

GEOLOGICAL AND GEOCHEMICAL REPORT

on the

RYTE, IF and SEABITER CLAIM GROUP

LIARD and OMINECA MINING DIVISIONS

N.T.S. 94F/13W and 94F/13E

Latitude: 57°58'N

Longitude: 125°48'W

by

R.C. Carne

ARCHER, CATHRO & ASSOCIATES LTD.

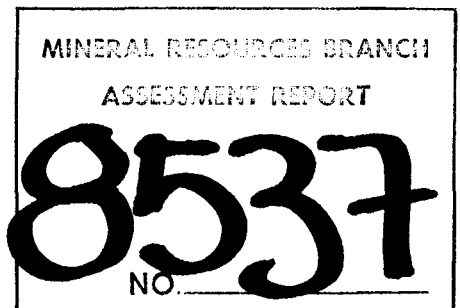
for

WELCOME NORTH MINES LTD. (Owner)

and

GATAGA JOINT VENTURE (Operator)

Submitted December 15, 1980



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LIST OF CLAIMS

<u>Claim</u>	<u>Record Number</u>	<u>Number of Units</u>	<u>Record Date</u>	<u>Expiry Date</u>
Ryte	667	20	July 11, 1977	July 11, 1982
If	1153	5	Sept. 11, 1979	Sept. 11, 1981
Seabiter	997	12	Dec. 10, 1979	Dec. 10, 1981

GEOLOGICAL AND GEOCHEMICAL REPORT

on the

RYTE, IF and SEABITER CLAIM GROUP

Introduction

The Ryte, Seabiter and If claims were staked by Gataga Joint Venture in the name of Welcome North Mines Ltd. to cover a possible strike extension of stratiform lead-zinc mineralization on the adjoining Bear claims. Gataga Joint Venture (GJV), formed in 1977 to explore for lead-zinc in northeast British Columbia, is a syndicate composed of Aquitaine Company of Canada Ltd., Chevron Canada Limited, Getty Mines Limited, Welcome North Mines Ltd. and Castlemaine Exploration Ltd. The program was managed by Archer, Cathro & Associates Limited and was directed in the field for the fourth successive season by R.C. Carne.

The If claims were geologically mapped at a scale of 1:20,000 as part of a program of investigation of nearby mineralization on the adjoining Bear claims. About 150 soil and silt samples were taken at roughly 50 m x 100 m intervals on the Ryte and Seabiter claims. Topographic control for both the geological and geochemical surveys was established with the aid of a contoured 1:20,000 scale orthophoto map produced from aerial photography flown by GJV in 1979. The 1980 work was carried out in the period May 26 to June 23.

Location and Access

The Ryte, Seabiter and If claim group is located 5 km northwest of Gataga Lakes on NTS map sheets 94F/13W and 94F/13E (Figure 1). The centre of the group is located at latitude 57°58'N and longitude 125°48'W.

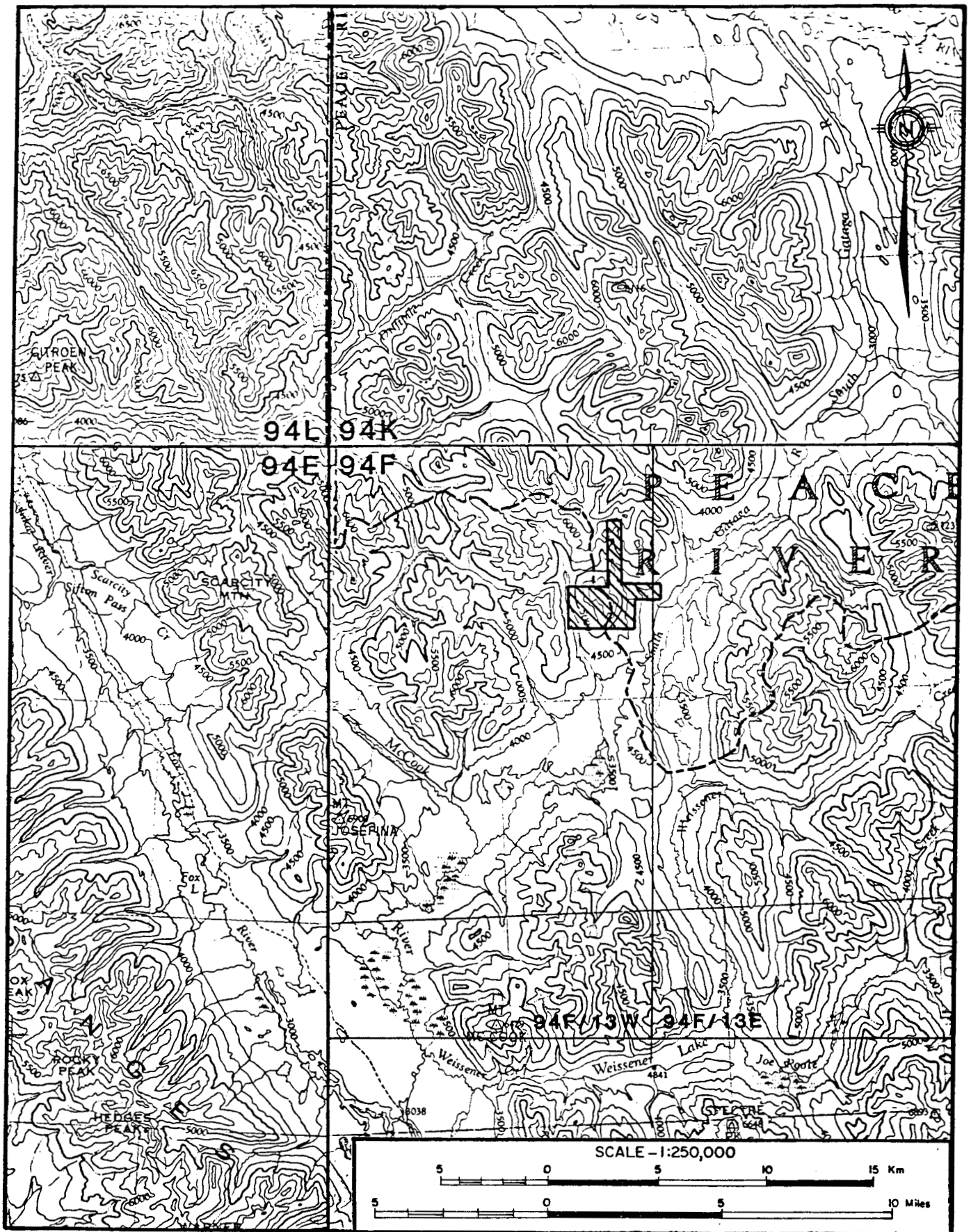


Figure 1: Location of If, Ryte and Seabiter claim group (NTS 94F/13W and 94F/13E)

Access is by float-equipped, fixed-wing aircraft from Watson Lake, Yukon Territory, about 310 km to the northwest, to Gataga Lakes about 5 km to the southeast and by helicopter from that point to the property. The nearest large town, 210 km to the east, is Fort Nelson which does not have a float plane base. Fuel and camp supplies used for the 1980 program were trucked 300 km from Watson Lake to Muncho Lake (Km 747 on the Alaska Highway) and ferried 100 km during mid-April, 1980 by ski-equipped, single Otter aircraft to Mayfield Lake, located about 30 km northeast of the claim group. Field work was conducted with a helicopter supported program based at a permanent field camp located on Driftpile Creek, about 20 km to the northwest.

### Regional Geology

The Gataga Lakes area lies within Kechika Trough, a southeasterly extension of the much larger Selwyn Basin. Sedimentary rocks range in age from Cambrian to lower Mississippian. Prior to Upper Devonian, easterly derived clastic sedimentary assemblages reflect normal sedimentation patterns while the westerly derivation of upper Devonian to Mississippian sedimentary rocks resulted from block faulting and uplift along the continental margin. Regional stratigraphic relationships are summarized on Figure 2.

Structural geology of the area is dominated by northwesterly trending, easterly directed thrust faults. Pelitic sedimentary rocks within thrust sheets are complexly deformed into upright to slightly overturned isoclinal folds cut by numerous near-vertical shear zones. A penetrative axial plane foliation is commonly well developed. Structural geology is complicated by deformation initiated prior to deposition of middle Devonian clastic rocks above a pronounced unconformity.

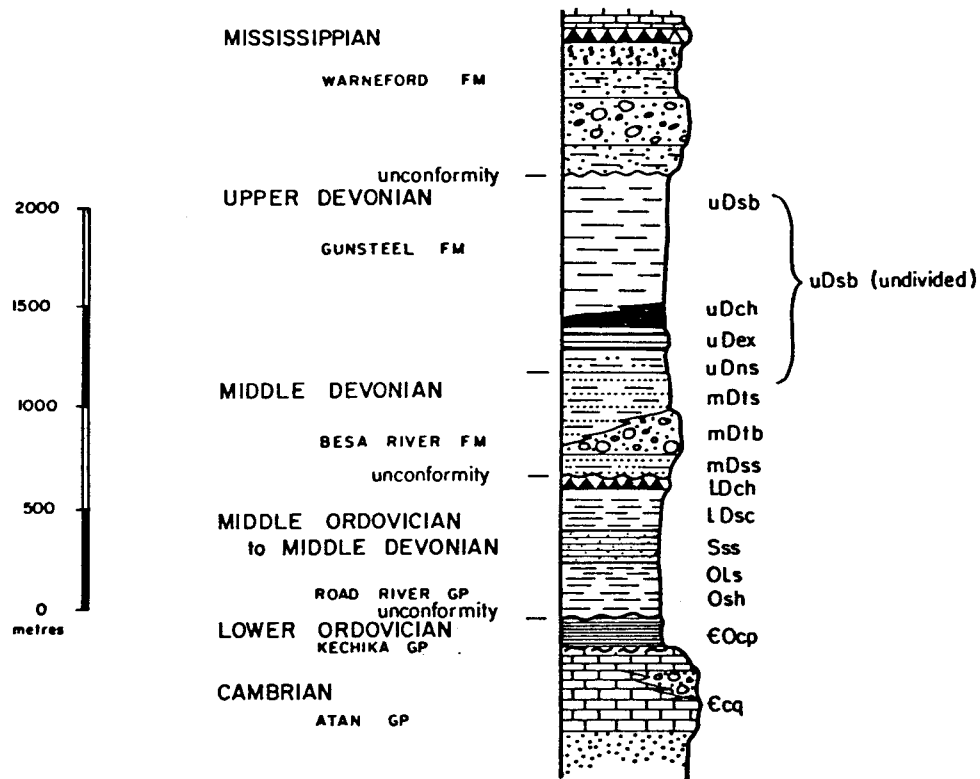


FIGURE 2

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**STRATIGRAPHY**  
**GATAGA LAKES AREA**  
**GATAGA JOINT VENTURE**

Upper Devonian siliceous and pyritic black shales are host to numerous stratiform barite and barite-lead-zinc deposits in the area, notably those at Driftpile Creek some 20 km along strike to the northwest and at Cyprus Anvil's Cirque claims, located about 100 km southeast of the area.

### Property Geology

Geology of the If claims and surrounding area is shown at 1:20,000 scale on Figure 3. Oldest lithologies exposed on the property are clastic sedimentary rocks of Besa River Formation (Map Units mDts and mDtb). Unit mDts consists of brown weathering, resistant, thick to medium bedded gritty and fine grained mudstone and shale with thin interbeds of pyritic siltstone. Sedimentary structures indicate deposition of the unit as distal turbidites with an easterly direction of sedimentary transport. Time equivalent rocks of unit mDtb occur west of the property above a series of westerly dipping thrust faults. Here Besa River Formation consists primarily of massive to thick bedded, very resistant chert pebble conglomerate and chert granule grit deposited as debris flows and proximal turbidites. Morphologies of channel deposits and paleocurrent indicators define an easterly direction of transport for the sediment.

Generally pyritic and fine grained, siliceous black shale of upper Devonian Gunsteel Formation conformably overlies coarser grained lithologies of Besa River Formation. Unlike older sedimentary units, facies changes within the formation are abrupt and bear no apparent relationship to regional trends. In simplest terms, the formation can be broken down into two members, Map Units uDns and uDsb, whose distribution is probably related to their physical environment of deposition. Discontinuous and irregular distribution of units uDch and uDex probably reflects their deposition as chemical sediments.



Medium bedded, non-siliceous, slightly gritty black shale of Map Unit uDns forms the basal part of Gunsteel Formation throughout the Gataga District. A diagnostic feature of the member is the presence of 2mm to 1cm diameter, spheroidal nodules composed of silica, calcite and clay minerals. Cross-bedded laminae or thin beds of a similar composition are sometimes associated with the nodules. Origin of these features is, at present, unknown but their mineralogy suggests possible derivation from water-lain tuffs in the north part of the district. Thickness of unit uDns varies from areas where it appears to be absent to over 200m on the GJV Bear and If claims in the southwest.

Bulk of the Gunsteel Formation consists of medium to thick bedded, siliceous and non-siliceous, carbonaceous black shale (unit uDsb). Stratigraphy within this member is very poorly defined because of the absence of identifiable marker horizons coupled with its generally recessive nature.

Distinctive lithologies of Map Units uDch and uDex always appear in close proximity to each other. Unit uDch consists of cherty argillite and black chert with siliceous shale partings. Thin beds of galena and sphalerite were also observed in drill core from this unit on the nearby Bear claims. Map Unit uDex consists of bedded barite and interbedded chert, cherty argillite, pyrite and nodular or blebby barite. Massive, pyritic sulphide deposits occur within this unit at Driftpile Creek and on adjoining Bear claims. Silica, iron and barium content of uDex and uDch is thought to be derived from submarine hot-spring or exhalite activity during early deposition of the upper Devonian Gunsteel Formation. Both units uDch and uDex are extrapolated to continue along strike southeast from known occurrences on the Bear claims although they are apparently not present south of a major creek which cuts across the south end of the If claim.

## Geochemical Surveys

During the 1980 field season, approximately 150 soil and silt samples were taken on the If, Ryte and Seabiter claims. Bulk of the sampling was carried out along a steep, easterly facing slope to cover possible along strike projections of lead and zinc mineralization on the adjoining Bear claims. Soil samples were taken every 50 metres along traverse lines spaced approximately 100 metres apart. Samples, taken from the "B" soil horizon where possible, were located with the aid of a Hip Chain measuring device and a contoured 1:20,000 scale orthophoto. Sample locations were marked in the field with orange survey flagging. All samples were shipped air freight to Chemex Labs Ltd., North Vancouver, B.C. where they were dried, screened to a minus 80 mesh fraction and analyzed routinely for copper, lead, zinc and silver using a nitric-perchloric acid extraction and atomic absorption spectrometry. Samples which contained a high barium content required redigestion due to barium interference with lead analysis. A portion of the minus 80 mesh fraction from each sample was stored at the lab.

Background levels for the four metals have been established statistically on results of grid soil geochemical surveys carried out by GJV over known mineralization at Driftpile Creek. Results are tabulated below:

	<u>Threshold Value (ppm)</u>	<u>Moderately Anomalous (ppm)</u>	<u>Strongly Anomalous (ppm)</u>
Cu	75	150	300
Pb	175	700	3000
Zn	700	3000	10,000
Ag	0.6	2.5	5.0

Copper anomalies are rare in the area, only minor copper values have been recorded from known mineralization. Lead geochemistry has proven to be the most valuable tool for both regional and detailed exploration for shale hosted massive

sulphide deposits. Lead distribution in both soil and silt is not as erratic as that for zinc which has a high mobility in locally acid ground waters. Exotic zinc soil geochemical anomalies resulting from dispersion in acid springs can range up to several percent. Silver distribution is very erratic in soils which overlie the upper Devonian Gunsteel Formation. Little is known about the silver content of the shales although values of greater than 30 ppm silver over several metres have been received from drill core of unit uDch on the Bear claims. Massive sulphide mineralization at Driftpile Creek contains only trace amounts of silver while similar mineralization on the Bear claims can contain as much as 35 ppm silver.

Lead, zinc, silver and copper geochemistry of the If, Ryte and Seabiter claims and surrounding area is shown on Figures 4, 5, 6 and 7, respectively; Lead values in soil and silt range from 1 ppm to 88 ppm, well within background variation for upper Paleozoic black shales in the region. Zinc soil contents range between 10 ppm to 600 ppm, again below threshold value for the area. Silver contents of soil and silt from the claim group ranges from 0.1 ppm to 7.8 ppm. Anomalous values (greater than 0.6 ppm) are numerous, especially within the detailed sampling area on the Ryte and Seabiter claims. Erratic distribution of the values does not, however, suggest a stratiform source for silver. Copper values are well within expected background variation for the underlying rocks, ranging between 4 ppm and 80 ppm.

### Economic Geology

The stratiform massive sulphide body which contains potentially economic values in lead, zinc and silver on the Bear claim is extrapolated to continue onto the south end of the If claim where it appears to rapidly thin and disappear in an

area of heavy vegetation and overburden cover. Geochemical sampling along strike to the southeast on the Ryte and Seabiter claims suggests that no mineralization is present.

Conclusions and Recommendations

Geological mapping suggests that the potentially economic lead-zinc-silver mineralization on the Bear claim may continue on to the south end of the adjoining If claim although this conclusion is inferred from the location of a few scattered limonitic gossans. Detailed soil geochemical sampling to the southeast on the Ryte and Seabiter claims does not indicate the presence of similar mineralization. The south part of the If claim should be explored with detailed grid geochemical sampling with follow-up hand pitting on anomalies. The Ryte and Seabiter claims should be retained for their positional value.

Respectfully submitted,

ARCHER, CATHRO & ASSOCIATES LIMITED

A handwritten signature in black ink, appearing to be 'R.C. Carne', written over a horizontal line.

R.C. Carne.

APPENDIX I

STATEMENT OF QUALIFICATIONS

I, Robert C. Carne, geologist, with business and residential addresses in Vancouver, British Columbia, hereby certify that:

- 1) I graduated from the University of British Columbia in 1974 with a B.Sc. and in 1979 with an M.Sc. majoring in Geological Sciences.
- 2) I am a member of the Geological Association of Canada.
- 3) From 1974 to the present I have been actively engaged as a geologist in mineral exploration in British Columbia and Yukon Territory.
- 4) I have personally participated in or supervised the field work reported herein and have interpreted all data resulting from this work.

A handwritten signature in black ink, consisting of stylized initials 'RC' followed by a long horizontal line extending to the right.

Robert C. Carne

APPENDIX II

SUMMARY OF COSTS

on work performed on the

RYTE, IF and SEABITER CLAIMS

between May 26, 1980 and June 23, 1980

Salaries and Wages

R. Carne (Geologist)	June 6,7,10,11,12	5 days @ \$177/day	\$885.00
D. Hamilton (Assistant)	May 26	1 day @ 77/day	77.00
J. Forrest (Assistant)	June 11	1 day @ 71/day	71.00
K. Kauppi (Assistant)	June 11	1 day @ 71/day	71.00
T. Sandberg (Assistant)	June 11	1 day @ 77/day	77.00
T. Paulsen (Draftsman)		2 days @ 62/day	<u>124.00</u>
			\$1,305.00

Assays and Geochemical Analyses

Analysis of 152 samples for Cu, Pb, Zn & Ag @ \$3.40 516.80

Camp Maintenance (includes fixed wing aircraft costs)

11 mandays @ \$35/day 385.00

Helicopter (includes fuel costs on site)

Northern Mountain Helicopters Ltd.

Bell Jet Ranger 206B @ \$406/hr. x 4.2 hrs. 1,705.20

Total Expenditures \$3,912.00

# LEGEND

## UPPER DEVONIAN

### Gunsteel Formation

- uDbb** medium to thick bedded, siliceous and non-siliceous, carbonaceous black shale
- uDns** medium bedded, non-siliceous, slightly gritty, nodular black shale (may be locally absent)
- uDb** bedded barite, interbedded chert, pyrite and bitby barite, massive pyrite
- uDbc** quartz, calcite and barite geosites
- uDbh** cherty argillite and black chert, minor silver-bearing galena-sphalerite beds in Bear claims (may be locally absent)
- uDbv** undivided Gunsteel Formation

## MIDDLE DEVONIAN

### Besa River Formation

- mDbt** thick bedded distal turbidites (dominantly black shale with minor siltstone intertals)
- mDss** medium to thick bedded intermediate turbidites (silty black shale with conglomerate and siltstone intertals)
- mDtl** thick bedded to massive proximal turbidites and debris flows (chert/pebble conglomerate and chert granule grit)
- mDer** thin bedded and nodular gray to black barite and siliceous shale, very minor pyrite

## MIDDLE ORDOVICIAN TO LOWER DEVONIAN

### Road River Group

#### LOWER DEVONIAN

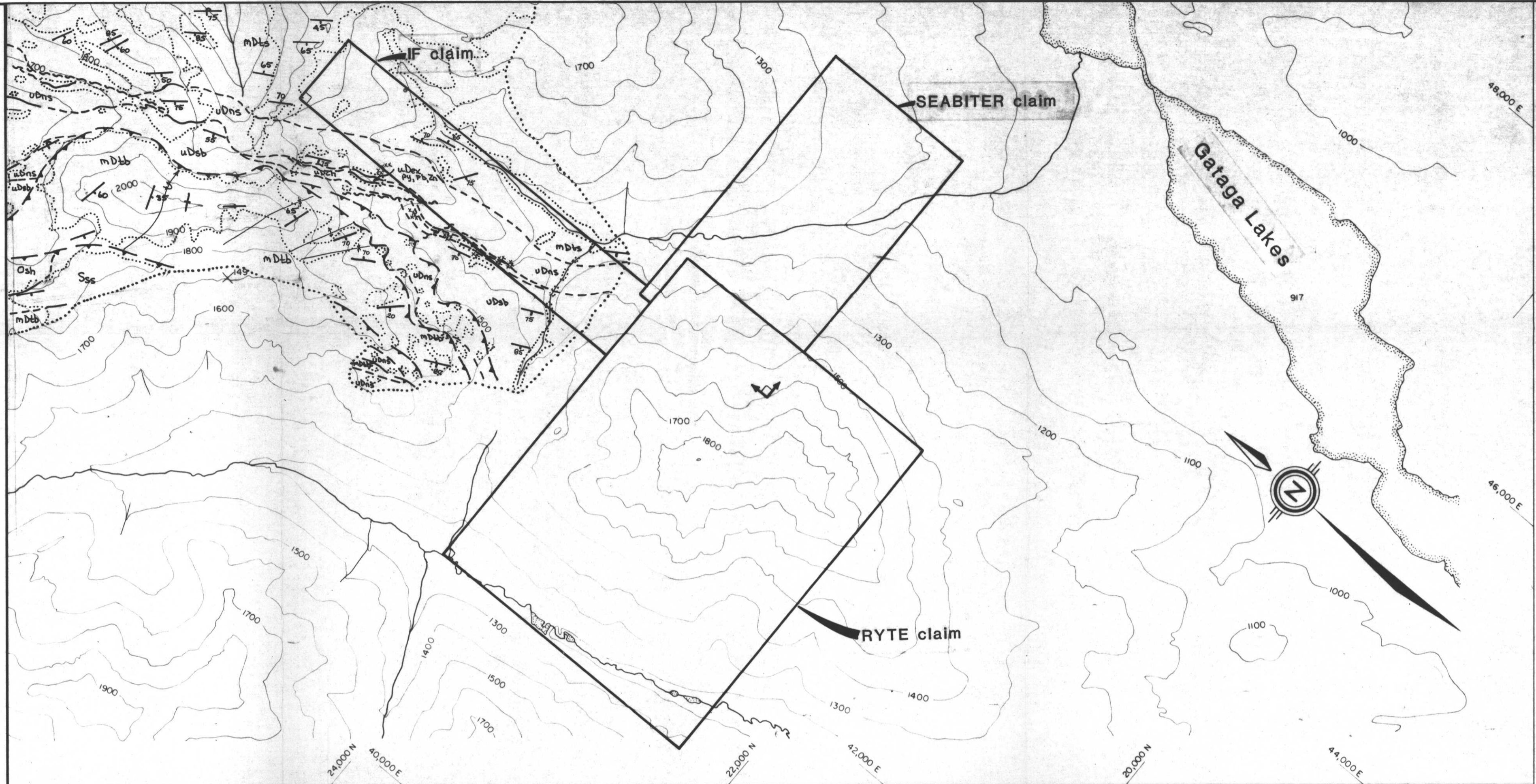
- LDck** black and bluish black, thin to medium bedded chert with minor carbonaceous shale intervals
- LDcs** interbedded carbonaceous black shale and cherty black argillite, minor black chert successions

#### SILURIAN

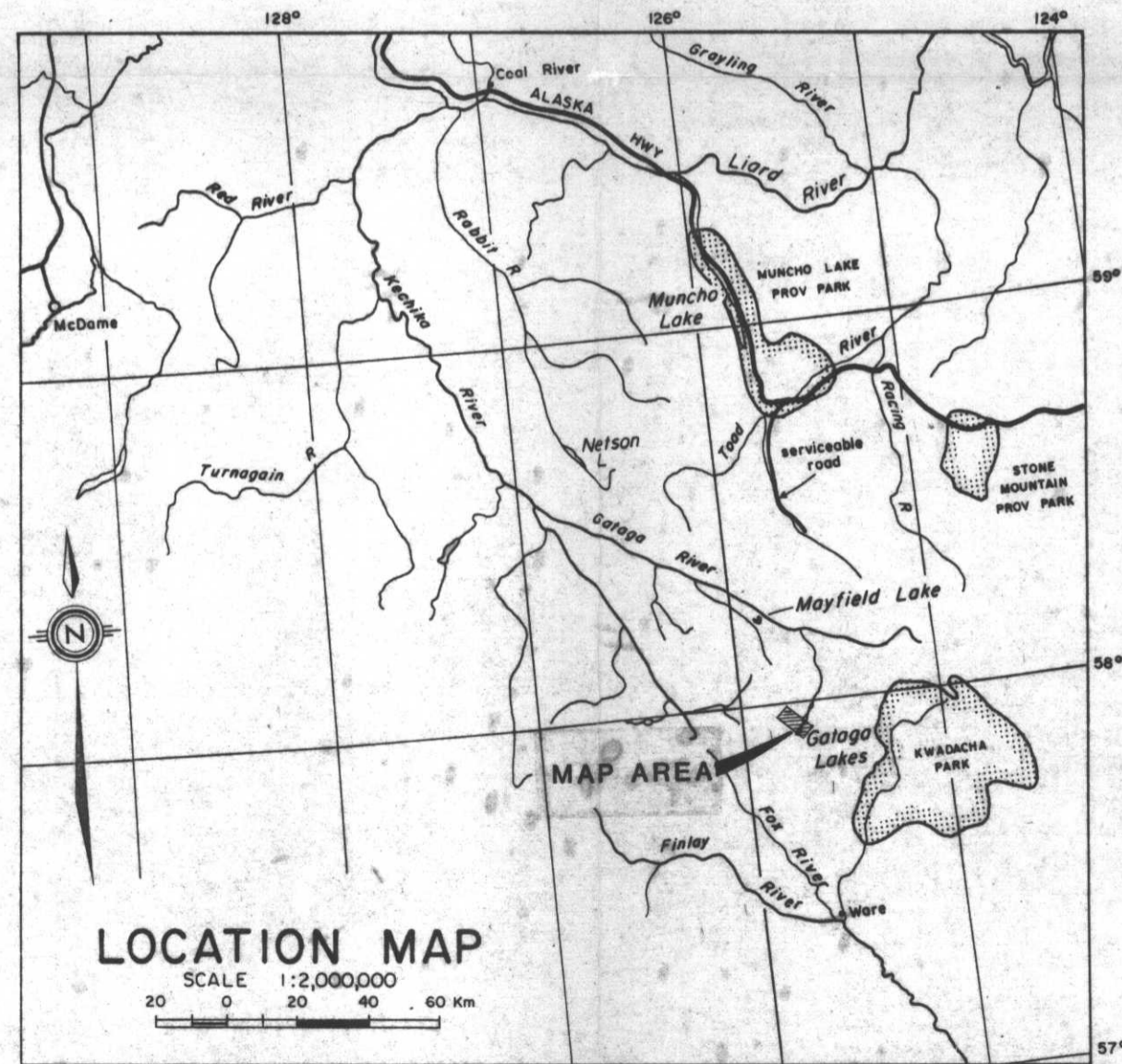
- Sss** orange weathering dolomitic and ankeritic siltstone, minor silty dolomite and cryptalgal laminated grey limestone

#### ORDOVICIAN

- Osh** medium to thick bedded calcareous black shale and mudstone
- OLS** grey and white limestone with black and green chert lenses



N.B. claims and geologic information were located in the field with the aid of a 1:20,000 scale orthophoto



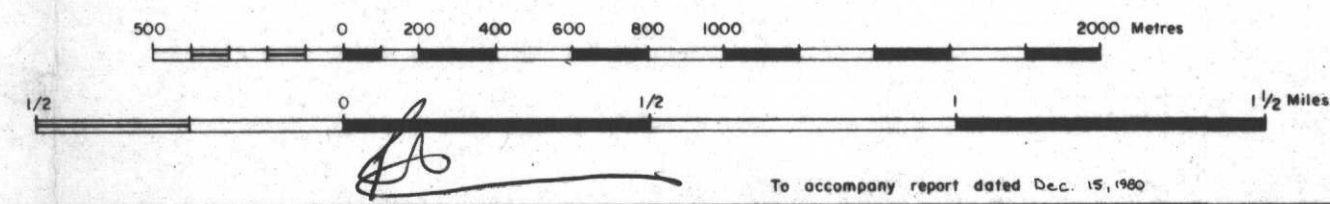
## SYMBOLS

- extent of outcrop
- geologic contact (known, assumed)
- bedding (inclined, vertical, overturned)
- cleavage (inclined, vertical)
- normal or strike slip fault
- thrust fault (known, assumed)
- anticline (upright, overturned)
- syncline upright, overturned)
- plunge of fold axis
- paleocurrent direction
- fossil locality (graptolite)
- quartz vein stockwork
- ferricrete deposit
- kill zone or gossan

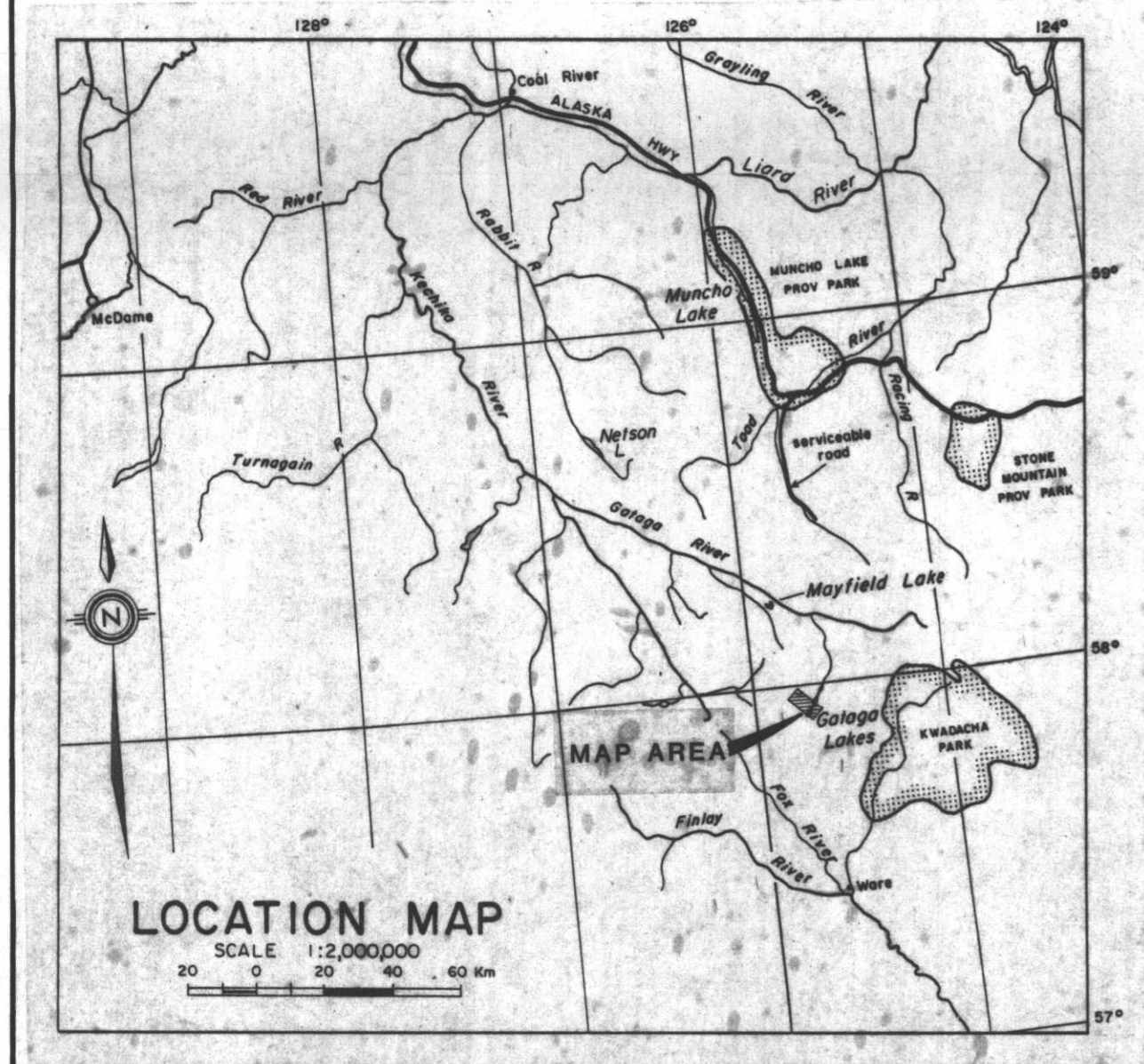
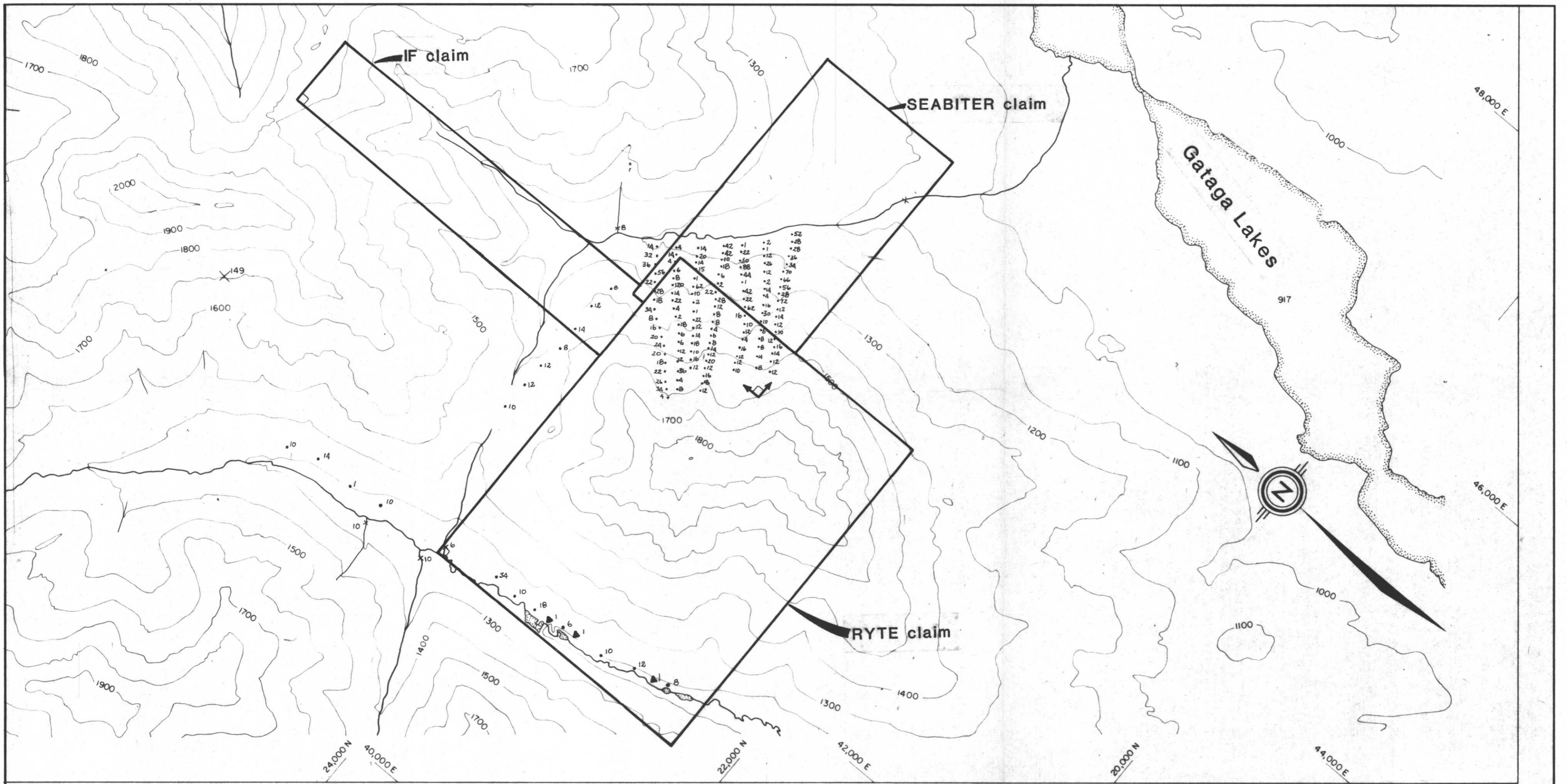
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ASSESSMENT REPORT  
**8537**  
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FIGURE 3  
ARCHER, CATHRO & ASSOCIATES LTD  
**GEOLOGY**  
**IF, SEABITER and RYTE claims**  
**GATAGA JOINT VENTURE**

SCALE 1:20,000



To accompany report dated Dec. 15, 1980



**SYMBOLS**

- soil sample
  - x silt sample
  - ▲ gossan sample
  - legal corner post
- (all values in ppm)

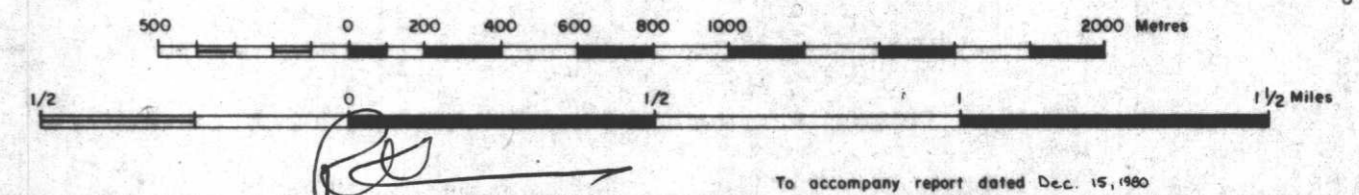
N.B. claims and geologic information were located in the field with the aid of a 1:20,000 scale orthophoto

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ASSESSMENT REPORT  
**8537**  
NO.

FIGURE 4  
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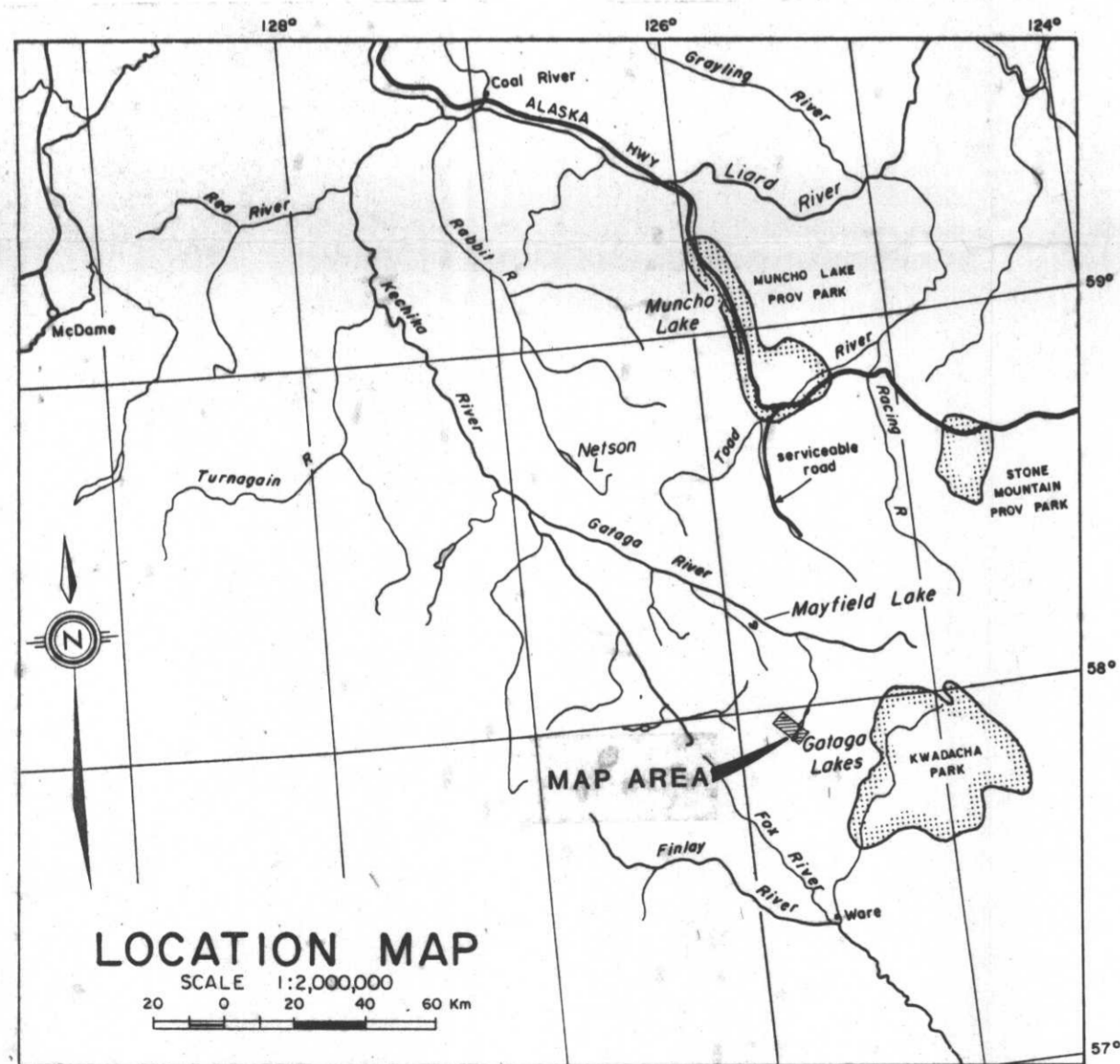
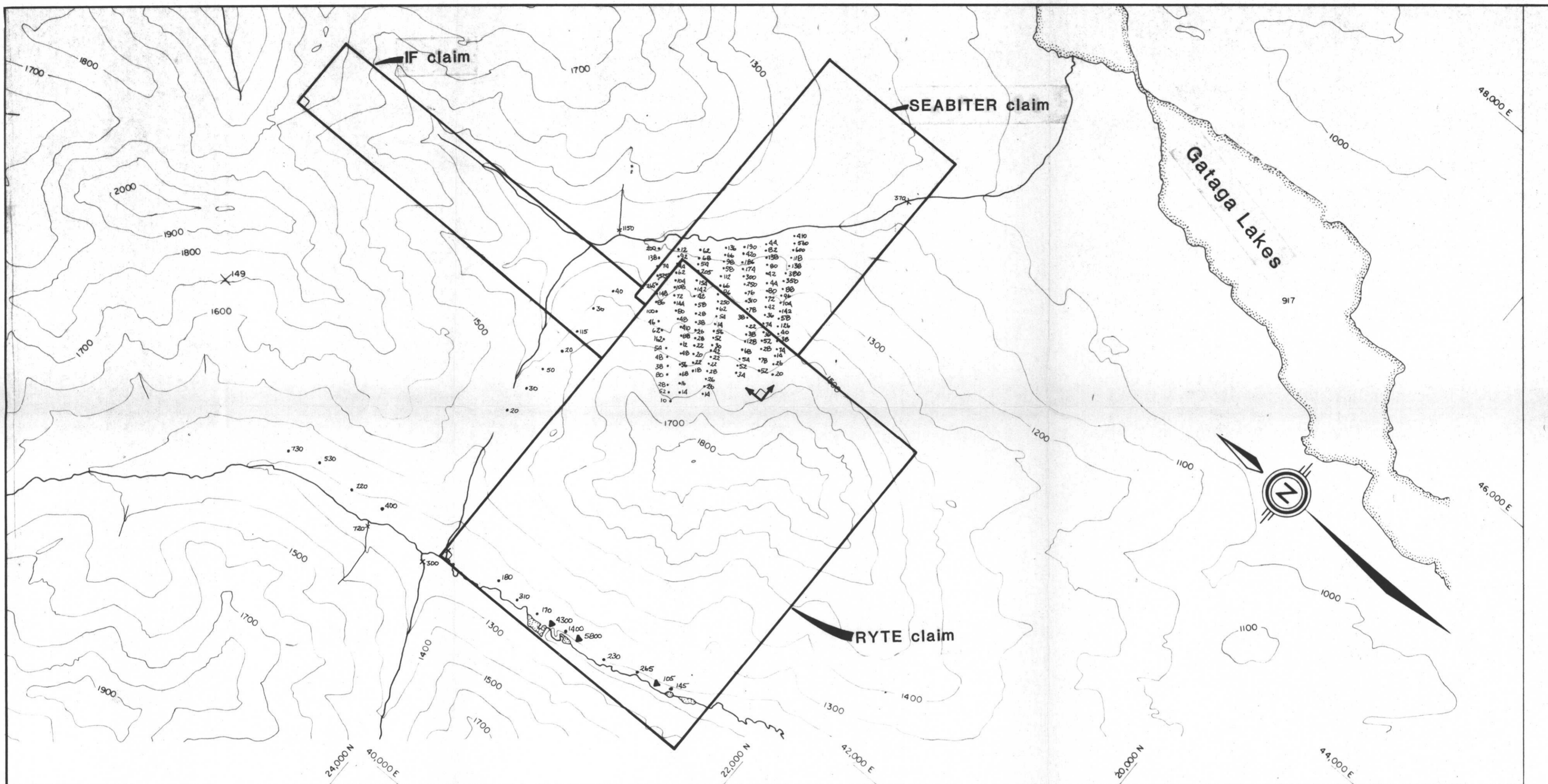
**LEAD GEOCHEMISTRY**  
**IF, SEABITER and RYTE claims**  
**GATAGA JOINT VENTURE**

SCALE 1:20,000



To accompany report dated Dec. 15, 1980





**SYMBOLS**

- soil sample
- x silt sample
- ▲ gossan sample
- legal corner post

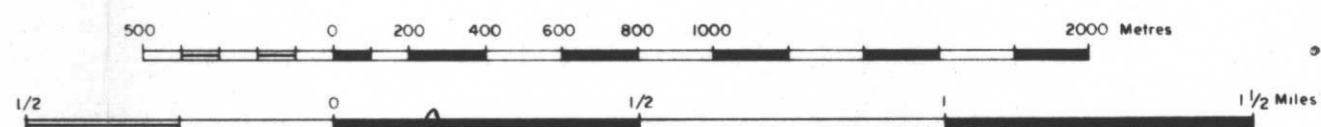
(all values in ppm)

N.B. claims and geologic information were located in the field with the aid of a 1:20,000 scale orthophoto

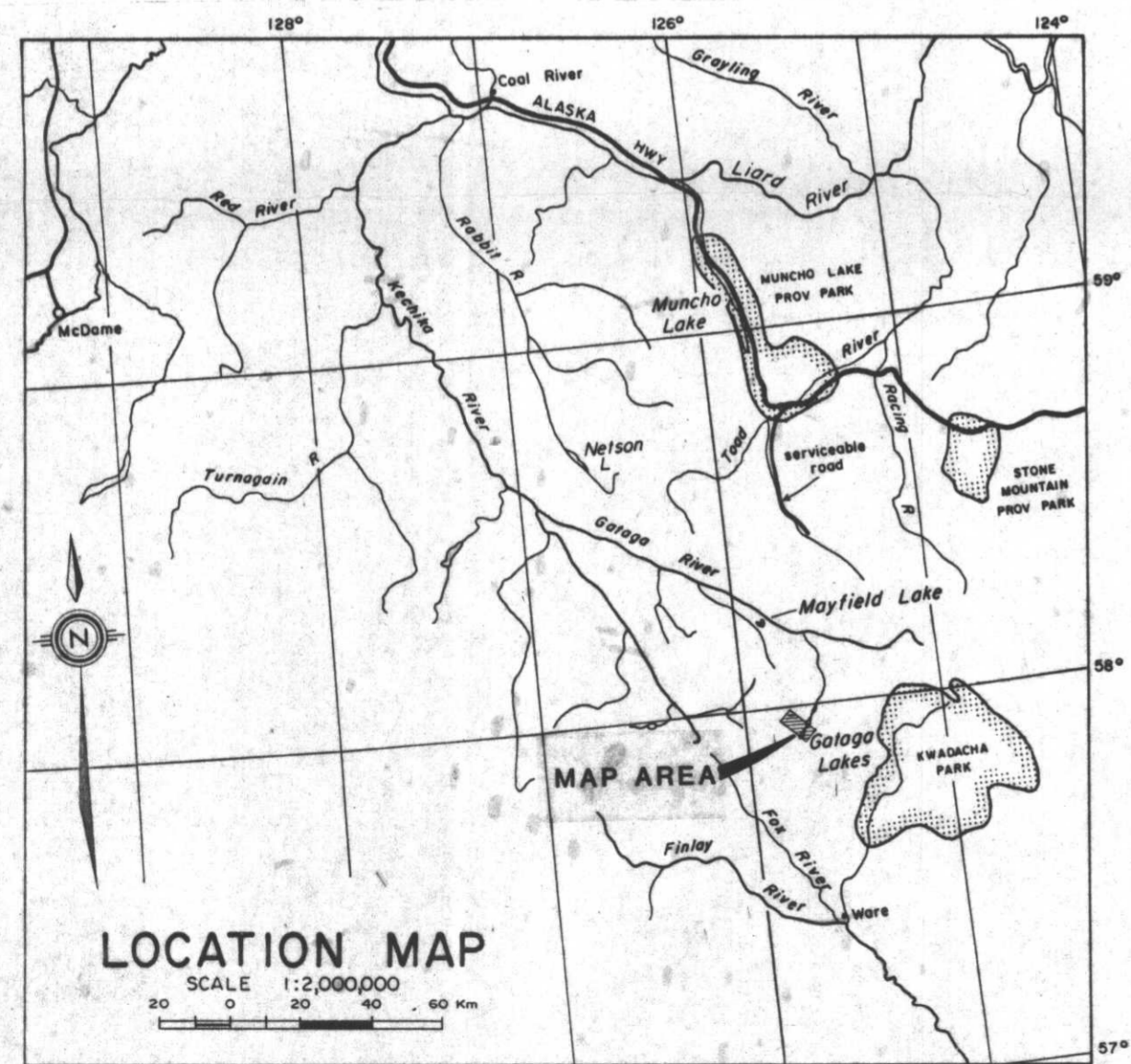
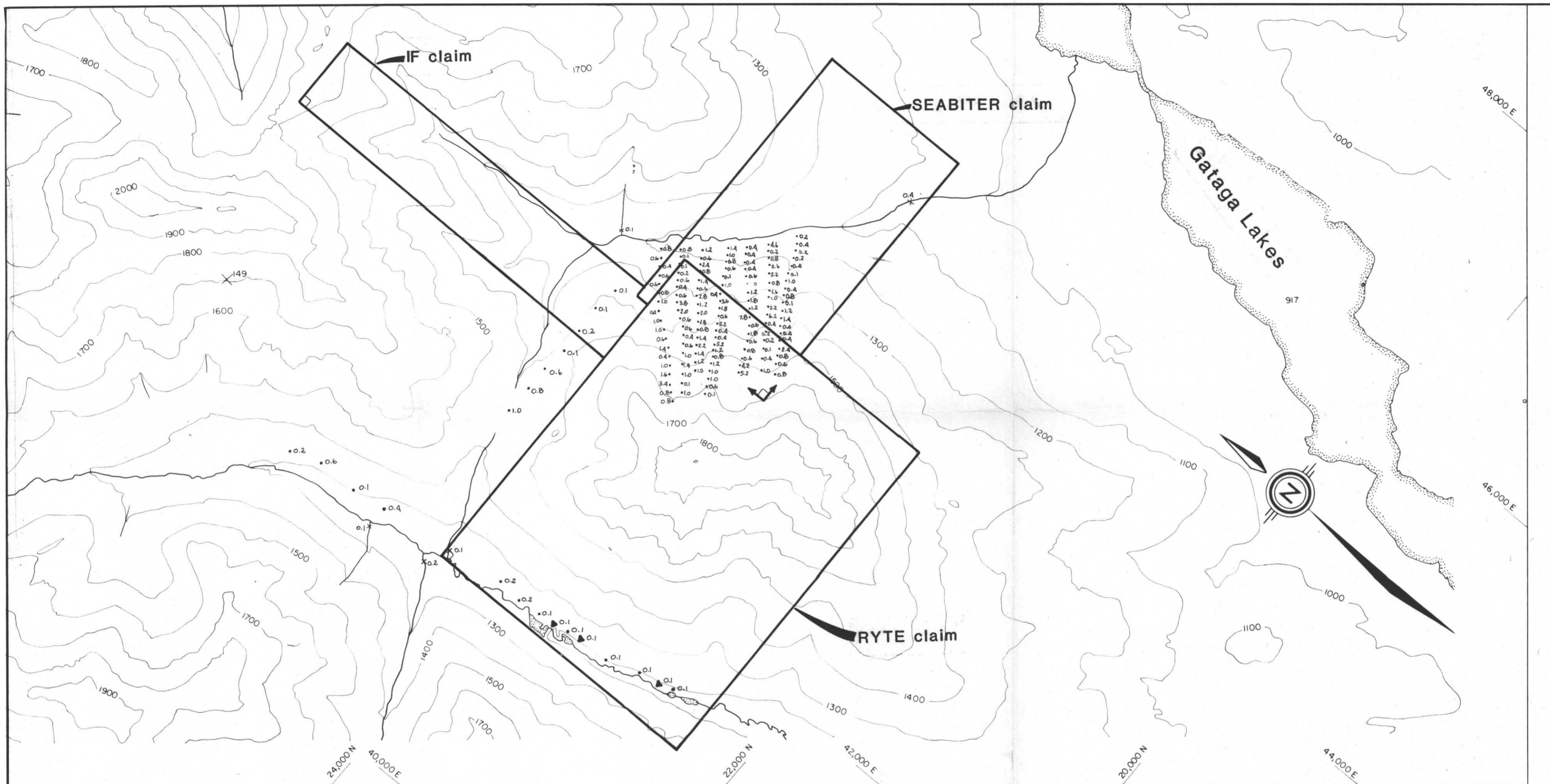
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FIGURE 5  
ARCHER, CATHRO & ASSOCIATES LTD  
**ZINC GEOCHEMISTRY**  
IF, SEABITER and RYTE claims  
GATAGA JOINT VENTURE

SCALE 1:20,000



To accompany report dated Dec. 15, 1980



**SYMBOLS**

- soil sample
  - x silt sample
  - ▲ gossan sample
  - legal corner post
- (all values in ppm)

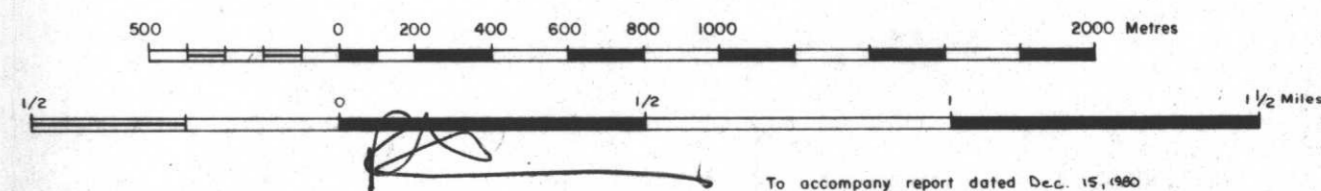
N.B. claims and geologic information were located in the field with the aid of a 1:20,000 scale orthophoto

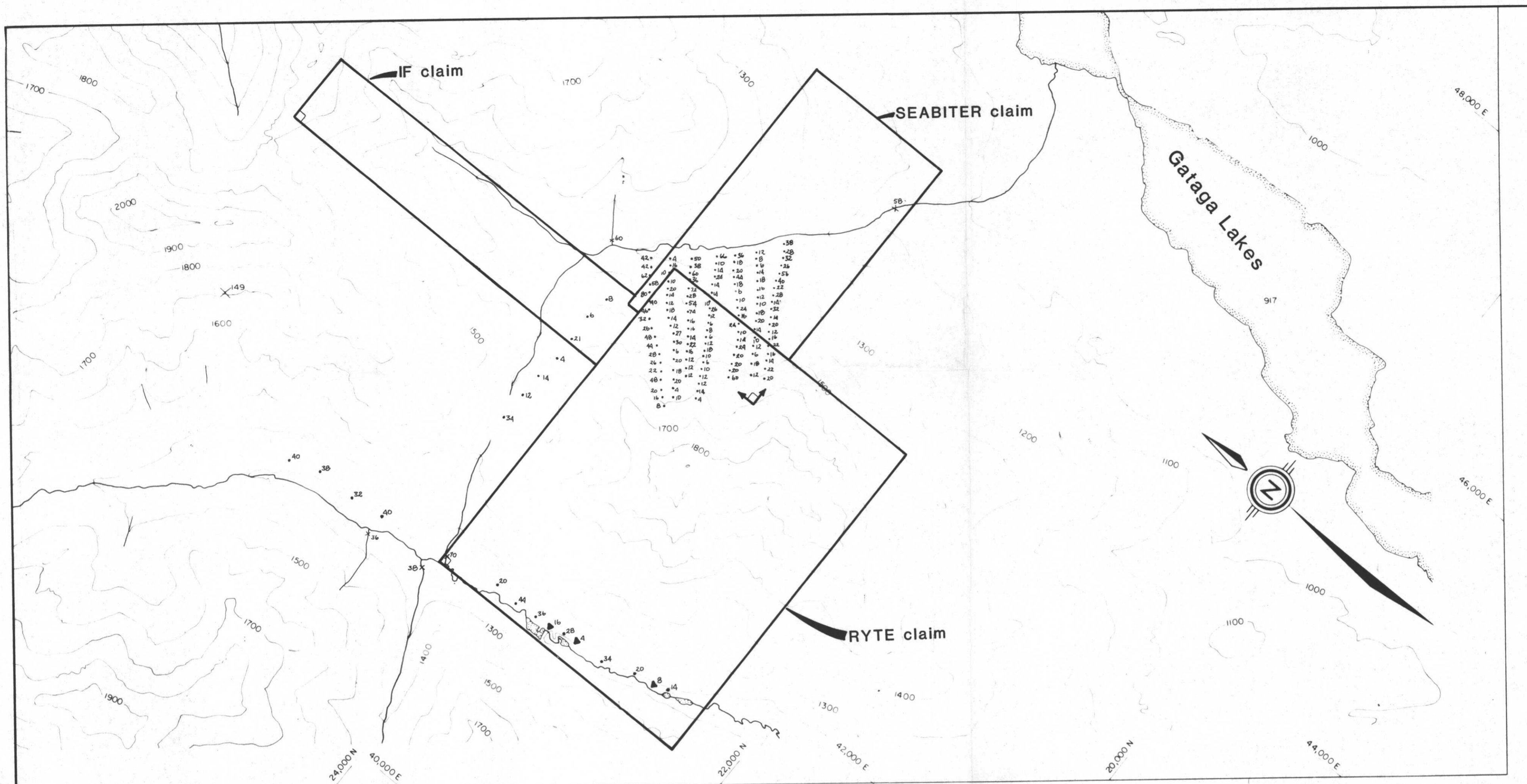
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FIGURE 6  
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**SILVER GEOCHEMISTRY**  
**IF, SEABITER and RYTE claims**  
**GATAGA JOINT VENTURE**

SCALE 1:20,000





**SYMBOLS**

- soil sample
  - x silt sample
  - ▲ gossan sample
  - legal corner post
- (all values in ppm)

N.B. claims and geologic information were located in the field with the aid of a 1:20,000 scale orthophoto

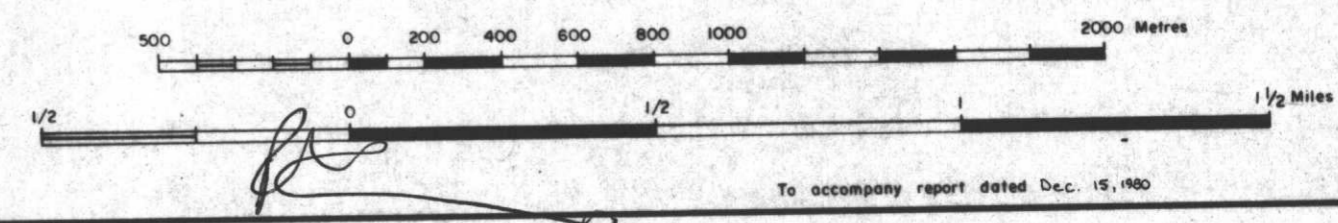
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FIGURE 7

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**COPPER GEOCHEMISTRY**  
**IF, SEABITER and RYTE claims**  
**GATAGA JOINT VENTURE**

SCALE 1:20,000



To accompany report dated Dec. 15, 1980