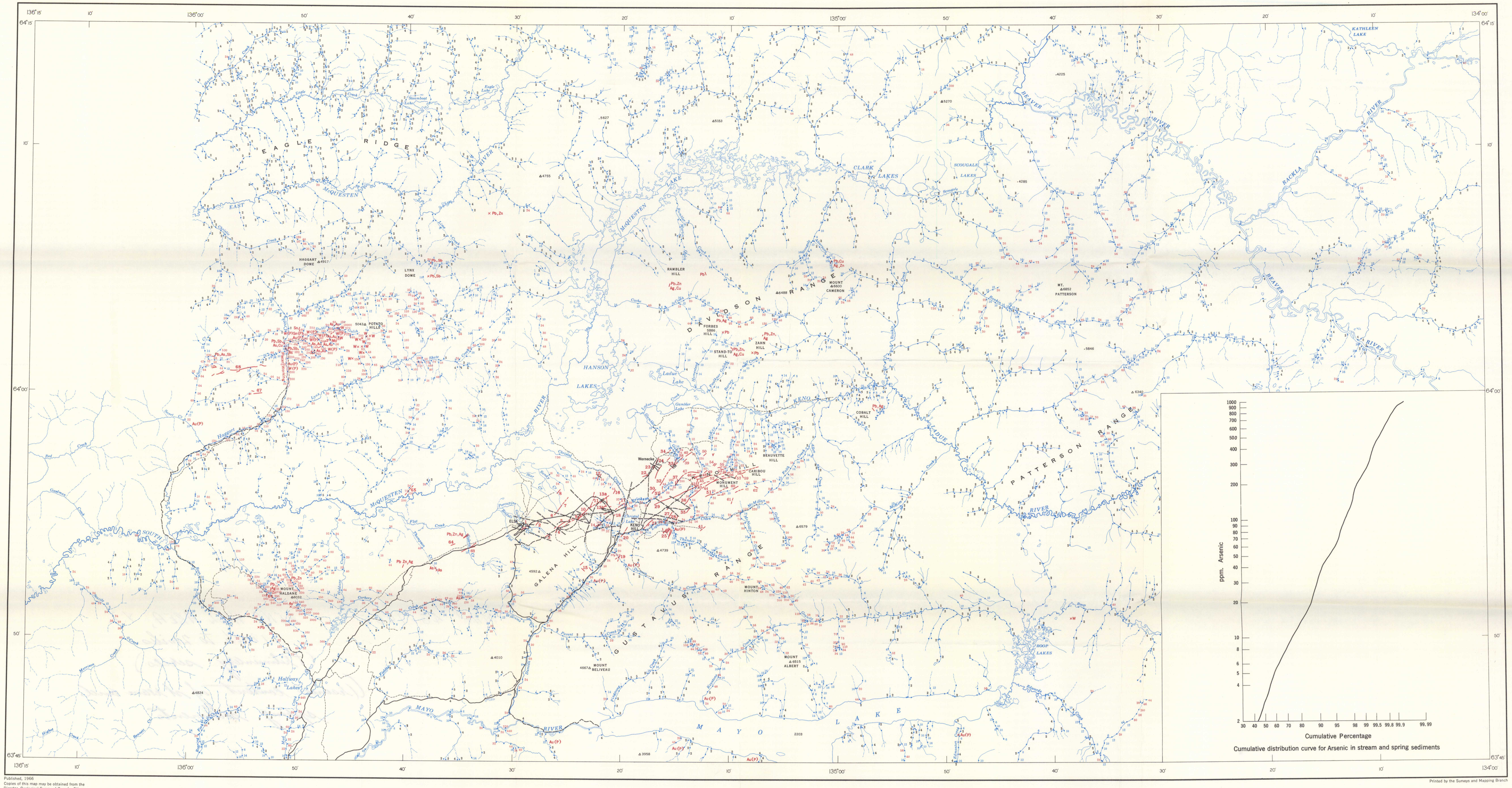
GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF MINES AND TECHNICAL SURVEYS

PRELIMINARY SERIES



Cumulative distribution curve for Arsenic in stream and spring sediments

LEGEND

Concentration of arsenic, less than 2 ppm
in stream sediments........ in spring sediments........

Concentration of arsenic, 2 ppm to 5 ppm
in stream sediments.......3 in spring sediments........3

Concentration of arsenic, 6 to 16 ppm
in stream sediments......15 in spring sediments.......15

Concentration of arsenic, 18 ppm or greater
in stream sediments.......50 in spring sediments.......50

Location of known veins ....

Mineral occurrence .... Au×

Mineral deposit 3

Mineral Symbols

Arsenic..........	As	Silver............	Ag
Antimony	Sb	Tungsten lode....	W
Copper	Cu	Tungsten (placer)..	W(P)
Gold (lode)	Au	Tin (lode).........	Sn
Gold (placer).....	Au(P)	Tin (placer)......	Sn(P)
Lead	Pb	Zinc.............	Zn
Molybdenum......	Mo		

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8. Cream
9. Hector
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12. Formo
13a. Galkeno (McLeod vein)
13b. Galkeno (Sime and Sugiyama veins)
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23. Sadie-Friendship
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68. Peso Silver

Field work by C. F. Gleeson, W. M. Tupper, A. Suparman, K. Domai, M. Shafiqullah, J. A. Colwell, J. R. Deighton, C. H. Yurchak, J. K. Worth, H. R. James, A. G. Troup, G. Wind, L. Hogg, and F. R. Campbell

Analyses by: J. J. Lynch, G. Mihailov, S. Blundon and G. MacGillivary

Compilation and text by C. F. Gleeson

Geological cartography by the Geological Survey of Canada, 1966

Roads, all weather ....

Other roads ....

Trail ....

Intermittent lake and stream ....

Horizontal control point .... △

Elevation in feet above mean sea-level 2043

Base-map cartography by the Geological Survey of Canada, 1966 from maps published by the Surveys and Mapping Branch and by the Army Survey Establishment, R. C. E.

Approximate magnetic declination, 34° 45' East, decreasing 4.2' annually

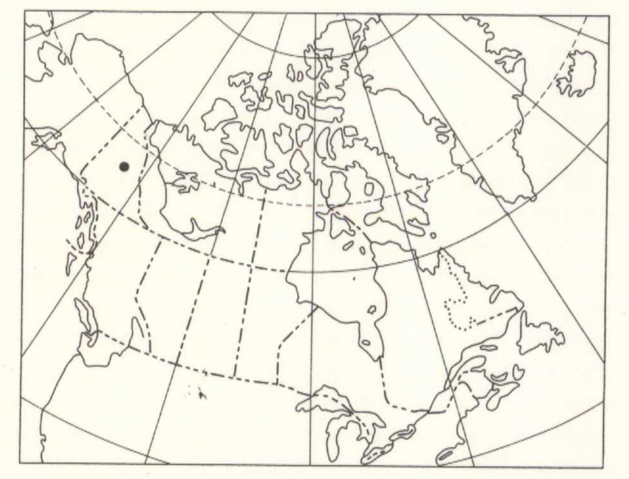
Published, 1966
Copies of this map may be obtained from the Director, Geological Survey of Canada, Ottawa

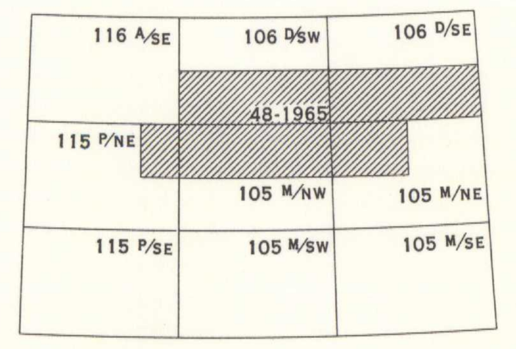
Printed by the Surveys and Mapping Branch

MAP 48-1965
ARSENIC CONTENT OF STREAM AND SPRING SEDIMENTS
KENO HILL AREA
YUKON TERRITORY

Scale 1:126,720
1 inch to 2 miles

Miles 2 0 2 4 6 Miles
Kilometres 3 0 3 6 9 Kilometres


INDEX MAP



N. T. S. REFERENCE
KENO HILL AREA
YUKON TERRITORY

DESCRIPTIVE NOTES

Introduction

The reconnaissance geochemical survey of Keno Hill area, Yukon Territory was started and completed in the summer of 1964. The creeks not accessible by roads were reached by helicopter. An attempt was made to maintain a sample interval of 1,500 feet along all rivers, creeks, and their tributaries.

The data on this map are based on 5,900 samples of stream sediment collected from the channels of the streams and on the sediments and precipitates in the vicinity of springs from an area of approximately 1,900 square miles. Where possible the active channel was sampled; however as work progressed it was found that moss on the creek banks below the water line had trapped considerable amounts of fine sediment suitable for sampling. The wet sediments and waters were analyzed at the sample site for cold citrate-soluble heavy metals. The results of this work have been published in a series of 14 preliminary maps (Gleeson, et al., 1965). Field observations on the character of the stream, composition of the sediment, pH and temperature of the water, and rock types in the vicinity of the sample station were entered in code on special geochemical field cards. Subsequently, this information was punched on cards for electronic data processing.

The wet sediment was dried in the field at a temperature of about 60° C and sieved through an 80 mesh stainless steel screen. The sieved samples were shipped to Ottawa where they were ground to minus 100 mesh in a ceramic ball mill.

Analysis

Samples of spring and stream sediments were analyzed by the Gutzeit method, Lynch and Mihailov (1963). The extraction technique used was fusion with potassium hydroxide in nickel crucibles.

General Geology

The regional geology has been described by Bostock (1947, 1964), and Green and Roddick (1962). More detailed geological studies have been made by Kindle (1962), McTaggart (1960), Poole (1965), and Green (1957, 1958). The geology, geochemistry, and origin of the mineral deposits in Keno Hill and Dublin Gulch areas have been described by Boyle (1965). Reports by Aho (1964) and Cockfield (1922) provide further information on mineral deposits of the area.

The map-area is underlain by a series of metamorphosed sedimentary rocks, mainly quartzites, phyllites, slates, chlorite, sericite and graphite schists, also grits and minor limestone. The age of these rocks is uncertain and appears to range from Precambrian to Mesozoic (Poole, 1965; Tempelman-Kluit, 1966).

A dolomite and limestone unit outcrops in the northeast part of the area. Fossils from these rocks range in age from late Cambrian to late Silurian or early Devonian (Green and Roddick, 1962).

Mafic igneous sills and lenses now altered to greenstones are interlayered with the metamorphosed sediments. Quartz-feldspar porphyry sills and lamprophyre dykes are present locally. Granitic stocks cut the metamorphosed sediments east and north of Mayo Lake, northwest of Hanson Lake, south of Dublin Gulch and in the vicinity of Mount Haldane.

Scarn zones containing scheelite occur in the vicinity of some of the granitic masses particularly around Dublin Gulch, Mount Haldane, and east of Mayo Lake.

Most of the lead-silver ore deposits in the Keno - Galena Hills area occur along northeasterly striking vein faults in thick-bedded quartzite and occasionally in greenstone (Boyle, 1965). In the Dublin Gulch area quartz arsenopyrite-gold veins with a general northeast strike are present near the contacts of the granitic stocks. Also easterly striking vein faults are mineralized with siderite, jamesonite, boulangerite, pyrite, arsenopyrite, galena, tetrahedrite, and chalcopyrite. Two cassiterite-tourmaline veins occur on the right limit of Dublin Gulch nears it mouth (Boyle, 1965; Poole, 1965). Also northerly striking lead-zinc-silver veins are present in Davidson Range (Cockfield, 1922; Aho, 1964). Placer gold has been recovered from Dublin Gulch, Haggart Creek, and Duncan Creek since 1898.

The area has undergone several stages of glaciation. Thick glacial deposits occupy the major valleys and hill slopes below an elevation of 3,000 feet. Permafrost is present throughout the area.

Results

Statistical studies using electronic computation are still in progress and until this phase of work is completed adequate assessment of the results will be difficult. However, cumulative distribution curves have been constructed from information supplied by the computer. The curve for arsenic closely approximates a straight line suggesting that arsenic in the stream sediments has a lognormal distribution. On the cumulative distribution curve information is plotted only for values of arsenic 2 ppm or greater. About seventeen per cent of the samples have less than 2 ppm arsenic and values range from less than 2 ppm to 4,800 ppm. For this map the values have been grouped in the following three classes: those less than 2 to 5 ppm (55 per cent of the samples), those 6 to 16 ppm (28 per cent of the samples), and those containing 18 ppm or more arsenic (17 per cent of the samples).

In the Keno Hill district arsenic is high in areas intruded by granitic rocks. This is clearly illustrated by the numerous high values found in the sediments of the Dublin Gulch and Mount Haldane areas. Most of the known lead-silver deposits and gold-arsenopyrite-pyrite veins have high arsenic values in the sediments of the neighbouring streams, although some of the creeks are high because of contamination from mine workings. Anomalous trains vary in length from less than ½ mile to 4 miles (Corkery Creek). The distribution of arsenic in the vicinity of Dublin Gulch, Mount Haldane, and Mount Hinton indicates that arsenic mineralization may be more widespread in these areas than previously thought. Above average values for arsenic could be indicative of any of the following types of mineralization: quartz-arsenopyrite-pyrite-gold veins, lead-zinc-silver veins, lead-arsenic-antimony-silver veins, and arsenopyrite in porphyry dykes and in contact metamorphic deposits around granitic rocks. In addition some high values are associated with iron hydroxide deposits in the vicinity of springs. Further follow up work is warranted to explain the distribution of arsenic in the stream and spring sediments of the area.

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