Geology, Geochemistry and Radiometrics

BOOT 1-284 and MARMOT 1-24
Claim Group

Watson Lake Mining District
Claim Sheet 105G/6

This report has been examined by the Geological Evaluation Unit and is recommended to the Commissioner to be considered as representation work in the amount of $ 41,050.00

J A Main

Resident Geologist or
Resident Mining Engineer

Considered as representation work under Section 53 (4), Yukon Quartz Mining Act.

B. R. BAXTER
Supervising Mining Recorder

Commissioner of Yukon Territory

ARCHER, CATHRO
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CONSULTING GEOLOGICAL ENGINEERS

BOX 4127, WHITEHORSE, Y.T. Y1A 3S9 667-4415 | STANDARD BUILDING, VANCOUVER, B.C. 688-2568

1016 STANDARD BUILDING
510 WEST HASTINGS STREET
VANCOUVER, B.C.
V6B 1L8

REPORT ON
GEOLOGICAL MAPPING, AND
GEOCHEMICAL AND RADIOMETRIC SURVEYS
BOOT 1-284 & MARMOT 1-24 CLAIM GROUP

Tag Numbers:

YA25436-YA25459
YA25687-YA25699
YA26131-YA26154
YA33838-YA34052
YA34734-YA34741
YA34852-YA34859
YA34948-YA34955
YA34994-YA34997
YA35531-YA35534

WATSON LAKE MINING DISTRICT, Y.T.

CLAIM SHEET 105G/6

Latitude 61°26'N | Longitude 131°10'W

FOR GRASS PROJECT, CHEVRON CANADA

U. Schmidt, B.Sc. | R.J. Cathro, B.A.Sc., P.Eng.

December 15, 1978

TABLE OF CONTENTS

TABLES

LIST OF ILLUSTRATIONS IN TEXT

LIST OF ILLUSTRATIONS IN POCKET

CONCLUSIONS AND RECOMMENDATIONS

Tungsten mineralization in the Grass Lakes area exhibits significant differences from classical Yukon skarn deposits. For one thing, it is developed in minor carbonate members within a highly deformed schist sequence of uncertain age, probably upper Paleozoic. In addition, the best mineralization consists of leucocratic, biotite and muscovite-rich skarn with lower than average contents of garnet and diopside and almost no associated sulphides. And, finally, the skarns have formed at the margins of augen gneiss bodies as well as the contacts of the porphyritic-quartz monzonite stocks.

The 1977 and 1978 surveys have resulted in the discovery of 10 tungsten occurrences on the Boot-Marmot claims. Most consist of talus or float and were found by a combination of stream panning, grid soil panning and prospecting in daylight and at night with an ultraviolet lamp. Most of these occurrences, including the Marmot and Pika found in 1977, have little size or grade potential and/or are very difficult to explore without deep trenching because of vegetation or overburden cover. Few of these warrant any further work unless strong encouragement is obtained from the better showings.

The best of the known targets is the discovery showing, known as the Main Boot showing or the A Zone. Although apparently thin (2 m), the discovery outcrop at the contact of the quartz monzonite stock has an impressive grade of 5.88 per cent WO_3 and 0.056 oz/ton Au in a chip sample. A mineralized float train suggests a possible strike length of 150 m and there is a potential for more mineralized horizons to occur lower in the section at the A Zone and in a second zone (B) on the opposide side of the stock. The size of this deposit can only be determined by drill sampling, commencing with close-spaced, short holes near the discovery outcrop.

Respectfully submitted,

ARCHER, CATHRO AND ASSOCIATES LTD.

U. Schmidt, B.Sc.

R.J. Cathro, B.A.Sc., P.Eng.

Association of Professional Engineers of the Yukon Territory
R.J. CATHRO
GEOLOGICAL ENGINEER

INTRODUCTION

The 1978 Grass Project was a continuation of the 1977 Firth Project, which carried out regional uranium exploration in the Grass Lakes area of the Yukon and staked one uranium target as the Toke claim group. The unexpected discovery of tungsten mineralization late in the season resulted in a limited tungsten exploration program and the staking of the two best showings as the adjoining Boot and Marmot claim groups. Both the 1977 and 1978 programs were managed by Archer, Cathro and Associates Ltd. on behalf of Chevron Canada Ltd.

1978 PROGRAM

The 1978 field crew was led by project geologist Uwe Schmidt and included geologist Jim Chapman and field assistants Gary Matthews and Art Halleran. The program extended from July 2 to September 24 and utilized a crew and contract helicopter that were shared with another project earlier in the season. The program started with the staking of an additional 247 Boot claims, which expanded the 1977 property to a single 308 claim block. This was followed by line cutting, geological mapping, soil sampling, soil panning and scintillometer survey in the northern end of the claim group. A smaller soil sampling and panning grid was located just south in the Boot Cirque area. Detailed mapping was done here and on the adjoining Marmot claims. A few contour soil sampling and panning lines were located on the Marmot claims as well while work in the "Pika" area to the west was limited to reconnaissance mapping and creek panning and silt sampling. This work is illustrated on eight 1:5,000 scale maps in four map areas (see Figures 3-10 in pocket).

The property work ended with hand trenching in four overburden covered areas and one hand trench in talus at the discovery outcrop in the Boot Cirque.

PROPERTY, LOCATION AND ACCESS

The 1978 basecamp was established on an unnamed lake, called Lampman Lake by the Archer, Cathro crew, that is situated within the Boot claim group at 61°26'N and 131°10'W, approximately 9 km northwest of Grass Lakes and 100 km southeast of Ross River (see Figure 1).

Access in 1978 was by float equipped aircraft, principally a Pilatus Porter chartered from Norcrown Air Ltd., Ross River, 100 km northwest of Lampman Lake. Helicopter support was provided by Trans North Turbo Air Ltd. of Whitehorse, which supplied a Bell 47 G3/B2 helicopter piloted by Ron Dennett from July 2 to July 14 and from August 30 to September 24.

The Campbell Highway, an all-weather gravel road connecting Ross River to Watson Lake, passes within 30 km north of Lampman Lake and a 45 km long winter tote trail from the Campbell Highway passes within 8 km on the north end of the lake. This tote trail was built in 1967 and has been used occasionally by bulldozers during dry summers since then.

The Boot-Marmot claim group illustrated on Figure 2 consists of 308 contiguous claims which form an irregular north trending block of 14 km maximum length and 7 km maximum width. The are registered in the name of Archer, Cathro and Associates Ltd. in the Watson Lake Mining Recorder's office as follows:

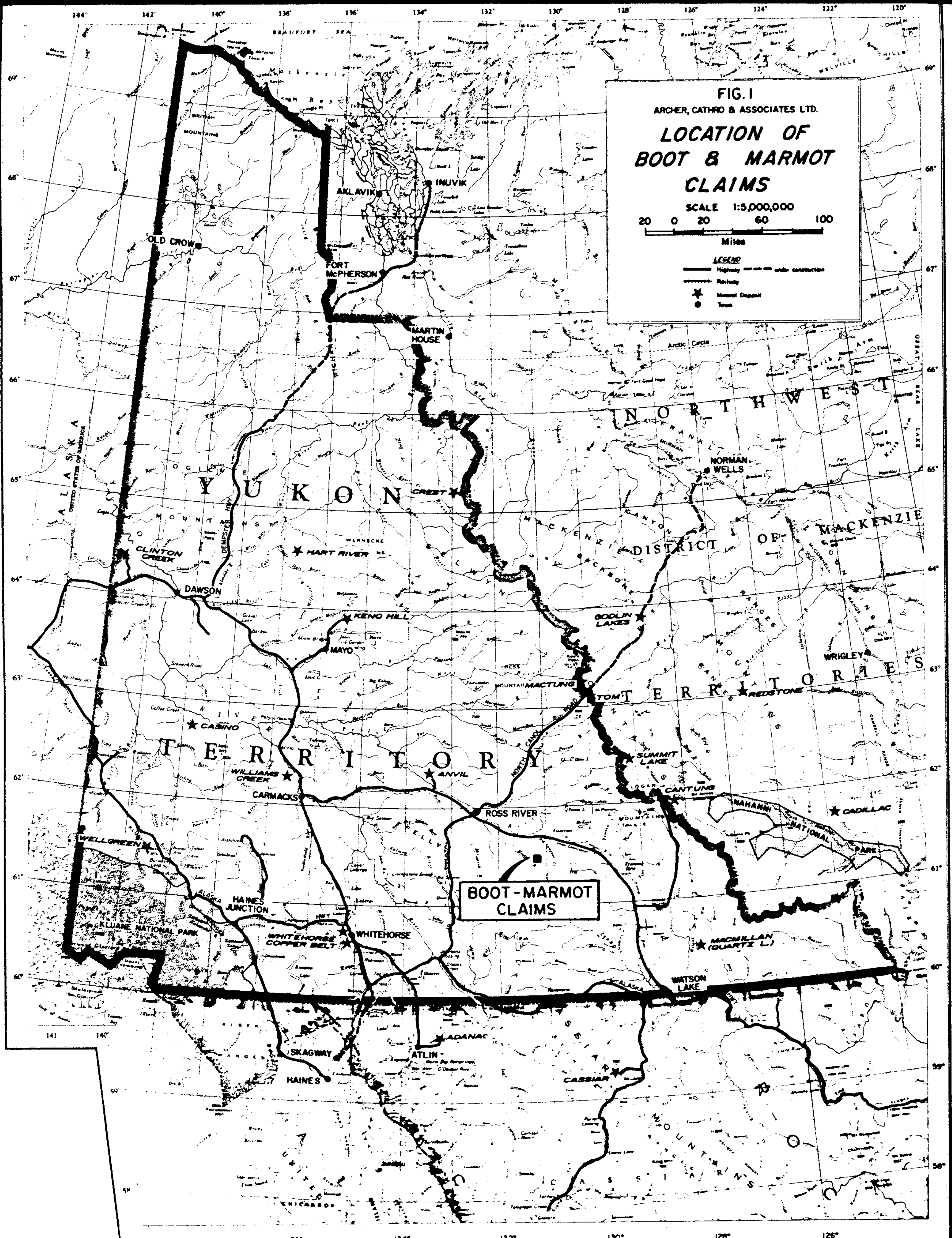


FIG. 1

ARCHER, CATHRO & ASSOCIATES LTD.

LOCATION OF BOOT & MARMOT CLAIMS

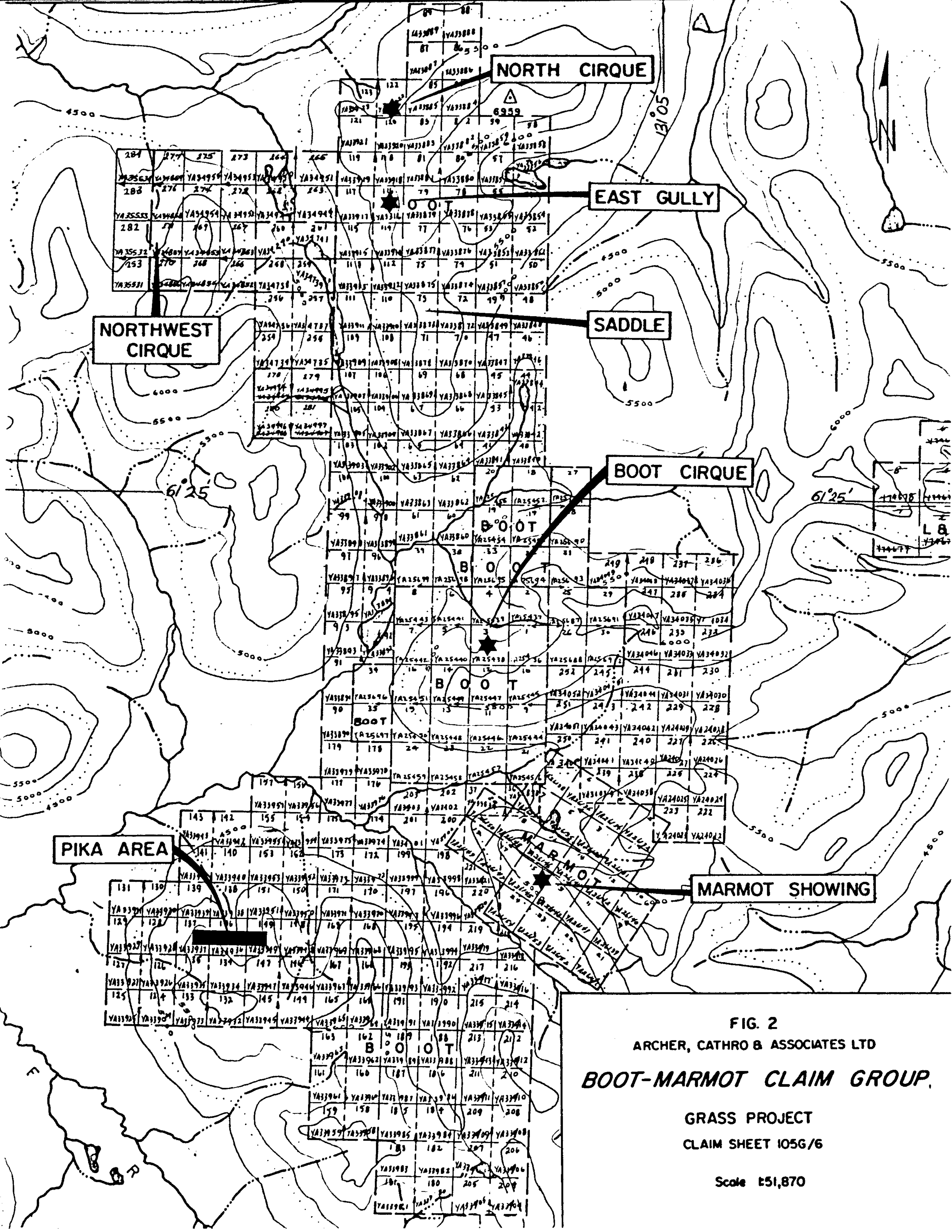


FIG. 2
ARCHER, CATHRO & ASSOCIATES LTD
BOOT-MARMOT CLAIM GROUP.
GRASS PROJECT
CLAIM SHEET 105G/6
Scale 1:51,870

CLAIM NAME	NO. OF CLAIMS	GRANT NUMBERS	EXPIRY DATE
Boot 1-2		YA25436-YA25437	26 February, 1979
Boot 3-8		YA25438-YA25443	26 February, 1980
Boot 9-10		YA25444-YA25445	26 February, 1979
Boot 11-16		YA25446-YA25451	26 February, 1980
Boot 17-24		YA25452-YA25459	26 February, 1979
Boot 25-35		YA25687-YA25697	26 February, 1981
Boot 36-37		YA33838-YA33839	19 July, 1979
Boot 38-39		YA25698-YA25699	26 February, 1981
Boot 40-252		YA33840-YA34052	19 July, 1979
Boot 253		YA35531	17 September, 1979
Boot 254-261		YA34734-YA34741	7 August, 1979
Boot 262-265		YA34948-YA34951	24 August, 1979
Boot 266-271		YA34852-YA34857	18 August, 1979
Boot 272-275		YA34952-YA34955	24 August, 1979
Boot 276-277		YA34858-YA34859	18 August, 1979
Boot 278-281		YA34994-YA34997	28 August, 1979
Boot 282-284	284	YA35532-YA35534	17 September, 1979
Marmot 1-24	24	YA26131-YA26154	26 February, 1980
Total -	308		

FIELD AND ANALYTICAL PROCEDURES

The property work included mapping, prospecting soil and stream panning, soil, silt and rock sampling, limited hand trenching, a radiometric survey and grid lay-out and surveying.

The prospecting phase relied heavily on ultraviolet lamping, both in daylight and at night. A black cloth was carried in daylight to aid in lamping talus and outcrop areas. Night lamping was used mainly for prospecting for unsuspected areas or unusual types of mineralization, as well as for investigating geochemical or panning anomalies in which no showings were known. It proved useful, as well, in defining the limits of showings and distribution of mineralization within them as an aid to sampling. Rock sampling was performed in daylight to avoid bias.

The standing panning technique was the same, whether used for stream prospecting or for grid soil panning in the property evaluation. Heavy mineral concentrates produced from a 30 cm diameter pan were examined in camp under ultraviolet lamp for scheelite content and placed in a kraft coin bag for permanent storage. The amount of scheelite occurring as both coarse and fine fragments in each sample were recorded and plotted on maps. Coarse fragments are classified as those which are easily visible under ultraviolet light, even in dim light. Fine fragments are only visible in complete darkness after a short period of eye adjustment. Grain counts of coarse fragments are fairly accurate in the smaller ranges but large grain counts, especially in the fine grain size, are merely careful estimates.

Silt or soil samples were normally collected at each panning site and were shipped by air freight with rock samples to Chemex Labs Ltd., North Vancouver, B.C. for routine geochemical analysis. Silt and soil samples were dried and then screened to minus 80 mesh, whereas rock samples were pulverized first and then screened. All samples were analyzed for tungsten with a colorimetric determination after fusing the sample with potassium bisulfate, leaching with concentrated HCl, extracting into an amyl acetate solution containing dithiotoluene, and reducing interfering elements with stannous fluoride in a hot water bath.

All samples from the Boot, Marmot and Pika showings and a few selected sample lines from the Lampman Lake grid were also analyzed for tin and gold. The gold determination consisted of atomic absorption spectrometry (AA) of a sample that had been ashed, double digested to dryness in aqua regia, leached in hydrochloric acid and extracted into methyl isobutyl ketone (MIBK) as a bromide complex. The procedure for tin consisted of sintering with ammonium iodide, leaching with dilute hydrochloric ascorbic acid to form a TOPO complex, extraction into MIBK and AA analysis.

At the Boot discovery showing (1977 Zone A), the 1977 grid was relocated on a new baseline established with 1 m wooden lath pickets and sample sites were positioned at 100 m intervals on lines spaced 100 m apart. At the Marmot showing, sampling was conducted on reconnaissance lines located at snow shutes or at the base of talus slopes or gulleys suitable for scheelite accumulation rather than on baselines. The main area of interest was sampled along the lowest suitable contour. Pace and compass sample lines were run down three main creeks in the Pika area. Creeks were panned and silt sampled and a few soil samples were collected, usually at 100 m but occasionally at 200 m intervals.

Most of the 1978 property work was situated on a new grid centered on Lampman Lake. This grid was established with a central baseline A along an existing cut line. Examination of old assessment records disclosed that the old line had been cut by Northlake Mines Ltd. in 1967 in connection with ground geophysical surveys for base metal targets. The Northlake Mines reports also contained 1:12,000 scale topographic maps with 50 foot contours covering most of the Boot-Marmot property and two of those maps have been used to produce 1:5000 scale basemaps for this report. The other two basemaps were made for Grass Project by McElhanney Surveying and Engineering Ltd. from 1:31,680 scale government airphotos.

The Lampman Lake grid covers an area about 2500 m by 3500 m and consists of two other baselines (B and C) east of baseline A and one baseline (D) to the west. The sample spacing and sampling procedure was changed several times during the course of the survey and varies from one portion of the grid to another. The survey consisted initially of soil sampling at 100 m intervals on lines spaced 100 m apart and was revised as an experiment to include both a soil sample and a panning sample at 100 m intervals on every second line (200 m apart). Anomalous areas were later sampled in more detail on intermediate lines and at closer spacings

(25 m to 50 m) on the lines to outline anomaly shape. Baselines were marked with 1 m wooden lath pickets at 50 m intervals whereas sample sites were identified either with commercial wire flags or flagged lath pickets 1/2 m high. Panning samples on the grid were pan-size, weighing 2.5 to 3.0 kg, and were collected in large plastic bags and carried to basecamp for panning. Although pan sampling is more difficult to perform in the field than geochemical soil sampling because of the large samples required, it is more effective and efficient because results can be obtained either immediately or as soon as poor weather prevents normal field work. Also, scheelite grain size and the nature of the rock component in the panning sample provide useful prospecting guides, as well.

The radiometric mapping was conducted with a Scintrex BGS-1S broadband scintillometer and consisted of grid readings in conjunction with soil sampling. It was carried out to determine if augen gneiss and schist could be differentiated in poorly exposed areas on the basis of potassium variations. This work has proven that there is sufficient contrast between gneiss and schist to outline contacts; however, the usefulness of this technique is doubtful since the gneiss is also more resistant weathering.

Limited hand trenching was also performed in 1978. Two pits were dug at anomalous soil panning sites on the Lampman grid, two soil pits were dug on the Boot soil grid and the mineralized outcrop on the original Boot claim group was hand trenched and resampled.

REGIONAL GEOLOGY

The project area lies within the Finlayson Lake map-area (105G), which was originally mapped for the Geological Survey of Canada by Wheeler, Green and Roddick in 1960. Because of its unusually complex structural history, the map-sheet had to be significantly remapped by Tempelman-Kluit between 1973 and 1977 as part of his reinterpretation of the geologic development of central Yukon. The description that follows is largely derived from his work and is a brief summary of a larger discussion that was included in the 1977 Firth Project report, with some refinement based on the 1978 field observations.

Rocks within the district are divided into two important assemblages by an almost-horizontal, major regional thrust fault of upper Triassic age. Both assemblages are intruded by porphyritic quartz monzonite intrusions of Cretaceous age. Rocks above the thrust plane comprise an eugeoclinal assemblage of basic volcanic and ultramafic rocks, named the Anvil-Campbell Allochthon by Tempelman-Kluit, which is interpreted as a slice of oceanic crust of Carboniferous or Permian age that once formed part of an island arc to the southwest. This allochthonous assemblage has been partially removed by erosion and now occurs as random remnants on the underlying assemblage.

Rocks beneath the thrust comprise a miogeoclinal assemblage of metamorphosed sedimentary and/or crystalline rocks that now consist of a monotonous schist-gneiss sequence. Their origin, age and stratigraphy is difficult to unravel because they lack marker beds or fossils and have been pervasively foliated.

Theories on the origin of these rocks are still quite speculative and are based mainly on vague similarities with rocks far removed from this district. Tempelman-Kluit has divided this assemblage into an upper schist unit, presumably of upper Paleozoic or Mesozoic age, that he correlated with the Klondike Schist; and, a lower schist-gneiss unit that could be lower Paleozoic or Hadrynian in age. He has further postulated that the schist member could be correlative with rocks of the Pelly-Cassiar Platform whereas the underlying gneiss member could be equivalent to the Windermere Group. These relationships are shown in a simplified form in Table I on the following page.

When tungsten mineralization was discovered in 1977, some panning anomalies could not be related to typical contact metamorphic skarn-hornfels assemblages. This field evidence, together with the similarity in radiometric response of the augen gneiss and quartz monzonite, led to the geological model presented in the 1977 FP report, in which the lower schist unit of Tempelman-Kluit (unit P€sc) was interpreted as a contact alteration phase of his upper schist units PPk2 and PPk4 that occurs at the margin of either Cretaceous plutons (Kqm) or gneissic domes (Pn). According to this hypothesis, the augen gneiss must be either (a) a granitized sedimentary or igneous unit or (b) a foliated phase of intrusive, perhaps Cretaceous or older in age, that was deformed during crystallization. This interpretation is shown in a diagrammatic fashion in Table II on the following page. Additional support for the idea that gneiss domes have acted as plutons is given by the presence of chilled margins at contacts. The relationship between augen gneiss and mineralization is discussed further in a later chapter, while textural and compositional similarities between augen gneiss and Cretaceous porphyritic-quartz monzonite were discussed in detail in the 1977 FP report.

TABLE I

GSC GEOLOGICAL INTERPRETATION IN GRASS PROJECT AREA

(based on Open File 486, D.J. Tempelman-Kluit, et al, 1977)

	ERA	PERIOD	MAP UNIT	LITHOLOGY
Allochthonous	Mesozoic	Cretaceous	Kqm	porphyritic biotite quartz monzonite
	(intrusive into all previous units but gradational to Ᵽn)			
Allochthonous	Paleozoic	Carboniferous and Permian	CPAv and CPAub	aphanitic and phyllitic basalt dunite, peridotite and pyroxenite
	(thrust fault contact)			
Allocthonous?	Paleozoic or Mesozoic (?)	Unknown	ᵽPk2 to ᵽPk4	muscovite schist, mica marble chloritic mica schist and quartz-feldspathic gneiss (possibly correlative with Klondike Schist)
	(structurally conformable contact but probably unconformable)			
Autochthonous?	Proterozoic or Paleozoic(?)	Late Hadrynian or Cambrian(?)	Ᵽ€c and Ᵽn	biotite-garnet-muscovite schist (possibly Pelly-Cassiar Platform) biotite-muscovite-quartz feldspar augen gneiss (possibly correlative with Windermere Group)

TABLE II - INTERPRETED GEOLOGICAL MODEL - GRASS PROJECT

(Geological symbols are based on Open File 486 by D.J. Tempelman-Kluit, et al, 1977)

				Hypothetical Metamorphic Contact Boundary	Intrusive Contact (often gossanous)
Carboniferous and Permian	Anvil-Campbell Allochthon	CPAv and CPAub	-aphanitic basalt, dunite pyroxenite		
U. Triassic	THRUST FAULT CONTACT				
Paleozoic? or Mesozoic?	Klondike Schist Possibly including Pelly-Cassiar Platform carbonates	ⱣPK2	-minor dark green phyllite (meta-volcanic?) -minor graphitic siliceous phyllite -talcy chloritic schist -minor grey and brown crystalline dolomite -buff weathering chloritic muscovite schist -brown and silvery muscovite marble interbedded with muscovite schist	"Ᵽ6sc" silvery muscovite-garnet schist biotite hornfels garnet diopside skarn	Kqm (Cretaceous) porphyritic quartz monzonite
	STRUCTURALLY CONFORMABLE				or
		ⱣPK4	-grey mica marble -chlorite schist -chloritic quartzose and quartzo-feldspathic gneiss	chloritic muscovite schist biotite hornfels "Ᵽ6sc"	Ᵽn (age unknown) biotite-muscovite-quartz-feldspar augen gneiss with porphyroblasts of K-feldspar (thought to be deformed equivalent of Kqm)

Tempelman-Kluit has subdivided the upper schist unit into five units but only two of these have been commonly encountered during tungsten exploration. They are loosely subdivided by variations in carbonate, quartz and chlorite content into chloritic muscovite-biotite quartzofeldspathic gneiss (unit ⱣPk4) and muscovite schist, marble and dark phyllite (unit ⱣPk2). Unit ⱣPk4 has less carbonate, higher clastic quartz and greater chlorite content than unit ⱣPk2, which tends to have a higher muscovite and carbonate content. Exceptions frequently occur and detailed mapping in the Boot claim group showed that mappable field units sometimes straddle the subdivisions in the GSC legend.

The lower schist unit (ⱣЄsc) is highly variable and occurs intermittently, often as small discordant patches within augen gneiss that may represent roof pendants. Mineralogical variability in this unit is probably a reflection of variations in the original sedimentary succession.

PROPERTY GEOLOGY

The Boot-Marmot claims are underlain by gently to moderately folded metamorphic rocks of possible Proterozoic, Paleozoic and Mesozoic ages intruded by a small Cretaceous quartz monzonite stock. The metamorphic units are Proterozoic Pn, P€sc and Paleozoic or Mesozoic PPk2 and PPk4, and consist of augen gneiss, marble, muscovite schist and quartose schist respectively.

Rock exposure is generally poor on the claims except for augen gneiss in the northern end of the claim group and quartz monzonite in the Boot Cirque. Both these units are able to maintain steep cliff faces and weather to large and blocky talus and felsenmeer fragments.

In contrast, schist and marble units are recessive weathering. Soil cover in schist areas is comprised of both glacially transported till and mica rich soils which appear to be locally derived from easily decomposed schist units. Locally, post glacial solifluction has altered the landscape and mixed soil horizons. The best example of this process is seen in the "Saddle" area of Lampman grid.

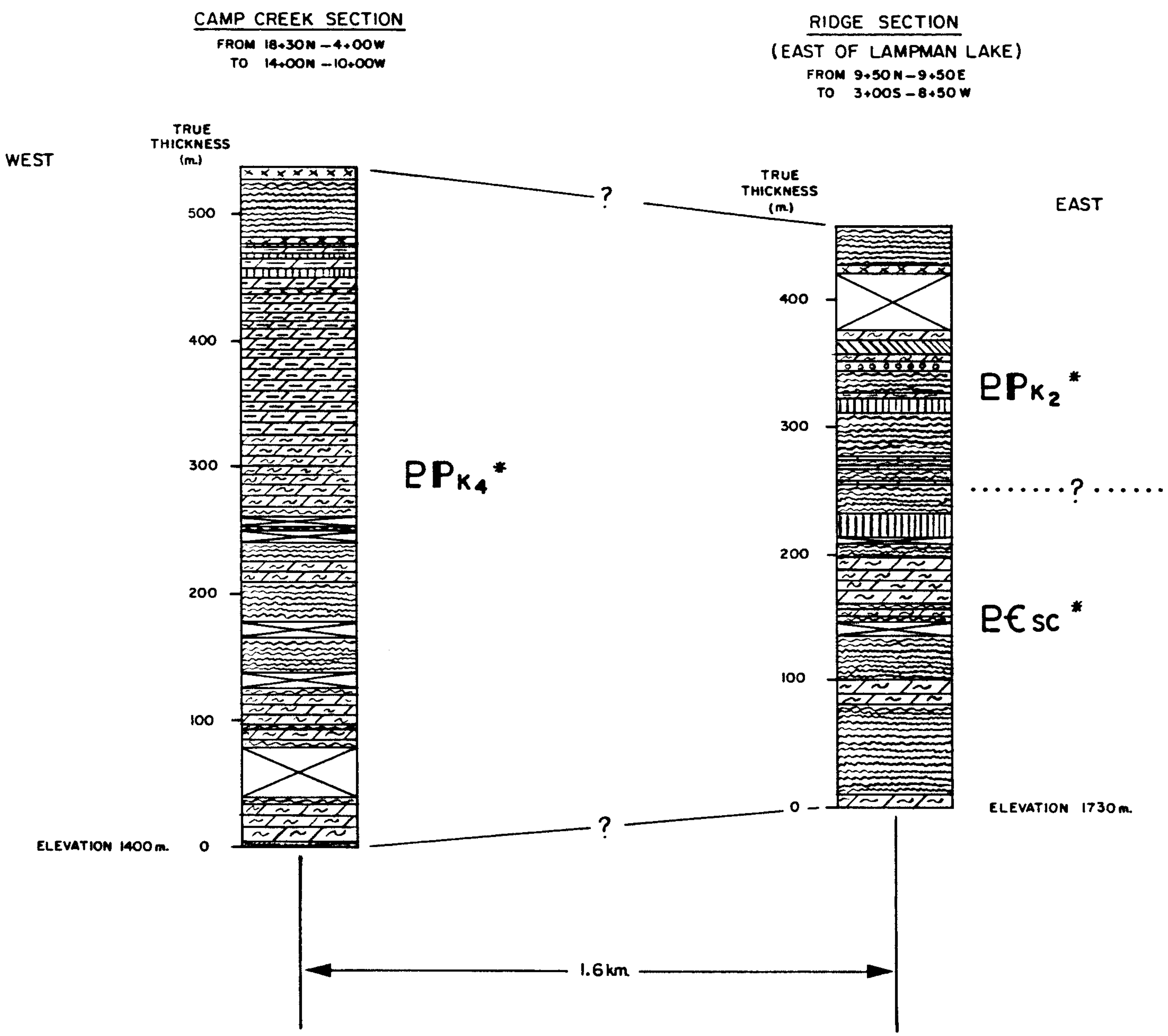
Glacial till cover is extensive and of variable thickness. Up to 10 m of till lies exposed in Camp Creek although outcrop occurs nearby. Erratics and till deposits indicate glacial deposition at the highest elevations. The most prominant features are those produced by a later episode of valley glaciation. Terminal and lateral moraines in the main valleys and abundant cirques are evidence of this event.

Two sections were measured on Lampman grid and are illustrated in Figure 11 on the following page. A 450 m section was measured on the east side of Lampman Lake while 500 m of similar lithologies are exposed along "Camp" Creek on the west side of the lake. Farther south in Boot Cirque and Marmot areas, similar lithologies of roughly equivalent thickness were recognized but have not been measured in detail. The metamorphic sequences are characterized by abundant muscovite schist and minor gneiss interbedded with micaceous marble, buff weathering crystalline marble and minor occurrences of graphitic siliceous phyllite and dark green basic foliated metavolcanics. Among these the black recessive weathering graphitic siliceous phyllite is the most distinctive but also least abundant unit. This phyllite is present on the ridge east of Lampman Lake in Boot Cirque and Marmot areas. Another distinctive rock unit, a silvery, buff weathering, muscovite marble unit, is more abundant and was recognized in the Lampman Lake area sections as well as in Boot Cirque and Marmot areas. Muscovite schist and chloritic muscovite schist, the most common rock types, are present in all areas. The muscovite schist unit is buff weathering and relatively recessive. Dark green, massive, weakly foliated to talcy dark green chloritic schist were found in all areas and are thought to be derived from basic volcanic rocks.

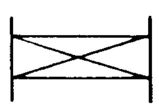
No definite correlations between sections can be made in Figure 11 even though lithologies and regional foliation are the same. Variations in unit thickness could reflect depositional environment and it is possible that a continuous sedimentary succession underlies the claims and not several units juxtaposed by faults as presently shown on government maps.

This relationship is shown on Figure 11. The GSC units are useful in regional scale mapping but were abandoned on the 1:5,000 scale detail mapping in favour of rock units based on obvious mineralogical and physical characteristics. Lithological subdivisions of the GSC map units are shown in the legends of four geological maps which cover the area.

GEOLOGICAL SECTIONS LAMPMAN GRID (SEE FIG. 3)



* GSC mapping from Open File 486


covered interval

VERTICAL SCALE – 1:5,000

LEGEND

CRETACEOUS?

Pn — AUGEN GNEISS
grey weathering biotite-muscovite quartz feldspar gneiss, with white porphyroblasts of K-feldspar, from 1-10 cm in length, thought to be older deformed quartz monzonite.

PALEOZOIC or MESOZOIC?

P€sc
PPK$_2$ — undifferentiated, structurally conformable schist gneiss, marble and skarn.

Pbm — Biotite Marble
Grey-green biotite marble and limy biotite gneiss

Pmm — Muscovite Marble
Buff and silvery weathering muscovite marble

Psp — Siliceous Phyllite
Black graphitic siliceous phyllite

Pms — Muscovite Schist
Buff weathering muscovite schist, minor muscovite gneiss, minor garnet-muscovite schist and minor chloritic equivalents

Pgn — Micaceous Gneiss
Biotite-muscovite quartzo-feldspathic gneiss, minor garnet-mica gneiss

Pcs — Dark Green Metavolcanic?
Dark green foliated schist and gneiss, possibly metavolcanic?

Pcm — Grey Marble
Grey and buff weathering limestone and marble

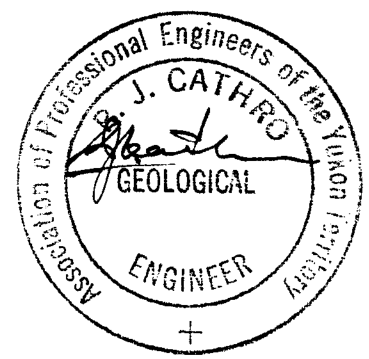


FIG. 11

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GEOLOGICAL SECTIONS LAMPMAN GRID

GRASS PROJECT

To accompany report dated Dec. 1978

MINERALIZATION

The initial work in 1977 led to the early recognition of the Boot Cirque, Marmot and Pika showings and several other anomalous creeks. The 1978 program was planned to concentrate on these showings but priorities changed during the program when numerous new showings and scheelite soil concentrations were found at the north end of the property, near Lampman Lake (referred to as the Lampman Grid area). A total of 22 small showings have been found, of which half are on the Boot-Marmot claims.

Disappointing results from more detailed prospecting have downgraded the Marmot and Pika targets. Both properties contain extensive talus slopes, which can be rapidly and effectively prospected with lamping as long as they are not vegetation-covered. Further experience, both in the Grass Lakes area and elsewhere in Yukon, has indicated that these panning and geochemical anomalies are only moderately intense.

Tungsten mineralization has been found in five different host rocks or settings within the project area: skarn, quartz veins, schist, gneiss, and intrusive rock. It occurs primarily as scheelite although wolframite has been recognized in one area, where it is associated with an unidentified tin mineral. Pyrrhotite, pyrite, galena, arsenopyrite and molybdenite have been found in minor or trace amounts but all show only a minor affinity to tungsten mineralization. Pyrrhotite has only been found with scheelite in occurrences hosted by rusty muscovite-garnet schist and gneiss in the Northwest Cirque and 73 Creek areas. Arsenopyrite was found in quartz veins at the north end of baseline B on the Lampman Grid and molybdenite and pyrite were found in the Pika area close to scheelite-wolframite-tin mineralization. Good gold assays have been obtained from biotite-rich skarn at the Boot A Zone.

Although the skarn-hosted showings in the Grass Lakes area do not fit all the criteria of classical Yukon deposits, such as abundant pyrrhotite and some chalcopyrite in a diopside-garnet skarn at the contact of a small discordant stock, they do have some similarities. Grass Lake skarns show the typical mineral associations, both in the silicate and sulphide phases, but the sulphides are erratically present in trace amounts and the skarns tend to be more leucocratic.

Scheelite is associated with tourmaline in some of the quartz veins that cut augen gneiss, quartz monzonite and, in some cases, muscovite schist. Tourmaline is most common in quartz veins in the Pika area, whereas muscovite is an important associate of scheelite mineralization on the Lampman Grid. Mineralized fragments found in pit L-1 on the Lampman Grid in a muscovite-rich soil horizon 125 cm below surface contained fluorite in addition to abundant muscovite, suggesting a greisen-like rather than skarn setting.

Only the most important showings are described individually below, while the main features of the minor occurrences are tabulated in Table III on following page.

Boot Cirque Showing (A Zone) (Figure 6)

This is the 1977 discovery showing, called the A Zone. Mineralization occurs in one outcrop and in talus along a horizontal distance of at least 150 m. The mineralized rock is a white and black, weakly banded, biotite-rich, feldspathic and leucocratic calcsilicate rock that is quite different in appearance from any other showings in the district. Selected specimens have assayed up to 16 per cent WO_3 and 0.191 oz/ton Au.

Hand pitting of the main outcrop in 1978 exposed flat-lying mineralization over a 2 m thickness. A chip sample weighing approximately 40 lbs. across a true width of 1.8 m assayed 5.88 per cent WO_3 and 0.056 oz/ton Au. Previous grab samples from this location assayed 16.1 per cent WO_3, 0.191 oz/ton Au and 11.66 per cent WO_3.

The mineralized horizon is in sharp contact on both sides with banded garnet-diopside skarn. A 2 m chip sample across the underlying skarn assayed 0.05 per cent WO_3 and trace Au, which is probably a little lower than true grades since higher grade concentrations of scheelite have been recognized visually. No samples were taken of the overlying skarn but it is visually estimated to grade less than the lower skarn. Contacts in the outcrop and the pattern of the mineralized float trains on the talus slope to the north suggest a mineralized, flat-lying, 2 m thick, biotite-rich bed with a strike length of at least 150 m.

Two other types of mineralization are found nearby. Biotite-quartz-scheelite and scheelite mineralization occur along dry fractures or in thin quartz veinlets in the quartz monzonite stock adjoining the A Zone. This type of mineralization has only been found in talus slopes or in glacial debris covering a small cirque valley. Fragments of biotite-scheelite veins have been found that assay up to 2.15 per cent WO_3 and 0.028 oz/ton Au over widths of up to 14 cm. Scheelite-bearing dry fractures have been observed in large quartz monzonite boulders with a fracture density of 15 to 30 per m. A representative grab sample of a typical specimen assayed 0.02 per cent WO_3. When exposed by weathering, individual fractures prove to be evenly peppered with scheelite.

The mineralized quartz monzonite stock at the Boot showing resembles typical porphyritic quartz monzonite in the district. Pervasive, weak chlorite with minor carbonate and kaolinite alteration products are common while phenocrysts of white K-feldspar are weakly corroded within the stock and entirely destroyed in the highest grade biotite skarn. Alteration intensity is directly related to tungsten grade with weak alteration accompanying low grade mineralization, whereas secondary biotite clots, total destruction of feldspar boundaries and partly remobilized potassium contact are characteristic of the highest grade material.

Potassium distribution (indicated by staining), tungsten and gold ratios, and similarity in mineral assemblages and alteration between biotite-rich veins cutting quartz monzonite and biotite skarn suggests that the biotite skarn at the Boot A Zone might have been derived from the alteration and recrystallization of a quartz monzonite dyke or sill.

Augen Gneiss Body - East Lampman Grid (Figure 3)

Several scheelite occurrences clustered at the margins of this body are interesting representatives of an unusual type of mineralization. The three best examples are called the North Cirque, East Gulley and Saddle showings. This type of mineralization occurs in weakly developed and thin skarn horizons within the schist and gneiss sequence or quartz-tourmaline veins or bodies cutting the schist and has been seen mainly as infrequent talus or creek float. Selected float specimens can be well mineralized and assays of up to 5.4 per cent WO_3 have been obtained. Where seen in outcrop or near-outcrop float, the individual showings are too small and erratically mineralized to have commercial interest and the small amount of mineralized float found in the best areas suggest that the potential of this area is low. Soil panning has shown several moderate anomalies in overburden covered portions of the contact where prospecting is almost impossible.

The Saddle showing occurs at the south end of the augen gneiss body east of 73 Creek. One of the strongest panning anomalies, up to 750 grains per pan including 200 coarse grains, was obtained from a grassy slope near the ridge, above an extensive area of coarse rubble that is well drained by springs, contains a higher than average proportion of mineralized fragments, and is interpreted as a landslide. A 1.85 m deep pit in this anomaly (Pit L-1) encountered a rusty mica-rich soil from 125 to 155 cm with siliceous fragments containing fluorite and scheelite and a high muscovite content, an assemblage more characteristic of greisen than skarn. Mineralized rocks within this layer assayed 1.08 per cent WO_3 and the micaceous soil horizon itself assayed 2300 ppm W. This zone is of interest because it could be derived from a stratiform source in the schist.

Marmot Showing (Figure 8)

Sufficient float was discovered in 1977 while investigating panning anomalies to warrant staking because of the proximity of the showing to the edge of the Boot claims. The showing was not investigated until 1978, when it was explored with 1:5000 scale mapping, soil panning and one night traverse.

The geological setting of this target is more like a classical Yukon skarn than other showings in the project area. A gently dipping sequence at least 300 m thick of weakly developed garnet-diopside skarn, micaceous and garnetiferous marble and hornfels is well exposed in a cliff face. The contact with the adjacent quartz monzonite stock is buried beneath talus. Well mineralized float has been found sporadically along a one km length of the contact. Three assays of selected skarn specimens ranged from 1.50 to 3.65 per cent WO_3 but only low grade disseminated and intermittent vein mineralization has been found in outcrop. The high-grade float is found only at the base of the talus slope and is probably derived from erratic small showings on the cliff face, which is too steep to explore, although there is a possibility that the source is nearer the contact, under the talus. Future efforts should concentrate on outlining the position of the float with grid control, soil panning where sufficient soil is available, night lamping and examination of the cliff where possible.

Pika Showing (Figure 10)

This showing was discovered in 1977 and consists of scheelite and wolframite-bearing quartz float found by night lamping at the head of a creek in which up to 75 grains of scheelite were found in panning concentrates. Initial prospecting had suggested that mineralization was confined to quartz veins and was erratically distributed.

The 1978 work consisted of more detailed panning and soil sampling and reconnaissance mapping which located skarns in several discordant schist bodies that are completely surrounded by augen gneiss. No mineralization or quartz veining was found in the skarns. The schist/skarn sequence includes garnet-muscovite schist and garnet-diopside skarn when limy constituents are present. The 1978 sampling showed a moderate but even tungsten response along creeks draining the area. Tin and gold geochemical response is low, with slightly better tin response (6 ppm) in Pika Creek.

The only new mineralization found in 1978 consisted of a 20 kg quartz boulder in Pika Creek. The 40 cm thick specimen contained coarse wolframite rimmed by scheelite assaying 35.1 per cent WO_3 and gave a tin assay of 2.36 per cent, although no tin mineral has been identified. Quartz veins found previously in this valley contain tourmaline with traces of molybdenite and pyrite.

GEOCHEMISTRY

Ten anomalies are unexplained at the end of the field season. These have not been explained because of either poor exposure or time limitations. They are illustrated on Figures 2,5 and 7. Anomalies A and B on the Marmot showing; B to D on Boot grid and A to C on Lampman grid are worthy of further examination.

Lampman Grid (Figure 4)

In general, panning and geochemical results on Lampman grid are low in areas underlain by augen gneiss and high to moderate in areas underlain with schist, carbonate and skarn. With a few exceptions, geochemical and panning results were coincident. Some panning anomalies, especially those with a large component of coarse grains, were only moderately anomalous in the corresponding geochemical analysis. Geochemical anomalies tend to be broader and more elongate suggesting hydromorphic transport and a breakdown of scheelite to finer grains by weathering. Panning anomalies are considered to be closer to source rocks. Anomaly outlines on the figures generalize the boundaries of anomalous panning and geochemical values. Low values within anomalies may be caused by geomorphological and sampling variations.

Anomaly A occurs in two segments and is believed to be the geochemical expression of greisen-like mineralization formed at the boundary of a limy schist sequence and augen gneiss. Anomaly B may be a downhill mobilization of scheelite or an extension of Anomaly C separated by a modified low background soil cover. Anomaly C is significant because it lies in an area of poor rock exposure, coincident with a moderate linear EM response obtained by Northlake Mines in 1967. Traces of graphite and pyrrhotite have been found on the grid but none were seen in the vicinity of this conductor.

Two soil pits were dug at panning anomalies on Lampman grid. Pit L-1 dug at Anomaly A showed an increasing scheelite content to a depth of 155 cm in a 30 cm thick muscovite rich horizon containing mineralized rock fragments. Minerology of these fragments indicate a muscovite quartz fluorite rich source rock. Lower scheelite content and uniform mineralogical composition of soil and rock below this horizon suggest proximity to bedrock.

Pit L-2 is a soil pit dug on a geochemical anomaly west of camp. The pit exposed scheelite rich layers with abundant quartz and tourmaline fragments in a highly weathered muscovite rich soil suggesting quartz-scheelite vein mineralization hosted by muscovite schist. One problem with this interpretation is that no augen gneiss or quartz monzonite bodies have been found near the occurrence to explain the vein. Therefore, it is possible that augen gneiss underlies the schist unit at a deeper level.

Boot Cirque Grid (Figure 7)

Four anomalies were outlined by grid work in the Boot Cirque area. Panning and sampling on the Boot grid was limited to a small area due to a lack of time. A similar correlation between panning and soil geochemistry was obtained. Anomaly A is a creek panning and silt geochemical anomaly located 800 m from the A Zone. Response drops upstream towards the western tributary which drains the A Zone. This downstream increase in value is attributed to a lowering of the gradient thus producing better concentration of the scheelite.

Anomaly B in the headwaters of the eastern tributary is unexplained. It is farther from the quartz monzonite in an area underlain by chloritic muscovite schist. More work should be done to trace this anomaly to source.

Anomaly C straddles the B Zone or east contact, an area in which a few pieces of well mineralized biotite rich skarn have been found. This anomaly is open ended to the north towards the A Zone because this talus covered area cannot be explored by soil sampling.

Anomaly D is another unexplained relatively weak geochemical anomaly with two panning highs. It overlies chloritic muscovite schist 800 m to the east of the Zone B contact. More work should be done on this anomaly.

Marmot Showing (Figure 9)

The Marmot showing was investigated by limited contour soil panning and sampling. Two anomalies with no corresponding geochemical expression were outlined by panning. Both should be investigated by night lamping in an attempt to locate specific mineralized float train or mineralized outcrop.

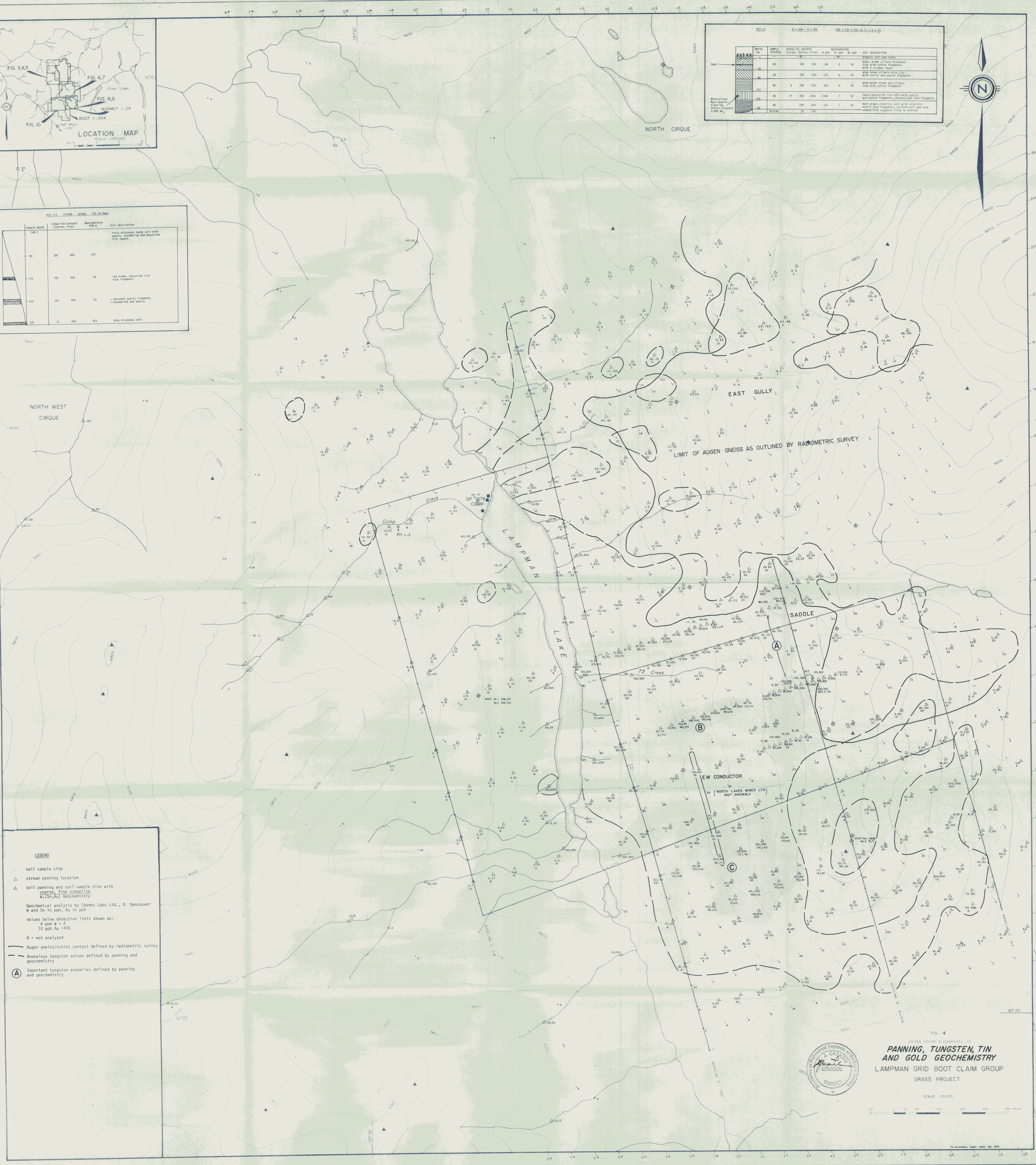
TABLE III TUNGSTEN OCCURRENCES WITHIN PROJECT AREA

OCCURRENCE	FIG. NO.	DESCRIPTION	UNIT	COMMON MINERAL ASSEMBLAGE	ASSAY % WO_3	% Sn	(ppb) oz/t Au	SAMPLE TYPE	REMARKS
NORTH WEST CIRQUE	3	rusty musc. schist cut by scheelite calcite vein	ЄPK4	musc.,tour.,pyrr.	5.4		T	creek float	only 6 pieces of creek float found, not followed up to bedrock
	"	disseminate scheelite in rusty musc. schist	"	" " "	0.6			" "	
WEST RIDGE	3	disseminated scheelite in rusty musc.-garnet schist	"	musc., garnet	0.03			typical talus specimen	locally in talus and o/c
Creek draining Lampman Lake	3	grey green calc-silicate skarn	"	grey green calc-sil., trace pyrr.	2.98			creek float	a few pieces of creek float
LAMPMAN GRID									
NORTH CIRQUE	3	scheelite in banded diopside skarn	"	diopside	3.65			selected talus specimen	occasional float over approximately 50 x 150 m area
	"	grey green banded actinolite? skarn	"	actinolite	1.20			"	
	"	banded garnet skarn	"	garnet, diopside?	2.23			"	
EAST GULLEY	3	light coloured quartz-rich skarn	ЄPK4/Єn	quartz vein	0.92			typical talus specimen	occasional float over 100 m width
SADDLE SHOWING	3	disseminated scheelite in rusty musc. gneiss	ЄЄsc/Єn	musc., pyrr.	0.55		0.005	"	skarn found along 150 m length
	"	" "	"	" "	0.50			"	
PIT L-1	3	musc.-qtz.-fluorite schist fragment	ЄЄsc	musc., fluorite, qtz.	1.08			selected specimen	soil pit
	"	musc.-rich soil		musc. rich soil horizon	0.23			soil	soil pit
73 CREEK	3	rusty schist with disseminated scheelite	ЄЄsc	musc.	0.28		(10)	creek float	creek float
	"	scheelite in tour-qtz vein	"	tour., qtz.	0.44		T	" "	" "
	"	mineralized qtz. vein	"	qtz.	6.8		(10)	" "	" "
	"	tour.-qtz. vein with scheelite	"	qtz., tour.	1.56		(20)	" "	" "
BOOT CIRQUE									
Boot Showing (Zone A)	6	Boot Showing outcrop	Kqm & Psk	biot., chl., clacite, kaolinite	5.88		0.056	chip sample	1.8 m width, 150 m strike length
" "	"	scheelite in fractures in quartz monzonite	Kqm	qtz.	0.02			selected talus specimen	abundant in 100 m by 100 m area
" "	"	biot.-rich vein in qtz. monz.	"	biot.,chl.,qtz.	2.15		0.028	" "	2 fragments found in above area
east contact (Zone B)	"	light coloured biot. skarn	"	biot.,chl.,calcite, kaolinite	6.70		0.032	" "	2 boulders about 50 kg each
MARMOT	8	brown garnet diopside skarn	ЄPK4	garnet,diop.,qtz.	1.83				intermittent in talus along a 1000 m length
	"	light coloured garnet skarn	"	garnet, qtz.	1.50				
	"	thinly banded chloritic gneiss	"		3.65				
PIKA AREA	10	wolframite and scheelite in quartz veins	Єn	qtz., tour.	3.51	2.36	T	portion of 15 kg creek boulder	only a few isolated pieces of creek float were found

TABLE IV - UNEXPLAINED GEOCHEMICAL AND PANNING ANOMALIES

Anomaly	Location Lat. N.	Long. W	Sample Type	Assays PPM W	PPB Au	Scheelite Content Coarse		Fine	Remarks
Property Anomalies									
Lampman Grid (Fig. 4)									
A	61°26',	131°08'	soil, pan	45 to 600		125 200	to	250 550	A 100 m by 200 m anomaly and a 200 m by 300 m anomaly are the panning and geochemical expressions of the Saddle showing.
Pit L-1	"	"	soil, pan	65 to 2300		70 200	to	130 2000	This pit is located within anomaly A and was dug at a soil panning site with 200 coarse, 550 fine fragments. Rock specimen from pit assayed 1.08% WO_3.
B	"	"	soil, pan	60 to 80		20 100	to	300 400	A narrow anomaly is found for a length of 300 m on one line downhill from anomaly A.
C	"	"	soil, pan	22 to 200		10 500 100	to and to	100 0 500	An irregularly shaped anomaly with maximum dimensions of 600 m by 400 m occurs in heavily overburden-covered area and is partly coincident with an EM anomaly from an earlier survey.
Pit L-2	"	"	soil, pan	50 to 425		70 700	to	200 200	This pit is located at an isolated soil and panning anomaly discovered by night lamping. Abundant quartz and tourmaline fragments suggest vein mineralization.
Boot Cirque Grid (Fig. 7)									
A	61°24',	131°07'	silt, pan	80 to 150	20	60 88	to	500 140	Anomaly A is the geochemical and panning expression obtained up to 800 m downstream from Zone A mineralization. A slightly lower geochem value and smaller panning concentrate is obtained from tributary draining the showing.
B	"	"	silt, pan	28		40	to	150	Anomaly B is only moderately anomalous in relation to other anomalies, but is important because no skarn or intrusive contact lies nearby to explain the anomaly.
C	"	"	soil, pan	20 to 70		40 80	to	80 500	An elongated anomaly of 700 m by 400 m maximum dimension is outlined by moderate geochem response and isolated high panning response. The anomaly straddles the B Zone (eastern) contact with Kqm stock. Northwest limit of anomaly is not known (near A Zone).
Pit B-1	"	"	soil, pan	90	10	50	to	400	This pit was dug at anomaly C where a soil value of 25 ppm W and a panning response of 40 coarse and 400 fine was obtained. Sub-outcrop was encountered 75 cm below surface.
D	"	"	soil, pan	22 to 125		60 150	to	40 400	A weak to moderate geochemical anomaly with two high pans measures approximately 200 m by 300 m. The highest value, where pit B-2 was dug, is located 800 m from quartz monzonite/skarn contact (Zone B).
Pit B-2	"	"	soil, pan	65 to 150		4 50	to	150 300	A soil pit dug at the highest value in anomaly D did not reproduce or improve panning results but geochemistry improved slightly.
Marmot Showing (Fig. 9)									
A	61°23',	131°06'	pan	2 to 6		30 30	to	200 400	3 soil panning sites over a length of 120 m define this anomaly, however soil geochemistry did not confirm panning results. Mineralized skarn fragments were found intermittently in the area in 1977.
B	"	"	pan	2 to 16		20 30	to	100 400	Moderate to high panning results define a 500 m long anomaly along the base of a talus slope.


LOCATION MAP
SCALE 1:250,000
FIG. 3,4,5
FIG. 6,7
FIG. 8,9
FIG. 10
MARMOT 1-24
BOOT 1-284
Grass Lakes
NORTH CIRQUE
NORTH WEST CIRQUE
EAST GULLY
SADDLE
LAMPMAN LAKE
GP 1978 CAMP
PIT L-1
PIT L-2
LEGEND
CRETACEOUS ?
Ꝑn AUGEN GNEISS
grey weathering biotite-muscovite quartz feldspar gneiss, with white porphyroblasts of K-feldspar, from 1-10 cm in length, thought to be older deformed quartz monzonite.
PALEOZOIC or MESOZOIC ?
Ꝑ€sc Ꝑ PK2 undifferentiated, structurally conformable schist gneiss, marble and skarn.
Psk Skarn
Garnet-diopside skarn, biotite-garnet schist and hornfels, minor quartz tourmaline veins associated with skarn
Pbm Biotite Marble
Grey-green biotite marble and limy biotite gneiss
Pmm Muscovite Marble
Buff and silvery weathering muscovite marble
Psp Siliceous Phyllite
Black graphitic siliceous phyllite
Pms Muscovite Schist
Buff weathering muscovite schist, minor muscovite gneiss, minor garnet-muscovite schist
Pmcs Chloritic Muscovite Schist
Chloritic muscovite schist
Pgn Micaceous Gneiss
Biotite-muscovite quartzo-feldspathic gneiss, minor garnet-mica gneiss
Pcs Dark Green Metavolcanic?
Dark green foliated schist and gneiss, possibly metavolcanic?
Pcm Grey Marble
Grey and buff weathering limestone and marble
Symbols
Geological boundaries: defined, approximate, assumed
Fault: assumed
Fold axis: inclined
Foliation: inclined
Scheelite mineralization located by night lamping
Limit of outcrop
Limit of talus
Claim Post
Height of land
FIG. 3
ARCHER, CATHRO & ASSOCIATES LTD
GEOLOGY
LAMPMAN GRID BOOT CLAIM GROUP
GRASS PROJECT
SCALE 1:5,000
100 0 50 100 200 300 400 500 Metres
Association of Professional Engineers of the Yukon Territory
R. J. CATHRO
GEOLOGICAL ENGINEER
To accompany report dated Dec. 1978



LOCATION MAP
FIG. 3,4,5
FIG. 6,7
FIG. 8,9
FIG. 10
MARMOT 1-24
BOOT 1-294
NORTH CIRQUE
NORTH WEST
CIRQUE
EAST GULLY
LIMIT OF AUGEN GNEISS AS OUTLINED BY RADIOMETRIC SURVEY
LAMPMAN LAKE
CAMP
PIT L-2
SADDLE
'73 Creek
EM CONDUCTOR
(NORTH LAKES MINES LTD)
1967 ANOMALY
BASELINE 'B'
8+50E
61° 25'
LEGEND
soil sample site
stream panning location
soil panning and soil sample site with
coarse, fine scheelite
W,(Sn,Au) Geochemistry
Geochemical analysis by Chemex Labs Ltd., N. Vancouver
W and Sn in ppm, Au in ppb
values below detection limit shown as:
4 ppm W = 2
10 ppb Au =<10
N = not analyzed
Augen gneiss/schist contact defined by radiometric survey
Anomalous tungsten values defined by panning and geochemistry
Important tungsten anomalies defined by panning and geochemistry
FIG. 4
ARCHER, CATHRO & ASSOCIATES LTD
PANNING, TUNGSTEN, TIN AND GOLD GEOCHEMISTRY
LAMPMAN GRID BOOT CLAIM GROUP
GRASS PROJECT
SCALE 1:5,000
100 0 50 100 200 300 400 500 Metres
To accompany report dated Dec. 1978

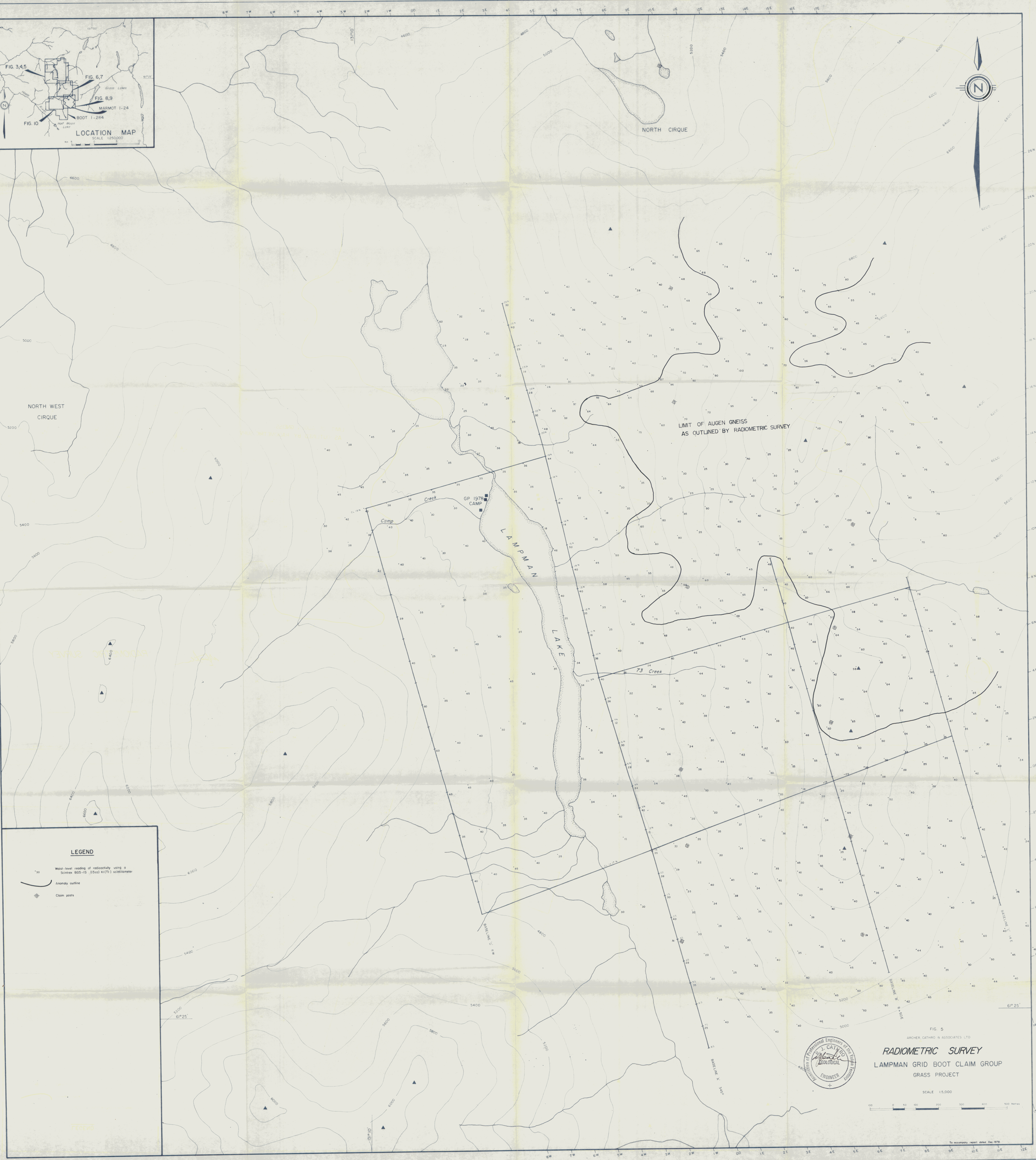
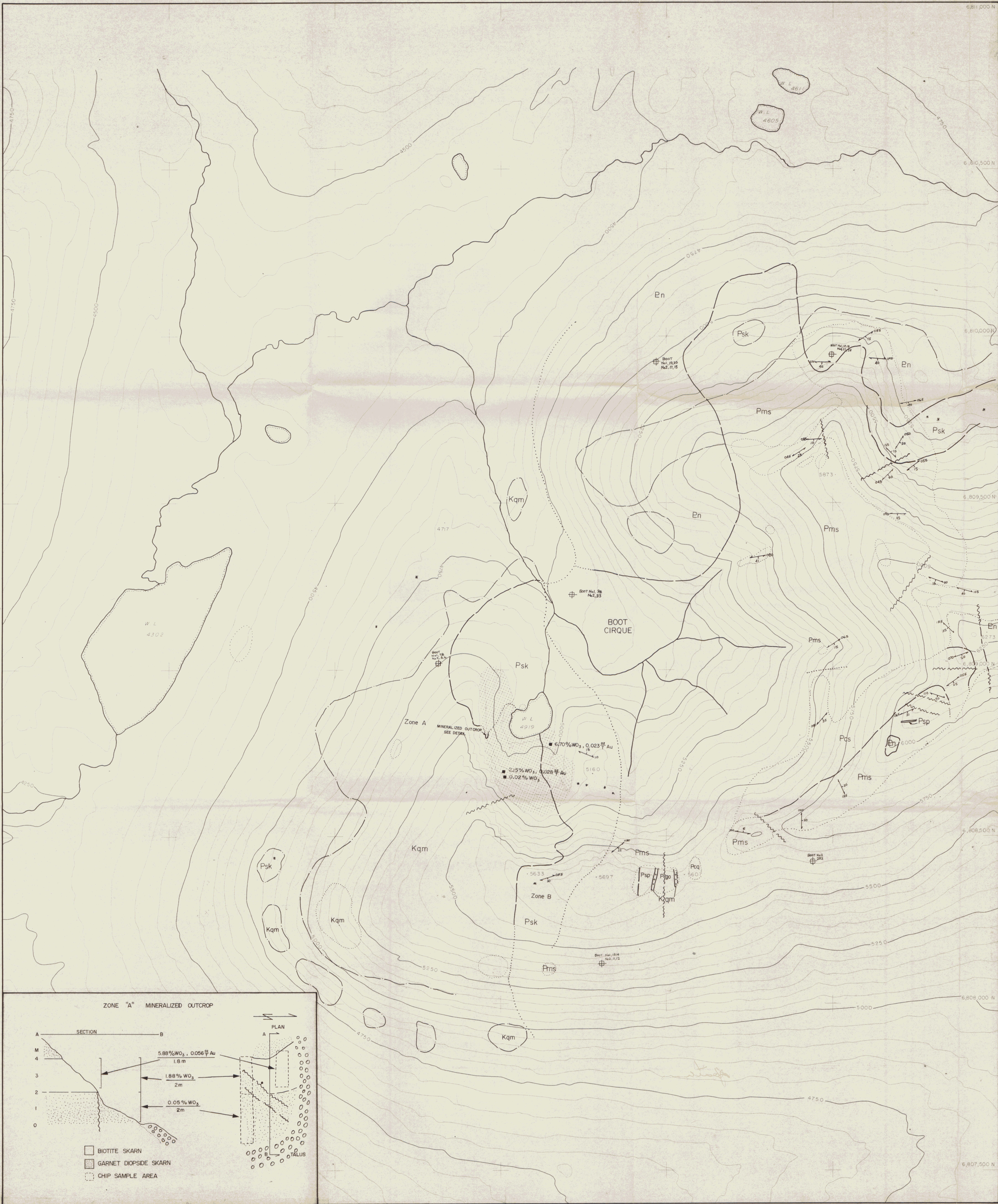
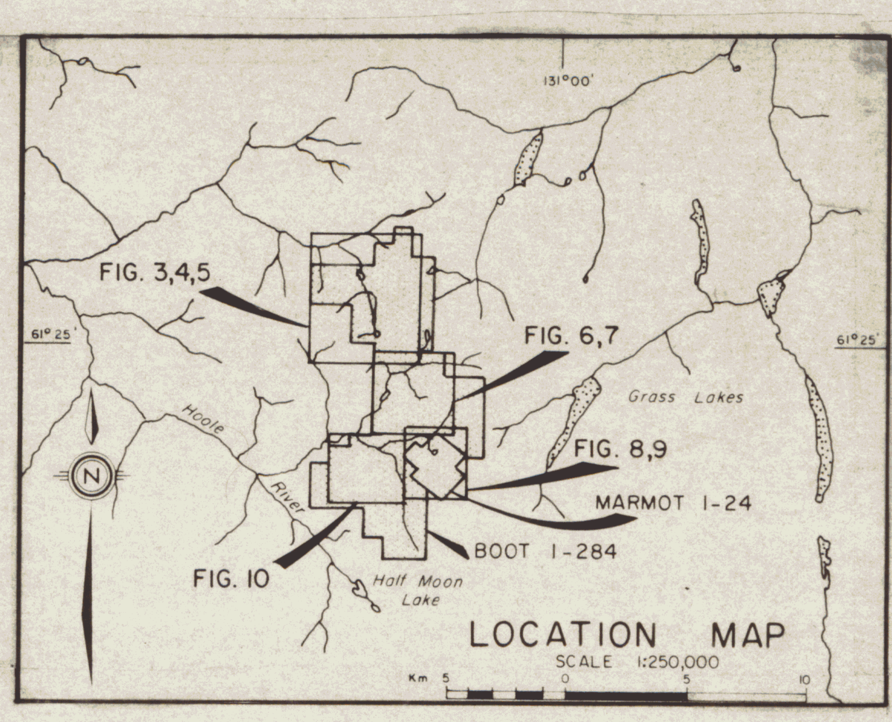


FIG. 3,4,5
FIG. 6,7
FIG. 8,9
MARMOT 1-24
BOOT 1-284
FIG. 10
LOCATION MAP
SCALE 1:250,000
NORTH CIRQUE
NORTH WEST
CIRQUE
LIMIT OF AUGEN GNEISS
AS OUTLINED BY RADIOMETRIC SURVEY
GP 1978
CAMP
Camp Creek
LAMPMAN LAKE
73 Creek
BASELINE 'B' 8+50E
61° 25'
LEGEND
Waist-level reading of radioactivity using a Scintrex BGS-1S (13cc) KI(Tl) scintillometer
Anomaly outline
Claim posts
FIG. 5
ARCHER, CATHRO & ASSOCIATES LTD
RADIOMETRIC SURVEY
LAMPMAN GRID BOOT CLAIM GROUP
GRASS PROJECT
SCALE 1:5,000
100 0 50 100 200 300 400 500 Metres
Association of Professional Engineers of the Yukon Territory
R. J. CATHRO
GEOLOGICAL
ENGINEER
To accompany report dated Dec. 1978





LEGEND

MESOZOIC

CRETACEOUS

Kqm — QUARTZ MONZONITE: grey weathering, coarse porphyritic quartz monzonite with white K-feldspar phenocrysts from 1-10 cm in length, weakly developed chlorite-carbonate-clay alteration common, mineralized with scheelite quartz biotite in some areas

CRETACEOUS?

Ꝑn — AUGEN GNEISS: grey weathering biotite-muscovite quartz feldspar gneiss, with white porphyroblasts of K-feldspar, from 1-10 cm in length, thought to be older deformed Kqm

PALEOZOIC?

ꝐPK2? SCHIST, GNEISS, MARBLE, SKARN

Psk — SKARN: garnet-diopside skarn, light coloured biotite calc-silicate skarn, biotite-chlorite banded hornfels, commonly veined with white quartz, host to tungsten mineralization

Pms — MUSCOVITE SCHIST: light brown weathering chloritic muscovite-biotite quartz schist

Pcs — CHLORITE SCHIST: dark green, platy to massive, talcy chlorite schist with minor marble

Psp — SILICEOUS PHYLLITE: black graphitic siliceous phyllite

Pgo — GOSSAN: red brown weathering carbonate and quartz gossan

Pcq — LIMY QUARTZITE: grey quartzite interbedded with grey crystalline marble

SYMBOLS

Scheelite mineralization located by night lamping
- abundant mineralized float
- isolated mineralized fragments or groups of fragments

Geological Boundaries: defined, approximate, assumed

Faults: defined, assumed

Foliation: inclined

Outcrop and sub-outcrop limit

Talus and felsenmeer limit

FIG. 6

ARCHER, CATHRO & ASSOCIATES LTD

GEOLOGY

BOOT CIRQUE

BOOT CLAIM GROUP

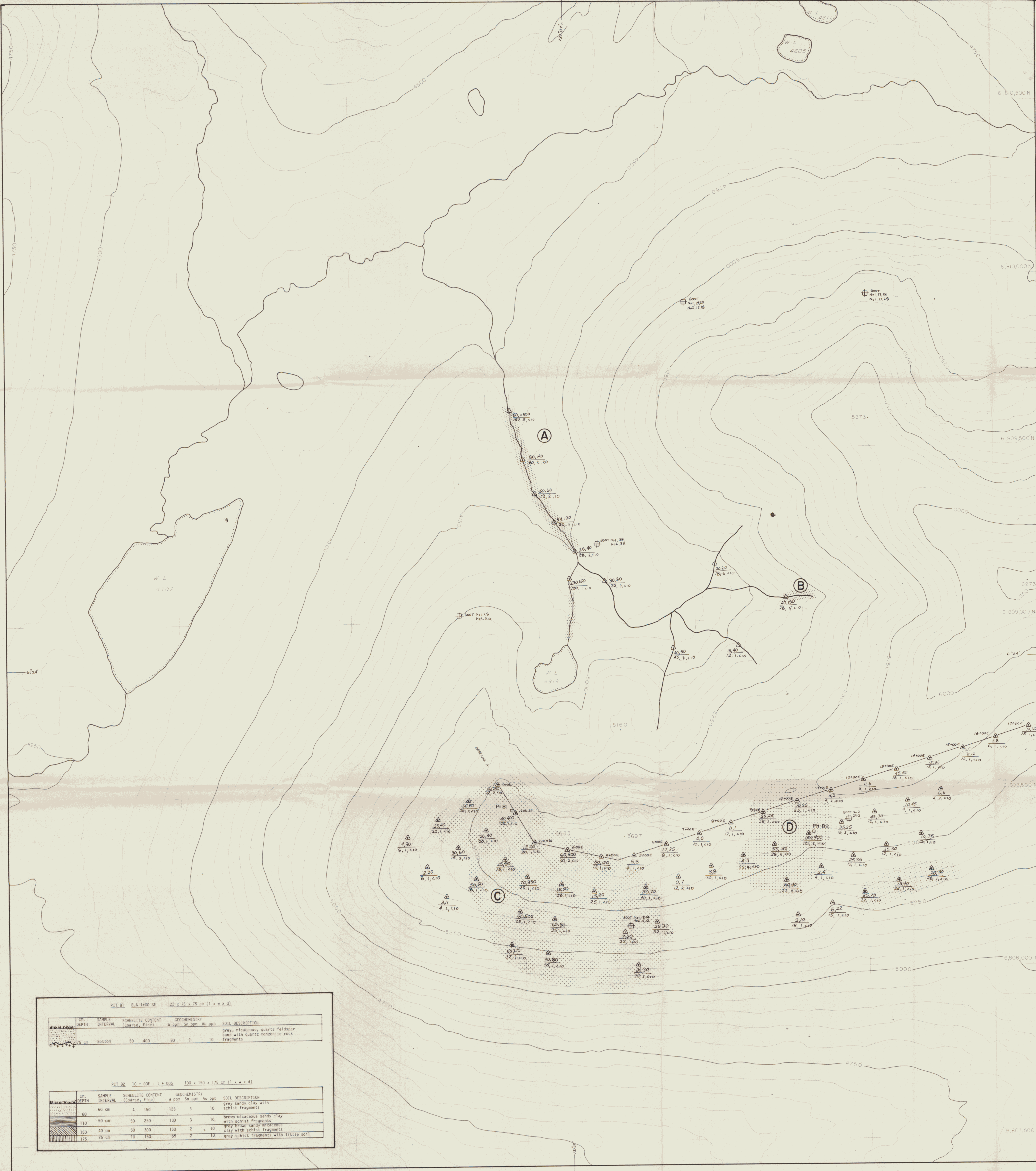
GRASS PROJECT

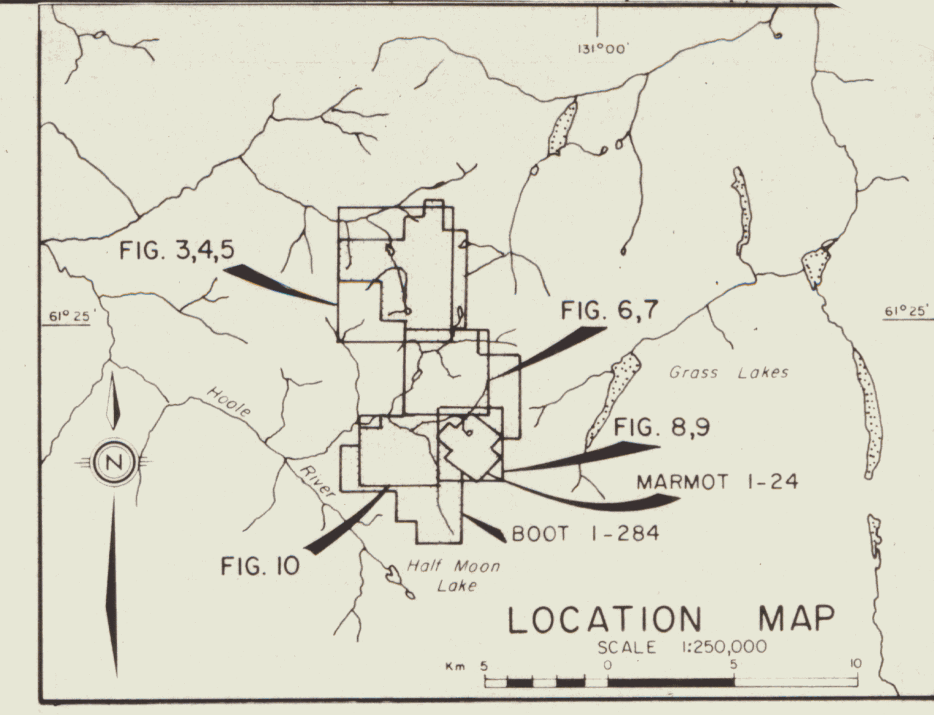
SCALE 1:5,000

100 0 50 100 200 300 400 500 Metres

Association of Professional Engineers of the Yukon Territory — R. J. CATHRO — GEOLOGICAL ENGINEER

To accompany report dated Dec. 1978





PIT B1 BLA 1+00 SE 122 x 75 x 75 cm (l x w x d)

cm. DEPTH	SAMPLE INTERVAL	SCHEELITE CONTENT (Coarse, Fine)		GEOCHEMISTRY W ppm	Sn ppm	Au ppb	SOIL DESCRIPTION
75 cm	Bottom	50	400	90	2	10	grey, micaceous, quartz feldspar sand with quartz monzonite rock fragments

PIT B2 10 + 00E - 1 + 00S 100 x 150 x 175 cm (l x w x d)

cm. DEPTH	SAMPLE INTERVAL	SCHEELITE CONTENT (Coarse, Fine)		GEOCHEMISTRY W ppm	Sn ppm	Au ppb	SOIL DESCRIPTION
60	60 cm	4	150	125	3	10	grey sandy clay with schist fragments
110	50 cm	50	250	130	3	10	brown micaceous sandy clay with schist fragments
150	40 cm	50	300	150	2	10	grey brown sandy micaceous clay with schist fragments
175	25 cm	10	150	65	2	10	grey schist fragments with little soil

LEGEND

△,△ Soil, stream, panning location and estimate of scheelite content in concentrate over geochemical analysis.

Shown as: coarse, fine grains / W, Sn, Au geochemistry

x Silt, • Soil, ■ Rock — Geochemistry in ppm W, Sn and ppb Au
- analyzed by Chemex Labs Ltd., North Vancouver

- values below detection limit shown as
  W < 4 ppm = 2
  Sn < 1 ppm = 1
  Au < 10 ppb = <10
  N = not analyzed

(A) Panning and geochemical anomaly

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GEOLOGICAL ENGINEER

FIG 7

ARCHER, CATHRO & ASSOCIATES LTD

PANNING, TUNGSTEN, TIN AND GOLD GEOCHEMISTRY

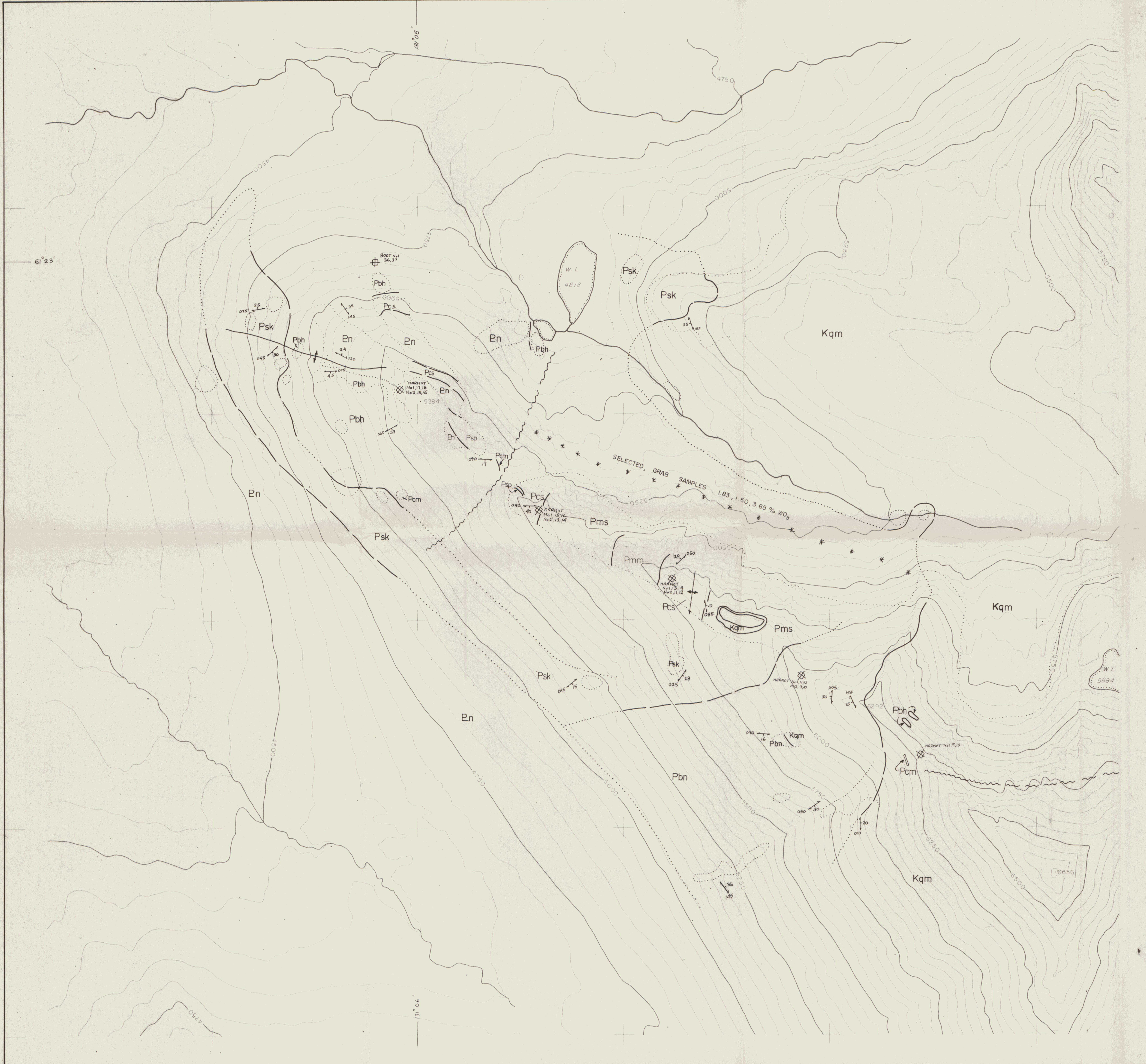
BOOT CIRQUE

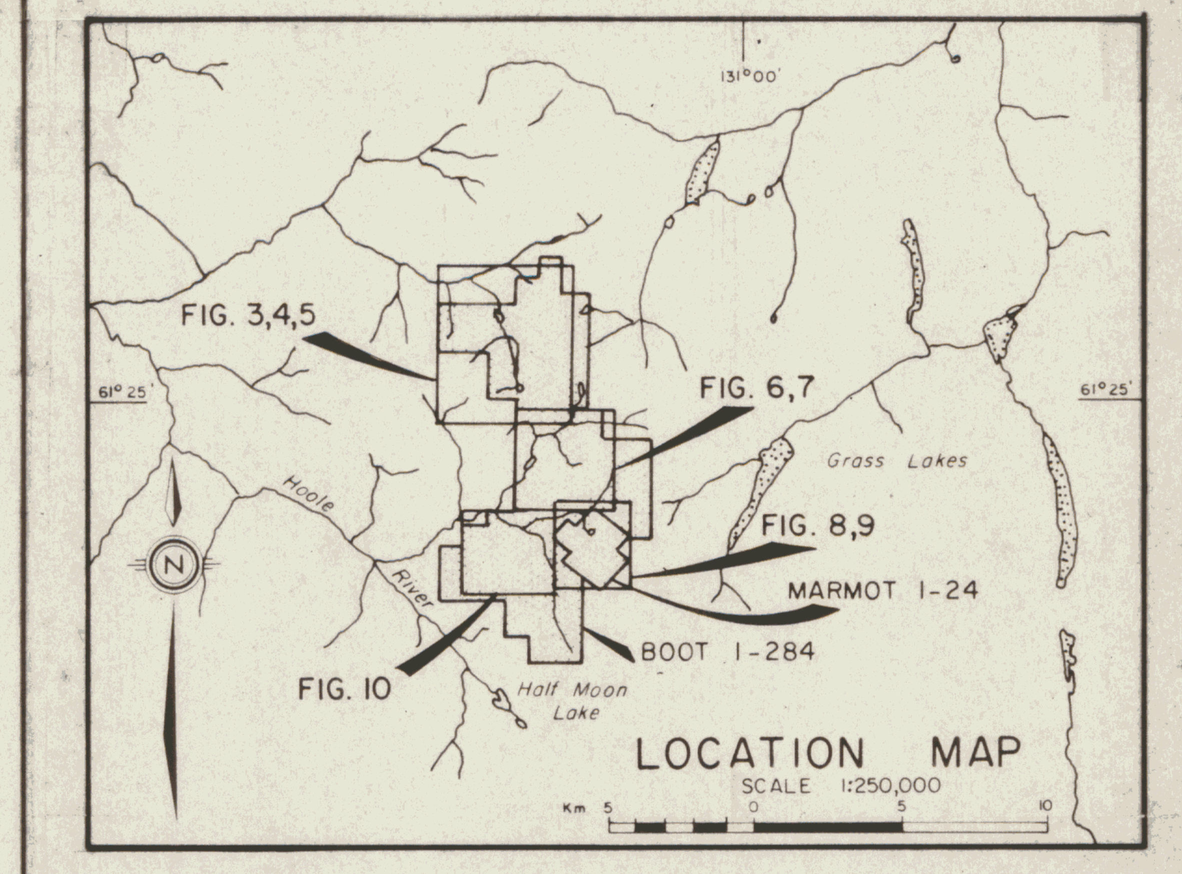
BOOT CLAIM GROUP

GRASS PROJECT

SCALE 1:5,000

To accompany report dated Dec. 1978





LEGEND

MESOZOIC

CRETACEOUS

Kqm — QUARTZ MONZONITE
grey, massive to blocky weathering, porphyritic biotite-muscovite quartz monzonite, white K-feldspar phenocrysts from 1 to 10 cm in length.
(contacts gradational between Kqm and Pn)

CRETACEOUS?

Pn — AUGEN GNEISS
grey weathering biotite-muscovite quartz feldspar gneiss, with white porphyroblasts of K-feldspar, thought to be older deformed Kqm

PALEOZOIC?

PPK2? — SCHIST, GNEISS, MARBLE, SKARN

Psk — SKARN
garnet-diopside skarn, garnet muscovite-biotite schist, light coloured calc-silicate skarn, white crystalline marble, biotite hornfels

* Pbh — BIOTITE HORNFELS
light green fine grained banded biotite hornfels

Pbn — BIOTITE GNEISS
chloritic biotite gneiss with minor limy beds, gradational with Pn

Pms — MUSCOVITE SCHIST
light brown weathering chloritic muscovite-biotite quartz schists, mica content is variable but muscovite is the most common

Psp — SILICEOUS PHYLLITE
black graphitic siliceous phyllite

Pcs — CHLORITE SCHIST
dark green chlorite schist

Pmm — MUSCOVITE MARBLE
light brown weathering muscovite marble

Pcm — GREY MARBLE
grey crystalline marble

* - Geological units based on G.S.C. Open File 486 by D.J. Tempelman-Kluit et al. Age relationships and other units reflect Grass Project geological interpretation.

Symbols

- scheelite bearing float located by night lamping
- Geological Boundaries: defined, approximate, assumed
- Fault: defined, approximate
- Foliation: inclined
- Fold axis: plunging, attitude unknown
- Outcrop and sub-outcrop limits
- Claim post location

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ENGINEER

FIG. 8

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GEOLOGY

MARMOT SHOWING

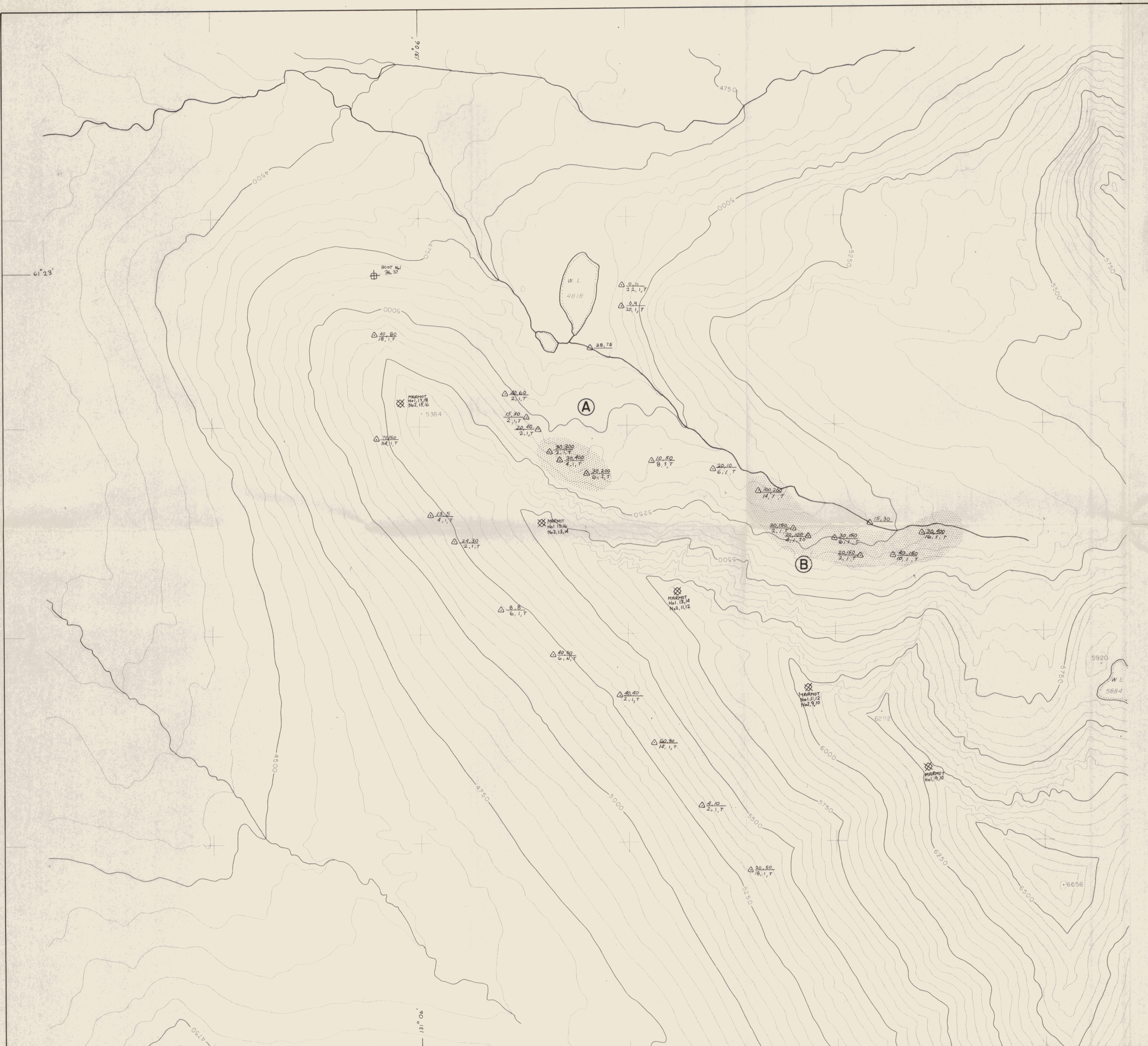
BOOT AND MARMOT CLAIM GROUP

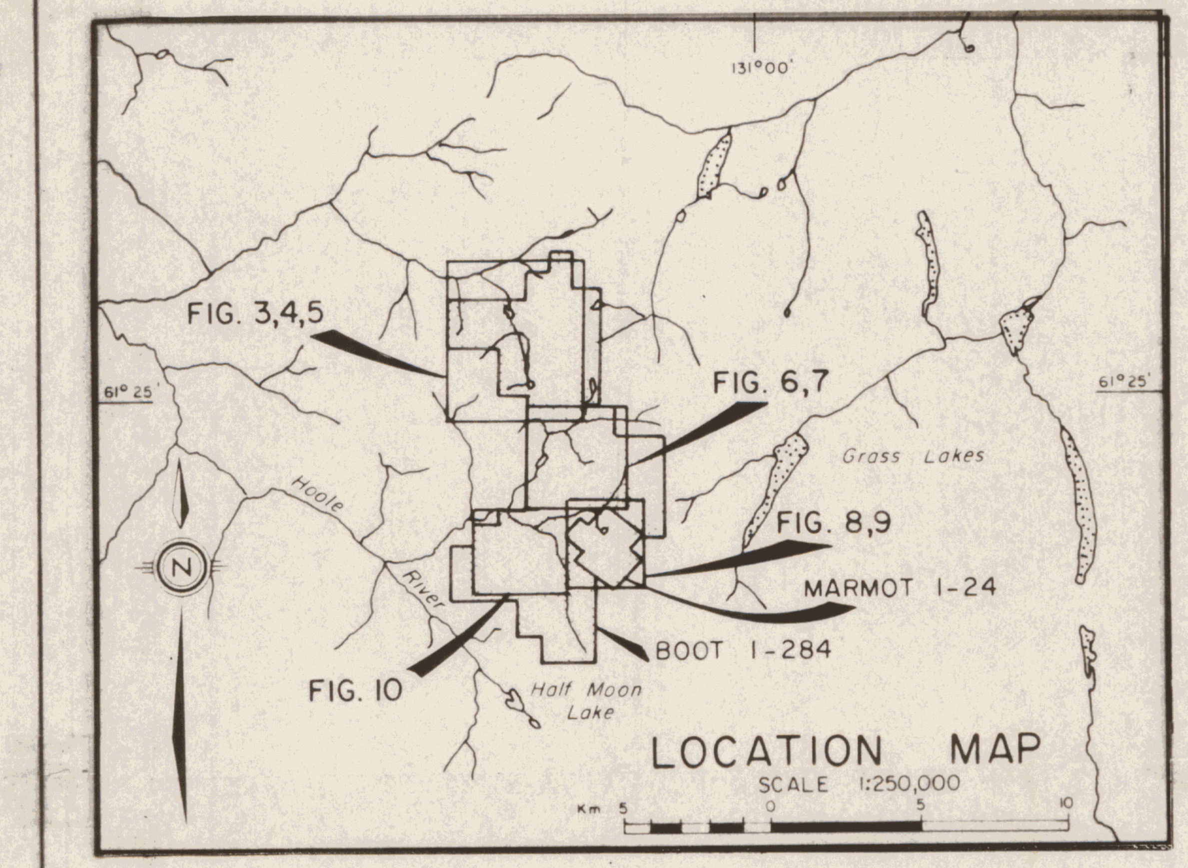
GRASS PROJECT

SCALE 1:5,000

100 0 50 100 200 300 400 500 Metres

To accompany report dated Dec. 1978





LEGEND

△,△ Soil, stream, panning location and estimate of scheelite content in concentrate over geochemical analysis.

Shown as: coarse, fine grains
W, Sn, Au geochemistry

× Silt
· Soil
■ Rock
Geochemistry in ppm W, Sn and ppb Au
- analyzed by Chemex Labs Ltd., North Vancouver

- values below detection limit shown as T
W < 4 ppm = T
Sn < 1 ppm = T
Au < 10 ppb = T

N = not analyzed

Ⓐ Panning anomaly

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ENGINEER

FIG 9

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PANNING, TUNGSTEN, TIN AND GOLD GEOCHEMISTRY

MARMOT SHOWING

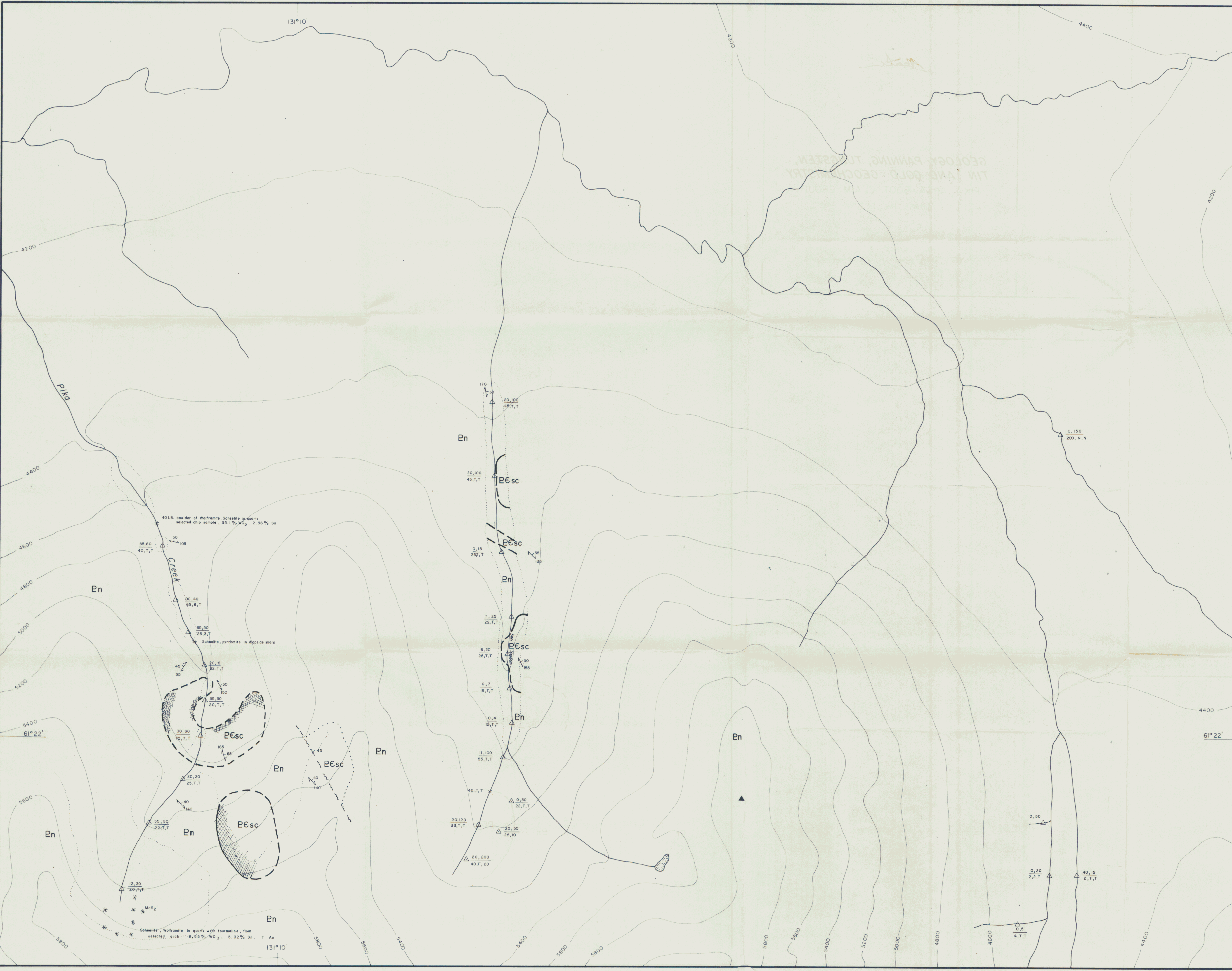
BOOT AND MARMOT CLAIM GROUP

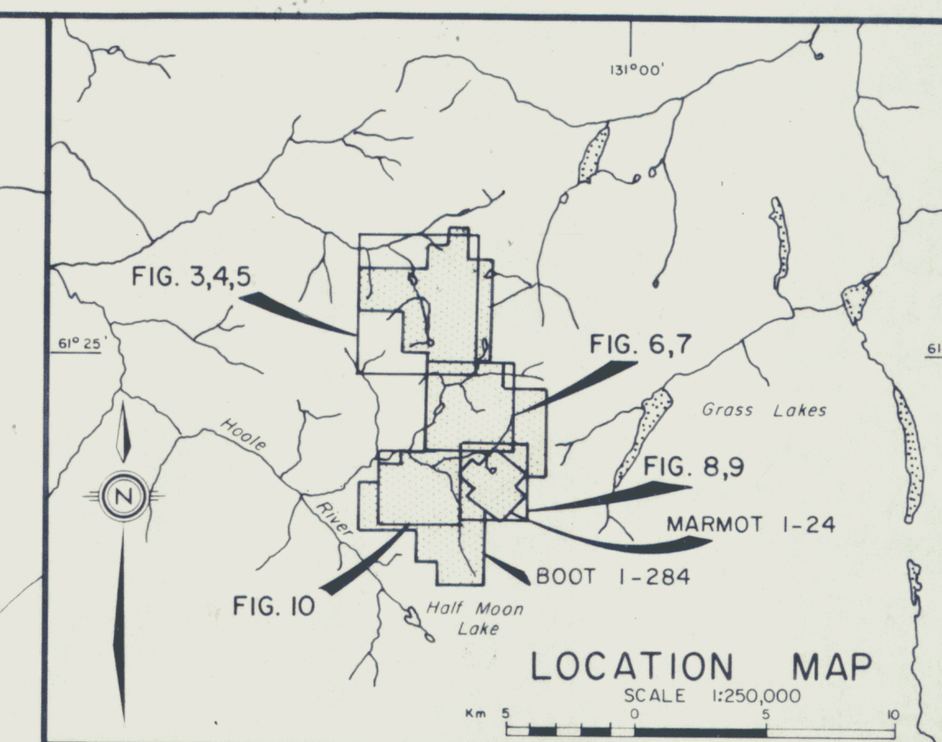
GRASS PROJECT

SCALE 1:5,000

100 0 50 100 200 300 400 500 Metres

To accompany report dated Dec. 1978





LEGEND

MESOZOIC

CRETACEOUS?

Ꝑn — Augen Gneiss
grey weathering, biotite-muscovite-quartz-feldspar augen gneiss with white porphyroblasts of K-feldspar from 1-10 cm in length, thought to be deformed quartz monzonite

WINDERMERE AND CAMBRIAN?

ꝐЄsc — Garnet Schist and Marble
garnet-muscovite schist, chloritic muscovite schist with interbedded skarn

SKARN
garnet diopside skarn found in ꝐЄsc

SYMBOLS

Foliation: inclined

Fault: approximated and inclined

Geological Boundary: defined, approximate, assumed

Limit of outcrop

Mineralized float occurrence

△,△ Creek, soil panning location with scheelite content in concentrate given in coarse and fine fragments over geochemical analysis shown as:
coarse, fine
ppm W, ppm Sn, ppb Au

Geochemical analysis by Chemex Labs Ltd., North Vancouver

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FIG. 10

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GEOLOGY, PANNING, TUNGSTEN, TIN AND GOLD GEOCHEMISTRY

PIKA AREA BOOT CLAIM GROUP

GRASS PROJECT

SCALE 1:5,000

100 0 50 100 200 300 400 500 Metres

To accompany report dated Dec. 1978