 2c contains thin interlayers of Subunit 1b. Some rocks in Subunits 2c and 2b contain abundant medium- to coarse-grained muscovite. Subunit 2c is best developed south of Mount Cockfield and along the north bank of Hayes Creek. In the latter occurrence, garnet porphyroblasts are common in some intervals. One medium-grained sample from this zone contains quartz (35-40%), muscovite (20-25%), chlorite (10-15%),

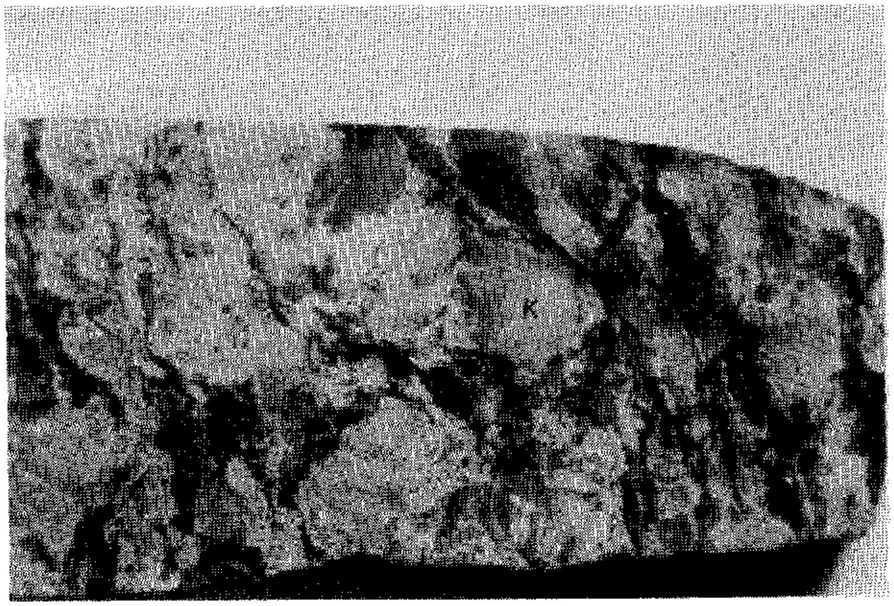


Figure 2.7. Photomicrograph of Subunit 2a (metamorphosed rhyodacite): K-feldspar porphyroblasts in a foliated groundmass dominated by quartz and plagioclase. Station S 526; daylight, length of photograph, 3.4 cm.

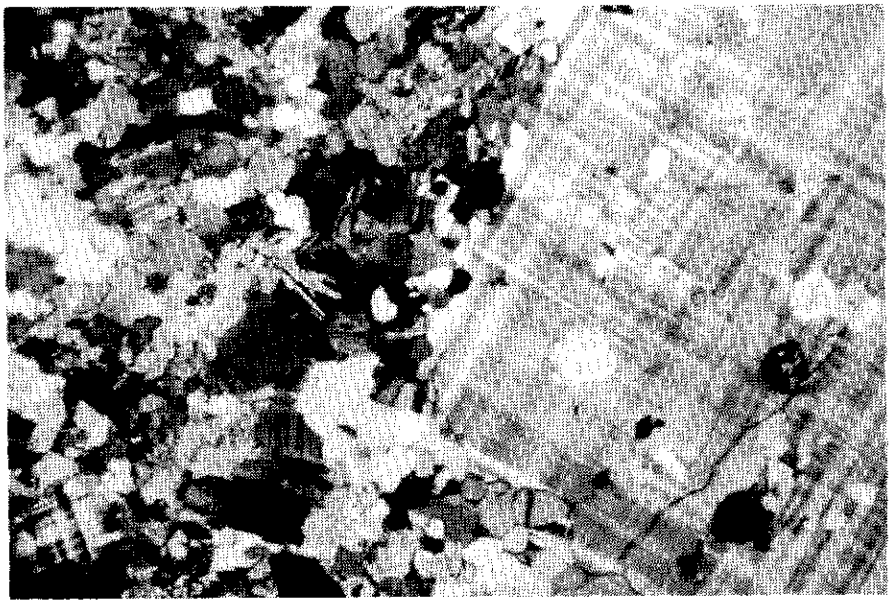


Figure 2.8. Photomicrograph of Subunit 2b (metamorphosed rhyodacite): augen gneiss containing microcline porphyroblast in a groundmass of microcline, plagioclase, quartz, and biotite. Station W 326; crossed nicols, length of photograph, 3.0 mm.

plagioclase (10-15%), garnet (8-10%), biotite (2%), Ti-oxide (1%), and minor staurolite (altered to muscovite) (Figure 2.9).

Subunit 2d includes metamorphosed andesite to dacite tuffs and flows. Locally it forms mappable units and in some areas grades into Subunit 2b. The largest occurrence is on the east-west ridge several km south of Mount Cockfield. In thin section, one rock consists of extremely fine grained plagioclase (possibly including minor quartz); lesser actinolite (20-30%), biotite (5-7%), in part as porphyroblasts up to 1 mm in size; extremely fine grained clusters of Ti-oxide (2-3%); and a trace of apatite (Figure 2.10). Another is dominated by epidote (40%), and contains plagioclase (25%), actinolite (25%), and quartz (10%), prominent sphene or Ti-oxide (2%), and accessory apatite. Epidote is secondary after both plagioclase and mafic minerals.

Subunit 2e consists of fine- to medium-grained amphibolite, and interlayered amphibolite and felsic gneiss in which amphibolite layers are more abundant than those of felsic gneiss. North of Hayes Creek, it forms intervals up to 200 m thick; northwest of Klaza Mountain it is present as scattered inclusions, mostly less than 100 m across in rocks of Unit 3. A prominent foliation is defined by parallel orientation of amphibole grains and by compositional banding.

In thin section, the rock is dominated by hornblende and lesser plagioclase, and contains lesser epidote, minor quartz, sphene, opaque, and apatite (Figure 2.11). Epidote and chlorite also form minor to moderately abundant alterations of hornblende. One sample is cut by irregular veins of tremolite-actinolite and calcite. In regions of higher-grade metamorphism, especially north of Hayes Creek, some rocks contain up to 10% anhedral garnet porphyroblasts averaging 1 mm in size (Figure 2.12).

Subunit 2f is restricted to the zone of higher grade metamorphism north of Hayes Creek. It is a grey to brownish-grey orthogneiss to schist of quartz diorite to granodiorite composition, with a strong foliation but poor development of compositional layering. Biotite and (or) hornblende form 10-20% of the rock, with locally more mafic or leucocratic zones. Epidote (5-20%) is characteristic, and is in equilibrium with other minerals, rather than being a replacement of any of them (Figure 2.13). Accessory to minor minerals include apatite, zircon, muscovite, and allanite. Quartz commonly forms segregations, averaging one to a few millimetres in width, parallel to foliation. Felsic segregations up to 20 cm across form conformable lenses and crosscutting dykes which were deformed with the host rock (Figure 2.14).

Figure 2.9. Photomicrograph of Subunit 2c (metamorphosed rhyodacite tuff): garnet porphyroblasts in compositionally banded groundmass containing plagioclase, muscovite, quartz, biotite and Ti-oxide. Station p 66; plane light, length of photograph, 3.0 mm.

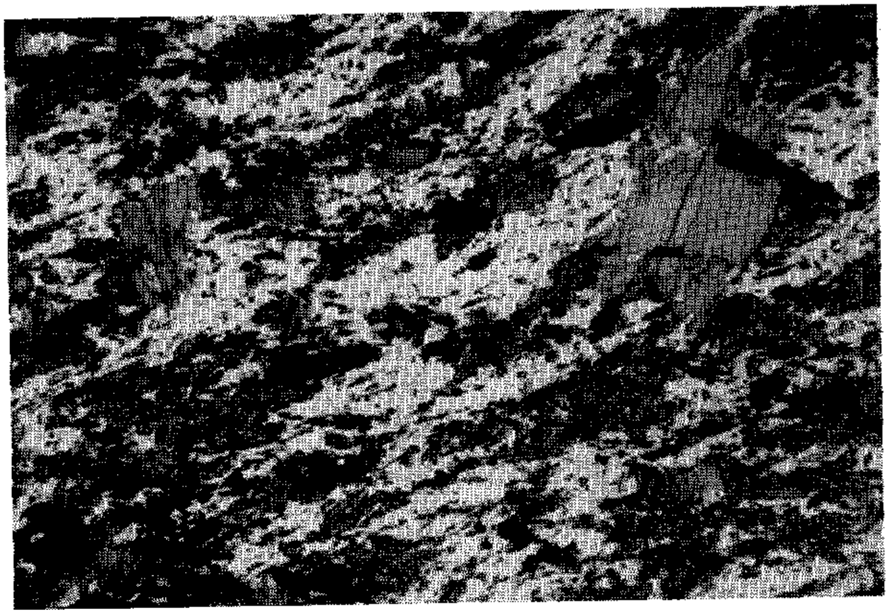


Figure 2.10. Photomicrograph of Subunit 2d (meta-andesite): biotite porphyroblasts in groundmass of plagioclase, actinolite, and minor Ti-oxide. Station J 499; plane light, length of photograph, 3.0 mm.

Figure 2.11. Photomicrograph of Subunit 2e (amphibolite): hornblende-plagioclase-(epidote) amphibolite. Station P 29; plane light, length of photograph, 3.0 mm.

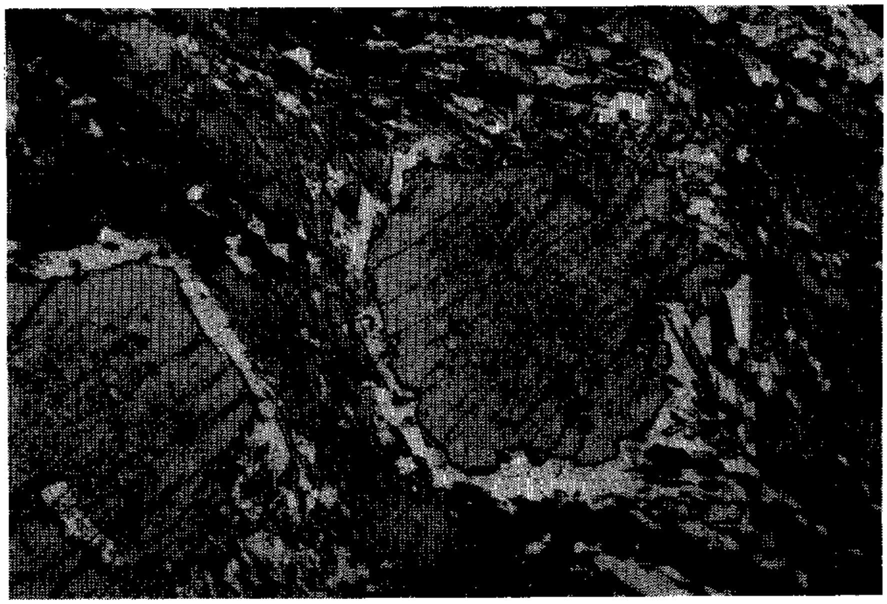


Figure 2.12. Photomicrograph of Subunit 2e (amphibolite): garnet porphyroblasts in hornblende-plagioclase amphibolite. Station W 48; plane light, length of photograph, 3.0 mm.

Figure 2.13. Photomicrograph of Subunit 2f (quartzofeldspathic orthogneiss): gneiss with plagioclase, quartz, epidote, biotite, and opaque. Station P 34; plane light, length of photograph, 3.0 mm.

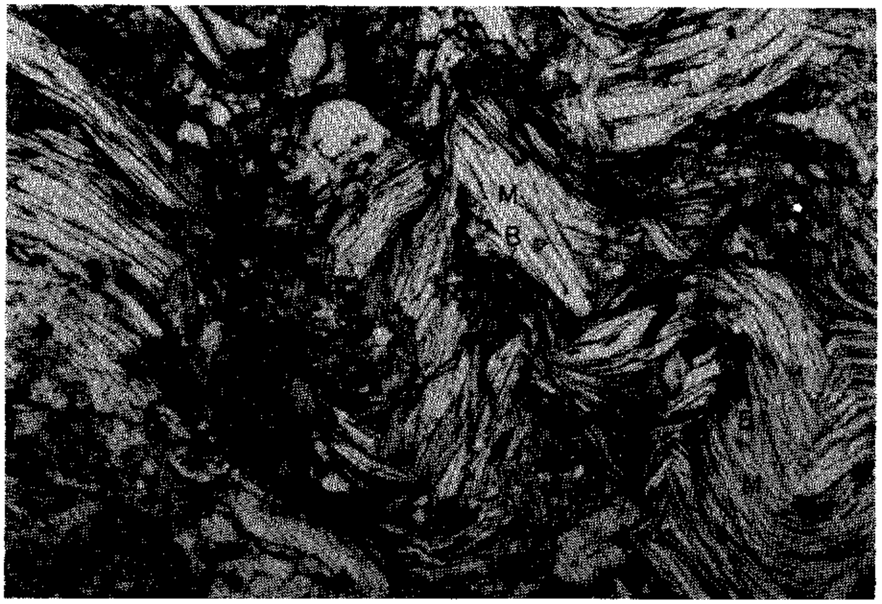


Figure 2.15. Photomicrograph of Subunit 2g (contact metamorphosed schist): biotite replacing muscovite in a kink fold nose. Station K 241; plane light, length of photograph, 3.0 mm.

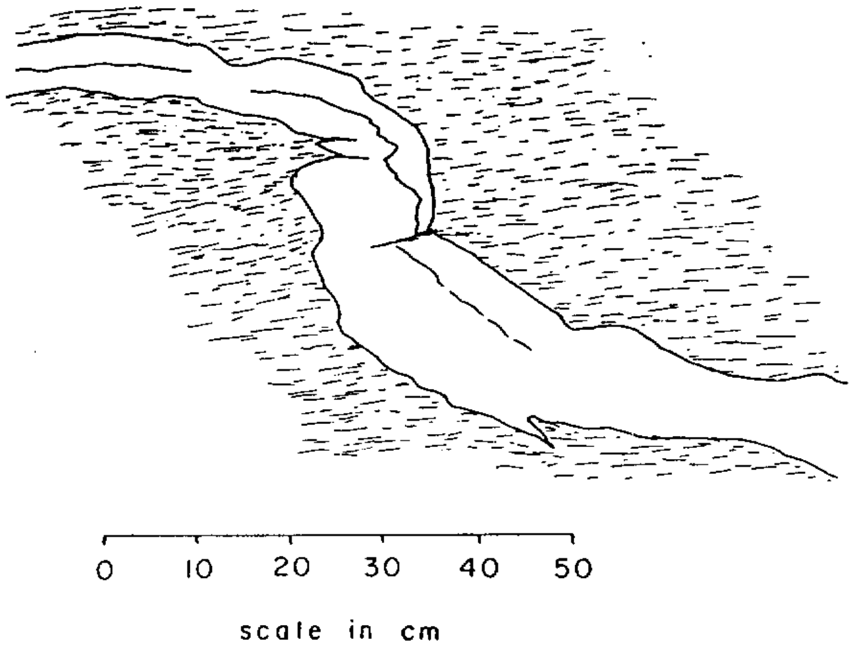


Figure 2.14: Line drawing from a photograph showing a deformed felsic dyke cutting subunit 2f.

Subunit 2L occurs near the Big Creek Fault along Hayes Creek and Selwyn River. It consists of massive to well-bedded recrystallized limestone and carbonate-rich schists, the latter of which grade into muscovite-quartz-rich schists of Subunit 2c. A few limestone pods up to 200 m across are present. Small lenses, pods, and beds are common in association with Subunit 2c. The largest zone of these, along Hayes Creek, contains intervals of limestone up to 20 m thick, interlayered with muscovite-rich gneisses and schists.

Subunit 2g contains more highly metamorphosed rocks of Unit 2 along the contact of younger plutonic rocks. Where the parent rock type is known, a suffix, 'g', is added on the maps to the rock symbol, (e.g., 2cg). Reddish-brown biotite and (or) pale green actinolite are characteristic. In one sample very fine grained biotite replaces muscovite along the axial planes of kink folds (Figure 2.15). Garnet and tourmaline are abundant locally.

Subunit 2m is equivalent to Subunit 1m, but was derived from rocks of Unit 2. It is most abundant south of Battle Creek and along the upper east-west stretch of Selwyn River (Figure 2.16).

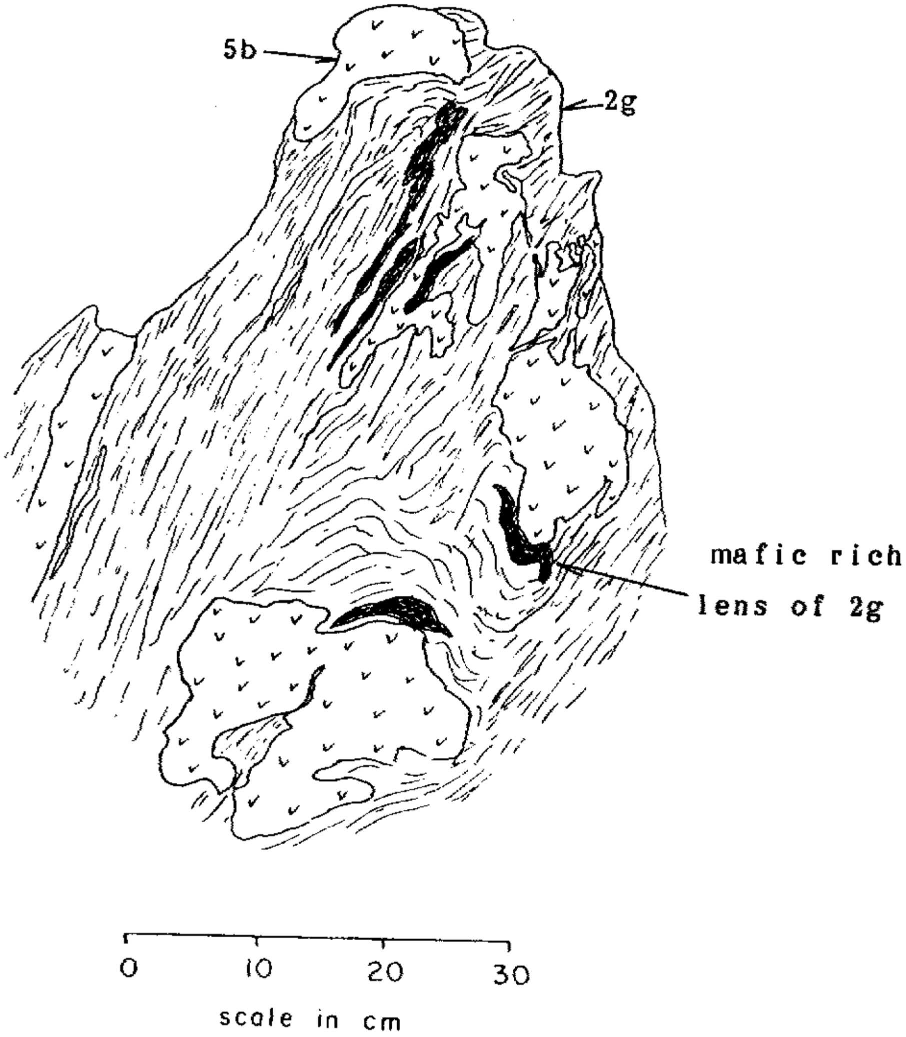


Figure 2.16: Line drawing from a photograph showing a mixed zone: Subunit 2g in contact with Subunit 5b.

Subunit 2s (skarn) occurs locally as pods up to a few tens of metres across in contact zones against younger plutonic rocks. It consists of massive aggregates of medium-grained to pegmatitic actinolite, lesser other calc-silicates, and minor to abundant magnetite. Pyrite is widespread but not abundant. Chalcopyrite (and secondary Cu-minerals) were recognized locally. The largest outcrop of skarn is on the ridge south of Mount Cockfield. From aeromagnetic data, a large magnetite-bearing skarn is inferred to exist in rocks of

Unit 2 (and possibly Unit 1) in the upper, alluvium-covered valley of Canadian Creek, west of the Casino deposit.

2.3.2 Klotassin Suite

The Klotassin Suite contains two major subunits: hornblende- to hornblende-biotite granodiorite (Subunit 3a), and leucocratic granodiorite to quartz diorite (Subunit 3b). These occur together, locally with abundant patches of rocks from Unit 2, in the eastern part of the project area. Most rocks have a weak to moderate metamorphic foliation.

Subunit 3a is a medium- to coarse-grained, slightly to strongly foliated quartz diorite to granodiorite containing 15-30% hornblende-actinolite and (or) biotite, and accessory sphene, opaque, and apatite.

Subunit 3b is a leucocratic, slightly to moderately foliated granodiorite, dominated by plagioclase and quartz, and containing K-feldspar (10-20%), actinolite (2-7%), as well as minor sphene and magnetite. K-feldspar is perthitic and commonly porphyroblastic. Actinolite forms ragged to subhedral, light- to medium-green grains, many of which are altered slightly to strongly to chlorite. The rock contains diffuse seams and patches of extremely fine to very fine grain size, interpreted as having been formed by slight cataclastic deformation.

In a broad belt running along the axis of the main outcrop zone of Subunit 3b, strong cataclastic deformation produced a rock composed of very fine grained, foliated and lineated aggregates of rods of quartz enclosed in feldspar (**3bD**).

Along the contact of Subunits 3a and 3b and locally in both subunits are patches of amphibolite (probably equivalent to Subunit 2e) and felsic gneiss (equivalent to Subunits 2b, 2c, and 2g), as well as massive to moderately foliated hybrid rocks intermediate in composition between the plutonic and basement rocks. Inclusions of basement rocks are up to 100 m across. As most of this region is covered by felsenmeer and talus, demarcation of contacts is at best approximate.

2.3.3 Big Creek Suite

The **Big Creek Suite (Unit 4)** occurs in the eastern part of Prospector Mountain map area southwest of the Big Creek Fault. It contains two major subunits. Subunit 4a is a medium- to very coarse-grained, massive to moderately foliated, hornblende monzonite to quartz-bearing monzonite, characterized by perthitic K-feldspar megacrysts. The megacrysts, which probably are of metamorphic origin, reach 3 cm in size within the project area, and over 5 cm in size east of the project area (Carlson, pers. comm.).

In thin section, the rocks show a metamorphic texture. Plagioclase ranges from unzoned to weakly zoned in broad growth zones; many grains are corroded by surrounding K-feldspar (Figure 2.18). The latter forms anhedral to euhedral, equant to prismatic, perthitic megacrysts. Some samples contain abundant myrmekite in fine-grained plagioclase grains surrounded by or adjacent to K-feldspar megacrysts (Figure 2.19). Quartz (0-20%) forms very fine grained aggregates interstitial to feldspars. Hornblende (20-40%) forms anhedral to subhedral, medium to coarse grains with a medium- to light-green colour. Biotite is conspicuous by its absence. Sphene (2-3%) is common as euhedral to subhedral, wedge-shaped grains up to 0.7 mm in size. Apatite (0.5-1%) forms subhedral, prismatic grains averaging 0.1 mm in size (a few up to 0.8 mm), mainly associated with hornblende. Opaque oxide (0.2-0.5%), in part magnetite, forms scattered ragged patches, mainly associated with hornblende. Plagioclase is altered slightly to sericite, and hornblende locally is altered to patches of fine-grained chlorite.

The porphyritic rocks of Subunit 4a grade gradually to abruptly into a finer grained, non-porphyritic granodiorite (**Subunit 4b**), which in places is difficult to distinguish from rocks of Subunit 3a.

Subunit 4c is dark green, massive, medium- to coarse-grained hornblendite, which locally forms segregations parallel to foliation in Subunit 4a. These are up to 6 m thick, and can be traced laterally on ridge tops for a few tens of metres. Interstitial to hornblende are minor patches of biotite, plagioclase, K-feldspar, apatite, opaque, and sphene (Figure 2.20). Hornblende is altered slightly to pale green actinolite. Biotite forms flakes up to 2 mm in size; it is replaced completely by pseudomorphic, light green chlorite and minor Ti-oxide, and in patches in some grains by K-feldspar. Plagioclase is altered slightly to moderately to disseminated and patchy sericite. Interstitial patches up to 0.8 mm across contain unoriented aggregates of strongly interlocking K-feldspar, anhedral epidote, and minor chlorite; other patches consist entirely of chlorite in felted aggregates of extremely

Figure 2.17. Photomicrograph of Subunit 3b (leucocratic granodiorite): micro-shear zone cutting coarse grained meta-granodiorite. Station P 793; crossed nicols, length of photograph, 3.0 mm.

Figure 2.18. Photomicrograph of Subunit 4a (hornblende quartz-bearing monzonite): plagioclase corroded by K-feldspar. Station P 847; crossed nicols, length of photograph, 3.0 mm.

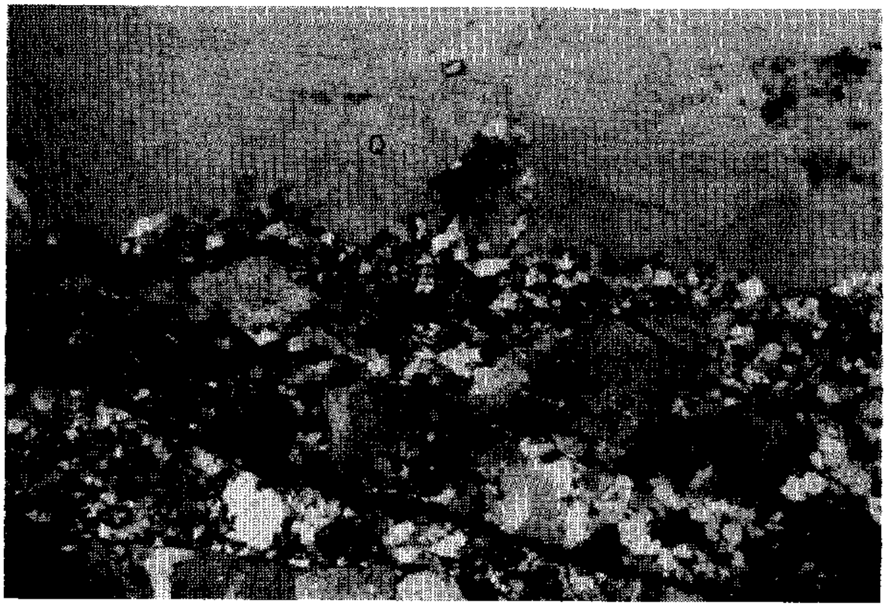


Figure 2.19. Photomicrograph of Subunit 4a (hornblende quartz-bearing monzonite): myrmekitic plagioclase on border of K-feldspar. Station P 847; crossed nicols, length of photograph, 3.0 mm.

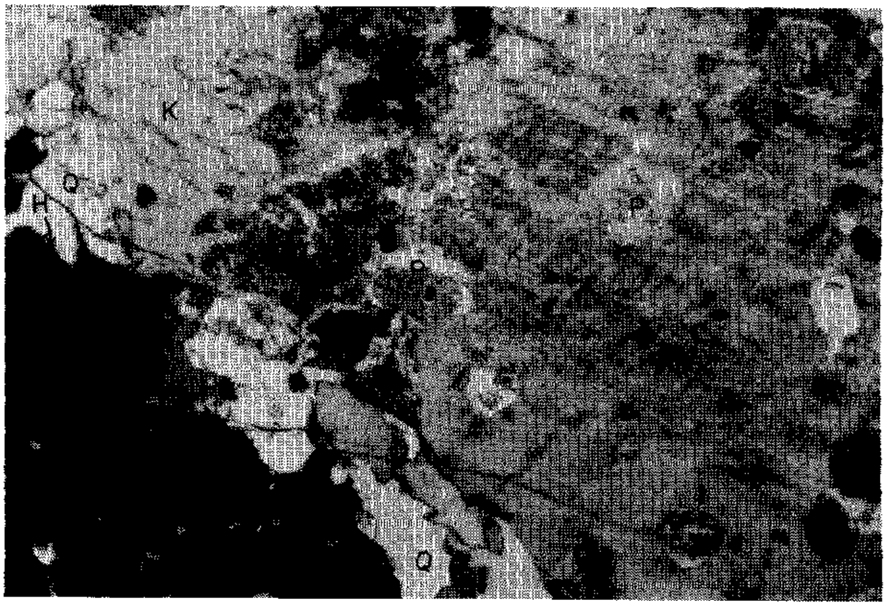


Figure 2.20. Photomicrograph of Subunit 4c (hornblendite): hornblende surrounding biotite altered to chlorite and K-feldspar. Station P 562; plane light, length of photograph, 3.0 mm.

fine grains.

Unit 4 is cut by dykelets of pink aplite (probably equivalent to Subunit 6d), and by dykes and dyke swarms of Unit 9.

2.3.4 Dawson Range Suite

The **Dawson Range Batholith (Unit 5)** outcrops extensively along the axis of the Dawson Range. It has been subdivided on the basis of mafic mineralogy and abundance into three major subunits as follows:

Subunit 5a:	hornblende potassic quartz diorite (previously described in part as Casino Granodiorite).
Subunit 5b:	granodiorite with biotite more abundant than hornblende (previously described in part as Casino Granodiorite, possibly correlative with Nisling Range Granodiorite).
Subunit 5c:	biotite-bearing, leucocratic granodiorite to quartz monzonite (previously described as Coffee Creek Granite).

All subunits are characterized by moderately- to strongly-zoned plagioclase, whose composition (determined optically) ranges from about An_{40} in the cores to about An_{20} in the rims (Figure 2.21).

Subunit 5a is a potassic quartz diorite, commonly containing 15-20% mafic minerals dominated by hornblende and negligible- to moderately-abundant biotite. Some hornblende forms distinctive, euhedral, prismatic phenocrysts from 0.7 to 3 mm in average length (Figure 2.22). Locally near the contact with older rocks, the pluton is equigranular with up to 30% hornblende and negligible biotite. This rock is interpreted as a hybrid phase containing assimilated country rock. Elsewhere, the contact rocks are more leucocratic than normal, with more abundant biotite and minor hornblende. Such rocks are interpreted as hybrid rocks which assimilated siliceous rocks of Units 1 and 2.

Southwest of Casino, and between Mount Cockfield and the Selwyn River, are two large zones in which a strong, primary flow-foliation is defined by parallel orientation of

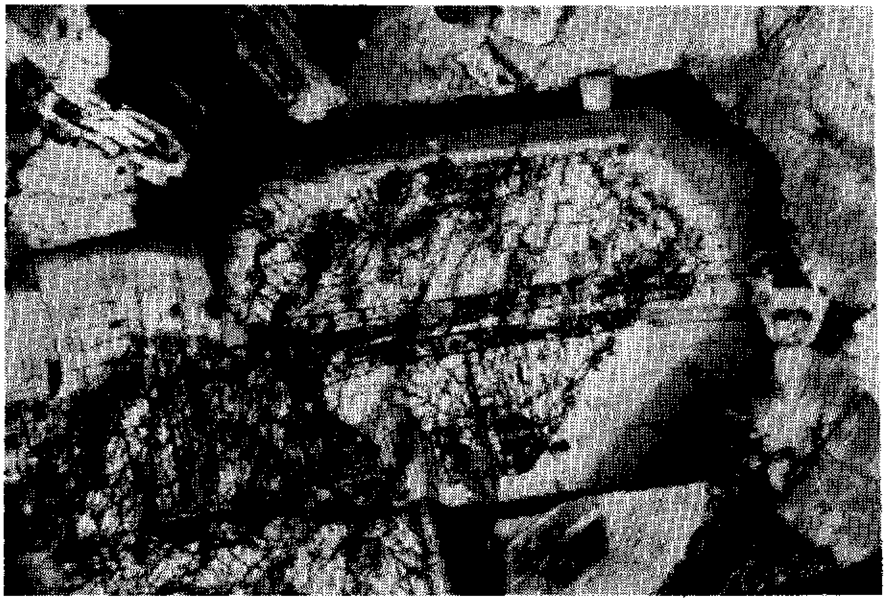


Figure 2.21. Photomicrograph of Subunit 5a (quartz diorite): zoned plagioclase Station J 215; crossed nicols, length of photograph, 3.0 mm.

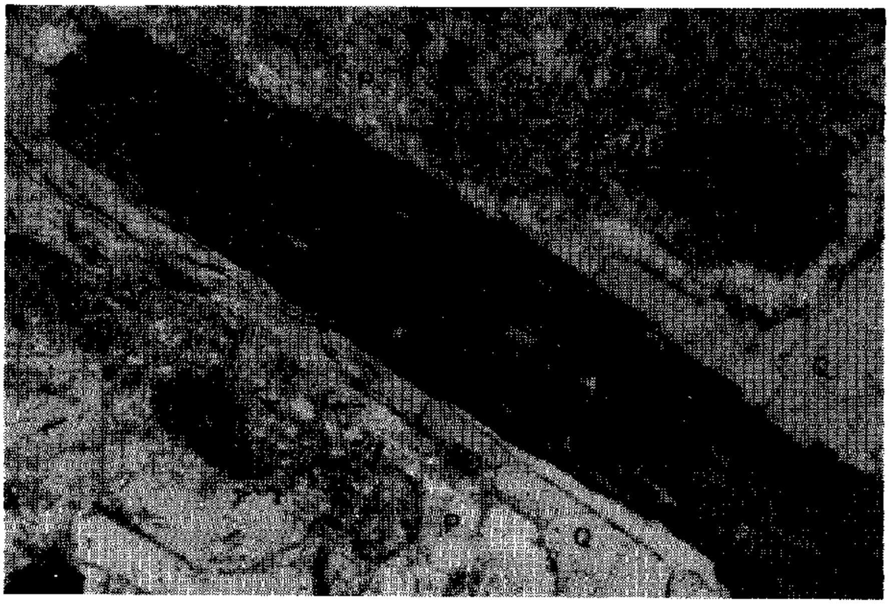


Figure 2.22. Photomicrograph of Subunit 5b (granodiorite): hornblende phenocryst surrounded by plagioclase and quartz. Station J 804; plane light, length of photograph, 3.0 mm.

hornblende and feldspar grains. A primary foliation of a different nature occurs locally along the northern border of the Colorado Creek sheet. There, near the contact of Subunit 5a and Subunit 5b, slightly foliated rocks of Subunit 5a are coarsely interbanded subhorizontally with a leucocratic variety of Subunit 5b.

Subunit 5b is a granodiorite to potassic quartz diorite, commonly containing hornblende phenocrysts as in Subunit 5a, but with biotite more abundant than hornblende (Figure 2.23). The average mafic content is 10-15%, but varies widely. East of Selwyn River is a region containing abundant phenocrysts up to 1.5 cm across of K-feldspar (**5bp**). Locally, mainly near the contact between the batholith and rocks of the Yukon Metamorphic Complex, is a biotite quartz diorite containing 25-30% biotite and minor K-feldspar. This rock probably represents a zone of Subunit 5b contaminated by assimilation of mafic-rich country rock. It has about the same potassium content as normal Subunit 5b, but almost all the potassium is contained in biotite rather than in K-feldpsar.

On a ridgetop near the southwest corner of Prospector Mountain sheet is an unusual, porphyritic, fine-grained granodiorite (**5bf**). It contains phenocrysts of plagioclase, biotite, and quartz in a very fine grained groundmass dominated by feldspars and lesser quartz (Figure 2.24).

With decreasing content of mafic minerals and increasing content of K-feldspar, Subunit 5b grades into **Subunit 5c**. The latter generally contains less than 5% mafic minerals and ranges in composition from granodiorite to quartz monzonite (Figure 2.25). It is slightly to moderately porphyritic with phenocrysts up to 1.5 cm across of K-feldspar and (or) plagioclase. Quartz commonly forms over 30% of the rock. Accessory minerals include sphene, allanite, and traces of zircon and apatite.

Subunit 5d is a fine- to medium-grained quartz-bearing diorite, which, east of Casino, forms bodies up to a few hundred metres across enclosed in the Dawson Range Batholith. It is interpreted as an early-formed phase of the batholith. The diorite is dominated by subhedral to euhedral, strongly zoned plagioclase, with 25-35% hornblende plus biotite, 8-15% interstitial quartz, minor interstitial K-feldspar, and accessory opaque and zircon (Figure 2.26). Biotite is altered moderately to pseudomorphic chlorite and patches of epidote, whereas hornblende is fresh.

All subunits contain scattered dykelets of pink aplite averaging a few centimetres in width. The aplite is a quartz monzonite, identical to rocks of Subunit 6d. However, its ubiquitous

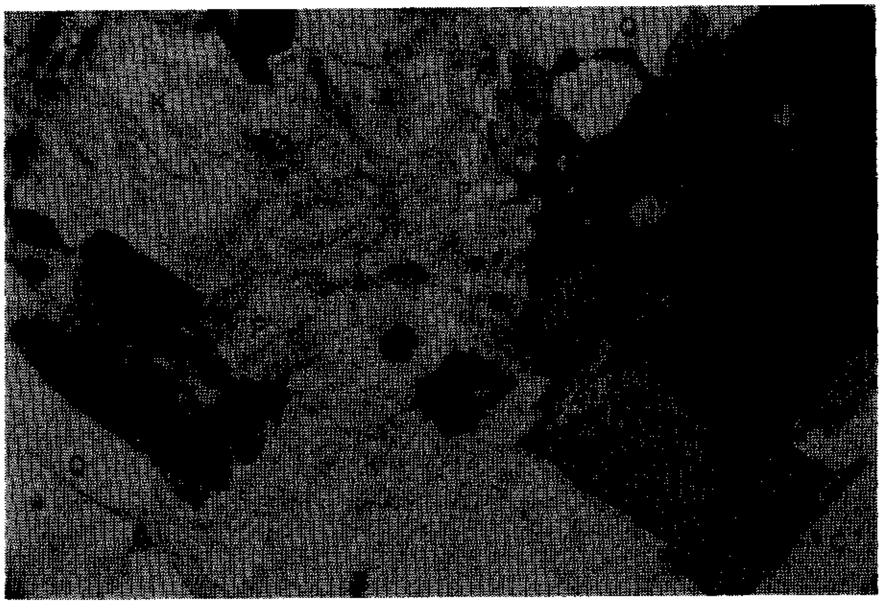


Figure 2.23. Photomicrograph of Subunit 5b (granodiorite): intergrowth of K-feldspar, biotite, plagioclase, and quartz. Station J 310; plane light, length of photograph, 3.0 mm.

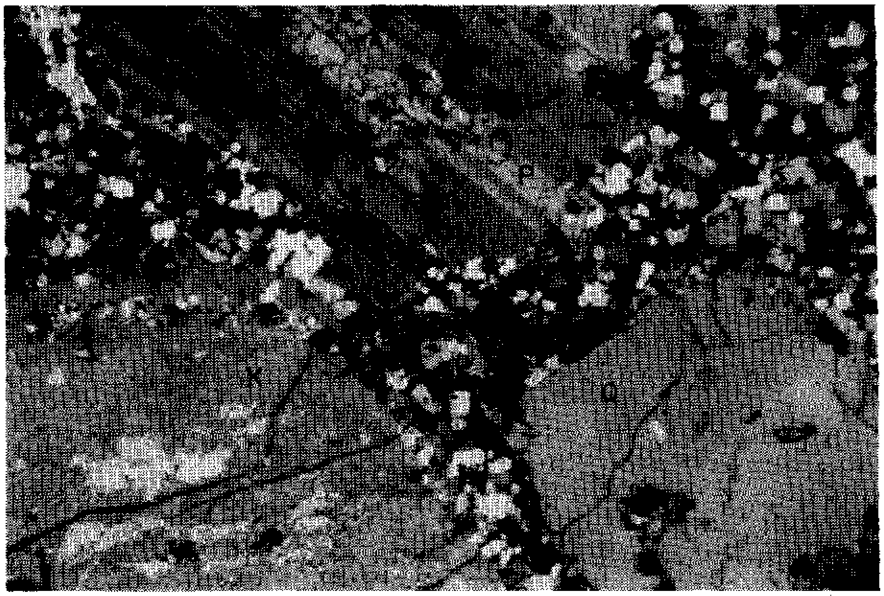


Figure 2.24. Photomicrograph of Subunit 5bf (fine-grained granodiorite): phenocrysts of plagioclase, quartz, and K-feldspar in felsic groundmass. Station P 408; crossed nicols, length of photograph, 3.0 mm.

Figure 2.25. Photomicrograph of Subunit 5c (quartz monzonite): intergrowth of K-feldspar, plagioclase, quartz, and biotite. Station J 417; crossed nicols, length of photograph, 3.0 mm.

Figure 2.26. Photomicrograph of Subunit 5d (quartz-bearing diorite): subhedral to euhedral plagioclase with interstitial quartz, patches of hornblende and biotite. Station J 468; plane light, length of photograph, 3.0 mm.

presence in rocks of Unit 5 well away from exposures of Unit 6, suggests that it was formed from minor, late-stage, magmatic liquid related to Unit 5, rather than being associated with a buried stock of Unit 6.

In several parts of the batholith, particularly in the southeast corner of the Selwyn River map area, subrounded inclusions of biotite-hornblende meta-diorite form up to 5% of the rock. Some contain scattered porphyroblasts of hornblende and (or) feldspars. Size of inclusions averages several centimetres across, with larger inclusions up to a few tens of centimetres across. The composition of the inclusions is moderately similar to that of Subunit 5d; however, in the inclusions, quartz is much less abundant, plagioclase is unzoned, and textures are metamorphic (Figure 2.27). Biotite is replaced slightly to moderately along cleavage by chlorite, and in some ragged grains by feldspars. Inclusions are interpreted as partly assimilated remnants of stoped blocks of country rock. Where inclusions are abundant (over 3% of the rock), the unit symbol on the geologic maps contains a suffix "i" (e.g., **5ai**).

Rocks of Unit 5 form prominent castles on ridge crests. These result from spalling off of large blocks of rock along three major suborthogonal joint sets. Joints commonly are slightly curved, and are variable in distribution and orientation between adjacent outcrops. As a result, structural data are too scattered to indicate trends, except that generally, one prominent, steeply dipping joint set is parallel to the ridge crest. Castles are most resistant and angular in rocks of Subunit 5a, and much more crumbled and rounded in those of Subunits 5b and 5c.

Most contacts between subunits are gradational, with Subunit 5a grading into Subunit 5b, and Subunit 5b grading into Subunit 5c. Along Selwyn River, Subunit 5c occupies the core of a zoned batholith, grading outwards into Subunit 5b and then further out to 5a. Elsewhere, Subunit 5a is common along the border of a pluton against rocks of the Yukon Metamorphic Complex. However, some plutons do not have a border zone of Subunit 5a, e.g., the one south of Hayes Creek in the eastern part of the Selwyn River map area.

The **Casino Intrusions (Unit 6)** are stocks of quartz monzonite to granodiorite. Most are dominated by leucocratic phases. They are scattered through the Dawson Range Batholith and are most abundant in the western part of the project area. Major plutons are at Casino, Pattison Creek, and Idaho Creek. The main subunits are as follows:

Subunit 6a:	fine-grained, sucrosic quartz monzonite, ranging in mafic content from 0 to 7%. Biotite is the dominant mafic mineral.
Subunit 6b:	medium-grained, sucrosic to massive quartz monzonite, generally less than 2% mafic minerals, predominantly biotite.
Subunit 6c:	very fine- to fine-grained, leucocratic, porphyritic quartz monzonite.

Subunit 6a occurs in the Pattison and Casino Stocks, and also forms the bulk of a few small plugs and irregular intrusions. It contains unzoned to slightly zoned plagioclase intergrown with lesser quartz and K-feldspar, scattered to moderately abundant ragged biotite flakes, and accessory opaque oxide. Quartz and K-feldspar locally form graphic intergrowths (Figure 2.28). Biotite commonly is replaced by pseudomorphic muscovite and disseminated grains and patches of Ti-oxide and chlorite. In one sample, biotite is replaced by pseudomorphic muscovite and abundant hematite.

Subunit 6b occurs in the Pattison and Idaho Creek Stocks. It is coarser grained, and contains more abundant quartz and K-feldspar than Subunit 6a. In the Pattison Stock, biotite is replaced partly to completely by pseudomorphic muscovite; this alteration is associated with the Cu-Mo mineralization. Locally, muscovite also forms primary flakes. Zircon is a rare accessory mineral.

Subunit 6c occurs only at Casino. It is a very fine- to fine-grained, leucocratic quartz monzonite with up to 15% phenocrysts of quartz up to 2 mm in size. The unit is in the hydrothermal alteration zone at Casino, and now consists almost entirely of quartz and sericite, with minor tourmaline and sulphides.

Subunit 6d forms a patch up to several tens of metres across in the Pattison Stock, and numerous small dykes throughout Units 5 and 6. It is an aplitic quartz monzonite, grading from pink to white in colour.

Subunit 6x is a breccia pipe a few tens of metres across which cuts the Casino Stock. The breccia was divided by Godwin (1976) into three main types, based on size of fragments, as follows: tuff, tuff breccia, and cobble breccia. Most fragments belong to Subunits 6a and 6c. Lesser fragments are of Subunits 5a and 5c from the surrounding batholith, and of Mount Nansen dykes and possibly younger dykes. Fragments are altered strongly to

Figure 2.27. Photomicrograph of Subunit 5bi (quartz-bearing diorite): remnant of partly assimilated inclusion containing plagioclase, hornblende-actinolite, biotite, and quartz. Station W 502; plane light, length of photograph, 3.0 mm.

Figure 2.28. Photomicrograph of Subunit 6a (quartz monzonite): intergrowths of quartz and K-feldspar surrounding plagioclase. Station J 167; plane light, length of photograph, 1.7 mm.

quartz-sericite. The groundmass of the breccia is silicified and altered to sericite, and contains patches of tourmaline and sulphides (Figure 2.29). Near surface, Fe-sulphides are altered to jarosite. Associated with the breccia pipe is the Patton Porphyry, a porphyritic latite similar to Subunit 9a, but containing more abundant plagioclase phenocrysts. Godwin (1976) dated this porphyry at 71.2 Ma (whole rock, K/Ar), and interpreted the breccia and mineralization of the Casino deposit to be of the same age. Locally, unaltered Patton Porphyry cuts strongly altered rocks of Unit 6a, suggesting that the porphyry formed after completion of much of the alteration in the Casino deposit.

2.3.5 Mount Nansen Suite

The **Mount Nansen Suite** includes volcanic flows, tuffs, and domes (**Unit 7**), subvolcanic dykes and stocks of similar composition (**Unit 9**), and, east of the project area, a granitic intrusion (**Unit 8**). Volcanic rocks are most abundant in the southeast corner of the project area; elsewhere, subvolcanic and lesser volcanic rocks occur in scattered small centers. These may be erosional remnants of a more widespread volcanic unit, preserved, in part, in fault-bounded grabens. Volcanic rocks near Mount Nansen (southeast of the project area) have been dated radiometrically at about 100 Ma (Tempelman-Kluit, 1971; whole rock K/Ar). This is the same age as the Casino Intrusions. The dates of isolated domes and plugs are uncertain, as are those of many of the dykes.

Based on chemical composition, volcanic rocks were divided into two main types, andesite-latite, and latite-rhyodacite.

Subunit 7a consists of massive, light to dark grey, porphyritic latite to andesite flows (**7a**), and locally abundant flow breccia and breccia (**7ax**). On a prominent mountain 5 km northwest of Klaza Mountain, Subunit 7ax contains abundant, subrounded to angular fragments, averaging a few centimetres across (mainly of Subunit 7a) in a tuffaceous(?) groundmass of similar composition. Similar breccias are abundant to the southeast towards and on Mt. Nansen (Carlson, pers. comm.).

One thin section of Subunit 7a from Klaza Mountain contains subhedral to euhedral phenocrysts of plagioclase (10-12%) and hornblende (3-5%) in an aphanitic groundmass dominated by plagioclase (Figure 2.30). Plagioclase phenocrysts are replaced slightly to completely by epidote and slightly to moderately by sericite. Hornblende phenocrysts are replaced completely by chlorite with minor to abundant epidote, and locally, moderately

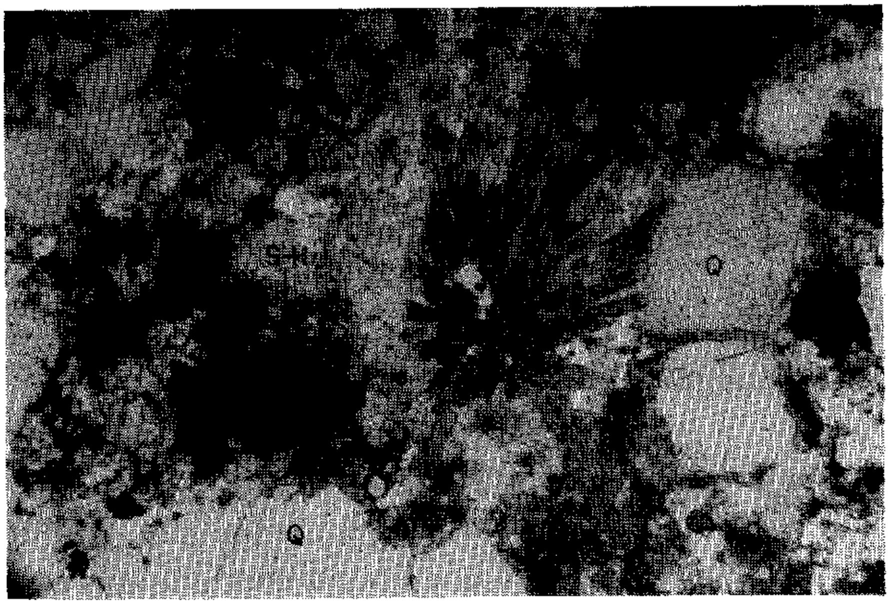


Figure 2.29. Photomicrograph of Subunit 6x (breccia pipe): fragment of porphyritic quartz monzonite containing quartz phenocrysts and secondary patches of sericite-hematite, tourmaline, and jarosite. Station C 6, plane light, length of photograph, 3.0 mm.

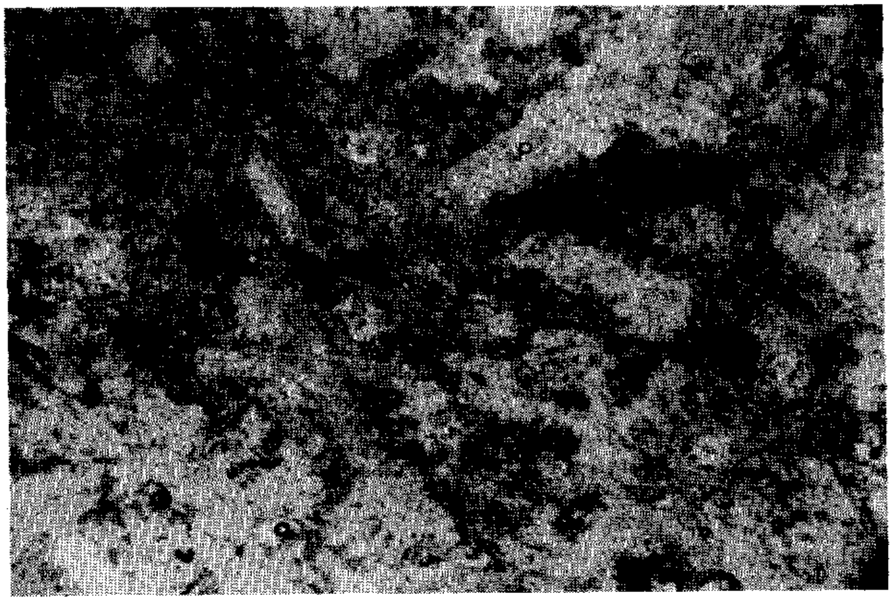


Figure 2.30. Photomicrograph of Subunit 7a (Porphyritic latite to andesite flow): plagioclase phenocrysts in an andesitic groundmass. Station S 179; plane light, length of photograph, 3.0 mm.

abundant opaque. Opaque (1-2%) forms irregular patches, and apatite forms scattered, euhedral grains, both mainly associated with hornblende phenocrysts. The groundmass contains patches of very fine grained plagioclase, some of which contain cores of very fine grained chlorite.

One thin section of Subunit 7ax contains fragments of a wide variety of latite flows in an aphanitic, possibly tuffaceous groundmass (Figure 2.31). Some fragments are of devitrified glass, and some contain prominent plagioclase and hornblende phenocrysts. In one fragment, plagioclase phenocrysts are moderately zoned as in rocks of Unit 5; in all other fragments, phenocrysts are unzoned. Plagioclase phenocrysts are altered slightly to moderately to patches of epidote and to disseminated sericite. Hornblende phenocrysts are fresh. Quartz forms minor, small anhedral phenocrysts, and biotite forms a few ragged phenocrysts, strongly altered to epidote. The rock contains minor patches of opaque, accessory apatite, and secondary radiating aggregates of epidote.

Subunit 7b contains felsic flows (**7b**) and tuffs (**7bt**). Most are bleached to a pale cream colour and are stained with limonite-hematite from weathering of disseminated Fe-sulphides. Plagioclase and quartz form scattered phenocrysts up to 1 mm in size in an aphanitic groundmass dominated by plagioclase and K-feldspar.

Subunit 7c includes felsic domes and subvolcanic intrusions, which form scattered outcrop zones in the eastern half of the project area. Many of the subvolcanic intrusions may have formed in volcanic necks. Many are loci of hydrothermal alteration and associated precious metal and base metal concentration (e.g., Sonora Gulch Plug south of Hayes Creek). Associated with some are massive to well-bedded, fine- to medium-grained tuffs of Subunit 7b.

The dome south of Big Creek at the east side of the project area contains phenocrysts of quartz (7-8%) and plagioclase (4-5%) up to 2 mm across, and biotite (0.5%) up to 1 mm long, in an extremely fine- to very fine-grained groundmass dominated by plagioclase and quartz. Plagioclase phenocrysts commonly are replaced strongly to completely by sericite, and in some samples they are represented by weathered cavities. Phenocrysts of biotite are replaced completely by pseudomorphic muscovite and minor to moderately abundant Ti-oxide. Along the southwest side of this dome are tuffaceous rocks of Subunit 7b, containing fragments up to a few millimetres across of quartz and plagioclase phenocrysts and a variety of felsic volcanic rocks in an extremely fine grained groundmass dominated by plagioclase and sericite.

The dome at the southwest corner of the Prospector Mountain Sheet contains prominent phenocrysts of quartz and zoned plagioclase and minor phenocrysts of muscovite and opaque in a very fine grained, granular groundmass of plagioclase and quartz, with scattered clusters of one or more of biotite, chlorite, and muscovite (Figure 2.32). Scattered blocks of rubble are of thinly laminated, fine tuffs.

At Mount Cockfield, volcanic rocks of possible Mount Nansen age are restricted to the Mount Cockfield Graben and are associated with later subvolcanic to epithermal intrusive rocks, including the Mount Cockfield Stock. Two main types of volcanic rocks are present (7b, 7d).

Subunit 7d is a mafic-rich zone dominated by andesite flows, containing lesser andesite tuffs (**7dt**), and minor sequences of commonly very siliceous, felsic tuffs and fine breccias (**7dft**). It occupies the eastern part of the graben, and is separated by a major fault from a felsic zone to the west, dominated by rocks of Subunit 7b. The felsic zone contains two major cooling units, each of which shows gradational contacts between a lower flow-banded phase, a central welded-tuff phase, and an upper unwelded-tuff phase.

Dyke swarms, and individual dykes of similar composition to the flows, cut basement rocks in several regions. The dykes may be of more than one age, but are grouped as **Unit 9** based on lithological similarities and spatial association to rocks of Unit 7. Near Mount Cockfield, a major dyke swarm trends northwards and splays out north of Battle Creek. Elsewhere, dyke swarms trend mainly northeastward; however, some swarms and individual dykes trend northwards and are perhaps later in age.

Subunit 9a contains dykes characterized by abundant plagioclase and lesser hornblende phenocrysts in a very fine- to extremely fine-grained groundmass dominated by plagioclase and K-feldspar. Most wider dykes are coarser grained; some of these contain scattered quartz and (or) biotite phenocrysts as well as those of plagioclase and hornblende. Phenocrysts are usually less than 3 mm in size. The groundmass colour generally is pale to light green, with finer grained varieties having a medium green colour. Some narrower dykes and borders of wider dykes have a dark green, almost glassy groundmass.

Subunit 9b contains dykes gradational in composition and texture from those of Subunit 9a. They are concentrated in the southeast part of the project area, whereas those of Subunit 9a are mainly in the centre and northwest. Dykes of Subunit 9b are characterized by abundant phenocrysts of plagioclase, hornblende, and quartz, and locally, biotite.

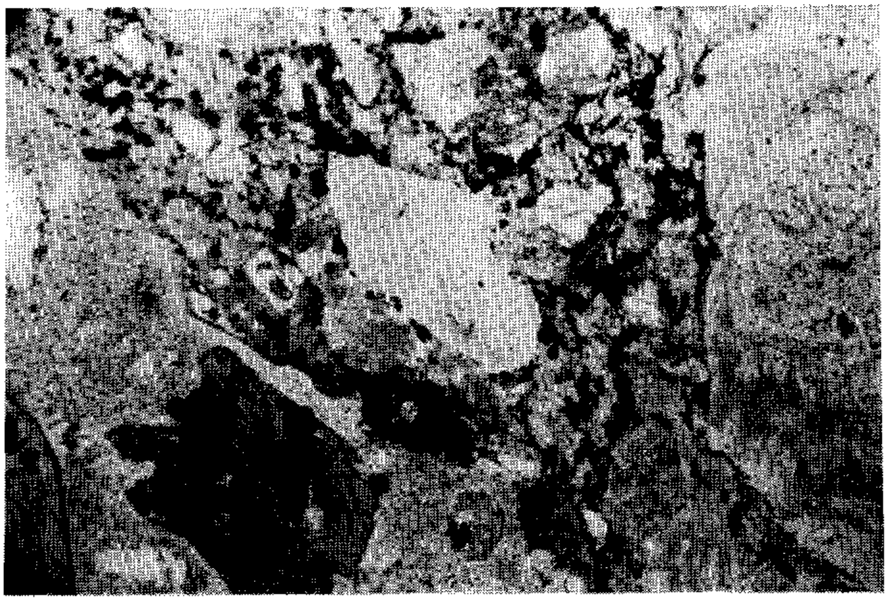


Figure 2.31. Photomicrograph of Subunit 7ax (andesite flow breccia): fragments of andesite lava flows in an igneous groundmass. Station P 872; plane light, length of photograph, 3.0 mm.

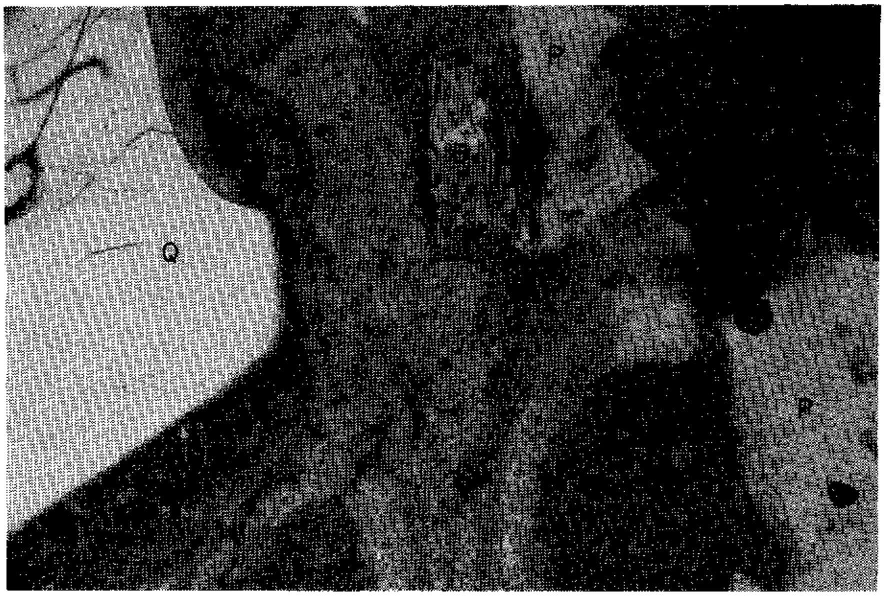


Figure 2.32. Photomicrograph of Subunit 7c (felsic dome or subvolcanic intrusion): quartz, plagioclase, and biotite phenocrysts in a felsic groundmass. Station P 766; plane light, length of photograph, 3.0 mm.

Characteristically, the groundmass is pink to cream coloured, extremely fine- to very fine-grained, and generally more siliceous than that of Subunit 9a. The pink colour is from disseminated secondary hematite.

In thin section, the rocks contain phenocrysts of plagioclase (15-30%), quartz (0-15%), hornblende (5-10%), and biotite (1-5%), with accessory opaque, apatite, and allanite, and a trace of zircon (Figure 2.33). Alteration of phenocrysts is variable. Much of the plagioclase is altered slightly to moderately to disseminated or patchy sericite. Hornblende is altered moderately to very strongly to chlorite and epidote, and biotite is altered slightly to strongly to pseudomorphic chlorite and epidote. The groundmass ranges widely in texture and grain size between samples, with some having an extremely fine grained groundmass dominated by plagioclase and lesser K-feldspar, and others a very fine grained groundmass dominated by plagioclase, K-feldspar, and quartz. Epidote forms scattered, subradiating secondary patches, and calcite forms a few replacement patches up to 1 mm across.

Subunit 9c contains felsic dykes, with sparse to abundant plagioclase and (or) K-feldspar, and quartz phenocrysts in an aphanitic to fine-grained, leucocratic groundmass. Biotite forms a few small phenocrysts, replaced completely by pseudomorphic muscovite. The groundmass in coarser grained varieties commonly contains graphic intergrowths of K-feldspar and quartz, and subradiating aggregates of muscovite (Figure 2.34). Many dykes contain minor, disseminated Fe-sulphides, which weather to yield a slight limonite stain. Dykes of Subunit 9c are similar in composition to rocks of Subunits 7b and 7c, and are tentatively correlated with them. However, some of the dykes may be significantly younger.

Subunit 9d is the Mount Cockfield Stock which fills the northern part of the Mount Cockfield Graben. It is composed of a moderately porphyritic granodiorite containing phenocrysts of quartz and feldspars in a very fine grained groundmass dominated by feldspars. The groundmass also contains moderately abundant biotite and hornblende, and minor sphene and apatite (Figure 2.35). Plagioclase phenocrysts show fine, concentric, compositional zoning towards more sodic rims. Associated with the stock are dykes similar in composition to those of Subunits 9a, 9b, and 9d. Some of the dykes contain abundant megacrysts of pyrite and (or) magnetite up to a few millimetres across.

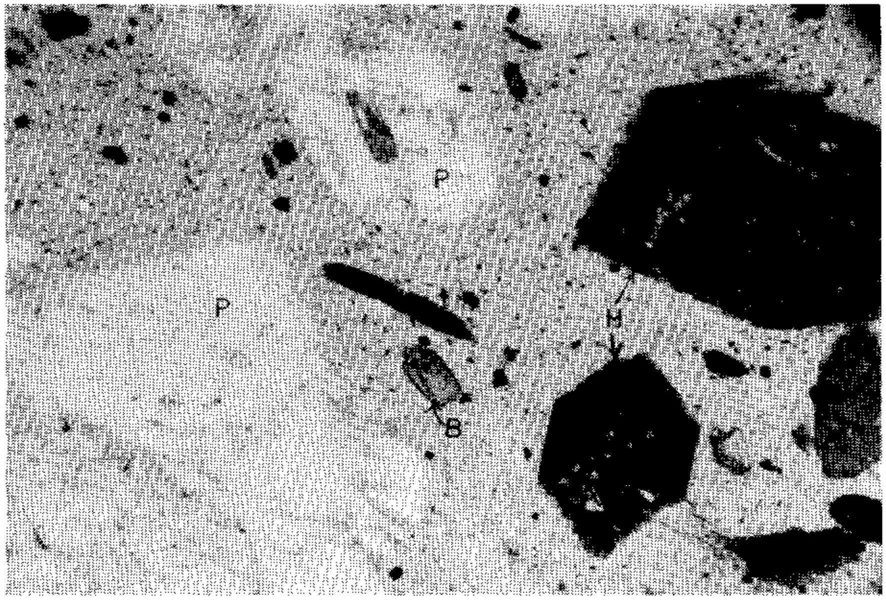


Figure 2.33. Photomicrograph of Subunit 9a (latite dyke): plagioclase, hornblende and minor biotite phenocrysts in a felsic groundmass. Station J 412; plane light, length of photograph, 3.0 mm.

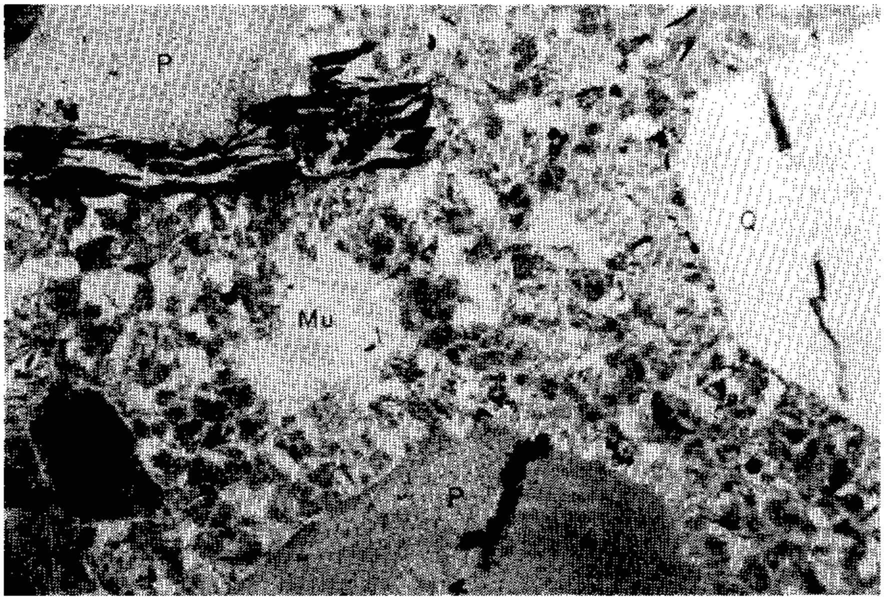


Figure 2.34. Photomicrograph of Subunit 9c (felsite dyke): phenocrysts of quartz, plagioclase, K-feldspar and biotite in a groundmass dominated by intergrowths of K-feldspar and quartz, with minor patches of secondary muscovite. Station P 142; plane light, length of photograph, 3.0 mm.

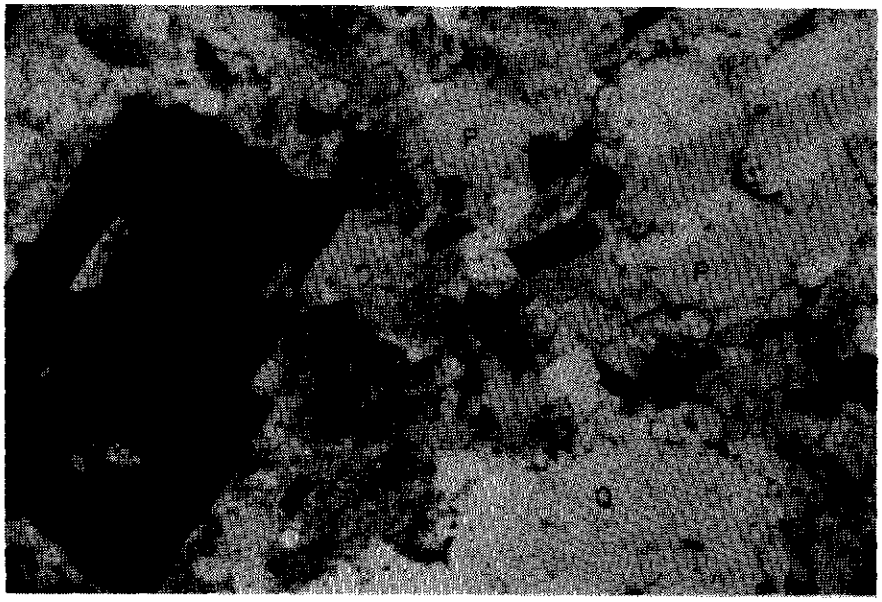


Figure 2.35. Photomicrograph of Subunit 9d (porphyritic granodiorite): plagioclase, quartz and biotite phenocrysts in a granitic groundmass. Station J 543; plane light, length of photograph, 3.0 mm.

2.3.6 Cretaceous Clastic Rocks

In the southeast corner of the Colorado Creek map area, a prominent mountain peak (elevation 1740 m) is capped by volcanic and hypabyssal rocks of the Carmacks Suite, which are underlain by rubbly exposures of the Caribou Creek Conglomerate (**Unit 10**). This, in turn, rests on an eroded surface of Subunit 5b. The conglomerate, which is up to 130 m thick, is poorly sorted and contains boulders, cobbles, and pebbles of locally derived rocks of Units 1, 5, and 9 in a sparse sandy to silty matrix. East of the project area, the conglomerate is more widespread.

The Colorado Creek Breccia (**Unit 11**) occurs along one ridge in the southeast part of the Colorado Creek map area. It is a landslide or talus breccia containing angular fragments of several rock types, dominated by Subunit 1b, with lesser ones of Subunit 1a, and scattered fragments of plutonic rocks (possibly Unit 5) and dyke rocks (Subunit 9a) (Figures 2.36 and 2.37). Most fragments are of the order of several centimetres across, but a few are up to 1 m across. The friable nature of many of the fragments (mainly those of Subunit 1b) indicates that they travelled only a short distance from their source. The groundmass of the breccia is sparse, and consists of comminuted fragments, mainly of Subunit 1b, with minor to abundant hematite cement. Larger fragments are prominent near the base of the unit (at the east), where it overlies a westerly dipping bedding plane surface in Subunit 1a. This may be the slip plane along which major landslide movement took place. Further east along the ridge are a few small outcrop zones of the breccia. A large outcrop zone of similar breccia at the southwest end of Stevenson Ridge (west of the project area) is of the same unit (Tempelman-Kluit, pers. comm.). The breccia is younger than rocks of Unit 9, and may have formed as a result of tectonic movement initiated at the beginning of the Carmacks volcanism.

2.3.7 Carmacks Suite

Locally at the base of the section of Carmacks volcanic rocks is a thin sequence of rhyodacite tuff (**Unit 12**). This thickens to the south and southeast beyond the project area towards a volcanic center containing rhyodacite to rhyolite domes. In the project area, it is exposed only in the south-central part of the Prospector Mountain map area, where it underlies basalt flows of **Unit 14**, and very locally on the south flank of Prospector Mountain, where it underlies coarse tuff and debris flow material of **Unit 13.**

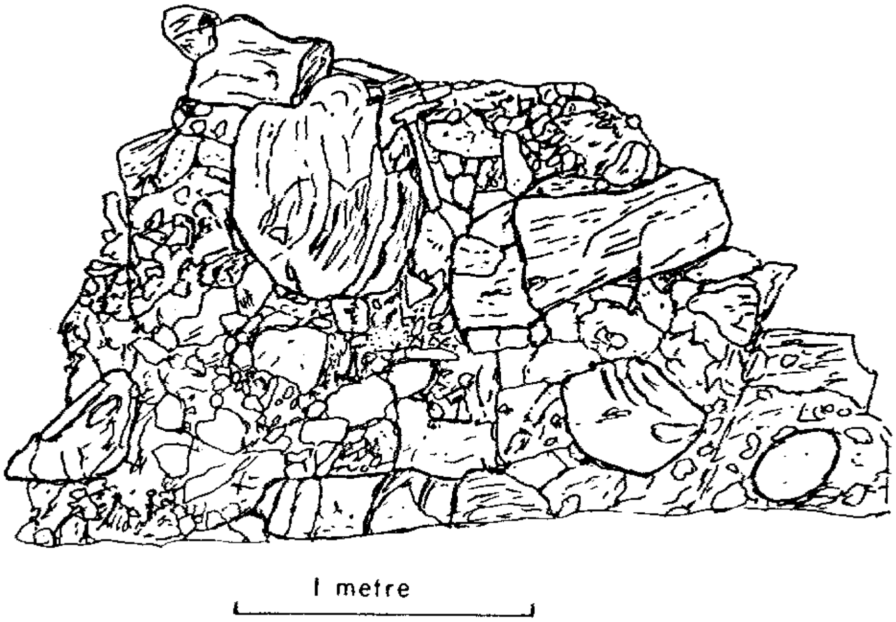


Figure 2.36. Sketch from a photograph of Unit 11 (landslide or talus breccia): fragments of Subunits 1b (quartz-mica schist) and 1a (quartzite).

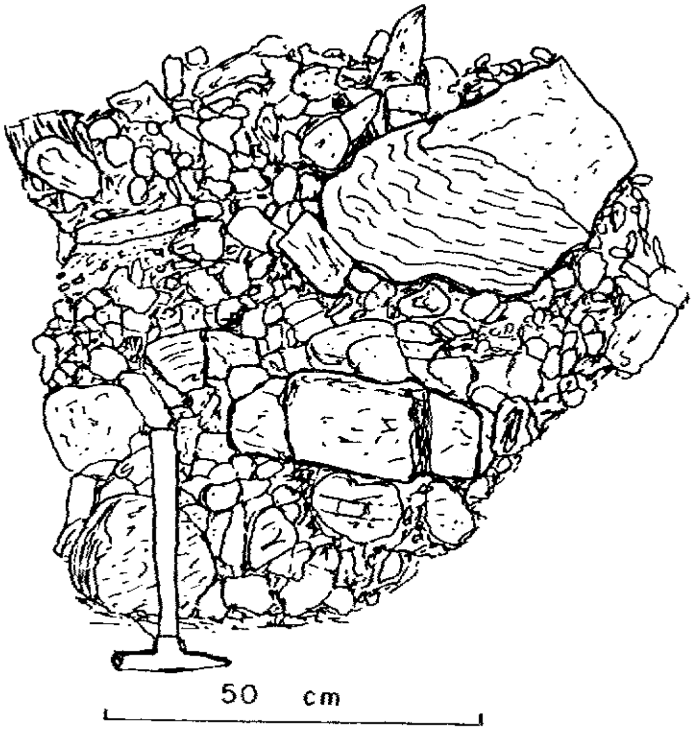


Figure 2.37. Sketch from a photograph of Unit 11 (landslide or talus breccia): fragments of Subunits 1b (quartz-mica schist), 1a (quartzite), and 9a (porphyritic latite dyke).

The rocks generally are reddish brown in colour, with 10-30% cream-coloured to reddish brown clasts averaging 1 mm to 1 cm in size. Many of these are flattened pumice fragments. Commonly, the outcrops show a prominent platy fracture set which appears to be parallel to original bedding. This has produced a crumbly to rubbly weathered surface. Local, more massive zones probably are welded tuffs.

The lower sequence of the Carmacks Suite (**Unit 13**) is dominated by andesite lava flows (**Subunit 13a**) and pyroclastic rocks (**13at**). Minor intervals consist of one or more of andesite flow breccias (**13ax**), andesitic tuffaceous sediments interlayered with shales (**13as**), and basaltic andesite lava flows (**Subunit 13b**). Locally, at the base of Unit 13, is a coarse debris flow (**Subunit 13x**), containing rounded to angular fragments of andesite flows, and lesser but abundant rounded fragments of basement rocks (Figures 2.38 and 2.39). Most fragments are from a few to several centimetres across; a few fragments are up to 30 cm in diameter. Most fragments of basement material are of plutonic rocks of Unit 5 and to a much lesser extent of Units 3 and 4. Scattered to locally abundant fragments are of Subunits 1a, 2b, 2c, and 2L. Bedded pyroclastic rocks (13at) are fine to coarse air-fall and waterlain tuffs, commonly with a prominent, platy parting parallel to bedding. Some intervals contain up to 3% disseminated magnetite. Fragments are mainly of andesite flows and tuffs. A few lava flows show a platy parting similar to that in the tuffs, and others are massive.

Andesite lava flows contain phenocrysts of plagioclase (5-15%), clinopyroxene and (or) amphibole (2-10%), and apatite (0-0.1%) in a groundmass of extremely fine- to very fine-grained plagioclase (65-85%), actinolite-chlorite (5-20%), opaque (0.3-2%), and apatite (0-0.2%) (Figure 2.40). Most clinopyroxene phenocrysts are replaced by pseudomorphic actinolite or by unoriented aggregates of actinolite. Hornblende(?) phenocrysts are replaced slightly to completely by aggregates of extremely fine grained sericite and chlorite. Some rocks contain amygdules up to 1.5 mm across dominated by very fine grained chlorite.

The upper sequence of the Carmacks Suite (**Unit 14**) is dominated by basalt lava flows (**Subunit 14b**) averaging several metres in thickness. A few flows are up to 20 metres thick. Flows were extruded onto a surface of low to moderate relief. The shape of outcrops commonly indicates the attitude of the flows. As well, attitudes of flows can be seen locally through a moderate cover of overburden and vegetation; for such zones, the trace of S_0 is shown on Maps 2.1, 2.2, and 2.3. Present attitudes reflect original gentle dips of flow surfaces, which in part were modified by small-scale block faulting, resulting

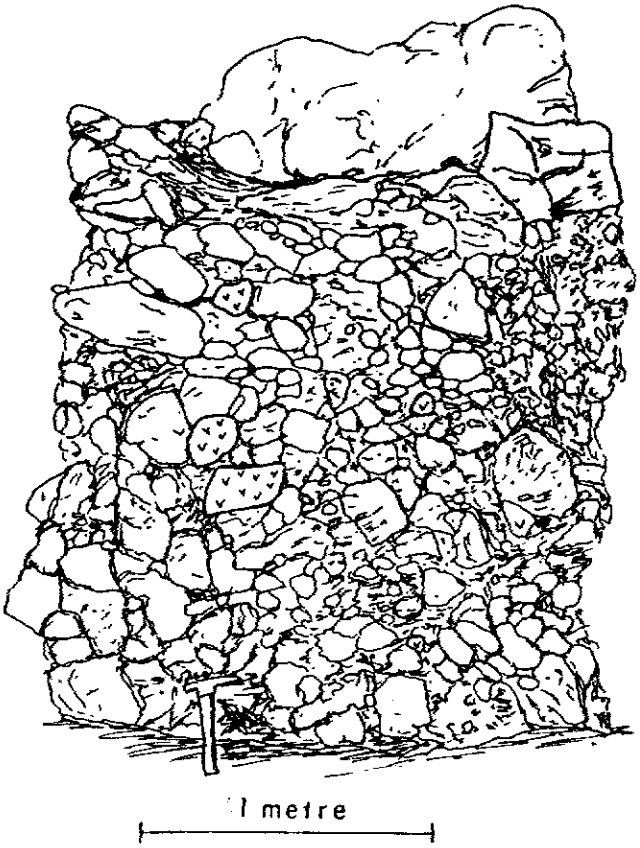


Figure 2.38. Sketch from a photograph of Subunit 13x (andesite breccia): rounded fragments of Unit 5 (quartz diorite) and Unit 13a (andesite lava flow) in sparse groundmass of andesite tuff.

in an increase in the dip of original laytering of up to 30 degrees. Flows are characterized by a resistant, massive, lower section (14b) and a generally much thinner, highly vesicular, upper section (**14bv**). The former is dark green to black in colour, and weathers reddish- to chocolate-brown. It contains abundant, irregular cooling cracks and commonly is strongly pitted on weathered surfaces. The latter is exposed only on a few major ridges, mainly as felsenmeer. It contains up to 5% irregular amygdular fillings averaging a few centimetres across of chalcedony and locally calcite. Crystalline quartz is common in larger cavity fillings. North of Big Creek, vugs reach sizes of 20 cm and locally occupy up to 10% of the rock. Many are zoned concentrically; outer zones of banded, purple-grey, cryptocrystalline chalcedony enclose cores of white, coarsely crystalline quartz, in part intimately intergrown with minor calcite. A few vugs contain cores of very coarse grained calcite inside the zone of crystalline quartz. The groundmass of the vesicular parts of flows is stained reddish-brown by hematite.

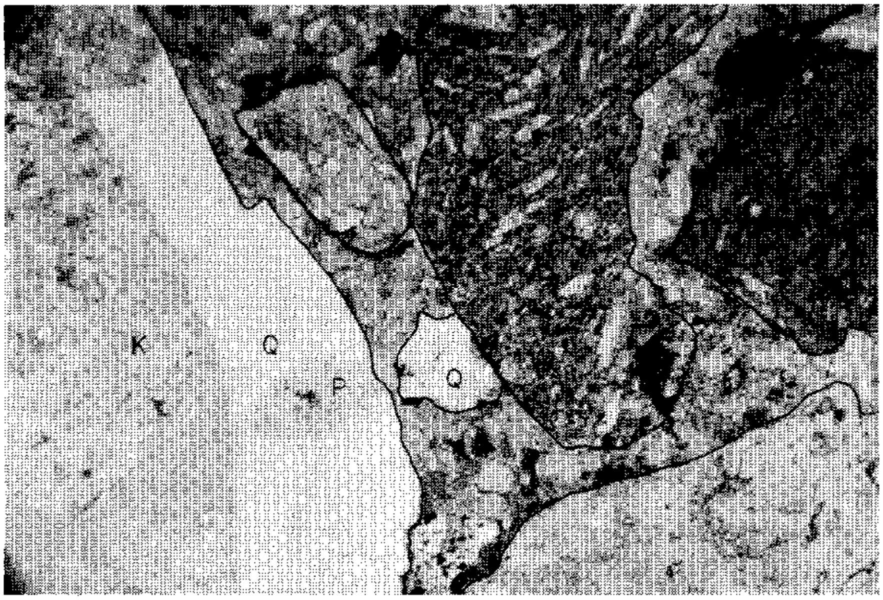


Figure 2.39. Photomicrograph of Subunit 13x (andesite breccia): fragments of plutonic basement and of andesite in a groundmass of andesite tuff. Station W 628; plane light, length of photograph, 3.0 mm.

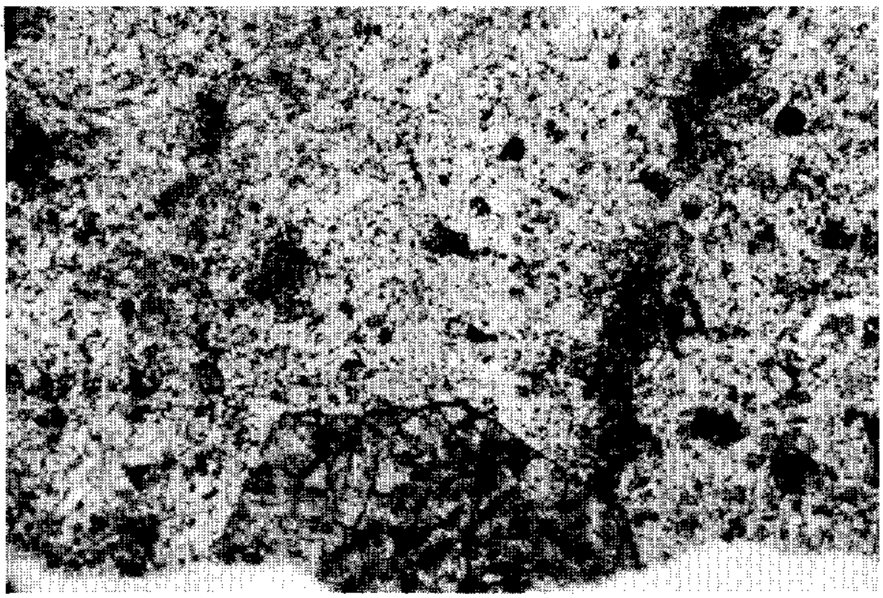


Figure 2.40. Photomicrograph of Subunit 13a (andesite lava flow): clinopyroxene phenocrysts in a plagioclase-rich groundmass. Station P 291; plane light, length of photograph, 3.0 mm.

Lava flows range from aphanitic, with only minor phenocrysts of clinopyroxene, to strongly porphyritic, with phenocrysts of black to dark green clinopyroxene, smaller, less abundant phenocrysts of pistachio-green olivine, and minor ones of colourless plagioclase. Disseminated magnetite (0-1%) is widespread. Locally, the sequence contains fine-grained tabular bodies, which may be cores of thicker flows or thin diabase sills (**Subunit 15d**). Elsewhere are small lenticular flows of porphyritic andesite (**Subunit 14a**). The latter are characterized by prominent plagioclase phenocrysts, with lesser ones of clinopyroxene.

Thicker parts of many basalt lava flows are characterized by phenocrysts averaging 1 to 1.5 mm across of clinopyroxene (5-15%) and olivine (2-7%) in a groundmass dominated by fine- to very fine-grained, lathy plagioclase (60-65%), and containing lesser equant clinopyroxene (10-15%), and minor olivine, chlorite, opaque, and apatite. Crystal-rich flows contain up to 25% phenocrysts, and clusters of phenocrysts of clinopyroxene and olivine (Figure 2.41). Clinopyroxene grains commonly show broadly to finely layered, concentric, compositional zoning, and many contain abundant, extremely fine grained, plagioclase inclusions concentrated in certain growth zones. Olivine is altered slightly to moderately to extremely fine grained secondary minerals (probably dominated by actinolite and chlorite). Plagioclase appears to be labradorite (composition not determined optically). Chlorite forms scattered interstitial patches of extremely fine grain size. Apatite forms acicular to elongated, prismatic grains intergrown with plagioclase. In one sample, amygdules (1-2% of the rock) up to 2 mm across are filled by fine-grained, radiating to irregular aggregates of calcite.

Lava flow tops (14bv) contain phenocrysts of labradorite plagioclase (5-15%) and clinopyroxene (3-7%) in an extremely fine- to very fine-grained groundmass dominated by lathy plagioclase and opaque hematite (Figure 2.42). Clinopyroxene is replaced slightly to moderately by irregular aggregates of extremely fine grained actinolite.

The Carmacks Suite contains several types of small, late intrusions (**Unit 15**), genetically related to the Carmacks lava flows.

Subunit 15a consists of aphanitic andesite and basalt dykes which cut country rocks throughout the project area and locally cut the layered Carmacks rocks. Dykes range in width from less than a metre to a few tens of metres. Many are discontinuous, and could not be traced from one outcrop to the next.

Subunit 15b is a northerly trending dyke swarm of very fine- to fine-grained, andesite to

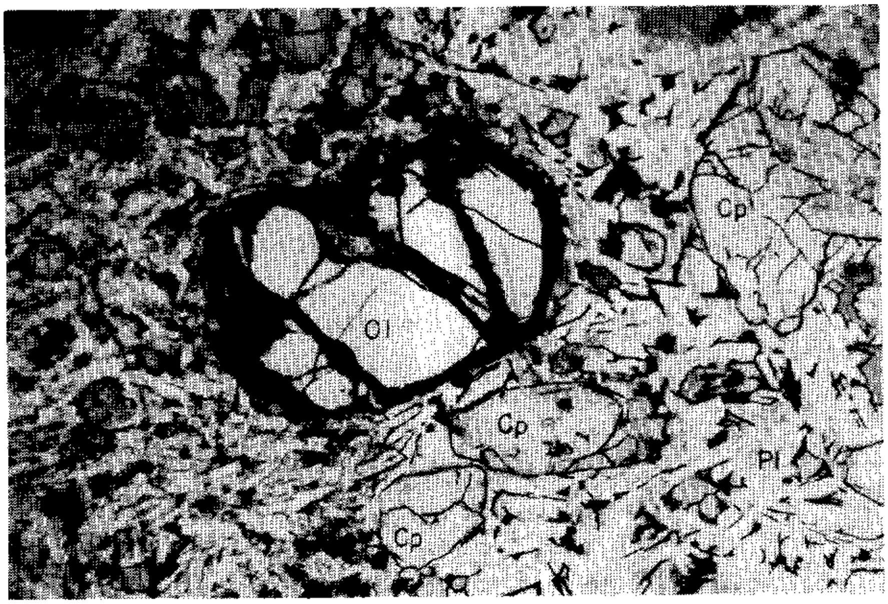


Figure 2.41. Photomicrograph of Subunit 14b (basalt lava flow): olivine and clinopyroxene phenocrysts in a groundmass of plagioclase and lesser clinopyroxene. Station P 736; plane light, length of photograph, 3.0 mm.

Figure 2.42. Photomicrograph of Subunit 14bv (vesicular basalt lava flow): plagioclase and clinopyroxene phenocrysts in a groundmass of plagioclase and hematite. Station P 375; plane light, length of photograph, 3.0 mm.

latite, to fine grained quartz-bearing monzodiorite (**Subunit 15b**). Most dykes are in the southern part of the Colorado Creek map area, and average 2 to 5 m in width. The dykes are much more resistant to erosion than enclosing rocks of Units 1 and 5b, and underlie many of the north-south trending spurs extending off the main east-west trending ridges.

The andesite consists of an aggregate of very fine- to fine- grained plagioclase laths in a groundmass dominated by anhedral plagioclase and hornblende-chlorite, with minor quartz and K- feldspar, and accessory apatite and opaque (Figure 2.43). Sparse phenocrysts consist of plagioclase, hornblende, and clinopyroxene. Interstitial patches of quartz, K-feldspar and minor calcite up to 1.5 mm across occur in coarser grained latite and monzodiorite.

Subunit 15c is an unusual potassic gabbro to monzogabbro which forms lenticular intrusions south of Mount Cockfield. One occurrence is a stubby ring dyke(?) along the western border of a small patch of Carmacks basalt flows. The dyke may be offset to the right a few hundred metres along a fault extending south from the Mount Cockfield Graben. The dyke contains a prominent, steeply dipping, closely spaced joint set, which trends northwestward, roughly parallel to the faults bordering the graben. The body ranges in texture and composition from medium-grained potassic gabbro near the west to fine-grained, slightly porphyritic, potassic monzogabbro to the east.

The gabbro contains relic cores of olivine (3-4%) surrounded by overgrowths of clinopyroxene (25-30%) (Figure 2.44). Olivine is slightly to moderately altered on fractures to brownish-green amphibole, and both it and clinopyroxene are rimmed locally by similar amphibole and (or) light green chlorite. These mafic minerals are intergrown with medium- to coarse- grained, slightly zoned, subhedral plagioclase (50-55%), bright red biotite (5-7%), and interstitial K- feldspar (7-10%). Apatite (1%) forms subhedral to euhedral grains up to 1 mm in length.

The monzogabbro contains clinopyroxene (12-15%), moderately altered to aggregates of extremely fine-grained biotite, hornblende, and chlorite. Plagioclase (25-30%) forms coarse- to medium-grained aggregates as in the gabbro. These are surrounded by a groundmass dominated by poikilitic to interstital K-feldspar (30-35%) with patches of quartz (7-8%) and very fine grained, subhedral prismatic plagioclase (7-10%) (Figure 2.45). Biotite (10-12%) forms subhedral, bright red-brown flakes, slightly altered to pale green chlorite. Hornblende (2-3%) forms anhedral interstitial fine-grained patches. Apatite (0.5%) forms abundant acicular grains in K-feldspar, and scattered, coarser,

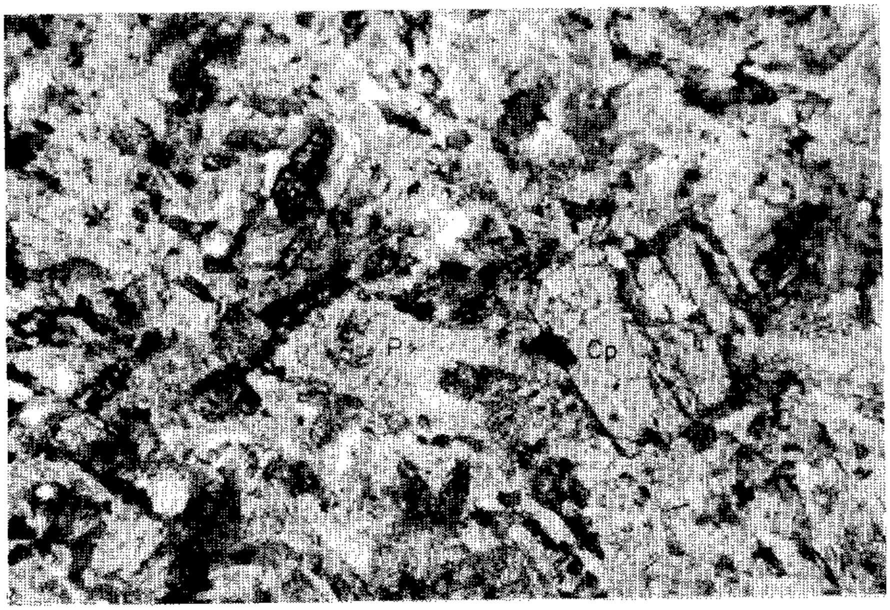


Figure 2.43. Photomicrograph of Subunit 15b (andesite dyke): phenocrysts of plagioclase and clinopyroxene in a groundmass of plagioclase hornblende-chlorite, and minor quartz and K-feldspar. Station W 332; plane light, length of photograph, 3.0 mm.

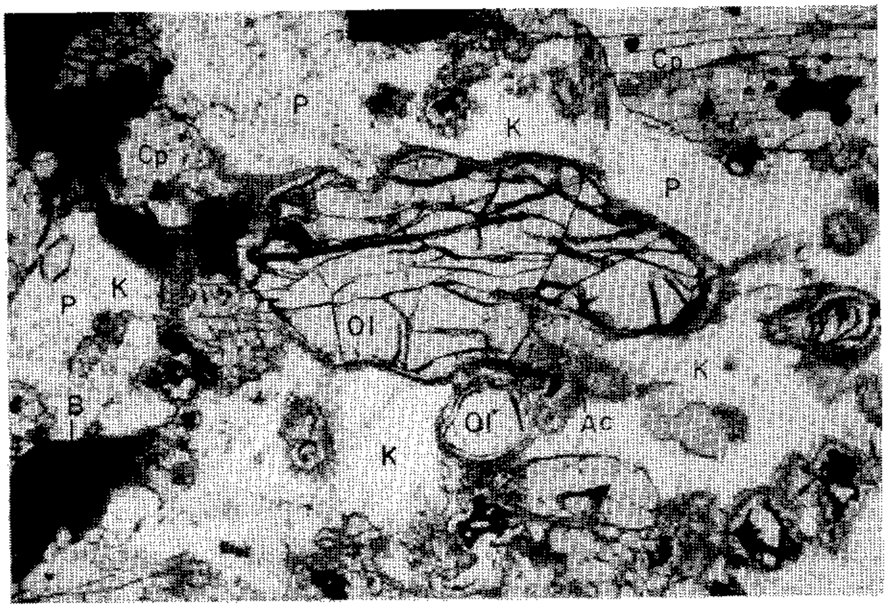


Figure 2.44. Photomicrograph of Subunit 15c (potassic gabbro): olivine and clinopyroxene surround by plagioclase, K-feldspar, and biotite. Station P 375; plane light, length of photograph, 3.0 mm.

subhedral prismatic grains associated with biotite. A few mafic patches (probably originally clinopyroxene) are altered completely to strongly interlocking, very fine grained aggregates of calcite, opaque, sericite-muscovite and biotite.

A second, smaller monzogabbro dyke trends northwestward across the top of the 1740 m peak at the southeast corner of Colorado Creek map area. It cuts through a thin sequence of flows of Unit 13a, which overlies a section of conglomerate rubble (Unit 10). The dyke contains cumulus, subhedral to subrounded, olivine grains (15-20%) up to 1.5 mm in size (Figure 2.46), a few of which are partly rimmed by clinopyroxene. The latter mineral also forms subhedral to euhedral grains up to 1.5 mm in length, most of which show broad to narrow growth zones of slightly different compositions. Labradorite plagioclase (50-55%) forms interstitial, anhedral aggregates, of slightly to moderately zoned grains averaging 0.3 to 1.0 mm in size. Plagioclase is moderately replaced by K-feldspar containing dusty hematite(?) inclusions. Biotite (possibly with some hornblende) (3-4%) forms anhedral, very fine to fine grains with a bright red colour. Opaque (1-2%) forms anhedral, very fine grains commonly associated with biotite. Apatite (0.1%) form tiny, acicular inclusions in feldspars.

Along the north side of the lower stretch of Big Creek are two plugs up to a few tens of metres across of medium- to coarse-grained potassic gabbro. Labradorite-andesine plagioclase (50-55%) forms moderately zoned, prismatic grains up to 2 mm long; many are altered along grain borders to patches of K-feldspar (7-8%). Clinopyroxene (15-20%) forms phenocrysts up to 2 mm in size and clusters of smaller grains; some are altered slightly to moderately to tremolite-actinolite, and others are replaced completely by patches of tremolite and opaque. Some clinopyroxene phenocrysts contain inclusions of olivine (1%) up to 0.2 mm across completely altered to opaque and secondary actinolite(?). Biotite (4-5%) forms ragged books, which are replaced moderately to strongly by pseudomorphic chlorite. Opaque (2-3%) occurs with actinolite and biotite. Apatite forms scattered acicular grains up to 0.6 mm long associated with feldspars. Epidote and sphene form minor grains and aggregates associated with actinolite. Tremolite forms secondary, commonly radiating patches of very fine grains.

Subunit 15d forms of a small plug or dyke of granophyric diabase on the west side of Prospector Mountain map area (lat. 62o 24' N., long. 138o 00' W.). It cuts basalt lava flows of Subunit 14b. Labradorite-andesine plagioclase forms phenocrysts (2-5%) up to 2 mm across, and unoriented prismatic grains (55-60%) averaging 0.5-0.8 mm in length (Figure 2.47). Clinopyroxene (15-17%) forms euhedral stubby prismatic grains up to 1 mm

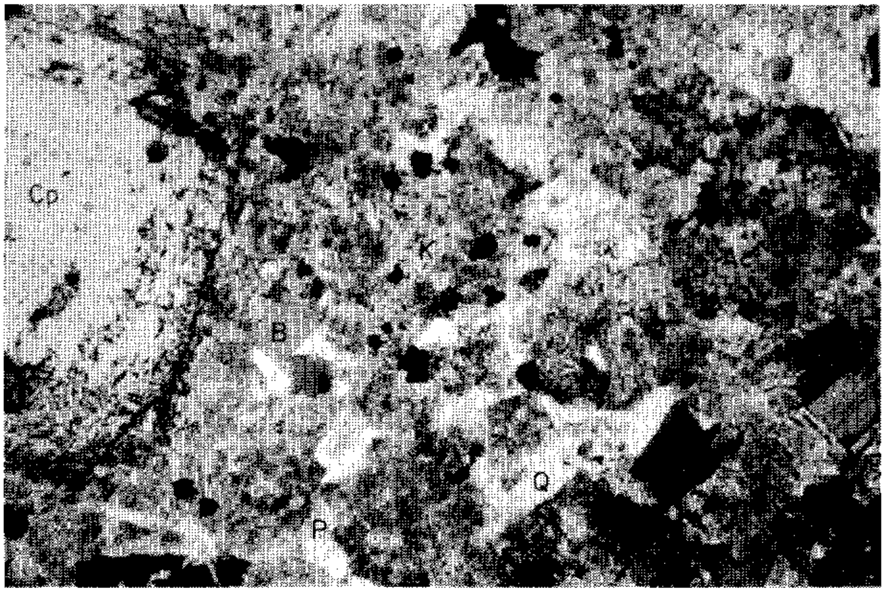


Figure 2.45. Photomicrograph of Subunit 15c (monzogabbro): phenocrysts of clinopyroxene (partly altered to actinolite) in a groundmass of K-feldspar, quartz, plagioclase, and biotite. Station J 685; plane light, length of photograph, 3.0 mm.

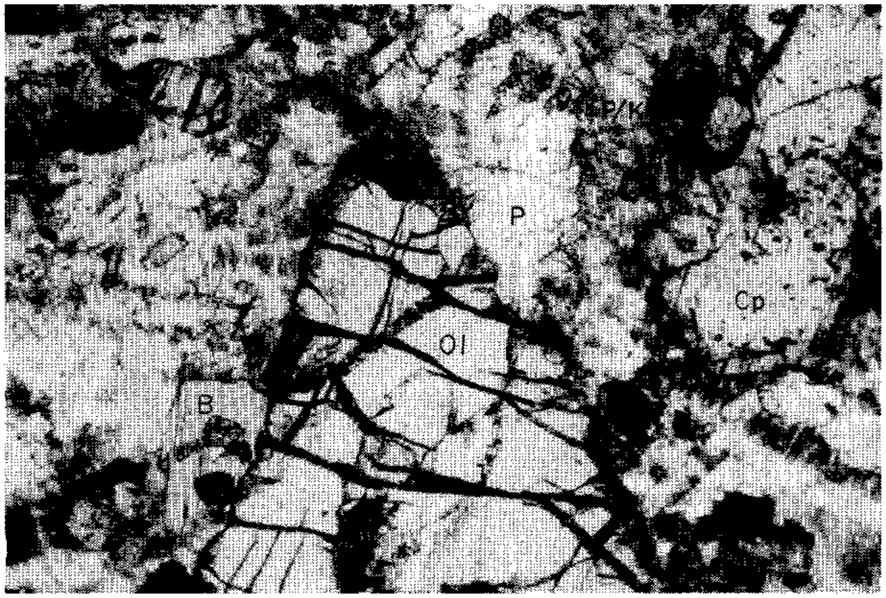


Figure 2.46. Photomicrograph of Subunit 15c (potassic gabbro): olivine and clinopyroxene surrounded by plagioclase (partly altered to K-feldspar) and biotite. Station K 266; plane light, length of photograph, 3.0 mm.

Figure 2.47. Photomicrograph of Subunit 15d (diabase): phenocrysts of clinopyroxene in a groundmass of plagioclase, biotite, K-feldspar and quartz. Station P 336; crossed nicols, length of photograph, 3.0 mm.

Figure 2.48. Photomicrograph of Subunit 16a (quartz-bearing monzonite): intergrowth of K-feldspar, plagioclase, quartz, actinolite, and biotite. Station P 295; plane light, length of photograph, 3.0 mm.

in size. It is variably altered; some grains are fresh, whereas others are replaced completely by secondary biotite, opaque, and actinolite. Reddish-brown biotite (2-3%) forms very fine grains and aggregates interstitial to plagioclase, and irregular patches surrounding or replacing clinopyroxene. K-feldspar (5-7%) and quartz (4-5%) form interstitial fine grained patches. Opaque (3-4%) forms irregular aggregates associated mainly with biotite and actinolite. Apatite forms minor prismatic grains. Calcite forms minor irregular patches of secondary origin.

On a prominent ridge southeast of the above mentioned locality (lat. 62° 18' N., long. 137° 5' W.) is a sill of similar diabase composition. This sill, approximately 10 m thick, is contained in sequence of Carmacks basalts.

2.3.8 Prospector Mountain Suite

Intrusive into andesite of Unit 13 at Prospector Mountain and Apex Mountain (to the west just outside the project area) is a large stock of the Prospector Mountain Suite (**Unit 16**). **Subunit 16a**, which makes up most of this stock, is an earlier, medium- to fine-grained, partly porphyritic, quartz-bearing monzonite, dated radiometrically at 68.2 Ma (Tempelman-Kluit, 1971; biotite, K/Ar). The rock is massive, and generally weathers to form broad ridges of coarse felsenmeer. Finer grained peripheral bodies and dykes of similar composition and commonly more porphyritic texture are designated **16af.**

Most rocks contain phenocrysts of plagioclase, K-feldspar, hornblende, and minor biotite in a groundmass of very fine- to fine-grained K-feldspar, quartz, lesser plagioclase, and minor biotite, opaque, and chlorite (Figure 2.48). Pale green actinolite (7-10%) forms secondary aggregates after hornblende phenocrysts, and also forms very fine grained, secondary patches of unoriented, stubby prismatic grains. Opaque is a prominent minor mineral, and apatite is moderately abundant locally. Zircon is a trace accessory mineral.

Subunit 16b crops out near the southwest corner of Prospector Mountain, along the border of Unit 16a. This subunit is a medium- to coarse-grained, leucocratic quartz-rich quartz monzonite. It generally shows moderate to strong quartz-sericite alteration, and contains very abundant quartz veinlets and veins. These range from discontinuous lenses with diffuse borders to veins up to several centimetres across (Figure 2.49). The rock has an irregular texture, with patches of very fine grained plagioclase and (or) K-feldspar, coarser porphyroblasts(?) of K-feldspar replacing plagioclase, irregular patches and

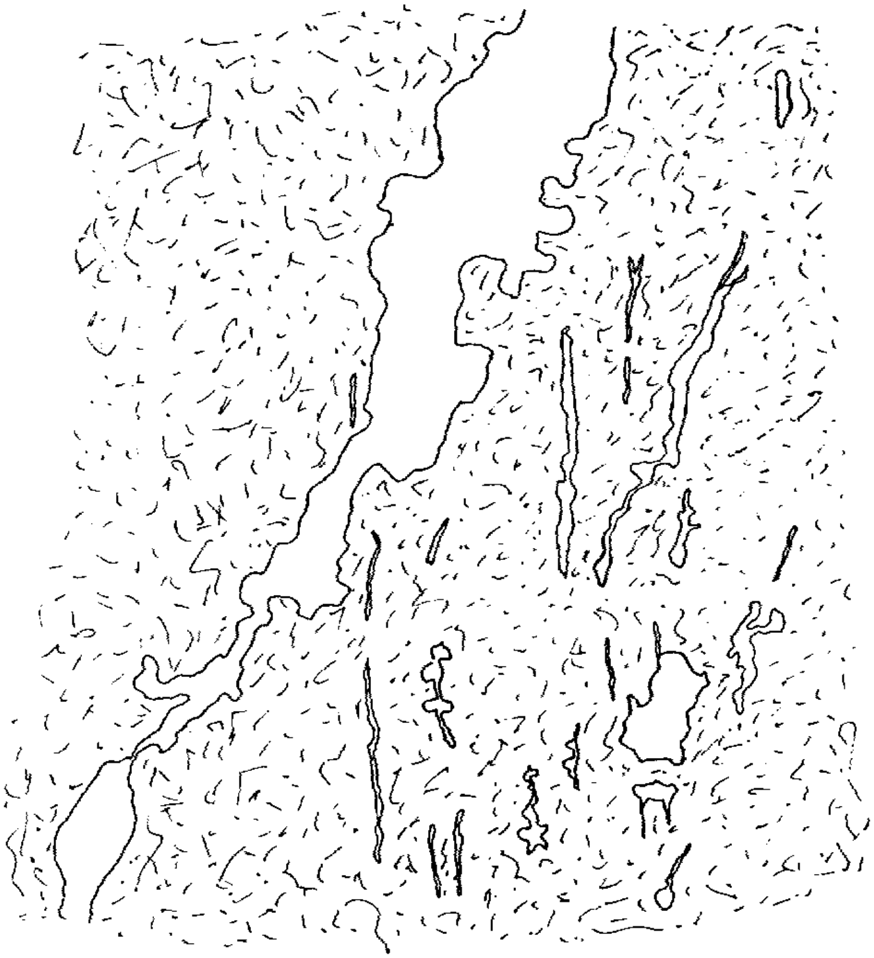


Figure 2.49 Line drawing from a photograph of Subunit 16b (quartz monzonite): Rock cut by quartz veins and veinlets. Scale of photographic 25 cm.

veinlike zones of quartz, and minor patches of chlorite (Figure 2.50). Muscovite forms scattered radiating aggregates, and sericite is abundant locally; probably both were formed by alteration of plagioclase. The texture of the rock does not indicate whether it is part of the basement or part of the younger intrusive suite. It is grouped with the younger suite because of its close spatial and genetic(?) association with alteration zones and veins in overlying andesites of Unit 13.

Porphyritic latite and quartz-bearing latite dykes (**Subunit 16c**) locally cut rocks of the Carmacks Suite, e.g., northeast of Big Creek. Dykes of similar composition and texture cut rocks of Unit 1 in the southeast part of the Colorado Creek map-area. These contain phenocrysts of plagioclase (15-20%) and K-feldspar (0-5%) up to a few millimetres across, and of biotite (2-5%) up to 1 mm across, in a groundmass dominated by very fine grained, strongly interlocking aggregates of plagioclase, K-feldspar, and minor quartz. Many K-feldspar phenocrysts include smaller, euhedral phenocrysts of plagioclase. Biotite phenocrysts are replaced completely by pseudomorphic muscovite with minor to moderately abundant brown oxide. Accessory minerals include irregular patches of hematite and (or) Mn-oxide (2-3%) and minor apatite.

2.3.9 Surficial Deposits

During Tertiary time, the region was eroded to a surface of low to moderate relief, with a few higher, rounded ridges. Uplift was renewed in the Late Tertiary, producing deeply incised, steep-sided valleys. Pleistocene valley glaciation scoured out U-shaped valleys, and deposited terminal, lateral, and ground moraines, and kame terrace deposits, with locally well-developed kettled surfaces (**Subunit 17g**). Recent erosion has cut valleys through these features and deposition has produced thick alluvial fill in many valleys (**Unit 17**). Along the upper stretch of Big Creek are two small Holocene landslides (**Subunit 17s**), the larger of which shows a prominent fault scarp and a typical hummocky debris field below.

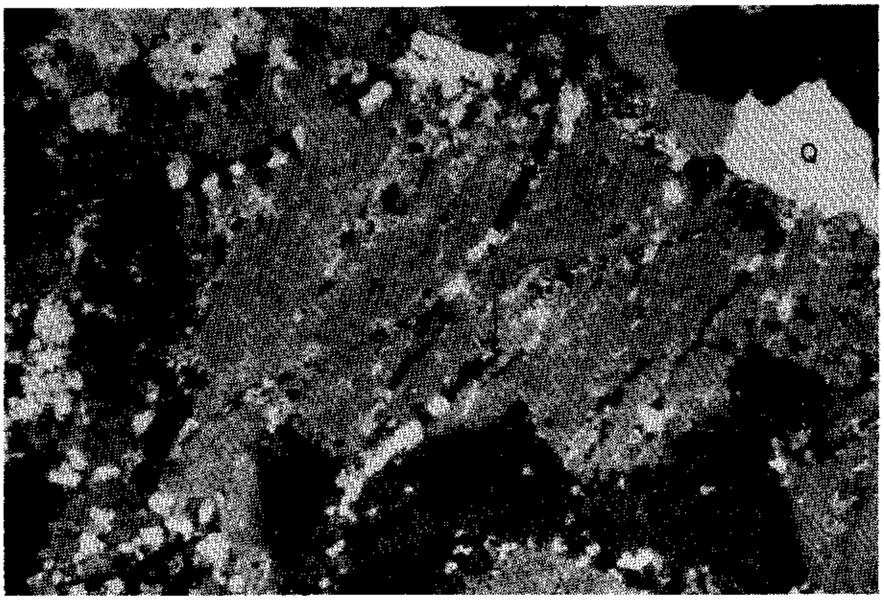


Figure 2.50. Photomicrograph of Subunit 16b (quartz monzonite): K-feldspar cut by quartz veinlets. Station P 309; crossed nicols, length of photograph, 3.0 mm.

3.0 STRUCTURAL GEOLOGY

3.1 Deformation in The Yukon Metamorphic Complex

Rocks of Units 1 and 2 were deformed during a period of regional metamorphism (**D_1**). The minimum age of metamorphism is indicated as Early Jurassic, based on radiometric K/Ar dates about 180 Ma (Tempelman-Kluit, 1974) for the Pelly Gneiss (equivalent to Subunit 2f) along the Yukon River just north of the map-area. These dates may represent a thermal event associated with the intrusion of rocks of the Klotassin Suite; the original regional metamorphic event may be of Late Paleozoic or Triassic age.

Rocks were folded around open to nearly isoclinal, mesoscopic folds, (**F_1**). Wavelengths and amplitudes range up to a few tens of centimetres (Figure 3.1). Data from mesoscopic folds (style of folding, vergence) indicate the presence of major folds. However, because of poor quality bedrock data in much of Units 1 and 2, and later warping of F_1 folds during a second metamorphic event, (**D_2**), the location and distribution of many of these folds are uncertain.

In major fold noses, a prominent mineral lineation (**L_1**) was developed on folded bedding plane surfaces (**S_0**) parallel to the fold axes (Figure 3.2). This feature is best developed in Subunits 1a and 2c, which have prominent bedding planes. In Subunit 1a, jointing is controlled by the intersection of the lineation and bedding, producing rod-like fragments in felsenmeer. In subunits without prominent bedding planes (1b, 2a, 2b, 2d), L_1 is weaker, and is defined by elongation of mica aggregates. In subunit 2e, lineation is defined by elongation of hornblende grains. In some fold noses, a weak to prominent axial planar foliation (**S_1**) was developed, and bedding planes are slightly offset along these surfaces (Figure 3.3).

On the limbs of the folds, bedding planes are transposed parallel to S_1, which dips moderately to steeply about the major fold axes. The fold axis lineation is absent or weak. Minor, isoclinal drag folds were recognized locally; these give an indication of the position of the major folds.

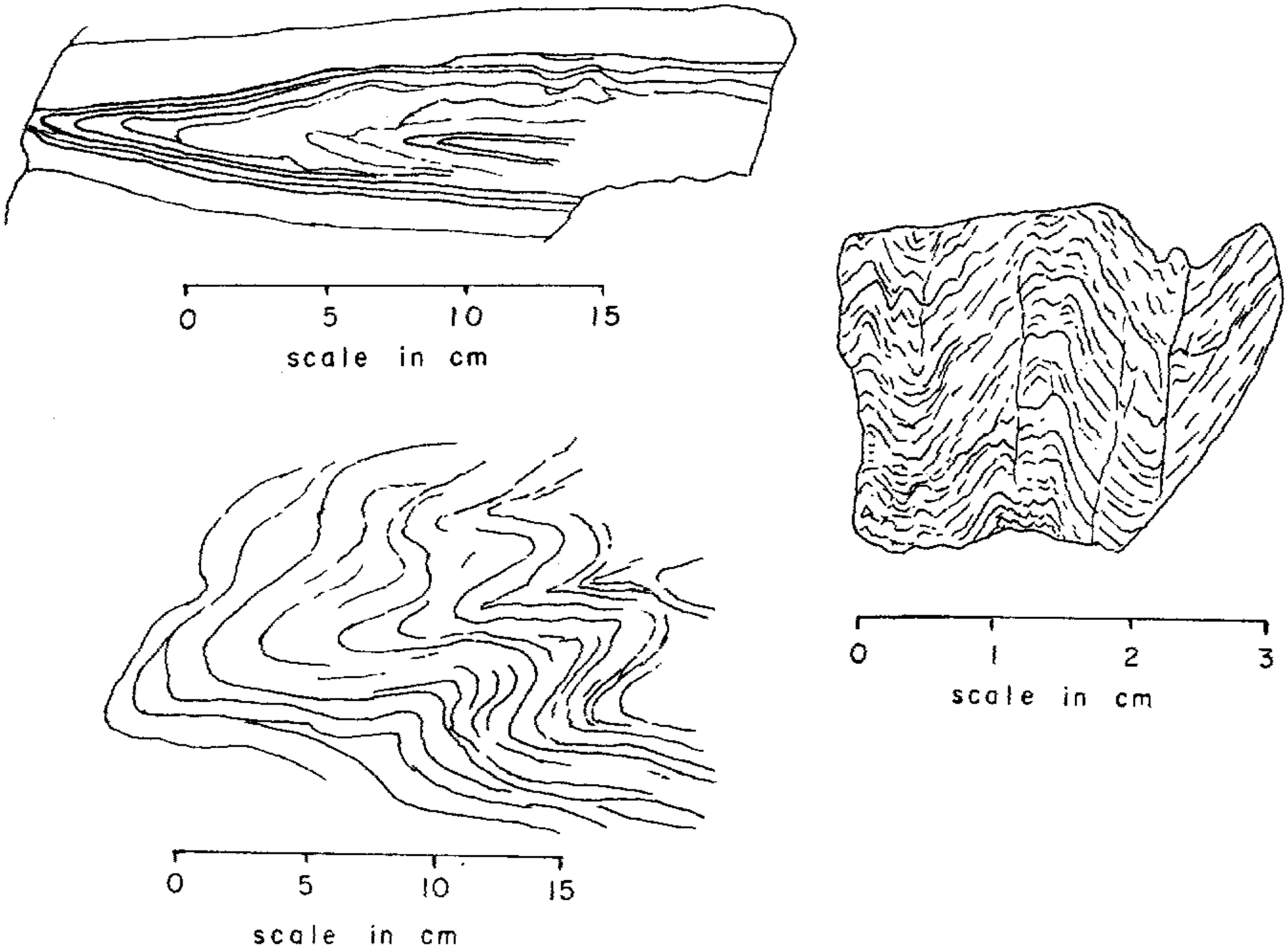


Figure 3.1: Line drawings from photographs showing various F_1 folds in quartzites of Subunit 1a.

The presence of a later period of deformation (D_2) probably related to the intrusion of the Dawson Range Batholith (Unit 5), is shown by warping of S_1 and by the variation in orientation of L_1 axis lineations within structural blocks.

Outcrop zones of rocks of the Yukon Metamorphic Complex were grouped into 14 structural blocks and the related data summarized in Figures 3.4a, b, and c. The distributions of S_1 and L_1 in Blocks 3, 8, and 11, where abundant data were collected, are shown in Figures 3.5a, b, and c.

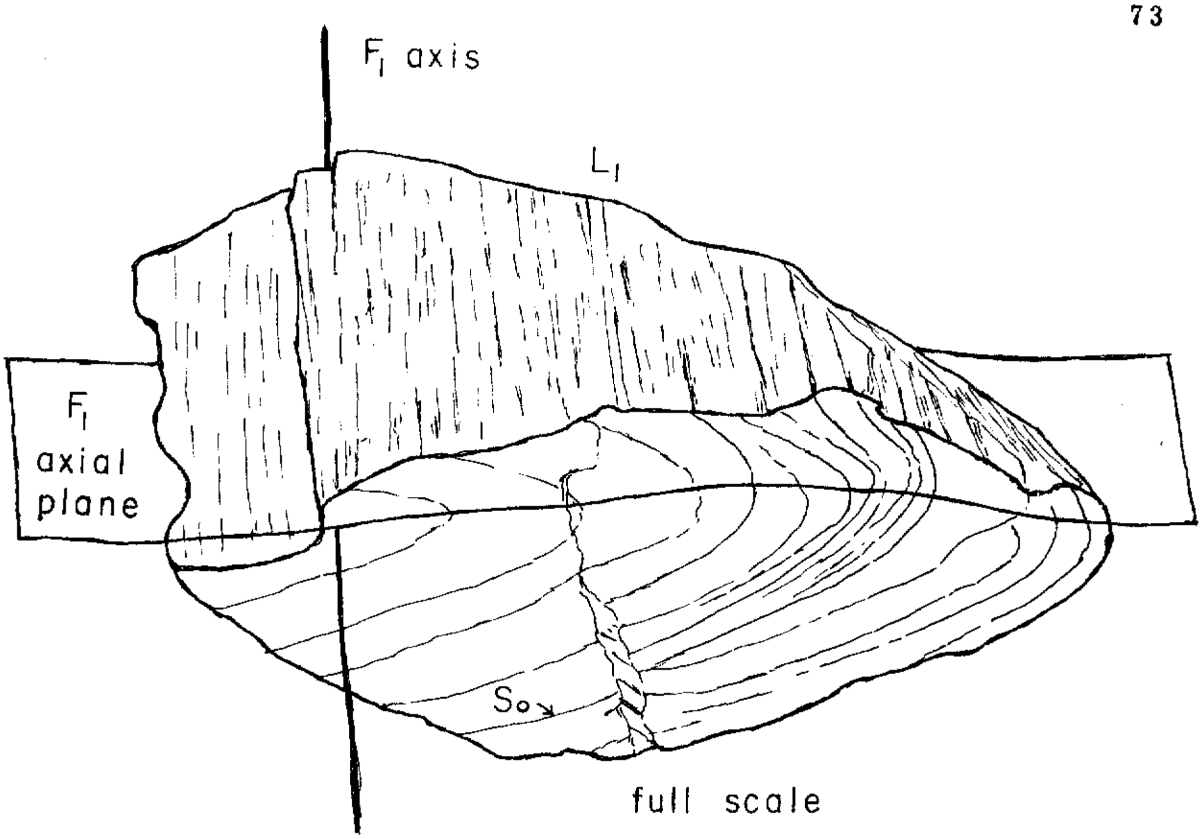


Figure 3.2. Line drawing from a photograph showing L_1 parallel to F_1 axis in quartzite of Subunit 1a.

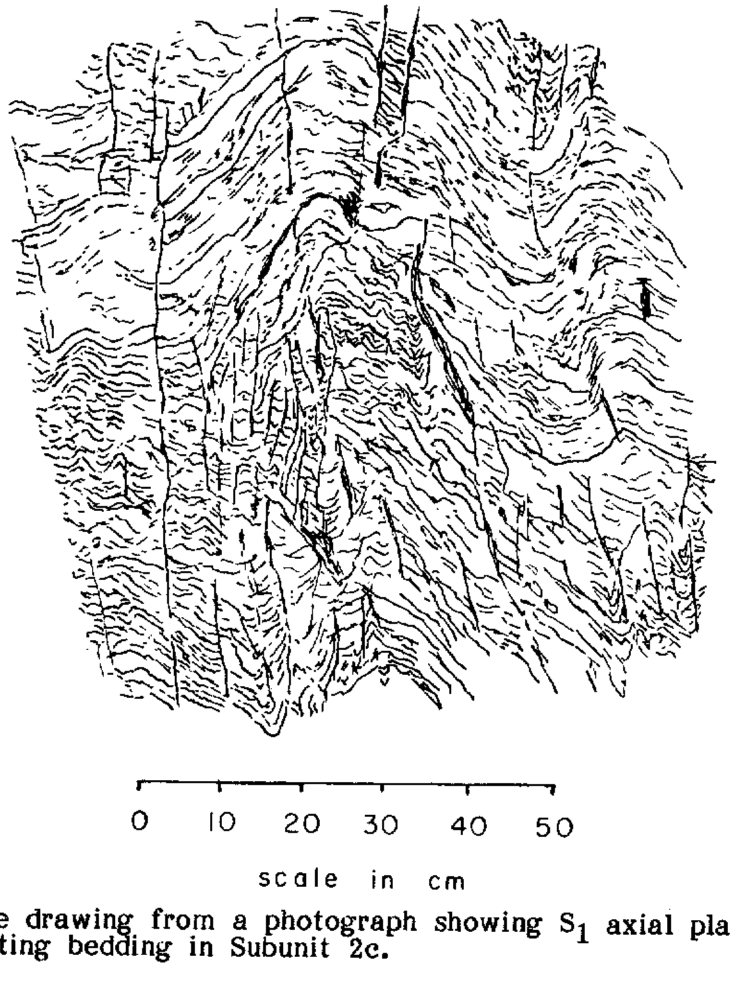


Figure 3.3: Line drawing from a photograph showing S_1 axial planar foliation cutting bedding in Subunit 2c.

3.1.1 Detailed Structural Analysis

Blocks 1 and 2 are remnants of basement rocks in the Dawson Range Batholith (Subunit 5a). Limited structural data show a predominantly east-west trend to foliation and a subhorizontal east-west lineation direction.

In Blocks 3, 7, 8, 9, 10, and 16, poles to foliation are concentrated in a girdle striking northeast and dipping steeply southeast, and lineations plunge gently to the southeast or east. However, within this overall framework are several important variations from the trend.

In Block 3, the largest block, L_1 is oriented in a girdle striking north-south and dipping gently eastward. This is consistent with warping of L_1 about a second fold axis (F_2) trending 075° and plunging 10° northeast. Such a deformation could have accompanied intrusion of the Dawson Range Batholith, but other explanations are equally possible. Block 3 was divided into three sub-blocks. In Sub-block 3a, S_1 folds are warped about fold axes trending northeast. In Sub-block 3b, L_1 ranges widely in orientation; S_1 is mainly on the northwest side of a major syncline plunging gently to the east. Outcrops along the north side of Klotassin River are on the southern hinge of this broad fold. The shape of the fold is outlined by several of the spurs leading off the south side of Stevenson Ridge; these are probably underlain mainly by Subunit 1a, whereas intervening valleys are most likely underlain by the less resistant Subunit 1b. Sub-block 3c is grossly similar to Sub-block 3b except just north of Colorado Creek where foliation locally dips northwest. This dip is inconsistent with the regional pattern, and suggests local warping.

Block 4 shows evidence of strong folding of basement rocks near the contact with the Dawson Range Batholith. The block contains three distinct subzones (4a, 4b, and 4c) each with different orientations of structural features. To the southwest, Block 4c has a gentle northerly dipping foliation and a northwest plunging lineation. To the east of this, Block 4b has a steep northerly trending foliation; no lineation were seen. To the north of these blocks and separated from them by a poorly exposed zone of quartz diorite of Subunit 5a, Block 4a has a steep westerly dipping foliation and a moderately steep lineation plunging southwest. These are consistent with a tight F_2 fold trending northwards and opening to the west, with the northern limb dipping steeply southwest, the southern limb dipping gently north, and the hinge zone at the east side of the block dipping steeply. The F_2 axis is subhorizontal (Figure 3.6).

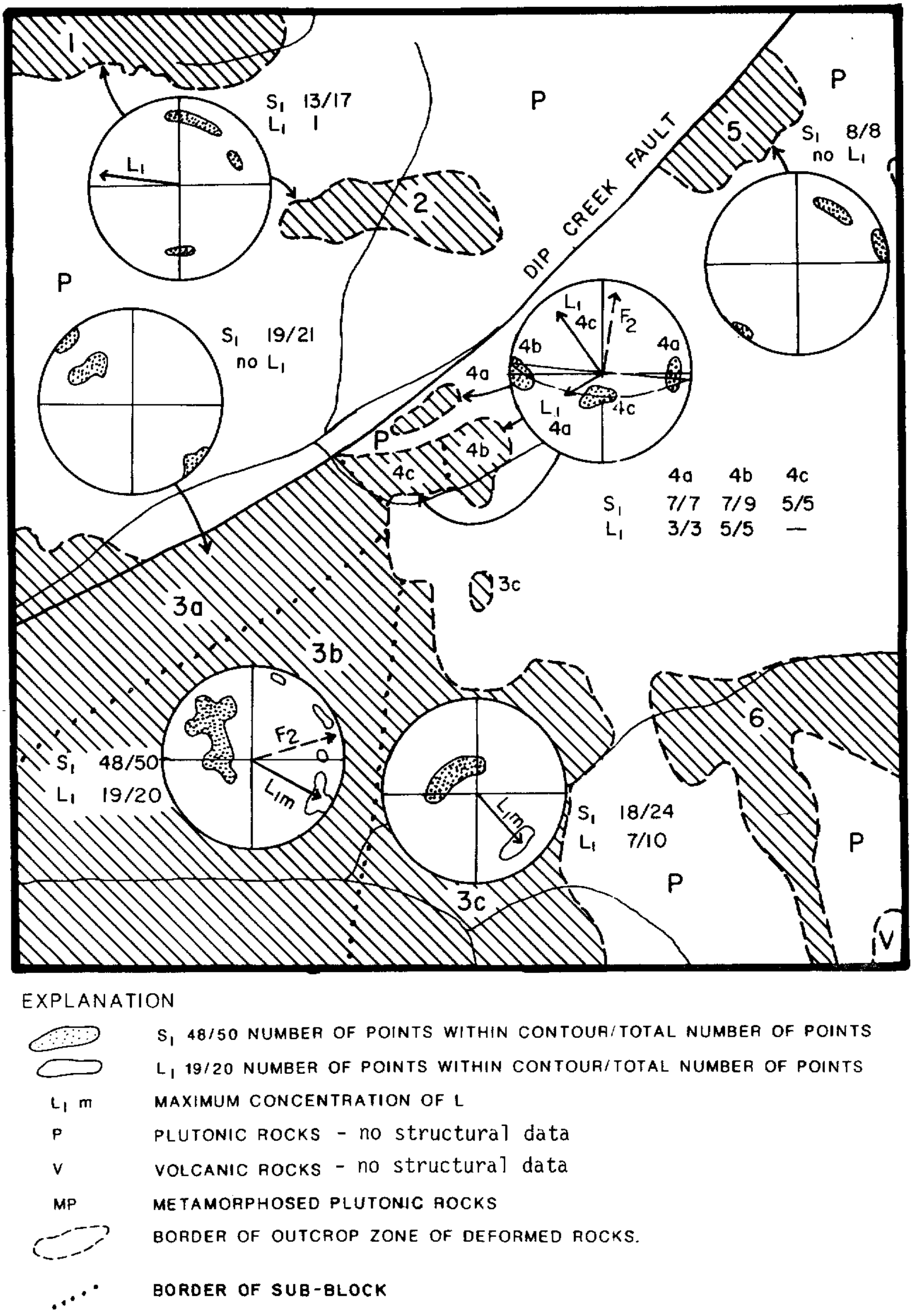


Figure 3.4a: Summary of structural data for S_1 and L_1 - Colorado Creek (115J/10)

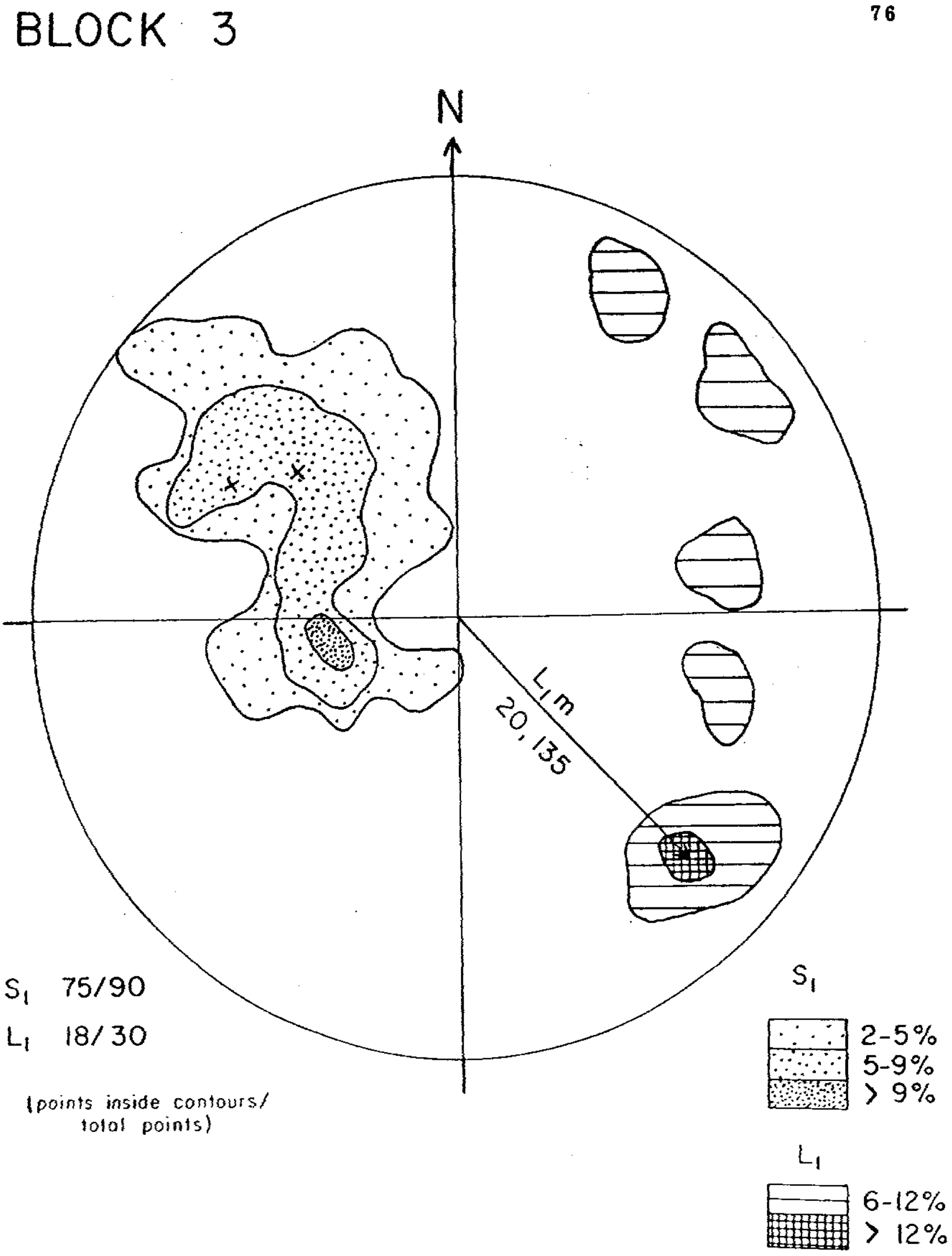


Figure 3.5a: Detailed structural data for Block 3 - Coloradao Creek (115J/10)

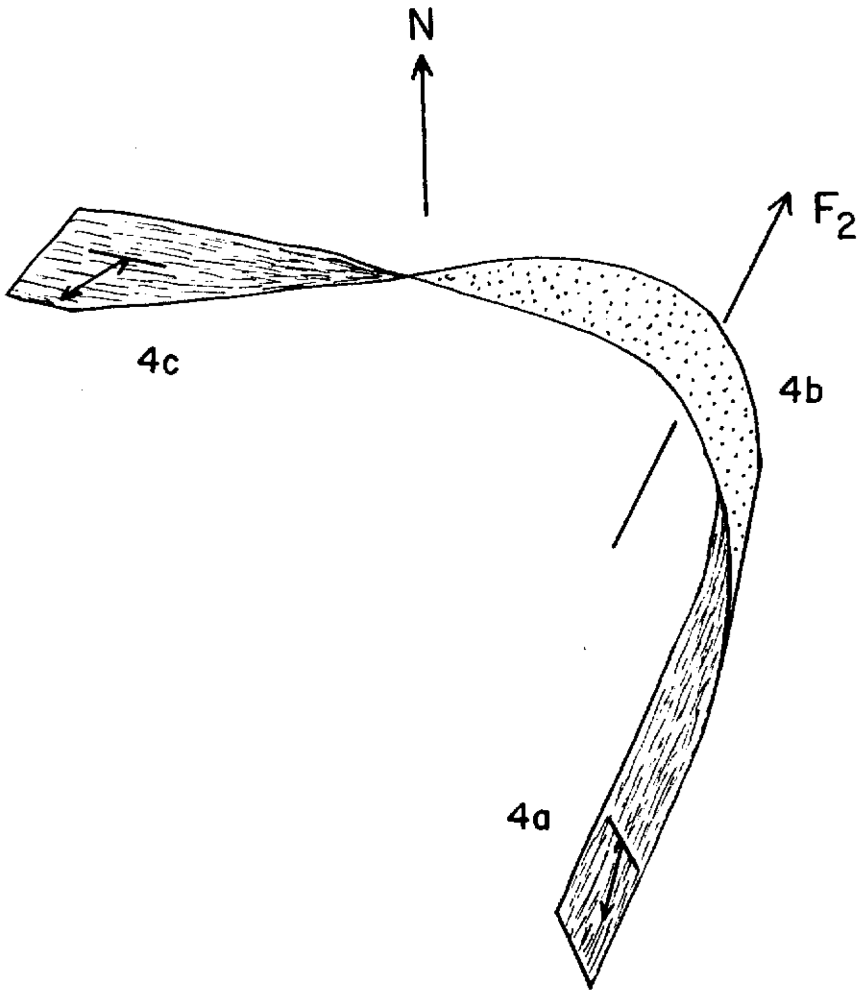


Figure 3.6. Structural Interpretation of Block 4: S_1 surface deformed by D_2

In Blocks 5 and 7 structural data are limited. The rocks are tightly folded about a lineation plunging gently east-southeast. The limbs of the folds are steeper in these blocks than elsewhere in the project area, suggesting that these blocks were more tightly folded by the same stresses as those which deformed the blocks to the south and southeast.

Block 6 contains too little structural data for meaningful analysis.

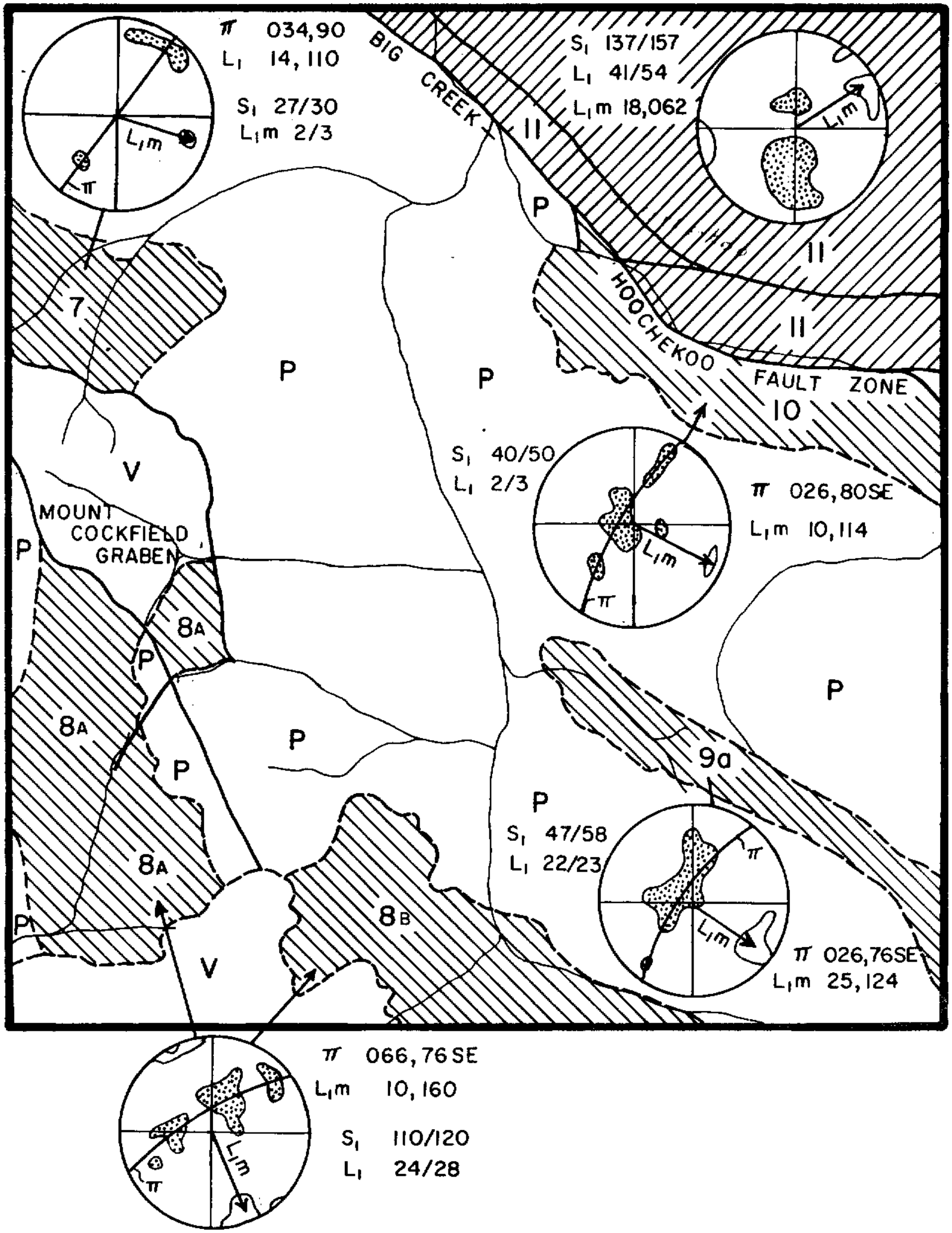
Block 8a contains a well-exposed ridge showing the details of deformation in felsic volcanic and volcanoclastic rocks of Unit 2. Rocks are folded about axes trending south-southeast and plunging gently southeast. Limbs of folds plunge gently to moderately. Block 8b contains limited data which is consistent with that of Block 8a.

Block 9a contains open folds plunging gently southeast in a narrow pendant sitting on top of the Dawson Range Batholith. The moderate scatter of data indicates more complex warping near the batholith borders. Block 9b shows similar features to Block 9a.

Block 10 is similar to Block 9, having open folds and a possible major fold closure near the west side. Rocks of Unit 1 are warped around the outside of what appears to be a northwest plunging antiform, within whose core are rocks of Unit 2. An alternate explanation of this relationship between Units 1 and 2 is that the contact is faulted.

Block 11 is north of the Big Creek-Hoochekoo Fault zone in the Yukon Cataclastic Terrane, and shows a completely different structure than the rocks to the south. Rocks are more strongly folded about an east-west trending fold system, with gently northwardly dipping axial planes. Most lineations plunge gently northeast or southwest, but show a wide scatter suggesting that they were warped strongly during a second period of deformation. The higher degree of deformation correlates with a higher degree of metamorphism and a more intense recrystallization of the rocks in this block.

Blocks 12 and 13 are small zones of rocks of Unit 2, in which moderately abundant structural data was available. In Block 12, foliations dip gently northwards, and lineations plunge gently north-northwest. In Block 13, foliations dip steeply to moderately southeastwards, and lineations plunge gently to the south. The blocks are in contact with a large zone of rocks of the Carmacks Suite, and some of the contacts may be along faults. The moderate to locally steep dips of adjacent rocks of the Carmacks suite suggest block faulting along borders of the basin. Such faulting could have caused rotation of Blocks 12 and 13 away from the regional trend.



see Figure 3.4a for explanations

Figure 3.4b: Summary of structural data for S_1 and L_1 - Selwyn River (115J/9)

BLOCK 8

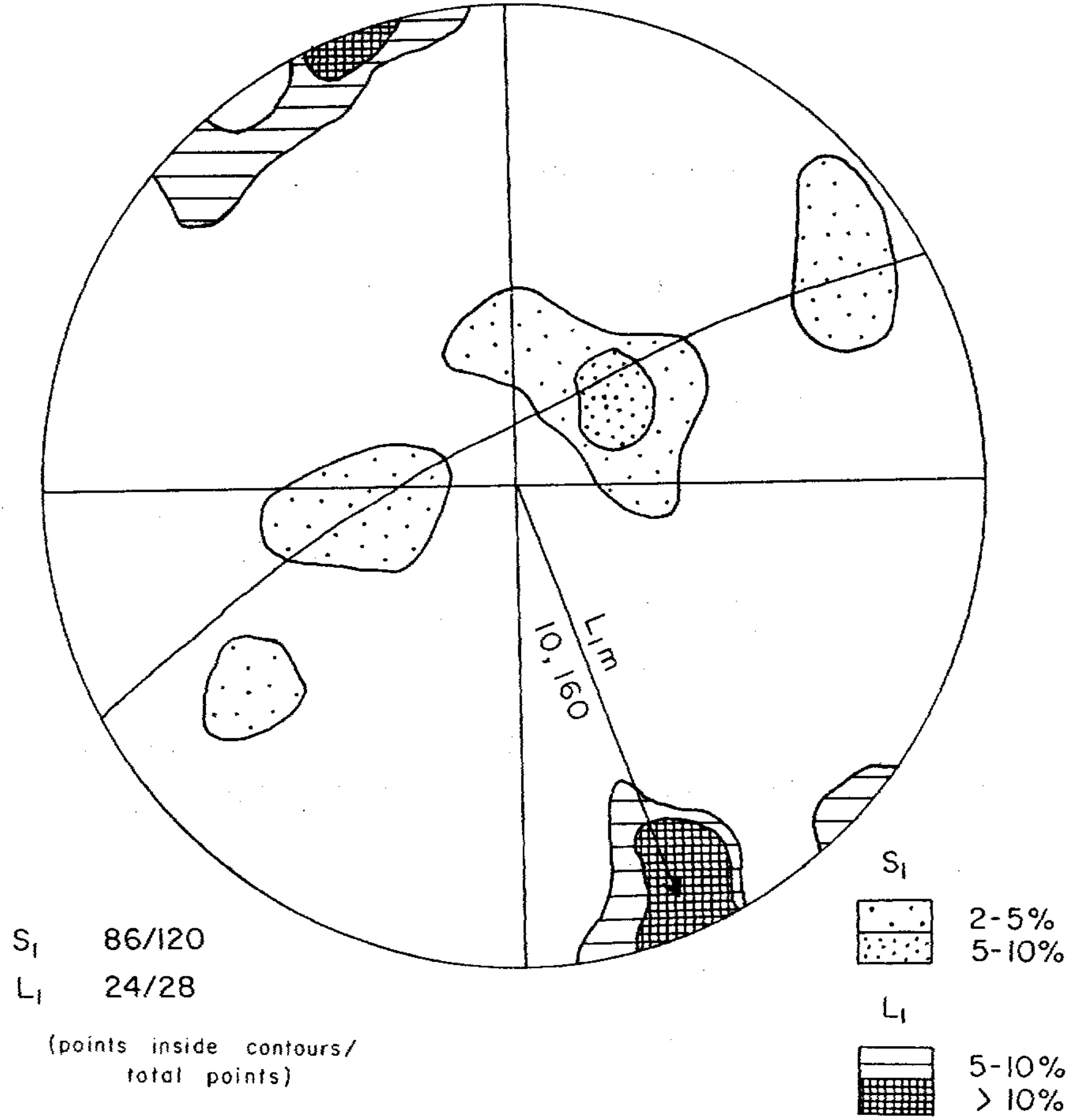


Figure 3.5b: Detailed structural data for Block 8 - Selwyn River (115J/9)

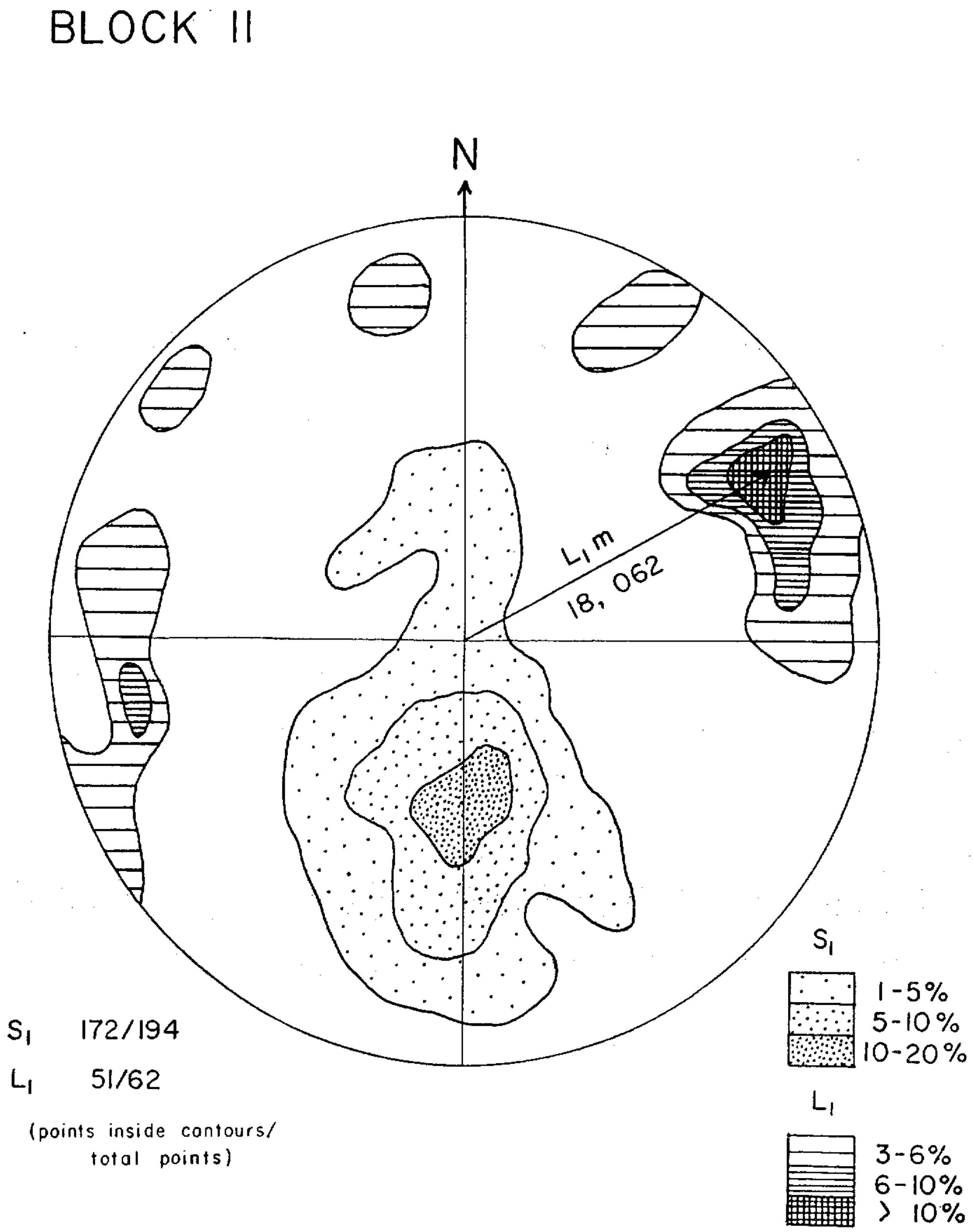


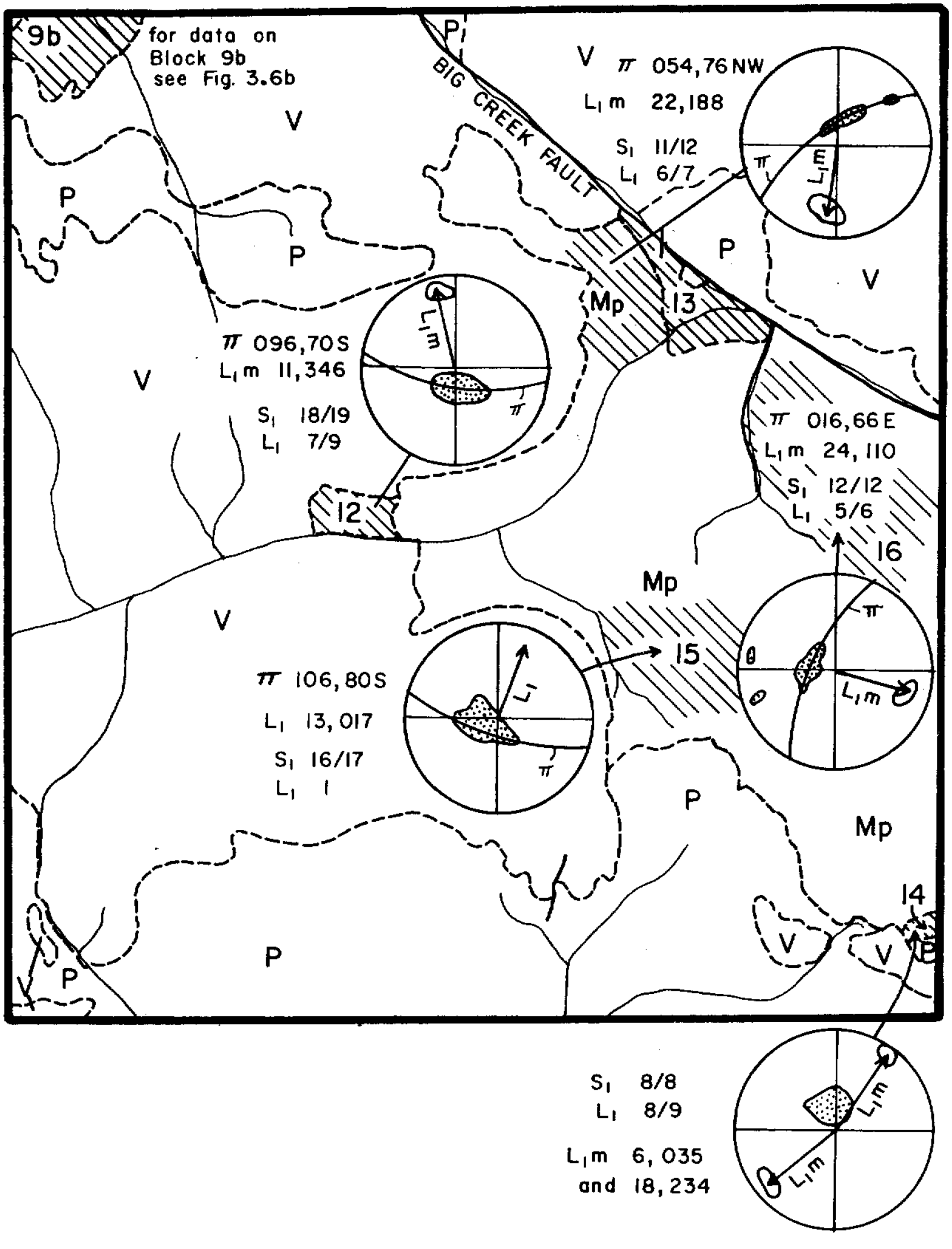
Figure 3.5c: Detailed structural data for Block 11 - Selwyn River (115I/9)

Block 14 is a small zone of gneiss of Unit 2 which extends into the Stoddart Creek map-area to the east. It shows a relatively flat lying foliation and a lineation plunging gently northeast or southwest. The structural trends in this zone are much different from the regional trends in the project area, but are similar to those of a large block of rocks of the Yukon Metamorphic Complex to the south (Tempelman-Kluit, 1971).

3.2 Deformation in the Klotassin and Big Creek Suites

Rocks of the Klotassin Suite show a pervasive metamorphic foliation of variable intensity. In much of Subunit 3b, mafic content is low and foliation is difficult to determine. In the core of the largest outcrop region of the subunit, the weakly foliated rock grades sharply into a zone up to one km wide of cataclastically deformed rock in which mafic minerals were destroyed. In this zone, a strong lineation and foliation are defined by elongation and flattening of quartz rods surrounded by feldspars (Figure 3.7). One thin section shows relic coarser grains of plagioclase and quartz surrounded by extremely fine- to very fine-grained zones of granulated plagioclase and quartz; the granulated zone contains a few recrystallized lenses of quartz (Figure 3.8).

On the ridge south of Big Creek at the east side of the project area in Block 16, a prominent foliation in quartz-bearing monzonite of Unit 4 is parallel to that in underlying rocks of the Yukon Metamorphic Complex. Locally a lineation is present which is also subparallel to that in the older rocks. Foliation commonly is prominent in coarse felsenmeer, but is much less obvious in outcrop. To the west of this block, diorite-granodiorite of Unit 3 is variable foliated. One zone (Block 15) shows a prominent, gently northeasterly dipping foliation and a north-northeasterly plunging lineation. To the northwest of this block a small unclassified region is characterized by a steeply westerly dipping foliation. This region is surrounded by unfoliated to weakly foliated rocks of Unit 3. The data suggest that the plutonic rocks of Units 3 and 4 were deformed with the metamorphic rocks of Units 1 and 2; the age of this deformation probably is Late Triassic to Early Jurassic.



see Figure 3.4a for explanations

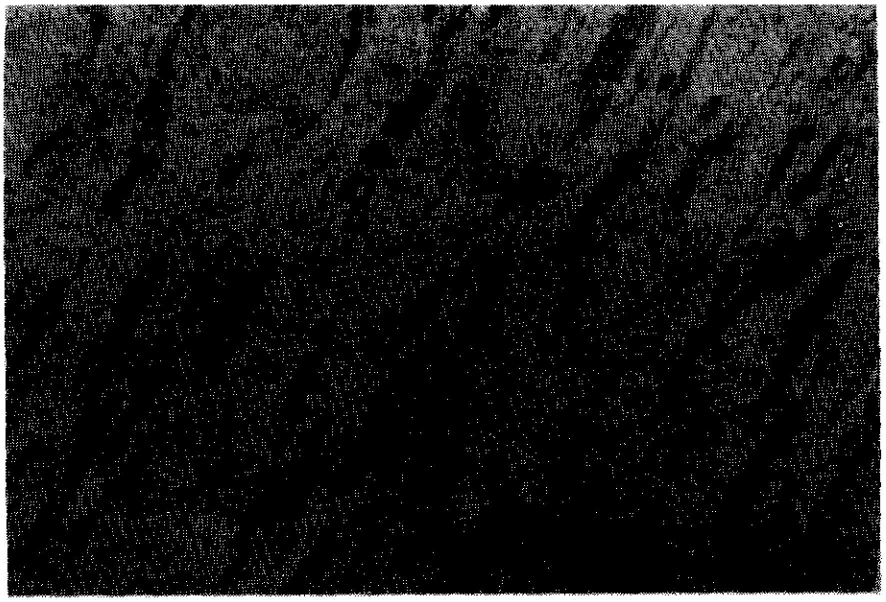


Figure 3.7. Photomicrograph of Subunit 3bD (deformed granodiorite): quartz lenses in feldspar-rich groundmass.

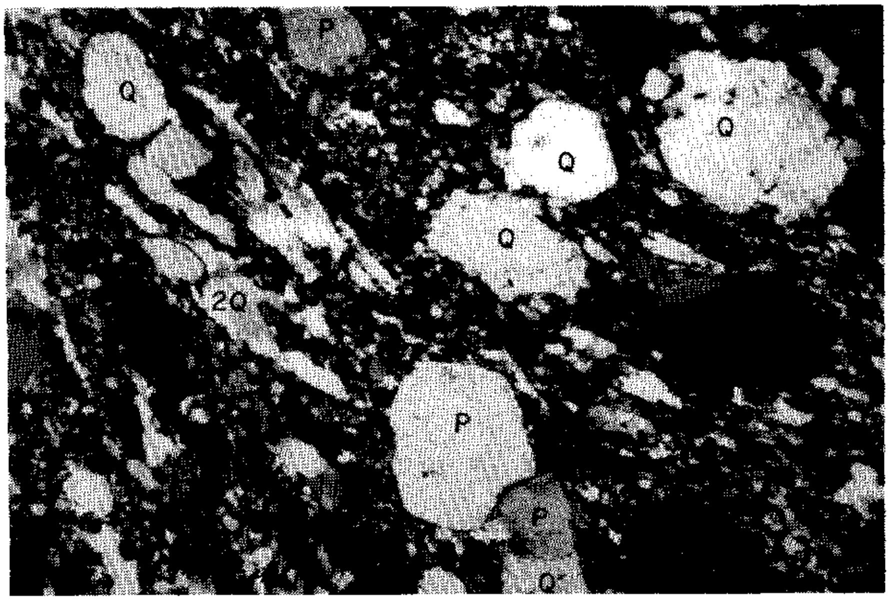


Figure 3.8. Photomicrograph of Subunit 3bD (cataclastically deformed quartz diorite): fragments of plagioclase and quartz in granulated groundmass containing lenses of secondary, recrystallized quartz.

3.3 Faults

Major faults include the Big Creek, Hoochekoo, and Dip Creek Faults, and the Mount Cockfield Graben.

The Big Creek Fault is a prominent linear feature, in the eastern part of the region, along the Big Creek, Valerie Creek and Hayes Creek Valleys. Along Big Creek, Tempelman-Kluit (1986, pers. comm.) considered it to be a normal fault associated with the collapse of Mount Nansen volcanic structures, with the southwest side down relative to the northeast. Further northwest, the fault passes out of the project area and re-enters it near the sharp westward bend in Hayes Creek at its junction with Selkirk Creek. Here, the Big Creek Fault joins a branch of the Hoochekoo Fault which extends eastwards along the Selkirk Creek valley. Another branch of this fault occupies a prominent linear valley parallel to and just north of Selkirk Creek. Both branches continue to the northwest off the map sheet near Selwyn River. The faults separate rocks to the north in the Yukon Cataclastic Terrane, metamorphosed in the lower amphibolite facies, from those to the south in the Yukon Crystalline Terrane, metamorphosed in the upper-greenschist facies. As well, the style and orientation of deformation features change sharply across this fault zone. The rocks to the north were deformed much more strongly than those to the south. Insufficient data is available to indicate whether the Hoochekoo-Big Creek Fault system is a strike-slip fault or a southerly dipping normal fault.

A small north-south fault along Jensen Creek may be a subsidiary to the Big Creek Fault. Movement is probably with the east side up relative to the west side. Another prominent north-south linear north of the Big Creek valley meets the Big Creek Fault near the headwaters of Valerie Creek. The extent and nature of offset could not be determined because of limited outcrop and lack of structural data in such outcrop.

The Dip Creek Fault is defined by a prominent linear feature extending along the south side of Dip Creek and northeastward along the Isaac Creek valley. Displacement is impossible to determine because of lack of outcrop along the fault. Along the northern part of the fault, one roof pendant of Yukon Metamorphic Complex is truncated. On the south side of Dip Creek, immediately adjacent to the fault, the plunge of L_1 is sharply reversed in rocks of Unit 1.

The volcanic rocks at Mount Cockfield are confined to the complex, northwest-trending Mount Cockfield Graben. Many of the boundary faults of the graben are inferred in areas of no outcrop. However, along the southwest, the bounding fault is exposed on a cliff face. The fault dips 75° northeast, and separates metavolcanic rocks of Unit 2 from andesites of Subunit 7d. Normal displacement on the fault is at least 500 m. A narrow porphyritic quartz-bearing latite dyke of Subunit 9a was intruded along the fault. On the northeast side of the graben, andesites of Subunit 7d are juxtaposed against metavolcanic rocks of Unit 2 and granodiorite of Unit 5. Andesite of Subunit 7d is separated from latite of Subunit 7b by a steeply dipping, north-south fault in the center of the graben. Relative ages of these subunits are unknown. Near the northeast border a subsidiary graben cuts andesite of Subunit 7d. To the south, the main faults bordering the graben extend into country rocks. East of the graben, a few subparallel faults of unknown displacement cut basement rocks.

The age of the Mount Cockfield Graben and associated igneous rocks is uncertain. Most probably they are of Mount Nansen age, but they may be as young as the Carmacks and Prospector Mountain Suites. Evidence suggesting a Carmacks age includes the following:

1) The boundary and related faults of the graben extend into country rocks, and further south are associated with, and may offset a monzogabbro dyke of Subunit 15c.

2) Andesitic rocks at Mount Cockfield (Subunit 7d) are similar to andesitic flows at Prospector Mountain (Subunit 13a).

3) The Mount Cockfield Stock (Subunit 9d) is similar in some aspects of texture and composition to quartz-bearing monzonite of Subunit 16a of the Prospector Mountain intrusions.

4) A strong positive aeromagnetic anomaly is associated with both the Mount Cockfield Graben and the volcanic and hypabyssal rocks at Prospector-Apex Mountains.

Features which are difficult to explain by this model include the following:

1) Felsic volcanic rocks at Mount Cockfield are similar to felsic volcanic rocks elsewhere in the Mount Nansen Suite.

2) Dykes of probable Mount Nansen age cut the felsic volcanic rocks at Mount

Cockfield, but are absent at Prospector Mountain.

A third possibility is that both Mount Nansen and Carmacks volcanic rocks are present in the Mount Cockfield Graben, with the felsic volcanic rocks being of Mount Nansen age and the mafic volcanic rocks being of Carmacks age. In this model, the Mount Cockfield Stock could be of either Mount Nansen or Prospector Mountain age. The felsic dykes at Mount Cockfield do not cut the mafic volcanic rocks in the graben.

4.0 GEOCHEMISTRY

Representative samples for whole-rock determinations were collected from all of the major igneous subunits. Their locations are shown on the accompanying geological maps. Whole-rock analyses for major and minor elements (SiO_2, Al_2O_3, Fe_2O_3, MgO, CaO, Na_2O, K_2O, TiO_2, P_2O_5, MnO, Cr_2O_3, Ba, and Loss on Ignition (LOI)) were conducted on 76 rock samples. Trace-element analyses for Pb, Sr, Nb, Y, and Zr were included on 34 of the samples. Most of the samples analyzed chemically are of the same rocks from which thin sections were prepared.

Samples were grouped by subunit; arithmetic averages for the major constituents and derived normative analyses in each subunit are tabulated for rocks of the Yukon Metamorphic Complex, plutonic rocks, and volcanic rocks in Tables 4.1, 4.2, and 4.3, respectively. Analyses of major elements in individual samples are presented in Appendix A and trace elements, in Appendix B.

In addition, 40 rock samples were collected from areas of economic interest to give an indication of the geochemical distribution of minor and trace elements. Samples were chosen either because of alteration or the presence of sulphides. The results of trace elements analyses for Ag, As, Au, Ba, Ca, Cd, Co, Cs, Eu, Fe, Hf, Ir, La, Mo, Ni, Rb, Sb, Sc, Se, Ta, Tb, Th, U, W, Yb, and Zn are presented in Appendix C. The distribution of anomalous elements is discussed in Chapter 6.2 with the geological description of the corresponding property.

Because of the limited number of samples, definitive conclusions can not be made. However, the following trends are significant.

1. Basalts and andesites of the Carmacks Suite are anomalously high with respect to potassium. This suggests contamination of basaltic and possibly andesitic magma by crustal rocks high in potassium.

2. Altered quartz monzonites of Unit 6 at the Casino and Pattison deposits are anomalously high in gold, molybdenum, and tungsten.

3. Veins and associated altered andesite of Unit 13 at Prospector Mountain are anomalously high in tungsten and iron. A few samples are anomalously high in one or more of the following: gold, antimony, arsenic, molybdenum, silver,

and zinc.

4. The Sonora Gulch (Hayes Prospect) area is anomalous in gold, silver, cadium, antimony, arsenic, and zinc. Bismuth was not analysed in this study but has been reported (Hayes Resources Prospectus, 1986).

TABLE 4.1

CHEMICAL ANALYSES OF ROCKS OF THE YUKON METAMORPHIC COMPLEX

ROCK UNIT*	1b	2a	2b	2d	2e	2f
NUMBER OF SAMPLES	2	1	1	1	1	1
Major and minor elements (%)						
SiO2	76.18	77.27	69.78	54.76	51.12	74.39
Al2O3	10.64	11.67	14.85	15.29	14.39	12.45
Fe2O3	3.84	2.07	2.85	9.83	10.75	3.63
MgO	1.21	0.22	1.24	4.64	7.07	0.75
CaO	0.26	0.71	2.08	5.83	10.61	3.17
Na2O	0.33	2.85	3.82	5.00	2.70	3.25
K2O	2.95	4.15	1.62	1.00	0.15	1.15
TiO2	0.57	0.21	0.43	1.17	1.48	0.34
P2O5	0.12	0.12	0.13	0.23	0.19	0.06
MnO	0.02	0.02	0.03	0.14	0.15	0.05
Cr2O3	0.01	0.01	0.01	0.01	0.05	0.01
Ba(ppm)	3670	441	870	1516	14	869
LOI	3.20	0.80	1.60	1.90	1.40	0.80
TOTAL	99.69	100.14	98.52	99.95	100.06	100.13
Normative Analyses (Cation Equivalents)						
QUARTZ	61.65	41.33	34.25	1.78	3.55	41.09
CORUNDUM	8.03	1.67	3.81			0.27
ORTHOCLASE	19.07	25.26	9.99	6.05	0.91	7.02
ALBITE	3.24	26.37	35.80	45.94	24.94	30.17
ANORTHITE	0.55	2.82	9.88	16.71	27.48	15.85
CLINOPYRXN					9.08	20.33
ORTHOPYRXN	3.93	0.63	3.57	15.42	17.01	2.98
MAGNETITE	2.37	0.36	1.13	2.86	3.21	1.99
CHROMITE	0.01	0.01	0.01	0.01	0.06	0.01
HEMATITE		0.99	0.65			
ILMENITE	0.87	0.30	0.63	1.67	2.12	0.49
APATITE	0.27	0.26	0.28	0.49	0.41	0.13

CLINOPYRXN = clinopyroxene; **ORTHOPYRXN** = orthopyroxene

***ROCK NAMES**

1b	Quartz mica schist	2d	Meta-andesite
2a	Rhyo-dacite	2e	Amphibolite
2b	Meta-dacite	2f	Quartzofeldspathic gneiss

TABLE 4.2

CHEMICAL ANALYSES OF PLUTONIC ROCKS

	KLOTASSIN SUITE	BIG CREEK SUITE		DAWSON RANGE SUITE						MOUNT NANSEN SUITE	PROSPECTOR MOUNTAIN SUITE	
								CASINO INTRUSION				
ROCK UNIT*	3b	4a	4b	5a	5b	5c	5d	6a	6b	9d	16a	16b
NUMBER OF SAMPLES	3	4	1	3	6	3	2	2	1	4	3	3
Major and minor elements (%)												
SiO2	70.87	62.58	66.13	63.22	66.42	77.31	54.27	74.17	75.95	64.01	68.51	75.40
Al2O3	15.26	15.94	15.90	15.18	15.56	12.03	17.80	12.51	12.82	16.10	14.54	13.00
Fe2O3	1.79	5.31	4.36	6.20	3.22	1.45	1.96	2.47	1.72	2.87	2.83	1.28
MgO	0.48	1.85	1.47	2.74	1.57	0.09	3.13	0.57	0.06	1.53	1.09	0.20
CaO	1.27	4.06	3.69	5.10	2.99	0.23	5.65	1.96	1.03	2.55	2.05	0.29
Na2O	5.52	4.48	3.90	2.72	3.37	2.43	2.37	2.90	3.50	3.87	3.22	3.20
K2O	3.38	3.50	2.05	2.47	3.66	4.70	2.54	3.85	4.15	3.94	4.76	5.10
TiO2	0.16	0.46	0.57	0.59	0.47	0.07	0.71	0.23	0.05	0.56	0.37	0.12
P2O5	0.04	0.28	0.13	0.14	0.21	0.01	0.02	0.06	0.01	0.30	0.16	0.06
MnO	0.02	0.10	0.08	0.11	0.09	0.62	0.17	0.05	0.03	0.05	0.05	0.01
Cr2O3	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Ba(ppm)	3409	1598	2596	2042	1636	1506	2200	1624	1425	1275	1624	755
LOI	0.06	1.20	1.30	1.23	1.42	1.47	1.55	0.75	0.60	1.20	1.30	1.20
TOTAL	98.89	99.78	99.61	99.73	99.09	100.52	90.38	99.63	100.03	97.09	98.99	99.94
Normative Analyses (Cation Equivalents)												
QUARTZ	20.94	11.37	24.07	20.99	23.59	42.77	14.64	36.06	35.42	18.88	24.91	34.73
CORUNDUM	0.34		0.97		1.26	2.88	1.14	0.17	0.80	1.77	0.84	2.05
ORTHOCLASE	20.06	21.00	12.44	15.09	22.33	28.75	16.88	23.49	25.04	24.30	29.09	30.93
ALBITE	49.79	40.86	35.98	25.25	31.25	22.59	23.94	26.89	32.10	36.28	29.90	29.50
ANORTHITE	6.07	13.25	17.94	22.66	13.90	1.11	31.39	9.64	5.15	11.16	9.44	1.07
CLINOPYRXN		4.28		2.04								
ORTHOPYRXN	1.33	5.91	5.27	10.54	4.48	0.26	9.72	1.63	0.17	4.41	3.11	0.57
MAGNETITE		2.08	2.22	2.26	1.89	1.35		1.21	0.32	0.66	1.39	
CHROMITE	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
HEMATITE	1.16				0.16	0.15	1.54	0.44	0.89	1.06	0.42	0.92
ILMENITE	0.21	0.65	0.82	0.85	0.68	0.10	0.29	0.33	0.07	0.81	0.53	0.01
RUTILE	0.01						0.41					0.08
APATITE	0.08	0.59	0.28	0.33	0.45	0.02	0.05	0.13	0.02	0.65	0.35	0.13

CLINOPYRXN = clinopyroxene; **ORTHOPYRXN** = orthopyroxene

***ROCK NAMES**

3b	Leucocratic granodiorite	5a	Hornblende quartz diorite	5d	Quartz-bearing diorite	9d	Porphyritic granodiorite
4a	Hornblende monzonite	5b	Biotite-hornblende ganodiorite	6a	Quartz monzonite	16a	Quartz-bearing monzonite
4b	Quartz monzonite	5c	Biotite granodiorite	6b	Quartz monzonite	16b	Leucocratic quartz monzonite

TABLE 4.3

CHEMICAL ANALYSES OF VOLCANIC, HYPABYSSAL, AND DYKE ROCKS

	MOUNT NANSEN SUITE							CARMACKS SUITE						
ROCK UNIT*	7a	7b	7c	7d	9a	9b	9c	12a	13a	14b	15b	15c	15d	16c
NUMBER OF SAMPLES	4	3	2	2	3	3	1	3	2	2	2	5	1	1
Major and minor elements (%)														
SiO2	71.74	74.15	71.64	59.68	62.10	67.24	74.49	66.69	57.18	51.93	52.08	52.66	52.68	62.72
Al2O3	14.70	14.57	14.32	15.15	16.45	15.31	14.09	15.96	16.00	16.31	14.36	14.02	17.36	17.64
Fe2O3	2.00	1.03	1.91	2.40	4.19	2.42	0.27	3.40	5.96	4.05	3.58	2.27	5.40	3.67
MgO	1.08	0.28	0.62	3.30	1.77	1.30	0.12	0.44	5.23	5.84	5.35	8.13	3.99	1.46
CaO	0.96	0.36	2.08	2.99	3.77	2.35	0.19	5.23	5.47	7.53	6.92	6.97	4.80	2.26
Na2O	2.82	2.46	1.76	3.03	3.47	3.35	3.86	3.55	2.88	3.43	1.18	2.80	4.11	5.42
K2O	4.33	5.14	3.19	4.75	3.23	3.60	4.23	3.99	4.30	2.73	2.95	4.25	3.25	3.93
TiO2	0.29	0.10	0.20	0.66	0.67	0.38	0.05	0.45	0.90	1.16	1.23	0.78	1.12	0.71
P2O5	0.06	0.08	0.08	0.46	0.25	0.17	0.12	0.18	0.42	0.51	0.50	0.49	0.52	0.39
MnO	0.03	0.08	0.04	0.08	0.54	0.07	0.01	0.04	0.06	0.18	0.17	0.15	0.12	0.06
Cr2O3	0.01	0.01	0.01	0.03	0.01	0.01	0.01	0.01	0.04	0.01	0.02	0.02	0.01	0.01
Ba(ppm)	2344	2000	3874	1420	1492	2002	110	1706	1648	930	1555	1136	1300	1400
LOI	1.58	1.9	2.20	4.60	2.20	1.43	0.80	2.57	1.65	1.70	2.25	1.06	2.50	1.60
TOTAL	99.62	100.18	98.08	97.14	98.66	97.65	98.24	102.52	100.10	95.38	90.60	93.61	95.87	99.88
Normative Analyses (Cation Equivalents)														
QUARTZ	33.75	37.54	43.67	13.28	27.59	26.65	34.00	19.94	5.53	0.91	14.59		1.42	9.54
CORUNDUM	4.25	5.07	5.12	0.49	4.71	2.33	3.49							1.42
ORTHOCLASE	26.43	31.39	20.17	30.38	13.19	22.26	25.76	23.82	25.79	16.98	19.88	26.45	20.36	23.36
ALBITE	26.16	22.83	16.92	29.11	25.11	31.48	35.73	32.21	26.25	32.42	12.09	26.49	39.14	48.96
ANORTHITE	4.52	1.31	10.49	13.63	19.23	11.04	0.16	16.00	18.30	22.15	28.72	13.84	20.49	8.72
WOLLSTONIT								2.30						
CLINOPYRXN								2.64	5.17	10.93	4.74	13.55	0.93	
ORTHOPYRXN	3.08		1.83	9.65	6.44	3.76	0.34		14.21	11.51	14.48	10.56	11.93	4.06
MAGNETITE			0.11		2.38	0.51		2.06	2.55	0.94			2.90	1.71
CHROMITE	0.01	0.01	0.01	0.03	0.01	0.01	0.01	0.01	0.04	0.01	0.03	0.02	0.01	0.01
HEMATITE	1.29	0.74	1.19	1.60		1.03	0.19			1.32	2.17	1.67		0.41
ILMENITE	0.34	0.12	0.30	0.55	0.86	0.55	0.01	0.63	1.27	1.70	1.64	0.23	1.65	1.00
RUTILE	0.04	0.01		0.23			0.03							0.08
APATITE	0.13	0.17	0.18	1.05	0.46	0.37	0.26	0.38	0.89	1.12	1.19	1.08	1.15	0.82
FORSTERITE												4.74		
SPHENE												1.37		

WOLLSTONIT = Wollastonite; **CLINOPYRXN** = clinopyroxene; **ORTHOPYRXN** = orthopyroxene

*ROCK NAMES

7a	Latite to andesite lava flow	9a	Feldspar porphyry dyke	13a	Andesite lava flow	15d	Granophyric diabase
7b	Felsic flow or tuff	9b	Feldspar porphyry dyke	14b	Basalt lava flow	16c	Porphyritic latite dyke
7c	Felsic dome or subvolcanic intrusive	9c	Felsic dyke	15b	Andesite to latite dyke		
7d	Andesite lava flow	12a	Rhyodacite tuff	15c	Potassic gabbro to monzogabbro		

5.0 INTERPRETATION OF AEROMAGNETIC DATA

Regional aeromagnetic surveys by the Geological Survey of Canada were carried out between 1964 and 1966. Significant features identified by the survey which can be related to bedrock geology are listed below:

1. Rocks of the Yukon Metamorphic Complex (Units 1 and 2) show low magnetic relief and low magnetic response, indicating the absence of magnetic minerals. Exceptions are some of the skarn deposits along the borders of these units against plutonic rocks. The skarns give the highest ground-magnetometer anomalies in the region, but only a few are large enough to be apparent on the aeromagnetic maps. Two aeromagnetic anomalies are interpreted as being caused by magnetite-bearing skarns. One is in the alluvium-covered valley of Canadian Creek west of the Casino deposit. The other is on the Cash property south of Big Creek, where an outcrop of magnetite skarn and a ground-magnetometer survey indicate the presence of a moderately sized skarn deposit.

2. Metamorphosed plutonic rocks of Units 3 and 4 show mainly low magnetic relief and low magnetic response. An exception is a strong positive magnetic anomaly at the north end of the ridge east of Jensen Creek. It may reflect magnetic response in quartz-bearing monzonite of Subunit 4a or the presence of a magnetite-bearing skarn in underlying(?) quartzite and schist of Units 1 and 2. This anomaly also is part of a broad high extending eastward from Prospector Mountain and may be caused by a buried pluton of the Prospector Mountain Suite.

3. Rocks of the Dawson Range Batholith (Units 5 and 6) generally show moderate magnetic relief, but no strong magnetic anomalies.

4. Felsic and intermediate volcanic rocks of Unit 7 generally show low magnetic relief (e.g., near Klaza Mountain). An exception is in the Mount Cockfield Graben, which is marked by a strong aeromagnetic anomaly. Magnetite is common in some of the granodiorite porphyry dykes of Subunit 9d cutting felsic volcanic rocks of Subunit 7b, and in some of the andesitic tuffaceous sediments in Subunit 7d. However, the amount of magnetite seen on surface is insufficient to cause the intense anomaly over the entire graben.

5. Rocks of the Carmacks and Prospector Mountain Suites show strong magnetic relief; pronounced positive and negative anomalies are associated with specific flow or tuff intervals. The strongest positive anomaly is an east-west belt at Prospector and Apex Mountains. This correlates with zones of abundant magnetite in andesite tuffs (and to a lesser extent in andesite lava flows) and to the outline of the Prospector Mountain quartz-bearing monzonite (Subunit 16a).

6. Basalts (and to a lesser extent andesites) of the Carmacks Suite show strong, narrow, negative anomalies northeast of Big Creek and south of Prospector Mountain. Some of the basalt flows contain up to a few per cent magnetite. The negative anomalies may be caused by flows of reversed polarity.

7. The major faults (Big Creek, Dip Creek, Hoochekoo) are characterized by weak magnetic response and low magnetic relief.

6.0 ECONOMIC GEOLOGY

6.1 Introduction

None of the numerous mineral occurrences in the project area are economic, and, except for minor placer gold mining and bulk sampling of several showings, no mining has been carried out. Most mineral occurrences can be grouped into one of the following distinct types:

1. Disseminated chalcopyrite and (or) molybdenite porphyry deposits in and near altered felsic volcanic and porphyritic subvolcanic and plutonic rocks, in part brecciated.
2. Lead-silver-zinc sulphides in veins near the margins of 'porphyry' deposits and genetically associated with the 'porphyry' system
3. Chalcopyrite and gold in magnetite-rich skarns in volcanic and metamorphic rocks adjacent to plutonic rocks.
4. Disseminated and vein-type gold deposits associated with pyrite and (or) arsenopyrite in and near felsic volcanic domes and tuffs of the Mount Nansen Suite.
5. Gold in placer deposits, much of which is associated with lode gold occurrences in rocks of the Mount Nansen Suite.

The characteristics of these deposits are summarized in Table 6.1 and a detailed description of mineral properties is presented in Chapter 6.2 and 6.3.

The location and exploration results of 29 mineral deposits or occurrences are indexed on Figure 6.1 and their general characteristics are presented in Table 6.1. Figure 6.1 also shows areas of placer gold mining and exploration. The only significant recoveries of placer gold were in Sonora Gulch and Kline's Creek downstream from the Hayes Creek (Sonora Gulch) deposit, and in Canadian Creek downstream from the Casino deposit. In this study, no attempt was made to research the production records or further interpret the source of gold found at these placer localities.

TABLE 6.1

COLORADO CREEK SHEET (115 J/10; see Fig. 6.1)

DEPOSIT NAME	DEPOSIT TYPE	METAL(S)	ALTERATION	HOST ROCK UNIT
1 ZAPPA	Porphyry	Cu/Mo	Pyrite	Dawson Range granodiorite and quartz porphyry
2 ANA	-	Cu/Mo/Au	-	Breccia pipe in Yukon Metamorphic Complex gneiss and Dawson Range granodiorite
3 CASINO	Porphyry	Cu/Mo/Au	Phyllic	Subvolcanic breccia and porphyries; late-stage Dawson Range Suite or younger
4 PEG	-	Cu	-	Dawson Range granodiorite
5 TOAD	-	Ag/Pb(?)	-	Dawson Range granodiorite
6 ISAAC	Vein (?)		-	Dawson Range quartz monzonite, Mount Nansen dykes
7 IDAHO CK	Vein (?)		-	Dawson Range quartz monzonite, Mount Nansen dykes
8 NORDEX	Vein	Ag/Pb	-	Dawson Range granodiorite
9 AZTEC	Vein (?)	Mo/Cu	-	Qtz vein in Dawson Range granodiorite
10 BOMBER	Vein	Ag/Pb/Zn	Propylitic	Veins in faults and shear zones in Dawson Range quartz diorite
11 HOLE	-	Mo	-	Dawson Range granodiorite
12 GEP	-	Cu	Py & Ser	Dawson Range granodiorite and alaskite
13 RUDE CK	Vein	Ag/Pb/Zn	-	Dawson Range granodiorite
14 CLEVELAND	-	Cu/Mo	Gossan	Dawson Range granodiorite
15 HAXE	-	Cu/Mo	Pyrite	Dawson Range granodiorite
16 RONGE	-	Cu/Mo	-	Dawson Range granodiorite
17 VIC	-	Cu	-	Dawson Range granodiorite
18 PATTISON (PATT)	Porphyry	Cu/Mo	Argillic	Dawson Range quartz monzonite

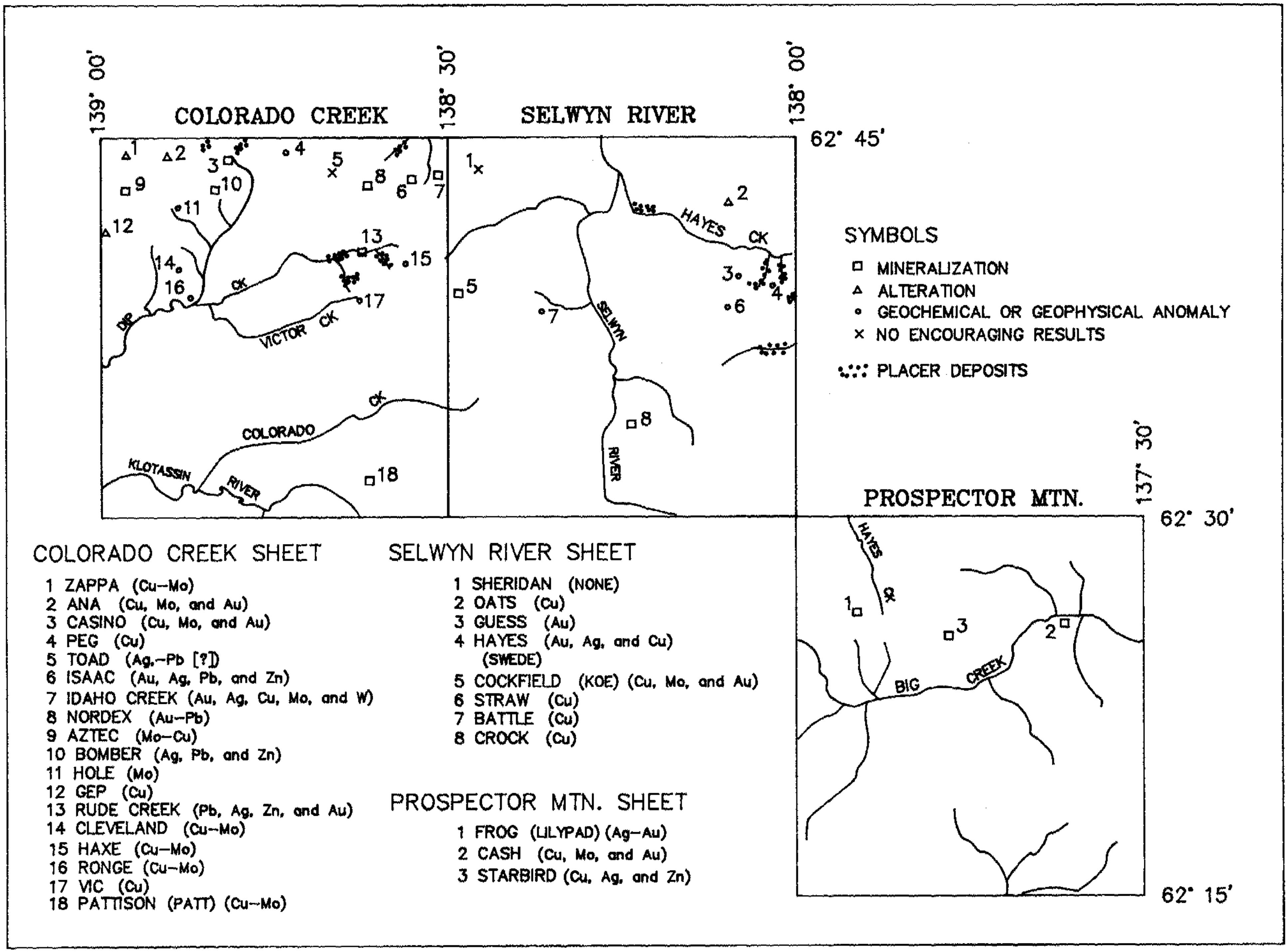
TABLE 6.1 (continued)

SELWYN RIVER SHEET (115 J/9; see Fig. 6.1)

DEPOSIT NAME	DEPOSIT TYPE	METAL(S)	ALTERATION	HOST ROCK UNIT
1 SHERIDAN	-	None	-	Dawson Range granodiorite
2 OATS	-	Cu	Gossan	Yukon Metamorphic Complex
3 GUESS	Vein?	Au	-	Yukon Metamorphic Complex
4 HAYES (SWEDE)	Vein & Porphyry	Au/Ag/Cu (Bi)	Propylitic Argillic	Mount Nansen plug, Yukon Metamorphic Complex & Dawson Range Batholith
5 COCKFIELD (KOE)	Porphyry, Vein	Cu/Mo/Au	Pyrite, clay, and sericite	Qtz monzonite stock intruding Mount Nansen volcanic rocks, Yukon Metamorphic Complex and Dawson Range granodiorite
6 STRAW	-	Cu	-	Dawson Range granodiorite cutting Yukon Metamorphic Complex
7 BATTLE	-	Cu	-	Dawson Range granodiorite
8 CROCK	-	Cu	-	Contact between hornblende diorite and quartz monzonite of Dawson Range Batholith

PROSPECTOR MOUNTAIN SHEET (115 I/5; see Fig. 6.1)

DEPOSIT NAME	DEPOSIT TYPE	METAL(S)	ALTERATION	HOST ROCK UNIT
1 FROG (LILYPAD)	Vein on fault	Ag/Au/Pb	Argillic, Phyllic	In Carmacks andesites intruded by quartz monzonite of Prospector Mountain Suite
2 CASH	Porphyry, Vein & Skarn	Cu/Mo/Au	Hypogene	Mount Nansen porphyry dykes and plugs intruding Yukon Metamorphic Complex and Big Creek monzonite
3 STARBIRD	Skarn (?) or vein	Cu/Ag/Zn	-	Carmacks volcanic rocks intruded by Prospector Mountain monzonite.



COLORADO CREEK SHEET

1 ZAPPA (Cu–Mo)
2 ANA (Cu, Mo, and Au)
3 CASINO (Cu, Mo, and Au)
4 PEG (Cu)
5 TOAD (Ag.–Pb [?])
6 ISAAC (Au, Ag, Pb, and Zn)
7 IDAHO CREEK (Au, Ag, Cu, Mo, and W)
8 NORDEX (Au–Pb)
9 AZTEC (Mo–Cu)
10 BOMBER (Ag, Pb, and Zn)
11 HOLE (Mo)
12 GEP (Cu)
13 RUDE CREEK (Pb, Ag, Zn, and Au)
14 CLEVELAND (Cu–Mo)
15 HAXE (Cu–Mo)
16 RONGE (Cu–Mo)
17 VIC (Cu)
18 PATTISON (PATT) (Cu–Mo)

SELWYN RIVER SHEET

1 SHERIDAN (NONE)
2 OATS (Cu)
3 GUESS (Au)
4 HAYES (Au, Ag, and Cu)
(SWEDE)
5 COCKFIELD (KOE) (Cu, Mo, and Au)
6 STRAW (Cu)
7 BATTLE (Cu)
8 CROCK (Cu)

PROSPECTOR MTN. SHEET

1 FROG (LILYPAD) (Ag–Au)
2 CASH (Cu, Mo, and Au)
3 STARBIRD (Cu, Ag, and Zn)

Figure 6.1 Index of Mineral Deposits and Occurrences

6.2 Description of Significant Mineral Occurrences

The project area contains twenty-nine known mineral deposits and occurrences. Of these, only eight may be regarded as significant (i.e., contain economic-type mineralization or abundant alteration which is typical of economic deposits elsewhere). None are economic and only the Casino deposit has had sufficient exploration to indicate potential tonnage and grade. The brief descriptions below are based on the available literature including the compendium of Northern Cordillera Mineral Inventory published by Archer, Cathro and Associates (1981) Ltd. and the 1984 Index to Mining Assessment Reports published by the Dept. of Indian and Northern Affairs. Annual reports such as the Mineral Industry Report, Yukon Geology and Exploration, and Yukon Exploration and Geology published by the Dept. of Indian and Northern Affairs, and other published papers as well as field examinations made during the present study were used in the property descriptions. The names of the properties are those in common usage and may refer to claim names, topographic features, names of people, or names of mining companies. More comprehensive descriptions can be obtained from the references cited. Names agree with those in the Yukon Exploration and Geology Report Series of D.I.A.N.D.

6.2.1 CASINO

NTS 115J/10 (Colorado Creek, #3)

Cu, Mo, Au, (W, Ag)

62°44' N., 138°50' W.

In 1985 optioned to Archer, Cathro & Associates (1981) Ltd.

References:

Archer, Cathro & Associates (1981) Ltd., 1986.
Archer and Main, 1971, (p. 67-77).
Cairnes, 1916, (p. 20-33).
Cairnes, 1916 (in Bostock, 1957), (p. 426-459).
Craig and Laporte, 1972, (p. 55-57).
Godwin, 1975.
Godwin, 1976, (p. 344-358).
Marion and Caine, 1984, (p. 794-797).
Ney et al, 1976, (p. 75-76).
Phillips, and Godwin, 1970, (p. 43-49).

History:

The earliest known exploration activity in the area was placer gold mining on Canadian Creek in about 1911. The first lode claims were staked in 1917 after Cairnes (1916) identified wolframite, (Fe, Mn) WO_4, in concentrates from the placer operations.

In 1965, Casino Silver Mines Ltd. restaked the area as part of a project on the nearby Bomber occurrence. Over the next decade, several operators explored the property and completed 91 rotary and diamond drill holes totalling approximately 18,000 m.

Geology:

The porphyry deposit occurs in a hypabyssal suite of intrusions, breccia pipes, and dykes designated by Godwin (1975) as the Casino Complex. The complex intrudes potassic quartz diorite of the Dawson Range Batholith (Figure 6.2). Godwin classified it into four subunits which he described, from oldest to youngest as follows: Patton Porphyry, tuff, tuff breccia, and cobble breccia. The fragmental rocks were classified on the basis of fragment size; however, the use of the term 'tuff' generally implies an eruptive rock, and therefore, a more appropriate terminology for the fragmental rocks is fine breccia, medium breccia, and coarse breccia. The breccias define an irregular conical pipe which extends approximately 600 m by 365 m on surface and plunges steeply to the south. A potassic alteration zone, approximately 450 m in diameter, is centered on the breccia pipe and is surrounded by a phyllic zone that extends 300 m into the Dawson Range Batholith. An apparently discontinuous pyrite halo occurs around the periphery of the main breccia body just outside the potassic core. The phyllic zone is surrounded by weakly developed zones of argillic and propylitic alteration. Figure 6.2 (modified from Godwin, 1975) shows the general distribution of rock types in and around the Casino Complex.

Metallic mineralization, consists of pyrite, chalcopyrite, molybdenite, and minor huebnerite ($MnWO_4$). It is concentrated in veins and disseminations in the phyllic zone along the inner side of the pyrite halo. A few samples of phyllic-altered rock collected in this study along the east side of Patton Hill are anomalous in gold, copper, molybdenum, and tungsten. The deposit displays a classic porphyry-type leached cap and supergene blanket. The cap ranges in thickness from 30 to 150 m and has an average grade of 0.05% Cu and 0.008% MoS_2. Minerals recognized in the supergene zone include tenorite, malachite, azurite, chalcanthite, brochantite, native copper, chalcocite, covellite, and digenite. Low-grade gold mineralization is associated with the copper-bearing breccia

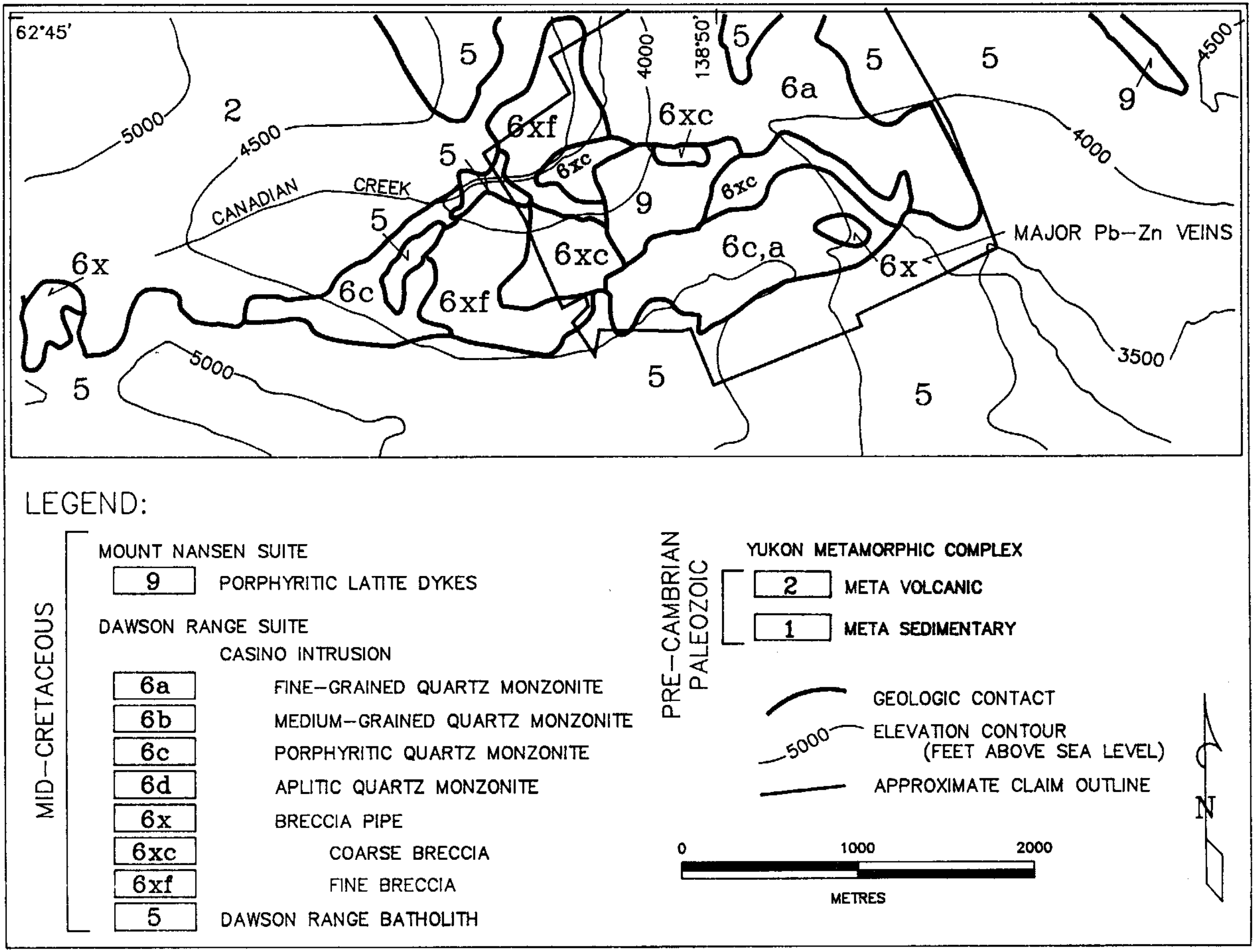


Figure 6.2 – Geology of the Casino Cu–Mo–Au Deposit

system and produces a strong, well defined soil anomaly.

Estimated mineable reserves are reported to be 163 million tonnes grading 0.37% Cu and 0.023% MoS_2 with a stripping ratio of 1.67 to 1.00. A re-evaluation of the deposit in terms of its gold content, using a cutoff of 0.514 g/t Au, suggests geological reserves of 10.8 million tonnes grading 0.72 g/t Au with a waste to ore ratio of 0.7:1.

6.2.2 BOMBER

NTS 115J/10 (Colorado Creek, #10)
Ag, Pb, Zn, Cu, Au, Ba, Bi
62°43' N., 138°50' W.
In 1985 optioned to Archer, Cathro & Associates (1981) Ltd.

References:

Archer, Cathro & Associates (1981) Ltd., 1986.
Findlay, 1967, (p. 32-34).
Green, and Godwin, 1964, (p. 22-24).
Green, 1966, (p. 39-42).
Marion and Caine, 1984, (p. 794-797).

History:

The Bomber prospect is 4 km south of the Casino deposit (Figure 6.3). Although silver-lead mineralization was known in the area since the late 1920's, the deposit probably was staked for the first time in October 1943. Some hand trenching was done prior to 1965, when Casino Silver Mines Ltd. was formed to develop the property. Casino Silver Mines trenched the property and shipped 43.9 t of hand-cobbed ore to Trail, B.C. This shipment assayed 68% Pb and 5523 g/t (161.1 oz/ton) Ag. By 1967, the vein system was developed along a 365 m adit and 1440 m of diamond drilling was completed. Between 1978 and 1980, underground development included 48 m of lateral drifting and 55 m of raise drifting (Figure 6.3). From this development, 328 t of hand-cobbed ore were shipped. The average grade of material shipped between 1965 and 1980 was 3690 g/t (107.6 oz/ton) Ag, 17 g/t (0.5 oz/ton) Au, 48.3% Pb, and approximately 5% Zn, 1.5% Cu, and 0.02% Bi.

Geology:

Mineralization occurs in a series of four subparallel shear zones trending 150°and dipping

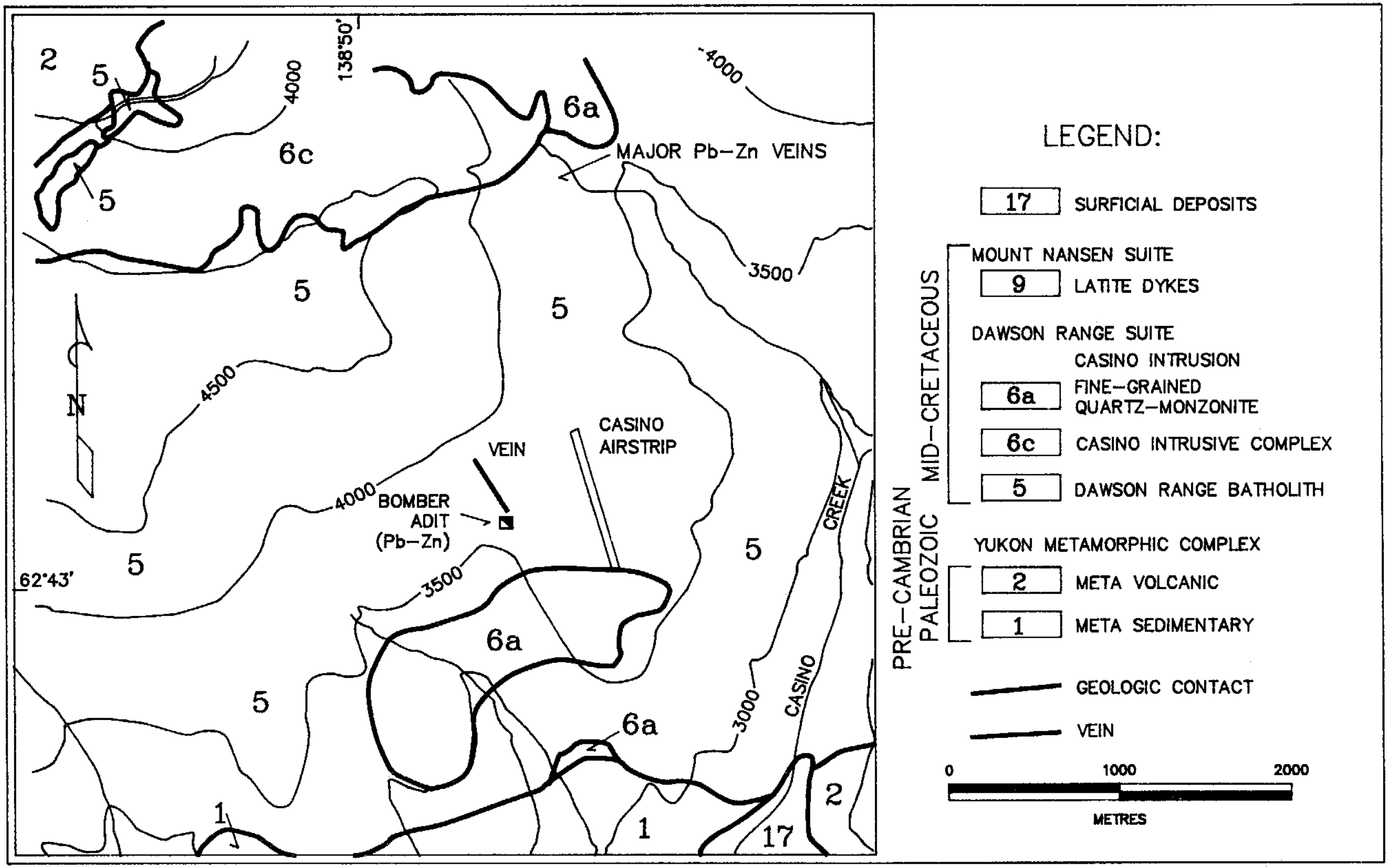


Figure 6.3 – Geology of the Bomber Ag–Pb–Zn Prospect

steeply west; they cut weakly to strongly altered, potassic quartz diorite to granodiorite of the Dawson Range Batholith. Veins in the shear zones contain galena, lesser sphalerite and pyrite, and minor chalcopyrite in a quartz-barite gangue. Ratios of silver to lead (oz/ton Ag:% Pb) vary from 4:1 to 0.5:1 and are highest at surface. Quartz, sphalerite, and pyrite increase in abundance with depth.

6.2.3 RUDE CREEK

NTS 115J/10 (Colorado Creek, #13)

Ag, Pb, Zn, Au

62°40' N., 138°38' W.

References:

Archer, Cathro & Associates (1981) Ltd., 1986.
MIR, 1969-70, (p. 63).
Craig and Laporte, 1972, (p. 63).
G.S.C. Sum. Rpt. 1916, (p. 23).
G.S.C. Sum. Rpt. 1927, (p. 11-13).
Marion and Caine, 1984, 090792 and 060225 (p. 796-797).

History:

This area was first staked in October 1915, and over the next 60 years was restaked by a number of individuals. Exploration consisted mostly of hand-trenching and an adit 22 m (72 ft.) in length. In 1966 and 1970, geochemical soil sampling was done; geological mapping was carried out in 1970.

In 1979, the Jo mineral claims were staked and in 1980, a few bulldozer trenches were completed. The Art mineral claims, adjoining the Jo claims on the west, were staked in 1980 by Gold Creek Mining Ltd. in conjunction with nearby placer gold mining.

Geology:

The showings exposed in the trenches consist of a lens of galena and sphalerite about 5 m (15 ft.) long and up to 25 cm (10 in.) wide in a quartz vein 1 m (40 in.) wide. The vein strikes east and cuts the Dawson Range granodiorite. An adit, driven along the western strike extension of the vein, failed to intersect the vein. A grab sample of galena is reported to have assayed 71.6% Pb, 6.2% Zn, 6518 g/t (190.1 oz/ton) Ag, and 0.34 g/t (0.01

oz/ton) Au. The origin of the vein is unknown.

6.2.4 COCKFIELD (CO and KOE)

Cu, Mo, Au, Ag	NTS 115J/9 (Selwyn River, #5) 62°39' N., 138°29' W.

References:

Archer, Cathro & Associates (1981) Ltd., 1986.
Craig and Laporte, 1972, (p. 64-67).
DIAND, YGE, 1979-80, (p. 265-266).
DIAND, YEG, 1984, (Open File).
Dawson, 1985, (Eng. Rpt. for Gyro E & M Corp.).
Denton, 1980, (Eng. Rpt. for Cominco - FFAC)
Marion and Caine, 1984, (p. 793-795 and 797).

History:

The property was staked originally in 1966 as the Ray mineral claims by Nordex Exploration Ltd., which performed a geochemical survey in the same year. In 1969, Newmont Exploration of Canada Ltd. staked the Co mineral claims, and in July 1969, a joint venture group staked the DR and Patsy claims. Both groups did geologic mapping and geochemical surveying later that year. In 1970, the Co group was optioned by United Keno Exploration Ltd., which explored with geochemical and IP surveys and 6 diamond drill holes (1397 m). In January 1970, the Hud & Barr mineral claims were tied onto the south and east by London Pride Silver Mines Ltd.

The property was restaked as the Cofield mineral claims in August 1976, and as the Kokup mineral claim in August 1979 by Archer, Cathro & Associates (1981) Ltd. In 1980, it was optioned by Denison Mining Ltd., which performed geological mapping and geochemical sampling. In April 1980, Cominco Ltd. staked the Battle mineral claims to the north, and carried out mapping and a geochemical survey. In September 1983, Kerr Addison Mining Ltd. staked the KOE mineral claims to the southeast, and in 1984 and 1985, performed geological mapping and geochemical sampling. In 1985, they also conducted a VLF-EM survey and some hand- trenching. The VLF-EM survey defined a major northwest-trending fault zone. Trenching of this zone revealed silicification and minor clay alteration. Samples from the alteration zone returned generally low levels of gold and silver. In 1986,

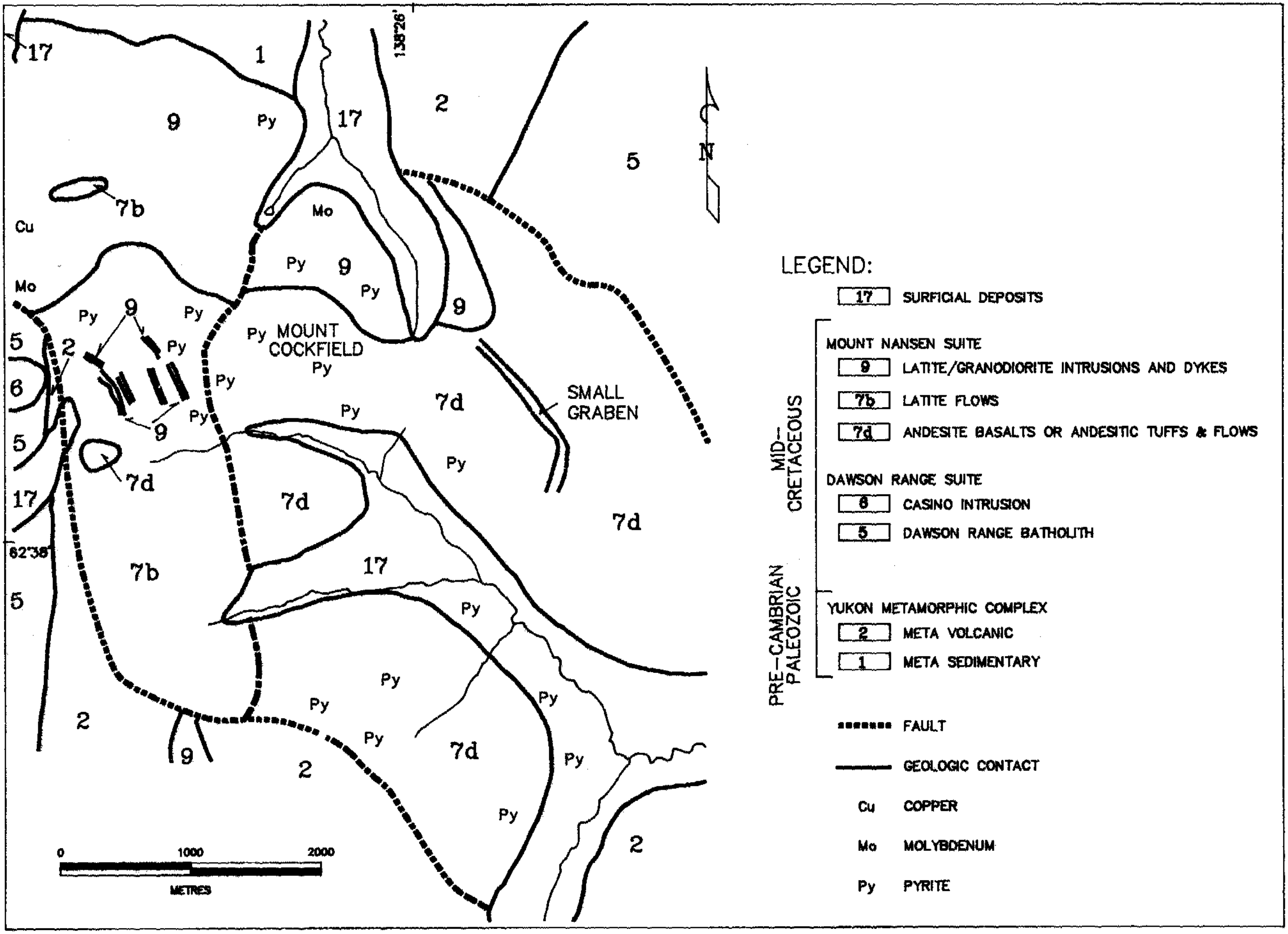


Figure 6.4 – General Geology of the Mount Cockfield Area

Kerr Addison completed five diamond-drill holes (443.6 m).

Geology:

The Mount Cockfield Graben is underlain by felsic and intermediate volcanic rocks of the Mount Nansen Suite and by the Mount Cockfield Stock (Figure 6.4). The volcanic rocks are cut by numerous northerly trending porphyritic felsic dykes, probably related in origin to the Mount Cockfield Stock. Country rocks outside the graben are dominated by quartzofeldspathic gneisses of the Yukon Metamorphic Complex.

Mineralization is best developed in and around the altered, southern part of the Mount Cockfield Stock, and appears to be genetically related to that body. Disseminations and veinlets of pyrite, chalcopyrite, and molybdenite occur in the alteration zone, in both the stock and in surrounding felsic volcanic rocks of the Mount Nansen Suite. Weak to moderate sericite- pyrite- quartz alteration is widespread in the graben. The results of a diamond drill program carried out by United Keno in 1970 indicated a fairly uniform grade averaging 0.03% Cu and 0.013% Mo. Cominco outlined a number of molybdenum-copper anomalies associated with the quartz monzonite stock.

The north-trending fault zone separating andesite of Subunit 7d from latite of Subunit 7b contains chalcedonic quartz veins with anomalous values in gold and silver. Clay-sericite-pyrite alteration is associated with the chalcedonic quartz veins. Recent activity has focused on precious-metal vein targets along the southern extension of this fault zone, where it cuts rocks of the Yukon Metamorphic Compex south of the graben.

6.2.5 HAYES CREEK (SWEDE)

Au, Ag	NTS 115J/9 (Selwyn River, #4) 62°39' N., 138°00' W.

References:

Archer, Cathro & Associates (1981) Ltd.; 1986.
Craig and Laporte, 1972, (p. 69).
DIAND, YGE, 1979-80, (p. 265).
DIAND, YGE, 1981, (p. 221).
DIAND, YGE, 1984, (Open File).
DIAND, YGE, 1985-Open File, (p. 230)

Hayes Res. Inc. Prospectus, Oct. 1985.
Morin, Sinclair, Craig, and Marchand, 1977, (p. 72).
Morin, Marchand, and Debicki, 1978, (P. 48).
Marion and Caine, 1984, (p.793-794).
Sinclair, Maloney, and Craig 1975, (pp. 95-96).
Sinclair, Morin, Craig, and Marchand, 1979, (pp. 178-179).

History:

Placer gold was found in Kline's Gulch in 1896. The first lode staking was in August 1899. Between 1965 and 1975, the area was restaked several times for its copper-molybdenum potential. In 1975, the property was optioned to a joint venture between Hudson Bay Mining and Smelting, Tombill Mining Ltd. and Minorco Canada Ltd. During that year, they did bulldozer trenching and drilled 11 holes (490 m). Between 1978 and 1980, four holes (404 m) were drilled, a soil geochemical sampling program, and a magnetometer and an EM survey were completed. In 1981, six additional holes (812 m) were drilled and more geochemical sampling and geophysical testing (magnetometer and VLF-EM) were carried out. In 1984, the owners transferred the property to a new company, Hayes Resources Inc., which explored the claims by trenching and diamond drilling of five holes (695 m). In the following year, the property was optioned to Hudson Bay Mining & Smelting Ltd. and the exploration program focused on the completion of previously started trenches, and the digging of new trenches to test the extension of previously defined mineralized zones. Many of the newly trenched areas were anomalous in gold and silver, but contained only minor sulphide mineralization.

Geology:

Mineralization is associated spatially with a porphyritic felsite plug and related dykes. Gold, silver, tetradymite (Bi_2Te_2S), and traces of molybdenite and chalcopyrite occur in a thin layer of sheared, quartz-veined, carbonatized, and chloritized peridotite in metasedimentary rocks of the Yukon Metamorphic Complex just northeast of the plug (Figure 6.5). Fine-grained sulphides occur in a greenish clay gouge at the contact between peridotite and quartz-sericite schist. The best sample of this material assayed 12.4 g/t Au and 65.6 g/t Ag over 1.52 m (Hayes Resources Inc. Prospects, 1985). The felsite plug is altered moderately to strongly (quartz-sericite-pyrite) and veined (pyrite-quartz), and contains anomalous but sub-economic values in gold. One sample of mineralized rock collected in this study is anomalous in gold, antimony, arsenic, zinc, cadmium, and silver

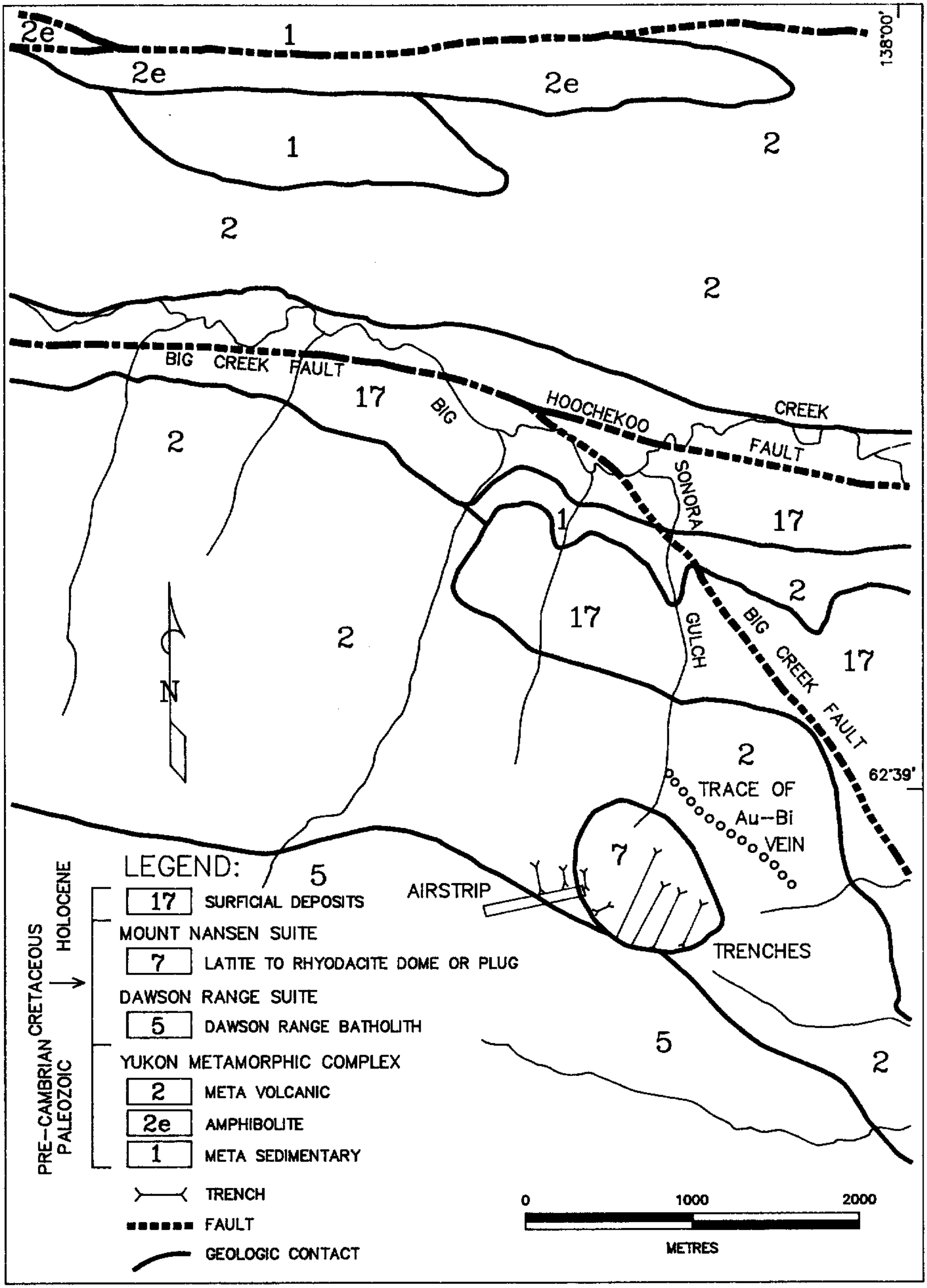


Figure 6.5 – General Geology of the Hayes (Swede) Prospect

(note: sample not assayed for copper and lead).

6.2.6 FROG (LILYPAD)

NTS 115I/5 (Prospector Mountain, # 1

Au, Ag, Pb, Zn, Cu

62°27' N., 137°53' W.

References:

Archer, Cathro & Associates (1981) Ltd., 1986.
Craig and Laporte, 1972, (p. 73).
Craig and Milner, 1972, (p. 58).
DIAND, YGE, 1979-80, (p. 261).
DIAND, YEG, 1981, (p. 216).
DIAND, YEG, 1982, (p. 201-202).
DIAND, YEG, 1983, (p.252).
Marion and Caine, 1984, (p.781-783).

History:

The property was staked as the Frog mineral claims by the International Mines Services Ltd. Syndicate and in 1970 was explored by soil sampling. When portions of the original Frog group were allowed to lapse, they were restaked in August 1970, by Phelps Dodge Corp. of Canada Ltd. In August, 1979, the property was restaked and enlarged by further staking as the Lilypad mineral claims by a joint venture between Armco Mineral and Chevron Canada Ltd. In 1980, the property was explored with geochemical surveys, in 1981 with geological mapping, soil sampling and extensive bulldozer trenching; in 1982 with seven diamond-drill holes (637 m); in 1983 with grid soil sampling; and in 1984 with four drill holes (884 m).

Geology:

Claims were staked in 1969-70 because of anomalous lead and silver values obtained during a regional silt-sampling program. The property is underlain by schist and gneiss of the Yukon Metamorphic Complex overlain by andesite flows, tuffs and breccias of the Carmacks Suite, all of which are intruded by a quartz-bearing monzonite to quartz monzonite stock of the Prospector Mountain Suite. The quartz monzonite is altered moderately to strongly to quartz-sericite and contains abundant quartz veins. Soil sampling located several areas anomalous in copper, lead, and zinc; prospecting turned up minor chalcopyrite and galena in narrow quartz veins cutting andesite (Unit 13) and quartz-bearing monzonite (Subunit 16a) on the Frog group, and minor galena and sphalerite in a contact zone on the ground staked by Phelps Dodge. Sulphide-bearing veins are interpreted as being related genetically to the Prospector Mountain quartz monzonite. Veins occur along steep, north-trending faults, some of which also contain narrow felsic dykes of the Prospector Mountain Suite (Subunit 16af). Wallrock alteration is confined to the dykes and zones up to a few metres wide in the andesites.

Work on the Lilypad claims was directed towards silver and gold in a swarm of steeply dipping veins that strike north-northeast and range up to several metres in width and up to several hundred metres in length. Mineralization consists of silver- and gold-bearing sulphosalts, galena, and chalcopyrite in a pyrite-quartz-carbonate gangue. Some veins contain abundant patches of specular hematite and tourmaline. Some veins contain abundant angular fragments of altered host rock. A galena sample from one of the veins is reported to have assayed 69.0% Pb and 3361 g/t Ag. Of six samples of veins collected in this study, most are anomalous in gold, antimony, arsenic, and tungsten, and a few are anomalous in one or more of lead, zinc, and silver. Silver values as high as 5 g/t have been reported from soils over the veins. Veins are commonly leached at the surface to clay rich gossans. Drilling in 1982 indicated that the leached zone in the vein extended to a depth of at least 150 m.

6.2.7 CASH

Cu, Mo, Au, Ag, Pb, Zn, Sn	NTS 115I/5 (Prospector Mountain, #2) 62°25' N., 137°40' W.

References:

Craig and Laporte, 1972, (p. 75).
DIAND, 1986, (p. 190).
Jensen, 1975.
Marion and Caine, 1984, 060211, (p.781).
Sinclair et al, 1975, (p. 190).
Sinclair et al, 1981, (p. 67-76).

History:

The Cash and Johnny claims were staked in 1969 and the western west half explored in 1970 by silt sampling and geological mapping. In 1974, additional grid soil samples were collected and a magnetometer survey was undertaken. The following year 12 diamond drill holes (1226 m) were completed. The east half was explored in 1974 by a magnetometer survey, grid soil sampling and hand trenching. By the end of 1974, an airstrip had been constructed on the north side of Big Creek. In 1975, an IP survey was conducted and during the following year, 8 holes totalling 858 m were drilled.

In July 1984, much of the area was restaked as the Cash claims by Archer, Cathro & Associates (1981) Ltd., which conducted bulldozer trenching, and later sold the property to Nordac Mining Corp. In 1985, Nordac added more claims and performed mapping and geochemical sampling.

Geology:

The property straddles the contact between schists and gneisses of the Yukon Metamorphic Complex, minor granodiorite of the Klotassin Suite, and monzonite of the Big Creek Suite (Figure 6.6). The contact is intruded by an elongate felsic plug and a few dykes of the Mount Nansen Suite. This deposit is one of several that lie along a northwest trend parallel to and a few kilometres south of the Big Creek Fault. The deposits, which extend from Mount Freegold to Sonora Gulch, are mainly of Mount Nansen age.

Rocks underlying most of the property were subjected to pervasive phyllic and argillic alteration. Alteration is most intense in the Mount Nansen rocks, but also is extensive in the granodiorite and metamorphic rocks. Skarn deposits were formed in the metamorphic rocks along the contact possibly during intrusion of rocks of the Big Creek Suite. These include pale calc-silicate intervals parallel to foliation and a massive magnetite body up to 15 m across. A large, moderate-intensity ground-magnetometer anomaly east of the magnetite body indicates the presence of moderately abundant magnetite in that part of the property.

Chip samples from trenches are reported to contain anomalous gold values (79-253 ppb Au) as well as strong copper and molybdenum values (110-2300 ppm Cu and 21-131 ppm Mo). These anomalies probably were formed by hydrothermal solutions associated with the Mount Nansen intrusive rocks.

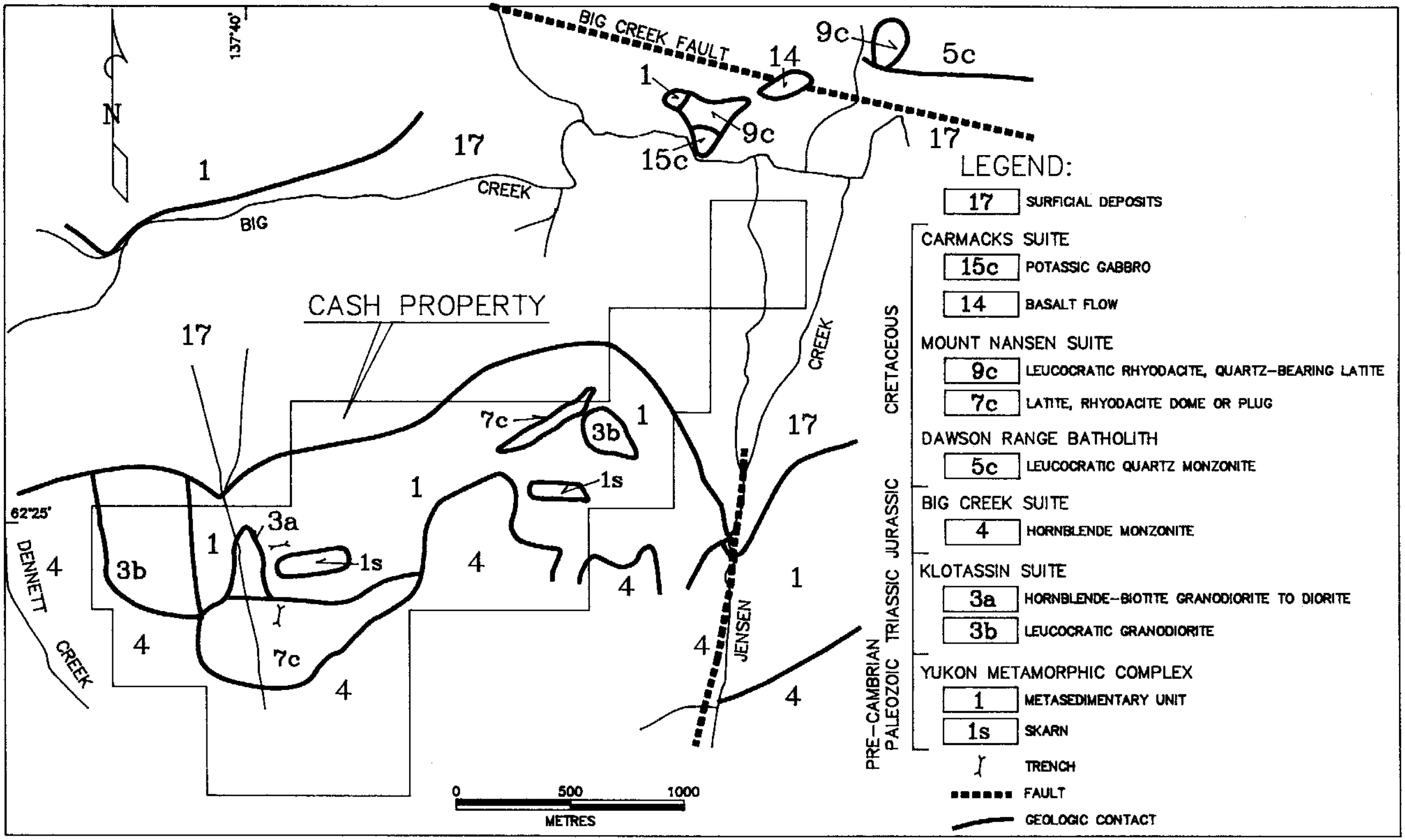


Figure 6.6 — General Geology of the Cash Property

Similar deposits occur on the north bank of Big Creek. These include a magnetite-bearing skarn (detected by ground-magnetometer studies) and a sulphide-bearing skarn containing anomalous gold, silver, arsenic, and zinc.

6.2.8 STARBIRD

NTS 115I/5 (Prospector Mountain, #3)

Cu, Ag, Zn

62°25' N., 137°47' W.

References:

Archer, Cathro & Associates (1981) Ltd., 1986.
Craig and Milner, 1971-72, (p. 70-71)
Marion and Caine, 1984, 061108, 061110, and 061166 (p.781).
Sinclair, 1971, (Eng. Rpt. in Prospectus)

History:

The property was staked as the Star mineral claims by Starbird Mining Ltd., which, in 1973, conducted an aeromagnetic survey, trenching, and geochemical sampling. Previously, the Pro claims had been staked immediately north of the Star claims by Canadian Occidental Petroleum Ltd. Prospecting and soil geochemical sampling by this company was carried out in 1971.

Geology:

A copper soil anomaly coincident with an airborne magnetic high was located on the Star group in an area underlain by andesite of the Carmacks Suite and fine-grained hornblende monzonite of the Prospector Mountain Suite. Mapping and soil sampling on the Pro mineral claim located chrysocolla in the andesite; native copper, tetrahedrite, and copper oxides along the monzonite contact; pyrite, tetrahedrite, enargite, proustite, and sphalerite in felsic dykes of the Prospector Mountain Suite.

6.3 Description of Mineral Prospects

The following is a brief description of twenty-one mineral prospects which are of minor significance.

6.3.1 ZAPPA

Cu, Mo	NTS 115J/10 (Colorado Creek #1) 62°44' N., 138°58' W.

References:

Craig and Laporte, 1972, (p. 46-47).
DIAND, YGE, 1981, (p. 266-67).
Marion and Caine, 1984, 060217, 060218, and 090772, (p. 795 and 797).

History:

In August 1969, the Zappa and Mothers mineral claims were staked by the Dawson Range Joint Venture (Strause Explorations Inc. Martin Marietta Corp., Molybdenum Corp. of America, Trojan Consolidated Mines Ltd., and Great Plains Development Corp. of Canada Ltd.). The property was explored in 1969 by grid soil sampling and geological mapping, and in 1970 by a magnetometer survey. In September 1976, the area was restaked as the Koffee mineral claims by Archer, Cathro & Associates Ltd. In 1980, the claims were explored by geological mapping and geochemical sampling under option to Denison Mines Ltd.

Geology:

The area is underlain by Dawson Range granodiorite intruded by a small stock of pyritized and altered quartz porphyry. Anomalous copper values are reported to be associated with the quartz porphyry, and anomalous molybdenum values occur immediately northwest of the porphyry.

6.3.2 ANA

NTS 115J/10 (Colorado Creek #2)

Cu, Mo, Au

62°44' N., 138°55' W.

References:

Archer, Cathro & Associates (1981) Ltd., 1986.
Marion and Caine, 1984, 019922-23, 060227, and 061956, (p. 795-797).

History:

The Aztec mineral claims were staked in September 1969, by Trans Columbia Explorations Ltd. In 1970, an airborne magnetometer and spectrometer survey were conducted followed by soil geochemical surveys over anomalous areas. In May 1985, the area was restaked as the Ana mineral claims (56 claims) by Nordac Mining Corp. which conducted a grid geochemical survey later in the year.

Geology:

The claims are underlain by Yukon Metamorphic Complex gneiss and Dawson Range granodiorite. Intruded along the gneiss-granodiorite contact is a tourmalinized heterolithic breccia pipe, west of which Trans Columbia located anomalous copper and molybdenum values. Sampling by Nordac outlined an area around the breccia carrying anomalous values of up to 395 ppb gold.

6.3.3 PEG

NTS 115J/10 (Colorado Creek #4)

Cu

62°44' N., 138°44' W.

References:

Craig and Laporte, 1972, (p. 53-54).
Marion and Caine, 1984, 060219-20, (p. 796).

History:

In July 1969, the Peg mineral claims were staked and optioned to Glenlyon Mining Ltd. which conducted grid soil sampling in the same year. In November 1969, the Gap mineral claims were staked immediately south by Montana Mines Ltd. and explored by reconnaissance geochemical sampling.

Geology:

The area is underlain by Dawson Range granodiorite with several roof pendants of Yukon Metamorphic Complex metasedimentary rocks. A small copper soil anomaly was reported to have been found in the southern portion of the Peg claims.

6.3.4 TOAD

Ag, Pb(?)	NTS 115J/10 (Colorado Creek #5) 62°44' N., 138°40' W.

References:

Craig and Laporte, 1972, (p. 52).
Marion and Caine, 1984, 060226, (p. 796).

History:

In January 1966, the property was staked as part of the Ray mineral claims (see Vic-prospect #17) and explored by geochemical sampling later in the year. Restaked as Toad mineral claims (80 claims) in August 1969 by International Mines Services Ltd. for Prado Explorations Ltd. and explored by grid soil sampling and geological mapping in 1970.

Geology:

The claims are mainly underlain by Dawson Range granodiorite with roof pendants of Yukon Metamorphic Complex metasedimentary rocks. The 1966 work was directed toward silver-lead vein targets and the 1970 work was toward porphyry targets. Apparently nothing of interest was found by either programme and the claims have lapsed.

6.3.5 ISAAC

NTS 115J/10 (Colorado Creek #6)

Au, Ag, Pb, Zn

62°44' N., 138°33' W.

References:

Archer, Cathro & Associates (1981) Ltd., 1986.

History:

In June 1985, the DAH mineral claims (79 claims) by Chevron Canada Resources Ltd., which performed geological mapping and geochemical sampling later in the year.

Geology:

The area is underlain by Dawson Range granodiorite intruded by dykes of Mount Nansen age. Cutting the granodiorite are manganiferous quartz veins containing limonite boxwork with minor pyrite, arsenopyrite, galena and sphalerite.

6.3.6 IDAHO CREEK

NTS 115J/10 (Colorado Creek #7)

Au, Ag, Pb, Zn, W

62°44' N., 138°31' W.

References:

Archer, Cathro & Associates (1981) Ltd., 1986.

History:

In June 1985, the DAH mineral claims (79 claims) were staked by Chevron Canada Resources Ltd., which performed geological mapping and geochemical sampling later in the year.

Geology:

The area is underlain by Dawson Range granodiorite intruded by dykes of Mount Nansen age. Minor remnants of Yukon Metamorphic Complex limestone and skarn were seen on the southern portion of the claims. Manganiferous quartz veins containing limonite boxwork with minor pyrite, arsenopyrite, galena and sphalerite cut the granodiorite.

6.3.7 NORDEX

Ag, Pb	NTS 115J/10 (Colorado Creek #8) 62°43' N., 138°37' W.

References:

Archer, Cathro & Associates (1981) Ltd., 1986.

History:

In August 1922, the area was first staked and in January 1966, was restaked as part of the Ray group (see, Vic-prospect #17). In 1966, Nordex Explorations Ltd. explored the claim group with regional geochemical sampling. In 1969, the Grant Syndicate staked the Pass mineral claims which covered a portion of the former Ray group. All the previous claims have lapsed.

Geology:

The original staking (1922) was on a galena vein, probably within Dawson Range granodiorite. Later staking appears to have been to test the potential of the area for porphyry-type mineralization.

6.3.8 AZTEC

Mo, Cu	NTS 115J/10 (Colorado Creek #9) 62°43' N., 138°58' W.

References:

Craig and Laporte, 1972, (p. 54 55).
Marion and Caine, 1984, 019922-23, 060227, and 061956, (p. 795-797).

History:

In August 1969, the Squaw, Tlingets, and Aztec mineral claims were staked by Trans Columbia Explorations Ltd. In 1970, they conducted an airborne magnetometer and spectrometer survey. Ground follow-up of all anomalous areas included grid soil sampling and geological mapping.

Geology:

The area is underlain by Dawson Range granodiorite which contains some altered and quartz-veined sections. Several non-coincident copper and molybdenum soil anomalies were found during the 1970 programme. Minor molybdenite is reported in quartz veins cutting the granodiorite.

6.3.9 HOLE

Mo	NTS 115J/10 (Colorado Creek #11) 62°42' N., 138°54' W.

References:

Craig and Laporte, 1972, (p. 58-59).
Marion and Caine, 1984, 060229-30, (p. 796).

History:

In October 1969, the Hole mineral claims were staked by Coin Canyon Mines Ltd. and, in 1970, were explored with grid soil sampling. In August 1973, the area was partially restaked as the BCD mineral claims.

Geology:

The claims are underlain by Dawson Range granodiorite. A molybdenum soil anomaly is reported to extend in an easterly trend across the claim group.

6.3.10 GEP

Cu	NTS 115J/10 (Colorado Creek #12) 62°41' N., 139°00' W.

References:

Craig and Laporte, 1972, (p. 45-46).
Marion and Caine, 1984, 060219-20, (p. 796).

History:

In July 1969, the Gep mineral claims were staked and optioned to Glenlyon Mines Ltd. In

1970, exploration included grid soil sampling and geological mapping.

Geology:

The area is underlain by Dawson Range granodiorite intruded by a small stock of fine-grained leucocratic quartz monzonite. The granodiorite is reported to contain disseminated pyrite and shows minor sericitization of feldspars. Soil sampling is reported to have outlined a copper anomaly 900 m long.

6.3.11 CLEVELAND

Cu, Mo	NTS 115J/10 (Colorado Creek #14) 62°40' N., 138°53' W.

References:

Craig and Laporte, 1972, (p. 60-61).
Marion and Caine, 1984, 060216, (p. 796).

History:

In December 1969, the property was staked as the Cub mineral claims by the Grant Syndicate for Cleveland Mining and Smelting Co. Ltd. In 1970, it was explored by geological mapping and grid soil sampling.

Geology:

The claims area mainly underlain by Dawson Range granodiorite. Several weakly gossaned areas are associated with felsite dyke swarms of Subunit 9c and a small roof pendant of Yukon Metamorphic Complex metasedimentary rocks. A 900 m long zone near the centre of the claims is reported to have returned anomalous values in copper and molybdenum.

6.3.12 HAXE

Cu, Mo	NTS 115J/10 (Colorado Creek #15) 62°40' N., 138°34' W.

References:

Craig and Laporte, 1972, (p. 61)
Marion and Caine, 1984, 060223 and 060226, (p. 796).

History:

In January 1966, the property was staked as the Ray mineral claims and geochemically sampled by Nordex Exploration Ltd. In October 1969, it was restaked as Axe and Hill mineral claims by Montana Mines Ltd., which, in 1970, conducted soil sampling and geological mapping. In June 1985, the property was restaked as the Hen mineral claims (88 claims) by Nordac Mining Corp.

Geology:

The claims are underlain by Dawson Range granodiorite. A pyritic area in the east-central portion of the original Hill mineral claims is reported to have returned anomalous soil values in copper and molybdenum.

6.3.13 RONGE

Cu, Mo	NTS 115J/10 (Colorado Creek #16) 62°40' N., 138°52' W.

References:

Craig and Laporte, 1972, (p. 59-60).
Marion and Caine, 1984, 060222, (p. 796).

History:

In December 1969, the property was staked as the Cash and Gun mineral claims by La Ronge Mining Ltd. In 1970, the claims were explored by soil sampling. Adjoining claims, staked in early 1970, include: the Barb mineral claims to the southwest and the Guy mineral claims to the south.

Geology:

The area is underlain by Dawson Range granodiorite with a few roof pendants of Yukon Metamorphic Complex rocks. Soil sampling is reported to have outlined non-coincident copper and molybdenum anomalies on the Cash and Gun claims. All the claims were allowed to lapse.

6.3.14 VIC

Cu

NTS 115J/10 (Colorado Creek #17)
62°39' N., 138°38' W.

References:

Craig and Laporte, 1972, (p. 62)
Marion and Caine, 1984, 060221, (p. 796).

History:

In October 1965, the Vic mineral claims were staked. They were abandoned and, in Junuary 1966, restaked as part of a larger block, the Ray mineral claims (536 claims). The claims were transferred to Nordex Explorations Ltd. which explored the area with regional geochemical sampling. In September 1969, the area was restaked as the Vic mineral claims (112 claims) and explored by grid soil sampling and geologically mapping and prospecting.

Geology:

The area is underlain by Dawson Range granodiorite. Several streams are reported to be moderately anomalous in copper but no source was located. Soil sampling located a weak copper anomaly on the original Vic 2 and 4 (September, 1969) claims.

6.3.15 PATTISON (PATT)

Cu, Mo

NTS 115J/10 (Colorado Creek #18)
62°32' N., 138°37' W.

References:

Sinclair, W.D., et. al., 1976, (p. 94).
Sinclair and Gilbert, 1975, (p. 146-147).
Sinclair, W.D., et. al., 1976, (p. 179-181).
Lynch and Pride, 1984, (p. 407-414).
Lynch, G.V., et. al., 1983 in YEG 1982, (p. 38-49)
Marion and Caine, 1984, 061297, (p. 797).

History:

In September 1974, the Patt mineral claims were staked by Amoco Canada Petroleum Co. Ltd. In 1975, Amoco conducted geological mapping, geochemical sampling, and an IP survey. In 1976, Amoco drilled 4 holes totalling 565 m. The claims were allowed to lapse and, in October 1981 were restaked as the Ross mineral claims. In 1981, six Pat mineral claims were staked approximately 2 km northwest of the original Amoco claims. All claims in the area have been allowed to lapse.

Geology:

The area is underlain by Dawson Range quartz monzonite intruded into Yukon Metamorphic Complex quartzite and Dawson Range granodiorite.

Drilling tested molybdenum soil anomalies with weak IP response associated with an alaskite pluton (Dawson Range quartz monzonite - Subunit 6b). Except for disseminated molybdenite in an argillically-altered phase near the bottom of one hole, all holes encountered only minor molybdenite rosettes and chalcopyrite and pyrite blebs in narrow quartz veins. The veins are associated with leucocratic quartz monzonite dykes of Subunit 6b. Grades averaged about 0.01% Cu and 0.015% MoS_2.

The Pattison prospect is geologically and chemically similar to the Casino deposit.

6.3.16 SHERIDAN

NTS 115J/9 (Selwyn River #1)
62°44' N., 138°28' W.

References:

Archer, Cathro & Associates (1981) Ltd., 1986.

History:

In July 1970, the Ore mineral claims (102 claims) were staked by Sheridan Copper Mines Ltd.

Geology:

The claim area is mainly underlain by Dawson Range granodiorite.

6.3.17 OATS

Cu	NTS 115J/9 (Selwyn River #2) 62°43' N., 138°06' W.

References:

Archer, Cathro & Associates (1981) Ltd., 1986.

History:

In December 1969, the Oats mineral claims (78 claims) were staked by Atlas Explorations Ltd., and in 1970, were explored by grid soil sampling and geological mapping.

Geology:

The claims are underlain by Yukon Metamorphic Complex rocks containing several areas of weak gossan. One piece of float containing pyrite and traces of chalcopyrite was reported.

6.3.18 GUESS

Au	NTS 115J/9 (Selwyn River #3) 62°40' N., 138°06' W.

References:

Archer, Cathro & Associates (1981) Ltd., 1986.
Marion and Caine, 1984, (p. 793-794).

History:

In February 1970, the GS mineral claims were staked by London Pride Silver Mines Ltd. In October 1975, the area was restaked as part of the Sam mineral claims by Anglo-American Corp. of Canada Ltd. In 1976, the area was geologically mapped and geochemically sampled.

Geology:

The claims are underlain mainly by Yukon Metamorphic Complex rocks.

6.3.19 STRAW	NTS 115J/9 (Selwyn River #6)
Cu	62°38' N., 138°07' W.

References:

Craig and Laporte, 1972, (p. 69)
Marion and Caine, 1984, 060248, (p. 793).

History:

The area was first staked in October 1969, as the Hay mineral claims by Nicanex Mining Ltd. (Nippon). In 1970, geological mapping and geochemical sampling was carried out along grid lines.

Geology:

The claims are underlain by Dawson Range granodiorite cutting Yukon Metamorphic Complex rocks. Two weak copper anomalies were found, one at the southwest end of the claims and the other at the northeast end.

6.3.20 BATTLE	NTS 115J/9 (Selwyn River #7)
Cu	62°38' N., 138°23' W.

References:

Craig and Laporte, 1972, (p. 65)
Marion and Caine, 1984, 060609, (p. 793).

History:

In July 1969, the Mo mineral claims were staked and in November 1970, were transferred to Glenlyon Mining Ltd. Grid geochemical soil sampling and geological mapping is reported to have been done in 1969 by the staker, H.C. Fromme.

Geology:

The claims are underlain by Dawson Range granodiorite and Carmacks volcanic rocks. Three copper soil anomalies were reported to have been found on the southern portion of the property.

6.3.21 CROCK

Cu	NTS 115J/9 (Selwyn River #8) 62°34' N., 138°15' W.

References:

Craig and Laporte, 1972, (p. 68)
Marion and Caine, 1984, 060214, (p. 793).

History:

In August 1969, the Crock mineral claims were staked by the Dawson Joint Venture (Straus Explorations Inc., Martin Marietta Corp., Molybdenum Corp. of America, Trojan Consolidated Mines Ltd., and Great Plains Development Corp. of Canada Ltd.) which did soil sampling and geological mapping during the same year. In December 1969, Montana Mines Ltd. fringe staked the Jackie mineral claims and, in 1970, explored by reconnaissance geochemical sampling and prospecting. In June 1985, the area was restaked as the ELW mineral claims by Chevron Canada Resources Ltd. which performed geochemical sampling later in the year. The ELW claims have been allowed to lapse.

Geology:

The original claims covered the contact between a hornblende diorite stock and quartz monzonite of the Dawson Range Batholith. Minor disseminated chalcopyrite was reported in a chilled margin at the contact.

7.0 REFERENCES

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APPENDIX A

APPENDIX A

CHEMICAL ANALYSES OF MAJOR AND MINOR ELEMENTS IN ROCKS

SAMPLE NUMBER	ROCK TYPE	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	MgO %	CaO %	Na_2O %	K_2O %	TiO_2 %	P_2O_5 %	MnO %	Cr_2O_3 %	Ba PPM	LOI %	SUM %
J134*	1 b	75.54	10.62	4.32	1.12	0.46	0.25	3.05	0.57	0.19	0.02	0.01	3735	3.1	99.97
W 48*	1 b	76.82	10.65	3.36	1.29	0.06	0.40	2.85	0.57	0.05	0.02	0.01	3605	3.3	100.08
J526*	2 a	77.27	11.67	2.07	0.22	0.71	2.85	4.15	0.21	0.12	0.02	0.01	441	0.8	100.19
J397+	2 b	69.78	14.85	2.85	1.24	2.08	3.82	1.62	0.43	0.13	0.03	0.01	870	1.6	99.59
J499*	2 d	54.76	15.29	9.83	4.64	5.83	5.00	1.00	1.17	0.23	0.14	0.01	1516	1.9	100.09
P 29*	2 e	51.12	14.39	10.75	7.07	10.61	2.70	0.15	1.48	0.19	0.15	0.05	14	1.4	100.06
P 34*	2 f	74.39	12.45	3.63	0.75	3.17	3.25	1.15	0.34	0.06	0.05	0.01	869	0.8	100.22
P793*	3 b	69.71	15.61	2.33	0.78	1.22	5.30	3.50	0.18	0.05	0.03	0.01	3149	0.7	100.03
S676A*	3 b	70.49	15.41	1.60	0.30	1.04	5.70	3.90	0.14	0.03	0.01	0.01	3282	0.8	100.06
K697*	3 b	72.42	14.77	1.44	0.38	1.54	5.55	2.75	0.15	0.03	0.02	0.01	3797	0.3	100.09
P788*	4 a	61.57	15.61	5.64	2.20	3.47	4.05	5.60	0.42	0.36	0.10	0.01	1370	0.8	100.10
P847*	4 a	66.06	15.44	4.09	1.27	3.37	4.00	4.00	0.37	0.17	0.09	0.01	1606	0.6	100.14
S403*	4 a	61.43	15.31	6.50	2.24	3.51	5.55	2.90	0.55	0.37	0.11	0.01	2088	1.3	100.18
P805*	4 a	61.26	17.39	5.01	1.67	5.87	4.30	1.50	0.49	0.21	0.11	0.01	1327	2.1	100.18
P848*	4 b	66.13	15.90	4.36	1.47	3.69	3.90	2.05	0.57	0.13	0.08	0.01	2596	1.3	100.09
J215*	5 a	65.44	15.39	5.22	2.42	4.60	2.90	2.35	0.55	0.10	0.09	0.01	839	0.9	100.13
P128*	5 a	56.80	15.76	8.87	4.21	7.06	2.55	1.65	0.83	0.23	0.14	0.01	2342	1.6	100.16
K188*	5 a	67.43	14.39	4.50	1.59	3.65	2.70	3.40	0.38	0.10	0.09	0.01	2946	1.2	100.01
J310*	5 b	67.50	14.99	4.01	1.42	3.50	3.05	3.85	0.38	0.18	0.08	0.01	2186	0.6	100.04
R 58*	5 b	70.06	14.44	3.40	1.08	2.89	3.55	2.75	0.31	0.08	0.08	0.01	1416	1.2	100.12
J804*	5 b	67.42	14.50	4.69	1.88	3.85	2.85	2.70	0.48	0.12	0.09	0.01	1731	1.2	100.12
J295+	5 b	66.89	15.17	2.58	1.39	2.71	3.85	5.08	0.56	0.24	0.06	0.01	980	0.8	100.74
P408+	5 bf	67.85	16.65	2.10	1.07	3.12	3.39	3.02	0.31	0.15	0.08	0.01	2300	0.9	100.61
S179A+	5 b	58.79	17.62	2.53	2.55	1.88	3.51	4.53	0.78	0.48	0.15	0.01	1200	3.8	99.38
J716*	5 c	77.88	12.03	1.32	0.04	0.18	2.35	4.80	0.05	0.01	0.03	0.01	1550	1.1	100.10
J717*	5 c	77.72	12.05	1.25	0.11	0.29	2.85	4.40	0.06	0.01	0.01	0.01	1831	1.0	100.11
K453*	5 c	76.33	12.00	1.79	0.13	0.21	2.10	4.90	0.09	0.01	0.01	0.01	1137	2.3	100.10
J459+	5 d	50.62	19.75	2.50	4.28	7.89	3.02	2.30	0.96	0.45	0.17	0.01	2300	1.1	97.94
W332+	5 d	57.92	15.84	1.42	1.97	3.40	4.09	2.77	1.88	0.78	0.17	0.01	2100	2.0	99.65
J168*	6 a	74.48	12.32	2.13	0.43	1.73	2.65	4.00	0.20	0.06	0.04	0.01	2121	1.1	99.56
J226*	6 a	73.86	12.70	2.80	0.70	2.18	3.15	3.70	0.26	0.06	0.05	0.01	1126	0.4	100.09
J417*	6 b	75.95	12.82	1.72	0.06	1.03	3.50	4.15	0.05	0.01	0.03	0.01	1425	0.6	100.21
K175*	7 a	77.30	12.19	1.30	0.12	0.20	1.90	5.20	0.05	0.01	0.01	0.01	2071	1.3	99.99
S463*	7 a	71.48	14.66	3.78	0.97	0.07	0.45	4.55	0.52	0.03	0.01	0.01	1478	3.2	100.02
P399*	7 a	71.69	15.23	1.18	0.20	1.02	5.85	3.60	0.11	0.03	0.02	0.01	4125	0.5	100.24
P872+	7 ax	66.48	16.73	1.72	1.21	2.55	3.09	3.98	0.49	0.18	0.08	0.01	1700	1.3	99.22
P881+	7 b	78.99	12.65	0.49	0.19	0.15	1.67	4.39	0.11	0.03	0.02	0.01	1400	1.9	100.85
W406B+	7 b	74.84	14.15	0.87	0.27	0.38	2.03	5.60	0.08	0.06	0.05	0.01	2500	1.9	100.48
W411+	7 b	68.62	16.91	1.73	0.37	0.56	3.67	5.43	0.10	0.10	0.06	0.01	2100	1.7	100.41
P842*	7 c	64.92	16.79	3.55	1.04	4.09	3.35	3.40	0.35	0.09	0.06	0.01	6648	1.1	100.04
P766+	7 c	78.35	11.85	0.27	0.20	0.06	0.16	2.98	0.05	0.07	0.01	0.01	1100	3.2	97.52
W428+	7 d	64.41	12.00	1.55	4.75	2.73	2.68	2.79	0.42	0.24	0.11	0.05	940	4.2	98.63
W468+	7 d	54.95	18.83	3.25	1.85	3.25	3.38	6.70	0.90	0.68	0.06	0.01	1900	5.0	104.14

CHEMICAL ANALYSES OF MAJOR AND MINOR ELEMENTS IN ROCKS (continued)

SAMPLE NUMBER	ROCK TYPE	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	MgO %	CaO %	Na_2O %	K_2O %	TiO_2 %	P_2O_5 %	MnO %	Cr_2O_3 %	Ba PPM	LOI %	SUM %
P844*	9 a	63.22	15.78	5.78	2.36	4.41	3.50	2.30	0.62	0.11	0.07	0.01	1075	1.7	100.07
J412+	9 a	66.20	16.07	3.78	1.30	3.02	3.59	3.88	0.35	0.18	0.08	0.01	1900	1.1	99.58
K203+	9 a	56.88	17.49	3.00	1.65	3.88	3.31	3.50	1.04	0.45	0.11	0.01	1500	3.8	99.02
P 96+	9 b	67.84	15.51	1.42	0.95	1.83	3.53	3.63	0.32	0.23	0.07	0.01	1700	1.5	98.04
P777+	9 b	65.37	15.90	2.07	1.45	2.36	3.38	3.66	0.44	0.16	0.08	0.01	1700	1.6	98.28
P802*	9 b	68.51	14.53	3.78	1.49	2.85	3.15	3.50	0.39	0.13	0.07	0.01	2606	1.2	100.11
P142+	9 c	74.49	14.09	0.27	0.12	0.19	3.86	4.23	0.05	0.12	0.01	0.01	010	0.8	98.65
J538+	9 d	61.92	16.62	3.61	2.11	2.41	3.60	2.44	0.86	0.47	0.05	0.01	1200	2.0	100.80
J544+	9 d	67.51	16.04	3.13	1.22	2.44	3.43	4.42	0.41	0.20	0.02	0.01	1200	0.9	100.93
J548+	9 d	65.62	15.10	2.07	1.24	2.47	4.41	4.09	0.46	0.28	0.06	0.01	1100	0.6	97.70
W426+	9 d	60.97	16.64	2.67	1.55	2.89	4.05	4.81	0.51	0.25	0.07	0.01	1600	1.3	97.52
P487*	12	66.86	15.94	3.12	0.35	2.13	2.95	4.00	0.47	0.19	0.01	0.01	1614	3.7	100.04
P926*	12	66.52	15.96	3.59	0.72	2.87	3.75	4.05	0.45	0.18	0.05	0.01	1857	1.6	100.11
P938*	12	66.68	15.97	3.49	0.25	2.44	3.95	3.90	0.44	0.17	0.05	0.01	1646	2.4	100.07
P289*	13 a	59.35	16.83	4.06	4.58	3.28	1.95	6.75	0.81	0.40	0.05	0.03	2454	1.5	100.06
P291*	13 a	55.00	15.17	7.31	5.88	7.65	3.80	1.85	0.98	0.43	0.07	0.04	841	1.8	100.14
P466+	14 b	51.99	15.65	3.70	6.23	8.28	2.78	2.47	1.25	0.55	0.16	0.01	1000	1.9	100.16
S625+	14 b	51.86	16.97	4.40	5.45	6.78	4.08	2.99	1.07	0.47	0.20	0.01	860	1.5	100.42
S261+	15 b	45.30	13.90	2.60	9.34	11.17	2.35	2.30	1.19	0.46	0.18	0.03	910	2.1	97.66
W 11+	15 b	58.85	14.81	4.55	1.36	2.67	3.18	2.80	1.27	0.54	0.16	0.01	2200	2.4	97.50
J685+	15 c	57.44	15.65	2.22	5.54	5.07	3.37	4.84	0.81	0.34	0.13	0.01	1400	1.1	100.52
J694+	15 c	56.41	14.97	2.85	5.70	5.86	3.37	4.57	0.79	0.50	0.14	0.01	1400	1.3	100.77
J697+	15 c	51.37	12.59	1.56	11.10	7.08	2.18	2.42	0.48	0.25	0.17	0.02	680	0.8	97.43
K211+	15 c	50.42	13.15	1.92	9.30	8.05	2.57	4.77	0.83	0.71	0.15	0.03	1100	1.1	99.35
K266+	15 c	47.64	13.76	2.78	8.99	8.78	2.49	4.63	0.97	0.67	0.15	0.03	1100	1.0	98.24
P336+	15 d	52.68	17.36	5.40	3.99	4.80	4.11	3.25	1.12	0.52	0.12	0.01	1300	2.5	98.32
P299*	16 a	66.77	14.18	3.78	1.43	2.51	3.20	5.00	0.49	0.21	0.04	0.01	1299	1.6	100.10
P620*	16 a	68.10	14.35	3.60	1.30	2.34	3.15	5.15	0.47	0.17	0.08	0.01	1072	1.0	99.93
P302+	16 a	70.67	15.09	1.10	0.53	1.31	3.31	4.13	0.14	0.09	0.03	0.01	2500	1.4	98.29
P308*	16 b	75.28	13.31	1.15	0.30	0.59	3.25	4.60	0.16	0.14	0.01	0.01	1319	1.1	100.16
P318*	16 b	75.97	12.95	0.99	0.26	0.25	2.70	5.55	0.10	0.02	0.01	0.01	1262	1.0	100.05
W126*	16 b	74.94	12.73	1.69	0.05	0.04	3.65	5.15	0.11	0.01	0.01	0.01	755	1.5	100.04
P744+	16 c	62.72	17.64	3.67	1.46	2.26	5.42	3.93	0.71	0.39	0.06	0.01	1400	1.6	100.38
STd SO-4*		67.89	10.14	3.38	0.95	1.63	1.35	2.00	0.54	0.21	0.07	0.01	758	11.6	99.92
STd SO-4*		68.02	10.12	3.36	0.96	1.61	1.40	2.10	0.54	0.21	0.07	0.01	749	11.4	99.94

* ANALYSED BY ACME ANALYTICAL LABORATORIES LTD., VANCOUVER, B.C.
\+ ANALYSED BY BONDAR-CLEGG & COMPANY LTD., VANCOUVER, B.C.

APPENDIX B

APPENDIX B

CHEMICAL ANALYSES OF TRACE ELEMENTS IN ROCKS (PPM)

SAMPLE NUMBER	ROCK TYPE	Ba	Rb	Sr	Nb	Zr	Y
J 397	2 b	870	49	265	18	195	6
J 295	5 b	980	215	360	24	215	20
S 179A	5 b	1200	260	330	25	220	23
P 408	5 bf	2300	96	325	14	130	<5
J 459	5 d	2300	55	550	12	110	11
W 332	5 d	2100	62	365	20	175	30
P 872	7 ax	1700	145	245	15	190	12
P 881	7 b	1400	155	63	17	96	19
W 406B	7 b	2500	230	210	17	105	13
W 411	7 b	2100	160	285	19	115	<5
P 766	7 c	1100	96	150	15	77	<5
W 428	7 d	940	91	175	18	120	<5
W 468	7 d	1900	205	530	21	150	15
J 412	9 a	1900	105	395	15	140	10
K 203	9 a	1500	130	335	18	240	30
P 96	9 b	1700	140	285	19	145	8
P 777	9 b	1700	120	285	12	130	7
P 142	9 c	110	230	12	23	90	22
J 538	9 d	1200	265	390	27	200	36
J 544	9 d	1200	170	395	22	120	12
J 548	9 d	1100	145	495	23	150	8
W 426	9 d	1600	125	675	21	155	14
P 466	14 b	1000	41	545	9	83	11
S 625	14 b	860	79	585	8	110	16
S 261	15 b	910	54	495	9	75	5
W 11	15 b	2200	93	280	19	205	22
J 685	15 c	1400	140	620	15	115	10
J 694	15 c	1400	125	630	14	96	11
J 697	15 c	680	69	610	14	78	<5
K 211	15 c	1100	155	645	10	74	13
K 266	15 c	1100	135	640	13	72	13
P 336	15 d	1300	88	590	16	120	14
P 302	16 a	2500	155	215	11	115	<5
P 744	16 c	1400	130	415	26	195	6

APPENDIX C

APPENDIX C

CHEMICAL ANALYSES OF TRACE ELEMENTS IN ALTERED AND MINERALIZED ROCKS+

	Au	Sb	As	Ba	Cd	Cs	Cr	Co	Eu	Hf	Ir	Fe	La	Mo	Ni	Rb	Sc	Se	Ag	Ta	Tb	Th	W	U	Yb	Zn
	ppb										ppb	%														
CASINO AND BOMBER AREA																										
C 2	210	10.0	4	1400	<10	2	<50	<10	<2	2	<100	<0.5	37	420	<50	140	1.5	<10	<5	<1	<1	18.0	4	0.9	<5	<200
C 3	370	3.7	6	2300	<10	3	<50	<10	<2	5	<100	1.3	19	110	<50	200	8.8	<10	<5	1	<1	12.0	49	4.1	<5	<200
C 4	82	6.2	9	9100	<10	3	<50	15	<2	<2	<100	1.9	36	31	<50	220	5.7	<10	<5	<1	<1	12.0	59	3.7	<5	<200
C 5	130	23.2	3	1400	<10	<1	<50	<10	<2	4	<100	0.9	40	110	<50	120	7.0	10	<5	<1	<1	8.4	97	1.4	<5	<200
C 6	9	3.6	35	1000	<10	4	<50	<10	<2	3	<100	<0.5	16	<2	<50	240	2.4	<10	<5	1	<1	11.1	<2	3.3	<5	<200
J 199	6	11.0	12	1200	<10	3	<50	<10	<2	4	<100	1.1	28	253	<50	170	6.4	<10	<5	1	<1	8.6	9	2.1	<5	<200
W 331	21	1.8	27	2600	<10	4	<50	<10	<2	4	<100	0.9	35	<2	<50	210	2.0	<10	<5	1	<1	40.0	<2	7.3	<5	<200
W 358	30	4.0	14	980	<10	6	<50	<10	<2	3	<100	1.7	11	13	<50	200	11.0	<10	<5	<1	<1	7.5	38	1.2	<5	<200
W 359	76	1.7	43	2000	<10	2	<50	<10	<2	3	<100	3.7	48	21	<50	140	8.5	11	<5	<1	<1	10.0	8	1.7	<5	<200
COFFEE CREEK																										
J 717	<5	10.0	23	1900	<10	2	<50	<10	<2	3	<100	0.6	39	<2	<50	100	1.4	<10	<5	<1	<1	25.0	<2	2.6	<5	<200
J 723	<5	2.5	4	2800	<10	3	<50	11	<2	4	<100	1.3	32	<2	<50	110	3.7	<10	<5	<1	<1	22.0	<2	5.5	<5	<200
J 749	<5	1.2	2	1200	<10	2	<50	30	<2	<2	<100	<0.5	21	<2	<50	140	1.4	<10	<5	<1	<1	13.0	<2	1.8	<5	<200
K 652	<5	69.0	143	6200	<10	4	<50	<10	<2	3	<100	1.4	20	4	<50	120	8.4	<10	<5	<1	<1	40.0	5	5.9	<5	<200
P 136	<5	1.8	2	920	<10	2	<50	<10	<2	2	<100	0.7	20	<2	<50	120	2.0	<10	<5	1	<1	24.0	<2	2.9	<5	<200
W 588	<5	6.0	12	1600	<10	2	<50	<10	<2	3	<100	<0.5	23	<2	<50	110	1.7	<10	<5	<1	<1	40.0	3	5.3	<5	<200
MOUNT COCKFIELD																										
J 539	6	1.5	15	1800	<10	6	<50	13	2	4	<100	1.8	36	<2	<50	140	2.0	<10	<5	<1	<1	17.0	<2	7.1	<5	<200
J 545	<5	0.3	11	2300	<10	4	<50	13	<2	5	<100	1.4	26	14	<50	220	2.2	<10	<5	1	<1	15.0	<2	5.8	<5	<200
W 406	<5	2.7	28	1700	<10	6	<50	19	<2	3	<100	0.8	17	<2	<50	170	1.3	<10	<5	1	<1	10.0	<2	4.3	<5	<200
W 434A	<5	1.4	8	1100	<10	25	57	15	<2	2	<100	5.1	21	<2	<50	310	15.0	<10	<5	<1	<1	5.7	7	2.8	<5	<200
W 436	5	1.3	8	1900	<10	3	<50	16	<2	5	<100	0.9	56	<2	<50	160	2.3	<10	<5	1	<1	17.0	<2	6.9	<5	<200
MOUNT NANSEN																										
P 400	<5	0.8	2	2200	<10	5	<50	<10	<2	3	<100	1.1	27	<2	<50	160	4.3	<10	<5	<1	<1	20.0	4	5.0	<5	<200
P 766	<6	41.3	12	1200	<10	3	<50	<10	<2	2	<100	<0.5	10	<2	<50	90	1.2	<10	<5	<1	<1	5.8	<2	1.8	<5	<200
P 767	<5	7.5	17	1100	<10	<1	<50	<10	<2	<2	<100	0.5	10	<2	<50	120	1.8	<10	<5	<1	<1	6.8	2	1.7	<5	<200
P 768	6	11.0	9	1700	<10	2	<50	<10	<2	<2	<100	<0.5	17	<2	<50	53	1.9	<10	<5	<1	<1	6.6	<2	3.2	<5	<200
PATTISON CREEK																										
J 168	37	10.0	10	2000	<10	5	<50	12	<2	3	<100	1.0	38	13	<50	200	3.2	<10	<5	1	<1	26.0	47	6.1	<5	<200
PROSPECTOR MOUNTAIN																										
K 493	859	62.6	315	<100	<10	4	<50	<10	<2	<2	<100	17.0	<5	9	<50	44	2.3	<10	350	<1	<1	<0.6	523	3.2	<5	<200
P 308	<5	2.5	6	1200	<10	7	<50	<10	<2	2	<100	0.6	15	<2	<50	140	2.4	<10	<5	1	<1	21.0	3	2.0	<5	<200
P 620	57	24.9	43	150	<10	10	52	18	<2	<2	<100	11.0	<5	3	<50	180	4.1	<10	<5	<1	<1	11.0	233	8.6	<5	410
S 177	61	14.0	179	<100	<10	<1	<50	<10	<2	3	<100	3.7	20	28	<50	<10	5.7	<10	5	<1	<1	8.2	20	3.5	<5	<200
S 183B	61	267.0	63	<140	<12	6	<68	<10	<2	<2	<100	1.3	<5	150	<50	33	0.7	<14	5	<1	<1	<1.0	20	1.2	<5	<200
S 183C	58	61.2	81	740	11	11	<50	<10	<2	<2	<100	24.0	7	51	<50	200	5.9	<10	18	<1	<1	5.3	962	5.0	8	940
S 185	76	26.3	50	120	<10	9	<50	27	<2	<2	<100	10.0	<5	5	<50	170	3.7	<10	<5	<1	<1	11.0	190	11.0	<5	550
SONORA GULCH																										
Hudson Bay Mining and Smelting Ltd. Diamond-Drill Hole																										
78-1 120'	75	4.6	26	3000	<10	9	<50	<10	<2	4	<100	4.0	23	5	<50	170	7.2	<10	<5	<1	<1	8.6	11	3.3	<5	<200
W 970	893	168.0	>999*	260	130	3	<130	<10	<2	<4	<140	4.9	20	<7	<50	230	3.8	<25	14	<1	<1	7.6	10	<1.4	27	7700
OTHER AREAS																										
J 686	<5	1.6	6	3300	<10	5	460	25	<2	5	<100	2.1	65	6	<50	230	15.0	<10	<5	<1	<1	24.0	10	2.8	<5	<200
P 709	41	6.5	9	930	<10	2	54	<10	<2	4	<100	2.0	26	8	<50	61	10.0	<10	<5	<1	<1	6.4	3	3.0	<5	<200
P 907	<5	10.0	11	460	<10	3	<50	<10	<2	<2	<100	<0.5	28	3	<50	120	1.3	<10	<5	<1	<1	19.0	4	3.0	<5	<200
S 624A	310	5.3	207	<100	<10	2	<50	<10	<2	<2	<100	4.5	<5	6	<50	<10	2.0	<10	<5	<1	<1	0.5	9	2.8	<5	450
S 625B	7310	8.9	172	330	15	5	180	74	<2	<2	<100	27.0	12	17	84	51	23.0	<10	36	<1	<1	2.1	62	1.5	<5	1600
W 772A	<5	6.5	12	970	<10	5	<50	30	<2	2	<100	1.5	18	<2	<50	95	3.1	<10	<5	<1	<1	10.0	<2	4.1	<5	<200

+ ppm except where noted
*As = 12,300 ppm

DESCRIPTION OF ALTERED AND MINERALIZED ROCKS

Sample No.	Rock type	Description
CASINO AND BOMBER AREA		
C 2	Subunit 6a	Quartz monzonite, strong phyllic alteration, common quartz veinlets
C 3	Subunit 6a	Quartz monzonite, strong phyllic alteration, common quartz veinlets
C 4	Subunit 6a	Quartz monzonite, strong phyllic alteration including pyrite, abundant quartz veinlets
C 5	Subunit 6c	Porphyritic (quartz, plagioclase) quartz monzonite, strong phyllic alteration with tourmaline and iron sulphate
C 6	Subunit 6x	Medium breccia, with fragments of phyllic-altered quartz monzonite (Subunit 6a) and lesser quartz diorite (Subunit 5a), in quartz-rich groundmass
J 199	Uncertain	Quartz-sericite rock, no primary texture preserved, probably either altered quartz monzonite of Subunit 6a of quartz diorite of Subunit 5a
W 331	Subunit 5a	Potassic quartz diorite, chalky, cream-coloured phyllic alteration
W 358	Subunit 5a	Potassic quartz diorite, strong phyllic alteration including pyrite and limonite, and minor quartz veinlets.
W 359	Subunit 5a	Potassic quartz diorite, strong phyllic alteration including fine pyrite; limonite in boxworks
COFFEE CREEK		
J 717		Quartz monzonite, strong phyllic alteration
J 723		Quartz monzonite, moderate phyllic alteration
J 749		Quartz monzonite, moderate phyllic alteration
K 652		Quartz monzonite, moderate phyllic alteration
P 136		Quartz monzonite, slight phyllic alteration
W 588		Quartz monzonite, slight phyllic alteration
MOUNT COCKFIELD		
J 539	Subunit 7b	Latite lava flow or welded tuff, siliceous alteration
J 545	Subunit 7b	Latite lava flow or welded tuff, contact zone against Mount Cockfield porphyritic granodiorite stock (Subunit 9b)
J 406	Subunit 7bx	Latite welded tuff with secondary tourmaline
J 434A	Subunit 7d	Andesite lava flow with 3-5% pyrite and lesser chalcopyrite on fractures and as blebby concentrations
W 436	Subunit 7b	Latite lava flow or welded tuff with 2% disseminated pyrite; near the major fault separating latite of Subunit 7b from andesite of Subunit 7d

DESCRIPTION OF ALTERED AND MINERALIZED ROCKS (continued)

Sample No.	Rock type	Description
MOUNT NANSEN (on Prospector Mountain Sheet 115I/5)		
P 400	Subunit 7c	Porphyritic latite plug, moderate phyllic alteration with disseminated, extremely fine-grained pyrite
P 766	Subunit 7c	Porphyritic latite plug, strong phyllic alteration, silicified groundmass, abundant quartz veinlets, and minor limonite
P 767	Subunit 7c	Porphyritic latite plug, strong phyllic alteration, moderate hematite stain
P 768	Subunit 7c	Porphyritic latite plug, moderate phyllic alteration
PATTISON CREEK		
J 168	Subunit 6a	Quartz monzonite, slight to moderate phyllic alteration, cut by quartz veins with minor patches of molybdenite and chalcopyrite, minor dykes of aplitic quartz monzonite (Subunit 6d): sample from DDH Patt 3, 541 ft.
PROSPECTOR MOUNTAIN		
K 493	Vein	Galena and sphalerite in gossanous andesite (Unit 13), vein up to 8 cm thick
P 308	Subunit 16b	Quartz monzonite with abundant quartz veins and veinlets, minor phyllic alteration
P 620	Brecciated Vein	Vein dominated by quartz and coarse-grained specular hematite, with fragments of phyllic-altered quartz-bearing monzonite (Subunit 16af)
S 177	Breccia	Fragments of andesite (Unit 13) in a grey, siliceous groundmass containing moderate limonite and Mn oxides
S 183B	Fault Zone	Silicified zone in andesite (Unit 13)
S 183C	Fault Zone	Silicified zone in andesite (Unit 13), with veinlets and cavity fillings of quartz, galena, and pyrite
S 185	Fault Breccia	Fragments of silicified andesite (Unit 13) in a gangue of quartz and calcite; patches of galena and minor sphalerite and limonite within the gangue
HAYES CREEK (SWEDE)		
W 970a	Subunit 7c	Porphyritic latite plug, moderate to strong phyllic alteration, silicification, 2-5% disseminated and vein pyrite: Hudson Bay Mining and Smelting Ltd. Diamond-Drill Hole 78-1 at 120 ft.
W 970	Subunit 7c	Porphyritic latite plug, moderate to strong phyllic alteration, 10% disseminated and vein pyrite and arsenopyrite: unnumbered drill core.

DESCRIPTION OF ALTERED AND MINERALIZED ROCKS (continued)

Sample No.	Rock type	Description
OTHER AREAS		
J 686	Uncertain	Quartz-sericite rock with no original texture, minor limonite
P 709	Subunit 16af	Fine-grained felsite dyke, 2-3% pyrite altered to limonite
P 907	Subunit 9c	Felsite dyke, moderate phyllic alteration, cut by quartz veins
S 624A	Subunit 9b	Porphyritic latite dyke, strong phyllic alteration, quartz lenses, secondary tourmaline rosettes
S 625B	Subunit 9b	Porphyritic latite dyke, galena, pyrite and chalcopyrite along fractures, moderate phyllic alteration
W 772A	Subunit 7b	Latite tuff, moderate phyllic alteration

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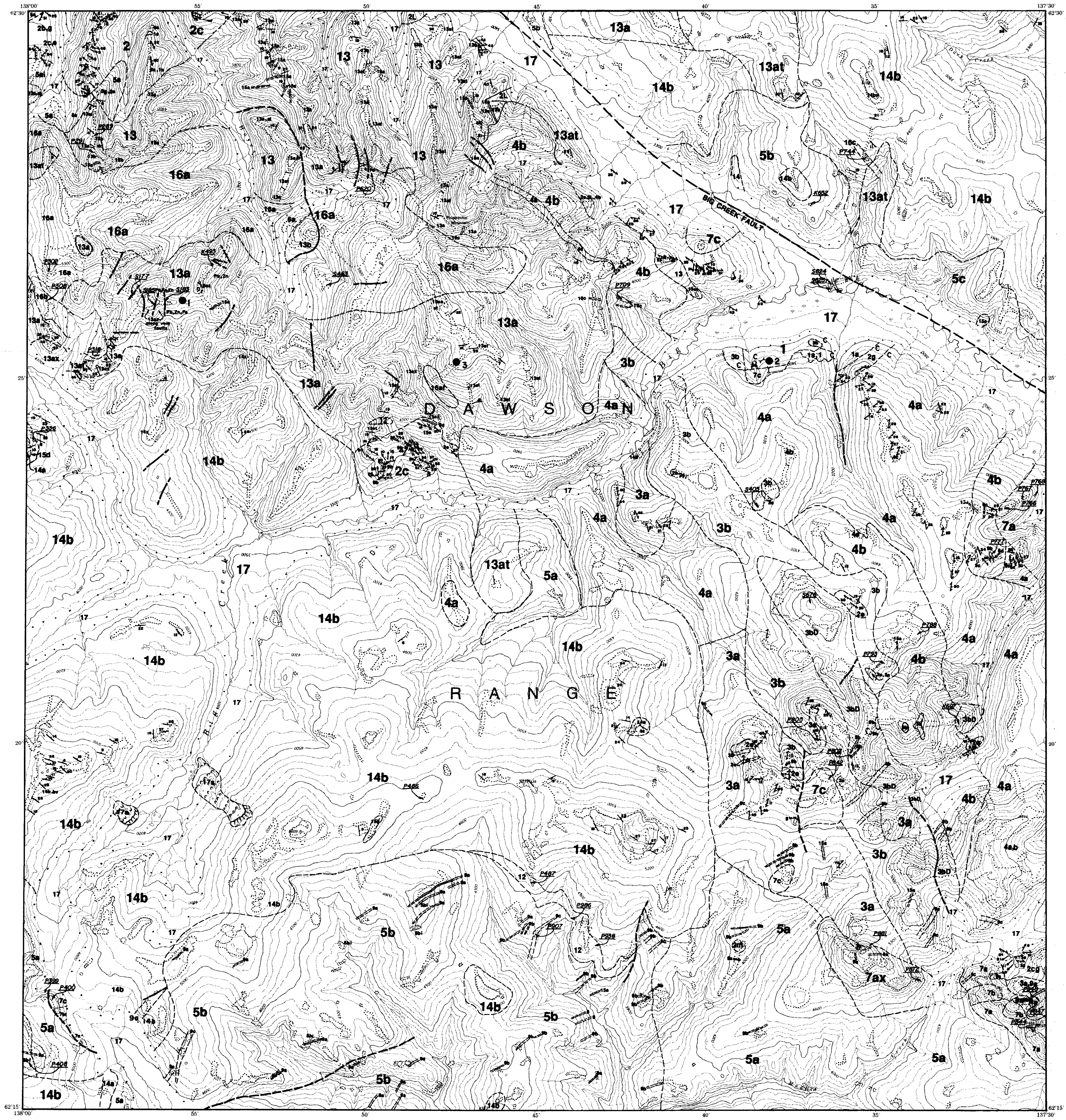


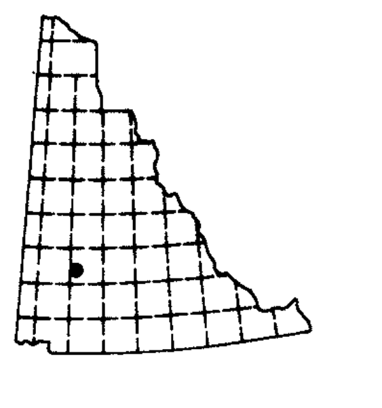
Approximate magnetic declination in 1987 was N30°23'E and decreasing at an annual change of 3.7'.

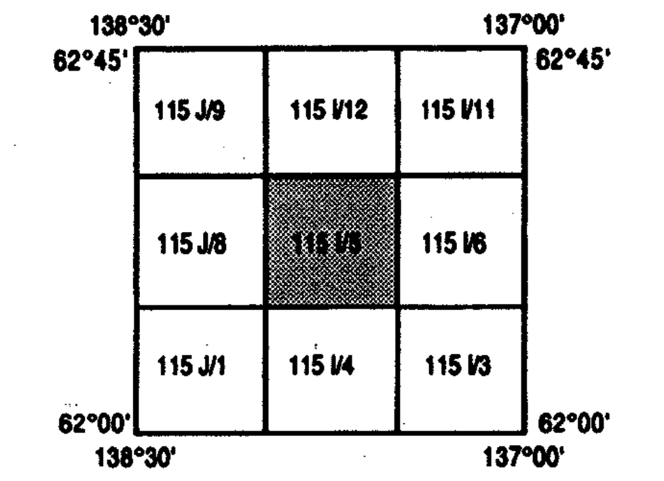
Scale 1:50,000 Échelle

Miles 1 0 1 2 3 Miles

Metres 1000 0 1000 2000 3000 4000 Mètres

Yards 1000 0 1000 2000 3000 4000 Verges





Index to adjoining Maps of the National Topographic System

LEGEND

QUATERNARY

17	Alluvium; 17s, landslide; 17g, glacial deposit.

LATE CRETACEOUS TO EARLY TERTIARY

PROSPECTOR MOUNTAIN SUITE

16	16a, quartz-bearing monzonite; 16af, fine grained variety; 16b, quartz-monzonite; 16c, latite, quartz-bearing latite dyke.

CARMACKS SUITE

15	LATE DYKES, INTRUSIONS: 15a, aphanitic andesite, basalt dyke; 15b, very fine to fine grained andesite, latite dyke; 15c, potassic gabbro, monzo-gabbro; 15d, diabase.
14	UPPER VOLCANIC SECTION: 14a, andesite flow; 14b, basalt flow; 14bv, upper, vesicular part of 14b; 14x, breccia, debris flow with fragments of basement rock.
13	LOWER VOLCANIC SECTION: 13a, andesite flow; 13as, andesitic tuffaceous sediments, shale; 13at, andesitic tuff; 13ax, andesitic flow breccia; 13b, basalt, basaltic andesite flow; 13x, breccia, debris flow with fragments of basement rock.
12	BASAL VOLCANIC SECTION: rhyodacite tuff.

EARLY CRETACEOUS

11	COLORADO CREEK BRECCIA: landslide, talus breccia.
10	CARIBOU CREEK CONGLOMERATE: conglomerate, sandstone.

MOUNT NANSEN SUITE

9	LATE DYKES, INTRUSIONS: 9a, latite, plagioclase, hornblende phenocrysts; 9b, quartz-bearing latite-dacite, plagioclase, quartz hornblende, biotite phenocrysts; 9c, leucocratic rhyodacite, quartz-bearing latite, plagioclase, quartz, k-feldspar phenocrysts; 9d, quartz-bearing monzonite (Mount Cockfield Stock, associated dykes).
8	BOW CREEK GRANITE: (only east of project area)
7	VOLCANIC ROCKS: 7a, andesite, latite flow; 7at, tuff; 7ax, flow breccia; 7b, latite, rhyodacite flow; 7bt, tuff; 7c, latite, rhyodacite dome, plug; 7d, andesite, basaltic andesite flow (Mount Cockfield), tuff, felsic tuff.

DAWSON RANGE SUITE

6	CASINO INTRUSIONS: 6a, fine grained quartz-monzonite; 6b, medium grained, leucocratic quartz-monzonite; 6c, porphyritic, leucocratic quartz-monzonite (Casino); 6d, aplitic quartz-monzonite; 6x, breccia pipe (Casino); 6xc, coarse breccia; 6xf, fine breccia.
5	DAWSON RANGE BATHOLITH: 5a, hornblende>biotite potassic quartz-diorite; 5b, biotite>hornblende granodiorite; 5c, biotite rich, leucocratic quartz-monzonite, granodiorite; 5d, hornblende-biotite diorite.

JURASSIC (?)

4	BIG CREEK SUITE: 4a, hornblende monzonite, quartz-bearing monzonite, common k-feldspar phenocrysts; 4b, hornblende monzonite to diorite; 4c, hornblendite.

TRIASSIC (?)

3	KLOTASSIN SUITE: 3a, hornblende-biotite granodiorite to diorite; 3b, leucocratic granodiorite; 3bd, strong cataclastic deformation.

PROTEROZOIC - PALEOZOIC

YUKON METAMORPHIC COMPLEX

2	QUARTZ-FELDSPATHIC GNEISS/SCHIST UNIT: 2a, meta-latite to meta-dacite flow, welded tuff, coarse texture; 2b, meta-latite to meta-dacite flow, tuff, medium to fine texture; 2c, latitic, dacitic, andesitic metasedimentary and meta-tuffaceous rocks, finely layered; 2d, meta-andesite tuff, flow; 2e, amphibolite (meta-basalt), banded amphibolite/felsic gneiss; 2f, orthogneiss, biotite-hornblende quartz-diorite to quartz-monzonite; 2L, recrystallized limestone, interlayered with rocks of Unit 2; 2g, gneiss, derived from Unit 2, parentage uncertain; 2m, migmatite, mixture of 2g and plutonic rocks; 2s, skarn, calcsilicate rock, derived from Unit 2.
1	METASEDIMENTARY UNIT: 1a, quartzite, micaceous quartzite; 1b, quartz-mica schist, after impure quartzite, siltstone; 1c, meta-greywacke; 1d, argillite, slate; 1e, metamorphosed pebble conglomerate; 1f, meta-andesite, tuff, tuffaceous sediments; 1L, recrystallized limestone, interlayered with rocks of Unit 1; 1g, gneiss derived from unit 1, parentage uncertain; 1m, migmatite, mixture of 1g and plutonic rocks; 1s, skarn, calcsilicate rock, derived from Unit 1.

Suffixes

g - gneissic equivalent when parent rock is known
i - rock containing abundant mafic phenocrysts
p - rock usually porphyritic
z - rock altered, parentage known

SYMBOLS

Outcrop and felsenmeer	
Geological data from Archer Cathro, Godwin or Hayes Creek Resources report	C,G,H
Outline of Alluvium	. . .
Geological boundary (defined, assumed)	
Bedding (inclined, surface trace)	
Igneous foliation (primary)	
Schistosity; S1 (inclined, vertical)	
S2 (inclined, vertical)	
Lineation; L1	
Anticline	
Syncline	
Fault, sense of movement unknown (observed, assumed)	
Sample collection site with station number	W126
Mineral deposit or prospect, reference number	●2
Trench	
Mineral Locality; gold, silver, copper molybdenum, zinc, pyrite, hematite	Au,Ag,Cu Mo,Zn,Py,Fe

MINERAL OCCURRENCES

Property Number	Name (Commodity)	YEX Number
1	FROG (Ag, Au)	115 I – (21)
2	CASH (Cu, Mo, Au)	115 I – (23)
3	STARBIRD (Cu, Ag, Zn)	115 I – (22)

Indian and Northern Affairs Canada
Exploration and Geological Services Division
Yukon Region

GEOLOGICAL MAP OF PROSPECTOR MOUNTAIN MAP AREA (115 I-5)

to accompany

OPEN FILE REPORT 1987-3

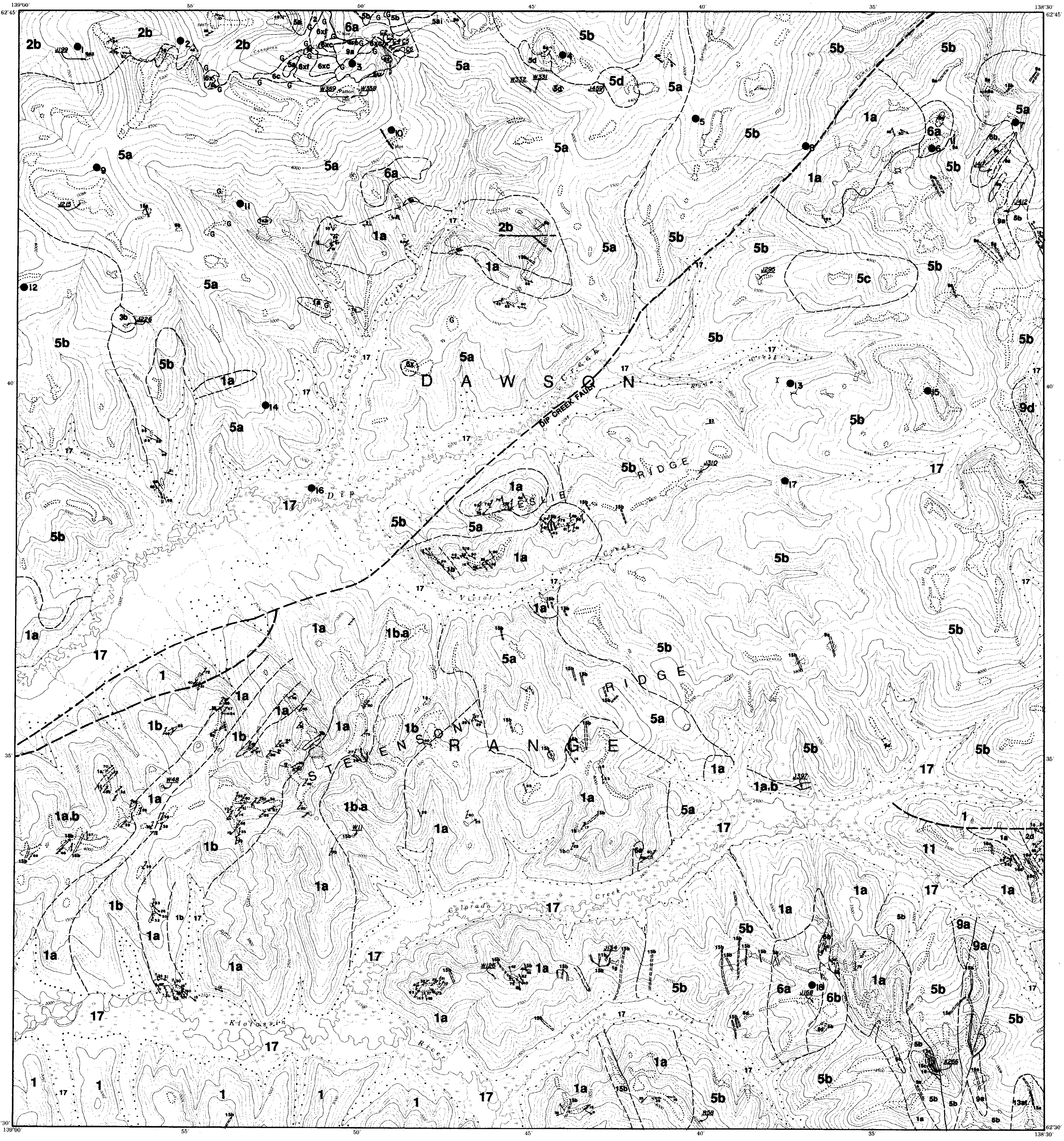
Geology of Colorado Creek (115 J-10), Selwyn River (115 J-9) and Prospector Mountain (115 I-5) map areas by John G. Payne, Ralph A. Gonzales, Kent Akhurst and Wendy G. Sisson.

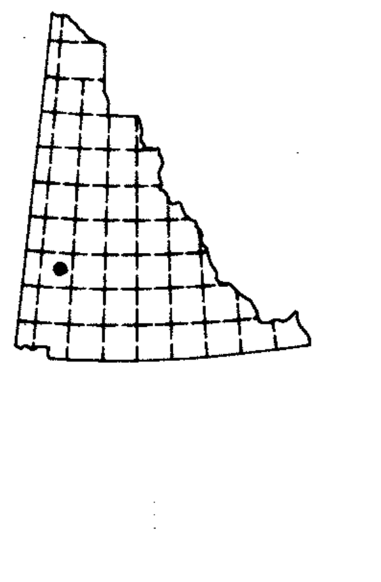
Funded by Canada-Yukon Economic Development Agreement (Contract YEDA 04/86)

Canada

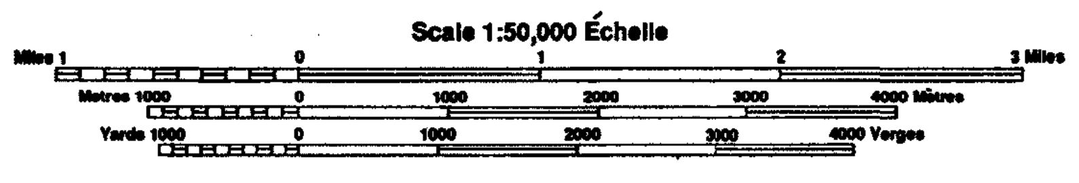
canada/yukon economic development agreement

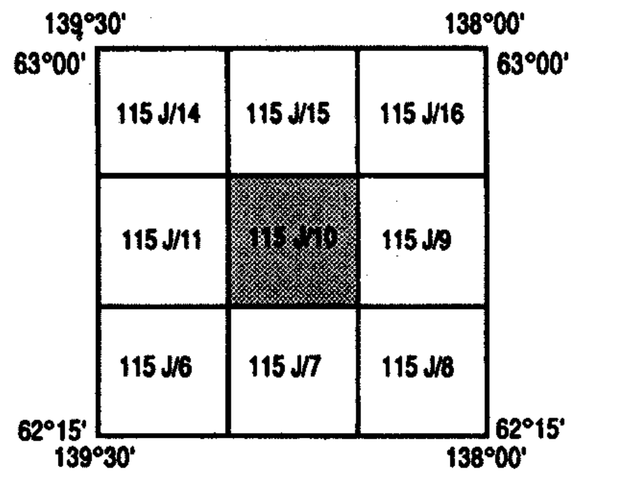
Yukon





Approximate magnetic declination in 1987 was N28°13'E and decreasing at an annual change of 3.5'.


Scale 1:50,000 Échelle



Index to adjoining Maps of the National Topographic System

LEGEND

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LATE CRETACEOUS TO EARLY TERTIARY

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EARLY CRETACEOUS

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10 CARIBOU CREEK CONGLOMERATE: conglomerate, sandstone.

MOUNT NANSEN SUITE

9 LATE DYKES, INTRUSIONS: 9a, latite, plagioclase, hornblende phenocrysts; 9b, quartz-bearing latite-dacite, plagioclase, quartz hornblende, biotite phenocrysts; 9c, leucocratic rhyodacite, quartz-bearing latite, plagioclase, quartz, k-feldspar phenocrysts; 9d, quartz-bearing monzonite (Mount Cockfield Stock, associated dykes).

8 BOW CREEK GRANITE: (only east of project area)

7 VOLCANIC ROCKS: 7a, andesite, latite flow; 7at, tuff; 7ax, flow breccia; 7b, latite, rhyodacite flow; 7bt, tuff; 7c, latite, rhyodacite dome, plug; 7d, andesite, basaltic andesite flow (Mount Cockfield), tuff, felsic tuff.

DAWSON RANGE SUITE

6 CASINO INTRUSIONS: 6a, fine grained quartz-monzonite; 6b, medium grained, leucocratic quartz-monzonite; 6c, porphyritic, leucocratic quartz-monzonite (Casino); 6d, aplitic quartz-monzonite; 6x, breccia pipe (Casino); 6xc, coarse breccia; 6xf, fine breccia.

5 DAWSON RANGE BATHOLITH: 5a, hornblende>biotite potassic quartz-diorite; 5b, biotite>hornblende granodiorite; 5c, biotite rich, leucocratic quartz-monzonite, granodiorite; 5d, hornblende-biotite diorite.

JURASSIC (?)

4 BIG CREEK SUITE: 4a, hornblende monzonite, quartz-bearing monzonite, common k-feldspar phenocrysts; 4b, hornblende monzonite to diorite; 4c, hornblendite.

TRIASSIC (?)

3 KLOTASSIN SUITE: 3a, hornblende-biotite granodiorite to diorite; 3b, leucocratic granodiorite; 3bd, strong cataclastic deformation.

PROTEROZOIC - PALEOZOIC

YUKON METAMORPHIC COMPLEX

2 QUARTZ-FELDSPATHIC GNEISS/SCHIST UNIT: 2a, meta-latite to meta-dacite flow, welded tuff, coarse texture; 2b, meta-latite to meta-dacite flow, tuff, medium to fine texture; 2c, latitic, dacitic, andesitic metasedimentary and meta-tuffaceous rocks, finely layered; 2d, meta-andesite tuff, flow; 2e, amphibolite (meta-basalt), banded amphibolite/felsic gneiss; 2f, orthogneiss, biotite-hornblende quartz-diorite to quartz-monzonite; 2L, recrystallized limestone, interlayered with rocks of Unit 2; 2g, gneiss, derived from Unit 2, parentage uncertain; 2m, migmatite, mixture of 2g and plutonic rocks; 2s, skarn, calcsilicate rock, derived from Unit 2.

1 METASEDIMENTARY UNIT: 1a, quartzite, micaceous quartzite; 1b, quartz-mica schist, after impure quartzite, siltstone; 1c, meta-greywacke; 1d, argillite, slate; 1e, metamorphosed pebble conglomerate; 1f, meta-andesite, tuff, tuffaceous sediments; 1L, recrystallized limestone, interlayered with rocks of Unit 1; 1g, gneiss derived from unit 1, parentage uncertain; 1m, migmatite, mixture of 1g and plutonic rocks; 1s, skarn, calcsilicate rock, derived from Unit 1.

Suffixes

g - gneissic equivalent when parent rock is known
i - rock containing abundant mafic phenocrysts
p - rock usually porphyritic
z - rock altered, parentage known

SYMBOLS

Outcrop and felsenmeer
Geological data from Archer Cathro, Godwin or Hayes Creek Resources report .... C,G,H
Outline of Alluvium
Geological boundary (defined, assumed)
Bedding (inclined, surface trace)
Igneous foliation (primary)
Schistosity; S1 (inclined, vertical)
S2 (inclined, vertical)
Lineation; L1
Anticline
Syncline
Fault, sense of movement unknown (observed, assumed)
Sample collection site with station number W126
Mineral deposit or prospect, reference number .... ● 14
Trench
Mineral Locality; gold, silver, copper, molybdenum, zinc, pyrite, hematite .... Au,Ag,Cu Mo,Zn,Py,Fe

MINERAL OCCURRENCES

Property Number	Name (Commodity)	YEX Number
1	ZAPPA (Cu, Mo)	115 J – (14)
2	ANA (Cu, Mo, Au)	115 J – (51)
3	CASINO (Cu, Mo, Au)	115 J – (12)
4	PEG (Cu)	115 J – (52)
5	TOAD (Ag, Pb)	115 J – (53)
6	ISAAC (Au, Ag, Pb, Zn)	115 J – (54)
7	IDAHO (Au, Ag, Cu, Mo, W)	115 J – (55)
8	NORDEX (Ag, Pb)	115 J – (10)
9	AZTEC (Mo, Cu)	115 J – (13)
10	BOMBER (Ag, Pb, Zn)	115 J – (11)
11	HOLE (Mo)	115 J – (56)
12	GEP (Cu)	115 J – (57)
13	RUDE CREEK (Pb, Ag, Zn, Au)	115 J – (9)
14	CLEVELAND (Cu, Mo)	115 J – (58)
15	HAXE (Cu, Mo)	115 J – (59)
16	RONGE (Cu, Mo)	115 J – (60)
17	VIC (Cu)	115 J – (61)
18	PATTISON (Cu, Mo)	115 J – (27)

Indian and Northern Affairs Canada
Exploration and Geological Services Division
Yukon Region

GEOLOGICAL MAP OF COLORADO CREEK MAP AREA (115 J-10)

to accompany

OPEN FILE REPORT 1987-3

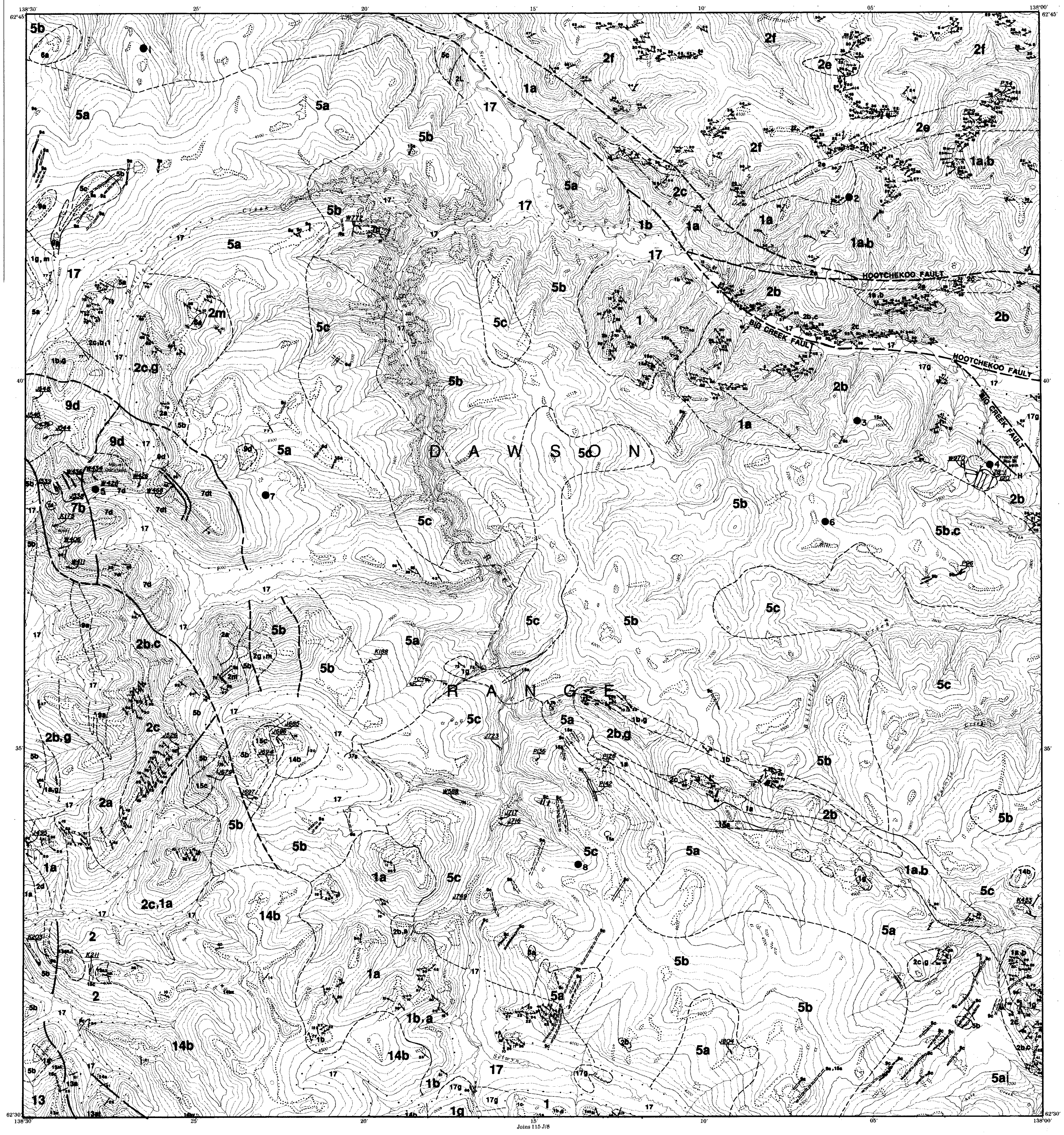
Geology of Colorado Creek (115 J-10), Selwyn River (115 J-9) and Prospector Mountain (115 I-5) map areas by John G. Payne, Ralph A. Gonzales, Kent Akhurst and Wendy G. Sisson.

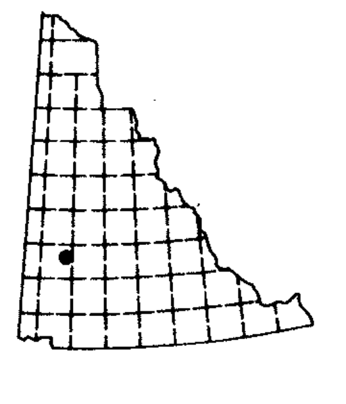
Funded by Canada-Yukon Economic Development Agreement (Contract YEDA 04/86)

Canada

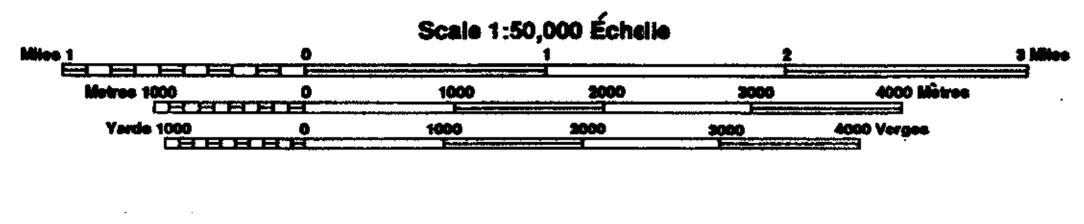
canada/yukon economic development agreement

Yukon





Approximate magnetic declination in 1987 was N27°59'E and decreasing at an annual change of 3.6'.



139°00'		137°30'
63°00'		63°00'
115 J/15	115 J/16	115 I/13
115 J/10	115 J/9	115 I/12
115 J/7	115 J/8	115 I/5
62°15'		62°15'
139°00'		137°30'

Index to adjoining Maps of the National Topographic System

LEGEND

QUATERNARY

17 Alluvium; 17s, landslide; 17g, glacial deposit.

LATE CRETACEOUS TO EARLY TERTIARY

PROSPECTOR MOUNTAIN SUITE

16 16a, quartz-bearing monzonite; 16af, fine grained variety; 16b, quartz-monzonite; 16c, latite, quartz-bearing latite dyke.

CARMACKS SUITE

15 LATE DYKES, INTRUSIONS: 15a, aphanitic andesite, basalt dyke; 15b, very fine to fine grained andesite, latite dyke; 15c, potassic gabbro, monzo-gabbro; 15d, diabase.

14 UPPER VOLCANIC SECTION: 14a, andesite flow; 14b, basalt flow; 14bv, upper, vesicular part of 14b; 14x, breccia, debris flow with fragments of basement rock.

13 LOWER VOLCANIC SECTION: 13a, andesite flow; 13as, andesitic tuffaceous sediments, shale; 13at, andesitic tuff; 13ax, andesitic flow breccia; 13b, basalt, basaltic andesite flow; 13x, breccia, debris flow with fragments of basement rock.

12 BASAL VOLCANIC SECTION: rhyodacite tuff.

EARLY CRETACEOUS

11 COLORADO CREEK BRECCIA: landslide, talus breccia.

10 CARIBOU CREEK CONGLOMERATE: conglomerate, sandstone.

MOUNT NANSEN SUITE

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Fault, sense of movement unknown (observed, assumed)
Sample collection site with station number W126
Mineral deposit or prospect, reference number .... ●47
Trench
Mineral Locality; gold, silver, copper, molybdenum, zinc, pyrite, hematite .... Au,Ag,Cu Mo,Zn,Py,Fe

MINERAL OCCURRENCES

Property Number	Name (Commodity)	YEX Number
1	SHERIDAN (None)	115 J – (46)
2	OATS (Cu)	115 J – (47)
3	GUESS (Au)	115 J – (48)
4	HAYES (Au, Ag, Cu)	115 J – (4)
5	COCKFIELD (Cu, Mo, Au)	115 J – (7)
6	STRAW (Cu)	115 J – (49)
7	BATTLE (Cu)	115 J – (50)
8	CROCK (Cu)	115 J – (6)

Indian and Northern Affairs Canada
Exploration and Geological Services Division
Yukon Region

GEOLOGICAL MAP OF SELWYN RIVER MAP AREA (115 J-9)

to accompany

OPEN FILE REPORT 1987-3

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