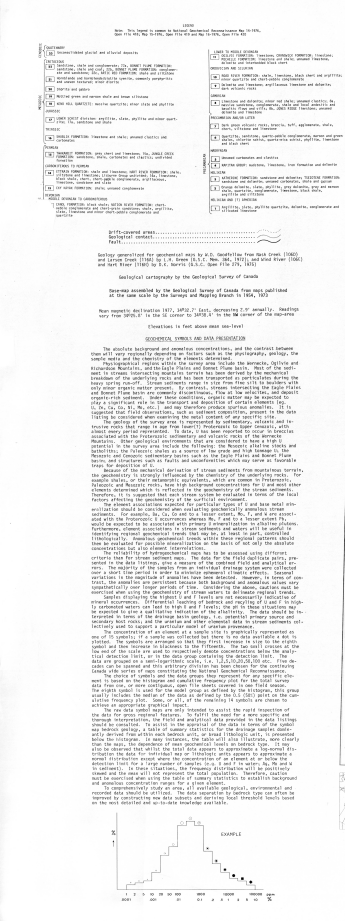
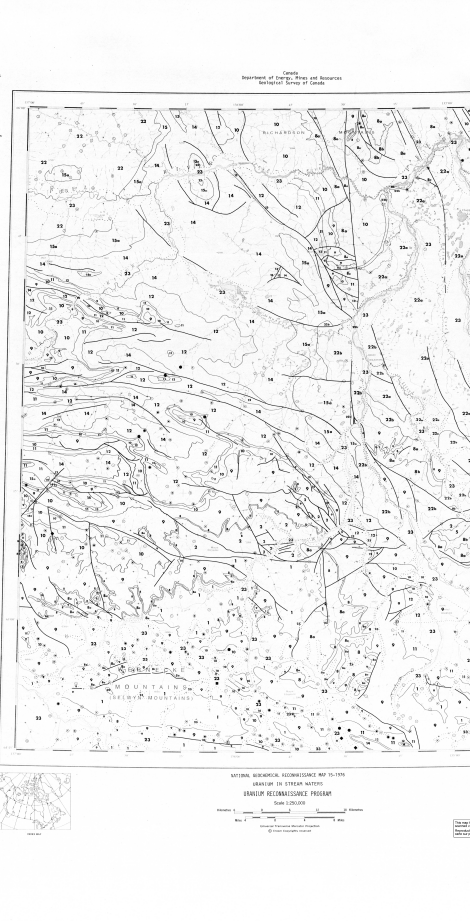
10200
Note: This legend is common to National Geochemical Reconnaissance Nos 15-1976,
Open File 412; Map 16-1976, Open File 413 and Map 17-1976, Open File 414


QUATERNARY
Unconsolidated glacial and alluvial deposits
CRETACEOUS
Sandstone, shale and conglomerate; THE BONNET PLUME FORMATION: sandstone, shale and coal; THE DRAGON FLAME FORMATION: conglomerate and sandstone; ALL WITH RECOMMENDATION: shale and siltstone
Granodiorite, quartz monzonite, monzonite, commonly porphyritic and usually contained minor phases
Diorite and gabbro
MIDDLE DEVONIAN
Medium grained and massive shale and limestone
KNOX HILL QUARTZITE: massive quartzitic arkose shale and phyllite
ORDOVICIAN
LOWER DEVOLT FORMATION: phyllite, slate, phyllite and minor quartzite; thin limestone and shale
TRIASSIC
SHEDLA FORMATION: limestone and shale; pinkish clastics and limestone
PERMIAN
RAVENSCY FORMATION: grey chert and limestone; TRA, SHALE DISCS FORMATION: sandstone, shale, carbonate and clastic, undivided
CARBONIFEROUS TO DEVONIAN
CITRINE FORMATION: shale and limestone; HART RIVER FORMATION: shale, siltstone, sandstone and limestone; GUNSIGHT FORMATION: sandstone, shale, chert, conglomerate, siltstone, limestone, sandstone and slate
Carbonate limestone, shale, calcareous conglomerate
MISSISSIPPIAN TO DEVONIAN TO CARBONIFEROUS
EARN FORMATION: shale and clastic; BATTEN RIVER FORMATION: chert, limestone, shale and minor clastic sandstone; shale, phyllite, slate, limestone and minor chert-quartz conglomerate and quartzite
LOWER TO MIDDLE DEVONIAN
PELLY FORMATION: limestone; CONRACKY FORMATION: limestone, shale; PELLY FORMATION: limestone and shale; undivided limestone, dolomite, shale and minor chert
ORDOVICIAN AND SILURIAN
ROAD RIVER FORMATION: shale, limestone, black chert and argillite; minor quartzite and clastic sediments
Dolomite and limestone; argillaceous limestone and dolomite; minor chert, shale
CAMBRIAN
Limestone and dolomite; minor red shale; pinkweed clastics; by GOLDEN FORMATION: limestone, shale, chert, argillite, minor quartz; Prune sea cliffs; By, LOWER RIVER FORMATION: pinkweed clastics and limestone
PRECAMBRIAN AND CAMBRIAN
Dark green siliceous rocks, tuffaceous, buff, agglomerate, shale, chert, siltstone and limestone
Quartzite, sandstone, quartz-pebble conglomerate, marble and green schist; minor shale, quartz-mica schist, phyllite, limestone and black chert
PRECAMBRIAN
Pinkweed carbonates and clastics
WHITING GROUP: dolomite, limestone, iron formation and dolomite
HELIKIAN
S, SEKWIKAN FORMATION: sandstone and dolomite; TSICHIKA FORMATION: dolomite, shale and minor sandstone conglomerate, chert and quartzite
Orange dolomite, shale, argillite, grey dolomite, grey and maroon shale, limestone conglomerate, limestone, shale, shale, argillite and siltstone
HELIKIAN AND (?) APHEBIAN
Argillite, slate, minor quartzite, dolomite, conglomerate and (?) intrusive rhyolite
Drift-covered areas
Geological contact
Fault
Geology generalized for geochemical maps by A.D. Oganbeltin from Wark Creek (1960) and Gunsight Mtn. (1961) by D.K. Norris; Bonnet Plume (1961) and Hart River (1960) by D.K. Norris (A.D.)
Open File 274, 1973
Geological cartography by the Geological Survey of Canada
Base-map assembled by the Geological Survey of Canada from maps published at the same scale by the Surveys and Mapping Branch in 1974, 1973
Mean magnetic declination 1977, 30°02.7' East, decreasing 2.9' annually. Readings vary from 29°05.8' to the SE corner to 30°58.8' in the NW corner of the map-area
Elevations in feet above mean sea-level
GEOCHEMICAL SYMBOLS AND DATA PRESENTATION
The absolute background and anomalous concentrations, and the contrast between them will vary regionally depending on factors such as the physiography, geology, the scale of sampling and the analytical method employed.
The physiographical regions within the survey area include the mountains, skyline and Richardson Mountains, and the Eagle Plains and Bonnet Plume basin. Most of the sediment in streams intersecting mountainous terrain has been derived by the mechanical breakdown of the underlying rocks and has been transported as particulates during the short period of the annual freshet. Chemical activity is at a minimum in this cycle and only minor organic matter present. By contrast, streams intersecting the Eagle Plains and Bonnet Plume basin are commonly discontinuous, flow at low velocities, and deposit much of their sediment load within the confines of their channels. Organic matter may play a significant role in the transport and deposition of certain elements (eg. U, Th, Cu, Co, Ni, Mo, etc.) and may therefore produce spurious anomalies. It is recommended that the Eagle Plains and Bonnet Plume basin be treated as a region for data listing to considered when examining the metal content of any specific area.
The geology of the survey area is represented by sedimentary, volcanic and intrusive rocks ranging in age from Precambrian to Cretaceous, with at least one rock of almost every period represented. To date, it has been assumed to occur in breccias associated with the Proterozoic sedimentary and volcanic rocks of the Wernecke Mountains, and in the Cretaceous granodiorite stocks of the Selwyn Range. Rocks of potential to the survey area include the following: the Mesozoic platform limestones and bioherms; the Paleozoic shales as a source of low grade and high tonnage Cu, Zn, Pb, Ag deposits; the Proterozoic Rapitan Group as a host for Pb, Zn, Ag and Cu deposits; and structures such as faults and unconformities which may serve as favourable traps for deposition of U.
The concentration of analytical derivation of stream sediments from mountainous terrain, the geochemistry is strongly influenced by the chemistry of the underlying rocks. For example shales, or their metamorphic equivalents, which are common to Proterozoic, Paleozoic and Mesozoic rocks, have high concentrations of Mn, Ni, Co and many other elements determined which is reflected in the geochemical patterns of stream sediments derived from them. Background and threshold values can be calculated in terms of the local factors affecting the geochemistry of the surficial environment.
The element associations expected for particular types of U and base metal mineralization should be taken into consideration when examining the data for stream sediments. For example, By, Cu, Co and to a lesser extent, Mn, Ni, Mo, V, and W are associated with the Proterozoic U occurrences whereas Mn, F and to a lesser extent Pb, Zn, Ag and Ba are associated with the Mississippi Valley type Pb-Zn-Ag mineralization. Furthermore, element associations in stream sediments and waters will be useful in identifying regional geochemical trends that may be, at least in part, controlled tectonically. The data for stream sediments and waters in the Yukon Territory should then be evaluated for possible economic significance on the basis of not only the absolute concentrations but also element interrelations.
The data for stream sediments and waters is to be assessed using different criteria than for stream sediment data. The data for the field analytical data, presented in the data listings, gives a measure of the combined field and analytical errors. Any one sample site is not necessarily significant, but a group of sites within even a short time period is under to minimize somewhat climatic effects. Seasonal variations in the magnitude of anomalies have been detected. However, in terms of sinuosity, the anomalies are reproducible and the anomalous patterns should be systematically over longer periods of time. Considering the above, caution must be exercised when using the geochemistry of stream waters to delineate regional trends.
Samples displaying the highest U and F levels are not necessarily indicative of mineral occurrences. Differential leaching of bedrock and recycling of U and F to high-level sediments may be the cause of the high U and F values. Therefore, caution must be exercised to give a qualitative indication of the anomalies. The data should be interpreted in terms of the drainage basin geology, i.e. potential primary source and secondary environments. Follow-up investigations should be undertaken to differentiately wash to support a particular model of uranium provenance.
The concentration of an element at a sample site is graphically represented as one of eight symbols. The range of values for each of the symbols is listed in the data listing. The symbols are arranged so that they first have regard to size in the eight symbol and then increase in blackness to the fifteenth. The two small crosses at the end of the symbol range are used to represent the lowest values in the data listing. Statistical data limits, or in the data group containing the detection limit, etc. The data are grouped on a semi-logarithmic scale, i.e. 1,2,5,10,20,50,100 etc. Five decades are represented on the symbol plots and are listed in the data listings. Samples with values outside of these constitutions the National Geochemical Reconnaissance.
The choice of symbols and the data groups they represent for any specific element is based on a histogram and probability plot. Usually, the first symbol represents five, or more contiguous, symbols based on the data's cumulative frequency. The eighth symbol is used for the model group as defined by the histograms, this group usually includes the median of the data as defined by the 0.5 (50%) point on the cumulative frequency plot. Some, of all, of the remaining 14 symbols are chosen to represent the anomalous data values.
The raw data symbol maps are only intended to assist the rapid inspection of the data for gross regional features. To fulfill the need for a more specific and quantitative assessment of the data, additional statistical data for the data groups should be consulted. To assist in the appraisal of the data in terms of the symbol map bedrock geology, a table of summary statistics for the drainage samples underlain by each of the major rock units is presented on the data sheet for the region below the histogram. In many instances, the table will also illustrate, more clearly than the maps, the dependence of most geochemical levels on bedrock type. It may also be noted that the mean and the median values are approximately equal. Investigation the data for individual map or lithologic units appears to approximate a normal distribution except where the concentration of an element at or below the detection limit. In this case, the median will be less than the mean and will tend to sediments. In these situations, the frequency distribution will be positively skewed and the mean will not represent the total population. Therefore, caution must be exercised when applying statistics to problems relative to establish background and anomalous concentration ranges for a given element.
To comprehensively study an area, all available geological, environmental and recorded data should be utilized. The data separation by bedrock type can often be improved by constructing new data subsets and deriving local threshold levels based on the most detailed and up-to-date knowledge available.

Canada
Department of Energy, Mines and Resources
Geological Survey of Canada
Parts of 106 D, E and 116 A, B


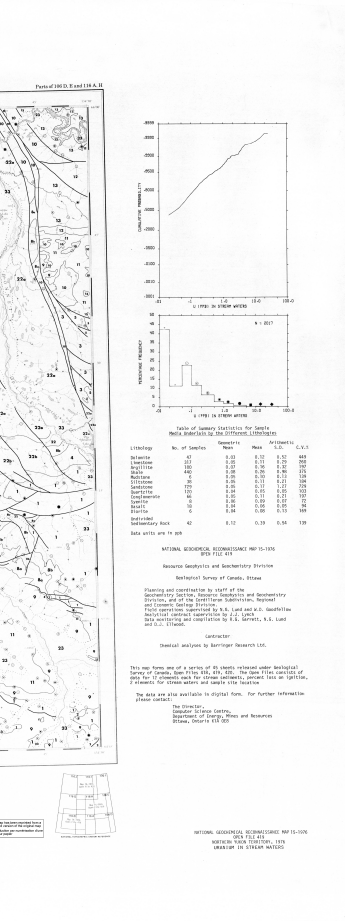


Table of Summary Statistics for Sample Media Underlain by the Different Lithologies

Lithology	No. of Samples	Geometric Mean	Arithmetic Mean	S.D.	C.V.%
Dolomite	47	0.03	0.12	0.52	445
Limestone	100	0.03	0.10	0.35	368
Shale	160	0.37	0.96	0.32	150
Shale	440	0.28	0.95	0.90	95
Mudstone	6	0.05	0.10	0.23	128
Conglomerate	6	0.06	0.33	0.77	230
Sandstone	179	0.05	0.31	1.23	726
Quartzite	170	0.04	0.05	0.05	122
Metasediments	6	0.04	0.04	0.01	33
Limestone	6	0.06	0.06	0.04	77
Basalt	10	0.04	0.06	0.05	96
Intrusive	6	0.04	0.06	0.04	109
Undivided Sedimentary Rock	42	0.12	0.39	0.56	139

Data units are in ppb
NATIONAL GEOCHEMICAL RECONNAISSANCE MAP 15-1976
OPEN FILE 411
Resource Geophysics and Geochemistry Division
Geological Survey of Canada, Ottawa
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NATIONAL GEOCHEMICAL RECONNAISSANCE MAP 15-1976
OPEN FILE 411
NORTHERN YUKON TERRITORY, 1976
URANIUM IN STREAM WATERS