

GEOPROCESS FILE - SUMMARY REPORT
LA BICHE RIVER MAP AREA - NTS 95C

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, volcanic 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 of smaller scale maps. Information from small scale (e.g., 1:1 000 000) maps was used for the summary reports, but not overlaid onto the 1:250 000 GEOPROCESS File maps.

The GEOPROCESS File compilation maps are intended as a first out planning tool; the legend on the maps describes the general aspects of terrain hazards (but 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 N.T.S. map area is described according to morphological belts and terranes defined by Gadsby 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 contact 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 maps were published, additional information has been inserted wherever 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.

NOTE: A new digital compilation of Yukon Geology is now available by Steve Gordon and Andrew Makepeace (GSC Open File D3826 and/or DIAND Open File 1999-10), and more recent MINFILE updates should also be verified (Yukon MINFILE, 2001).

BEDROCK GEOLOGY

The La Biche River map area is contained entirely within the Foreland Belt. The map area is characterized by long, linear north-south trending mountain ranges in the east and the Beaver River valley in the southwest. North-south trending thrust faults, the Beaver fault and the north-south trending Fardouze syncline, and La Biche and Kotaneteele Anticlines are prominent geological features, the latter two of particular importance for gas deposits.

The oldest rocks are in the west portion of the map area, south of the Beaver Fault. They include Ordovician to Devonian (360 to 500 million year old) shale and carbonate, in addition to argillites of possible Helikian age (1 to 1.75 billion years old). The sedimentary package gets younger towards the eastern portion of the map area. Mesozoic (66 to 245 million year old) sedimentary rocks are interbedded and folded with Permian (245 to 400 million year old) limestone, shale, siltstone and sandstone. The only intrusive rocks in the area are a Cretaceous (100 million year old) syenite pluton intruded along the Beaver River Thrust Fault in the southwest part of the map area, and four small, scattered trachyte bodies also in the southwest portion.

Mineral Deposits and Occurrences

Yukon MINFILE lists eleven mineral prospects of which six host known mineralization. Two of the occurrences are borate veins and lenses. Other deposit types include rare-earth elements and lead, zinc or copper veins. The La Biche map area has been explored for its oil and gas potential, especially in the southern portion. This area locates Canada's northernmost and Yukon's only producing field, the Kotaneteele Field. This field has the highest volume-producing capacity of natural gas from several wells.

SURFICIAL GEOLOGY

The La Biche River map area in southeastern Yukon is within the limits of the McConnell Glaciation. The map area is characterized by moderate to high elevations with a general increase in relief towards the east in the La Biche and Kotaneteele Ranges. At the time of preparation of this report, there were no quaternary geology or soil survey maps and very little information on terrain hazards for this area. General information on glacial history and permafrost is available in the User Guide of the Geoprocesses File.

TERRAIN HAZARDS

The Geological Survey of Canada's Pacific Geoscience Centre in Victoria recorded the seismic information.

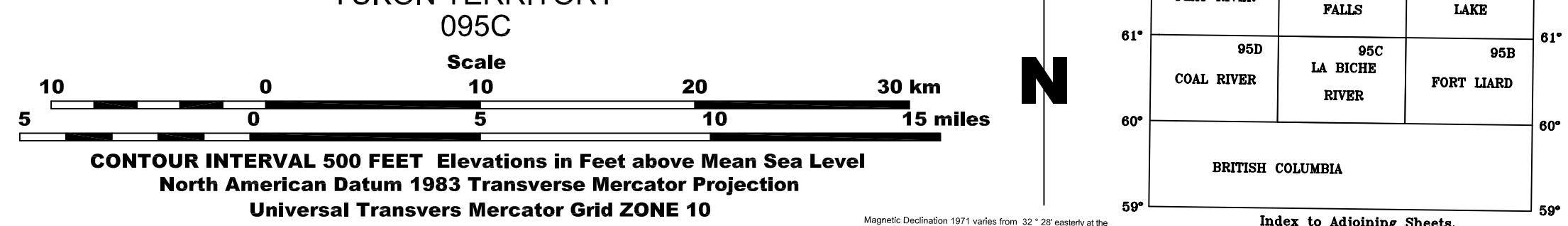
Permafrost

The La Biche River map area is located in the widespread permafrost zone (Brown, 1978). According to the compilation by Hoggbottom (1995), the map area is in the zone of Extensive Discontinuous Permafrost (50-90%) and has sparse occurrences of ice wedges, and low (<10%) ground ice content in the upper 10-20 m. Ground temperatures range from -2 to +2 degrees Celsius.

Seismicity

There are three recorded seismic events within the map area. All of the recorded events are 2.0 to 3.99 in magnitude.

LA BICHE RIVER YUKON TERRITORY 095C



References

La Biche River Map Area - N.T.S. 95 C

To be thorough, check the references for adjacent N.T.S. map sheets and the General Reference List (See User's Guide).

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

Brown, R.J.E., 1967. Permafrost in Canada. Geological Map of Canada, Map 1245A, (scale 1:603 200).

Byrdell, A.N., Minning, G.V., Netherivel, J.A., Rutter, N.W., Tammo, C., 1973. Surficial geology, Buller, Mills, Sibbston, and Trout Lakes, Kaituma, Root, and Doherty Rivers, Caribou Bend, and Waplay, District of Mackenzie (maps and legend). Geological Survey of Canada, Open File 158.

"Canadian Earthquake Epitome File. Maintained by the Geological Survey of Canada, Geophysical Division.

Douglas, R.J.W. and Norris, D.K., 1969. Fort Liard and La Biche map areas, Northwest Territories and Yukon, 095 B and 095C. Geological Survey of Canada Paper 59-56.

Douglas, R.J.W. (comp.), 1976. Geology of La Biche River map-area. Geological Survey of Canada, Map 1380A (scale 1:250 000).

Gabrielson, H. and Vornat, C.J. (eds.), 1991. Geology of the Cordilleran Orogen in Canada. Geological Survey of Canada, Geology of Canada, No. 4, 841 p.

Haines, R.J., 1980. Surficial Geology and geomorphology of Fort Liard, District of Mackenzie. Geological Survey of Canada, Preliminary Map 11-1079 (scale 1:200 000, N.T.S. 95B (adjacent the west side of La Biche River Map Area).

Hoggbottom, 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.

Hoggbottom, 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.

Minning, G.V. and Rutter, N.W., 1972. Surficial geology and land classification, Mackenzie Valley transportation corridor. Geological Survey of Canada, Paper 72-01A, 178 p. (N.T.S. 85A, 95B, 95H, 95J). Adjoins the west side of La Biche River map area.

Morrow, D.W., Cumming, G.I. and Auldred, K.L., 1990. The gas-bearing Devonian Manasse Facies, Yukon and Northwest Territories. Geological Survey of Canada, Bulletin 402, 40 p. (058, 95C).

Richards, S.C., 1989. Uppermost Devonian and lower Carboniferous stratigraphy, sedimentation and diagenesis, southwestern District of Mackenzie and southwestern Yukon Territory. Geological Survey of Canada, Bulletin 390, 135 p.

Rutter, N.W., 1974. Surficial geology and land classification. Mackenzie Valley Transportation Corridor. Geological Survey of Canada, Paper 74-01A.

"Wheeler, J.D., Goodfellow, A.J., Gabrielle, H., Monger, J.W.H., Tipper, H.W. and Woodsworth, G.J., 1991. Terrane map of the Canadian Cordillera. Geological Survey of Canada, Map 1712A.

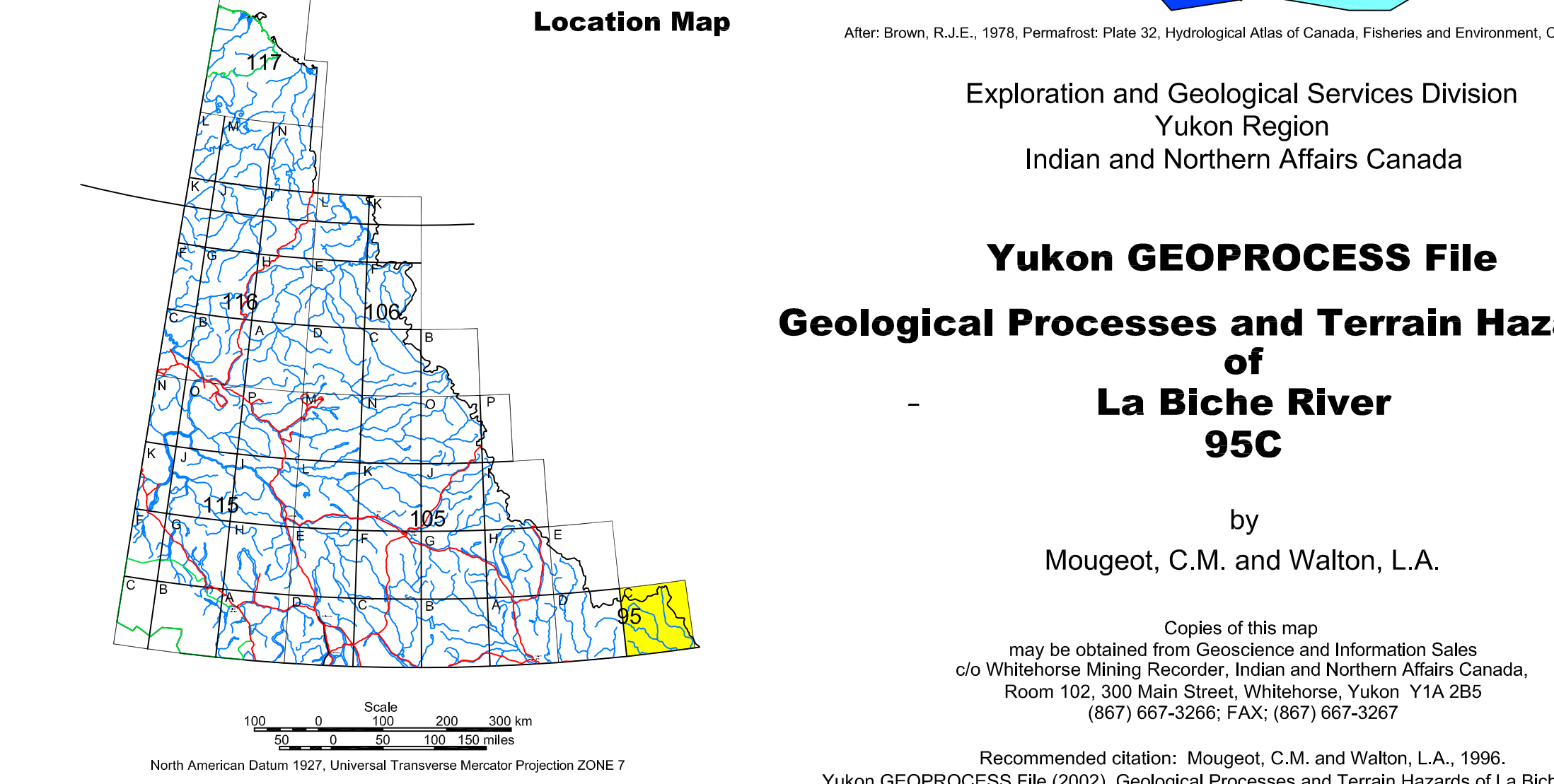
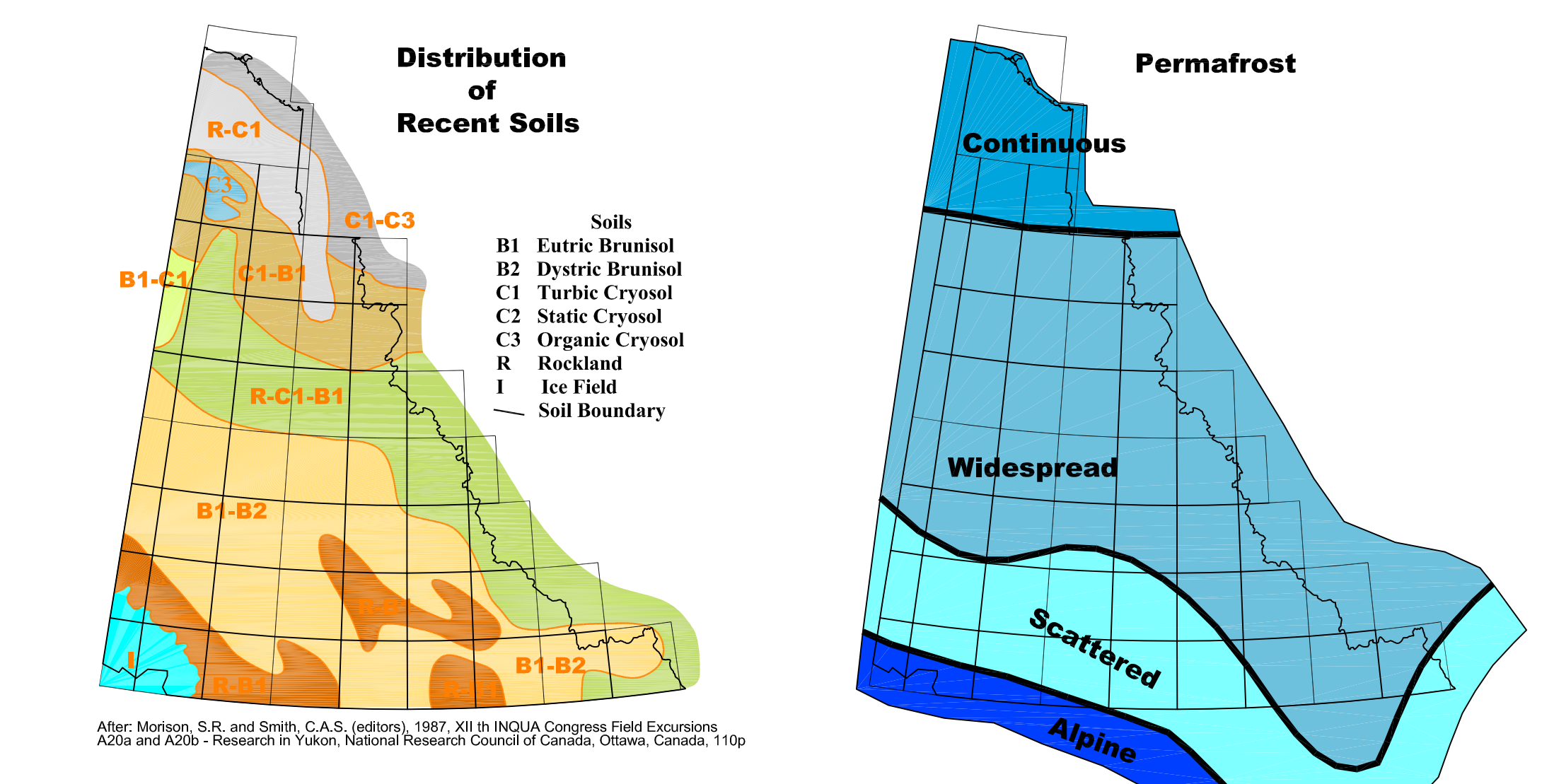
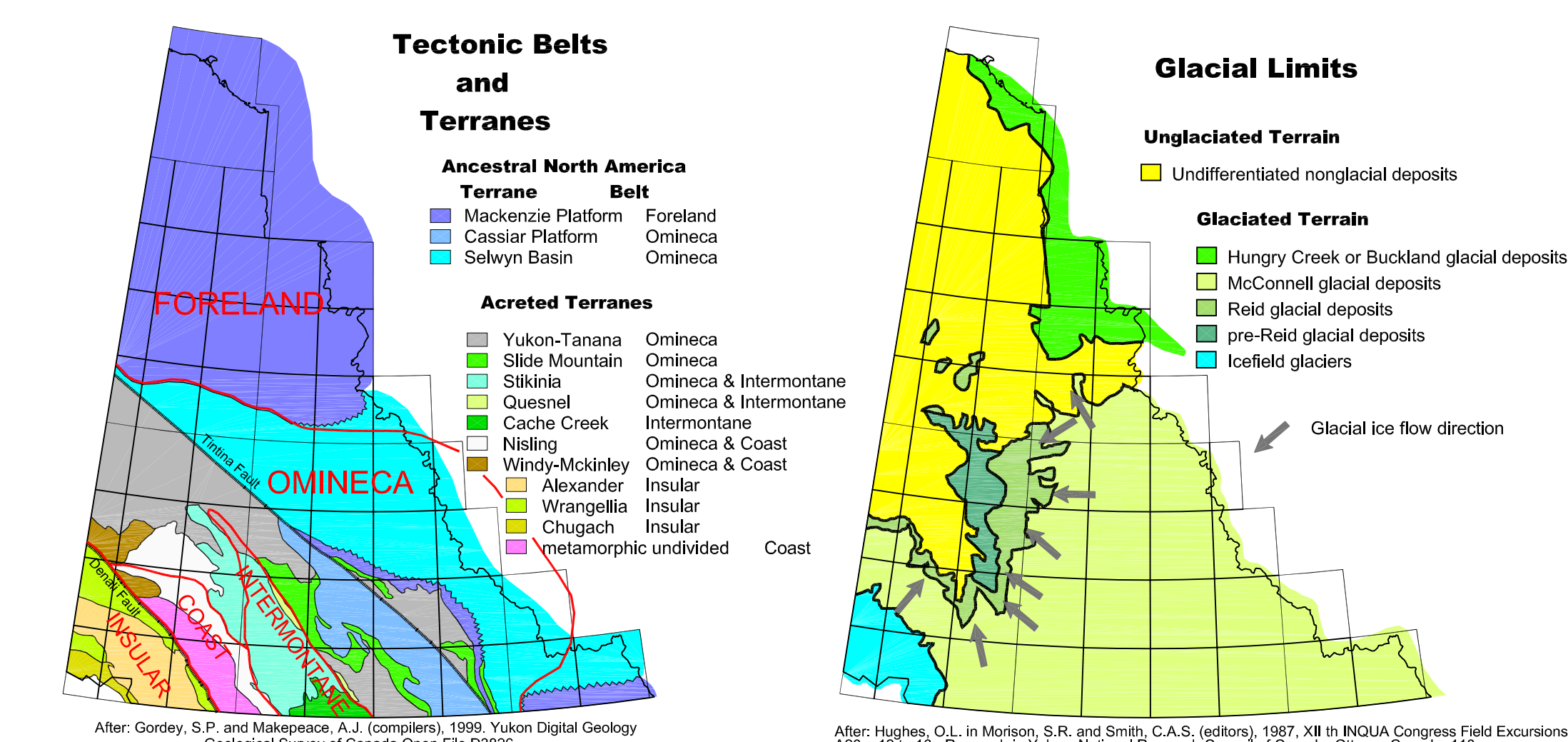
Yukon MINFILE 95C - La Biche River, Exploration and Geological Services Division, Yukon Region, Indian and Northern Affairs Canada.

*References used in compiling this map

LEGEND

MAP SYMBOL	DESCRIPTION	ASSOCIATED RISK LEVELS/COMMENTS
A	Mass Movement Processes	
S	Snow Avalanched.	High
E	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
B	Moderate to extremely rapid rates of failure in soil and bedrock (1.5 m/s to >3 m/s), including rock slump, debris slide, rock slide, debris flow, debris torrent, debris avalanche, rockfall, rock avalanche, Arctic, Alpine and Periglacial Processes	High
X	Permafrost present.	low risk
K	Thermokarst present.	low risk
S	Soilflooded.	low to intermediate
Z	Grouped, cryoturbated, soilflooded, riveted.	low to intermediate
F	Fluvial Processes	
B	Braked, unstable channels, risk of flooding.	intermediate to high
E	Fluvial erosion, deposition and low risk of flooding.	low to intermediate
A	Anastomosing.	intermediate to high
U	Flooded regularly.	intermediate to high
M	Miscellaneous Erosion Processes	
T	Karst.	intermediate
P	Piping.	intermediate to high
G	Gullied.	low to intermediate
U	On Site Symbols	
U	Unit boundary (defined, approximate).	
E	Erosional escarpment.	high
L	Landslide (includes source and runout areas).	high
P	Pileup.	high
R	Rock glacier.	high
S	Spring or saline area.	low
O	Observation of frozen soil or ground ice.	low
R	Rapid mass movements (debris torrent) with known point source. Limits of runout not implied by symbol.	high
S	Slow mass movement (earth flow) with landslide, escarpment source. Limits of landslide runout not implied by symbol.	intermediate to high
G	LEGEND SEISMIC EVENTS	
M	Magnitude represented	
S	Symbol	
M	Magnitude represented	
1	<2.0	4.0 to 4.999
2	2.0 to 2.999	5.0 to 5.999
3	3.0 to 3.999	>6.0
F	LEGEND GEOPROCESSES	
Cf	Talus fan or apron, moderate to steep slope, coarse angular bedrock fragments, sources are often areas of rapidly displacing bedrock.	
Ct	Landslides, moderate slope, varies from large blocks of bedrock to finer material.	
Cs	Colluvium covered slope, gentle to moderate slope, underlain by unsorted rubble, siltification and other periglacial features common.	
fa	Alluvial fan, active.	
fp	Floodplain.	
ice	Glacier ice.	
im	Mountain ice caps.	
lg	Cliff glacier.	
li	Lacustrine or glaciolacustrine sediments.	
ml	Rock glacier, debris covered glacier.	
o	Organic.	
F	LEGEND FAULTS	
F	Fault defined, approximate, assumed, extrapolated beneath overburden	
F	Fault Solid circle indicates downthrown side Arrows indicate relative movement	
F	Thrust Fault (both indicate upthrust side)	
F	Airphoto Lineament	
V	LEGEND QUATERNARY VOLCANISM	
V	No known recent volcanism in map area 95C	
R	LEGEND OTHER FEATURES	
R	Roads	
S	Streams	
L	Lakes	
M	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 Processes) followed by Geological Processes.



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

Yukon GEOPROCESS File
Geological Processes and Terrain Hazards of La Biche River 95C

by
Mougout, C.M. and Walton, L.A.

Copies of this map may be obtained from Geoscience and Information Sales at 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: Mougout, C.M. and Walton, L.A., 1996. Yukon GEOPROCESS File (2002), Geological Processes and Terrain Hazards of La Biche River, 95C. Exploration and Geological Services Division, Yukon Region, Indian and Northern Affairs Canada, 1:250 000 scale.