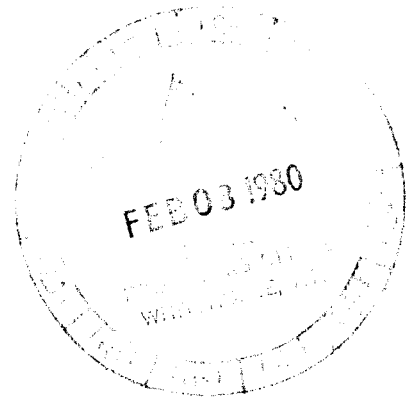


GEOLOGY AND GEOCHEMISTRY
THE DALE CLAIMS

NTS 116A/16
64°45'N, 136°02'W
MAYO MINING DISTRICT, YUKON TERRITORY



Owner: Noranda Mines Limited
Author: John Biczok
Date: January 1980

090530

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

\$ 1400.00

J. A. Main

Resident Geologist or
Resident Mining Engineer

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

E. R. BAXTER
Supervising Mining Recorder

h. Commissioner of Yukon Territory

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SUMMARY

The DALE 1-14 claims are located in the Wernecke Mountains, approximately 180 km northeast of Dawson City, Yukon, in the Mayo Mining District. They were staked by Mattagami on July 31, 1978 and are in good standing until August 8, 1980. This report deals with the work carried out on the claims by Mattagami in July 1979.

The claims cover the faulted, unconformable contact between Proterozoic phyllites and carbonates and Ordovician carbonates. Detailed mapping, based primarily on colour, of the phyllites has revealed the presence of five members within this unit. Rocks in this area have been intensely sheared by a major east-west fault, which separates the Proterozoic and Ordovician terranes in this area.

CHAPTER 1

INTRODUCTION

1-1 Location and Access

The DALE claims are located in the Mayo Mining District of the Yukon on NTS Map 116A/16 (Larsen Creek) at co-ordinates 64°45'N, 136°02'W (Figure 1). The property is accessible by helicopter from Dawson City, 180 km to the southwest, or Mayo, 130 km to the south. A trail extends north from Keno Hill to within 30 miles of the property.

1-2 History

The DALE claims were staked during ground followup of a G.S.C. Mo-Zn geochemical anomaly (G.S.C. Open File 519). During this followup, minor galena was discovered in narrow quartz-calcite veinlets. As a result, 14 claims were staked on July 31, 1978, and recorded in Mayo on August 8, 1978.

Only a few days were spent prospecting on the property in 1978 and therefore, a crew of four spent 26 man days on the property in July 1979, evaluating the potential of this area. The work included geological mapping, prospecting and stream sampling. The following personnel were involved:

- J. Biczok - Party Chief
- P. Wagner - Senior Assistant
- P. Lhotka - Junior Assistant
- C. Stewart - Junior Assistant

Because the Application For A Certificate of Work was filed late, and under penalty, the claims are in good standing only until August 8, 1980.

Figure 1

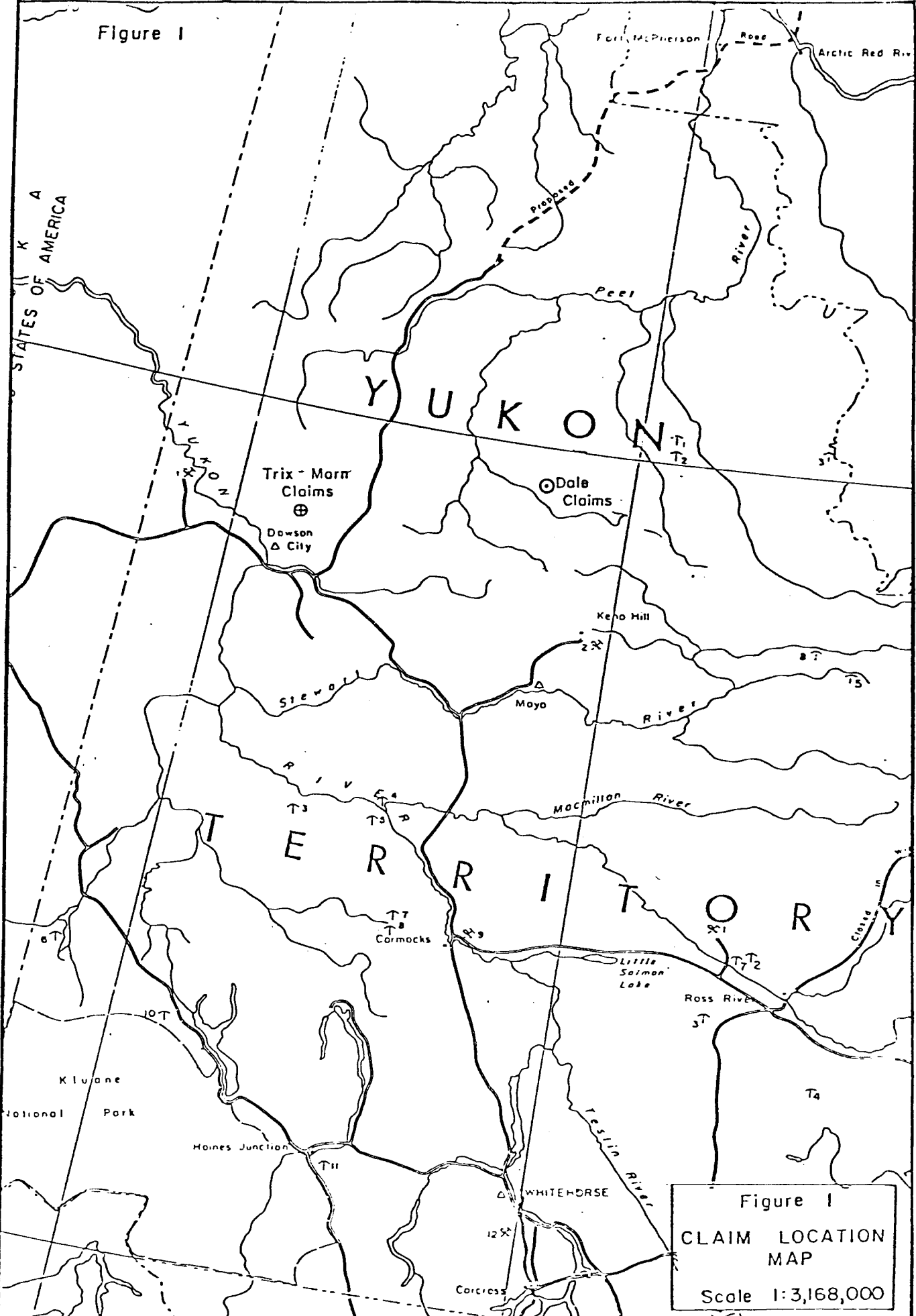


Figure 1
CLAIM LOCATION
MAP
Scale 1:3,168,000

1-3 Logistics

With the aid of a Bell 206B helicopter chartered from Trans North Turbo Air Ltd. in Dawson City, the crew and equipment were flown to the property from the Chapman Lake airstrip, approximately 108 km west of the property on the Dempster Highway. Camp was established beside a small lake (Spade Lake) on the property.

1-4 Physiography

The property is located in the Wernecke Mountains, part of the Selwyn range. It straddles the contact between Proterozoic phyllites and Proterozoic and Ordovician carbonates. These two rock types greatly influence the local topography. Areas comprising phyllite exhibit very steep sided mountains, up to 2100 m in elevation, with sheer cliffs, razorback ridges and very unstable slopes virtually bare of vegetation. Carbonate terranes on the other hand, feature more rounded mountains, up to 1800 m in elevation, with gentler, vegetation covered slopes at lower elevations giving way to bare rock on the upper slopes.

The area was glaciated in the late Wisconsin and features remnant valley glaciers and hanging valleys with broad, flat floors filled with glacial debris. Medial moraines are common in these valleys.

1-5 Flora and Fauna

Vegetation consists of subarctic grasses and low shrubs in this region. Shrubs rarely reach more than 1 metre in height on the property although at lower elevations in this area, dwarf

trees are found in some valley bottoms.

The area is inhabited by numerous marmots and less commonly by small birds. It is traversed occasionally by Dall sheep, caribou and moose.

CHAPTER 2

GEOLOGY

2-1 Introduction

The area was geologically mapped at a 1:250,000 scale in 1961 by L.H. Green and J.A. Roddick of the G.S.C. as part of Operation Ogilvie, and is described in G.S.C. Memoir 364 (L.H. Green, 1972).

The DALE claims straddle the faulted, unconformable boundary between a series of Proterozoic phyllites, siltstone, shale and carbonate, and overlying Ordovician carbonates (see Map 1, in back pocket, Table of Formations). The Ordovician carbonate occurs as an east-west band, roughly 1 km wide in this area, separating two large Proterozoic terranes to the north and south.

2-2 Description of Units

Unit 1

The oldest rocks in this area are a series of Proterozoic (Helikian ?) phyllites, shale and siltstone, with minor interbedded carbonates (Unit 1 of Green and Roddick). These have been subdivided largely on the basis of colour, but bed thickness and variations in composition were also considered. Tops are assumed to be to the north in this area, since that is where the Ordovician carbonates crop out. Age relationships between the various members of the Proterozoic phyllites, however, are not certain. Although there is not evidence for it, the possibility of isoclinal folding within this unit cannot be ruled out.

TABLE OF FORMATIONS

| <u>AGE</u> | <u>FORMATION</u> | <u>CORRELATIVE UNIT OF GREEN AND RODDICK</u> |
|-------------------|--|--|
| UPPER MESOZOIC | 4 Orange-to brown-weathering diorite and gabbro | 20a |
| Unknown | 3 Buff-weathering, dacite porphyry | --- |
| | - UNCONFORMITY - | |
| PROTEROZOIC | | |
| HADRYNIAN (?) | 2 Orange-weathering dolomitic limestone, minor black shale and grey-weathering calcareous dolomite; 2a, thin to medium bedded black shale; 2b, orange- weathering, platy, grey dolomitic limestone; 2c, light grey calcareous dolomite (possibly unit 8 of Green and Roddick). | 2 |
| HELIKIAN (?) | 1 Mainly thinly bedded, dark grey, black, green-grey phyllite, shale, siltstone, minor inter- bedded dolomitic limestone; 1a, grey to black phyllite and phyllitic shale; 1b, black shaly phyllite, siltstone and argillaceous siltstone, minor white siltstone; 1c, green- grey argillaceous siltstone and phyllite; 1d, black, shaly phyllite, locally graphitic, interbedded buff, sandy silt- stone in upper 2 metres; 1e, very fine grained, buff to grey, siliceous phyllite, siltstone, calcareous siltstone minor interbedded dolomitic limestone. | 1 |

The southernmost, and presumably the oldest, member of this unit, 1a, consists of grey to black, thinly bedded phyllite and phyllitic shale. This is overlain by a more argillaceous member, 1b, consisting of thinly bedded black shaley phyllite, siltstone and argillaceous siltstone. South of Lake Fleming, this member includes 10-20%, interbedded, clean white siltstone, in beds generally less than 8 cm in thickness. Overall this member has a relatively even thickness, varying from 200 to 400 metres. Overlying this is a very distinctive member, 1c, consisting of thinly bedded green-grey argillaceous siltstone and phyllite. It is thickest in the west, 500 metres, thinning to 200 metres in the east. This is followed by another black phyllitic member, 1d, composed of thinly bedded, black, shaley phyllite with locally a graphitic appearance. In the upper 2 metres of this member, adjacent to the contact with 1e, the phyllite is interbedded with a light brown sandy siltstone, with beds generally 1/2 to 1 metre in thickness. This member has a fairly constant thickness overall, ranging from 300 to 500 metres. The uppermost member of this formation, 1e, is also the most siliceous. It consists of very fine grained, light brown to grey, siliceous phyllite, siltstone and calcareous siltstone, with minor interbedded dolomitic limestone. Siltstone and phyllite beds are usually less than 5 cm thick while the limestone beds are up to 8 cm thick and occasionally form wedges up to 30 cm thick. Overall, this member appears to form a wedge with a maximum thickness of 300 metres, pinching out rapidly to the east and west.

Unit 2

Overlying the phyllitic unit is unit 2 of Green and Roddick, a distinctive Proterozoic (Hadrynian ?) unit consisting predominantly of a lower black shale member (2a) and an upper member of orange weathering dolomite (2b). The shale member was observed only on the ridge east of camp where it is 75 metres thick and rather intensely sheared. The dolomitic limestone is fine grained, equigranular, crystalline, light to medium grey on fresh surfaces weathering to a distinctive orange colour. It is quite massive, with no visible bedding observed in this area. cursory mapping in the carbonate terrane has revealed the presence of a light grey calcareous dolomite, 2c. Although included in the Proterozoic section, this may actually be the Ordovician grey carbonates, Unit 8 of Green and Roddick.

Igneous Intrusions

The Proterozoic sequence is intruded by two sets of dykes, a "dacite" porphyry (3) and gabbro/diorite (4). The porphyry is a light brown weathering rock consisting of 20-30% elongated, relict phenocrysts (chlorite ?), 5-7 mm in length, set in a fine grained, granular, groundmass of feldspar, quartz and trace chalcopyrite. These dykes average 1 metre in thickness and are usually nearly vertical.

Gabbro/diorite, presumed to be of Mesozoic age (Unit 20a of Green and Roddick), were found as boulders in a stream bed north of camp and intruding the phyllites south of camp. They are medium grained, equigranular and frequently exhibit calcite veining.

In addition to the dykes, narrow quartz-calcite and iron carbonate veinlets are common in the phyllitic sequence.

2-3 Structural Geology

Virtually all members of the Proterozoic series are highly sheared at 095° to 110° , dipping nearly vertical. This shearing is thought to be the result of a major east-west trending fault zone which extends over 40 km and forms the boundary between the Proterozoic and Ordovician sequences in this region. On the DALE claims this fault zone appears to consist of at least four individual, subparallel faults.

Although they were not observed by this crew outside of the claim area, the Proterozoic rocks of this region are described by Green and Roddick as consisting predominantly of argillite, slate, quartzite and phyllite. Presumably the phyllites on the DALE claims are simply highly sheared argillites, slate and quartzite.

In addition to being highly sheared, the phyllites appear to be complexly folded. The intense shearing makes bedding difficult to distinguish, however, in several areas numerous drag folds were observed. Bedding generally strikes 110° - 120° with moderate to steep dips to the north.

In contrast, the Ordovician carbonate sequence is much less deformed, having undergone only moderate folding and thrusting. It was probably deposited unconformably on a largely peneplained Proterozoic terrane.

CHAPTER 3

GEOCHEMISTRY

A total of 29 stream sediment samples were collected in the vicinity of the DALE claims during this program (Map 2, in back pocket). They were analyzed for the following elements: Cu, Zn, Pb, Mo, Ag, U (Appendix 1). Because of the high percentage of runoff derived from melting snow and frequent rains during this period, water samples were considered to be less useful and were not collected.

The 10 sediment samples collected in the phyllitic terrane are all relatively consistent in their metal concentrations. There seems to be no increase in metal concentrations as the siderite vein is approached, in fact a decrease seems apparent. This may be due to the high meltwater and rainwater components of the streams, the very steep relief in this terrane and the lack of any soil development. Because of these factors, there is little opportunity for the stream-water to pick up metals from the vein and deposit it in the sediments. Another factor is the poor development of the sediment itself. In this terrane the sediment is usually very coarse with very little silt developed, and many samples collected were actually bank samples.

In contrast, samples collected in the carbonate terrane exhibit wide variations and definite trends in metal concentrations. The first west to east flowing tributary north of camp contains anomalous levels of zinc, molybdenum, silver and uranium (Samples S1002-S1008). This anomaly is thought to have been produced by a black carbonaceous shale member observed in this area. This member has not been mapped as yet but the suite of metals concentrated in the stream sediments is characteristic of black shales.

It would appear that geochemical surveys are of little use in the Proterozoic phyllite terranes due to the lack of soil development, poor stream sediment development, very steep relief leading to rapid runoff and the abundance of snow in the valleys. Since there is a very high percentage of outcrop, prospecting and geological mapping would be more practical tools. In the carbonate terrane, more extensive soil and sediment development, gentler slopes and lower runoff rates combine to make geochemistry a useful tool.

REFERENCES

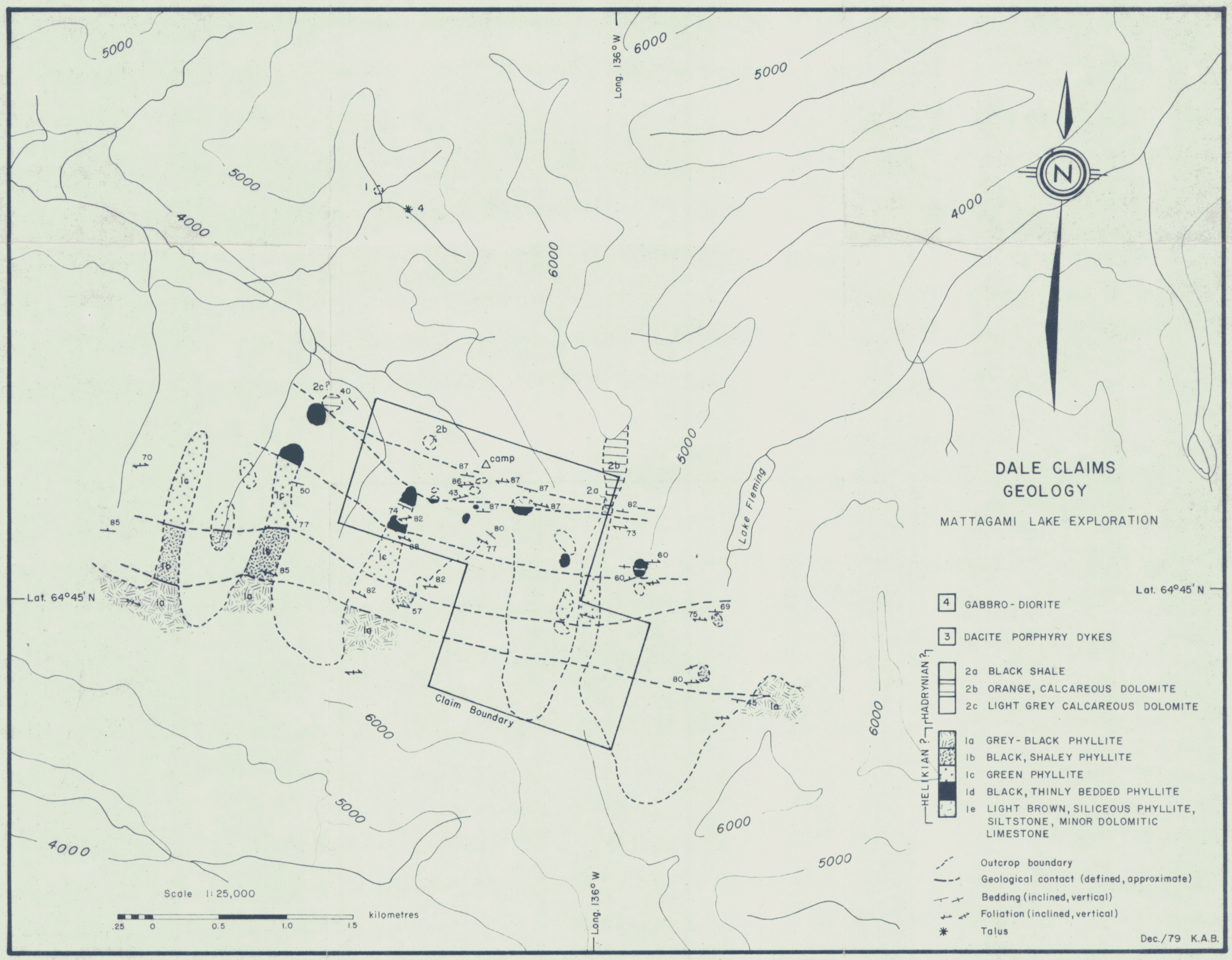
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APPENDIX 1

STREAM SEDIMENT ANALYSES

STREAM SEDIMENT ANALYSES - DALE CLAIMS

| <u>SAMPLE NO.</u> | <u>Cu</u> | <u>Zn</u> | <u>Pb</u> | <u>Mo</u> | <u>Ag</u> | <u>U</u> |
|-------------------|-----------|-----------|-----------|-----------|-----------|----------|
| 12903-S-1 | 96 | 66 | 34 | 2 | 1.2 | 3.7 |
| 2 | 90 | 66 | 38 | 2 | 1.4 | 3.4 |
| 3 | 90 | 68 | 50 | 2 | 1.6 | 4.5 |
| 4 | 34 | 64 | 22 | L2 | 0.6 | 1.6 |
| 1001 | 60 | 260 | 60 | 10 | 1.6 | 4.5 |
| 1002 | 46 | 450 | 46 | 36 | 2.4 | 5.9 |
| 1003 | 50 | 460 | 48 | 40 | 2.6 | 5.9 |
| 1004 | 52 | 500 | 46 | 42 | 2.6 | 7.5 |
| 1005 | 46 | 430 | 48 | 34 | 2.4 | 6.3 |
| 1006 | 34 | 350 | 76 | 28 | 2.2 | 5.3 |
| 1007 | 44 | 430 | 50 | 40 | 2.4 | 5.8 |
| 1008 | 50 | 450 | 48 | 44 | 2.6 | 6.0 |
| 1009 | 8 | 120 | 100 | 14 | 1.6 | 1.8 |
| 1010 | 8 | 110 | 92 | 16 | 1.6 | 1.7 |
| 1011 | 8 | 100 | 88 | 10 | 1.8 | 1.5 |
| 1012 | 8 | 110 | 82 | 8 | 1.4 | 1.4 |
| 1014 | 40 | 160 | 72 | L2 | 1.0 | 1.5 |
| 1015 | 52 | 190 | 90 | L2 | 1.0 | 1.3 |
| 1016 | 42 | 120 | 74 | L2 | 1.8 | 1.0 |
| 1017 | 44 | 120 | 80 | L2 | 1.8 | 1.2 |
| 1018 | 14 | 120 | 90 | 8 | 1.6 | 1.6 |
| 1020 | 32 | 140 | 76 | 6 | 1.6 | 1.4 |
| 1021 | 22 | 130 | 78 | 6 | 1.6 | 1.4 |
| 1501 | 94 | 78 | 46 | 4 | 1.2 | 2.9 |
| 1502 | 72 | 100 | 50 | 2 | 1.2 | 2.6 |
| 1503 | 130 | 160 | 94 | 2 | 1.8 | 4.0 |
| 1504 | 56 | 64 | 32 | L2 | 1.0 | 2.8 |
| 1505 | 54 | 74 | 34 | 2 | 1.4 | 2.8 |
| 1506 | 62 | 82 | 38 | 2 | 1.2 | 2.7 |



DALE CLAIMS GEOLOGY

MATTAGAMI LAKE EXPLORATION

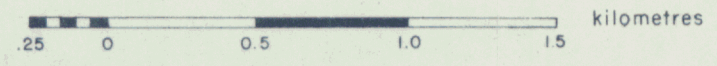
Lat. 64°45' N

Lat. 64°45' N

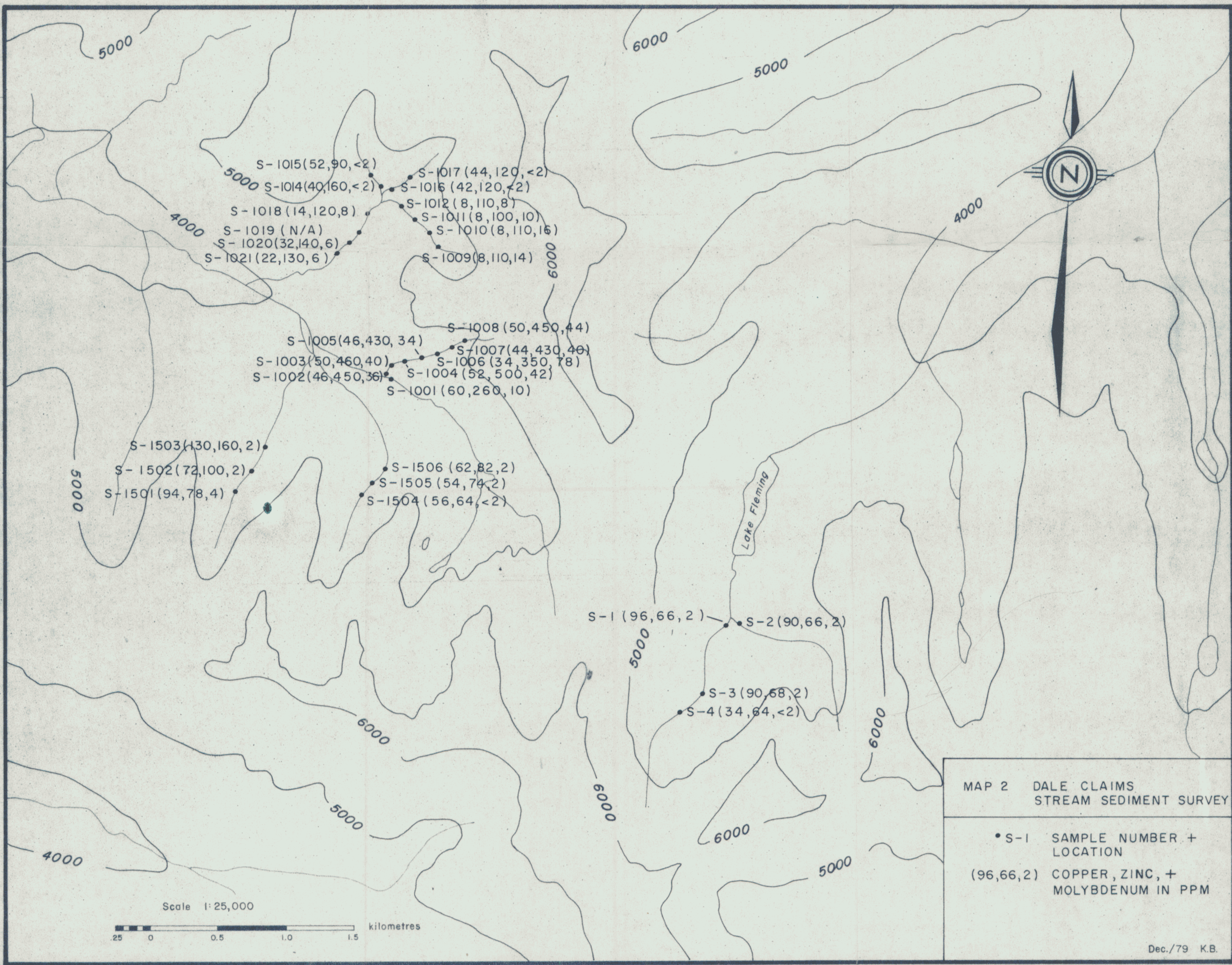
Long. 136° W

Long. 136° W

Scale 1:25,000



- 4 GABBRO - DIORITE
- 3 DACITE PORPHYRY DYKES
- 2a BLACK SHALE
- 2b ORANGE, CALCAREOUS DOLOMITE
- 2c LIGHT GREY CALCAREOUS DOLOMITE
- 1a GREY - BLACK PHYLITE
- 1b BLACK, SHALEY PHYLITE
- 1c GREEN PHYLITE
- 1d BLACK, THINLY BEDDED PHYLITE
- 1e LIGHT BROWN, SILICEOUS PHYLITE, SILTSTONE, MINOR DOLOMITIC LIMESTONE
- HELIXIAN ? - HADRYNIAN ?
- Outcrop boundary
- Geological contact (defined, approximate)
- Bedding (inclined, vertical)
- Foliation (inclined, vertical)
- Talus



S-1015 (52, 90, <2)
 S-1014 (40, 160, <2)
 S-1018 (14, 120, 8)
 S-1019 (N/A)
 S-1020 (32, 140, 6)
 S-1021 (22, 130, 6)
 S-1017 (44, 120, <2)
 S-1016 (42, 120, <2)
 S-1012 (8, 110, 8)
 S-1011 (8, 100, 10)
 S-1010 (8, 110, 16)
 S-1009 (8, 110, 14)
 S-1008 (50, 450, 44)
 S-1005 (46, 430, 34)
 S-1007 (44, 430, 40)
 S-1003 (50, 460, 40)
 S-1006 (34, 350, 78)
 S-1002 (46, 450, 36)
 S-1004 (52, 500, 42)
 S-1001 (60, 260, 10)
 S-1503 (130, 160, 2)
 S-1502 (72, 100, 2)
 S-1501 (94, 78, 4)
 S-1506 (62, 82, 2)
 S-1505 (54, 74, 2)
 S-1504 (56, 64, <2)

S-1 (96, 66, 2)
 S-2 (90, 66, 2)
 S-3 (90, 68, 2)
 S-4 (34, 64, <2)

MAP 2 DALE CLAIMS
 STREAM SEDIMENT SURVEY

- S-1 SAMPLE NUMBER + LOCATION
- (96,66,2) COPPER, ZINC, + MOLYBDENUM IN PPM