

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

THIS MAP IS ISSUED AS A PRELIMINARY GUIDE FOR WHICH THE SUPPORTING OF NEARBY AREAS AND WITHIN THE DEVELOPMENT WILL ACCEPT NO RESPONSIBILITY FOR ANY ERRORS, INACCURACIES OR OMISSIONS.

EDITION: 2 PRINT DATE: DECEMBER 7, 1998

FLAT RIVER MAP AREA - SUMMARY REPORT

FLAT RIVER MAP AREA - NTS USE

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 the 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 re-drafted 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 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 Gabrièlle 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 McFay (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 affiliations 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 whenever possible to assist the user in merging the information with current geological maps, concepts and understanding. The age ranges for smaller 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, prepared by Steve Gorday 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 Flat River map area lies within the Omineca Belt. Only the southwestern portion of the map area lies within the Yukon Territory. Mount Lofty in the Selwyn Mountains and the Coal River drainage are the dominant physiographic features.

The map area is underlain by 800-500 million year old Hyland Group shale, slate, quartzite, conglomerate, gneiss, quartzite, mafic gneiss and quartzite, green argillite, limestone, dolomite, schist and gneiss and 500-350 million year old Road River Group black slate, shale, argillite and pyrites. The Hyland and Road River Groups comprise the Selwyn Basin portion of ancient North America.

The area is intruded by large, 100 million year old granite plutons of the Selwyn suite. The plutons are quartz monzonite, granodiorite, granite, diorite and hornblende diorite.

Mineral Deposits and Occurrences

Yukon MINFILE lists 51 mineral occurrences of which 40 are mineralized. Most mineralization is in the form of tungsten or base metal skarn deposits. The few remaining deposits are copper-silver vein deposits.

SURFICIAL GEOLOGY

The Flat River map area in southeastern Yukon is within the limits of the McConnell Glaciation. There is no published information on surface geology or Quaternary geology in this area. General information on glacial history and permafrost is available in the User Guide of the GEOPROCESS File.

TERRAIN HAZARDS

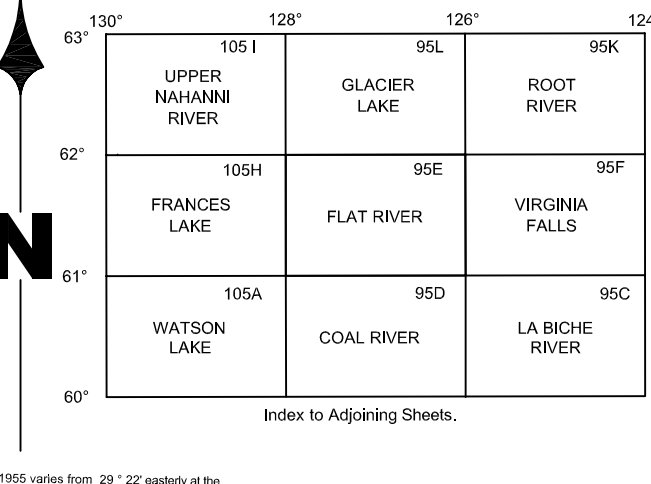
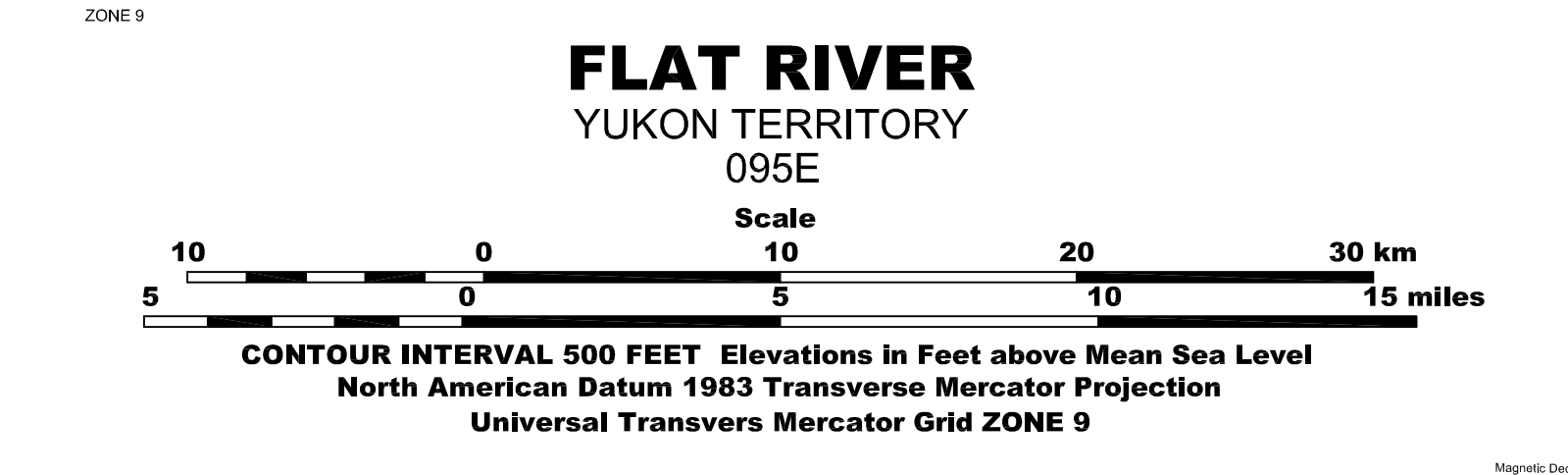
There is no published information on terrain hazards in this area. The Geological Survey of Canada's Pacific Geoscience Centre in Victoria provided the seismic information.

Permafrost

The Flat River map area is located in the widespread permafrost zone (Brown, 1976). According to the recent compilation by Heginbottom (1995), the map area is in the zone of Extensive Discontinuous Permafrost (60-90%), and has sparse occurrences of ice wedges and low (<10%) ground ice content in the upper 0-20 m. Mean annual ground temperatures range from -2 to 2 degrees Celsius.

Seismicity

There are 12 recorded seismic events within the map area. All of the recorded events are 2.0 to 4.99 or less in magnitude.



NOTE: This map is a preliminary guide for which the supporting of nearby areas and within the development will accept no responsibility for any errors, inaccuracies or omissions.

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References: Flat River Map Area - NTS 95E

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 Elgin Smith building in Whitehorse. The library and call number of some internal government reports are listed.

Alchison, M.E., 1964. A study of springs and spring deposits in the Flat River map area, District of Mackenzie, Northwest Territories. University of British Columbia, Berkeley, Ph.D. thesis, 249 p. (NTS 95E, 105H)

Blisson, S.L., 1965. Geology and tungsten deposits near the headwaters of Flat River, Yukon and southwest District of MacKenzie, Canada. Geological Survey of Canada, Paper 67-22. (NTS 95E, 105H)

Blisson, S.L., 1968a. Geology and tungsten deposits near the headwaters of Flat River, Yukon Territory and southwest District of MacKenzie, Canada. Geological Survey of Canada, Paper 67-22. (NTS 95E, 105H)

Blisson, S.L., 1968b. Geology, vicinity of Canada Tungsten Mine, Yukon Territory and District of Mackenzie. Geological Survey of Canada, Preliminary Map 4-1967, (scale 1:63 360). (NTS 95E, 105H)

Brown, R.L.E., 1967. Permafrost in Canada. Geological Survey of Canada, Map 1264A, (scale 1:7 603 200).

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

Gabrièlle, H., Blisson, S.L., and Roddick, J.A., 1973. Geology of Flat River, Glacier Lake and Wapley Lake map-areas, District of Mackenzie and Yukon Territory, Geological Survey of Canada, Memoir 366 (Parts I and II), includes map 1313A, 421 p.

"Gabrièlle, H., 1973. Geology of Flat River. Geological Survey of Canada, Map 1313A, (scale 1:250 000).

Gabrièlle, H. and Yorath, C.J. (eds.), 1991. Geology of the Cordilleran Orogen in Canada. Geological Survey of Canada, No. 4, 944 p.

Hamilton, S.M., Michel, F.A., and Jefferson, C.W., 1988. Groundwater geochemistry, South National Resource Management Area, District of Mackenzie. Geological Survey of Canada, Paper 88-01E, p. 127-136. (NTS 95E, 105H, 105J)

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.

Indian and Northern Affairs, 1995. Yukon MINFILE 95E - Flat River. Exploration and Geological Services Division, Yukon Region, Indian and Northern Affairs Canada, (NTS 95E, 95E, 105F, 105K)

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 95E, 95E, 105F, 105K)

"Wheeler, J.O., Brockfield, A.J., Gabrièlle, H., Monger, J.W.H., Tipper, H.W., and Woodsworth, C.J., 1991. Terrane map of the Canadian Cordillera. Geological Survey of Canada, Map 1712A.

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

*References used in compiling this map.

LEGEND

LEGEND TERRAIN HAZARDS		ASSOCIATED RISK LEVELS/COMMENTS	
MAP SYMBOL	DESCRIPTION	RISK LEVEL	COMMENTS
[A]	Mass Movement Processes	High	
[B]	Snow Avalanche	Low to Intermediate	
[C]	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.	High	
[D]	Moderate to extremely rapid rates of failure in soil and bedrock (1.5 m to >1 m), including rock slumping, debris slide, rock slide, debris flow, debris torrent, debris avalanche, rockfall, rock overhang.	Low	
[E]	Arctic, Alpine and Periglacial Processes	Low	
[F]	Permafrost present.	Low	
[G]	Thermokarst present.	Low	
[H]	Softflooded.	Low to Intermediate	
[I]	Grouped, crystratified, softflooded, riveted.	Low to Intermediate	
[J]	Fluvial Processes	Intermediate to High	
[K]	Braided, unstable channels, risk of flooding.	Low to Intermediate	
[L]	Fluvial erosion, deposition and low risk of flooding.	Intermediate to High	
[M]	Anastomosing.	Intermediate to High	
[N]	Flooded regularly.	Intermediate to High	
[O]	Miscellaneous Eolian Processes	Intermediate	
[P]	Karst.	Intermediate to High	
[Q]	Piping.	Low to Intermediate	
[R]	Gullied.	Low to Intermediate	
[S]	On Site Symbols	High	
[T]	Unit boundary (defined, approximate).	High	
[U]	Erosional escarpment.	High	
[V]	Landslide escarpment.	High	
[W]	Landslide (includes source and runoff areas).	High	
[X]	Prop.	High	
[Y]	Rock glacier.	Low	
[Z]	Spilling or saline seep.	Low	
[AA]	Observation of frozen soil or ground ice.	Low	
[AB]	Rapid mass movements (debris towers) with known point source. Limits of runoff not implied by symbol.	Intermediate to High	
[AC]	Slow mass movement (earth flow) with landslide, escarpment source. Limits of landslide runoff not implied by symbol.	Intermediate to High	

LEGEND SEISMIC EVENTS		MAGNITUDE REPRESENTED	
SYMBOL	MAGNITUDE REPRESENTED	SYMBOL	MAGNITUDE REPRESENTED
[1]	<2.0	[1]	4.0 to 4.999
[2]	2.0 to 2.999	[2]	5.0 to 5.999
[3]	3.0 to 3.999	[3]	>6.0

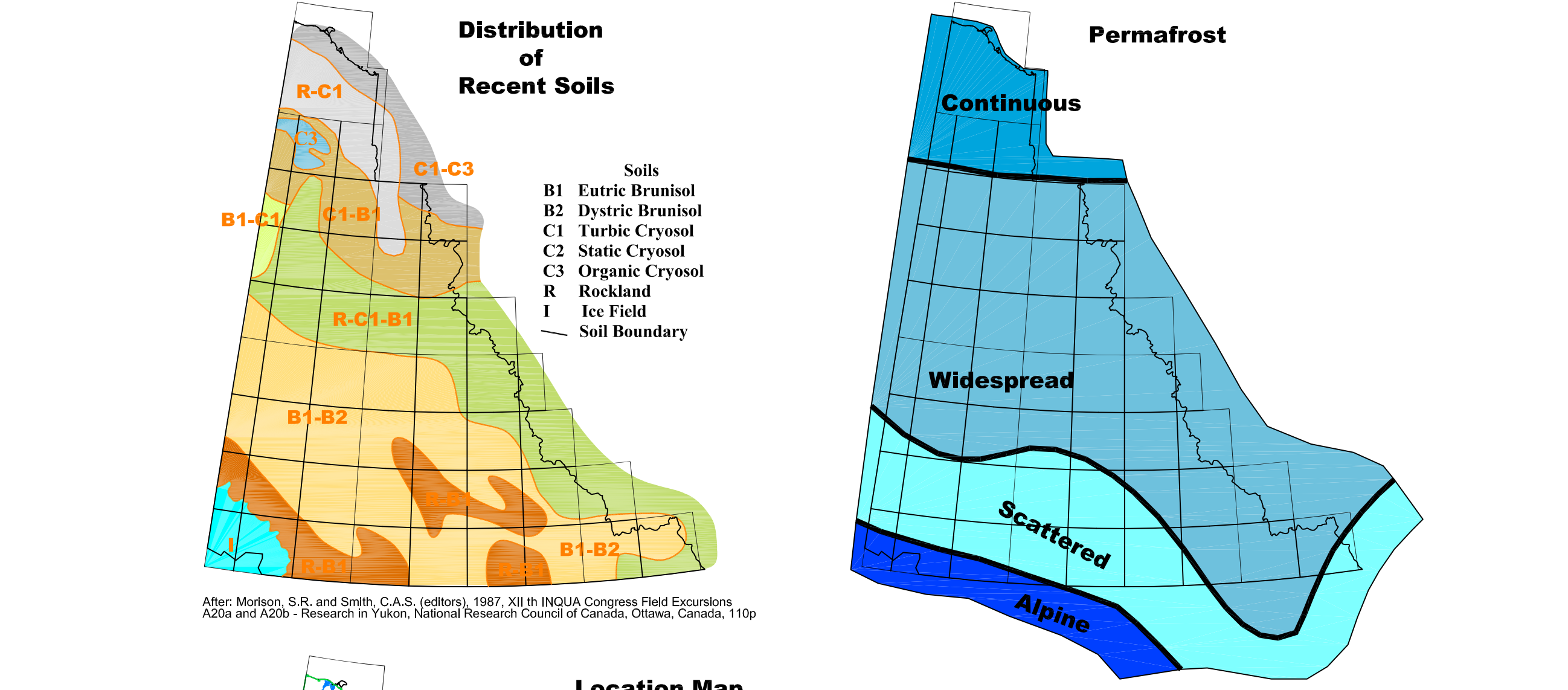
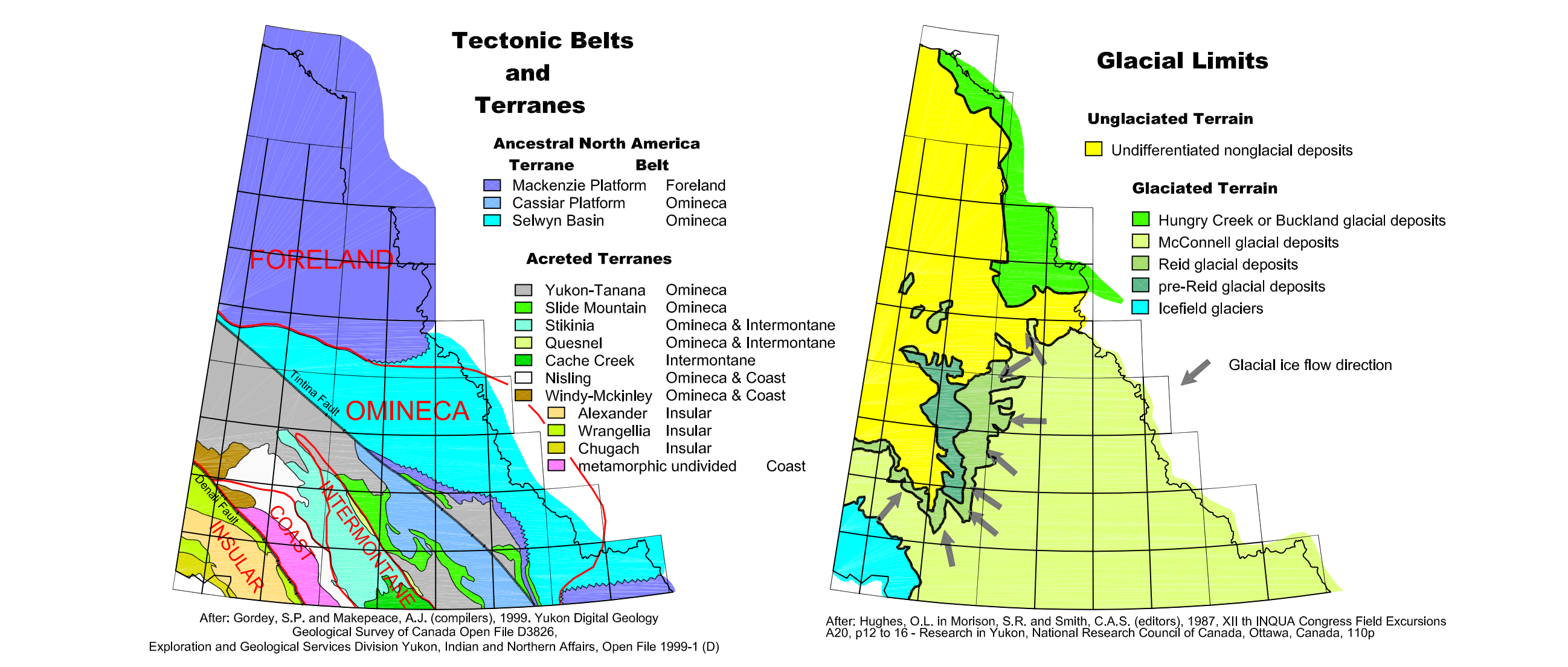
LEGEND GEOLOGICAL PROCESSES		ASSOCIATED RISK LEVELS/COMMENTS	
MAP SYMBOL	DESCRIPTION	RISK LEVEL	COMMENTS
[cf]	Talus fan or apron, moderate to steep slope, coarse angular bedrock fragments, sources are often areas of rapidly denuding bedrock.	High	
[cl]	Landslide, moderate slope, varies from large blocks of bedrock to finer material.	High	
[cm]	Colluvium covered slope, gentle to moderate slope, underlain by unsorted rubble, soilification and other periglacial features common.	High	
[fa]	Alluvial fan, active.	High	
[fp]	Floodplain.	High	
[ice]	Glacier ice.	High	
[im]	Mountain ice caps.	High	
[lg]	Chiff glacier.	High	
[li]	Lacustrine or glaciolacustrine sediments.	High	
[mg]	Rock glacier, debris covered glacier.	High	
[o]	Organic.	High	

LEGEND FAULTS	
SYMBOL	DESCRIPTION
[---]	Fault defined, approximate, assumed, extrapolated beneath overburden
[---]	Fault
[---]	Solid circle indicates downthrown side
[---]	Arrows indicate relative movement
[---]	Thrust Fault (both indicate upthrust side)
[---]	Alprokto Lineament

LEGEND QUATERNARY VOLCANISM	
SYMBOL	DESCRIPTION
[]	No known recent volcanism in map area 95E.

OTHER FEATURES	
SYMBOL	DESCRIPTION
[---]	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 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 Flat River 95E

by
Mougout, 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 diorama: Mougout, C.M. and Walton, L.A., 1996. Yukon GEOPROCESS File, Geological Processes and Terrain Hazards of Flat River, 95E. Exploration and Geological Services Division, Yukon Region, Indian and Northern Affairs Canada, 1:250 000 scale.