

GEOPROCESS FILE SUMMARY REPORT

COAL RIVER MAP AREA N.T.S. 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 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 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 been some interest in possible oil and gas reserves in this area.

SURFICIAL GEOLOGY

The western half of map 95 D 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 latest 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 (3,500 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 valley floor can be as thick or thicker than 30 m.

Large glaciofluvial deposits are found around Soby 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 Center 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%), with 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%) with low amounts of ground ice (<10%). Mean annual ground temperatures range from 0 to -2 degrees Celcius.

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 case of thermokarst lake is documented in this area, these fine-grained sediments are susceptible to 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 map area northwest of 95D, in the Frances Lake area, permafrost was found in poorly drained, spruce-covered morainal landforms.

Flooding and Other Risks

Although no hydrological studies were available during compilation of this map, it is locally known 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

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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.

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