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Geological Survey

LAKE SEDIMENT AND WATER SURVEY FOR COPPER, NICKEL AND PLATINUM GROUP ELEMENTS ACROSS THE OSSOK MOUNTAIN INTRUSIVE SUITE, WESTERN LABRADOR

J.W. McConnell

Open File LAB/1397

St. John's, Newfoundland
June, 2005

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Cover photo: Photograph of the helicopter approaching sample site during lake survey of Ossok Mountain Intrusive Suite.

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(PARTS OF NTS 23A, G and H)

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ABSTRACT

During 2002, a helicopter-borne, high-density lake-sediment and water survey was conducted in western Labrador over portions of NTS map areas 23A, 23G and 23H. The region was selected to examine its potential to host Cu–Ni, PGE and Au mineralization. Sampling was preferentially directed to lakes underlain by the Ossok Mountain intrusive suite, which consists of metamorphosed and deformed gabbronorite and lesser amounts of norite, gabbro, and olivine gabbronorite and norite. Areas underlain by two other groups of mafic rocks, the Shabogamo Gabbro and the Beaver Gneiss were also included in the survey. Samples were collected from 509 sites at a sample density of one per 4.4 km^2. Some exploration has been done in the region and six occurrences of copper ± nickel mineralization and six of pyrite have been identified previously. The area has been glaciated and till is the most widespread glacial sediment. The prevailing iceflow direction was toward the southeast.

Samples of lake sediment were analysed for 48 unique elements plus loss-on-ignition. Lake water was analysed for conductivity, pH, SO_4 and 25 elements. Summary statistics, correlation analysis and histograms were calculated to aid in data interpretation. Twenty-three symbol maps of significant elements and variables are presented. These maps indicate several anomalous sites for Au, PGE, Cu and Ni. Some are associated with areas of known mineralization but most are not.

INTRODUCTION

A lake-sediment and water survey was conducted over areas underlain by units of the Ossok Mountain intrusive suite (OMIS, 1850 km^2) in NTS map areas 23A/13, 14 and 15, 23G/01 and 08 and 23H/01-08 (Figure 1). In addition, areas of mafic rocks represented by the Shabogamo Gabbro (300 km^2) and Beaver Gneiss (65 km^2) which underlie minor portions of the survey area were also sampled. The area was selected for its Ni–Cu–Co–platinum group elements (PGE) potential. A previous reconnaissance geochemical survey indicated elevated levels of Cu and Ni but PGE were not analysed (Friske *et al.*, 1993a, b). This survey fills in a geologically important area with a considerably higher sample density and a larger suite of analyses than is available with the reconnaissance survey data.

This report provides summary statistics of the geochemical data, correlation analyses of selected sediment and water data, histograms, sample location map and symbol maps showing the distribution of several elements and variables in the sediment and water. Sample listings with their UTM coordinates and selected field and analytical data are included in the appendix. Full data listings are available as digital files on CD and included with this publication.

LOCATION, ACCESS AND PHYSIOGRAPHY

The survey area is located in western Labrador and includes parts of NTS map areas 23A/13, 14 and 15, 23G/01 and 08 and 23H/01, 02, 03, 04, 05, 06, 07 and 08. The Labrador City–Churchill Falls part of the Trans-Labrador highway transects the survey area. Private roads related to the drainage diversion structures provide additional access. Float plane service is available from Labrador City/Wabush. The western boundary of the survey is about 60 km east of Labrador City/Wabush and the eastern boundary extends to within a few kilometres of the town of Churchill Falls. The area is one of variable relief having a mix of low, boggy sections, considerable sections of moderate relief and some rugged zones, probably controlled by bedrock. The area is forested and has numerous ponds and lakes.

PREVIOUS GEOCHEMICAL SURVEYS

The area was included in the Labrador reconnaissance scale surveys (Friske *et al.*, 1993a, b). These low-density lake surveys (1 sample per 14 km^2) were conducted in 1979, 1982 and 1984. Sediment analyses include 41 elements (but no PGE's), and U, F and pH analyses of water. Elevated levels of Cu and Ni were noted over much of the mafic terrane.

The only Labrador lake-sediment survey for PGE was done in the Wilson Lake and Pants Lake area (McConnell, 2002). Results of this study showed high PGE values in sediment that were spatially associated with known occurrences of sulphide/PGE mineralization at Pants Lake.

GEOLOGY AND MINERALIZATION

Most of the surveyed area lies within the Lac Joseph terrane (Rivers and Chown, 1986). The most easterly portion is underlain by the Churchill Falls terrane (Connelly and Nunn, 1988, Nunn,

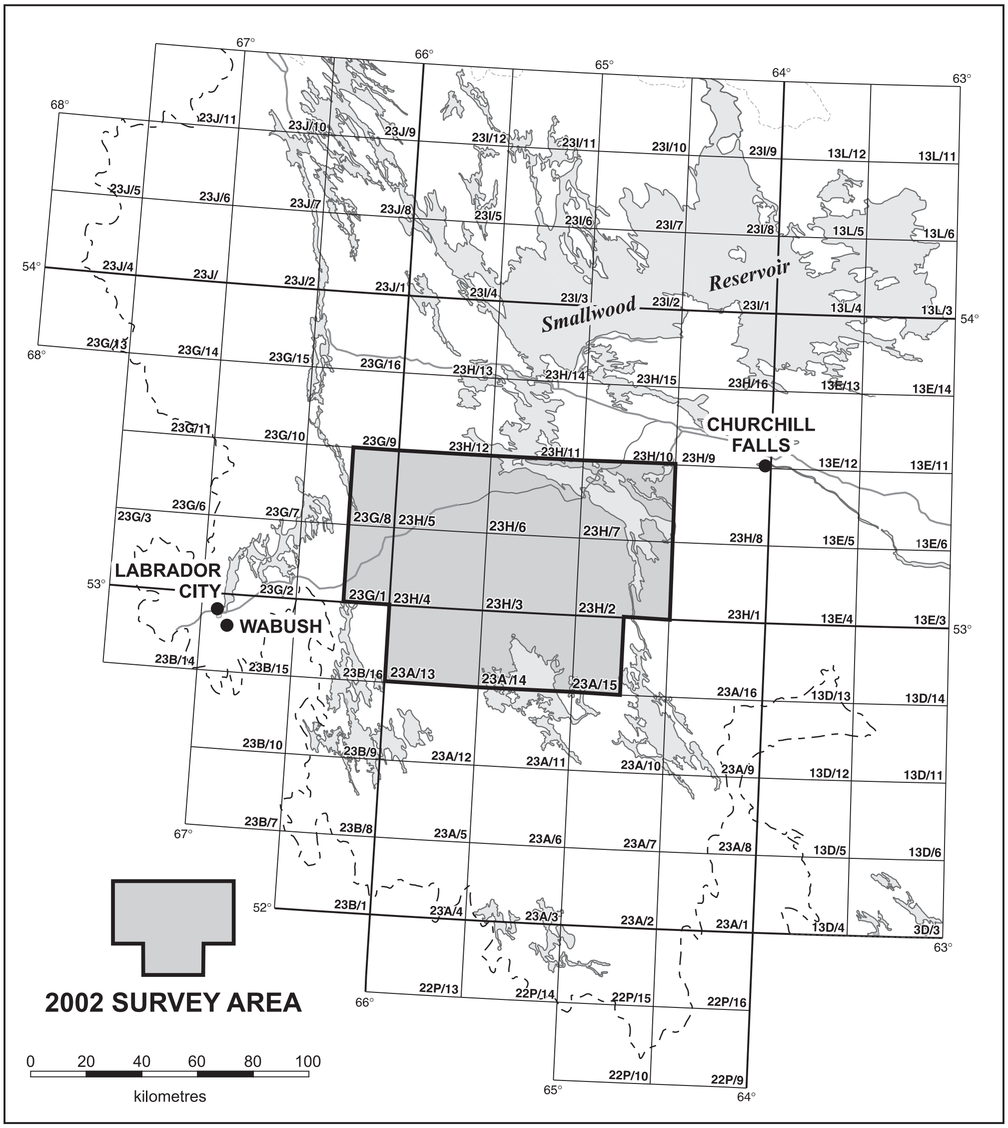

Figure 1. *Location of PGE-base metals lake sediment/water survey in western Labrador.*

1990). James (1994) describes the Lac Joseph terrane in this area as consisting predominantly of amphibolite- to granulite-facies paragneiss, mafic intrusive rocks and variably deformed granitic rocks of several ages. High-grade metamorphism and deformation resulted from the Labradorian Orogeny (ca. 1660 to 1600 Ma). Unlike the Lac Joseph terrane, which escaped the most severe metamorphic effects of the Grenvillian Orogeny (ca. 1000 Ma), the Churchill Falls terrane underwent high-grade metamorphism and deformation during this period.

Areas underlain by three groups of mafic rocks were sampled during this survey. The oldest and aerially most restricted is a Lower Proterozoic mafic supracrustal gneiss possibly derived from a mafic volcanic protolith. James (1994) tentatively correlates this unit with the Beaver Gneiss found in the Goose Bay area. The principal group of rocks surveyed were those belonging to the Labradorian Ossok Mountain intrusive suite, which consists principally of metamorphosed and deformed gabbronorite, and lesser amounts of norite, gabbro, and olivine gabbronorite and norite (James, 1994). The third group of rocks is the ca. 1450 Ma Shabogamo Gabbro (Connelly and Heaman, 1993, and James, 1994). In the survey area, rocks of this group occur principally in NTS map areas 23H/5, 6 and 7. They often show cumulate layering and consist mostly of olivine gabbro, gabbronorite and minor occurrences of troctolite.

There are 12 sulphide occurrences known in the area (Geological Survey of Newfoundland and Labrador, 2005) including six of pyrite and six of copper ± nickel. The Wynne showing in NTS map area 23A/14 is the most noteworthy and in addition to copper includes associated nickel, cobalt, chromium and silver. It is hosted by an ultramafic unit of the Ossok Mountain intrusive suite.

SURFICIAL GEOLOGY

The most recent surficial mapping in the area is contained in two publications. All of the area is covered at 1:1 000 000 scale (Klassen *et al.*, 1992) and most of the area is mapped at 1:250 000 scale (Klassen and Paradis, 1990). The 1992 map shows most of the area classified as "till" and consisting predominately of poorly sorted diamicton. Lesser areas of ribbed moraine and esker deposits complete most of the remaining surficial coverage. One consistent direction of glacial flow is apparent from north-west to south-east as expressed in striae, esker development and other flow indicators. The more detailed mapping indicates that most of the till is 1 to 5 m thick and that there are numerous areas of till veneer that are less than 1 m thick. The 1:250 000 scale mapping also outlines areas of organic deposits not shown on the more generalized map.

SAMPLE COLLECTION

Samples of organic lake sediment and lake water were collected from 509 sites and about one site in 20 was sampled in duplicate; the samples were collected about 50 m apart. Generally, smaller lakes were sampled in this survey than was the case for the reconnaissance survey, in which the objective had been to obtain a more regional geochemical perspective. Normally, the centre of the lake (or if apparent from the air, the central basinal portion of the lake) was sampled. On some deep lakes (>25 m), no sample was retrieved in lake centres and a sample from a shallower site closer to shore was obtained. The collection procedure involves landing a float-equipped 206-B Jet Ranger helicopter on the lake surface and dropping a weighted tubular sampler fitted with a nylon rope for retrieval. A butterfly valve in the bottom of the tube opens upon impact with the sediment and closes upon retrieval, trapping the contained sediment. Samples are stored in water-resistant Kraft paper bags. Markings on the rope permit determination of the sample depth. Other observations made during sampling include GPS coordinates of the site, the nature of vegetation surrounding the lake, sediment colour, texture and composition and water colour.

Samples of lake water were collected before the sediment sampler was dropped to avoid water contamination. Samples were collected in purified, 125 mL Nalgene bottles. These were filled by immersing the bottles about 40 cm below the lake surface. Prior to sampling, the bottles were acid leached in the laboratory, and washed with distilled and deionized water. Sampling of a typical site took about one minute between touchdown and takeoff.

SAMPLE PREPARATION AND ANALYSES

Preparation

Lake sediments were partially air-dried in the field prior to shipping to the departmental laboratory for final oven-drying at 40°C. The samples were then disaggregated using a mortar and pestle before being screened through a 180 micron stainless steel sieve. The fine fraction was retained for chemical analyses. To monitor analytical precision, five percent of the samples were randomly selected, split and included as blind duplicates in all analytical procedures. Water samples were stored in a cool environment prior to shipping to St. John's. At the laboratory, waters were filtered using a 0.45 µm millipore filtration apparatus.

Analyses

Lake sediment was analysed using five methods for 48 unique elements plus loss-on-ignition. In addition, 13 of these elements were analysed using a second method for a total of 60 separate determinations. The methods of analyses are tabulated in Table 1. Elements that are analysed using two methods, one of which gives preferable results for reasons of improved detection limit or precision, are distinguished by an asterisk. All analyses except FA-ICP-MS and INAA were performed in the geochemical laboratory of the Department of Natural Resources. The FA-ICP-MS analyses and the INAA analyses were performed by ActLabs. To enable the user to readily distinguish the method of analysis for a given element, a suffix is attached to the element symbol when used in most tables and figures as well as in the appendix and digital data files. The key to the suffixes is as follows:

1. Neutron activation analysis (INAA).

2. ICP-ES after HF-$HClO_4$-HCl digestion

6. Silver by AA after HNO_3 digestion.

9. Fluoride-ion selective electrode.

27. ICP-MS analysis after fire assay fluxing, fusing and digestion in HNO_3-HCl.

In the foregoing, "ICP-ES" refers to inductively coupled plasma-emission spectrometry; "AA" is atomic absorption spectrometry. Thus, Zn2 is zinc analysed by ICP-ES/HF-$HClO_4$-HCl whereas Zn1 is zinc analysed by INAA.

Lake water was analysed for conductivity, pH, SO_4 and 25 elements using the methods noted in Table 2.

Table 1. Analytical methods for lake-sediment samples

ELEMENTS	METHOD	DIGESTION/ PREPARATION
Pd, Pt, Au	Fire Assay Inductively Coupled Plasma Emission Mass Spectrometry (FA-ICP-MS)	5 gm fluxed and fused; HNO_3-HCl digestion
(Ag) As, Au, Ba, Br, Ce, Co, Cr, Cs, Eu, Fe, Hf, La, Lu, Mo, Na, (Ni), Nd, (Rb), Sb, Sc, Sm, (Sr), Ta, Tb, Th, U, W, Yb, (Zn), (Zr)	Neutron Activation Analysis (INAA)	5 to 10 gm in shrink-wrapped vial. (total analysis)
Al, (As), Ba, Be, Ca, Cd, Ce, Co, Cr, Cu, Dy, Fe, Ga, K, La, Li, Mg, Mn, Mo, Na, Nb, Ni*, Pb, Rb*, Sc, Sr*, Ti, V, Y, Zn*, Zr*	Inductively Coupled Plasma Emission Spectrometry (ICP-ES)[1]	Hf-$HClO_4$-HCl (total digestion)
Ag*	Atomic Absorption	HNO_3
F	Fluoride-ion specific electrode with digital ion analyser[2]	2:1 Na_2CO_3:KNO_3 flux, fusion
Loss-on-ignition (LOI)	Gravimetric using muffle furnace raised to 500°C	

* Indicates preferred method of analysis.
( ) indicates less favoured method of analysis; use alternative.

[1] Finch, C.J., 1998.
[2] Wagenbauer, H.A., Riley, C.A. and Dawe, G., 1983.

DATA QUALITY

To ensure the reliability of the analytical data, three means of determining data accuracy and precision were employed. During sample collection, pairs of site duplicates for sediment and water samples were obtained from 11 lakes to give an appreciation of within-lake data variation. The duplicate samples were taken about 50 m apart. At the analytical stage, a standard of known composition was inserted within every batch of 20 samples and a sample split, or laboratory duplicate, was similarly included. For sediment, international reference standards composed of lake-sediment material were used, notably LKSD-1, LKSD-2, LKSD-3 and LKSD-4. For water, standards used were both naturally occurring water and synthetic standards created in the laboratory to predetermined compositions. The results of these standards were monitored and found to be satisfactory for most elements. No previous analyses of PGE are available for these standards.

Table 2. Analytical methods for lake-water samples

ANALYSIS	METHOD	PREPARATION
pH	Corning combination pH electrode	None
Conductivity	Corning conductivity sensor	None
Ca, Fe, K, Mg, Mn, Na, Si, SO_4	ICP-emission spectroscopy[1]	Filtration (0.45 μm) and HNO_3 acidification
Al, Ba, Be, Co, Cr, Cu, Li, Mo, Ni, P, Pb, Sr, Ti, V, Y, Zn	ICP-ultrasonic nebulizer[1]	Filtration (0.45 μm) and HNO_3 acidification
As	ICP-ultrasonic nebulizer[1]	Filtration (0.45 μm) and HNO_3 acidification; H-H_2O_2
F	Fluoride-ion specific electrode with digital ion analyser	

[1] Finch, C.J., 1998.

Site duplicates are useful because they give an appreciation of overall data variance occurring at both the sampling and analytical stages. Since they consist of samples from the survey itself, they may reveal limitations in the data that are specific to the area and which may not show up in the reference standards. Scatter plots of 48 variables for sediment analyses along with the Spearman correlation coefficient (r^2) are shown in Figures 2a and 2b. The higher the value, the better the correlation. A comparison of coefficients for the same element by different methods is a useful way to select the more reliable method. For example, Cr1 gives a better correlation than Cr2. On the other hand, ICP-ES is better for Ca, Mo and Co. Some plots, e.g., Au1, appear to have fewer than 11 points. This is because several points are coincident, being less than the detection limit. One "flyer" was omitted from the plots of Au27, Pd27 and Pt27. Despite the very low absolute quantities of these elements, the correlations are quite strong suggesting the sampling is representative.

Scatter plots of selected data from site duplicates in water are shown in Figure 3. In general, the correlations are stronger between water duplicates than between sediment duplicates. This is not surprising because water is a more homogeneous medium than sediment and, unlike sediment, is not prone to compositional modifications within a lake due to variations in depth, LOI, Fe/Mn oxide scavenging and bottom currents. Most elements have very strong correlations (>0.9) with some others being less satisfactory but still useful (Ni, 0.36). Analyses of Mo, Pb and Ti appear to be of limited use in this area particularly for values near the detection limits.

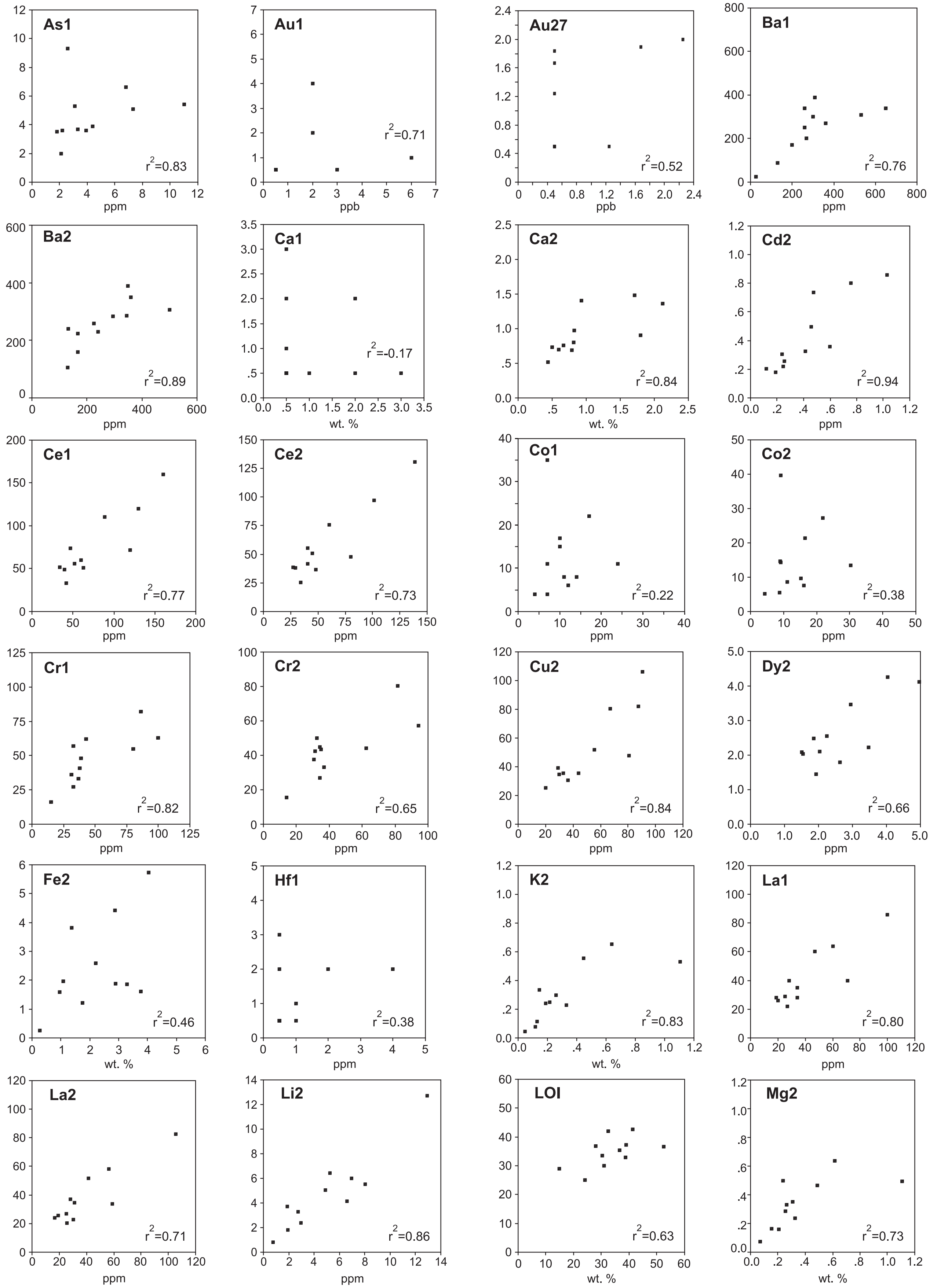

Figure 2a. *Scatter plots of As1, Au1, Au27, Ba1, Ba2, Ca1, Ca2, Cd2, Ce2, Co1, Co2, Cr1, Cr2, Cu2, Dy2, Fe2, Hf1, La1, La2, Li2, LOI and Mg2 in site duplicates of lake sediment.*

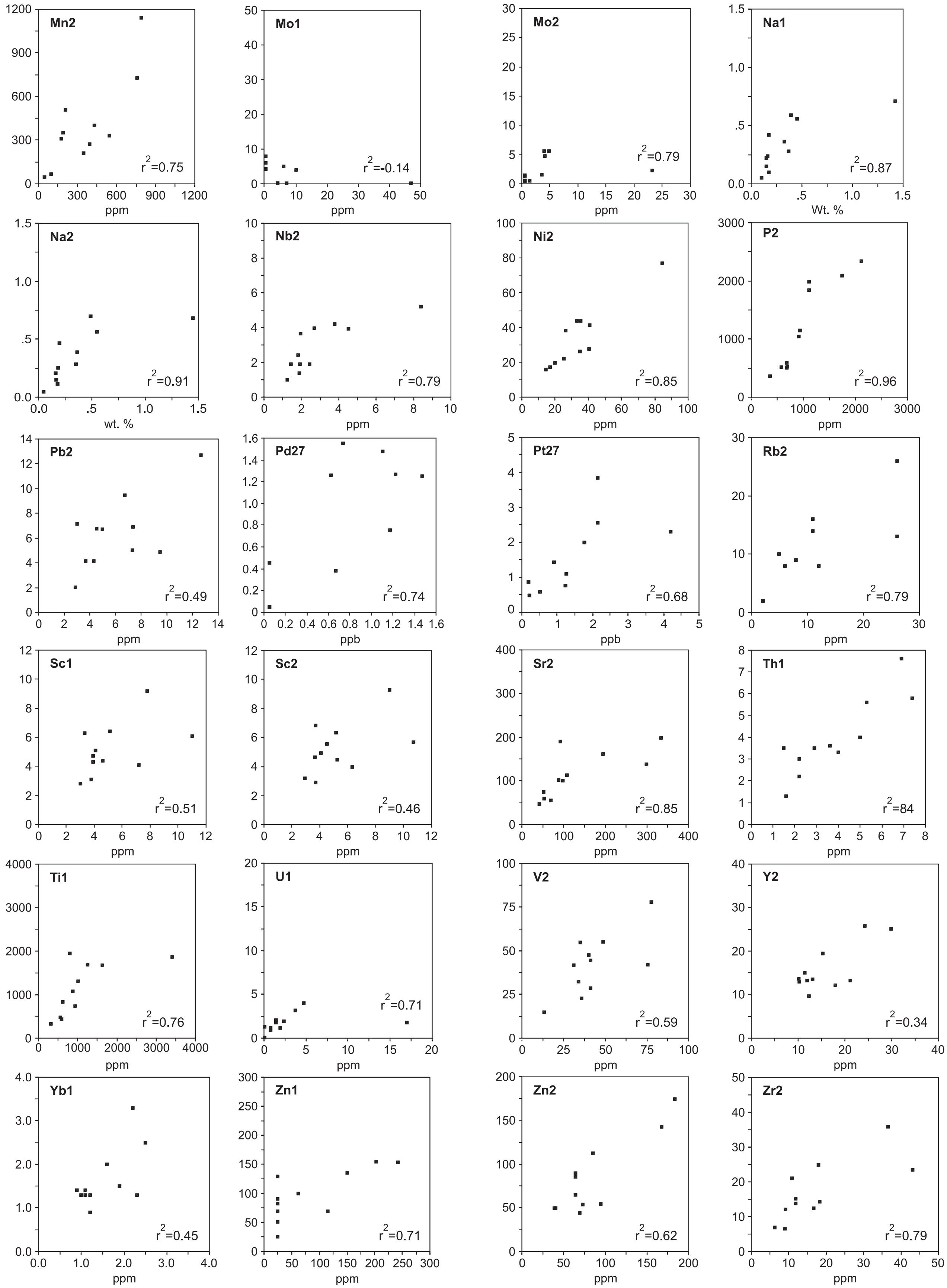

Figure 2b. *Scatter plots of Mn2, Mo1, Mo2, Na1, Na2, Nb2, Ni2, P2, Pd27, Pt27, Rb2, Sc1, Sc2, Sr2, Th1, Ti1, U1, V2, Y2, Yb1, Zn1, Zn2 and Zr2 in site duplicates of lake sediment.*

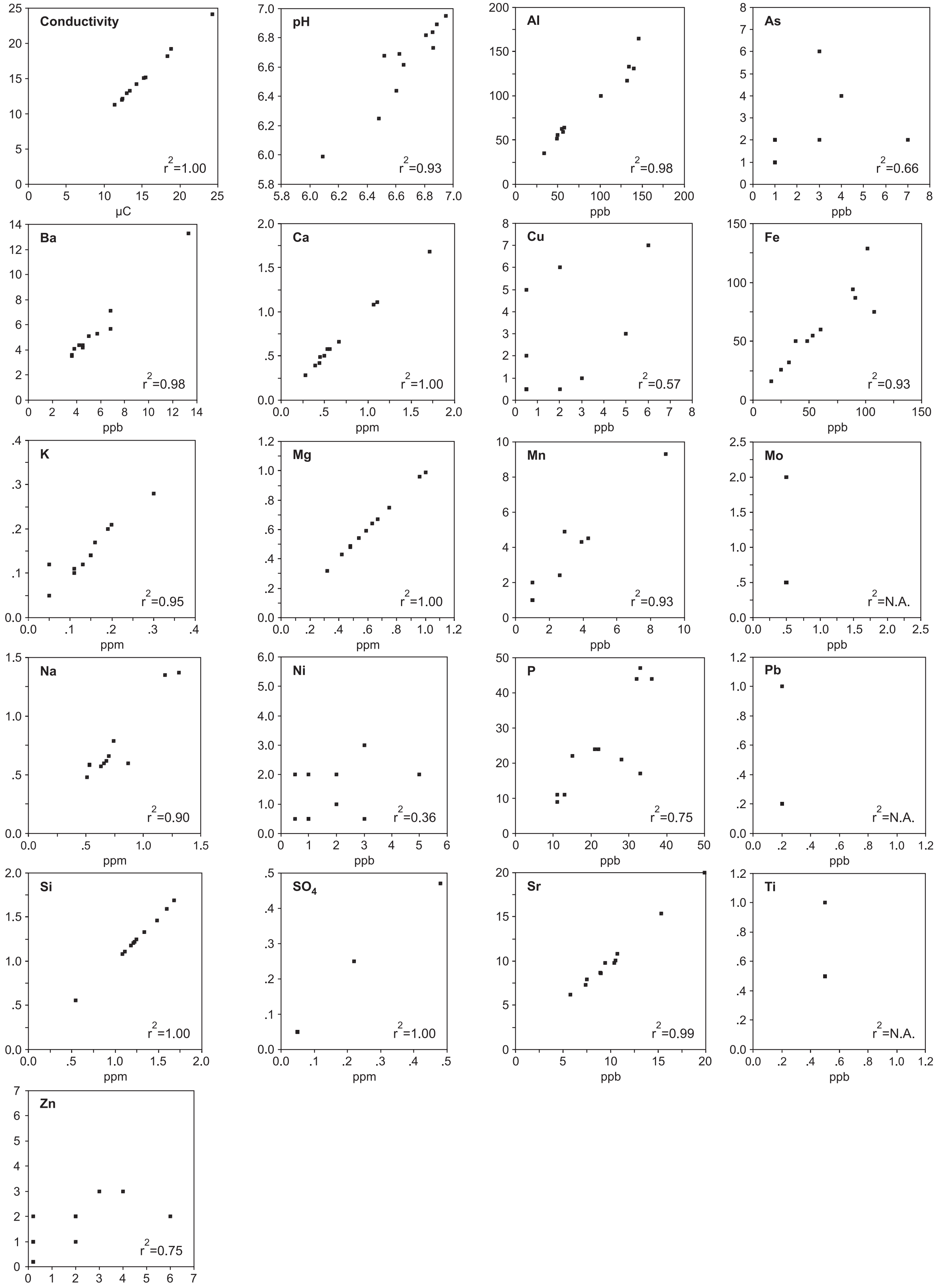

Figure 3. *Scatter plots of conductivity, pH, Al, As, Ba, Ca, Cu, Fe, K, Mg, Mn, Mo, Na, Ni, P, Pb, Si, SO_4, Sr, Ti and Zn in site duplicates of lake water.*

DESCRIPTION AND DISCUSSION OF RESULTS

STATISTICAL ANALYSIS

Summary Statistics

To quantify the range and distribution characteristics of the element populations, summary statistics have been calculated for the sediment and water data and a selection of these is tabulated in Tables 3 and 4. Because the distributions of most element populations are more nearly log-normal than normal, the geometric means as well as arithmetic means are given.

Histograms

Histograms of Au1, Co1, Cr1, Cu2, Fe2, La2, Mg2, Ni1, Pd27, Pt27, Zn2, depth and loss-on-ignition in lake sediment are shown in Figure 4. Histograms of the lake-water variables pH, conductivity, Co, Ca, Cr, Cu, Fe, Mg, Ni, Si, SO_4 and Zn are shown in Figure 5. These figures may be useful when interpreting the maps of dot plot distributions of these variables.

Correlation Analysis of Sediment Data

A matrix in which Spearman correlation coefficients of some elements and variables that may be associated with PGE mineralization are listed against a large selection of variables analyzed in lake sediments is shown in Table 5. Some interesting correlations are seen. Pd27 only has moderate correlations with a few variables including Au27, (but not Au1), Cu2, Pt27 and depth. Pt27 shows a stronger correlation with Au27 but also not with Au1. The presence of Fe/Mn hydroxide scavenging is strongly suggested by the large coefficients these two elements have with several others. Fe2 has coefficients of >0.70 with Co1, Co2, F9, Lu1, Mg2, Nb2, Yb1, Zn2 and Zr2. The coefficient between Fe2 and Mn2 is 0.90, the highest in the table between different elements. Loss-on-ignition has several strong, negative correlations (< -0.60) with mostly lithophile elements including, F9, Hf1, K2, Mg2, Nb2, Rb2 and Zr2. Depth shows moderate correlations (>0.30) with some elements, including Br1, Co1, Co2, Cu2, Ni2, P2, Pd27 and Zn2.

All elements and variables that correlate significantly (>99% confidence level) with Pd27 and Pt27 are shown in order of increasing coefficient in Figures 6 and 7. Interestingly, most significant correlations with Pd27 are positive whereas most significant correlations with Pt27 are negative and with lithophile elements.

Correlation Analysis of Water Data

Spearman correlation coefficients were calculated for those analyses for which more than 35 percent of the samples exceeded the detection limit. They are shown in Table 6. Noteworthy correlations include some with Mg such as Ca (0.79) and pH (0.65). Together, these suggest that in this mafic terrane, Mg analyses of water may reflect magmatic differentiation of the bedrock in the catchment basins. If so, Mg (and Ca and pH) analyses may provide a guide to areas of more

Table 3. Summary statistics for lake-sediment analytical data. Element values in ppm unless otherwise indicated (N=506; for Au27, Pd27 and Pt27 N=505)

Element	Median	Mean Arithmetic	Mean Geometric	Standard Deviation Arithmetic	Standard Deviation Logarithmic	Minimum	Maximum
Ag6	0.1	0.2	0.1	0.20	0.36	<0.1	2.1
Al2, wt. %	2.39	2.70	2.33	1.43	0.24	0.50	6.55
As1	3.9	4.7	3.7	3.57	0.33	<0.5	37
As2	<2	1.6	1.3	2.2	0.24	<2	31
Au1, ppb	<1	1.5	0.9	1.7	0.39	<1	10
Au27, ppb	<1	1.5	.9	2.4	0.34	<1	34.6
Ba1	270	290	209	191	0.42	25	1500
Ba2	238	282	241	163	0.26	1	1324
Be2	0.6	0.6	0.5	0.33	0.25	0.1	1.5
Br1	18.0	20	17	9	0.23	1.5	58
Ca1, wt %	<1	0.90	0.70	1	0.27	<1	5
Ca2, wt. %	0.87	0.97	0.89	0.43	0.18	0.32	2.84
Cd2	0.3	0.4	0.3	0.18	0.21	<0.2	1.4
Ce1	63	69	61	37	0.22	13	350
Ce2	49	53	47	29	0.22	11	281
Co1	9	11	9	9	0.26	1	99
Co2	10	13	10	11	0.26	2	140
Cr1	40	46	40	26	0.24	<10	300
Cr2	38	43	39	20	0.21	12	117
Cs1	<1	0.4	0.3	0.46	0.29	<0.5	2
Cu2	41	45	38	26	0.26	4	180
Dy2	2.5	2.6	2.4	1.03	0.18	0.6	10.5
Eu1	1.2	1.2	1.1	0.5	0.18	<0.5	3.2
Fe1, wt.%	1.66	2.3	1.7	2.08	0.33	0.2	25.9
Fe2, wt.%	1.53	2.19	1.58	2.05	0.35	0.14	24.42
Hf1	<1	1.8	1.1	1.9	0.40	<1	11
K2, wt. %	0.27	0.43	0.28	0.4	0.40	0.03	1.89
La1	37	40	35	21	0.21	8	190
La2	34	37	33	19	0.21	7	192
Li2	4.1	5.0	3.9	3.31	0.31	0.7	20.7
LOI, wt.%	34.6	34.1	31.0	11.60	0.23	1.89	70.51
Mg2, wt.%	0.30	0.39	0.31	0.29	0.30	0.06	1.59
Mn2	230	488	256	1687	0.41	32	33235
Mo1	<1	2.9	0.8	4.10	0.73	<0.5	29
Mo2	1	2.1	1.5	2.1	0.34	0.5	20.9
Na1, wt.%	2	0.52	0.34	0.49	0.41	0.04	2.23
Na2, wt.%	0.32	0.53	0.35	0.49	0.41	0.03	2.3
Nb2	3	3.7	2.9	2.8	0.33	1	14
Nd1	30	33	29	16.6	0.25	2	120
Ni2	25	28	26	12	0.16	8	107
P2	736	947	800	604	0.25	221	3512
Pb2	6	7	6	4	0.26	1	35
Pd27, ppb	0.5	0.9	0.4	1.87	0.55	<0.2	34.9
Pt27, ppb	1.2	1.5	1.1	1.58	0.39	0.1	22.5
Rb1	<10	9	3	15	0.49	<5	75
Rb2	10	14	9	12	0.41	<5	57
Sb1	<0.1	0.1	0.1	0.19	0.57	<0.1	2.2
Sc1	4.6	5.4	4.9	2.70	0.20	1.7	15

Table 3. Continued

Element	Median	Mean Arithmetic	Mean Geometric	Standard Deviation Arithmetic	Standard Deviation Logarithmic	Minimum	Maximum
Sc2	4.9	5.7	5.1	2.90	0.21	1.7	17.8
Se1	<1	0.5	0.5	0.3	0.09	<1	5.1
Sm1	5.4	5.6	5.1	2.37	0.19	1.3	17
Sr2	96	126	105	85	0.26	28	473
Ta1	<0.2	0.1	0.1	0.23	0.21	<0.2	2
Tb1	<0.5	0.3	0.3	0.28	0.25	<0.5	2
Th1	3.5	3.8	3.3	2.08	0.26	0.2	16
Ti2	1076	1467	1103	1198	0.33	196	7527
U1	1.8	2.5	1.5	4.29	0.51	0.1	87
V2	40	46	39	27	0.26	6	149
W1	<1	0.3	0.2	0.4	0.18	<1	5
Y2	15	16	15	6	0.17	4	49
Yb1	1.4	1.5	1.4	0.70	0.20	0.4	4.6
Zn2	67	74	68	34	0.18	19	242
Zr1 wt. %	<0.03	0.02	0.02	0.01	0.07	<0.03	0.1
Zr2	16	22	17	18	0.33	3	106
Lake area (km2)	0.09	0.25	0.10	0.72	0.51	0.01	10.9
Lake Depth (m)		4.1	3.0	3.3	0.35	1	26

Table 4. Summary statistics of lake-water analytical data. Element values in ppb unless otherwise noted (N=509)

Element	Detection Limit	Percentage of samples <D.L.	Median	Mean Arithmetic	Mean Geometric	Standard Deviation Arithmetic	Standard Deviation Logarithmic	Minimum	Maximum
Al	N.A.	0	75	84	69	47.0	0.31	1	295
Ba	N.A.	0	4.9	5.9	5	4.10	0.19	1.9	40.1
Be	0.1	96.9	<0.1	0.1	0.1	0.02	0.08	0.1	0.2
Ca	N.A.	0	0.80	0.89	0.72	0.56	0.30	0.04	4.63
Co	1	99.0	<1	<1	1	0.10	0.04	0.5	2
Cr	1	96.2	<1	<1	1	0.22	0.09	0.5	3
Cu	1	53.7	<1	2	1	1.92	0.42	0.5	10
Fe	10	1.5	46	77	49	113	0.38	5	1415
K, ppm	0.10	13.4	0.17	0.2	0.2	0.07	0.23	0.05	0.48
Li	1	99.2	<1	<1	1	0.22	0.06	0.5	4
Mg, ppm	N.A.	0	0.64	0.68	0.64	0.27	0.17	0.13	1.98
Mn	2	56.4	<2	2.3	1.7	2.31	0.30	1	26
Mo	1	95.6	<1	<1	1	0.27	0.11	0.5	2
Na, ppm	N.A.	0	0.69	0.75	0.72	0.22	0.12	0.37	1.64
Ni	1	38.2	<1	1.6	1.1	2.30	0.34	0.5	43
P	N.A.	0	22	23.9	21	12.5	0.23	2	93
Pb	1	96.2	<1	<1	0.2	0.92	0.21	0.2	17
Si, ppm	0.1	1.7	1.3	1.3	1.1	0.56	0.27	0.10	3.18
SO4, ppm	0.1	62.4	<0.1	0.1	0.1	0.08	0.27	0.05	0.48
Sr	N.A.	0	10.6	10.9	10.3	3.68	0.15	2.8	26.7
Ti	1	87.7	<1	<1	0.6	0.29	0.13	0.5	3
Y	1	100	<1	<1	0.2	0.00	0.00	0.2	0.2
Zn	1	30.5	2	2.7	1.4	3.26	0.59	0.2	34
					1				
Conductivity S	N.A.	0	16.32	16.9	16.2	4.96	0.12	6.18	46.9
pH	N.A.	0	6.75		6.71	**	0.26	5.79	7.47

** pH is defined as a logarithmic value.

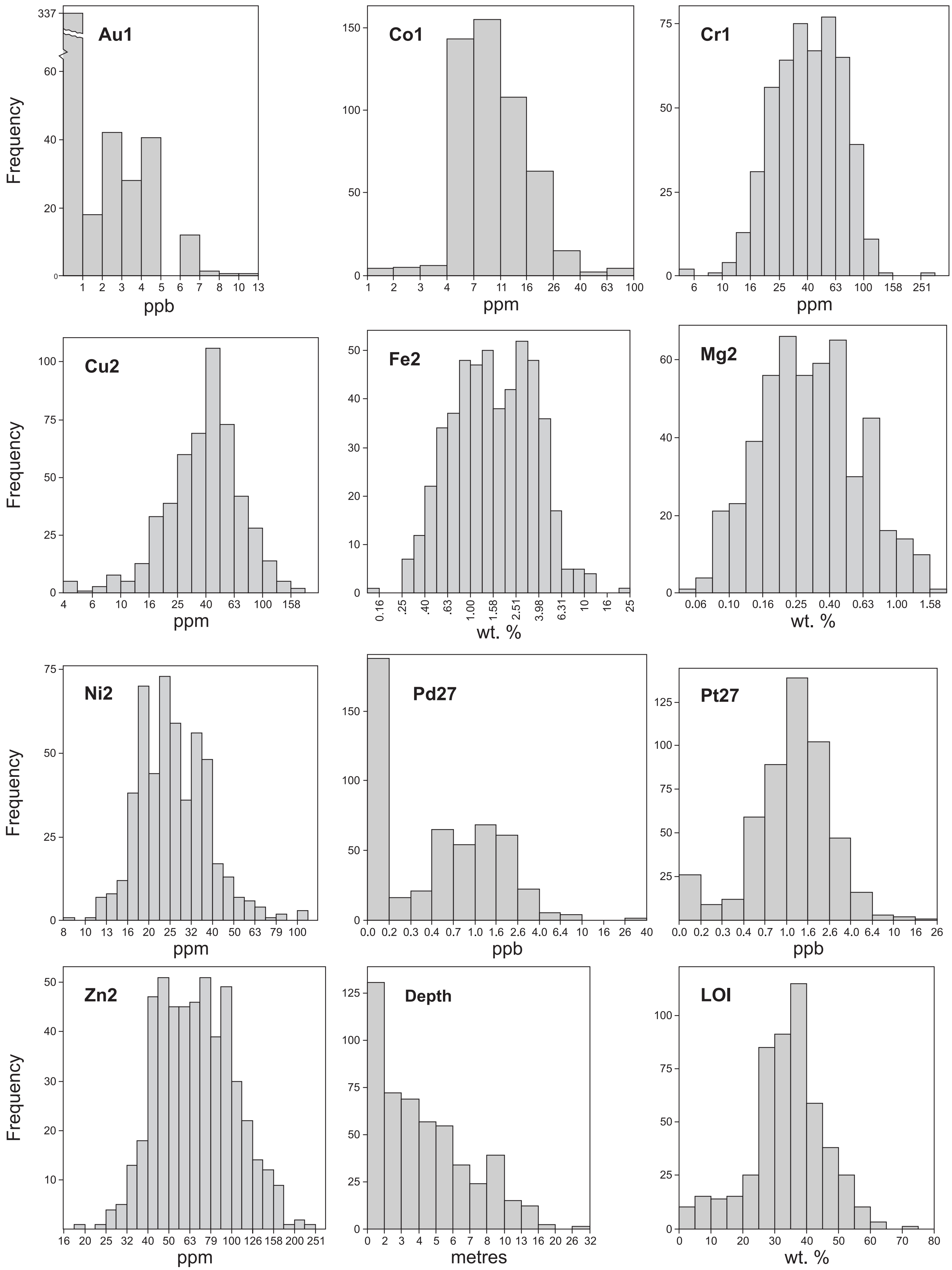

Figure 4. *Histograms of Au1, Cr1, Cu2, Fe2, La2, Mg2, Ni1, Pd27, Pt27 and Zn2 in lake sediment.*

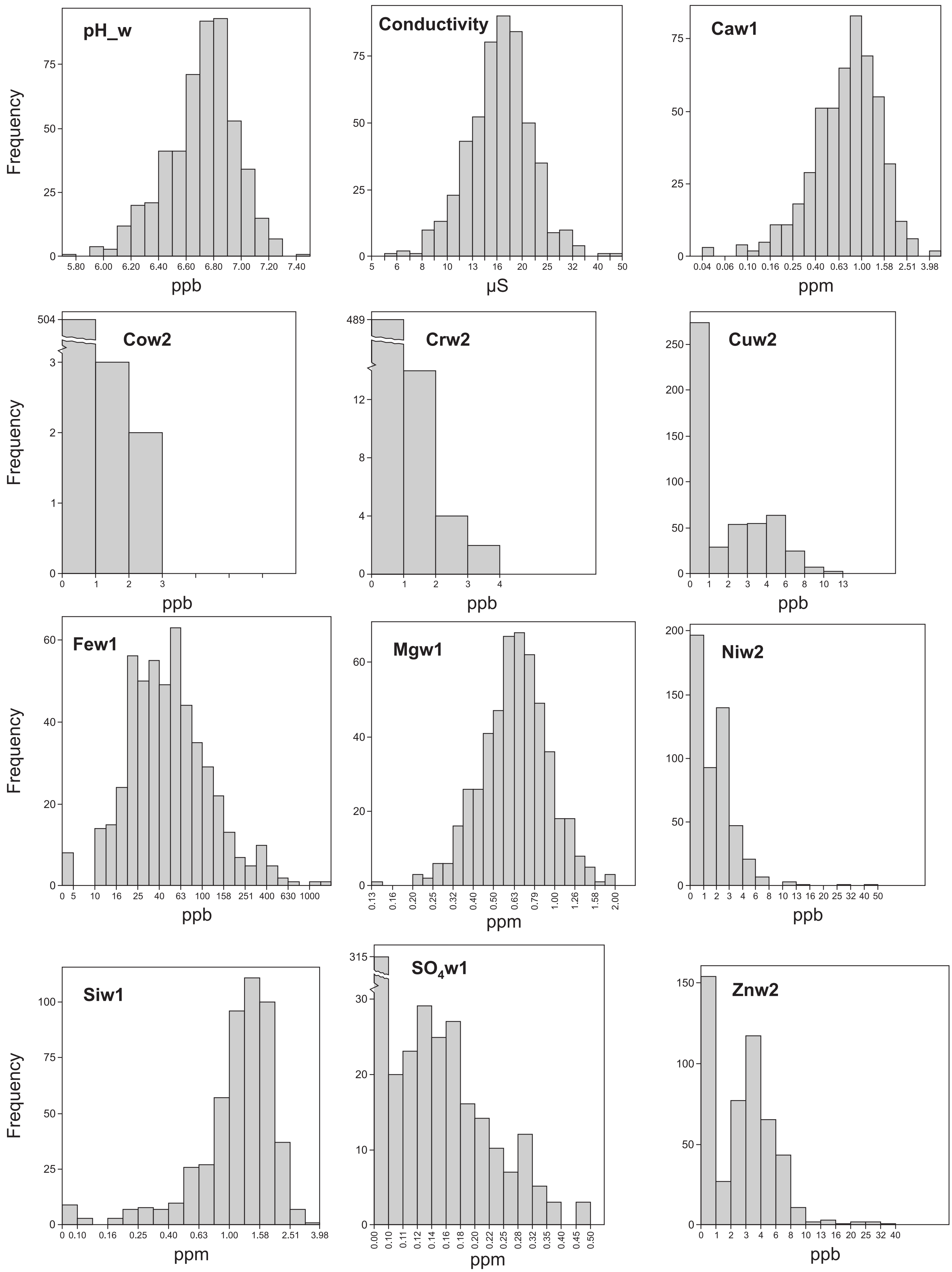

Figure 5. *Histograms of pH, conductivity, Co, Ca, Cr, Cu, Fe, Mg, Ni, Si, SO_4 and Zn in lake water.*

Table 5. Spearman correlation coefficients for selected elements and variables in lake sediment data (N=505). Coefficients >|0.12| are significant at the 99% confidence level

	Pd27	Pt27	Au1	Au27	Co2	Cr1	Cu2	Fe2	Ni2	LOI	Depth
As1	0.18	-0.02	0.04	-0.06	0.17	0.18	0.05	0.21	0.14	-0.04	0.10
As2	0.16	0.07	-0.03	0.08	0.37	0.36	0.05	0.40	0.29	-0.16	0.23
Au1	0.00	-0.08	1.00	-0.12	-0.03	0.13	-0.04	-0.05	-0.00	0.07	0.04
Au27	0.37	0.47	-0.12	1.00	-0.03	-0.06	0.10	-0.06	0.03	0.13	0.12
Br1	0.27	0.10	0.09	0.07	0.04	-0.06	0.50	-0.03	0.12	0.50	0.58
Ca2	0.15	0.06	-0.06	-0.01	0.66	0.72	-0.01	0.67	0.47	-0.41	0.16
Cd2	0.23	0.09	0.07	0.02	0.37	0.20	0.46	0.22	0.40	0.26	0.34
Ce1	0.01	-0.17	0.01	0.01	0.51	0.48	0.25	0.54	0.43	-0.16	0.27
Ce2	-0.02	-0.20	0.02	-0.01	0.51	0.46	0.20	0.55	0.40	-0.18	0.24
Co1	0.18	0.11	-0.03	0.02	0.96	0.72	0.16	0.79	0.61	-0.30	0.35
Co2	0.15	0.05	-0.03	-0.03	1.00	0.73	0.11	0.83	0.61	-0.34	0.31
Cu2	0.33	0.23	0.13	0.10	0.11	0.05	1.00	-0.06	0.39	0.36	0.53
Dy2	0.01	-0.18	0.01	-0.01	0.55	0.55	0.19	0.59	0.49	-0.22	0.21
F9	-0.02	-0.13	-0.06	-0.08	0.67	0.81	-0.06	0.73	0.54	-0.62	0.13
Hf1	-0.08	-0.12	-0.09	-0.08	0.56	0.72	-0.29	0.65	0.34	-0.65	-0.00
K2	-0.07	-0.13	-0.06	-0.11	0.60	0.81	-0.17	0.70	0.45	-0.71	0.04
La1	0.00	-0.20	0.03	-0.00	0.45	0.43	0.24	0.50	0.43	-0.12	0.23
La2	-0.03	-0.23	0.03	-0.01	0.41	0.39	0.22	0.46	0.39	-0.10	0.19
Li2	-0.06	-0.13	-0.05	-0.09	0.57	0.77	-0.03	0.63	0.56	-0.63	0.08
LOI	0.19	0.16	0.07	0.13	-0.34	-0.50	0.36	-0.46	-0.09	1.00	0.09
Lu1	0.05	-0.16	0.03	-0.04	0.64	0.66	0.04	0.71	0.46	-0.33	0.21
Mg2	-0.02	-0.08	-0.06	-0.11	0.66	-0.09	0.86	0.71	0.56	-0.66	0.08
Mn2	0.12	-0.02	-0.03	-0.05	0.85	-0.02	0.80	0.90	0.50	-0.51	0.30
Mo2	0.16	-0.09	-0.02	-0.07	0.41	0.31	0.10	0.46	0.29	-0.04	0.30
Nb2	-0.01	-0.13	-0.06	-0.07	0.70	0.81	-0.15	0.81	0.44	-0.64	0.13
Nd1	0.02	-0.13	0.01	0.05	0.43	0.39	0.33	0.43	0.42	-0.06	0.25
Ni2	0.18	0.10	-0.00	0.03	0.61	0.64	0.39	0.48	1.00	-0.09	0.31
P2	0.32	0.15	0.02	0.06	0.58	0.57	0.45	0.54	0.43	-0.14	0.73
Pb2	-0.05	-0.13	-0.05	-0.10	0.59	0.67	-0.14	0.68	0.41	-0.52	-0.05
Pd27	1.00	0.48	0.00	0.37	0.15	0.13	0.33	0.07	0.18	0.19	0.36
Pt27	0.48	1.00	-0.08	0.47	0.05	-0.06	0.23	-0.07	0.10	0.16	0.21
Rb2	-0.15	-0.21	-0.08	-0.16	0.55	0.75	-0.17	0.64	0.42	-0.64	0.07
Sm1	0.03	-0.16	0.02	0.01	0.49	0.50	0.30	0.51	0.50	-0.13	0.26
Th1	-0.11	-0.28	0.02	-0.04	0.48	0.59	-0.03	0.59	0.42	-0.41	0.09
Y2	0.06	-0.17	0.01	-0.05	0.62	0.62	0.14	0.68	0.51	-0.25	0.22
Yb1	0.07	-0.16	-0.00	-0.01	0.65	0.68	0.02	0.72	0.47	-0.36	0.18
Zn2	0.13	0.00	0.00	-0.01	0.80	0.29	0.68	0.72	0.71	-0.21	0.35
Zr2	-0.07	-0.17	-0.06	-0.10	0.62	0.79	-0.20	0.73	0.49	-0.65	0.02
Depth	0.36	0.21	0.04	0.12	0.31	0.31	0.53	0.26	0.31	0.09	1.00

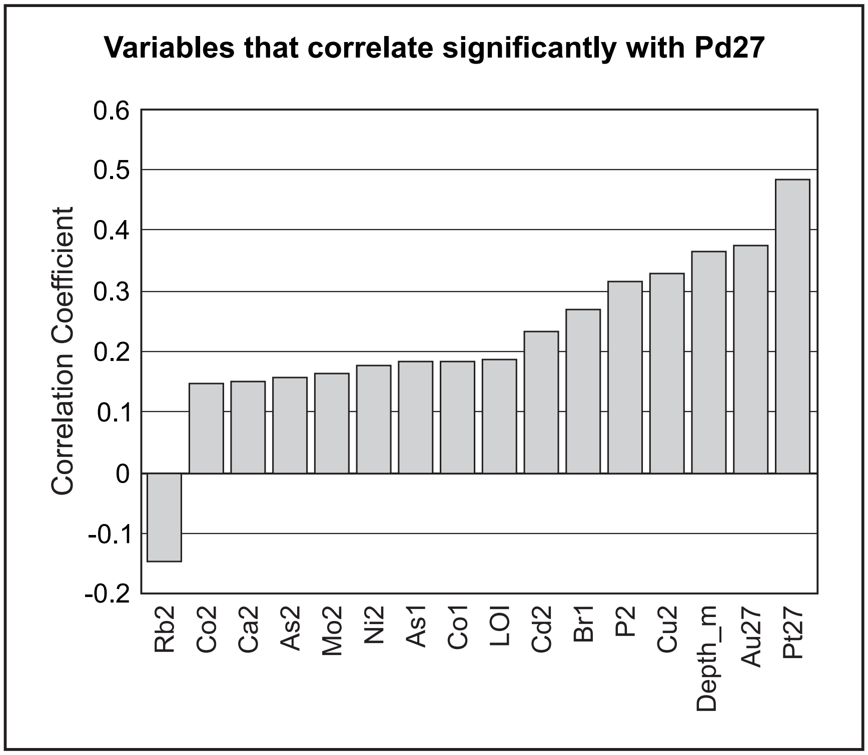

Figure 6. *Spearman correlation coefficients of variables that correlate significantly with Pd27 in lake sediment.*

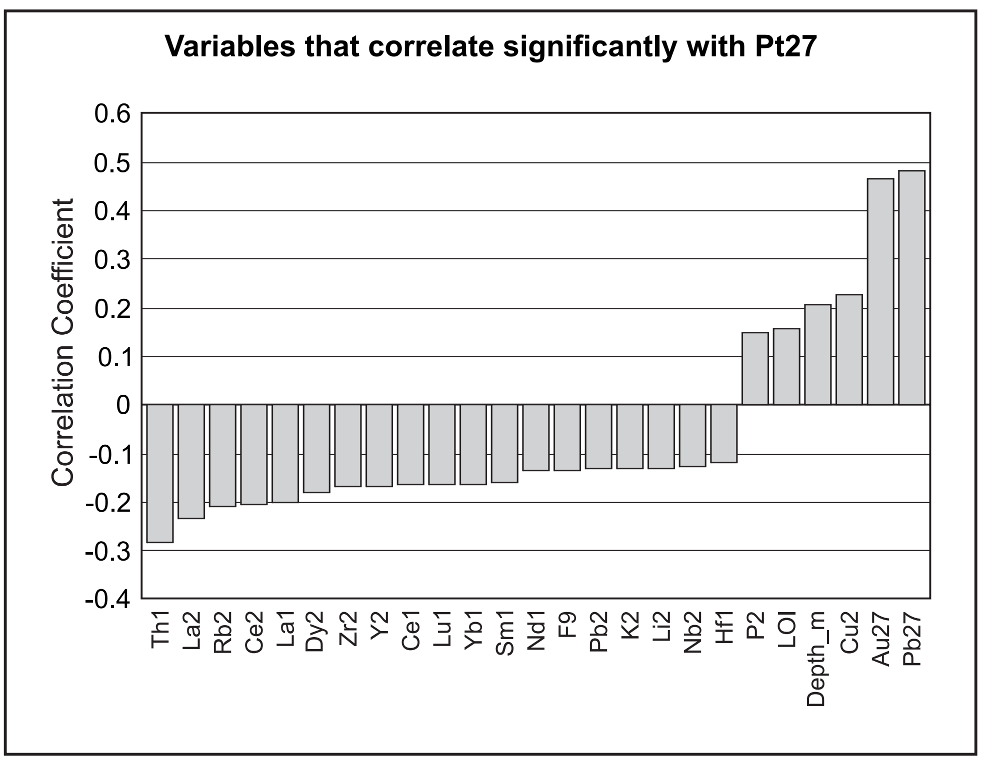

Figure 7. *Spearman correlation coefficients of variables that correlate significantly with Pt27 in lake sediment.*

Table 6. Spearman correlations of water analyses having more than 35% of samples above detection limit. (N=509)

	AlW2	AsW2X	BaW2	CaW1	CuW2	FeW1	KW1	MgW1	MnW1	NaW1	NiW2	PW2	SiW1	SO4W1	SrW2	VW2	ZnW2	pH_W	Conductivity
AlW2	**1.00**	-0.23	0.16	-0.23	0.24	0.22	-0.34	-0.12	0.27	-0.15	0.07	-0.20	0.20	-0.13	-0.06	0.07	0.19	-0.40	-0.22
AsW2X	-0.23	**1.00**	0.01	0.09	-0.07	0.25	0.24	-0.02	0.07	0.58	0.04	0.26	-0.03	0.21	0.09	0.03	0.01	-0.08	0.05
BaW2	0.16	0.01	**1.00**	0.59	-0.03	0.07	0.38	0.59	0.14	0.14	0.17	-0.10	0.27	0.24	0.35	0.00	0.08	0.31	0.58
CaW1	-0.23	0.09	0.59	**1.00**	-0.13	-0.14	0.63	0.79	-0.09	0.34	0.10	-0.15	0.42	0.52	0.61	-0.03	-0.05	0.69	0.95
CuW2	0.24	-0.07	-0.03	-0.13	**1.00**	0.15	-0.10	-0.16	0.23	-0.22	0.17	-0.43	-0.09	-0.31	-0.27	0.30	0.48	-0.12	-0.15
FeW1	0.22	0.25	0.07	-0.14	0.15	**1.00**	-0.03	-0.10	0.55	0.28	0.12	0.07	0.01	-0.16	-0.24	0.20	0.04	-0.36	-0.15
KW1	-0.34	0.24	0.38	0.63	-0.10	-0.03	**1.00**	0.49	-0.08	0.42	0.08	0.10	0.15	0.27	0.36	0.09	0.08	0.45	0.62
MgW1	-0.12	-0.02	0.59	0.79	-0.16	-0.10	0.49	**1.00**	-0.12	0.27	0.20	-0.06	0.37	0.41	0.47	-0.13	-0.14	0.65	0.90
MnW1	0.27	0.07	0.14	-0.09	0.23	0.55	-0.08	-0.12	**1.00**	0.04	0.05	-0.15	0.12	-0.16	-0.18	0.21	0.15	-0.25	-0.13
NaW1	-0.15	0.58	0.14	0.34	-0.22	0.28	0.42	0.27	0.04	**1.00**	0.15	0.43	0.30	0.54	0.39	-0.01	-0.09	0.15	0.35
NiW2	0.07	0.04	0.17	0.10	0.17	0.12	0.08	0.20	0.05	0.15	**1.00**	0.05	0.08	0.05	-0.04	0.06	0.20	0.11	0.16
PW2	-0.20	0.26	-0.10	-0.15	-0.43	0.07	0.10	-0.06	-0.15	0.43	0.05	**1.00**	-0.06	0.26	0.07	-0.22	-0.11	0.02	-0.09
SiW1	0.20	-0.03	0.27	0.42	-0.09	0.01	0.15	0.37	0.12	0.30	0.08	-0.06	**1.00**	0.34	0.45	-0.10	-0.13	0.32	0.45
SO4W1	-0.13	0.21	0.24	0.52	-0.31	-0.16	0.27	0.41	-0.16	0.54	0.05	0.26	0.34	**1.00**	0.53	-0.15	-0.18	0.34	0.52
SrW2	-0.06	0.09	0.35	0.61	-0.27	-0.24	0.36	0.47	-0.18	0.39	-0.04	0.07	0.45	0.53	**1.00**	-0.18	-0.17	0.40	0.59
VW2	0.07	0.03	0.00	-0.03	0.30	0.20	0.09	-0.13	0.21	-0.01	0.06	-0.22	-0.10	-0.15	-0.18	**1.00**	0.21	-0.13	-0.09
ZnW2	0.19	0.01	0.08	-0.05	0.48	0.04	0.08	-0.14	0.15	-0.09	0.20	-0.11	-0.13	-0.18	-0.17	0.21	**1.00**	-0.08	-0.08
pH_W	-0.40	-0.08	0.31	0.69	-0.12	-0.36	0.45	0.65	-0.25	0.15	0.11	0.02	0.32	0.34	0.40	-0.13	-0.08	**1.00**	0.73
Conductivity	-0.22	0.05	0.58	0.95	-0.15	-0.15	0.62	0.90	-0.13	0.35	0.16	-0.09	0.45	0.52	0.59	-0.09	-0.08	0.73	**1.00**

Correlations > |0.12| are significant at the 99% confidence level.

mafic bedrock. Nickel's strongest correlation in the water data is with Mg (0.20) as well, also suggesting a differentiation trend. Another interesting correlation is that of Cu and Zn (0.48), the highest coefficient for both of these elements.

ELEMENT DISTRIBUTION IN LAKE SEDIMENT AND WATER

The locations of sample sites with identifying numbers is shown in relation to mafic bedrock geology and NTS map areas in Figure 8. To avoid clutter in the data presentation figures, the locations of sample sites in relation to drainage features, geology and road access are shown separately in Figure 9.

Sediment Data

Symbol plots of the distribution of the possible ore metals Au, Cu, Ni, Pd, Pt and Zn are shown in Figures 10 through 16. Plots of elements, which may reflect oxidation conditions in the sediment (Fe) or bedrock composition in the catchment basin (Cr, La and Mg), are shown in Figures 17 through 20. Data for Pd, Pt, Au27, Cu, Ni and Zn were classified using natural breaks (Jenk's Optimization) to depict naturally occurring divisions in the data in the hope of reflecting geochemical or mineralogical processes. For possible ore metals, symbol sizes are proportional to class to emphasize the higher values. Au1 has too few samples with detectable values to use the Jenk's classification thus divisions were chosen visually. Quantile classification was used for maps of Fe and of elements that might reflect igneous differentiation or rock type – Cr, La and Mg – to maintain comparable classification divisions. Symbols are of uniform size.

The distributions of the data from the two types of gold analyses show little similarity as suggested by the lack of correlation between the two in Table 5. The distribution of high Au1 values (Figure 10) seems fairly random although two of the four highest values occur in NTS map area 23H/04. The distribution of Au27 (Figure 11) shows more patterning – two of the highest samples are spatially associated with other elevated Au27 samples. One of the highest values (19 ppb) is part of a six sample cluster near the Wabush–Churchill Falls highway in NTS map area 23H/07 and is also near an occurrence of base-metal mineralization. A cluster of two samples (35 and 8.6 ppb) located 1.5 km apart is found in NTS map area 23H/02. A nearby sample has high Au1 (7 ppb). The third high sample (22 ppb) is isolated and is found in NTS map area 23H/03 – the nearest sample site to this is 4 km away. The only sample that has high gold values in both types of analysis is in the southern part of NTS map area 23H/04. Au1 is 7 ppb and Au27 is 8 ppb.

Most of the highest Cu values (Figure 12) are found in NTS map areas 3H/5 and 23H/6 and some in NTS map area 23H/8. The area underlain by Ossok Mountain intrusive suite in NTS map areas 23H/1 and 23H/2 is remarkably low in Cu.

The distribution of Ni values (Figure 13) differs notably from that of Cu. The largest cluster of high values is found in NTS map areas 23G/8 and 23H/5 in the area underlain by OMIS. The next largest cluster in NTS map area 23A/15 is associated with units of the Beaver Gneiss which also contains occurrences of sulphide mineralization. An isolated high Ni value (105 ppm) is in NTS map area 23H/2 and another is located near Cu/Ni mineralization in the Shabogamo Gabbro in NTS map area 23H/7.

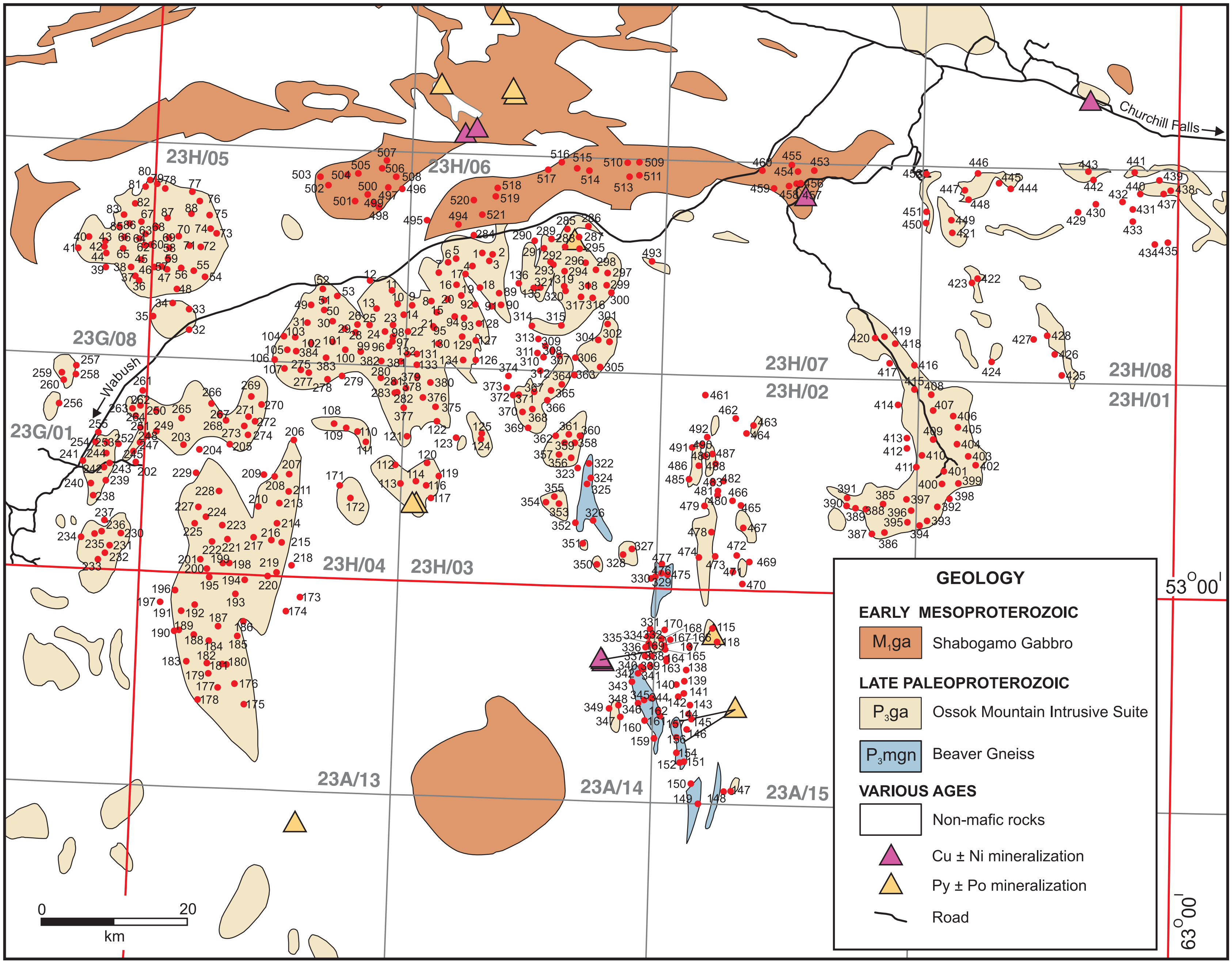

Figure 8. *Sample sites in relation to bedrock geology and NTS grid (last 3 digits of field number).*

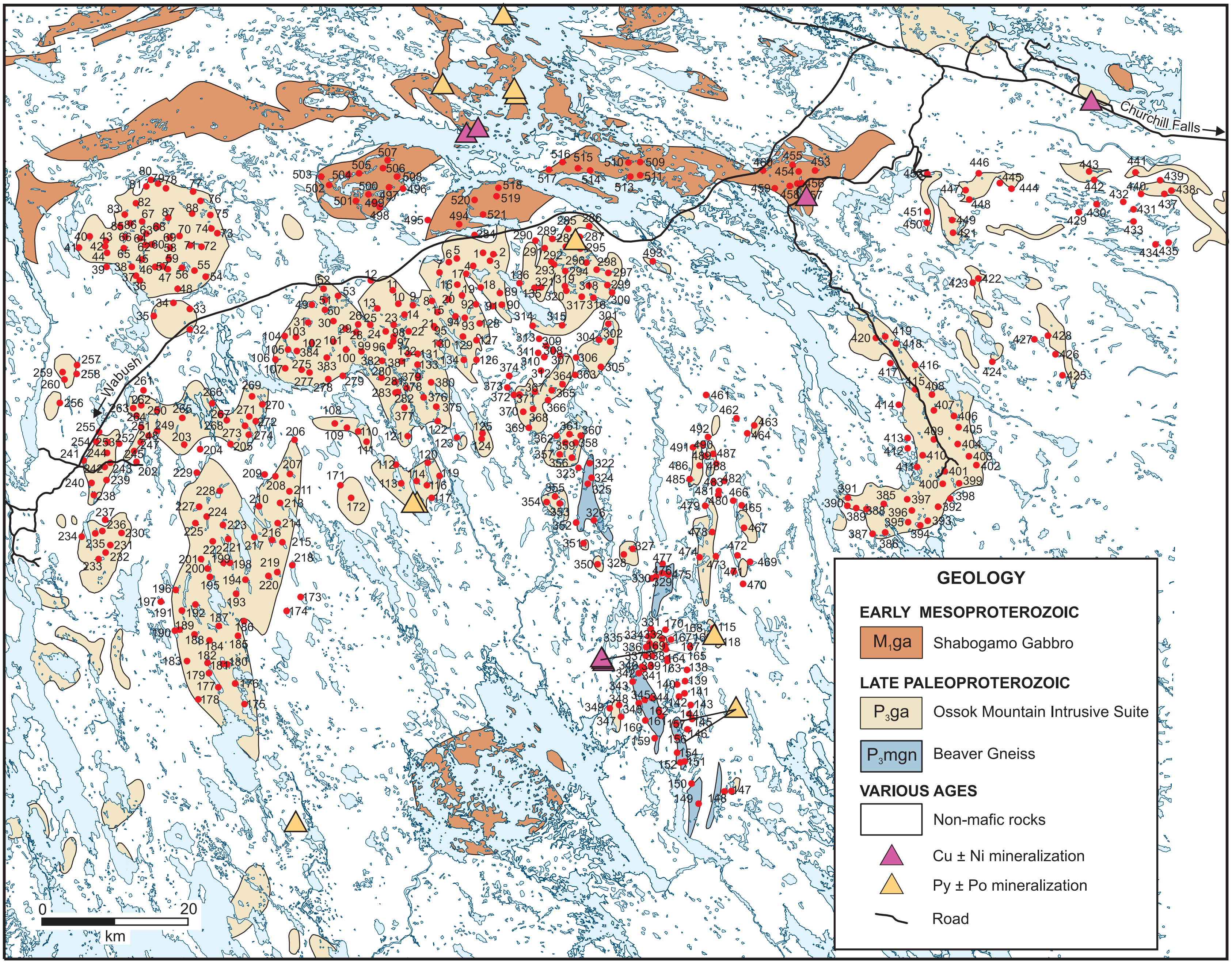

Figure 9. *Sample sites in relation to bedrock geology and lakes (last 3 digits of field number).*

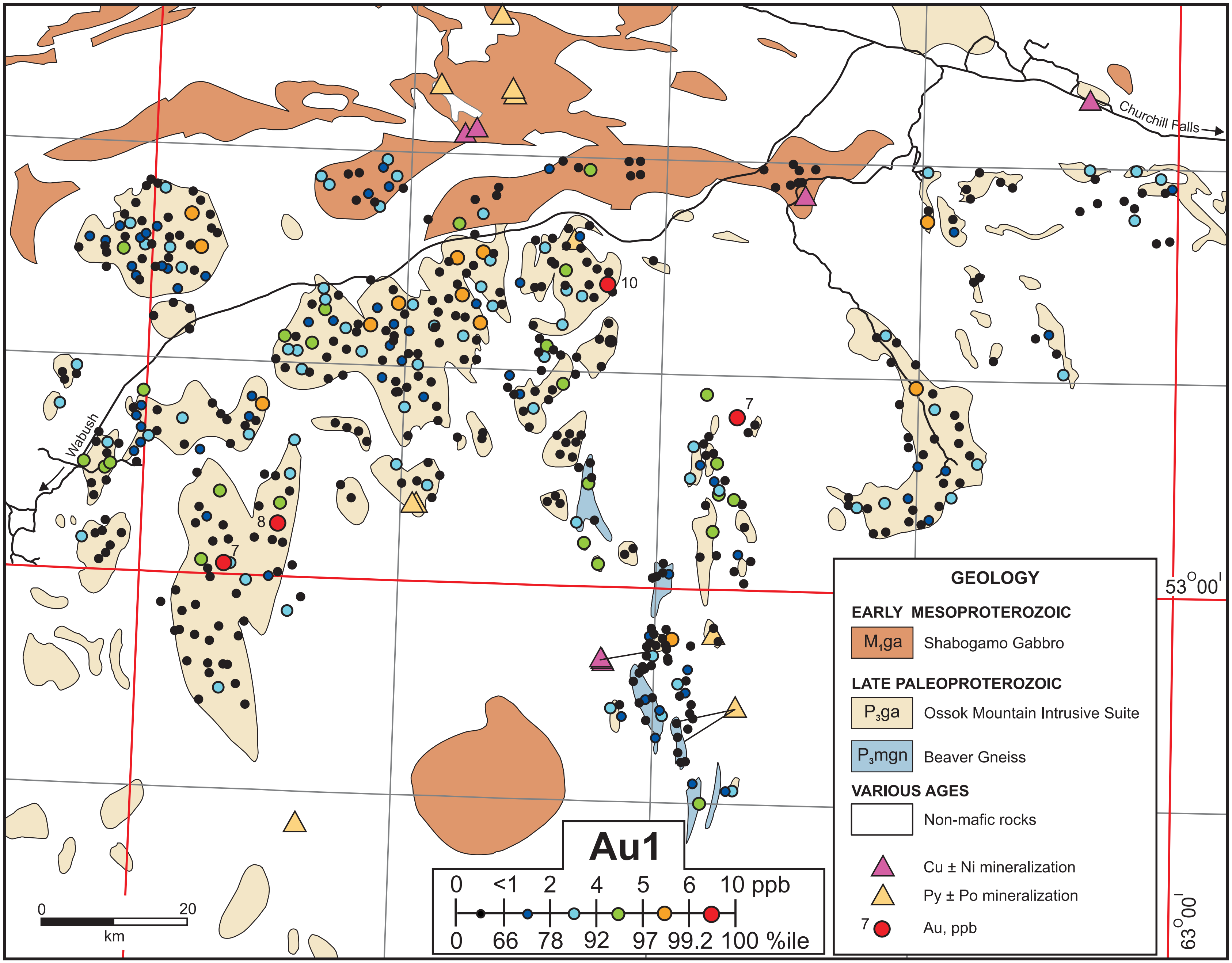

Figure 10. *Gold (Au1) in lake sediment.*

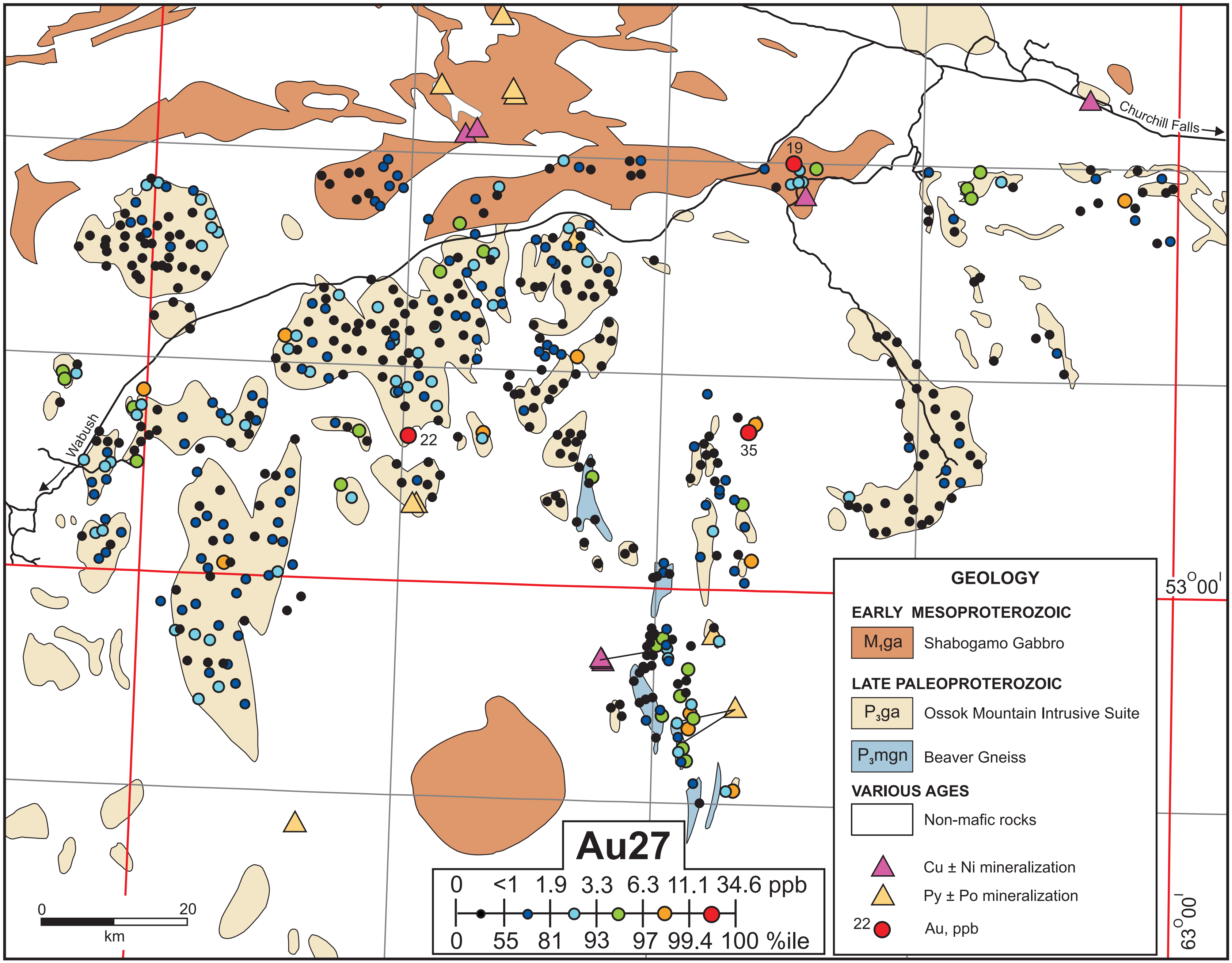

Figure 11. *Gold (Au27) in lake sediment.*

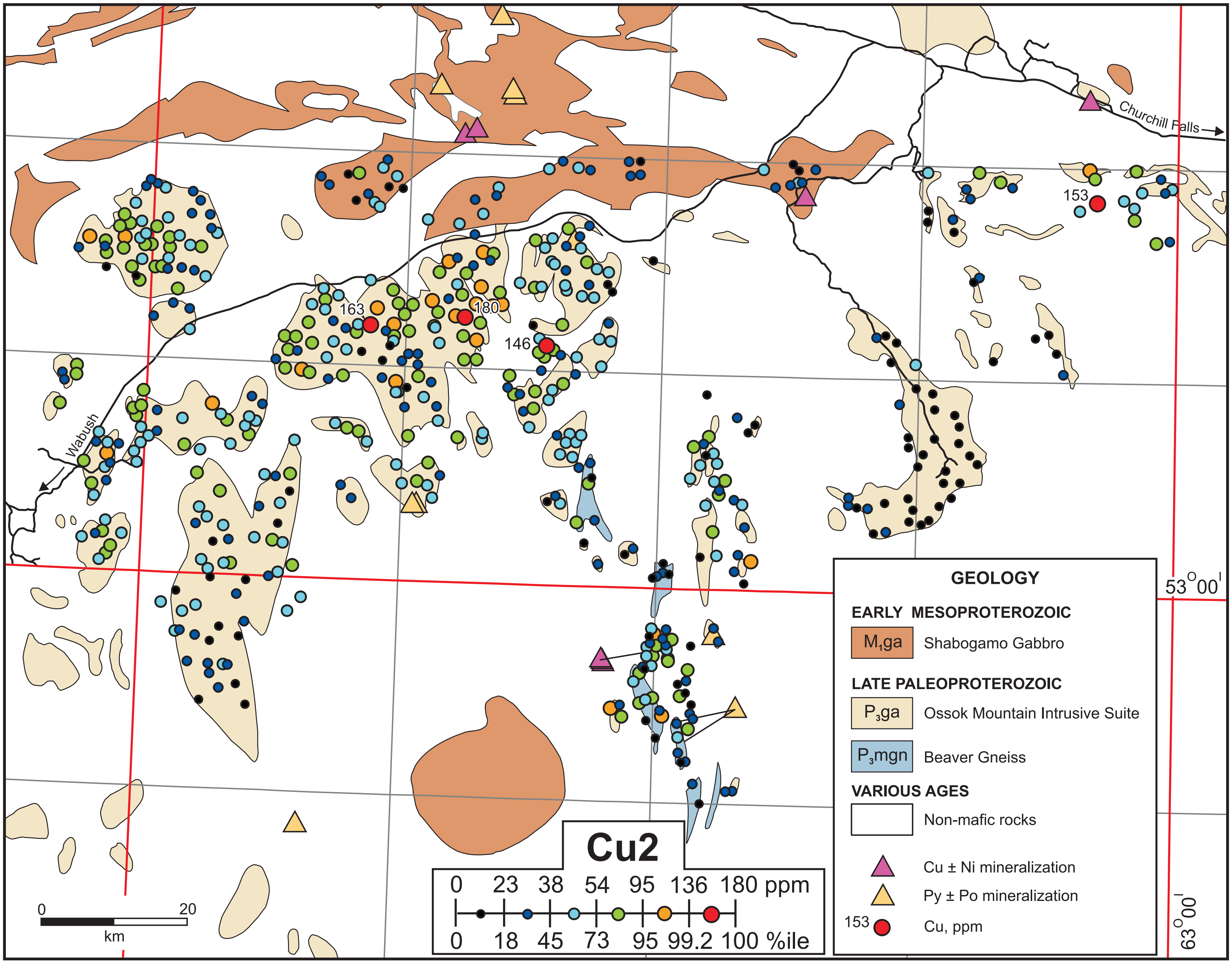

Figure 12. *Copper (Cu2) in lake sediment.*

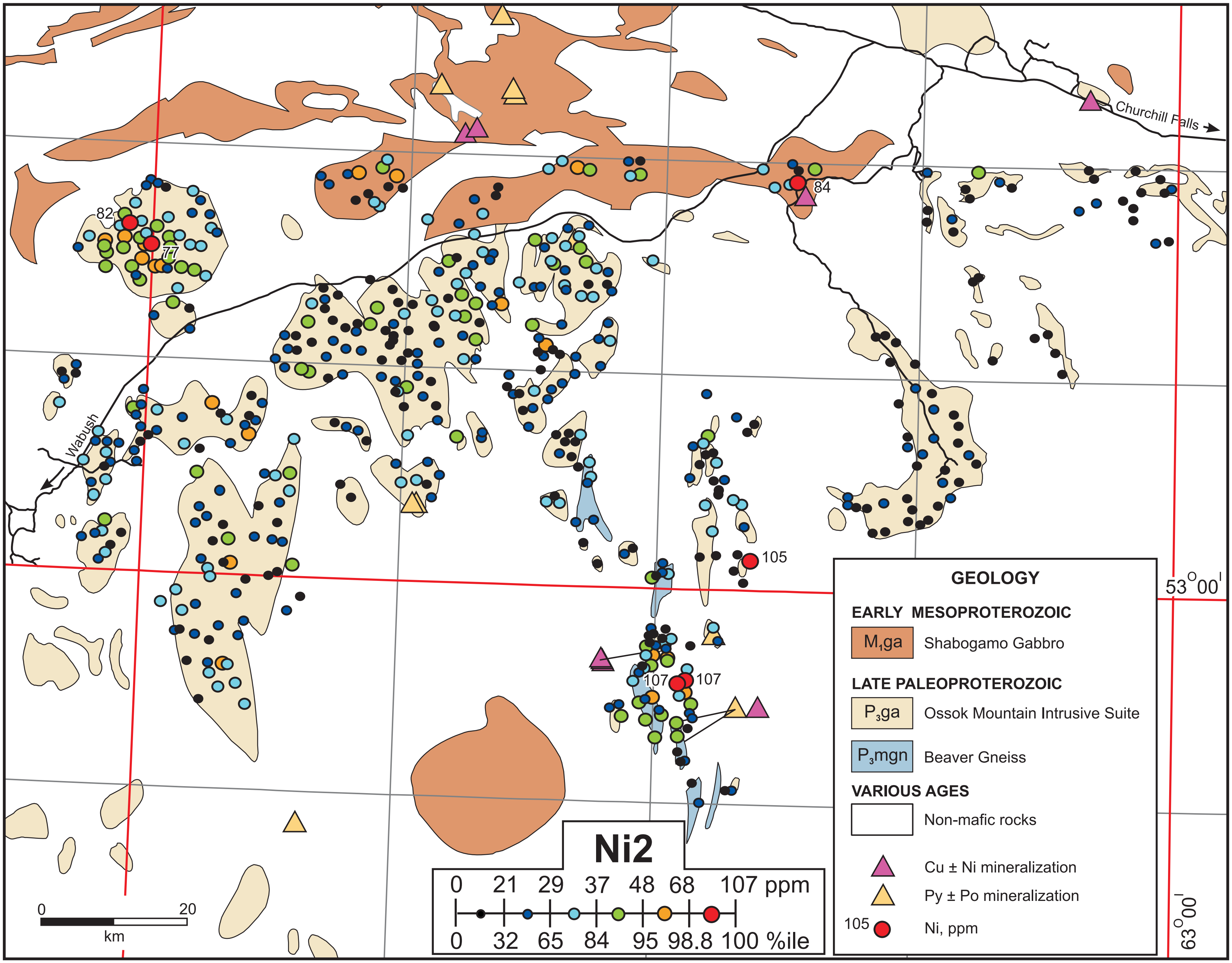

Figure 13. *Nickel (Ni2) in lake sediment.*

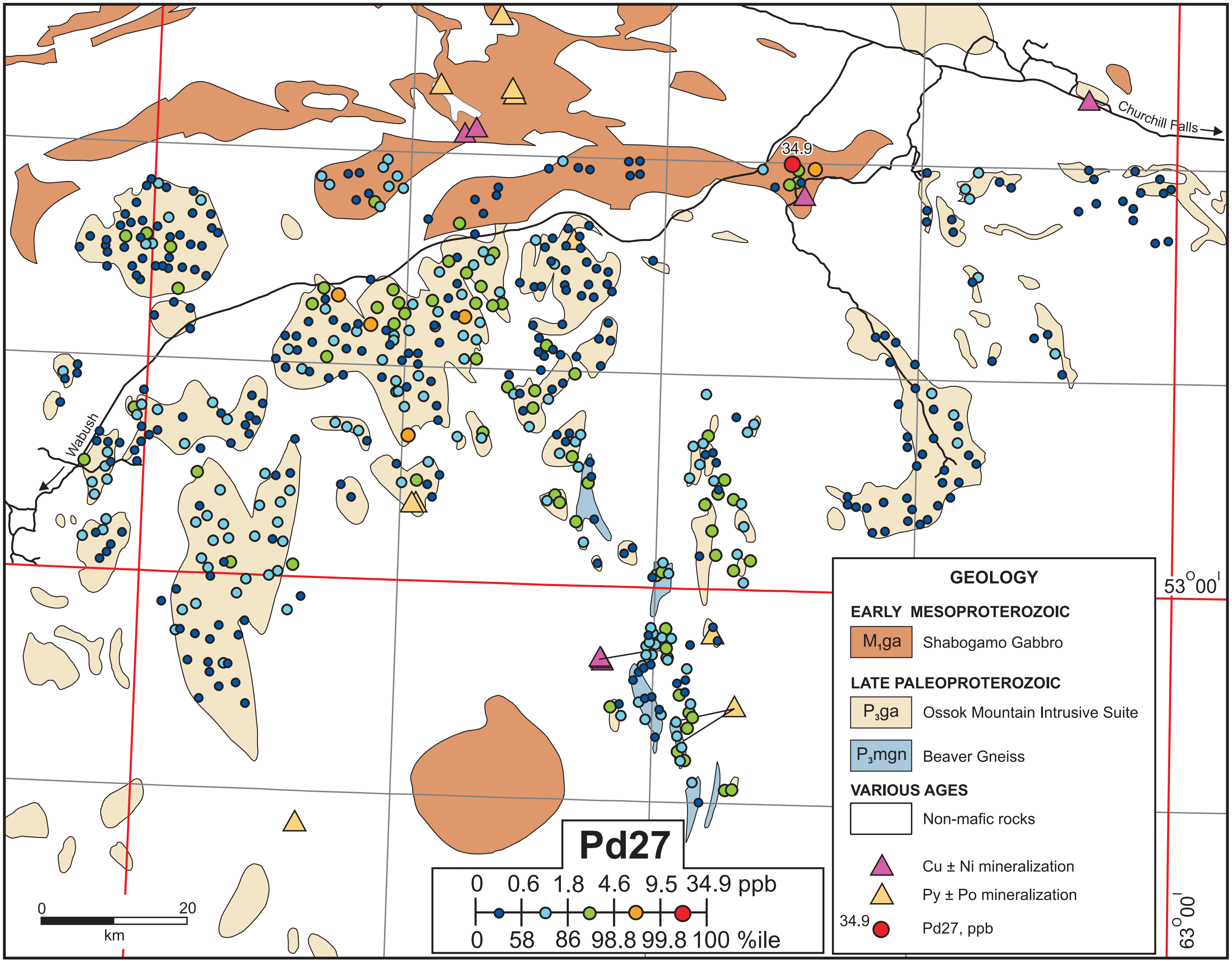

Figure 14. *Palladium (Pd27) in lake sediment.*

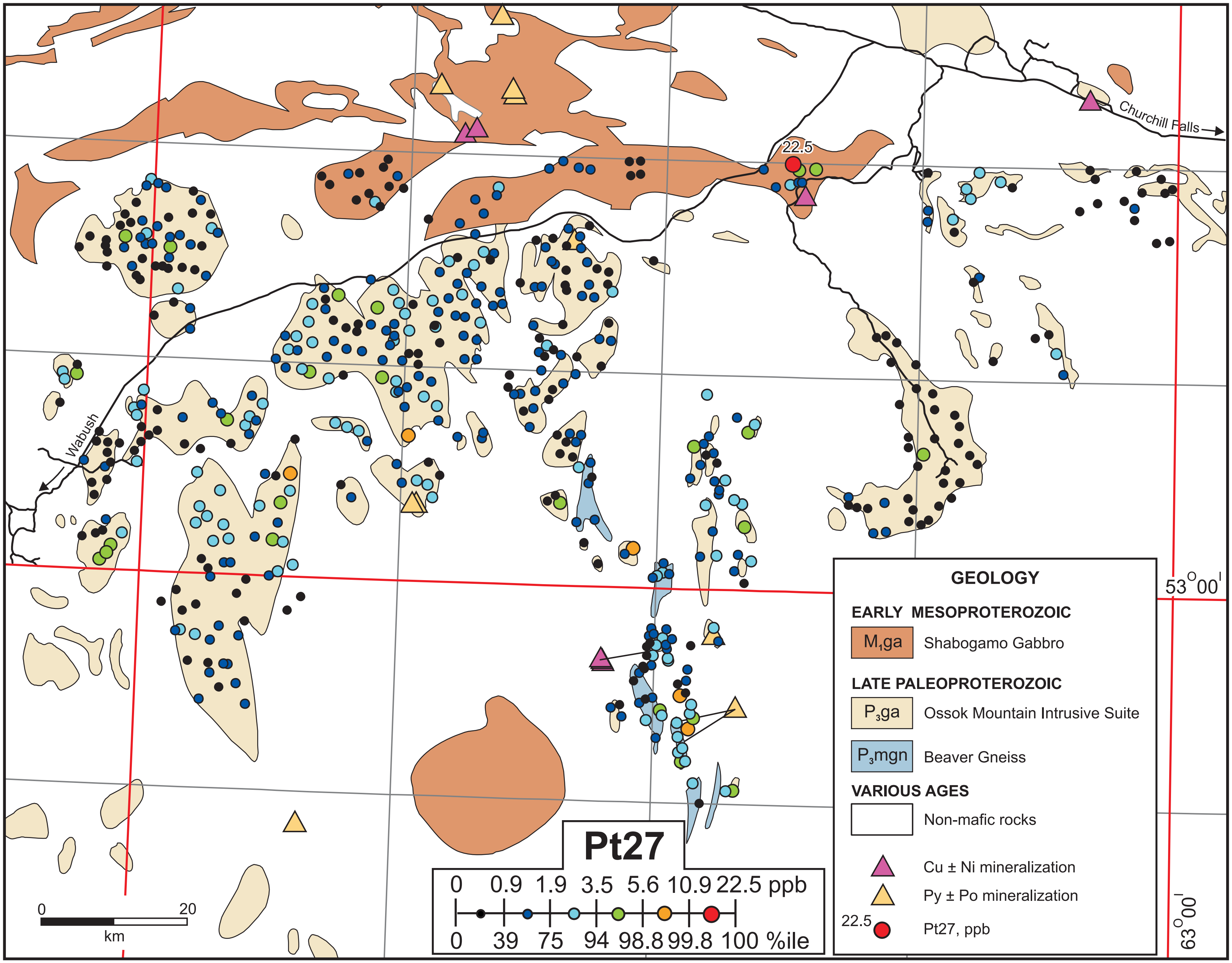

Figure 15. *Platinum (Pt27) in lake sediment.*

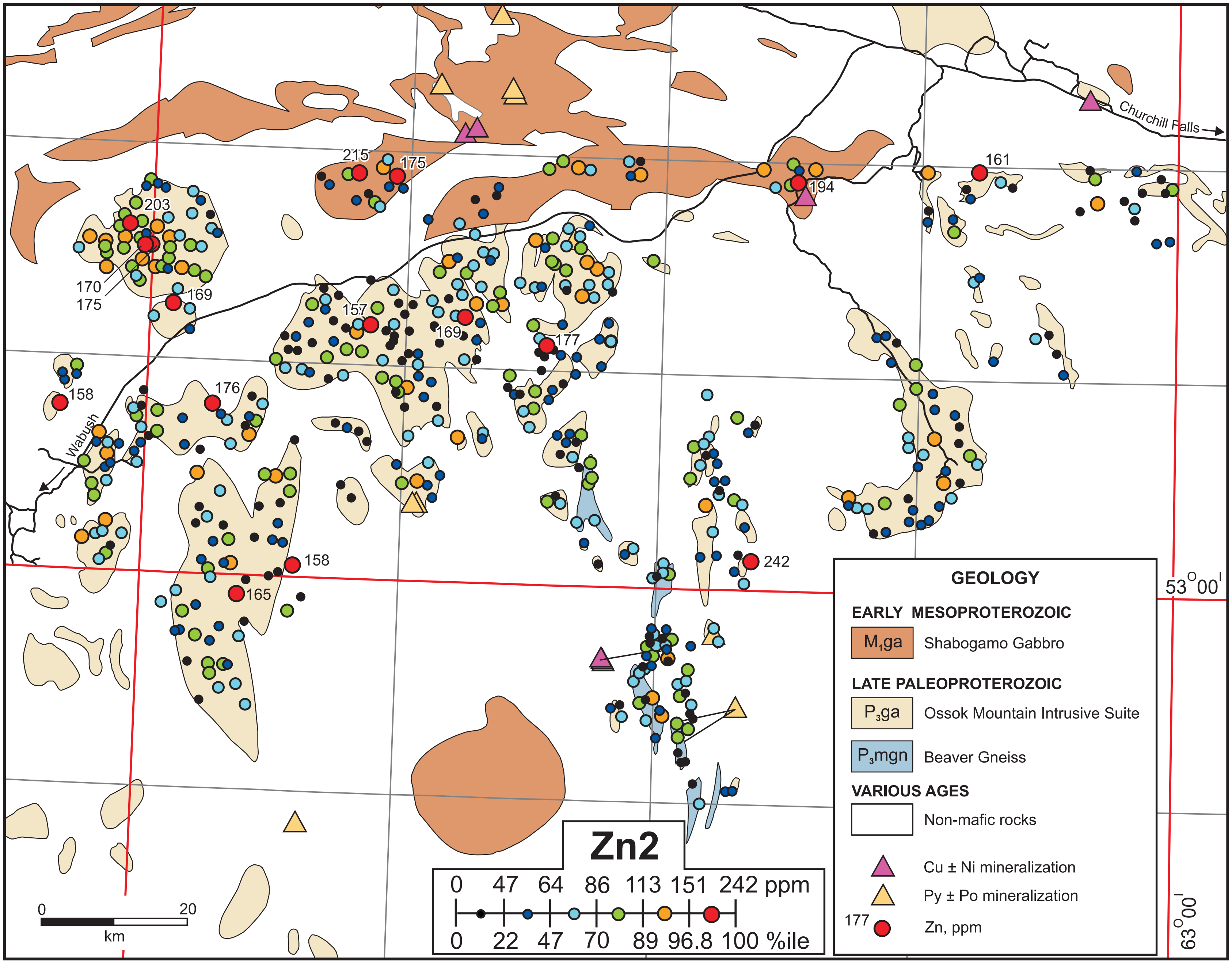

Figure 16. *Zinc (Zn2) in lake sediment.*

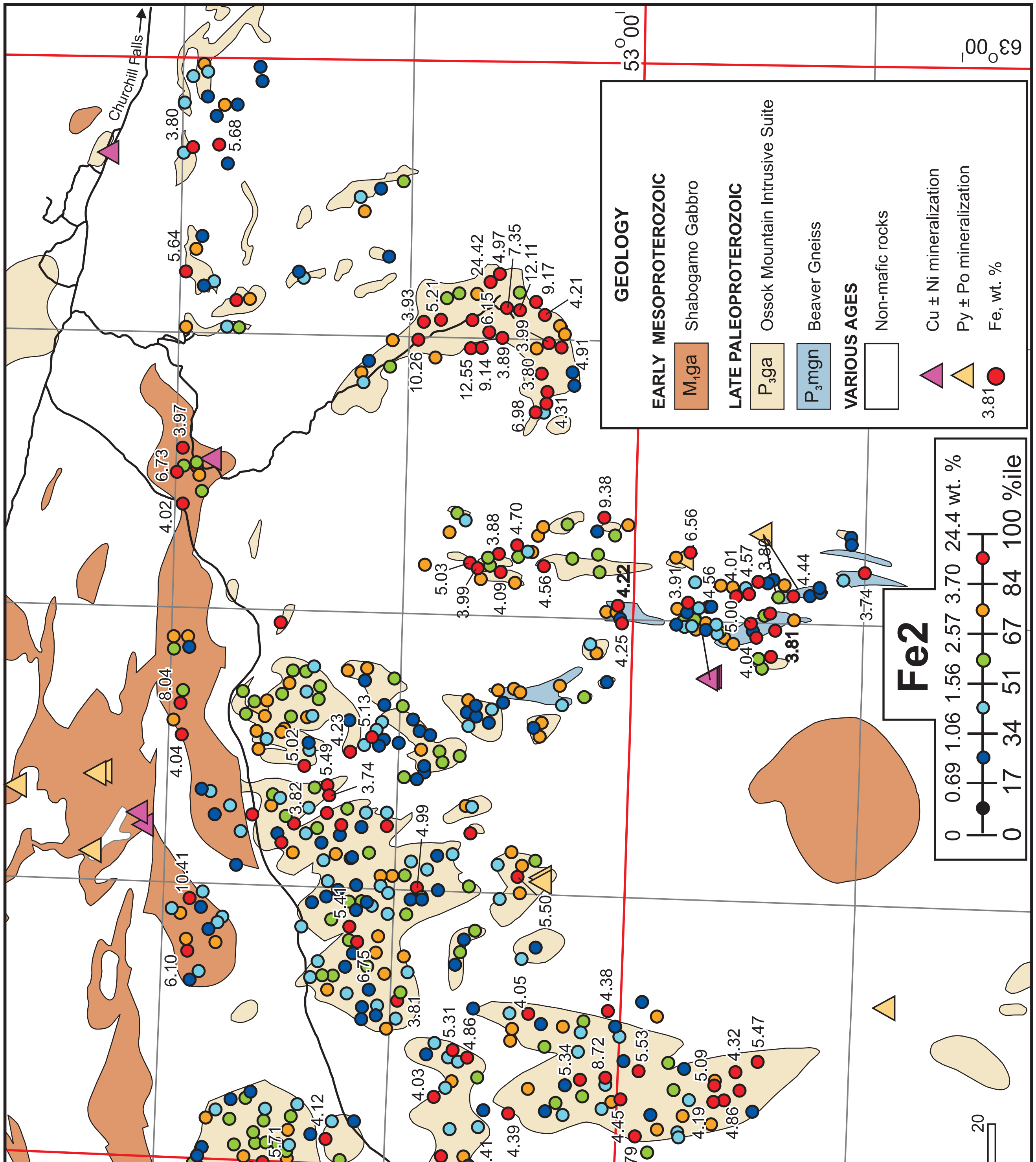

Figure 17. *Iron (Fe2) in lake sediment.*

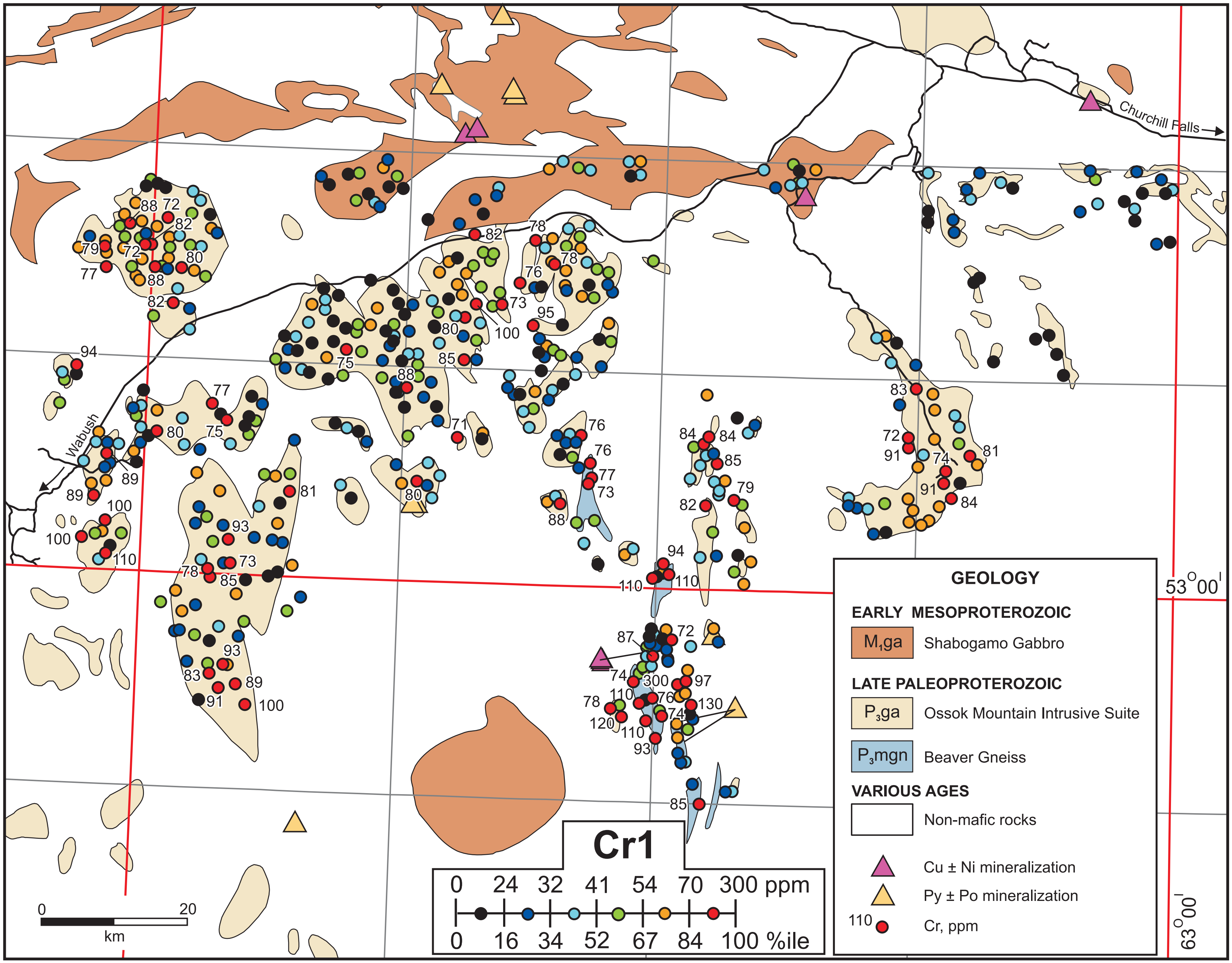

Figure 18. *Chromium (Cr1) in lake sediment.*

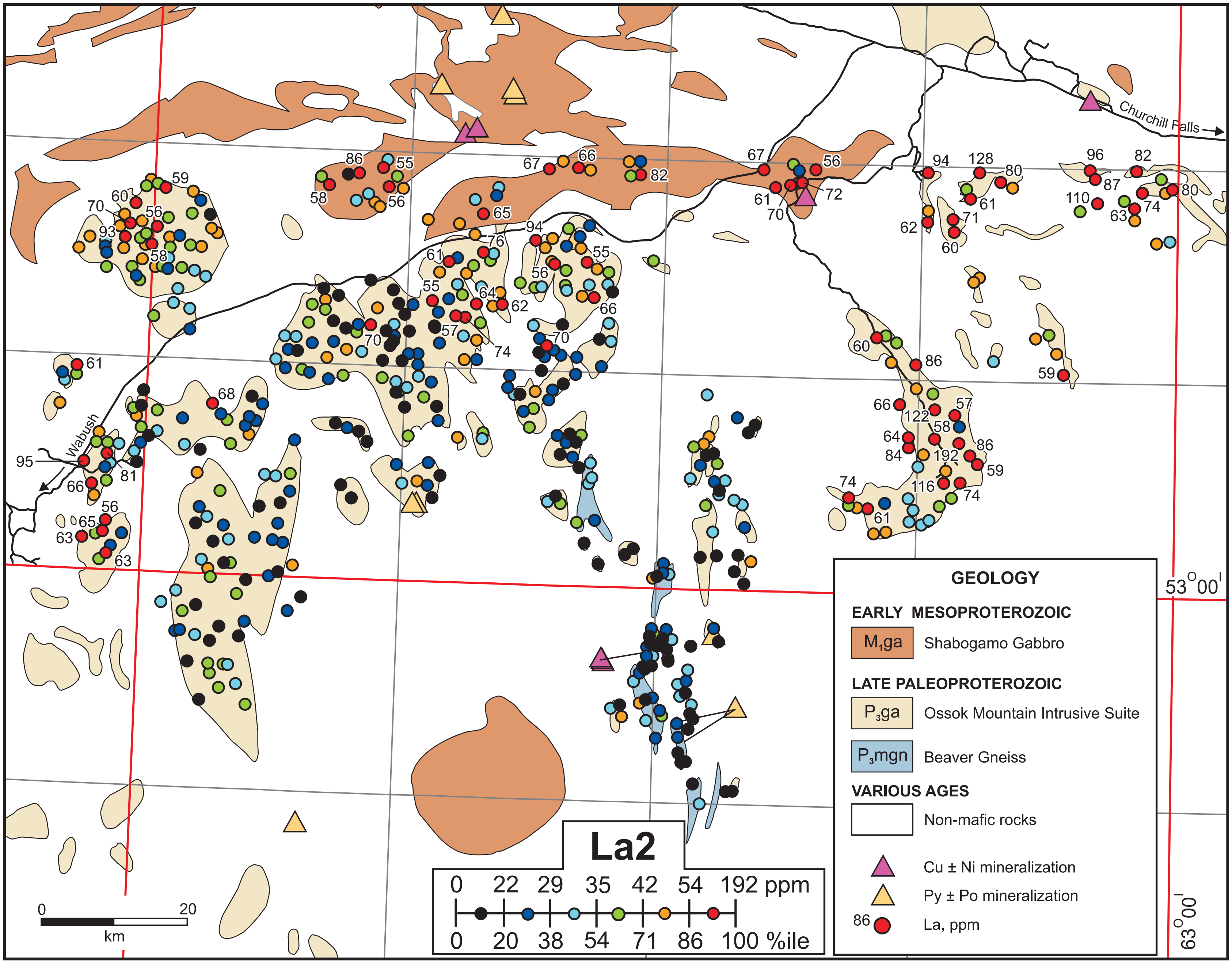

Figure 19. *Lanthanum (La2) in lake sediment.*

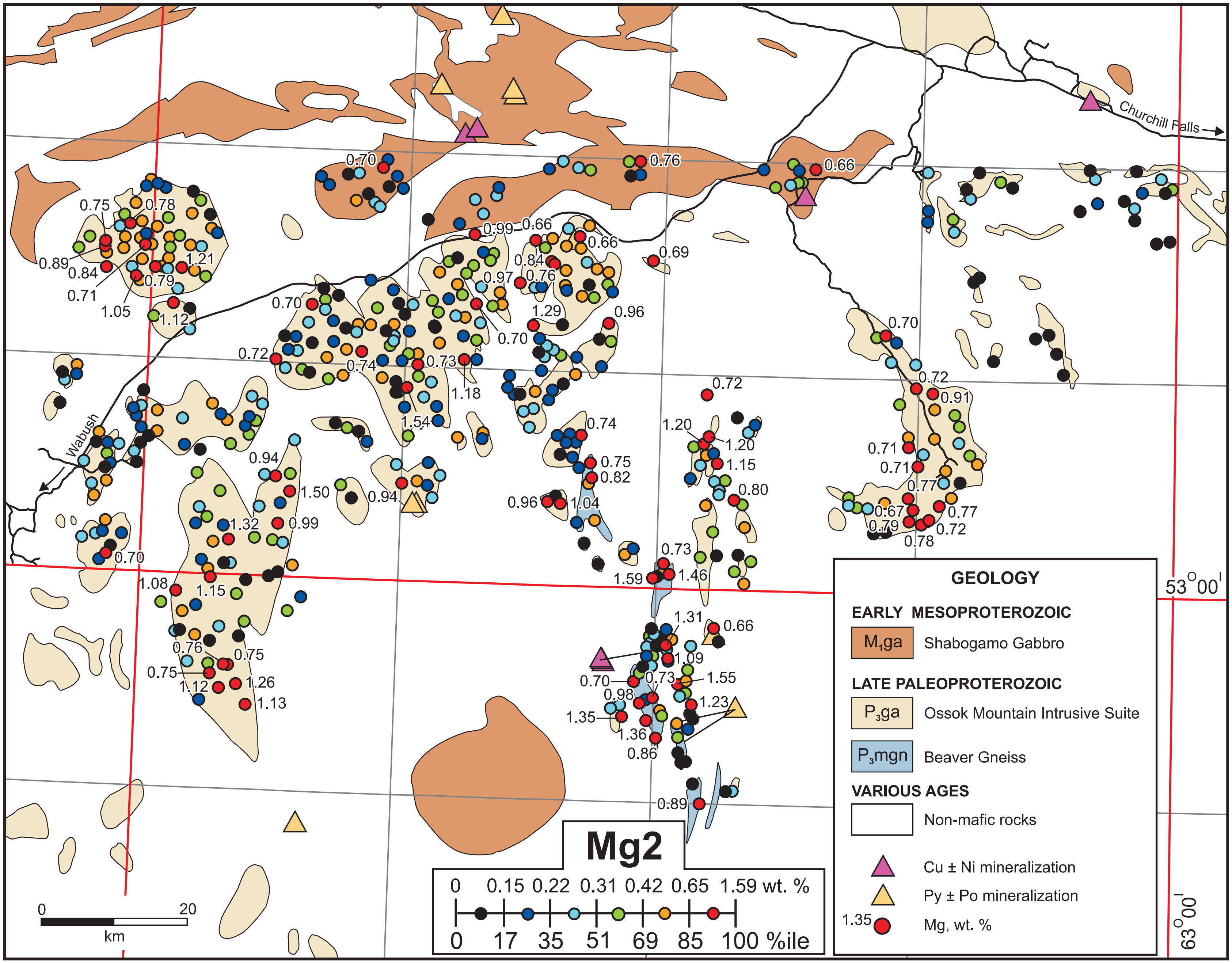

Figure 20. *Magnesium (Mg2) in lake sediment.*

The distribution of Pd is shown in Figure 14. The highest value sample (34.9 ppb) is located in NTS map area 23H/07 in a cluster of 4 samples that have elevated Pd values and is also about 4 km away from known base-metal mineralization. It is underlain by Shabogamo Gabbro. The high value sample also has very high Pt and Au27 values. The 4 samples classified in the next-to-highest category are all located in the large bat-shaped area of OMIS in NTS map area 23H. The southernmost of these samples also has high Pt and Au27 values.

The distribution of Pt is shown in Figure 15. As with Pd, the most obvious target is the high-Pt sample forming part of a four-sample cluster of elevated values found in NTS map area 23H/07. Other elevated values are found in samples over the Beaver Gneiss, in the southernmost sample over the bat-shaped area of OMIS mentioned above and a sample located in NTS map area 23H/04.

The distribution of high Zn values (Figure 16) is quite scattered. The highest value (242 ppm) is found in NTS map area 23H/2 and is coincident with high Ni (105 ppm) and high Fe (9.38%) values. The latter suggests that some contribution of the high Zn and Ni may be due to an abnormally high Fe (hydr)oxide content in the sample.

The distribution of Fe values (Figure 17) is fairly scattered with some clustering of higher values in NTS map areas 23H/1 and 23H/2. The plot of Fe is included as an indication of redox conditions in the sediment and as a reference for interpreting the significance of other elements that may correlate with Fe such as Co and Zn. *See* “Correlation Analysis of Sediment Data” above.

The distribution of Cr (Figure 18) shows some spatial clustering. The area underlain by OMIS in NTS map area 23H/1 and adjacent NTS map area 23H/2 has elevated Cr1 values as do the areas underlain by the Beaver Gneiss. In contrast, areas underlain by the Shabogamo Gabbro have low Cr1 values, as do areas of OMIS in the northeastern part of the survey.

The distribution of La values (Figure 19), not surprisingly, is nearly opposite to that of Cr. Areas of Beaver Gneiss have uniformly low values whereas the Shabogamo Gabbro and the northeast part of the survey have generally high La2 values. An exception is the area of OMIS in NTS map areas 23H/1 and 23H/2 that has high values of both La and Cr.

The distribution of Mg (Figure 20) is very similar to that of Cr.

Water Data

Symbol plots of pH and conductivity are shown in Figures 21 and 22. Plots of the ore metals Cu, Ni and Zn are shown in Figures 23 through 25 and Fe, Ca, Cr, Mg, Si and SO_4 are shown in Figures 26 through 31.

The distribution of pH is shown in Figure 21. The distribution shows clustering where most of the highest values occur in areas of the Shabogamo Gabbro, and at the northern edge of the OMIS unit in NTS map area 23H/5. Low values are found in the northeast of the survey, over OMIS in NTS map area 23H/2 and over the western lobe of OMIS in NTS map area 23H/5.

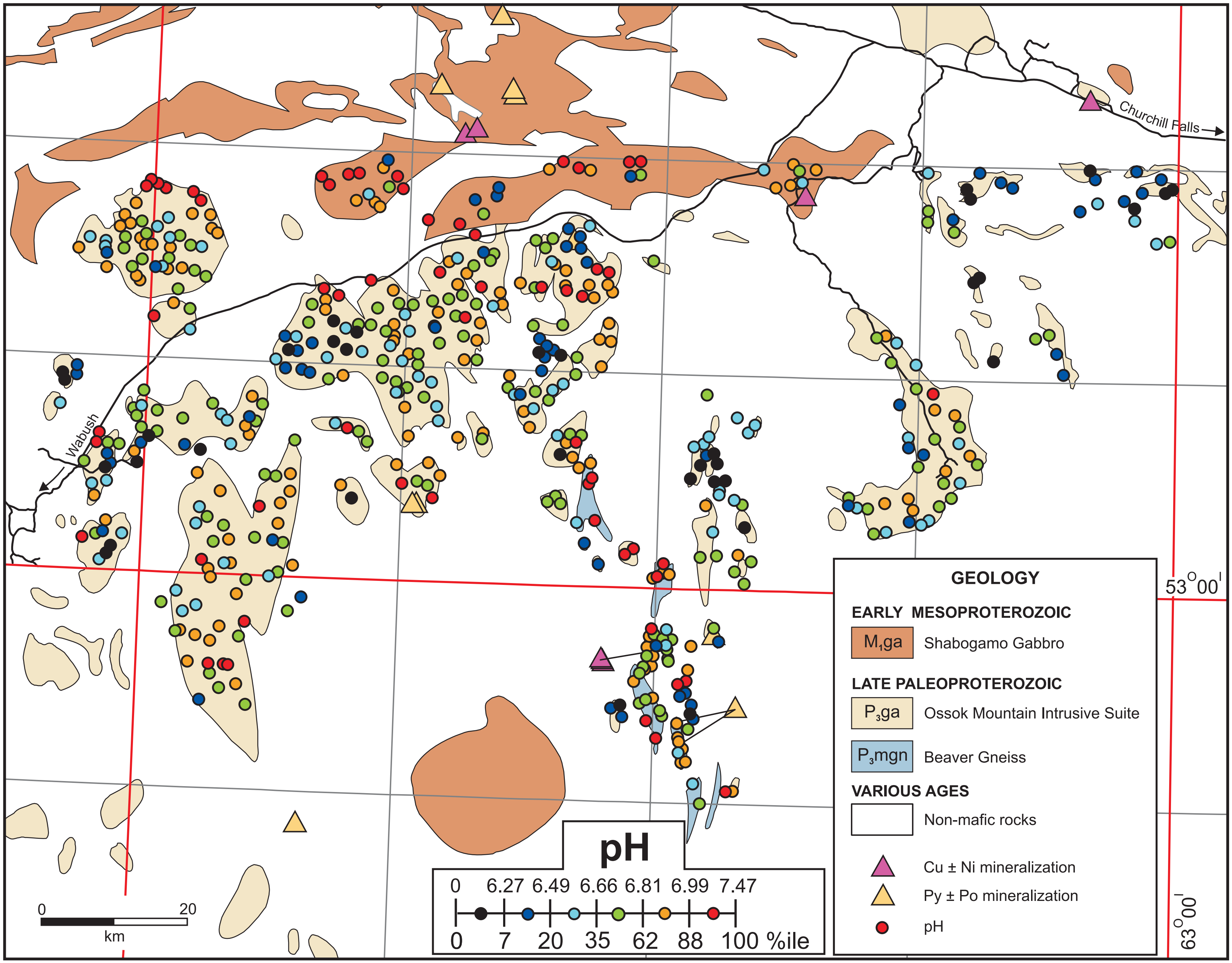

Figure 21. *pH of lake water.*

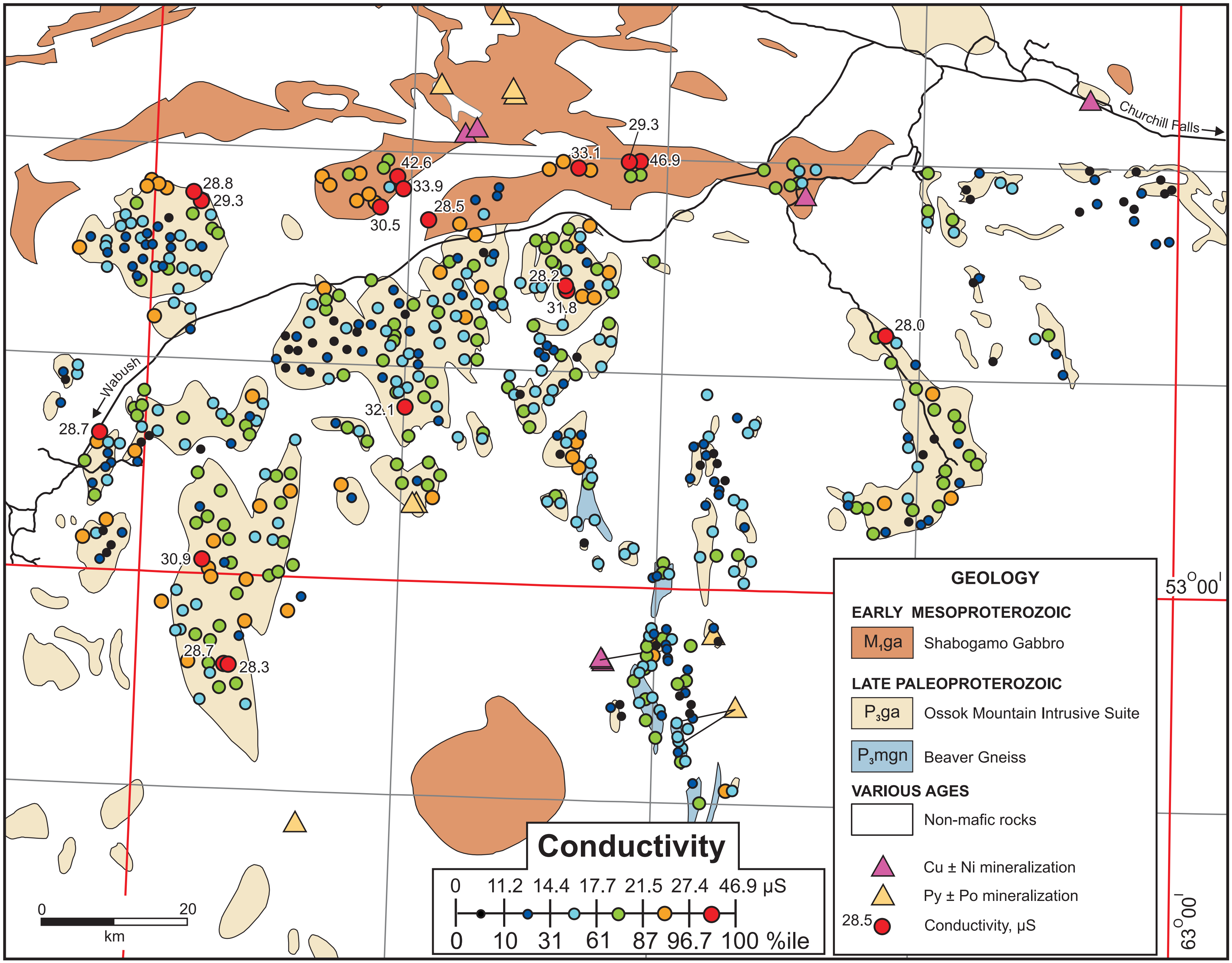

Figure 22. *Conductivity in lake water.*

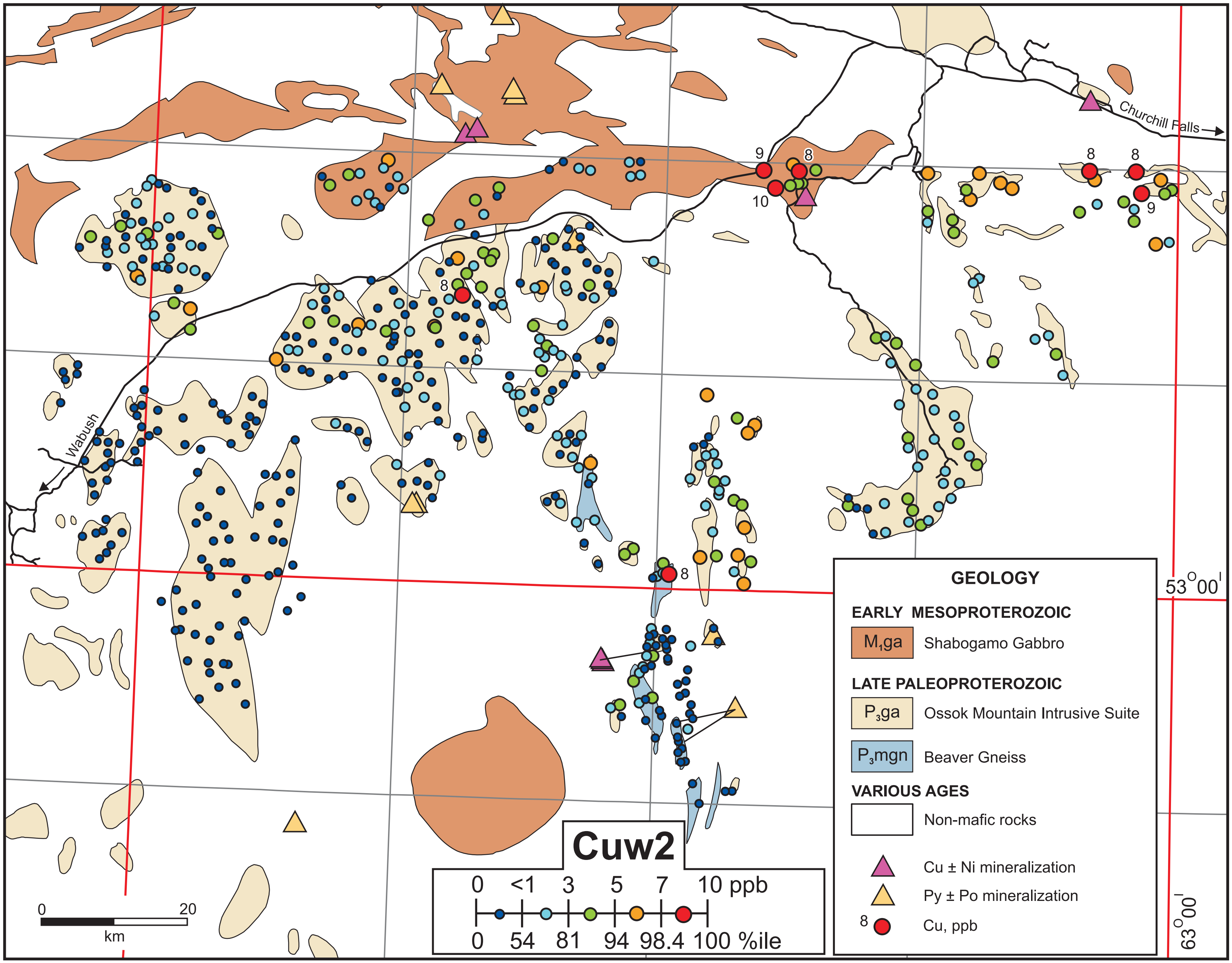

Figure 23. *Copper (Cuw2) in lake water.*

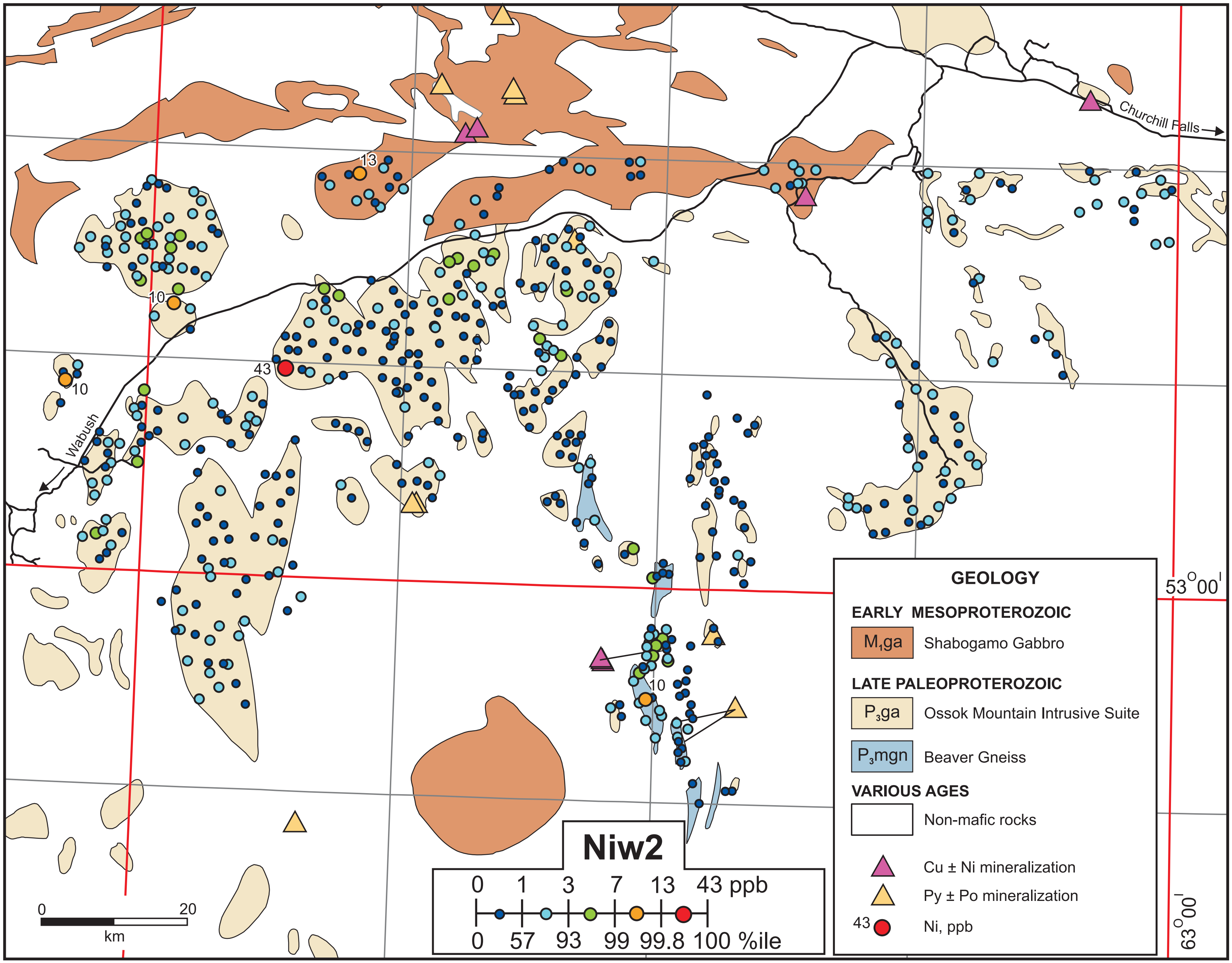

Figure 24. *Nickel (Niw2) in lake water.*

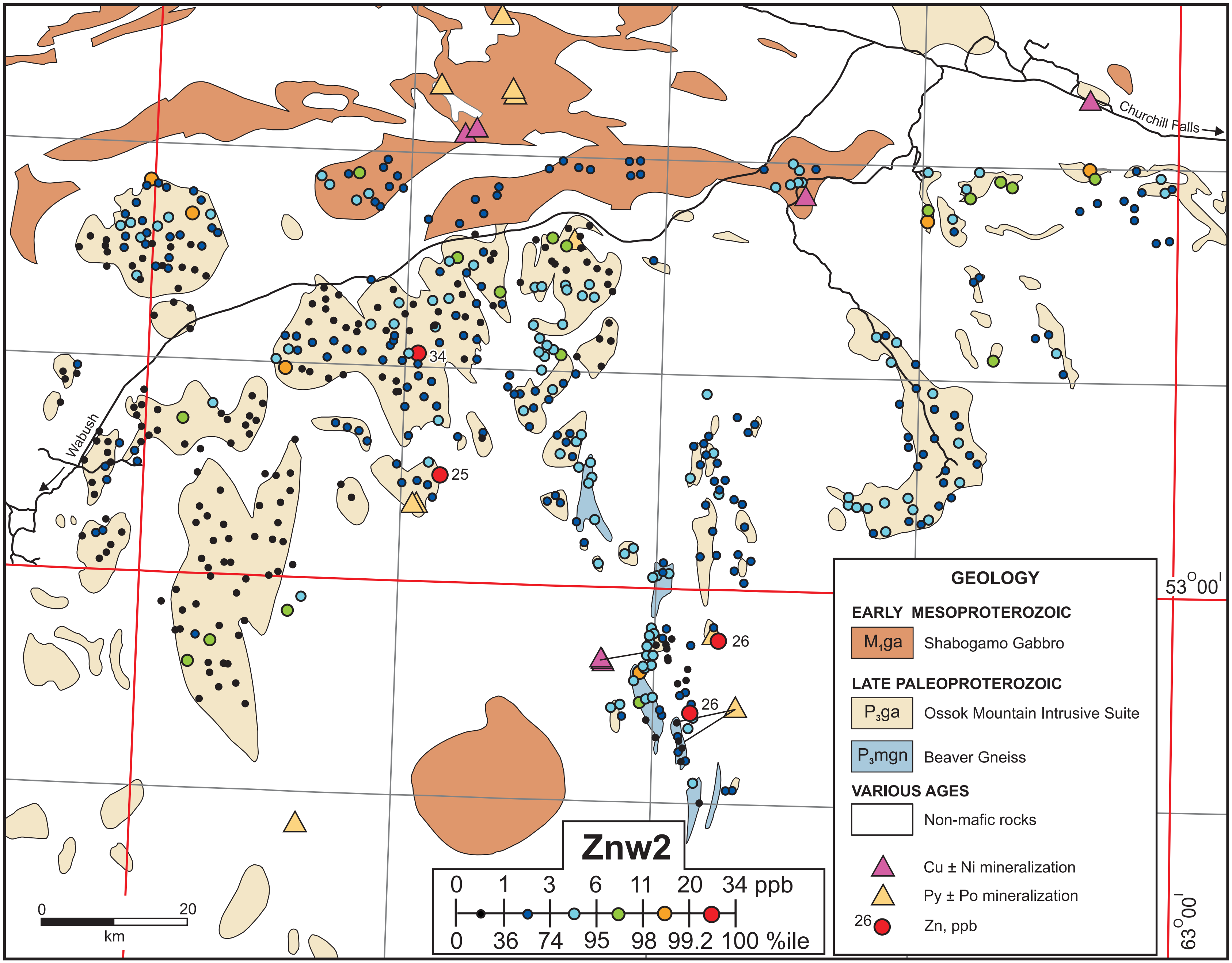

Figure 25. *Zinc (Znw2) in lake water.*

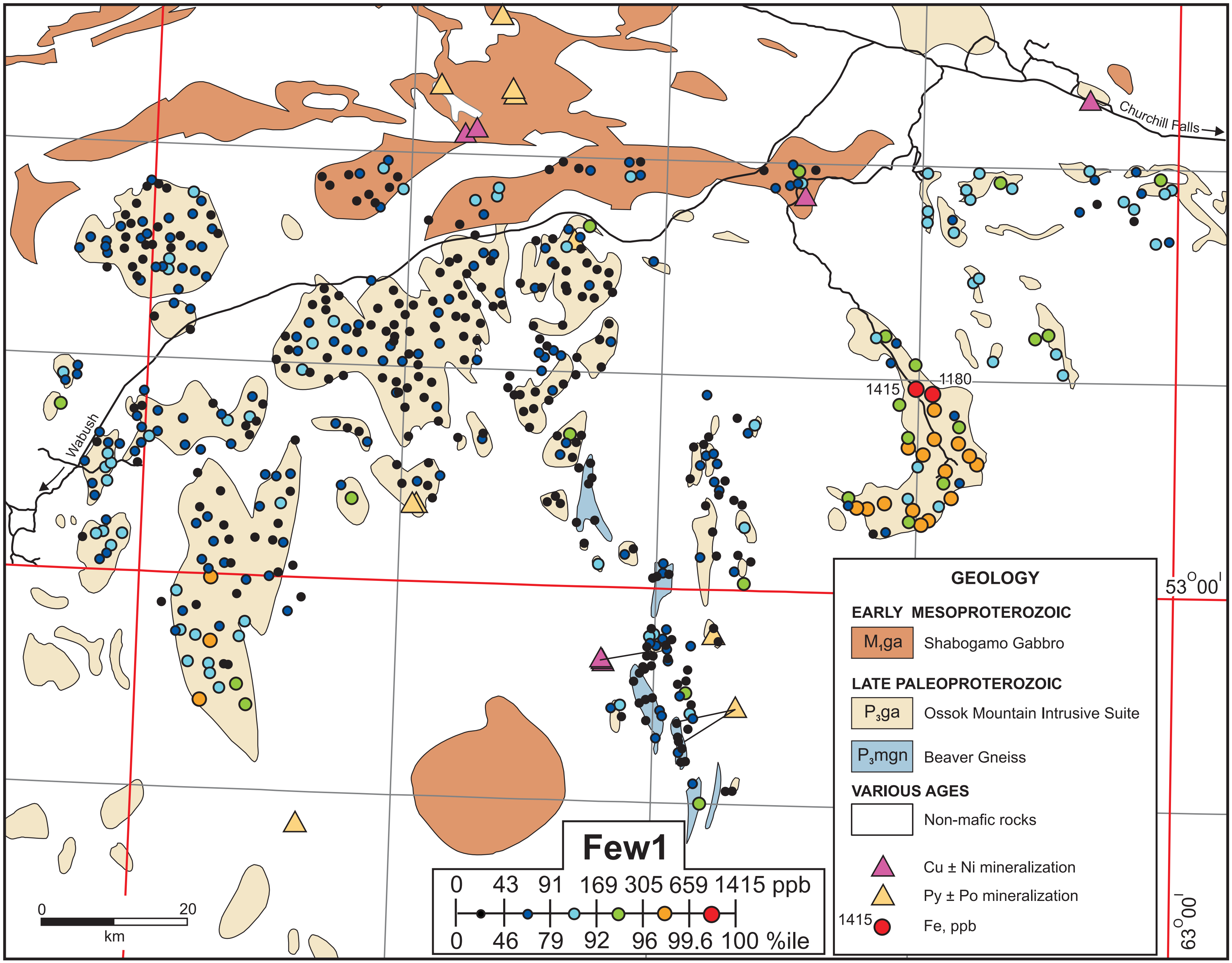

Figure 26. *Iron (Few1) in lake water.*

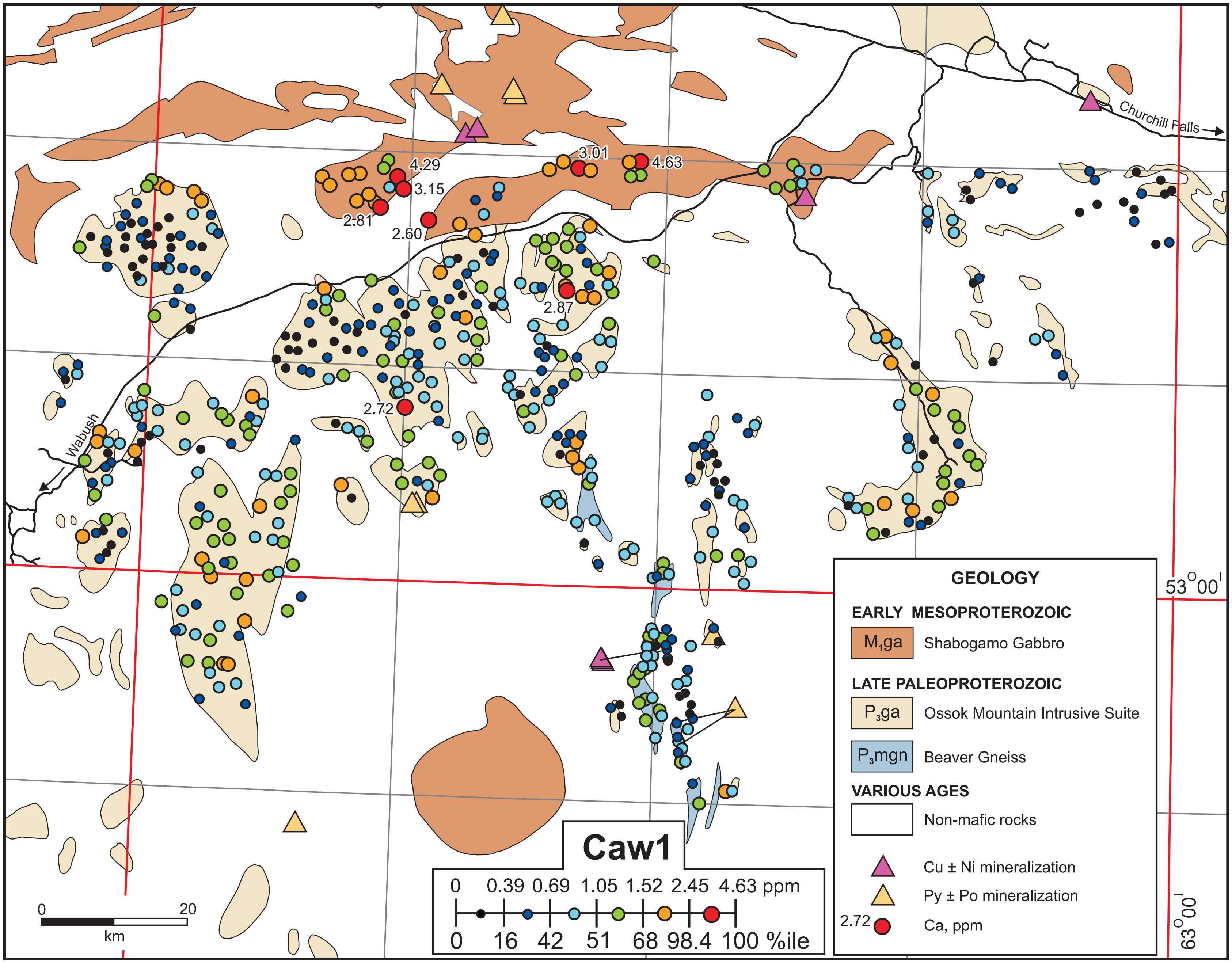

Figure 27. *Calcium (Caw1) in lake water.*

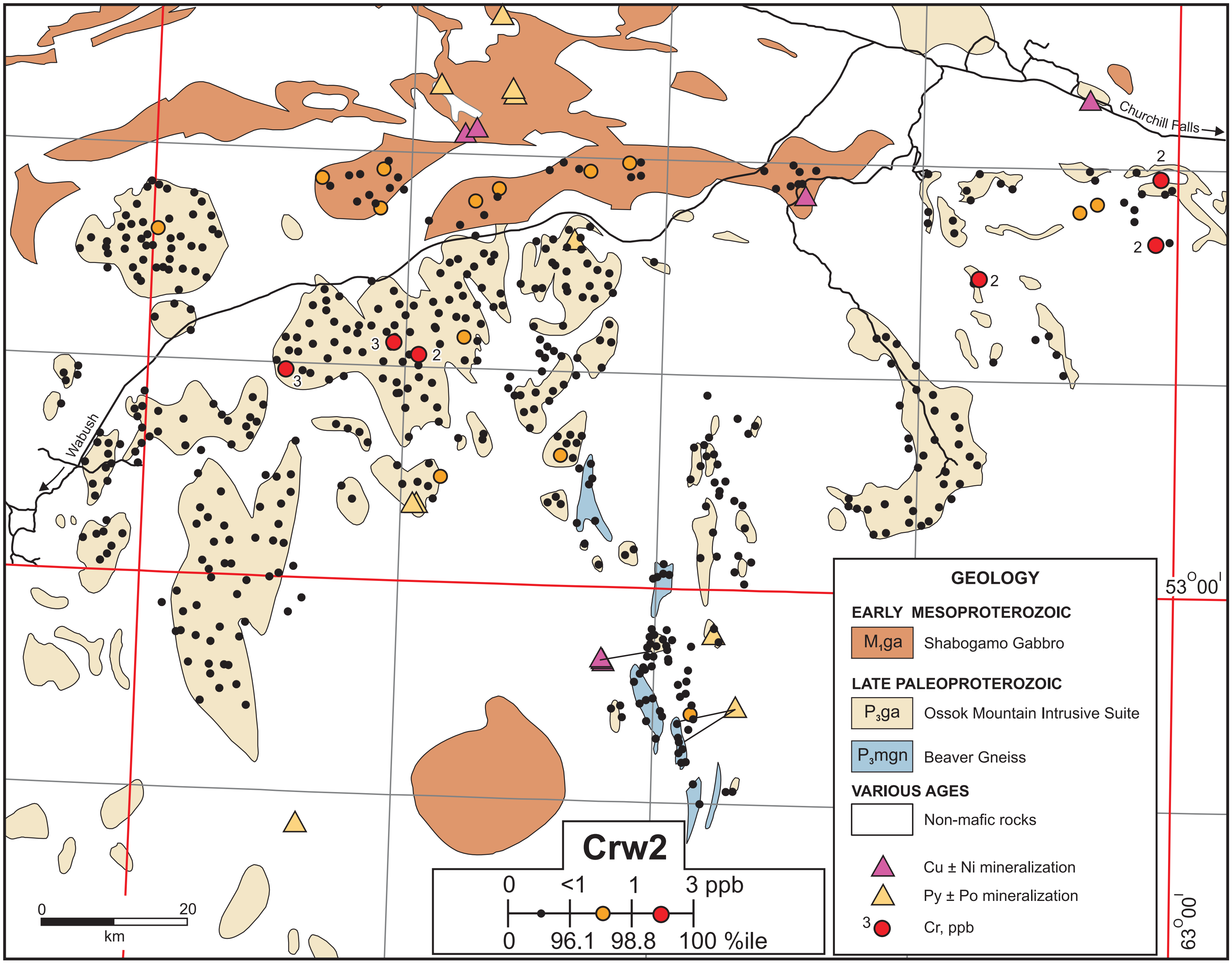

Figure 28. *Chromium (Crw2) in lake water.*

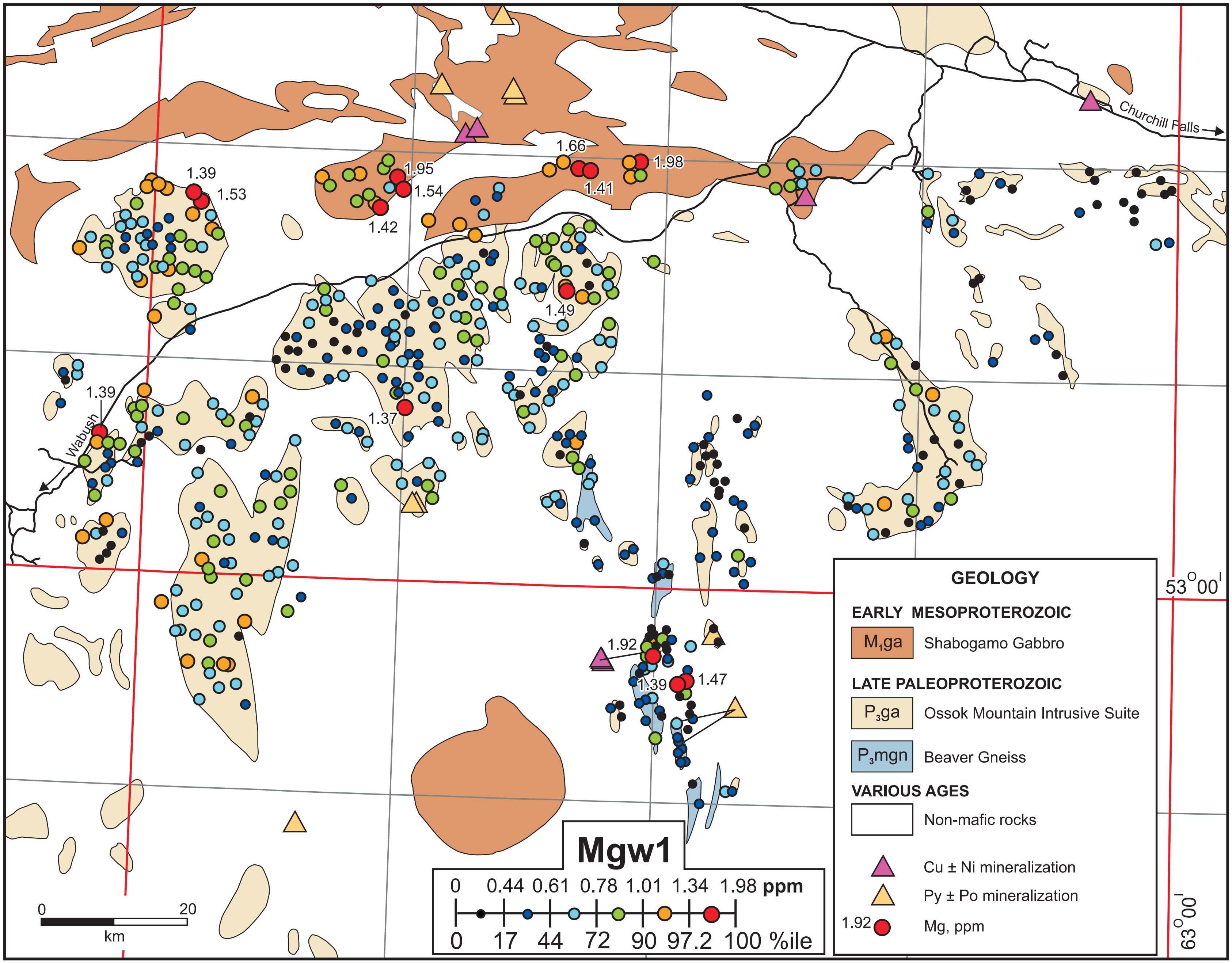

Figure 29. *Magnesium (Mgw1) in lake water.*

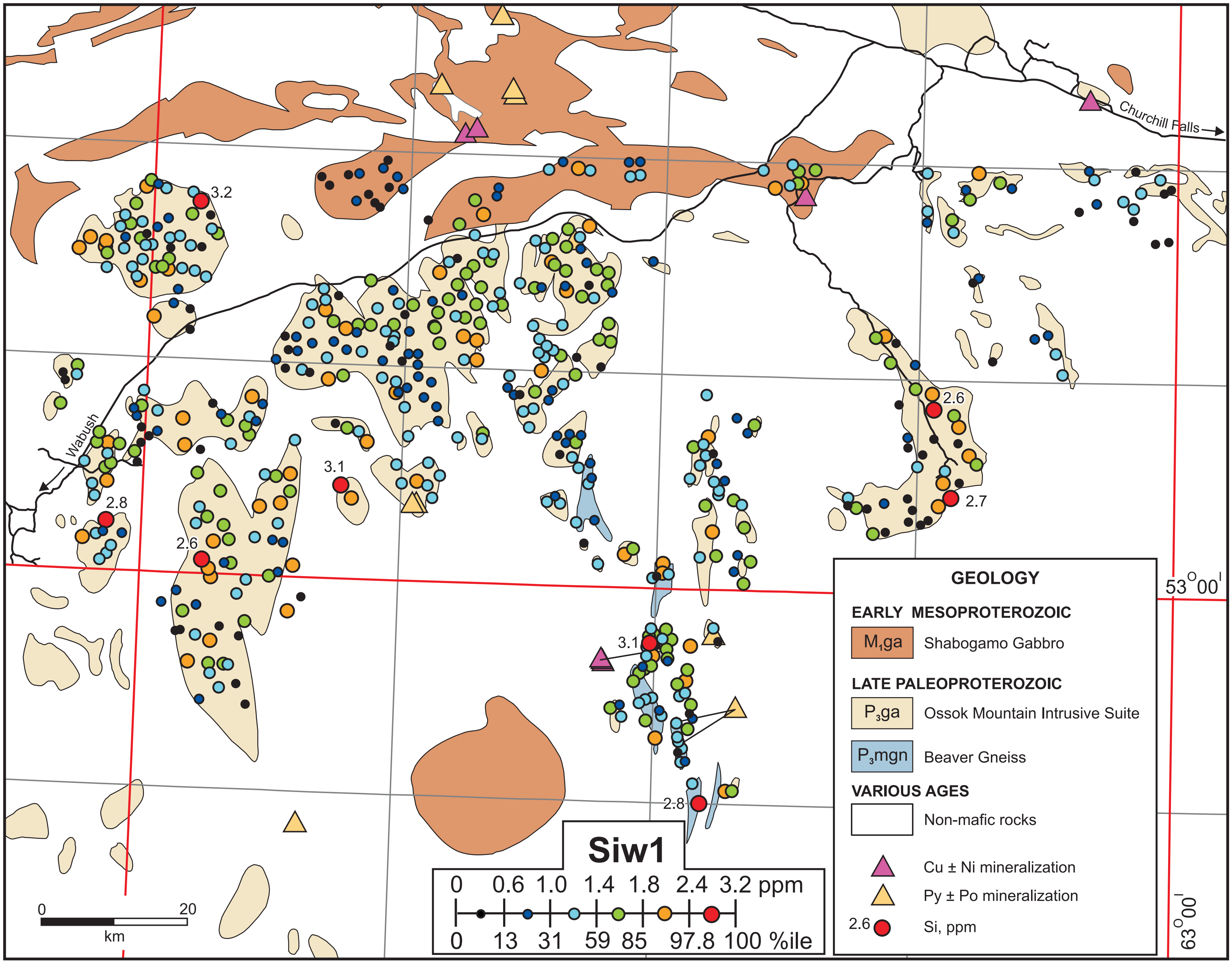

Figure 30. *Silicon (Siw1) in lake water.*

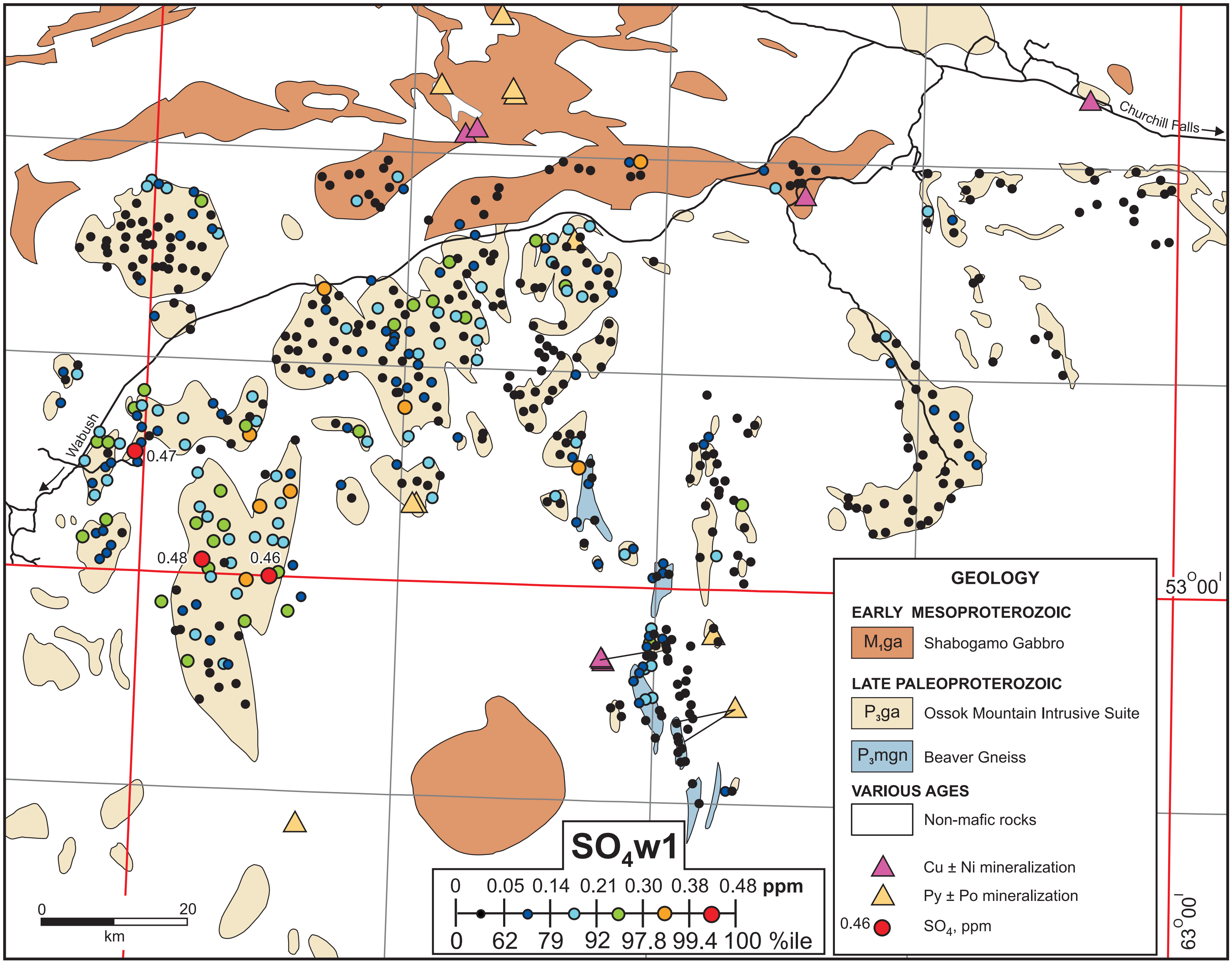

Figure 31. *Sulphate (SO$_4$w1) in lake water.*

The distribution of water conductivity values is shown in Figure 22. Conductivity is directly proportional to the dissolved ion content in the sample and the ion content, in turn, reflects both the nature of bedrock and overburden in the catchment basin, and the amount of time that the water was in contact with the material in order to dissolve ions. Generally, lakes (and their source streams) that have high conductivities are those which have a high contribution of groundwater input or have more readily soluble material in their catchment basins. The distribution pattern of conductivity values is very similar to that of pH.

The distribution of Cu is shown in Figure 23. Most of the high values are found in lakes underlain by the eastern lobe of Shabogamo Gabbro in NTS map area 23H/7 (also close to Cu/Ni mineralization) and over a small unit of OMIS in NTS map area 23H/8. One high value is from an area of Beaver Gneiss and one from OMIS in NTS map area 23H/6. Several elevated values are found in NTS map area 23H/2. Areas in the southwest part of the survey in NTS map areas 23A/13, 23H/4 and 23G/1 are uniformly low in Cu.

The distribution of Ni is shown in Figure 24. More than 50 percent of the samples are below detection limit. One very high value (43 ppb) is found in NTS map area 23H/4. The values of Zn and Cr in water in that sample are also elevated. The associated sediment sample does not show an enrichment in base metals. Four other sites with values of 10 to 12 ppb Ni are scattered. Four samples with 4 to 7 ppb Ni are clustered adjacent to known Cu ± Ni mineralization in the Beaver Gneiss in NTS map area 23A/15. Another four-sample cluster is located in the centre of the most northwesterly lobe of OMIS in NTS map areas 23H/5 and 23G/8 and approximately corresponds to an area of Ni enrichment in sediment although not on a sample by sample basis.

The distribution of Zn in water is shown in Figure 25. Two of the four highest samples are in close proximity to two known occurrences of Py ± Po mineralization in NTS map area 23A/15. Another sample with high Zn (20 ppb), located in NTS map area 23H/4 is the same sample that has the highest Ni in water in this survey (43 ppb). Seven samples in the 6 to 15 ppb range are from lakes overlying OMIS rocks in NTS map area 23H/8. Samples in proximity to the known Cu ± Ni mineralizations in the Shabogamo Gabbro and Beaver Gneiss have elevated Zn values (3 to 5 ppb).

The distribution of Fe in water is shown in Figure 26. The concentration of Fe in surface water is largely controlled by its exposure to oxygen. Ground water and water in bogs is effectively sealed off from atmospheric oxygen and hence can contain Fe levels in the hundreds to thousands of ppb. Such water quickly loses its Fe by oxidation when exposed to normal atmospheric oxygen in streams or lakes. Thus the presence of high Fe levels in some lakes in Figure 26 indicates that these waters were not yet in equilibrium with atmospheric oxygen and likely entered the lakes from bogs or groundwater sources shortly before sampling. The area in NTS map areas 23H/1 and 23H/2 has most of the high Fe values and also contains many lakes surrounded by bog.

The distribution of Ca in water is shown in Figure 27. The distribution appears to correlate well with underlying bedrock. Most of the highest values are from areas of the Shabogamo Gabbro.

The distribution of Cr in water is shown in Figure 28. All but 4 percent of the samples are below the detection limit. Nonetheless, the fact that the distribution of detectable values shows some geographic clustering suggests the data are reliable. Many of the high values are located over areas underlain by OMIS in the northeast of the survey and over the Shabogamo Gabbro. Additionally, three high values (3 ppb) are found in the centre of the OMIS unit in NTS map areas 23H/4, 23H/5 and 23H/6.

The distribution of Mg in water is shown in Figure 29. The distribution is quite similar to that of Ca, again reflecting underlying bedrock. Perhaps a noteworthy difference from that of Ca is the presence of several high Mg values in some samples over the Beaver Gneiss including one adjacent to Cu ± Ni mineralization.

The distribution of Si in water is shown in Figure 30. Its dispersion shows less patterning than most other variables plotted with few concentrations of high or low values. One exception is the lobe of the Shabogamo Gabbro in NTS map area 23H/5, which has uniformly low Si values and high or elevated Ca and Mg values, suggesting the presence of a particularly mafic phase of bedrock in the area.

The distribution of SO_4 in water is shown in Figure 31. It is included to see whether known sulphide occurrences in the area are reflected in the dispersion pattern; however, there appears to be little spatial correlation of high values with mineralization.

CONCLUSIONS

1. Results from comparing data from site duplicates of lake sediments indicate that analyses of Pd and Pt are reproducible and representative of a given lake.

2. Dispersion of Pt and Pd appears unaffected by Fe/Mn oxide scavenging.

3. The highest Pd27 value sample (34.9 ppb) is located in NTS map area 23H/07 in a cluster of 4 samples that have elevated Pd values and is also about 4 km away from known base-metal mineralization and is underlain by Shabogamo Gabbro. The high sample also has very high Pt and Au27 values. The 4 samples classified in the next-to-highest category are all located in the large bat-shaped area of OMIS in NTS map area 23H. The southernmost of these samples also has high Pt and Au27 values.

4. As with Pd, the most obvious Pt target is the 22.5 ppb sample forming part of a 4 sample cluster of elevated values in NTS map area 23H/07. Other elevated values are found in samples over the Beaver Gneiss, in the southernmost sample over the bat-shaped area of OMIS mentioned above and a sample located in NTS map area 23H/04.

5. The distribution of data from the two gold analyses, Au1 and Au27, show little similarity. Several of the high value Au27 samples are found in clusters, and one is located near a base-metal occurrence.

6. High Ni2 values are found both in clusters and isolated occurrences. One is adjacent to known base-metal mineralization.

7. Most of the highest Cu2 values occur in the central area underlain by the OMIS. A single, very high value sample is found in the northeast part of the survey. None of the highest value samples is near known mineralization.

8. Water analyses appear to reflect both rock type and possibly mineralization. Conductivity, pH, Ca and Mg seem to be the best indicators of bedrock lithology, whereas Cu and Ni may be useful guides to mineralization.

ACKNOWLEDGMENTS

Jerry Ricketts was instrumental in conducting the survey and Neal Bradbury and Ray Batstone provided excellent assistance, support and company in the field. Wayne Tuttle arranged for the accommodations and much of the logistical support. Dave Liverman and Chris Pereira improved the manuscript with their critical scientific and editorial reviews and are thanked for this. Dave Leonard and Tony Paltanavage are thanked for polishing the figures.

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APPENDIX 1

Locations and selected analyses of lake sediment and water data

FLDNUM	ZONE	UTMEAST	UTMNORTH	NTS	Au27 ppb	Cu2 ppm	Fe2 wt.&	LOI wt.%	Mn2 ppm	Ni2 ppm	Pd27 ppb	Pt27 ppb	Zn2 ppb	Cuw2 ppb	Niw2 ppb
6252001	20	343399	5917600	23H06	5.5	100	3.27	62.1	220	31	1.7	2.9	85	4.0	2.0
6252002	20	344739	5917411	23H06	3.3	77	1.37	33.8	218	28	2.0	1.7	71	4.0	4.0
6252003	20	344300	5916550	23H06	.5	36	.86	36.2	145	26	1.1	.6	49	4.0	2.0
6252004	20	342123	5915875	23H06	3.1	28	1.40	26.7	209	25	1.0	2.5	82	3.0	6.0
6252005	20	340016	5916864	23H06	.5	35	.27	39.4	52	19	.1	.6	54	7.0	5.0
6252006	20	338947	5916403	23H06	1.3	115	3.66	45.8	511	47	1.9	2.5	120	.5	4.0
6252007	20	337729	5915020	23H06	4.1	56	3.05	33.5	809	24	1.5	1.4	113	.5	2.0
6252008	20	336781	5911309	23H06	1.4	106	.83	56.2	159	36	2.0	3.1	66	.5	2.0
6252009	20	334273	5910801	23H06	.5	74	1.06	27.4	193	15	1.6	.4	47	.5	1.0
6252010	20	332414	5910999	23H05	.5	75	.33	47.1	54	21	2.3	2.5	41	2.0	.5
6252011	20	331696	5912708	23H05	.5	89	.57	49.8	129	14	2.9	2.1	73	.5	.5
6252012	20	328800	5914000	23H05	.5	45	.90	27.8	93	14	.1	1.2	28	.5	.5
6252013	20	329655	5910379	23H05	3.0	107	1.99	50.7	296	42	4.3	4.3	94	.5	2.0
6252014	20	333194	5909560	23H05	.5	78	.14	54.9	32	35	3.3	2.4	44	.5	.5
6252015	20	337531	5909850	23H06	.5	55	3.06	45.7	421	31	1.1	1.5	71	1.0	.5
6252016	20	340038	5913455	23H06	.5	53	1.19	27.7	235	37	.2	1.4	71	5.0	.5
6252017	20	341212	5914874	23H06	1.1	93	3.82	28.8	1130	34	2.3	1.5	101	5.0	1.0
6252018	20	343118	5913115	23H06	1.3	97	.96	27.8	178	22	4.1	1.5	70	5.0	2.0
6252019	20	340658	5912070	23H06	.5	61	1.27	52.5	184	40	1.2	3.3	72	8.0	2.0
6252020	20	338889	5911570	23H06	.5	36	.39	35.9	68	19	.1	1.3	40	3.0	4.0
6252021	20	337017	5908036	23H06	.5	67	.40	30.8	63	15	.1	.7	25	7.0	2.0
6252022	20	333770	5907383	23H06	.5	57	.38	45.4	61	17	1.7	2.7	36	1.0	.5
6252023	20	331786	5908254	23H05	.5	130	2.11	31.6	434	25	2.4	1.9	79	2.0	2.0
6252024	20	330754	5907394	23H05	.5	37	.38	33.1	60	15	.1	1.7	32	5.0	.5
6252025	20	328777	5908209	23H05	.5	163	5.41	37.1	1651	48	5.4	1.4	157	3.0	.5
6252026	20	327158	5908269	23H05	.5	52	1.87	30.0	273	20	.4	.8	65	7.0	1.0
6252028	20	326955	5907257	23H05	.5	93	6.75	48.3	3182	26	1.1	.8	118	3.0	.5
6252029	20	325539	5907767	23H05	.5	26	.42	30.9	40	12	.1	.4	26	.5	2.0
6252030	20	323941	5908710	23H05	.5	32	.46	31.3	95	15	.1	.7	33	4.0	2.0
6252031	20	320707	5908524	23H05	.5	89	.95	52.1	174	38	.2	2.2	63	5.0	2.0
6252032	20	305307	5907640	23H05	.5	48	.77	38.1	119	27	.1	1.1	64	4.0	1.0
6252033	20	305297	5910317	23H05	.5	36	.82	37.8	83	20	.1	1.2	66	6.0	3.0
6252034	20	303170	5911078	23H05	.5	24	4.12	19.9	1219	48	.1	.8	169	5.0	10.0
6252035	20	300633	5909383	23H05	.5	35	1.30	27.1	166	26	.1	.3	72	3.0	2.0
6252036	19	698277	5913900	23G08	.5	59	1.34	29.0	167	44	.1	.6	96	3.0	4.0
6252037	19	697774	5914429	23G08	.5	12	2.94	6.0	631	26	.1	.8	70	6.0	3.0
6252038	19	697124	5915572	23G08	.5	55	.90	33.8	117	41	.1	1.0	94	1.0	.5
6252039	19	693820	5915264	23G08	.5	22	2.66	17.1	458	39	.1	.6	121	.5	.5
6252040	19	691352	5919004	23G08	.5	102	1.18	37.2	169	37	.1	.1	127	4.0	2.0
6252041	19	690033	5917476	23G08	.5	37	1.42	30.3	207	24	.1	.4	79	.5	2.0
6252042	19	693411	5917911	23G08	.5	31	2.35	17.9	313	40	.1	.4	95	.5	1.0
6252043	19	693465	5918659	23G08	.5	55	1.99	29.2	270	57	.1	.7	125	.5	2.0
6252044	19	693719	5917108	23G08	.5	68	1.85	28.7	206	47	.1	.3	98	2.0	2.0
6252045	19	698358	5916659	23G08	.5	53	2.20	28.3	285	50	.1	.1	131	.5	3.0
6252046	20	300841	5915765	23H05	.5	74	3.25	28.9	445	55	.1	.6	141	.5	2.0
6252047	20	302435	5915482	23H05	.5	31	.82	29.3	119	27	.1	.7	60	.5	2.0
6252048	20	303758	5912887	23H05	.5	57	.70	33.9	90	34	2.7	2.3	72	.5	5.0
6252049	20	321162	5910876	23H05	1.5	44	2.91	24.5	546	33	3.2	3.3	104	2.0	2.0
6252050	20	322891	5910207	23H05	1.0	44	1.41	28.0	274	19	1.8	1.2	62	.5	2.0
6252051	20	322902	5911474	23H05	.5	56	1.34	36.3	291	25	.1	.9	76	.5	1.0
6252052	20	322701	5912930	23H05	.5	40	.83	33.8	118	16	2.6	1.7	35	1.0	4.0
6252053	20	324604	5912010	23H05	2.4	40	1.13	47.7	78	20	7.6	4.9	45	2.0	5.0
6252054	20	307371	5914493	23H05	.5	39	1.10	33.3	186	35	.1	1.3	90	.5	2.0
6252055	20	305914	5915283	23H05	.5	33	2.08	29.2	361	38	.1	.8	108	1.0	1.0
6252056	20	304270	5915622	23H05	.5	35	3.41	15.9	500	44	.3	.6	134	1.0	3.0
6252057	20	301714	5915810	23H05	.5	72	1.53	32.8	233	52	.1	.8	110	1.0	.5
6252058	20	302765	5918261	23H05	1.3	56	1.36	40.7	458	42	2.5	4.2	91	.5	4.0
6252059	20	302576	5916870	23H05	.5	46	1.60	33.2	213	45	.3	1.0	99	1.0	3.0
6252060	19	699447	5918666	23H05	.5	82	5.71	25.0	1144	77	1.5	1.1	175	2.0	2.0
6252062	19	698598	5918555	23G08	.5	65	2.57	26.3	416	64	.7	1.4	170	2.0	1.0

FLDNUM	ZONE	UTMEAST	UTMNORTH	NTS	Au27 ppb	Cu2 ppm	Fe2 wt.&	LOI wt.%	Mn2 ppm	Ni2 ppm	Pd27 ppb	Pt27 ppb	Zn2 ppb	Cuw2 ppb	Niw2 ppb
6252063	19	698623	5919993	23G08	1.6	44	.66	37.9	90	33	2.5	2.0	63	4.0	4.0
6252064	19	697894	5919352	23G08	.5	52	1.44	27.3	182	46	.1	1.0	101	2.0	6.0
6252065	19	695864	5917873	23G08	.5	72	2.13	37.9	330	44	.5	1.5	111	2.0	3.0
6252066	19	695918	5919347	23G08	.5	105	1.31	52.3	194	68	2.4	4.9	142	.5	3.0
6252067	19	697917	5921545	23G08	1.8	42	1.70	27.7	245	33	.2	1.3	94	.5	1.0
6252068	20	301073	5920971	23H05	.5	62	2.35	27.6	384	45	.1	1.1	142	1.0	2.0
6252069	20	302683	5919567	23H05	.5	56	1.88	22.8	255	46	.1	1.9	119	.5	3.0
6252070	20	303999	5919796	23H05	.5	44	1.41	35.8	128	33	.1	1.3	75	.5	5.0
6252071	20	305384	5918559	23H05	.5	50	1.40	33.1	222	36	.1	1.1	88	2.0	1.0
6252072	20	306815	5918376	23H05	2.3	63	.96	41.2	157	32	.4	.5	85	.5	2.0
6252073	20	308879	5920124	23H05	2.1	40	.74	33.9	78	27	.1	1.0	56	4.0	1.0
6252074	20	308124	5920728	23H05	2.1	34	1.28	25.9	220	35	.6	2.4	69	.5	.5
6252075	20	307969	5922513	23H05	2.7	28	.73	42.1	39	26	.1	.9	42	.5	2.0
6252076	20	306725	5924339	23H05	2.4	24	.91	28.6	162	24	.9	1.1	50	.5	2.0
6252077	20	305749	5925519	23H05	1.1	25	3.35	38.0	210	30	.1	.7	73	.5	3.0
6252078	20	302217	5926000	23H05	1.4	50	.52	34.2	54	21	.3	1.0	53	.5	.5
6252079	20	301188	5926566	23H05	2.8	28	.45	39.2	76	23	.7	1.5	52	.5	.5
6252080	19	698662	5927031	23G08	.5	26	1.60	26.4	391	27	.1	2.0	91	2.0	3.0
6252081	19	698106	5926143	23G08	2.3	38	.96	28.7	67	23	.2	1.0	52	2.0	1.0
6252082	19	696939	5923834	23G08	1.4	47	2.01	29.1	238	36	.3	.6	94	2.0	1.0
6252083	19	695631	5922229	23G08	.5	80	1.59	33.6	309	44	.1	.6	112	.5	2.0
6252085	19	695147	5920681	23G08	.5	88	1.01	36.3	186	33	.1	.3	91	4.0	2.0
6252086	19	696440	5921158	23G08	1.4	91	4.24	28.8	602	82	.6	.7	203	3.0	.5
6252087	20	302514	5922126	23H05	.5	45	1.40	31.0	187	32	1.2	.5	71	1.0	2.0
6252088	20	305612	5922662	23H05	.5	27	1.25	26.5	256	27	.1	.8	78	3.0	3.0
6252089	20	345560	5912385	23H06	1.5	78	1.78	37.4	217	27	.7	1.6	99	3.0	3.0
6252090	20	345832	5910834	23H06	1.4	113	5.49	25.9	1482	53	3.0	1.5	151	3.0	.5
6252091	20	344625	5910639	23H06	2.1	104	3.74	34.5	463	28	2.2	1.1	91	.5	.5
6252092	20	342479	5910907	23H06	1.5	129	3.58	25.6	922	43	2.6	1.2	130	.5	1.0
6252093	20	341018	5909176	23H06	1.6	180	3.55	29.3	1626	43	6.5	1.5	169	.5	.5
6252094	20	339802	5909342	23H06	1.5	128	.70	53.6	93	37	.4	1.6	70	.5	.5
6252095	20	337137	5907861	23H06	2.1	41	.27	30.1	39	11	1.3	2.9	19	4.0	2.0
6252096	20	331299	5905503	23H05	1.1	21	1.15	31.7	223	16	.2	1.3	40	.5	.5
6252097	20	331727	5906106	23H05	2.2	41	.77	32.8	159	17	1.4	2.1	35	.5	.5
6252098	20	331827	5906730	23H05	1.5	56	1.33	34.2	270	15	1.5	1.3	42	.5	.5
6252099	20	327619	5904750	23H05	.5	23	2.98	21.6	610	22	.1	1.1	89	.5	.5
6252100	20	325628	5904997	23H05	.5	53	3.41	27.5	610	25	.5	1.4	96	2.0	.5
6252101	20	323962	5906054	23H05	.5	48	1.46	43.9	87	26	.9	1.9	51	.5	.5
6252102	20	321169	5905868	23H05	1.9	63	.57	42.6	112	18	.6	2.7	45	.5	1.0
6252103	20	319095	5906684	23H05	2.2	79	.65	43.0	158	21	.6	2.2	58	.5	.5
6252104	20	317637	5906756	23H05	10.1	90	.42	49.8	63	25	.6	1.5	43	.5	.5
6252105	20	318078	5904995	23H05	3.2	79	.53	48.9	90	24	1.3	2.7	47	2.0	1.0
6252106	20	316459	5903765	23H05	.5	37	2.82	29.5	665	28	.2	1.4	106	7.0	.5
6252107	20	317687	5902605	23H04	.5	73	.89	48.4	144	28	.1	1.7	71	.5	43.0
6252108	20	324170	5895434	23H04	1.6	48	.53	46.1	76	18	.7	3.2	45	2.0	.5
6252109	20	325700	5894849	23H04	.5	57	2.11	33.5	197	22	1.0	2.3	63	.5	.5
6252110	20	327210	5894400	23H04	3.6	66	.75	50.2	58	24	1.5	2.5	47	.5	.5
6252111	20	328292	5893055	23H04	.5	47	1.45	34.5	149	17	.2	1.3	47	.5	.5
6252112	20	332118	5890080	23H04	.5	50	.83	39.0	174	23	.5	1.4	48	1.0	.5
6252113	20	332788	5887643	23H04	.5	50	2.91	23.2	749	32	.7	1.7	105	.5	.5
6252114	20	334762	5887921	23H03	1.0	76	5.50	39.2	2922	34	1.9	3.0	145	.5	.5
6252115	20	373264	5868809	23A15	.5	29	2.36	33.8	379	36	.1	2.7	73	.5	.5
6252116	20	336111	5887375	23H03	.5	46	2.29	39.4	172	20	.1	2.9	49	.5	1.0
6252117	20	336721	5885750	23H03	.5	43	1.80	44.5	147	24	.1	2.2	52	.5	.5
6252118	20	373886	5867061	23A15	2.8	24	6.56	46.8	204	25	.4	1.6	82	.5	.5
6252119	20	337738	5888635	23H03	.5	34	3.20	36.4	294	22	.3	.8	48	1.0	3.0
6252120	20	336235	5890309	23H03	.5	57	.91	38.9	263	23	1.3	.8	67	.5	2.0
6252121	20	333629	5893767	23H03	22.0	82	1.53	41.8	317	32	7.7	10.0	81	.5	.5
6252122	20	337512	5895741	23H03	.5	46	.95	41.1	120	23	.5	1.2	71	.5	.5
6252123	20	340031	5893592	23H03	.5	78	3.57	27.6	1066	40	1.6	1.0	128	.5	.5
6252124	20	343200	5893415	23H03	2.4	48	.80	48.7	99	27	1.1	1.7	64	.5	.5
6252125	20	343338	5894163	23H03	11.1	41	2.24	29.2	416	27	1.9	1.6	73	.5	.5
6252126	20	342523	5903660	23H06	1.6	73	.92	39.5	72	26	2.5	1.5	42	1.0	.5
6252127	20	342523	5906206	23H06	1.2	100	1.10	45.5	127	41	1.8	1.6	59	.5	.5
6252128	20	342989	5908429	23H06	.5	61	1.73	33.6	231	21	1.8	2.2	60	.5	.5

FLDNUM	ZONE	UTMEAST	UTMNORTH	NTS	Au27 ppb	Cu2 ppm	Fe2 wt.&	LOI wt.%	Mn2 ppm	Ni2 ppm	Pd27 ppb	Pt27 ppb	Zn2 ppb	Cuw2 ppb	Niw2 ppb
6252129	20	340792	5906736	23H06	.5	91	.45	37.8	67	29	.7	1.2	40	.5	.5
6252130	20	337681	5905823	23H06	.5	43	1.68	38.3	259	25	.5	.9	42	.5	.5
6252131	20	334905	5904447	23H06	2.0	30	2.34	32.3	514	24	.4	.9	62	.5	.5
6252132	20	333692	5904445	23H06	.5	32	1.20	27.7	264	19	.1	.9	45	.5	.5
6252133	20	334888	5903048	23H06	.5	30	2.59	26.6	788	27	.3	.9	81	.5	.5
6252134	20	340902	5903685	23H06	.5	55	3.68	3.2	575	36	1.1	1.4	66	.5	.5
6252135	20	350066	5913024	23H06	.5	61	.78	37.5	134	27	.1	1.8	69	1.0	.5
6252136	20	348161	5913626	23H06	.5	48	5.02	15.3	616	37	.1	.8	85	.5	.5
6252137	20	370300	5866476	23A15	.5	19	1.13	33.0	190	21	.1	.7	53	3.0	.5
6252138	20	369881	5863402	23A15	4.8	74	2.68	47.9	429	32	.8	1.2	107	.5	.5
6252139	20	369668	5861960	23A15	.5	35	2.90	34.6	363	107	.5	1.1	78	.5	.5
6252140	20	368587	5861532	23A15	.5	13	4.01	34.6	721	107	.1	.9	80	.5	.5
6252141	20	369591	5860380	23A15	.5	22	.96	35.6	188	62	.1	.7	42	.5	.5
6252142	20	368862	5859980	23A15	4.7	64	4.57	55.2	470	30	2.9	7.2	87	.5	.5
6252143	20	370343	5858870	23A15	2.6	19	3.80	8.7	727	43	1.4	2.5	79	.5	.5
6252144	20	370177	5857705	23A15	9.1	35	.40	44.4	57	24	3.7	3.4	34	.5	.5
6252145	20	370567	5857056	23A15	6.3	30	.58	39.9	79	24	2.0	5.3	44	.5	.5
6252146	20	369917	5855700	23A15	8.3	69	2.82	52.1	397	21	4.6	7.5	97	3.0	2.0
6252147	20	375666	5847658	23A15	7.2	36	.62	44.1	120	27	3.2	5.2	50	.5	.5
6252148	20	374771	5847613	23A15	3.0	32	.56	40.7	212	15	3.9	2.7	57	.5	.5
6252149	20	371389	5846044	23A15	.5	10	3.74	18.3	565	29	.1	.8	77	.5	.5
6252150	20	370516	5848625	23A15	1.6	25	.89	36.1	84	15	.9	2.5	35	.5	.5
6252151	20	369578	5851502	23A15	3.8	31	.53	50.9	80	27	2.9	3.5	46	.5	2.0
6252152	20	369012	5851402	23A15	1.5	17	.56	38.8	166	16	1.7	4.1	40	.5	.5
6252153	20	369170	5853171	23A15	5.5	25	3.62	22.7	710	46	.9	2.1	91	.5	.5
6252154	20	368635	5852658	23A15	3.2	34	.77	37.5	65	20	2.0	3.1	33	.5	.5
6252155	20	368711	5854086	23A15	.	.	.	.	.	.	.	.	.	.5	1.0
6252156	20	368588	5854655	23A15	1.7	51	4.44	30.5	789	45	1.7	2.1	94	.5	2.0
6252157	20	368460	5856455	23A15	2.0	36	1.97	32.9	508	44	1.3	2.3	90	.5	3.0
6252159	20	365710	5854553	23A15	.5	17	3.25	18.4	452	39	.3	1.5	63	.5	3.0
6252160	20	364462	5856837	23A14	1.1	17	3.62	7.0	621	40	.8	2.0	70	.5	3.0
6252161	20	366512	5857440	23A15	3.9	118	3.81	42.9	462	40	1.4	2.1	133	.5	2.0
6252162	20	366249	5858137	23A15	1.0	26	1.86	28.9	313	25	.4	3.9	52	.5	2.0
6252163	20	367350	5864540	23A15	1.4	56	.56	42.5	93	39	1.0	3.4	38	.5	4.0
6252164	20	367313	5864875	23A15	2.3	59	4.56	21.4	854	68	2.4	2.2	125	.5	2.0
6252165	20	367176	5866069	23A15	2.5	43	1.03	36.8	144	24	2.2	1.5	52	.5	1.0
6252166	20	367053	5866600	23A15	1.0	27	3.52	2.2	726	35	2.5	1.5	67	.5	1.0
6252167	20	367825	5867342	23A15	.5	58	3.91	34.6	1086	34	.7	1.3	102	.5	1.0
6252168	20	366647	5867448	23A15	3.9	27	.28	34.9	37	15	1.6	2.3	32	.5	6.0
6252169	20	365783	5866539	23A15	4.5	56	1.56	54.6	141	22	1.8	2.2	72	.5	5.0
6252170	20	367116	5868638	23A15	1.4	38	2.32	43.3	217	19	2.3	1.2	58	.5	2.0
6252171	20	324868	5887429	23H04	3.8	27	.89	26.0	175	21	.1	.7	46	.5	2.0
6252172	20	326255	5885734	23H04	2.3	25	.28	25.2	65	8	.1	1.2	28	.5	.5
6252173	20	319691	5872903	23A13	.5	45	.65	38.6	123	20	.1	.6	44	.5	3.0
6252174	20	317921	5871090	23A13	.5	39	2.66	34.7	486	27	.9	.9	98	.5	1.0
6252175	20	312451	5858951	23A13	1.2	22	5.47	13.3	629	34	.1	1.1	74	.5	1.0
6252176	20	311220	5861637	23A13	1.9	13	4.32	6.8	764	32	.2	1.4	68	.5	1.0
6252177	20	309006	5861156	23A13	2.4	24	3.63	11.2	803	33	.4	.9	85	.5	2.0
6252178	20	306442	5859611	23A13	3.2	16	.65	33.3	122	16	.1	1.5	30	.5	2.0
6252179	20	307833	5863015	23A13	1.2	26	4.86	16.1	877	32	.2	1.0	97	.5	2.0
6252180	20	310193	5864111	23A13	1.1	25	2.20	22.2	473	34	.4	1.1	63	.5	3.0
6252181	20	309613	5864196	23A13	.5	47	5.09	19.7	2526	51	.8	1.1	109	.5	1.0
6252182	20	307633	5864309	23A13	.5	35	4.19	30.3	858	26	.1	.8	99	.5	.5
6252183	20	304937	5864587	23A13	.5	25	2.58	32.0	222	18	.1	.7	36	.5	3.0
6252184	20	307850	5867261	23A13	2.2	15	1.19	44.0	157	21	.1	1.5	49	.5	3.0
6252185	20	311605	5867822	23A13	1.6	23	.76	45.7	196	23	.1	1.5	73	.5	2.0
6252186	20	312341	5869733	23A13	.5	33	1.44	33.1	209	29	.1	.9	38	.5	3.0
6252187	20	309057	5869112	23A13	1.5	22	1.42	44.9	216	22	.1	1.5	58	.5	2.0
6252188	20	305946	5868011	23A13	2.2	29	2.73	35.7	537	29	.1	2.3	97	.5	.5
6252189	20	303980	5868640	23A13	.5	28	1.16	41.8	185	20	.5	3.3	59	.5	2.0
6252190	20	303363	5868530	23A13	3.0	48	.78	42.6	149	26	1.0	1.7	53	.5	.5
6252191	20	304300	5871114	23A13	1.1	54	2.87	31.6	582	31	1.0	.9	96	.5	2.0
6252192	20	306068	5871897	23A13	1.0	46	.62	35.8	123	25	.9	.7	52	.5	.5
6252193	20	311328	5873321	23A13	1.3	34	5.53	29.2	1614	29	.8	.9	165	.5	1.0
6252194	20	312550	5875155	23A13	1.1	19	.57	32.3	69	14	1.0	.6	36	.5	.5

FLDNUM	ZONE	UTMEAST	UTMNORTH	NTS	Au27 ppb	Cu2 ppm	Fe2 wt.&	LOI wt.%	Mn2 ppm	Ni2 ppm	Pd27 ppb	Pt27 ppb	Zn2 ppb	Cuw2 ppb	Niw2 ppb
6252195	20	307940	5875517	23A13	.5	23	4.45	11.1	615	34	.4	1.0	72	.5	2.0
6252196	20	303488	5873772	23A13	.5	13	3.79	14.4	734	30	.1	.9	73	.5	.5
6252197	20	301531	5872283	23A13	1.3	39	1.84	36.1	232	32	.1	.4	83	.5	1.0
6252198	20	310563	5877324	23H04	.5	72	8.72	33.9	3144	50	2.1	1.1	133	.5	2.0
6252199	20	309704	5877337	23H04	8.0	45	1.01	38.4	225	21	.2	1.3	52	.5	.5
6252200	20	307652	5876607	23H04	1.4	45	2.69	37.1	472	36	.8	.7	103	.5	3.0
6252201	20	306803	5877786	23H04	1.5	50	1.19	43.4	131	29	1.0	.8	54	.5	1.0
6252202	19	699859	5890380	23G01	5.7	52	.42	49.9	89	25	.1	2.2	67	.5	4.0
6252203	20	304603	5892675	23H04	1.2	73	.92	44.5	129	34	.7	.7	61	.5	2.0
6252204	20	306628	5892062	23H04	.5	39	.52	37.8	102	20	.6	.6	36	.5	.5
6252205	20	310593	5892776	23H04	.5	53	1.28	42.7	214	29	.1	.7	73	.5	.5
6252206	20	318904	5893274	23H04	.5	54	.54	38.9	71	31	.1	.6	46	.5	.5
6252207	20	318324	5888891	23H04	1.1	93	1.05	33.3	218	39	.1	10.9	90	.5	.5
6252208	20	316443	5888585	23H04	.5	27	3.27	27.4	868	33	.1	.4	120	.5	1.0
6252209	20	315025	5888791	23H04	.5	47	3.30	37.3	491	23	1.4	1.1	96	.5	.5
6252210	20	314286	5884670	23H04	.5	35	1.51	38.0	160	21	1.7	2.4	43	.5	.5
6252211	20	318273	5886625	23H04	1.4	12	4.05	10.4	1081	33	1.1	2.5	96	.5	.5
6252212	20	318867	5885728	23H04	.	.	.	.	.	.	.	.	.	.5	.5
6252213	20	317019	5885094	23H04	1.8	54	.54	36.6	100	25	1.4	3.6	39	.5	1.0
6252214	20	316713	5882462	23H04	1.2	10	2.62	11.5	745	21	1.5	1.3	64	.5	.5
6252215	20	317364	5879979	23H04	1.6	42	1.34	35.9	189	25	1.2	2.8	50	.5	.5
6252216	20	316011	5880297	23H04	1.4	57	1.20	37.9	155	26	.5	3.9	48	.5	3.0
6252217	20	313688	5880641	23H04	.5	46	.81	38.8	184	24	1.1	1.8	45	.5	.5
6252218	20	318607	5877011	23H04	1.6	90	4.38	29.3	1447	39	1.9	2.5	158	.5	.5
6252219	20	316704	5876132	23H04	2.7	42	.38	40.0	59	20	1.2	2.8	38	.5	2.0
6252220	20	315514	5875637	23H04	1.0	34	.96	36.8	104	20	1.8	1.9	44	.5	1.0
6252221	20	310309	5880393	23H04	1.0	25	5.34	7.9	867	40	1.6	2.5	94	.5	.5
6252222	20	308297	5880124	23H04	.5	17	1.57	27.5	449	21	1.5	3.1	63	.5	.5
6252223	20	309635	5882222	23H04	1.3	40	.66	31.4	93	19	.7	2.5	41	.5	.5
6252224	20	307529	5883340	23H04	1.6	47	1.34	34.0	357	25	1.0	2.0	72	.5	1.0
6252225	20	306056	5882490	23H04	1.2	30	1.23	35.4	66	22	.8	2.0	44	.5	.5
6252227	20	306523	5884606	23H04	.5	46	.77	35.4	137	25	.5	2.3	47	.5	.5
6252228	20	309217	5886683	23H04	.5	75	2.51	25.1	424	28	.9	2.2	86	.5	2.0
6252229	20	306246	5889030	23H04	1.8	72	4.39	28.8	1182	39	2.7	2.8	134	.5	.5
6252230	19	698650	5881015	23G01	1.6	45	1.14	36.2	298	21	.1	2.4	78	.5	.5
6252231	19	697350	5879286	23G01	.5	58	.91	32.8	174	12	.1	5.6	36	.5	3.0
6252232	19	696854	5878265	23G01	1.6	64	4.54	23.0	685	34	.1	3.7	100	.5	.5
6252233	19	696014	5877390	23G01	1.2	51	1.10	31.5	214	22	.1	4.3	67	.5	.5
6252234	19	693570	5880117	23G01	.5	51	2.27	42.5	658	26	1.3	.7	123	.5	3.0
6252235	19	695282	5880683	23G01	2.2	37	1.27	33.3	310	29	.6	.5	85	.5	4.0
6252236	19	696169	5881066	23G01	2.1	76	1.67	47.1	277	30	.9	.8	79	.5	3.0
6252237	19	696437	5882536	23G01	1.6	47	3.90	27.0	637	38	1.2	1.3	140	.5	2.0
6252238	19	694683	5885614	23G01	1.0	40	3.37	36.1	509	33	.8	.9	112	.5	2.0
6252239	19	696134	5887661	23G01	1.3	33	2.11	22.0	419	31	.8	.6	80	.5	3.0
6252240	19	694253	5887134	23G01	1.2	85	1.23	43.4	262	24	1.5	.9	97	.5	2.0
6252241	19	693006	5889953	23G01	3.0	62	1.18	53.8	200	33	2.8	1.5	98	.5	1.0
6252242	19	695794	5889349	23G01	2.2	43	.89	32.1	115	19	1.3	1.6	54	.5	1.0
6252243	19	696454	5889958	23G01	3.3	37	.83	33.7	142	23	.6	.6	54	.5	2.0
6252244	19	695917	5891172	23G01	1.0	107	2.62	50.7	622	37	1.5	.7	118	.5	.5
6252245	19	699408	5891731	23G01	.5	48	4.41	36.6	403	28	.3	.6	55	.5	2.0
6252247	19	700156	5892926	23G01	.5	40	1.12	41.8	105	21	.3	.6	58	.5	1.0
6252248	20	299963	5893827	23H04	.5	46	.39	45.5	66	21	.1	.6	43	.5	.5
6252249	20	301040	5894445	23H04	.5	36	2.78	25.4	374	28	.5	.5	93	.5	.5
6252250	20	301070	5897139	23H04	.5	37	3.56	28.6	759	33	1.3	.6	113	.5	.5
6252251	19	700043	5894918	23G01	.5	48	1.54	45.1	265	29	.3	.7	80	.5	.5
6252252	19	697370	5892540	23G01	.5	36	1.02	32.7	142	23	.1	.4	52	.5	3.0
6252253	19	695884	5892566	23G01	.5	51	1.45	33.0	198	23	.1	.1	73	.5	2.0
6252254	19	694400	5892528	23G01	.5	35	.74	36.4	78	25	.1	.4	58	.5	1.0
6252255	19	694656	5893827	23G01	.5	42	4.31	30.2	832	34	.1	.5	145	.5	1.0
6252256	19	689283	5897173	23G01	.5	65	1.81	57.3	504	33	.1	.8	158	.5	.5
6252257	19	691086	5902260	23G01	.5	75	2.23	33.3	624	29	.4	.7	89	.5	3.0
6252258	19	691112	5901083	23G01	3.1	56	.44	39.0	103	21	.3	5.6	57	.5	.5
6252259	19	689287	5901184	23G01	4.8	25	1.24	30.2	107	18	1.7	3.2	50	.5	.5
6252260	19	689636	5900230	23G01	3.8	25	.93	46.9	108	29	.6	3.0	62	.5	10.0
6252261	19	699980	5899734	23G01	7.3	65	.54	40.1	74	22	.2	3.0	37	.5	5.0

FLDNUM	ZONE	UTMEAST	UTMNORTH	NTS	Au27 ppb	Cu2 ppm	Fe2 wt.&	LOI wt.%	Mn2 ppm	Ni2 ppm	Pd27 ppb	Pt27 ppb	Zn2 ppb	Cuw2 ppb	Niw2 ppb
6252262	19	699849	5897719	23G01	2.2	68	.54	36.2	80	26	1.7	1.3	42	.5	1.0
6252263	19	698853	5897311	23G01	3.8	81	1.39	49.0	116	40	2.6	3.4	68	.5	2.0
6252264	19	699318	5896348	23G01	2.0	90	.75	39.0	175	27	.9	3.0	89	.5	2.0
6252265	20	304358	5896129	23H04	1.9	48	.82	38.5	163	26	.2	1.8	56	.5	2.0
6252266	20	308246	5898033	23H04	1.9	115	4.03	39.0	668	55	1.1	1.7	176	.5	2.0
6252267	20	309330	5896646	23H04	1.7	49	.90	40.3	106	19	.5	1.7	56	.5	1.0
6252268	20	310127	5895858	23H04	2.0	68	2.49	29.3	479	30	1.1	3.6	65	.5	1.0
6252269	20	313370	5898937	23H04	1.2	28	.69	29.4	127	18	.1	1.9	43	.5	3.0
6252270	20	314732	5897940	23H04	1.3	37	1.10	37.5	205	26	.3	2.1	70	.5	1.0
6252271	20	313021	5896306	23H04	.5	45	1.18	40.0	172	17	.1	2.1	57	.5	2.0
6252272	20	313879	5895737	23H04	1.1	47	5.31	33.3	1486	27	.4	1.9	97	.5	2.0
6252273	20	312501	5895109	23H04	2.5	53	1.13	38.9	198	27	.1	2.6	44	.5	2.0
6252274	20	312982	5893980	23H04	.5	71	4.86	31.4	816	57	.6	1.7	147	.5	1.0
6252275	20	319827	5902420	23H04	1.9	106	3.81	42.1	353	38	1.3	2.6	85	.5	.5
6252277	20	320846	5902042	23H04	2.3	81	1.76	56.1	93	40	.1	4.1	55	.5	2.0
6252278	20	323280	5901196	23H04	1.2	32	.78	27.9	163	17	.1	3.4	37	.5	2.0
6252279	20	325170	5901646	23H04	.5	59	2.62	28.7	422	26	.1	.5	77	.5	.5
6252280	20	330247	5901344	23H04	.5	37	1.65	35.5	661	29	.1	4.8	106	.5	.5
6252281	20	332054	5900834	23H04	2.0	100	.43	52.2	119	24	1.1	2.9	89	.5	.5
6252282	20	332348	5899474	23H04	1.0	51	1.51	37.9	862	30	.7	1.5	105	.5	3.0
6252283	20	332042	5899442	23H04	3.2	46	.42	32.5	124	19	.9	2.5	30	.5	.5
6252284	20	342300	5919900	23H06	1.7	26	3.55	3.1	1103	31	.5	1.6	69	.5	2.0
6252285	20	354433	5920669	23H06	3.1	81	1.65	45.4	162	26	.5	1.8	67	.5	.5
6252286	20	357182	5921040	23H06	1.6	30	1.73	23.4	375	25	.1	.7	60	.5	2.0
6252287	20	355946	5919633	23H06	.5	28	2.02	25.1	397	33	.1	1.3	84	.5	.5
6252288	20	354165	5918385	23H06	1.7	33	2.25	21.9	271	32	.1	.8	66	.5	2.0
6252289	20	352394	5919399	23H06	.5	51	2.93	29.3	391	36	.6	.8	93	4.0	2.0
6252290	20	350200	5919152	23H06	1.5	91	3.28	22.9	594	44	.8	.7	122	.5	1.0
6252291	20	351420	5918195	23H06	1.6	51	1.18	39.9	178	28	.2	1.3	60	.5	1.0
6252292	20	352253	5916406	23H06	1.2	51	2.69	21.8	346	36	.3	1.1	99	.5	2.0
6252293	20	352656	5916048	23H06	1.8	48	3.16	25.6	708	38	.9	1.2	111	.5	.5
6252294	20	354109	5915235	23H06	.5	36	2.12	18.1	478	27	.1	.2	107	.5	.5
6252295	20	356039	5918114	23H06	1.3	41	2.63	21.7	759	40	.5	1.1	106	.5	2.0
6252296	20	356834	5916294	23H06	2.6	88	1.75	58.3	232	40	.5	1.7	116	.5	.5
6252297	20	359667	5914994	23H06	1.4	39	2.09	27.0	520	24	.1	.9	83	.5	2.0
6252298	20	358136	5915431	23H06	.5	47	3.18	30.1	879	36	.4	.9	117	.5	.5
6252299	20	359535	5913402	23H06	.5	21	1.59	27.2	301	21	.1	.6	68	.5	.5
6252300	20	360143	5912457	23H06	.5	19	1.18	47.3	94	22	.1	2.1	34	.5	.5
6252301	20	359671	5908376	23H06	.5	33	3.13	5.4	516	29	.1	.9	62	.5	1.0
6252302	20	359928	5906039	23H06	.5	47	3.45	42.7	337	35	.1	1.2	84	.5	.5
6252303	20	359928	5906038	23H06	.5	48	2.89	42.1	347	36	.1	1.4	87	.5	1.0
6252304	20	358454	5906312	23H06	.5	44	.48	45.9	81	23	.1	1.2	49	.5	.5
6252305	20	358690	5902751	23H06	.5	51	1.38	41.2	92	26	.3	.6	48	.5	.5
6252306	20	355512	5903986	23H06	6.9	42	.57	50.5	89	24	.3	.9	50	.5	.5
6252307	20	353441	5904254	23H06	1.4	24	1.06	31.2	282	21	.3	1.0	55	3.0	4.0
6252308	20	352490	5904913	23H06	1.3	61	.90	29.1	133	16	.1	.8	39	3.0	2.0
6252309	20	351620	5905477	23H06	1.5	146	5.13	44.1	2954	52	2.0	2.0	177	4.0	3.0
6252310	20	351331	5904025	23H06	1.2	62	.71	40.9	136	23	.5	.8	44	3.0	2.0
6252311	20	350583	5904615	23H06	1.0	57	.62	38.4	56	21	.1	1.4	41	3.0	1.0
6252312	20	350924	5902257	23H06	.5	33	.47	32.0	69	20	.1	1.0	40	4.0	2.0
6252313	20	350670	5906411	23H06	.5	50	1.20	36.4	238	22	.5	.8	66	2.0	7.0
6252314	20	349855	5908092	23H06	.5	17	4.23	9.7	985	38	.6	1.8	111	5.0	2.0
6252315	20	353665	5908197	23H06	.5	70	.38	43.9	82	23	.3	.8	48	3.0	2.0
6252316	20	357751	5911729	23H06	.5	52	1.36	45.4	206	34	.1	1.0	76	3.0	3.0
6252317	20	356211	5911889	23H06	.5	51	2.03	43.8	568	30	.6	1.4	118	.5	3.0
6252318	20	357112	5913365	23H06	.5	37	1.20	43.6	114	20	.1	1.6	70	4.0	2.0
6252319	20	354027	5913284	23H06	.5	41	2.67	25.4	314	33	.1	.9	71	2.0	2.0
6252320	20	354200	5912650	23H06	.5	43	.78	39.0	112	27	.1	.9	47	3.0	4.0
6252321	20	350950	5913100	23H06	.5	49	.40	39.8	85	24	.1	1.6	60	7.0	2.0
6252322	20	357280	5890269	23H03	.5	26	2.47	25.4	651	32	.1	1.1	91	6.0	3.0
6252323	20	355769	5889649	23H03	.5	26	.55	37.6	145	16	.8	2.2	41	2.0	2.0
6252324	20	357464	5888353	23H03	4.6	23	2.62	21.0	650	32	.1	.9	95	2.0	.5
6252325	20	357036	5887596	23H03	.5	62	2.32	41.7	514	26	2.0	1.4	97	.5	.5
6252326	20	357816	5882830	23H03	.5	30	2.74	36.7	414	28	.1	1.0	74	3.0	3.0
6252327	20	362837	5879137	23H03	.5	34	1.13	35.2	296	20	.1	7.6	67	5.0	4.0

FLDNUM	ZONE	UTMEAST	UTMNORTH	NTS	Au27 ppb	Cu2 ppm	Fe2 wt.&	LOI wt.%	Mn2 ppm	Ni2 ppm	Pd27 ppb	Pt27 ppb	Zn2 ppb	Cuw2 ppb	Niw2 ppb
6252328	20	361715	5878402	23H03	.5	14	2.18	21.1	366	24	.1	1.8	53	4.0	1.0
6252329	20	365902	5875535	23H03	.5	26	.47	52.0	90	19	2.8	2.0	47	2.0	.5
6252330	20	365356	5875327	23H03	.5	10	4.25	5.9	1031	40	.1	1.0	71	.5	7.0
6252331	20	365186	5868763	23A14	.5	39	.58	42.8	72	23	.7	1.3	48	2.0	1.0
6252332	20	365509	5868040	23A14	.5	111	1.77	28.8	399	19	1.3	1.3	76	.5	3.0
6252334	20	364902	5867779	23A14	.5	18	.88	26.3	203	16	.1	1.8	44	.5	2.0
6252335	20	365004	5866880	23A14	.5	26	.81	28.0	158	18	.7	.6	43	2.0	6.0
6252336	20	364594	5866398	23A14	.5	48	3.04	35.7	649	38	1.4	.7	97	.5	2.0
6252337	20	364567	5865226	23A14	.5	45	.62	41.8	125	34	.9	.8	59	3.0	3.0
6252338	20	365383	5865226	23A14	.5	59	2.48	44.2	323	68	1.5	2.2	87	4.0	4.0
6252339	20	365185	5863935	23A14	.5	41	.92	38.1	192	39	.5	1.4	63	.5	2.0
6252340	20	364076	5863819	23A14	.5	26	1.07	44.9	91	21	1.2	.8	46	3.0	1.0
6252341	20	364297	5863523	23A14	.5	19	1.99	28.6	411	30	.1	.5	83	.5	2.0
6252342	20	363620	5862994	23A14	.5	66	2.43	36.8	365	25	.2	1.2	70	3.0	5.0
6252343	20	362865	5861919	23A14	.5	40	2.40	30.0	372	36	.1	.3	86	4.0	2.0
6252344	20	365315	5859779	23A14	.5	61	5.00	28.1	687	52	.5	1.3	119	4.0	.5
6252345	20	364413	5859552	23A14	.5	45	.75	36.3	77	23	.1	.8	38	.5	10.0
6252346	20	363610	5859109	23A14	.5	56	4.04	21.0	705	48	1.2	1.2	111	2.0	2.0
6252347	20	361305	5857347	23A14	.5	60	3.54	4.6	707	46	1.2	1.4	71	.5	1.0
6252348	20	361071	5858862	23A14	.5	29	1.28	36.1	154	22	.1	.5	34	4.0	.5
6252349	20	359892	5858456	23A14	.5	121	1.58	53.7	242	29	1.9	1.4	55	3.0	2.0
6252350	20	358280	5877148	23H03	.5	29	.63	36.3	65	18	.1	.2	40	.5	.5
6252351	20	356456	5879876	23H03	.5	22	2.06	50.8	106	18	1.6	.9	62	.5	.5
6252352	20	355468	5882555	23H03	.5	59	1.24	43.9	128	27	2.1	1.1	65	3.0	1.0
6252353	20	353359	5885018	23H03	.5	45	3.45	8.9	598	36	1.9	3.8	73	3.0	.5
6252354	20	351669	5885246	23H03	.5	17	3.05	17.4	574	32	.9	.8	103	.5	.5
6252355	20	352732	5885975	23H03	.5	31	.57	38.6	66	19	2.3	.9	40	.5	.5
6252356	20	354950	5891009	23H03	.5	42	.82	39.5	357	20	1.9	.9	68	2.0	.5
6252357	20	353340	5891393	23H03	.5	42	.31	51.9	57	23	1.0	.6	30	.5	1.0
6252358	20	355412	5892953	23H03	.5	43	.41	41.6	122	19	1.6	1.2	40	.5	.5
6252359	20	354112	5892903	23H03	.5	46	.48	40.6	108	21	.6	.8	48	3.0	.5
6252360	20	356093	5893867	23H03	.5	41	2.88	30.7	824	36	.8	1.1	113	2.0	.5
6252361	20	354609	5894033	23H03	.5	47	.51	37.3	127	17	.1	1.8	49	.5	.5
6252362	20	352960	5893831	23H03	.5	30	.99	37.3	130	20	.1	.7	53	3.0	1.0
6252363	20	355365	5901755	23H03	.5	38	1.26	35.4	196	29	3.1	1.5	59	.5	.5
6252364	20	353738	5900522	23H03	.5	59	.26	42.7	59	23	.1	1.0	40	.5	.5
6252365	20	352357	5899718	23H03	.5	42	.71	39.3	101	23	.4	.6	49	.5	.5
6252366	20	351853	5898439	23H03	.5	50	.51	39.9	88	22	.8	.9	52	2.0	.5
6252367	20	350117	5899536	23H03	.5	78	3.06	34.0	593	35	2.1	1.0	100	.5	.5
6252368	20	349886	5897330	23H03	.5	58	1.68	37.0	303	24	2.0	1.0	91	.5	1.0
6252369	20	349360	5894897	23H03	.5	53	1.92	39.4	230	26	1.0	1.4	84	.5	.5
6252370	20	348600	5896968	23H03	1.6	30	1.28	39.6	424	20	.6	.5	74	2.0	.5
6252371	20	348134	5899175	23H03	.5	30	.45	55.3	66	18	.3	1.1	46	2.0	.5
6252372	20	347383	5899144	23H03	.5	55	.67	48.0	162	25	1.2	1.1	55	3.0	.5
6252373	20	346562	5900072	23H03	.5	33	.48	35.4	96	15	2.6	.5	42	2.0	1.0
6252374	20	346783	5901613	23H03	.5	90	2.08	25.2	453	26	.1	.1	105	.5	.5
6252375	20	337318	5897594	23H03	2.4	35	.67	36.9	104	20	.1	2.2	40	.5	.5
6252376	20	335663	5898813	23H03	1.2	51	1.05	48.5	219	26	.8	2.2	48	1.0	.5
6252377	20	333176	5897511	23H03	.5	30	.69	32.4	89	15	.9	1.0	35	2.0	2.0
6252378	20	333484	5900050	23H03	2.3	17	4.99	11.6	1184	38	.3	1.8	116	2.0	.5
6252379	20	334946	5901513	23H03	1.3	56	1.49	39.9	276	25	1.0	1.7	63	3.0	.5
6252380	20	336639	5900774	23H03	2.1	32	.88	38.8	183	20	.1	1.8	53	.5	.5
6252381	20	332841	5903517	23H05	.5	29	.79	41.8	159	17	.4	1.3	38	1.0	.5
6252382	20	330312	5903571	23H05	.5	20	.96	36.9	520	12	.9	1.5	70	1.0	.5
6252383	20	323095	5903982	23H05	1.8	44	2.50	30.1	658	27	2.6	1.4	109	.5	.5
6252384	20	319254	5904860	23H05	.5	26	.84	32.9	168	16	.1	1.0	41	1.0	.5
6252385	20	395446	5885003	23H02	.5	10	3.80	28.5	409	22	.1	1.3	96	1.0	1.0
6252386	20	395613	5881257	23H02	.5	24	.64	42.3	79	19	.1	1.0	51	3.0	.5
6252387	20	394007	5881064	23H02	.5	21	.62	33.3	85	17	.1	1.1	43	.5	1.0
6252388	20	393238	5884316	23H02	.5	27	3.53	33.4	188	20	.1	.9	82	.5	1.0
6252389	20	391845	5884436	23H02	.5	19	4.31	27.4	319	19	.1	.3	68	.5	2.0
6252390	20	390747	5884738	23H02	.5	33	1.10	39.6	176	22	.6	.7	54	4.0	2.0
6252391	20	390774	5885741	23H02	3.2	26	6.98	33.4	726	24	.1	1.2	141	.5	2.0
6252392	20	402515	5884614	23H01	.5	5	4.21	3.2	578	19	.1	.1	48	1.0	2.0
6252393	20	401184	5882783	23H01	.5	9	3.08	11.3	460	21	.1	.4	57	1.0	2.0

FLDNUM	ZONE	UTMEAST	UTMNORTH	NTS	Au27 ppb	Cu2 ppm	Fe2 wt.&	LOI wt.%	Mn2 ppm	Ni2 ppm	Pd27 ppb	Pt27 ppb	Zn2 ppb	Cuw2 ppb	Niw2 ppb
6252394	20	400186	5882207	23H01	.5	5	2.85	4.6	571	19	.1	.5	50	4.0	1.0
6252395	20	398620	5882599	23H02	.5	5	4.91	7.6	788	19	.1	.5	52	3.0	.5
6252396	20	399126	5884113	23H02	.5	7	3.99	9.7	514	19	.1	.9	63	4.0	2.0
6252397	20	398503	5885604	23H02	.5	4	3.34	1.9	616	16	.1	.6	38	4.0	1.0
6252398	20	404104	5885668	23H01	.5	7	12.11	14.8	804	23	.1	.5	80	2.0	3.0
6252399	20	405220	5887648	23H01	1.3	9	1.85	34.1	68	14	.1	.1	46	3.0	2.0
6252400	20	403104	5887609	23H01	1.1	19	9.17	39.4	439	24	.1	.5	117	2.0	1.0
6252401	20	403371	5889196	23H01	1.1	7	7.35	17.0	494	19	.4	.6	54	3.0	2.0
6252402	20	407470	5890043	23H01	.5	11	4.97	23.4	421	17	.1	.7	76	4.0	2.0
6252403	20	406494	5891167	23H01	.5	21	24.42	28.7	894	24	.1	.1	110	2.0	2.0
6252404	20	405071	5892774	23H01	1.6	13	3.09	49.0	247	14	1.0	.6	40	5.0	1.0
6252405	20	405148	5894925	23H01	.5	11	1.30	23.2	229	12	.1	.2	28	2.0	2.0
6252406	20	404549	5896414	23H01	.5	19	1.52	21.6	258	16	.8	.1	49	2.0	.5
6252407	20	401936	5897148	23H01	.5	11	5.21	20.8	442	25	.1	.2	62	2.0	1.0
6252408	20	401714	5899199	23H01	.5	4	3.93	6.4	773	18	.8	.1	49	2.0	2.0
6252409	20	401933	5893350	23H01	.5	18	3.68	34.3	253	26	.1	.2	121	1.0	1.0
6252410	20	400471	5891315	23H01	.5	21	3.89	7.1	233	24	.2	5.4	78	2.0	.5
6252411	20	399778	5889755	23H01	.5	14	6.15	47.3	779	20	.1	.1	54	3.0	2.0
6252412	20	398544	5892225	23H02	1.0	9	9.14	13.1	787	23	.1	.3	79	3.0	2.0
6252413	20	398523	5893547	23H02	.5	15	12.55	33.3	435	21	.1	.3	74	4.0	.5
6252414	20	397401	5897823	23H02	.5	26	2.29	70.5	206	20	.1	.6	94	3.0	1.0
6252415	20	399546	5899875	23H02	.5	17	10.26	13.2	1197	24	.1	.3	87	2.0	2.0
6252416	20	399503	5902983	23H07	.5	41	2.63	32.4	206	19	.1	.1	89	4.0	.5
6252417	20	396300	5903272	23H07	.5	23	1.50	31.9	187	19	.1	.1	58	1.0	3.0
6252418	20	397004	5905828	23H07	.5	17	.71	40.0	120	17	.1	.1	47	5.0	2.0
6252419	20	395608	5906729	23H07	.5	9	3.28	11.9	393	19	.1	.1	58	2.0	3.0
6252420	20	394406	5906510	23H07	.5	31	1.20	20.8	228	17	.1	.1	50	5.0	1.0
6252421	20	404472	5920187	23H08	.5	19	3.30	28.8	617	19	.1	.1	92	5.0	1.0
6252422	20	407740	5914257	23H08	.5	25	.60	41.2	107	16	1.3	1.2	59	3.0	2.0
6252423	20	407020	5913677	23H08	.5	21	.80	49.3	101	21	.1	.1	71	2.0	1.0
6252424	20	409569	5903410	23H08	.5	20	.36	55.6	47	21	.1	.7	55	4.0	2.0
6252425	20	418651	5901651	23H08	.5	27	1.48	27.1	159	13	.1	1.0	62	2.0	1.0
6252426	20	417751	5904383	23H08	1.2	20	.35	33.2	58	12	.7	2.5	44	4.0	1.0
6252427	20	415030	5906344	23H08	.5	18	2.34	38.1	199	17	.1	.1	67	2.0	1.0
6252428	20	416772	5906830	23H08	.5	19	.79	35.7	98	16	.1	.1	44	1.0	3.0
6252429	20	420801	5922854	23H08	.5	50	.43	42.8	44	29	.1	.1	41	4.0	2.0
6252430	20	423072	5923884	23H08	.5	153	5.68	33.0	621	23	.1	.5	142	3.0	2.0
6252431	20	427879	5923221	23H08	.5	43	2.39	27.8	240	19	.1	1.0	75	3.0	.5
6252432	20	426544	5924188	23H08	7.8	43	.73	35.8	80	14	.1	.2	36	5.0	3.0
6252433	20	427895	5921663	23H08	1.3	62	.39	47.0	43	17	.1	.6	47	4.0	1.0
6252434	20	430729	5918674	23H08	.5	61	.45	51.5	72	28	.1	.3	51	7.0	2.0
6252435	20	432441	5918920	23H08	1.8	35	.28	42.6	45	16	.1	.9	50	3.0	2.0
6252437	20	431869	5925230	23H08	.5	35	.79	64.5	64	18	.1	.1	31	4.0	2.0
6252438	20	432795	5925689	23H08	.5	48	2.32	38.2	193	29	.1	.2	87	5.0	.5
6252439	20	431338	5927018	23H08	1.4	30	.82	29.6	139	15	.1	.1	36	6.0	3.0
6252440	20	428858	5925267	23H08	.5	48	.75	39.3	97	12	.1	.1	31	9.0	2.0
6252441	20	428154	5928059	23H08	.5	57	1.19	56.7	102	17	.1	.6	58	8.0	1.0
6252442	20	422773	5927038	23H08	1.7	81	3.80	34.5	356	20	.1	.3	91	6.0	2.0
6252443	20	422106	5928169	23H08	.5	97	.85	49.3	111	16	.1	.3	41	8.0	1.0
6252444	20	412053	5925923	23H08	.5	31	.70	38.4	108	12	.1	.1	42	6.0	.5
6252445	20	410522	5926638	23H08	2.1	72	2.92	19.1	315	22	.3	2.5	75	6.0	1.0
6252446	20	407790	5927887	23H08	5.9	93	5.64	33.7	1313	42	1.3	2.7	161	6.0	2.0
6252447	20	406091	5925738	23H08	4.2	24	.61	39.7	131	17	.7	2.5	35	5.0	1.0
6252448	20	406600	5924500	23H08	4.0	32	1.06	27.5	206	16	.7	3.2	64	6.0	2.0
6252449	20	404311	5921829	23H08	1.4	26	3.70	26.3	260	23	.6	2.0	61	5.0	2.0
6252450	20	401042	5921495	23H08	.5	23	1.26	35.4	176	17	.1	1.1	50	3.0	2.0
6252451	20	401124	5922963	23H08	.5	21	.80	30.1	113	17	.4	1.1	46	5.0	2.0
6252452	20	401095	5927885	23H08	1.1	47	2.53	44.3	325	28	.4	.2	115	6.0	2.0
6252453	20	386542	5928305	23H07	4.3	26	3.97	15.8	914	42	9.5	5.3	141	4.0	2.0
6252454	20	384384	5928160	23H07	3.3	17	1.55	32.8	173	18	3.1	4.2	53	8.0	2.0
6252455	20	383612	5929000	23H07	19.3	20	4.70	30.9	785	28	34.9	22.5	110	6.0	2.0
6252456	20	384769	5926616	23H07	3.2	28	1.39	29.6	197	23	.5	1.1	61	5.0	3.0
6252457	20	384245	5926581	23H07	2.2	40	6.73	37.8	3709	84	2.1	1.6	194	5.0	2.0
6252458	20	383245	5926296	23H07	2.3	31	2.62	57.4	459	35	2.0	2.9	98	4.0	.5
6252459	20	381321	5925971	23H07	.5	30	1.71	39.9	258	32	.2	1.0	66	10.0	2.0

FLDNUM	ZONE	UTMEAST	UTMNORTH	NTS	Au27 ppb	Cu2 ppm	Fe2 wt.&	LOI wt.%	Mn2 ppm	Ni2 ppm	Pd27 ppb	Pt27 ppb	Zn2 ppb	Cuw2 ppb	Niw2 ppb
6252460	20	379788	5928300	23H07	1.1	43	4.02	28.2	1085	30	1.1	1.8	136	9.0	2.0
6252461	20	372403	5899098	23H02	1.2	13	3.15	17.4	509	23	.9	2.1	70	6.0	1.0
6252462	20	376331	5896108	23H02	.5	35	2.60	29.4	1874	22	.1	1.2	98	5.0	.5
6252463	20	378623	5895182	23H02	8.6	15	1.37	27.5	243	17	1.5	3.4	40	6.0	.5
6252464	20	377742	5894160	23H02	34.6	19	1.16	33.4	197	19	.7	4.4	51	6.0	.5
6252465	20	376970	5884821	23H02	3.6	52	2.32	41.2	309	35	.9	3.3	78	4.0	.5
6252466	20	375918	5885421	23H02	1.8	28	2.92	14.9	840	31	2.2	3.1	111	5.0	.5
6252467	20	377273	5881871	23H02	1.7	25	1.87	29.0	332	26	1.6	3.8	53	6.0	.5
6252469	20	378103	5877447	23H02	8.0	120	9.38	32.7	33235	105	3.9	2.9	242	5.0	.5
6252470	20	377191	5874572	23H02	1.1	16	2.98	24.4	547	20	.7	.9	67	6.0	.5
6252471	20	375947	5876152	23H02	1.7	26	1.66	26.4	291	19	2.2	1.0	56	3.0	.5
6252472	20	376417	5878285	23H02	.5	30	.39	34.1	51	15	.7	1.1	36	6.0	3.0
6252473	20	373627	5878195	23H02	.5	48	1.65	36.8	247	16	1.9	2.4	59	5.0	.5
6252474	20	371499	5878021	23H02	1.3	18	1.43	28.7	220	20	.3	1.6	53	7.0	.5
6252475	20	367472	5875808	23H02	.5	14	4.22	9.5	1016	37	1.2	1.3	96	8.0	.5
6252476	20	366668	5875984	23H02	1.1	27	2.31	35.1	285	25	2.2	2.3	67	1.0	.5
6252477	20	366737	5877212	23H02	1.0	23	2.44	28.1	391	27	1.7	1.0	72	4.0	.5
6252478	20	373135	5881316	23H02	2.2	67	1.93	44.4	186	34	1.9	1.1	68	3.0	.5
6252479	20	372224	5884729	23H02	1.9	48	4.56	22.6	1079	34	3.8	2.5	139	3.0	.5
6252480	20	373947	5886116	23H02	1.8	71	2.77	25.0	654	21	2.2	1.9	84	3.0	1.0
6252481	20	374000	5886690	23H02	1.3	24	.87	32.2	167	18	.1	1.0	44	2.0	.5
6252482	20	374757	5887965	23H02	1.7	57	4.70	52.3	302	27	2.3	2.8	62	3.0	.5
6252483	20	373354	5887842	23H02	.5	39	1.62	36.8	210	17	1.3	1.4	49	5.0	.5
6252485	20	370235	5888214	23H02	.5	53	3.19	31.6	1408	23	1.1	1.2	104	1.0	1.0
6252486	20	371544	5889966	23H02	.5	44	4.09	31.2	611	20	1.0	1.3	85	2.0	.5
6252487	20	373271	5891486	23H02	.5	43	1.45	38.6	130	18	.6	1.1	62	2.0	1.0
6252488	20	373715	5890176	23H02	.5	48	3.88	4.1	540	36	.4	.5	64	2.0	.5
6252489	20	372299	5891218	23H02	.5	14	1.61	27.2	328	18	.1	.7	43	1.0	.5
6252490	20	371978	5892703	23H02	.5	35	3.99	2.5	719	33	.7	1.2	66	.5	.5
6252491	20	370688	5892349	23H02	1.1	76	2.29	50.3	550	23	1.7	5.3	89	.5	.5
6252492	20	372643	5893657	23H02	.5	77	5.03	6.0	728	38	4.5	1.1	78	.5	1.0
6252493	20	365475	5916476	23H06	.5	22	3.67	29.2	842	30	.6	.8	110	3.0	2.0
6252494	20	340300	5921300	23H06	3.8	41	1.11	36.1	230	24	1.9	1.8	85	3.0	2.0
6252495	20	336233	5921842	23H06	1.1	44	.32	50.3	55	31	.6	.1	55	4.0	2.0
6252496	20	333007	5925884	23H05	1.4	17	1.05	37.4	123	17	.8	.8	48	3.0	2.0
6252497	20	331172	5926111	23H05	1.8	16	.77	53.7	71	14	1.4	.9	54	.5	.5
6252498	20	329971	5923522	23H05	1.3	41	1.10	50.7	142	32	1.2	.5	68	.5	2.0
6252499	20	329311	5924102	23H05	1.9	53	.91	56.7	238	32	2.0	2.0	98	2.0	1.0
6252500	20	328504	5925181	23H05	.5	32	.48	53.4	98	17	.4	.2	47	2.0	3.0
6252501	20	326906	5924346	23H05	.5	13	2.27	12.0	512	18	.4	.4	63	3.0	2.0
6252502	20	323411	5926382	23H05	.5	37	1.01	45.8	134	26	1.0	.4	54	4.0	2.0
6252503	20	322400	5927481	23H05	.5	35	.55	44.9	112	27	.8	.1	45	.5	1.0
6252504	20	325888	5927744	23H05	.5	23	6.10	62.4	480	25	.6	1.0	88	4.0	.5
6252505	20	327300	5927900	23H05	.5	67	2.82	44.4	840	61	.6	.7	215	2.0	13.0
6252506	20	330423	5928596	23H05	1.3	47	2.73	30.1	339	44	.7	.7	122	3.0	2.0
6252507	20	331022	5929613	23H05	1.3	37	.88	49.9	168	35	1.0	.7	65	6.0	1.0
6252508	20	332239	5927477	23H05	1.3	47	10.41	47.2	7450	57	1.5	1.3	175	2.0	1.0
6252509	20	363798	5929395	23H06	1.5	6	2.59	3.5	455	20	.1	.4	43	.5	2.0
6252510	20	362315	5929341	23H06	.5	27	1.97	36.1	484	23	.1	.7	68	3.0	1.0
6252511	20	363782	5927665	23H06	.5	36	2.59	37.2	727	41	.5	.5	143	1.0	.5
6252513	20	362514	5927493	23H06	.5	34	.57	42.3	119	32	.1	.3	54	1.0	1.0
6252514	20	357290	5928272	23H06	.5	28	1.95	43.6	280	40	.1	1.0	75	3.0	2.0
6252515	20	355752	5928566	23H06	1.2	48	8.04	44.5	15278	63	.6	1.6	144	2.0	2.0
6252516	20	353751	5929399	23H06	2.1	32	2.71	45.4	592	32	.8	1.4	96	.5	1.0
6252517	20	351943	5928401	23H06	.5	39	4.04	48.8	845	33	.5	1.3	108	.5	1.0
6252518	20	345392	5926023	23H06	2.9	40	.63	35.9	135	17	.1	2.6	54	4.0	1.0
6252519	20	345137	5924938	23H06	.5	27	.96	38.0	109	19	.1	1.8	43	.5	1.0
6252520	20	342324	5924440	23H06	1.9	33	.62	38.4	93	22	.1	1.7	32	4.0	2.0
6252521	20	343411	5922583	23H06	.5	47	.85	36.4	119	30	.1	1.7	64	3.0	1.0

Number of cases read: 509 Number of cases listed: 509