

GEOPROCESS FILE SUMMARY REPORT

FLAT RIVER MAP AREA N.T.S. 95E

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 Introduction and User's 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's 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 and summaries followed by summaries of the bedrock geology, surficial geology and terrain hazards for this N.T.S. 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 attached to 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 N.T.S. 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 Introduction and User's 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 Flat River map area lies within the Omineca Belt. Only the southwestern portion of the map area lies within the Yukon Territory. Mount Laporte in the Selwyn Mountains and the Coal River drainage are the dominant physiographic features.

The map area is underlain 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 and 530-390 million year old Road River Group black slate, shale, argillite and phyllite. 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-lead-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 Introduction and User's 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 Center in Victoria provided the seismic information.

Permafrost

The Flat River map area is located in the widespread permafrost zone (Brown, 1978). According to the recent compilation by Heginbottom (1995), the map area is in the zone of Extensive Discontinuous Permafrost (50-90%) with the occurrence of sparse ice wedges, and low (<10%) ground ice content in the upper 10-20 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 4.999 or less in magnitude.

References

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

- Atchison, 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, B.Sc. thesis.
- Blusson, S.L., 1965, Geology and tungsten deposits near the headwaters of Flat River, Yukon and southwest District of MacKenzie, Canada. University of California, Berkeley, PhD. thesis, 249 p.
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- Brown, R.J.E., 1967, Permafrost in Canada. Geological Survey of Canada, Map 1246A, (scale 1:7,603,200).
- Gabrielse, H., Blusson, S.L. and Roddick, J.A., 1973, Geology of Flat River, Glacier Lake and Wrigley Lake map-areas, District of Mackenzie and Yukon Territory. Geological Survey of Canada. Memoir 366 (Parts I and II), includes map 1313A, 421 p.
- Gabrielse, H., 1973, Geology of Flat River. Geological Survey of Canada, Map 1313A, (scale 1:250,000).
- Gabrielse, H. and Yorath, C.J. (eds.), 1991, Geology of the Cordilleran Orogen in Canada. Geological Survey of Canada, No. 4, 844 p.
- Hamilton, S.M., Michel, F.A. and Jefferson, C.W., 1988, Groundwater geochemistry, South Nahanni Resource Management Area, District of Mackenzie. Geological Survey of Canada, Paper 88-01E, p. 127-136.
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- Heginbottom, J.A. and Radburn, L.K. (comp.), 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, Indian and Northern Affairs Canada.

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.
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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.