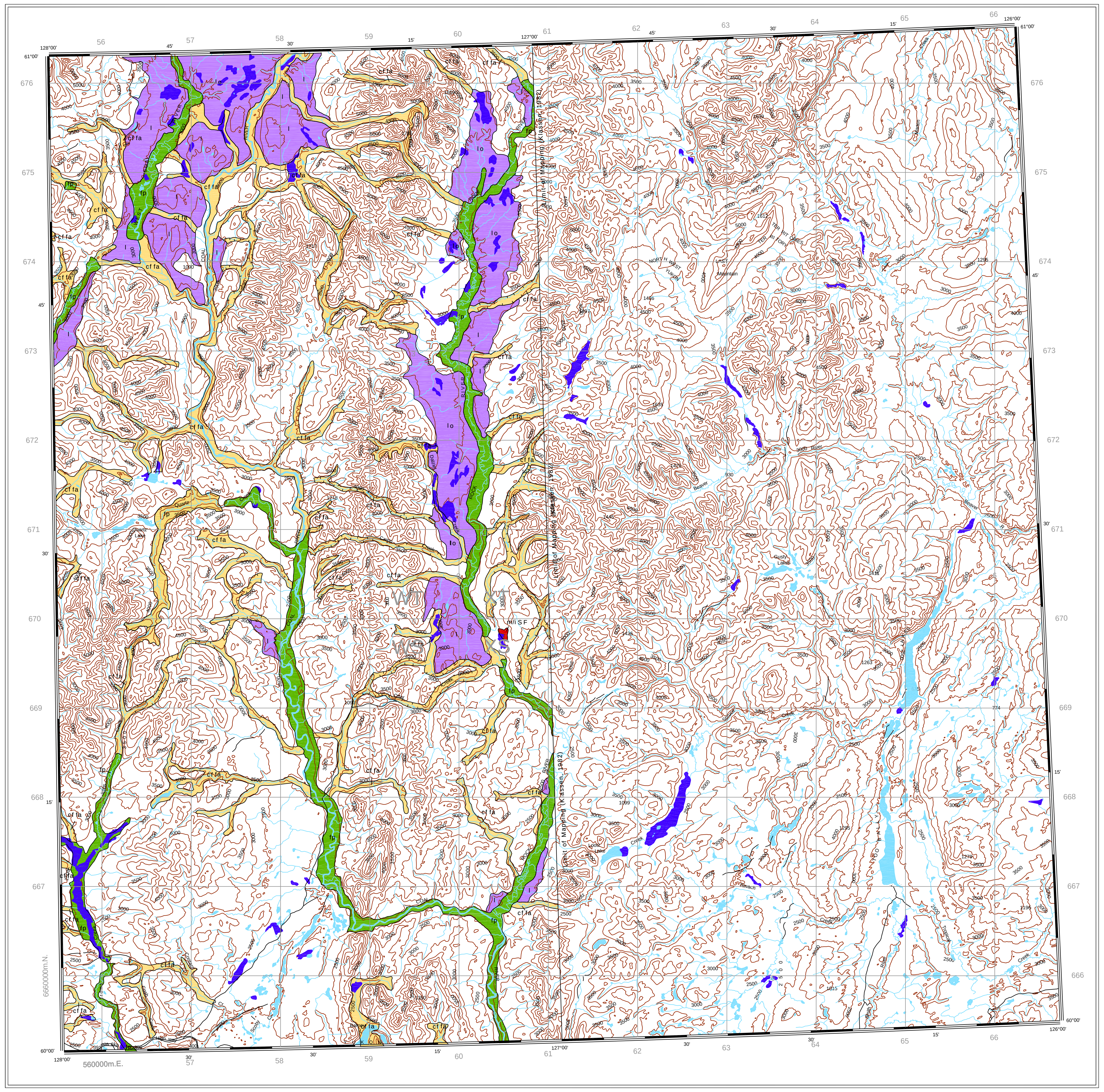
NATIONAL TOPOGRAPHIC SERIES NTDB (1995) D.I.A.N.D. N.A.P. LAND RESOURCES CANADA SHEET 95D



TEN THOUSAND METRE UNIVERSAL TRANSVERSE MERCATOR GRID NAD 83 ZONE 9

NOTE: THIS MAP HAS BEEN PRODUCED BY THE COMPILATION OF DATA FROM VARIOUS SOURCES. IT IS NOT TO BE USED TO DEFINE LEGAL BOUNDARIES.

THIS MAP IS ISSUED AS A PRELIMINARY GUIDE FOR WHICH THE DEPARTMENT OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT WILL ACCEPT NO RESPONSIBILITY FOR ANY ERRORS, INACCURACIES OR OMISSIONS WHATSOEVER.

EDITION: 2 PRINT DATE: MAY 11, 1999

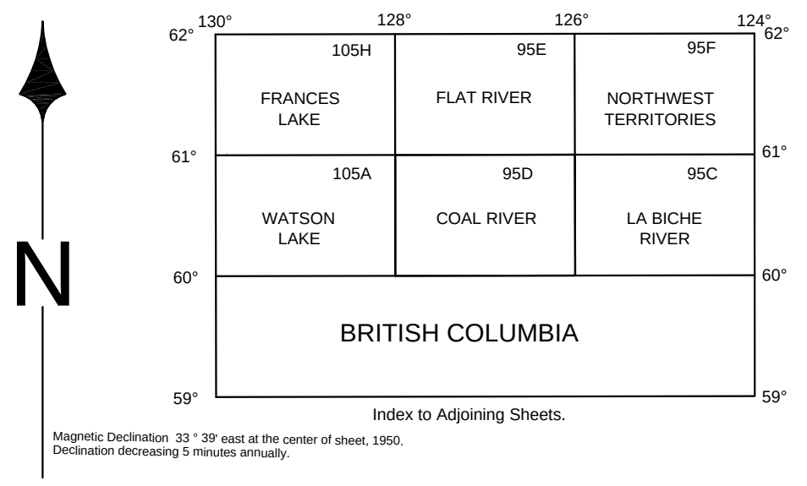
COAL RIVER
YUKON TERRITORY
095D

Scale

10 0 10 20 30 km

5 0 5 10 15 miles

CONTOUR INTERVAL 500 FEET Elevations in Feet above Mean Sea Level
North American Datum 1983 Transverse Mercator Projection
Universal Transvers Mercator Grid ZONE 9



Index to Adjoining Sheets.

Magnetic Declination 33 ° 39' east at the center of sheet, 1950.
Declination decreasing 5 minutes annually.

GEOPROCESS FILE - SUMMARY REPORT

COAL RIVER MAP AREA - NTS 95D

INTRODUCTION

The GEOPROCESS File is a compilation of information and knowledge on geological processes and terrain hazards, including mass movement processes, permafrost, flooding risks, faults, seismic activity and recent volcanism, etc. Please refer to the GEOPROCESS File User Guide for more in-depth information on how the maps were developed, which other GEOPROCESS File maps are available, how to utilize this inventory and how to interpret the legend. Special interest should be taken in the detailed description of the terrain hazard map units. Appendices in the User Guide include summary papers on the geological framework, permafrost distribution, and Quaternary geology in Yukon and a list of comprehensive GEOPROCESS File references.

This report includes a brief discussion of the scope and limitations of the GEOPROCESS File compilation maps followed by summaries of the bedrock geology, surficial geology and terrain hazards for this NTS map area, and a list of references.

Geological Processes and Terrain Hazard Compilation Maps

The GEOPROCESS File map units were drafted on the 1:250 000 topographic base maps through interpretation from bedrock geology maps, surficial geology maps and in some cases terrain hazard maps at various scales. The compilation maps have a confidence level reflecting the original source material. All materials used to produce the maps are listed in the references on each map. A file containing the documentation used to construct these maps is available at the Indian and Northern Affairs library in Whitehorse, Yukon. Areas for which no surficial geology or terrain hazard information is published were left blank. Summary reports on surficial geology and terrain hazards for these map sheets were written by extrapolating the data from adjacent map sheets or smaller scale maps. Information from small scale (e.g. 1:1 000 000) maps was used for the summary reports, but not redrafted onto the 1:250 000 GEOPROCESS File maps.

The GEOPROCESS File compilation maps are intended as a first cut planning tool; the legend on the maps describes the general aspects of terrain hazards (also see below) and associated geological processes. **These maps should never replace individual site investigations for planning of site specific features, such as buildings, roads, pits, etc.**

Bedrock Geology Summaries

Each 1:250 000 NTS map area is described according to morphogeological belts and terranes defined by Gabrielse et al. (1991) and Wheeler et al. (1991). Bedrock geology (including structure) and mineral occurrences are briefly described and taken largely from the referenced, most recent 1:250 000 geological map with additional contributions from Wheeler and McFeely (1991), and Yukon MINFILE (1993). A summary paper ("A Geological Framework for Yukon") in Appendix A of the User Guide provides a framework and context for each of the bedrock summaries.

The level of knowledge and understanding of Yukon geology is constantly evolving with more detailed mapping and development of geological models. Names, ages and terrane affinities of rock units on the most recent 1:250 000 geological maps may, in some cases, now be considered incorrect. Thus information contained within some of the bedrock geology summaries may be out of date. Although much of the information reflects the knowledge at the time that the source map was published, additional information has been inserted whenever possible to assist the user in merging the information with current geological maps, concepts and understanding. The age ranges for similar packages of rocks may also vary between map areas since the actual rocks, or at least the constraints on their age, may vary between map areas.

BEDROCK GEOLOGY

The Coal River map area is bisected by the northeast-trending division between the Foreland Belt to the southeast and the Omineca Belt to the northwest. Subdued mountain ranges and ridges, separated by broad, drift-filled, well-forested valleys characterize the region.

The Omineca Belt portion of the map area is underlain by sedimentary rocks of the Selwyn Basin portion of ancient North America, including the Hyland and Road River Group rocks. The western part of the map area is dominated by 800-530 million year old Hyland Group shale, slate, quartz-pebble conglomerate, grit, quartzite, maroon shale and slate, green argillite, limestone, dolomite, schist and gneiss. The central portion of the map area is dominated by 530-390 million year old Road River Group black slate, shale, argillite and phyllite. The Foreland Belt portion in the eastern map area includes, in addition to the Road River Group, the Gog and Windermere Groups of rifted and passive continental margin sediments.

Mineral Deposits and Occurrences

Yukon MINFILE lists 22 mineral prospects, 18 hosting known mineralization. One of these is a coal occurrence. The most common, known deposit type is lead-zinc-barite-silver sedimentary exhalative or replacement deposits. There are scattered skarn, mafic volcanic-hosted copper and gold vein/manto deposits. There has also been some interest in possible oil and gas reserves in this area.

SURFICIAL GEOLOGY

The western half of NTS map sheet 95D was surveyed by Klassen (1982). A surficial geology map provides general map unit distribution.

This part of Yukon was subject to several glaciations since the late Tertiary (Hughes, 1966), but present landforms are associated with the lastest glaciation, the McConnell. The Liard lobe of this large ice body originated in the Selwyn Mountains (Jackson, 1994). It moved through the western half of the Coal River map area in an eastward to northeastward direction, as indicated by drumlins seen in the southwest corner of the map area, and in the Coal and Rock River valleys.

Alpine areas higher than 1066 m (3500 ft) consist of bedrock slopes and summits covered by a veneer of colluviated moraine, and weathered and colluviated rock. Morainal deposits on lower slopes can be thicker than 6 m and are usually composed of cobbly sand, silt and minor clay. Sporadic permafrost can be found in the low-relief, poorly drained morainal landforms overlain by thick organic deposits. According to Klassen (1982), moraine deposits in the valley floor can be thicker than 30 m.

Large glaciofluvial deposits are found around Scoby Creek, and on the floor and lower slopes of the Rock and Coal River valleys, north of Quartz Creek. Glaciolacustrine deposits are present in the Rock River valley above the present floodplain, and in the Coal River valley, north of the West Coal River fork. The glaciolacustrine deposits are often covered by thick organic deposits.

TERRAIN HAZARDS

There is no published information on terrain hazards for this area. Information is derived from the surficial geology map at 1:250 000 scale (Klassen, 1982). The Geological Survey of Canada's Pacific Geoscience Centre in Victoria provided the seismic information.

Mass Movement Processes

There are no large slides shown on the surficial geology map. Unstable colluvial and alluvial fans are the most common landform associated with mass movement hazards in this area. Active fans may also experience mudflows and torrent debris flow in early summer, or after a rainstorm. The movement of moraine or colluvium-covered slopes is restricted to solifluction lobes mainly on north-facing slopes. Slumping can be expected along the Coal and Rock rivers where streams undercut glaciolacustrine sediments. There is no mapped information available on high risk mass movement such as avalanches or rock slides.

Permafrost

The Coal River map area lies within the widespread permafrost zone (Brown, 1978). Permafrost has a more restricted distribution than in more northerly parts of Yukon. According to Heginbottom (1995), the southern part of the map area is in a region of Sporadic Discontinuous Permafrost (10-50%) and has medium amounts of ground ice (10-20%) including sparse ice wedges. The central and northern portions of the map area are in a region of Extensive Discontinuous Permafrost (50-90%) and have low amounts of ground ice (<10%). Mean annual ground temperatures range from 0 to -2 degrees Celsius.

Glaciolacustrine deposits are present in the Rock River valley above the present floodplain and in the Coal River valley, north of the West Coast River fork. The surface of the glaciolacustrine deposits may be covered by thick, organic deposits. Although no thermokarst lakes are documented in this area, fine-grained sediments may contain ice-rich permafrost, and such deposits situated in sheltered, north-facing slopes or depressions with thick organic cover are likely to contain ice lenses. In the Frances Lake map area, northwest of 95D, permafrost was found in poorly drained, spruce-covered morainal landforms.

Flooding and Other Risks

Although no hydrological studies were available during the compilation of this map, local knowledge is that the lower reaches of the Coal and Rock rivers, and other streams in the area are flooded seasonally.

Seismicity

There are three recorded seismic events within the map area. All of the recorded events are 2.0 to 4.999 or less in magnitude.

References

Coal River Map Area - NTS 95D

To be thorough, check the references for adjacent NTS map sheets and the General Reference List (See User Guide).

Most of the following references should be available for viewing in the DIAND library on the third floor of the Elijah Smith building in Whitehorse. The library and call number of some internal government reports are listed.

Brown, R.J.E., 1978. Permafrost: Plate 32, Hydrological Atlas of Canada, Fisheries and Environment Canada, Ottawa. 34 plates.

*Canadian Earthquake Epicentre File: Maintained by the Geological Survey of Canada, Geophysics Division.

Denny, C.J., 1952. Late Quaternary geology and frost phenomena along Alaska Highway, northern British Columbia and southeastern Yukon. Geological Society of America Bulletin, Vol. 63, p. 883-922.

*Gabrielse, H., 1969. Geology of Coal River. Geological Survey of Canada, Map 11-1968.

Gabrielse, H. and Blusson S.L., 1969. Geology of the Coal River map area, Yukon Territory and District of MacKenzie. Geological Survey of Canada, Paper 68-38.

Gabrielse, H. and Yorath, C.J. (eds.), 1991. Geology of the Cordilleran Orogen in Canada. Geological Survey of Canada, Geology of Canada, No. 4, 844 p.

Heginbottom, J.A. and Radburn, L.K. (comps.), 1992. Permafrost and ground ice conditions of northwestern Canada, Geological Survey of Canada, Map 1691A, scale 1:1 000 000.

Heginbottom, J.A., 1995. Canada Permafrost, The National Atlas of Canada 5th Edition, Natural Resources Canada, Geological Survey of Canada, Map MCR 4177F, 1:7 500 000 scale.

Hughes, O.L., Campbell, R.B., Muller, J.E., J.E., and Wheeler, J.O., 1969. Glacial limits and flow patterns, Yukon Territory, south of 65 degrees north latitude. Geological Survey of Canada, Paper 68-34, 9 p. (1:1 000 000 scale map).

Jackson, L.E., Jr. and MacKay, T.D., 1990. Glacial limits and ice-flow directions of the last Cordilleran ice sheet in Yukon Territory between 60 and 63 degrees north. Geological Survey of Canada, Open File 2329. (NTS 95D, 105A, 105B, 105C, 105D, 115A, 115E, 115F, 115G, 115H, 115I, 115J, 106K, 106L, 115G, 115H)

Jackson, L.E., 1994. Terrain inventory and Quaternary history of the Pelly River area, Yukon Territor. Geological Survey of Canada, Memoir 437, 41 p.

Klassen, R.W., 1978. A unique stratigraphic record of late Tertiary-Quaternary events in southeastern Yukon. Canadian Journal of Earth Sciences, Vol. 15, p. 1884-1886.

Klassen, R.W., 1982. Surficial geology, Coal River, Yukon Territory (95D, west half). Geological Survey of Canada, Map 13-1982, (1:250 000 scale).

Klassen, R.W., 1987. The Tertiary-Pleistocene Stratigraphy of the Liard Plain, southeastern Yukon Territory. Paper 86-17, 16 p. (N.T.S. 95D, 95E)

Long, D.G.F. and Sweet, A.R., 1994. Age and depositional environment of the Rock River coal basin, Yukon Territory, Canada. Canadian Journal of Earth Sciences, Vol. 31, No. 5, p. 865-880.

Owen, E.B., 1965. Engineering geology investigations of dam sites in the Yukon and Northwest Territories. Geological Survey of Canada, Paper 65-01, 29 p. (NTS 95D, 95E, 105F, 105K)

*Wheeler, J.O., Brookfield, A.J., Gabrielse, H., Monger, J.W.H., Tipper, H.W. and Woodsworth, G.J., 1991. Terrane map of the Canadian Cordillera. Geological Survey of Canada, Map 1713.

*Wheeler, J.O. and McFeely, P., 1991. Tectonic Assemblage map of the Canadian Cordillera and adjacent parts of the United States of America. Geological Survey of Canada, Map 1712A.

Yukon MINFILE, 1995. 95D - Coal River. Exploration and Geological Services Division, Yukon Region, Indian and Northern Affairs Canada.

* References used in compiling this map

NOTE: A new digital compilation of Yukon Geology is now available by Steve Gordey and Andrew Makepeace (GSC Open File D3826 and/or DIAND Open File 1999-1(D)), and more recent MINFILE updates should also be verified (Yukon MINFILE, 2001).

LEGEND

LEGEND TERRAIN HAZARDS

MAP SYMBOL	TERRAIN HAZARDS	ASSOCIATED RISK LEVELS, COMMENTS
	Mass Movement Processes	
A	Snow Avalanched.	high
F	Extremely slow to moderate rates of failure in soil and bedrock, including soil creep, rock creep, earthflow, soil or rock slump, debris or rock slide.	low to intermediate
R	Moderate to extremely rapid rates of failure in soil and bedrock (1.5 m/d to >3 m/s), including rock slump, debris slide, rock slide, debris flow, debris torrent, debris avalanche, rockfall, rock avalanche.	high
	Arctic, Alpine and Periglacial Processes	
X	Permafrost present.	low
K	Thermokarst present.	low
S	Soliflucted.	low to intermediate
Z	Grouped, cryoturbated, solifluncted, nivated.	low to intermediate
	Fluvial Processes	
B	Braided, unstable channels, risk of flooding.	intermediate to high
E	Fluvial erosion, deposition and low risk of flooding.	low to intermediate
J	Anastomosing.	intermediate to high
U	Flooded regularly.	intermediate to high
	Miscellaneous Erosion Processes	
T	Karst.	intermediate
P	Piping.	intermediate to high
V	Gullied.	low to intermediate

On Site Symbols	Risk Level
Unit boundary (defined, approximate).	
Erosional escarpment.	high
Landslide escarpment.	high
Landslide (includes source and runout areas).	high
Pingo.	high
Rock glacier.	high
* ☐ Spring or saline seep.	low
▽ ▽ Observation of frozen soil or ground ice.	low
Rapid mass movements (debris torrent) with known point source. Limits of runout not implied by symbol.	high
Slow mass movement (earth flow) with landslide, escarpment source. Limits of landslide runout not implied by symbol.	intermediate to high

LEGEND SEISMIC EVENTS

SYMBOL	MAGNITUDE REPRESENTED	SYMBOL	MAGNITUDE REPRESENTED
⊡	<2.0	⊡	4.0 to 4.999
⊡	2.0 to 2.999	⊡	5.0 to 5.999
⊡	3.0 to 3.999	⊡	>6.0

LEGEND GEOLOGICAL PROCESSES

MAP SYMBOL	DESCRIPTION	INFERRED HAZARDS
cf	Talus fan or apron, moderate to steep slope, coarse angular bedrock fragments, sources are often areas of rapidly disintegrating bedrock.	Rock fall and debris flows common on active fans, steep slopes generally unstable to traffic.
cl	Landslide, moderate slope, varies from large blocks of bedrock to finer material.	Landslides generally are recurrent in susceptible areas and may be become active if disturbed.
cs	Colluvium covered slope, gentle to moderate slope, underlain by unsorted rubble, solifluction and other periglacial features common.	Areas of fine textured materials and gentle slopes at high elevations, where there is ground ice will be susceptible to high solifluction rates and thermokarst if disturbed.
fa	Alluvial fan, active.	Subject to shifts in channel and bar positions, occasionally subject to flooding.
fp	Floodplain.	Subject to shift in channel and bar positions, occasionally subject to flooding.
ice	Glacier ice.	Crevasses.
im	Mountain ice caps.	Avalanches, ice and rock falls, and crevasses.
is	Cliff glacier.	Avalanches, ice and rock falls.
l	Lacustrine or glaciolacustrine sediments.	Silt and clay, usually susceptible to frost heaving and, if permafrost present, to thermokarsting when disturbed.
m/i	Rock glacier, debris covered glacier.	Ice at depth make surface susceptible to thermokarst, unstable slopes.
o	Organic.	Thick organic matter is often underlain by permafrost. Disturbance of permafrost may cause poor drainage and thermokarsting.

LEGEND FAULTS

Fault
defined, approximate, assumed,
extrapolated beneath overburden

Fault
Solid circle indicates downthrown side
Arrows indicate relative movement

Thrust Fault (teeth indicate upthrust side)

Airphoto Lineament

LEGEND QUATERNARY VOLCANISM

No known recent volcanism in map area 95D

OTHER FEATURES

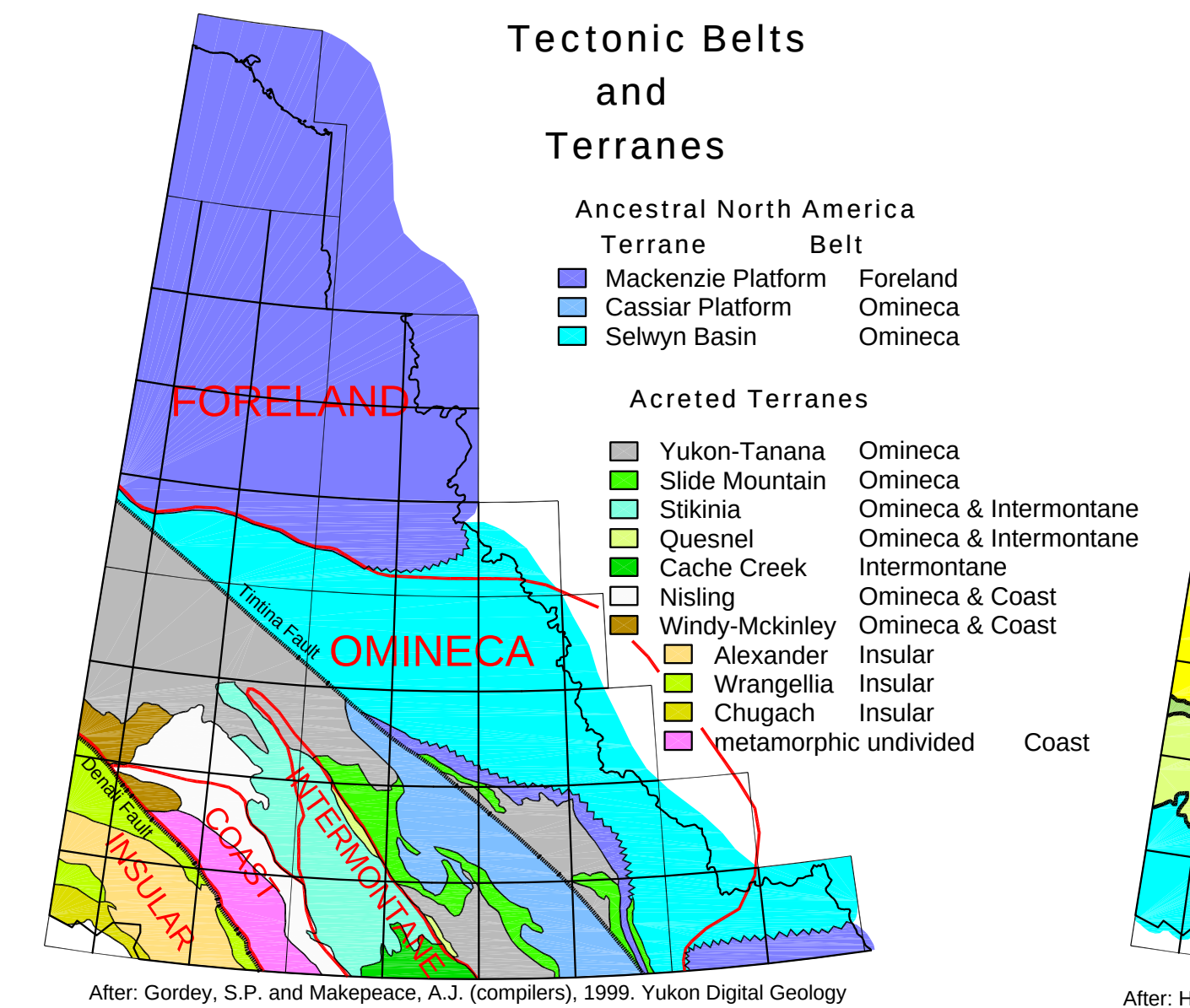
Roads

Streams

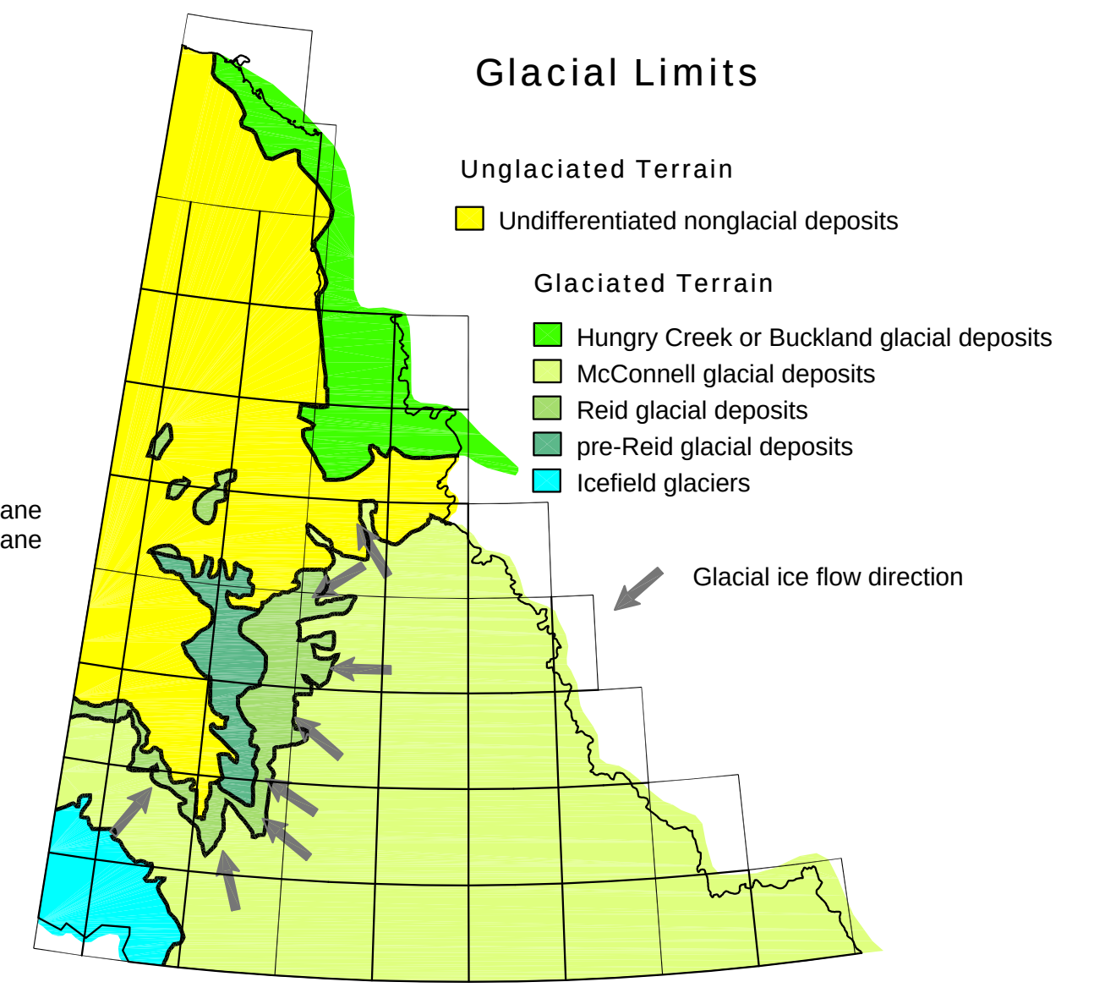
Lakes 🟦

Marsh 🟦

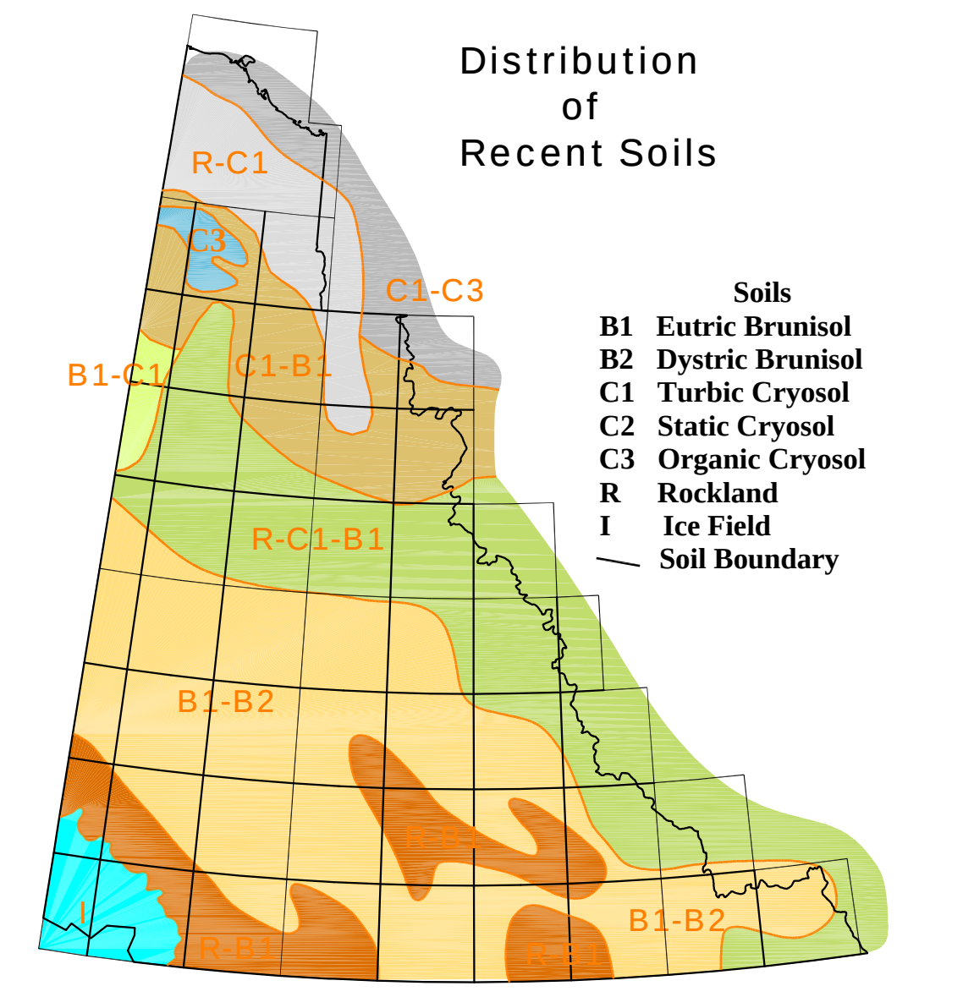
NOTE: Where areas have more than one identified process or hazard, the colour of the encompassing polygon is assigned based on a hierarchical scheme relating to the severity of the hazard. The relative order of severity is: Terrain Hazards (Mass Movement Processes then Fluvial Processes then Arctic, Alpine and Periglacial Processess) followed by Geological Processes.



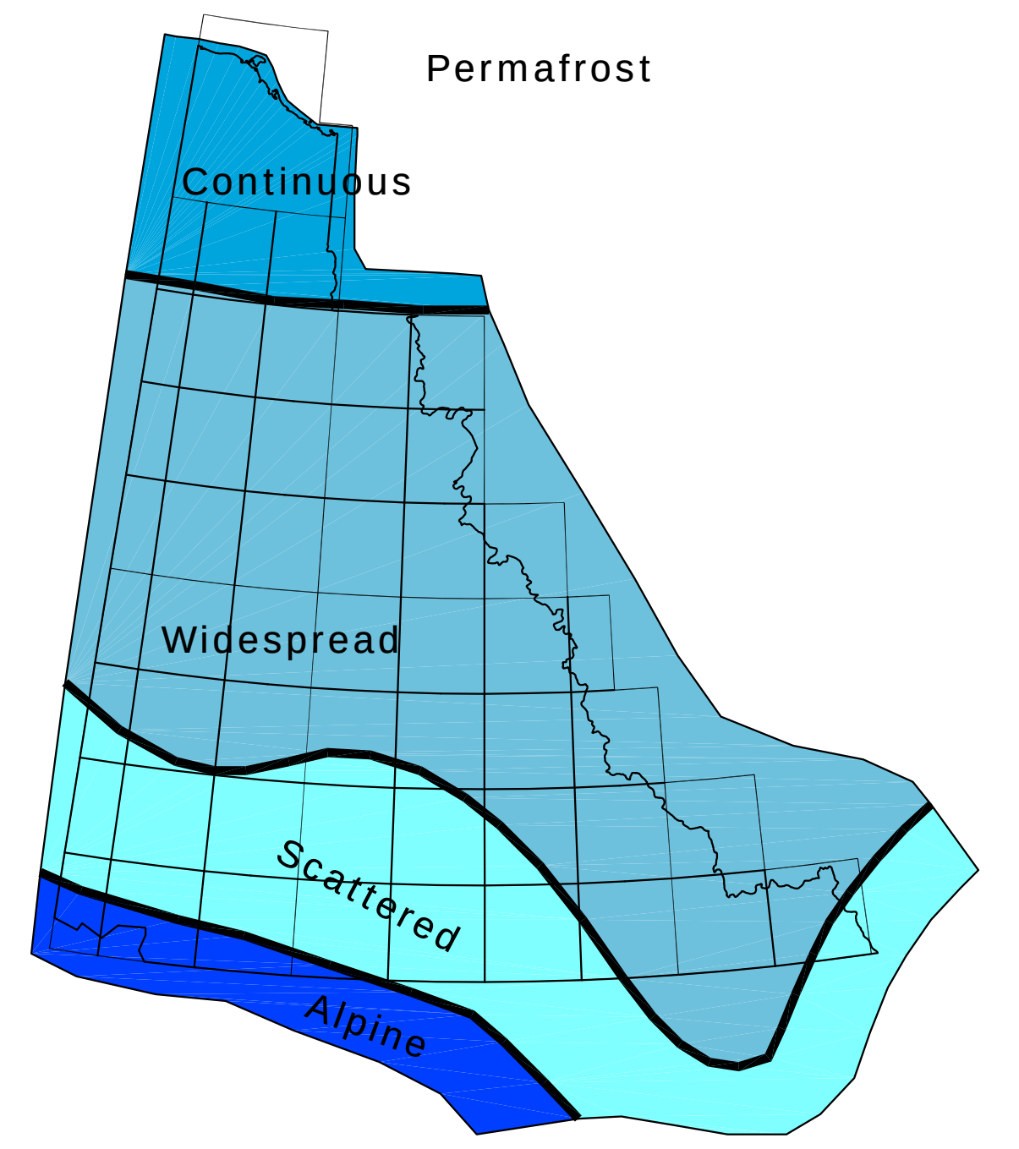
After: Gordey, S.P. and Makepeace, A.J. (compilers), 1999. Yukon Digital Geology Geological Survey of Canada Open File D3826.
Exploration and Geological Services Division Yukon, Indian and Northern Affairs, Open File 1999-1 (D)



After: Hughes, O.L. in Morison, S.R. and Smith, C.A.S. (editors), 1987, XII th INQUA Congress Field Excursions A20, p12 to 16 - Research in Yukon, National Research Council of Canada, Ottawa, Canada, 110p



After: Morison, S.R. and Smith, C.A.S. (editors), 1987, XII th INQUA Congress Field Excursions A20a and A20b - Research in Yukon, National Research Council of Canada, Ottawa, Canada, 110p



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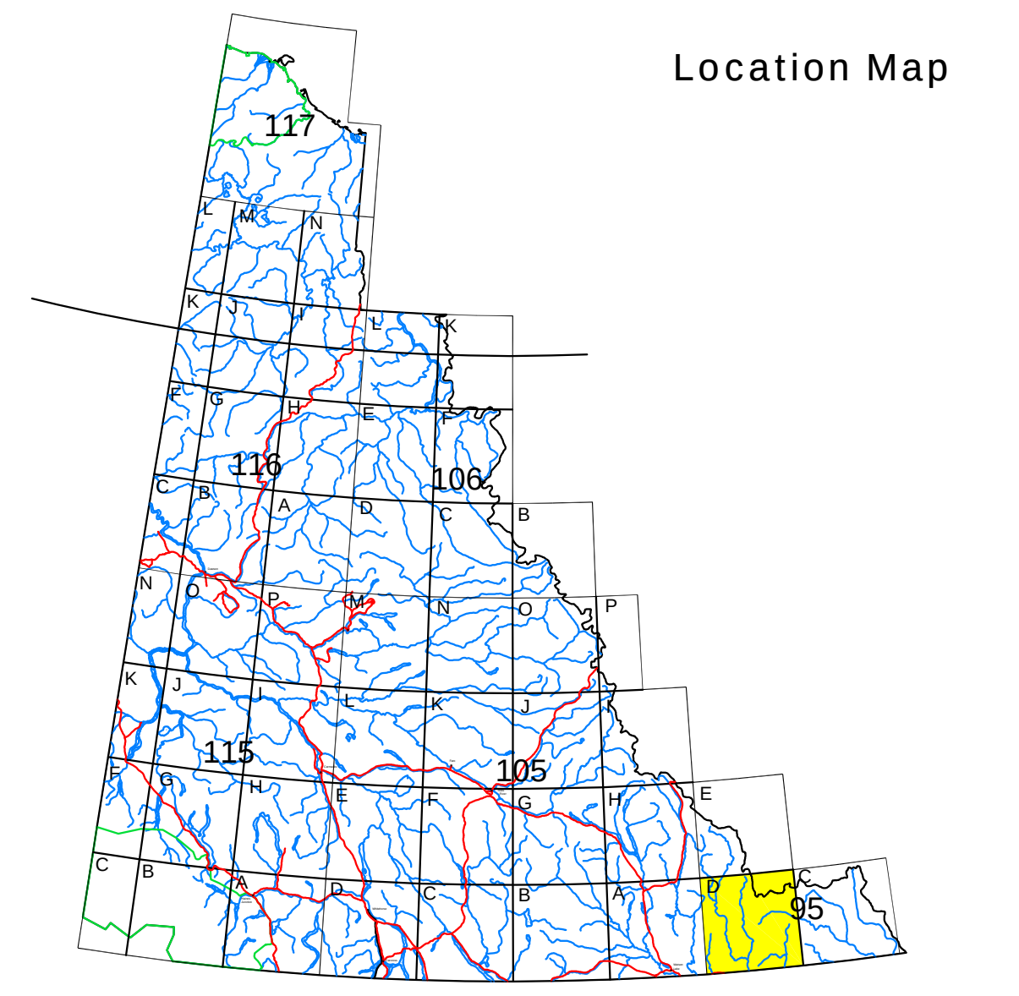

Exploration and Geological Services Division
Yukon Region
Indian and Northern Affairs Canada

Yukon GEOPROCESS File

Geological Processes and Terrain Hazards
of
Coal River
95D

by

Mougeot, C.M. and Walton, L.A.

Copies of this map
may be obtained from Geoscience and Information Sales
c/o Whitehorse Mining Recorder, Indian and Northern Affairs Canada,
Room 102, 300 Main Street, Whitehorse, Yukon Y1A 2B5
(867) 667-3266; FAX; (867) 667-3267

Recommended citation: Mougeot, C.M. and Walton, L.A., 1996.
Yukon GEOPROCESS File (2002), Geological Processes and Terrain Hazards of Coal River, 95D
Exploration and Geological Services Division, Yukon Region, Indian and Northern Affairs Canada, 1:250 000 scale.