

Kautokeino
Case History

A/S EDJOM & GRUBER

Statens råstofflaboratorium
Trondheim

2519

Kautokeino.

Metal: Cu, (Zn, and Pb)
Dispersion Type: Secondary, soils and stream sediments.
General Locality: Northern Norway.

Source: P. Padget et.al. (1957) NGU Nr. 201
T. Gjelsvik (1957) NGU Nr. 203
" " (1958) Geol.Føren.Førh. 80.381-406.

Internal reports: Geofysisk Malmleting, Trondheim.
Kautokeino Kobberfelter, Trondheim.
Statens råstofflaboratorium, Trondheim.

A/S BIDJOVAGGE GRUBER

1. Location.

Kautokeino district of Finnmark, Norway.

Lat $69^{\circ}0' - 69^{\circ}30' N$

Long $22 - 23^{\circ}E$

Area covered is about 1000 km^2 of which 5 km^2 is investigated in detail. (App. 1)

2. Physical Features.

a. Topography and drainage.

Pre-Cambrian peneplain 300-600 m above sea level. The peneplain is dissected by streams running in broad valleys. Occasional mountains rise above the general level of the plain.

Drainage is occasionally good, but usually poor with extensive areas of bog.

b. Climate

Yearly rainfall 310 mm varying monthly from 7 to 64mm.

Mean temperature range - $2,6^{\circ}C$. Extremes jan. - $14,5^{\circ}C$, july + $13,0^{\circ}C$. There is no regional permafrost.

c. Vegetation.

Different mountain-birches, moss, grass, heather, etc. Rich vegetation, for this latitude and altitude.

3. Geology. (App. 2)

a. Geological setting.

Pre-Cambrian greenschists and greenstones (originally flows, pyroclastics and intrusives) striking N-S, are to the north covered by the overthrust Caledonides.

b. Cu-mineralization of possible economical interest.

1. Chalcopyrite, pyrite, and pyrrhotite mineralization in breccias and contact zones.

4. Weathering and Overburden.

Very little visible weathering of bedrock. Two known Cu-deposits give rust colour to the glacial till near the outcrops.

Overburden consists mainly of glacial till and partly of fluvial deposits. Thickness of cover varies generally from 2 to 10 m.

Fluvo-glacial deposits of up to 100 m depth have been measured.

Exposures of bedrock are not uncommon, but zones of ore-mineralization seldom outcrop.

5. Geochemical Dispersion Pattern.

I. Soils

C-horizon, -80 mesh (App. 3)

a. Background concentration is 0-25 ppm Cu.

b. Magnitude of anomalies are 50-5000 ppm Cu.

The anomalies have mostly an irregular form and are difficult to interpret.

Humus. (App. 4)

a. Background concentration: 0-1ml 0,03% Dithizone.

Magnitude of anomalies are 3-15 ml 0,03% Dithizone.

Anomalies are irregular and nonconclusive.

Special Features.

1. In the area strike of bedrock, glacial movement, and drainage system are all parallel. This makes interpretation of the anomaly pattern difficult.
2. The origin and composition of the soil vary within the sampled area, mostly podzol profile in the soil.
3. There is no soil contamination.

Sediments (-80 mesh fractions)

a. Background concentrations

Holman test (App. 5 and 6)

Low background: less than 1 ppm Cu

High " : 1 - 5 ppm Cu

Bloom test (App. 7)

Low background: less than 1 ppm as Zn

High " : 1 - 5 ppm as Zn

b. Magnitude and form of anomalies.

Holman test 11-100 ppm Cu

Bloom test 11-50 ppm as Zn

1. On two known deposits the Holman test in each case gives persistent high, values for more than 20 sample sites. In the first case the high values persist for about 3 km and are followed by 3 km decreasing concentration down stream.

In the second case a stream with high concentration empties into a lake.

2. The Bloom test gives a similar, but more irregular pattern.
3. In less known areas various types of anomalies are obtained. These may range from a few high values in one stream up to higher than background concentrations in several streams over a large area.

c. Special features.

1. The quaternary geology, which in this area is presumably a dominating geochemical factor, is not yet known in detail.
2. The size of the streams has not yet been taken into account, but is assumed to be of importance. Seepages tend to give high Cu-values.
3. Varying composition and origin of sediment samples (organic/inorganic, coarse/fine, under/above water) seem to have no significant disturbing influence on the anomaly pattern.
4. Stream contamination is not likely.

6. Field Technique.

a. Sampling

C-horizon soil samples were collected from 50 cm - deep holes dug with a spade, and packed in paper bags. Distance between holes 25 m along profiles 100 m apart.

Humus was sampled with a small gardeners trowel.

Stream sediments were collected systematically along all streams.

The interval between sampling sites generally was 250 m (1958 : 100 m). Seepages were also sampled.

Two samples were taken - one from each side of the stream at each site.

The samples were packed in paper bags.

b. Treatment of samples.

The samples (except humus samples, which were analyzed in the field) were dried in air current of about 80°C, and sieved through 80 mesh sieve of stainless steel.

c. Analytical methods.

Sub.-soil: Crowe test (USGS Open file report sept. 1953) using
HNO₃ - digestion.

Humus: Bloom test, field procedure (Econ.Geol. 1956, 533-41)

Stream Sediments: Holman test, lab. method (Bull. Inst. Min.
Met. 1956, 7-16.)

Bloom test (Econ.Geol. 1956)

7. Organization of Field Work and Intergration with Other Methods.

a. General

During 1953-59 the area has been intensively explored by the following reconnaissance methods:

Geology

Airborne measurements (Magnetic, electromagnetic)

Boulder hunting

Stream sediment geochemistry.

Parts of the area have been covered by follow up and detail work:

Geology (Bedrock and quaternary deposits)

Ground geophysics (Electromagnetic, magnetic, self potential, seismic, surveys).

Geochemistry (Soil analysis and tentative plant mapping (Viscaria Alpina)).

Drilling, trenching, blasting.

b. Aim of Geochemical work.

1. To try out soil methods on known deposits in order to investigate the possibility of using geochemistry as an aid in the search for favourable sites for drilling along geophysical anomalies.

The Geophysical anomalies are caused by layers of graphite shale.

2. To try out stream sediment methods in areas of known mineralization, and, subsequently, as promising results were obtained, to prospect for new deposits in the favourable greenstone formation.

c. Organization of geochemical work.

Introductory sampling and analysis for testing methods were mainly done as part time work by the staff engaged in drillcore - analysis.

The stream sediment work during 1959 was done by a 14 person team consisting of:

Administration and sampling 1 man

Sampling 9 men (University students and teenage helpers).

Lab, work and map drawing 4 girls (2 chemists and 2 untrained).

The work was directed from a barrack as head quarters where also laboratory and drafting were carried out.

Sampling pairs went out on 1-2 week tent expeditions carrying proviant, etc. out and samples back to head quarters.

d. Operation statistics 1959 (Stream sediments, Holman test)

Covered area 870 km²

Number of samples 9850

Aproximately costs pr. km²:

Sampling and transportation	kr. 32, -
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Paper bags	kr. 2, -
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Lab. work, map drawing	kr. 20, -
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Administration and consultants	<u>kr. 11, -</u>
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Sum	N kr. 65, - pr. km ²
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8. Results of Application.

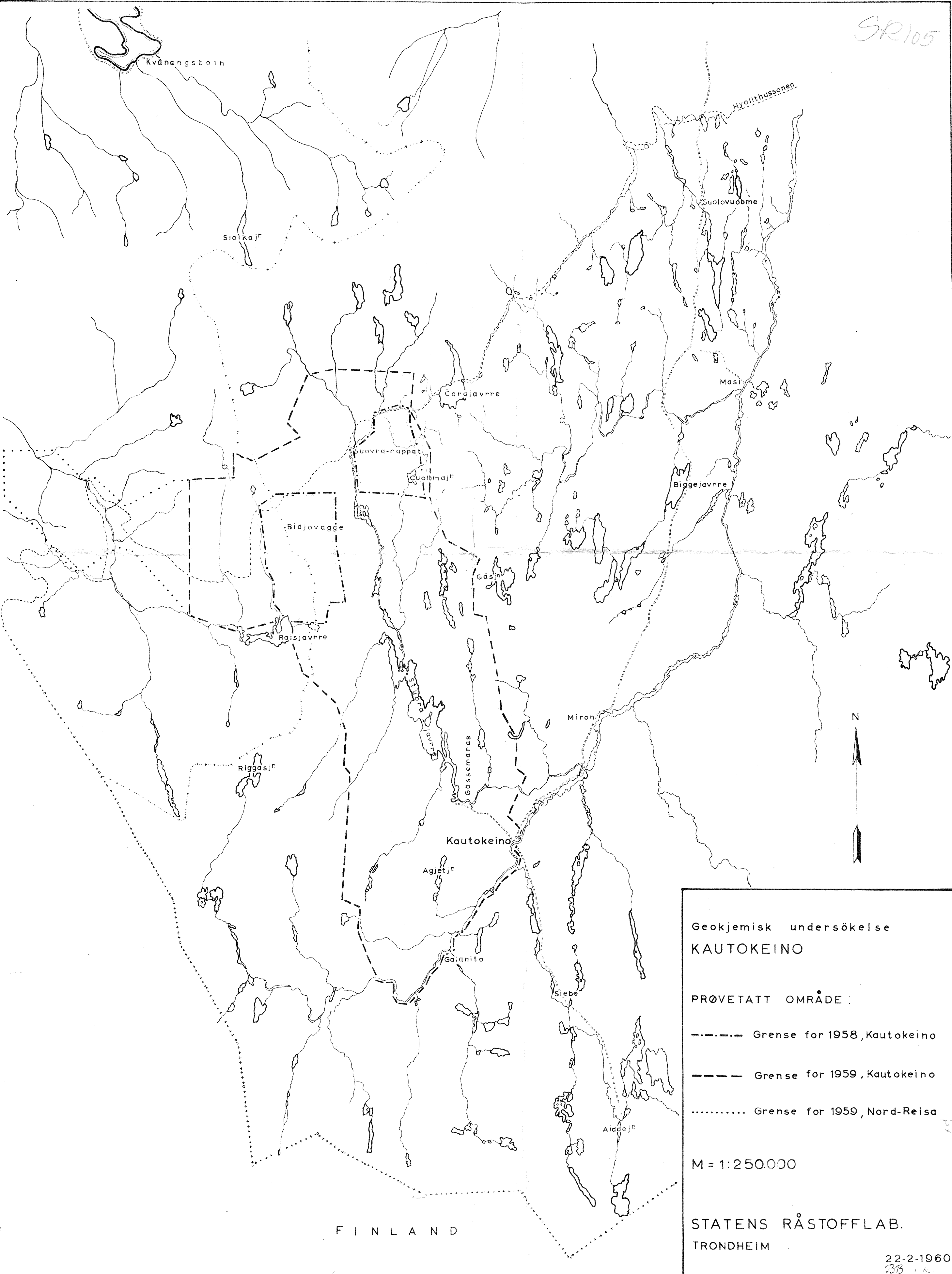
1. Bloom test on humus seems not to be recommendable in the area investigated.
 2. Cu-analysis of sub-soil gave inconclusive anomalies which add very little to the information obtained by geophysical measurements.
 3. The occurrence of Viscaria Alpina appears in a general way to have some correlation with sulfide mineralization. No correlation in detail has however been possible. (App. 8)
 4. ~~Experimental stream sediment work in areas of known Cu-mineralization~~ disclosed evident anomalies with Holman test and to a less extent with Bloom test.
 5. Prospecting in less known areas using stream sediment analysis resulted in several anomalies. The anomalies are generally in agreement with boulder work results.
- Other methods, in particular quarternary geology is thought to be of vital importance for the interpretation of stream sediment results.

Statens råstofflaboratorium

Trondheim March 19th 1960.

Bjørn Bølviken
Bjørn Bølviken.

SR105



F I N L A N D

Geokjemisk undersökelse
KAUTOKEINO

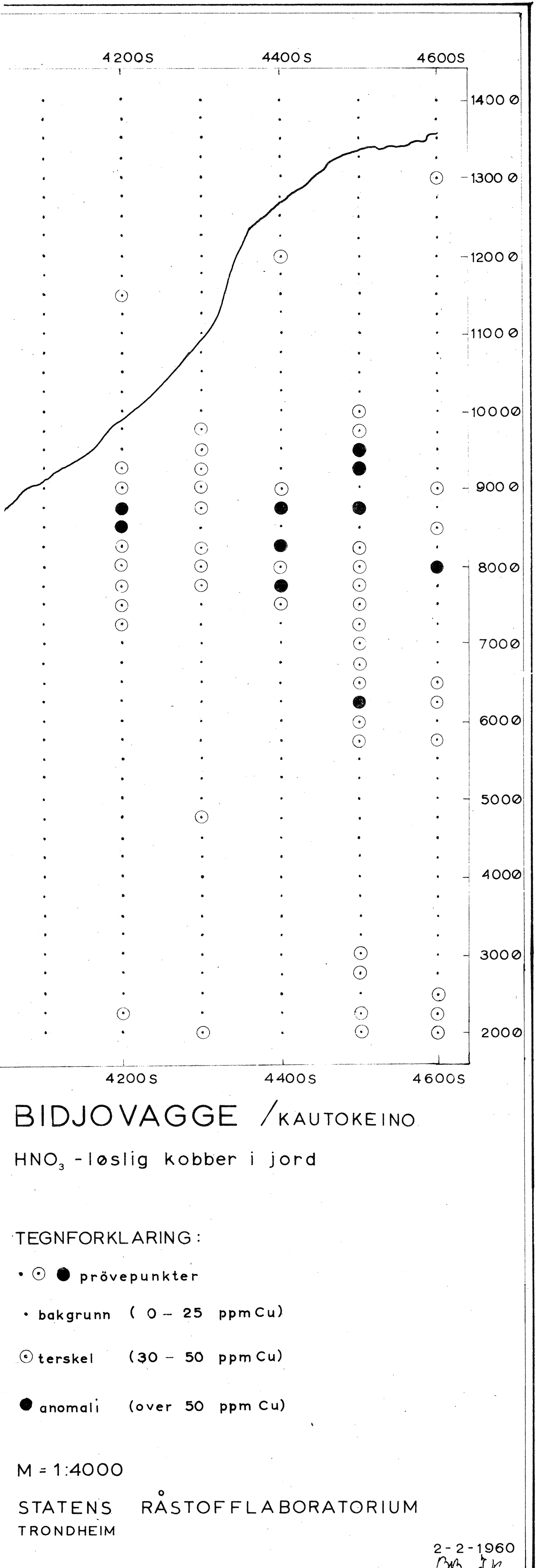
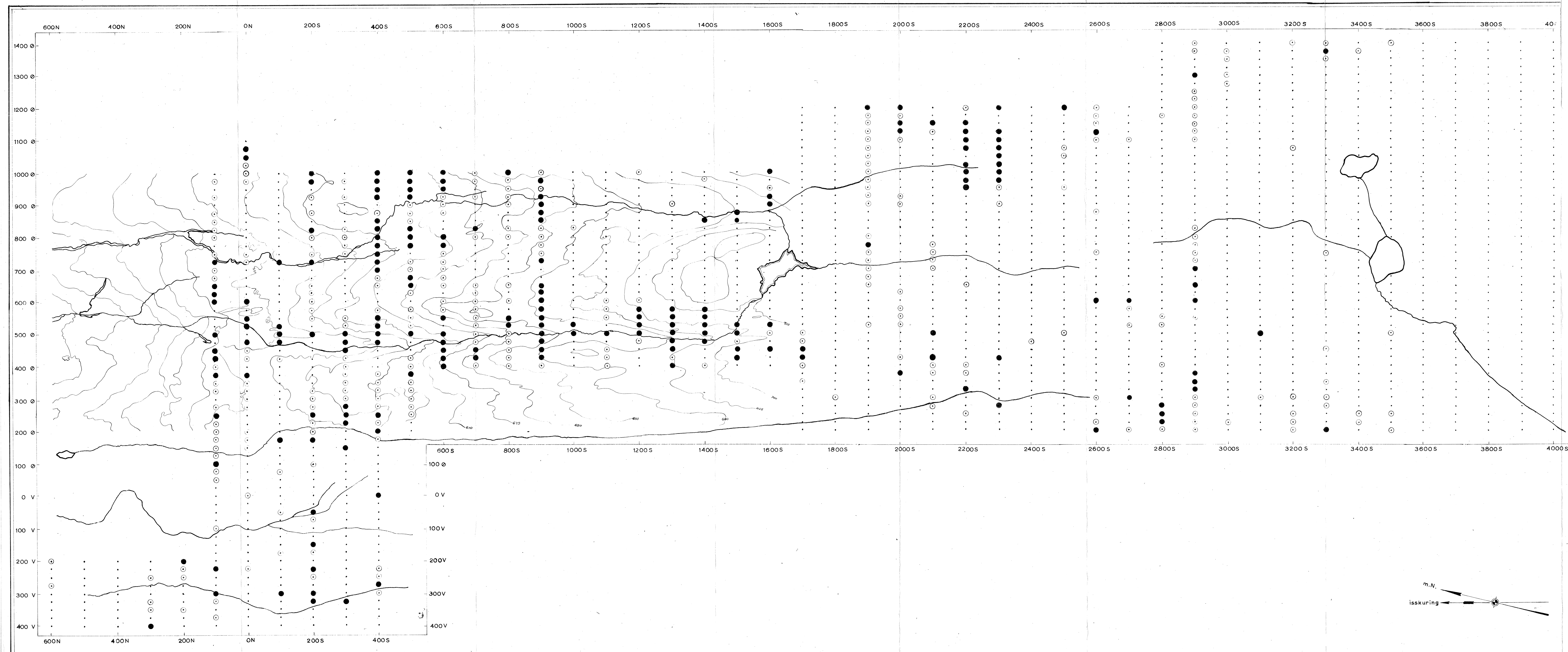
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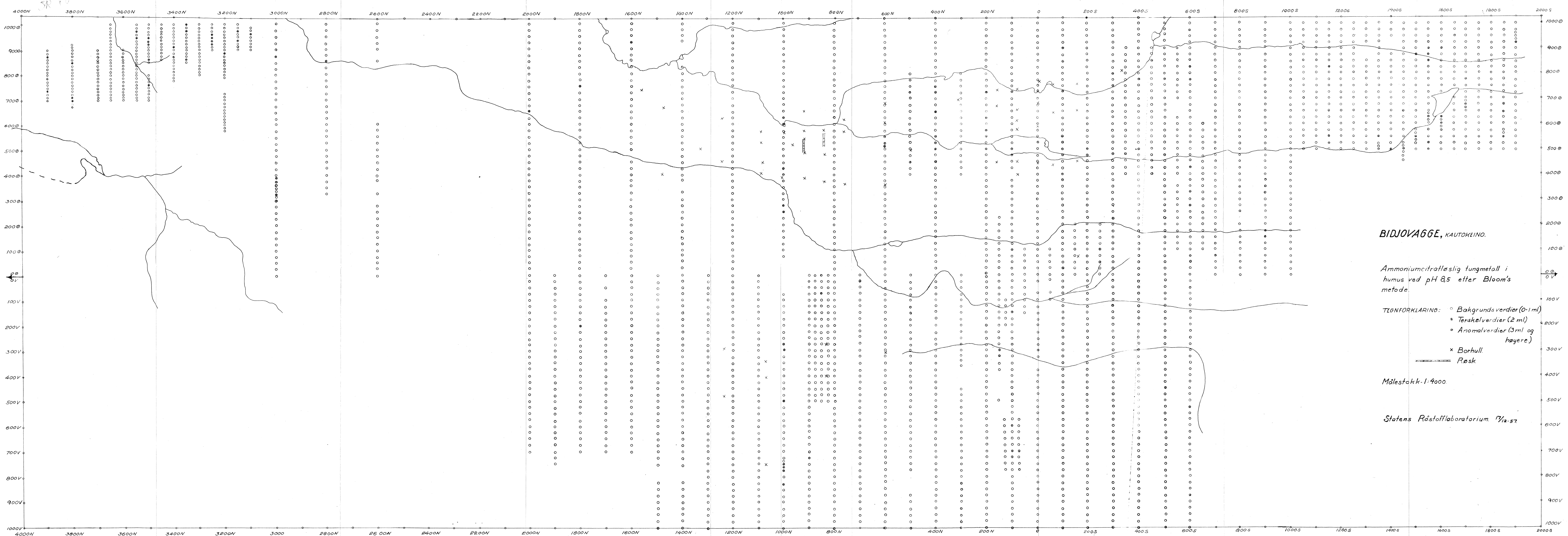
- Grense for 1958, Kautokeino
- Grense for 1959, Kautokeino
- Grense for 1959, Nord-Reisa

M = 1:250.000

STATENS RÅSTOFFLAB.
TRONDHEIM

22-2-1960
33. 1. 12





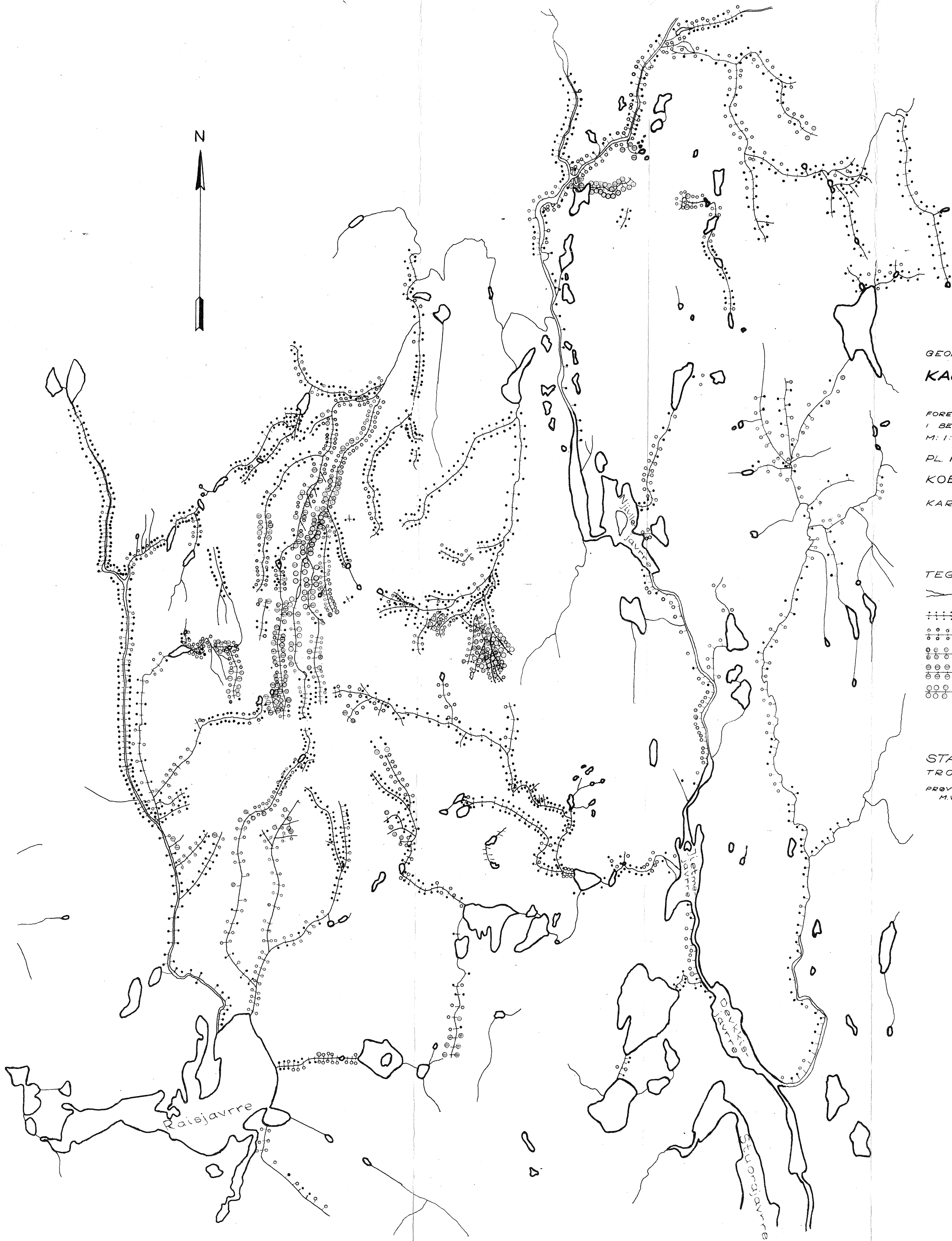
BIDJOVAGGE, KAUTOKEINO.

Ammoniumcitrat-løslig tungmetall i
humus ved pH 8,5 etter Bloom's
metode.

- TEGNFORKLARING:
- Bakgrundsverdier (0-1 ml)
 - * Terskelverdier (2 ml)
 - ⊗ Anomalverdier (3 ml og høyere)
 - x Borhull.
 - Røsk.

Målestokk 1:4000

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GEOKJEMISKE UNDERSØKELSER I
KAUTOKEINO

FORELØBIG KART OVER SPORELEMENTER
I BEKKESEDIMENTER
M: 1:50000

PL. I

KOBBER, lettleslig (Holmans prøve)

KARTGRUNNLAG: Gradteigskart 1:50000
T6 Nabor
T7 Kautokeino
Flybilder (Widerøes oppgave 630 og 608)

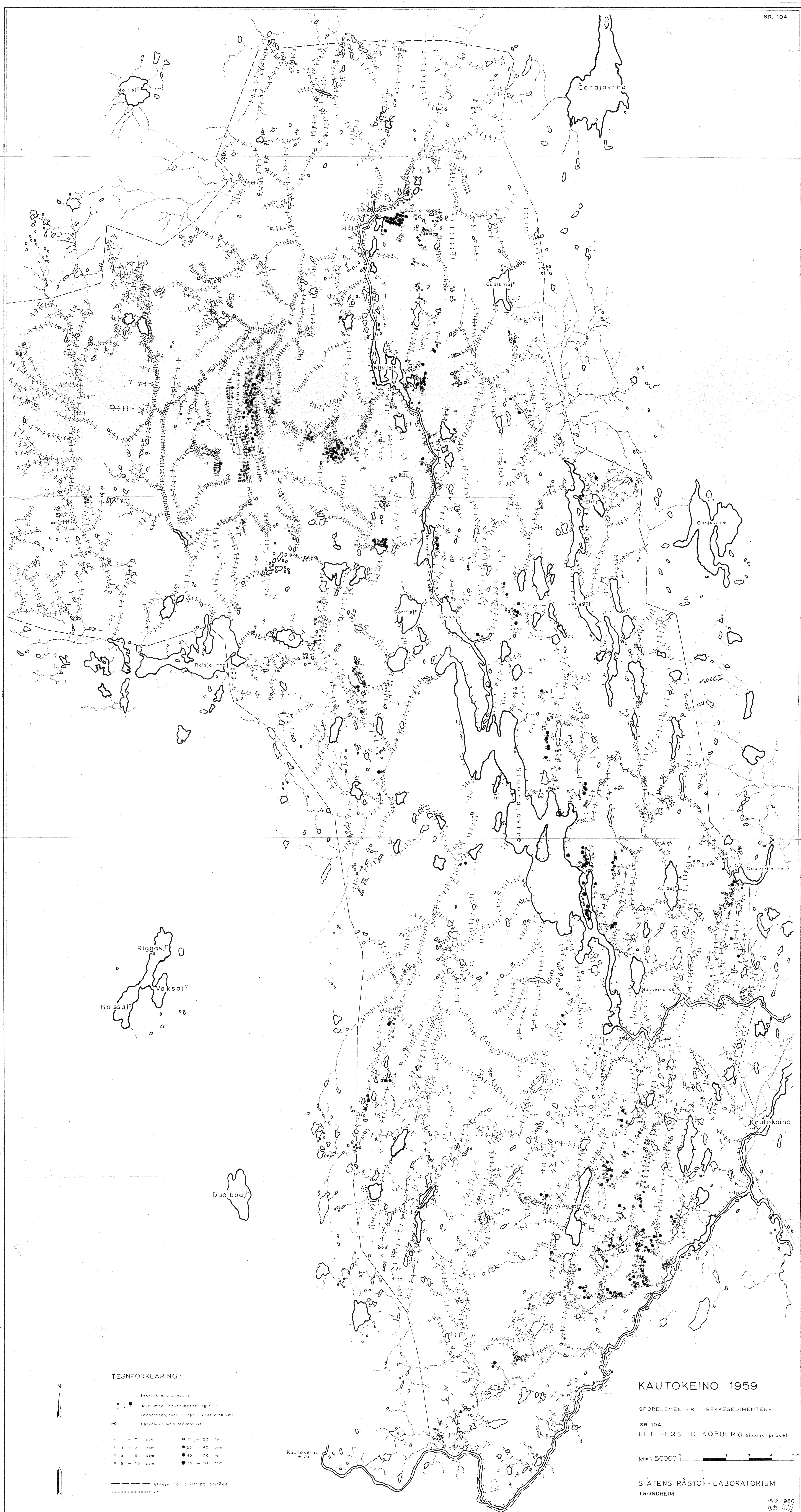
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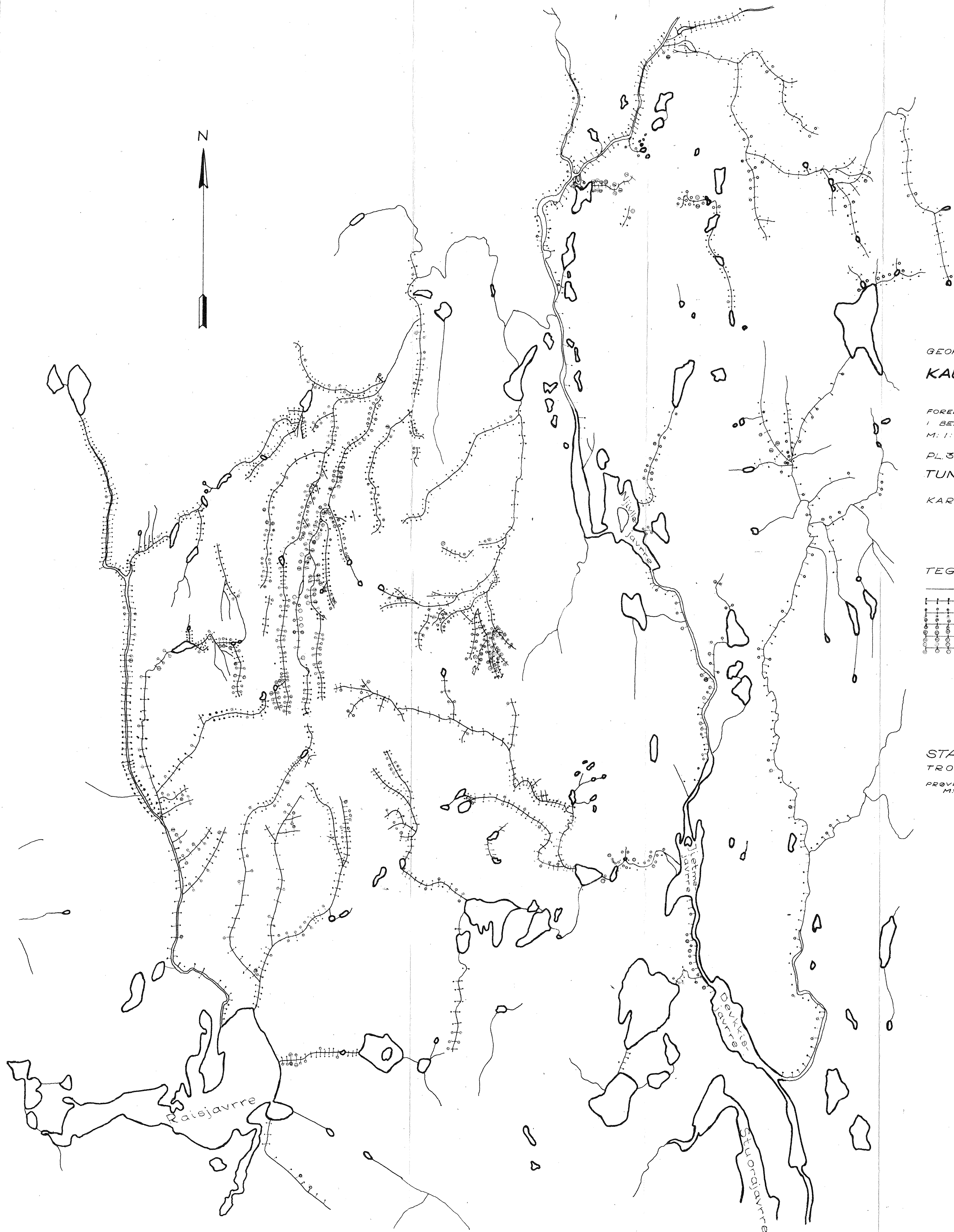
— Bekk, ikke prøvetatt

+++++	Lav bakgrunn 0	ppm	(vekt/volum)
○○○○○	Høy bakgrunn 0-5	—	—
⊙⊙⊙⊙	Terskel 6-9	—	—
⊕⊕⊕⊕	Svak anomali 10-17	—	—
⊗⊗⊗⊗	Sterk anomali 20-	—	—

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PRØVETATT	ANAL.	TEGN.	TRAC.	KFR.	DATO
M.V.	UC.	BB,EA.	EA.	BB.	7-2-59





GEOKJEMISKE UNDERSØKELSER I

KAUTOKEINO

FORELØBIG KART OVER SPORELEMENTER
I BEKKESEDIMENTER
M: 1:50000

PL 3

TUNGMETALLER, lettleslige (Blooms prøve)

KARTGRUNNLAG: Gradteigskart 1:50000
T6 Nabor
T7 Kautokeino
Flybilder (Widerøe oppgave 630 og 808)

TEGNFORKLARING:

—	Bekk, ikke prøvetatt		
++++	Lav bakgrunn	0 ppm (vekt/volum)	
	Høy bakgrunn	2 og 5	
	Terskel	7	
	Svak anomali	10-17	
	Stærk anomali	20-	

STATENS RÅSTOFFLABORATORIUM
TRONDHEIM

PRØVETATT	ANAL.	TEGN.	TRAC.	KFR.	DATO
MV.	UO.	BB, EA	EA	BB	7-2-59

