

Preliminary Bedrock Topography and Drift Thickness of the Montney Play Area


By A.S. Hickin
 Cartography by M.A. Fournier, MAF Geographix

The relatively subdued topography of British Columbia's northern interior plains does not always reflect the irregular buried bedrock surface (Hickin et al., 2008). In the Montney Play area, several deep paleovalleys exist that may represent targets for unconsolidated aquifer evaluation. The Montney Gas Play is a world class unconventional natural gas development region. In developing this unconventional gas resource, gas wells are stimulated through hydraulic fracturing (fracing) whereby the relatively impermeable shale is fractured, providing a conduit for the gas to flow from the rock to the well bore. Hydraulic fracturing requires a substantial quantity of water therefore secure water supply is a limiting factor in development. Industry, the public, and various levels of government are investigating water resources to ensure responsible development of British Columbia's natural resources.

Five maps are presented that depict bedrock topography (Map A), thickness of unconsolidated sediments (drift thickness; Map B), modern topography (Map C), interpretation of paleovalleys (paleovalley outline; Map D), and density of bedrock contact point data (Map E). The bedrock topography has been modelled based on ~1500 subsurface data records from several shallow subsurface data sources including: water well data from British Columbia Ministry of Environment and Prairie Farmers Rehabilitation Administration, several academic sources (Rutter, 1977; Mathews, 1978, 1980; Hartman, 2005; Hartman and Clague, 2008), and geological sections logged from exposures in the Murray, Pine, and Pouce Coupe river valleys and more than 500 surface observations stations from fieldwork and aerial photographs.

References:

Hartman, G.M.D. (2005): Quaternary stratigraphy and glacial history of the Charlie Lake (NTS 94A) map-sheet area, British Columbia; unpublished MSc thesis, Simon Fraser University, Burnaby, BC, 165 pages.

Hartman, G.M.D. and Clague, J.J. (2008): Quaternary stratigraphy and glacial history of the Peace River valley, northeast British Columbia; Canadian Journal of Earth Sciences, v. 45, pages 549-564.

Hickin, A.S., Kerr, B., Turner, D.G., and Barchyn, T.E. (2008): Mapping Quaternary paleovalleys and drift thickness using topophysical logs, northeast British Columbia, Fontas map sheet, NTS 94; Canadian Journal of Earth Sciences, v. 45, pages 577-591.

Mathews, W.H. (1980): Retreat of the last ice sheets in northeastern British Columbia and adjacent Alberta; Geological Survey of Canada, Bulletin 331, 22 pages.

Mathews, W.H. (1978): Quaternary stratigraphy and geomorphology of Charlie Lake (94A) map-area, British Columbia; Geological Survey of Canada, Paper 76-20, 25 pages.

Rutter, N.W. (1977): Multiple glaciation in the area of Williston Lake, British Columbia; Geological Survey of Canada, Bulletin 273, 31 pages.

Funding for the project was provided, in part, by the Montney Water Project, a collaborative effort between BC Ministry of Energy and Mines, Geoscience BC and industry partners, with support from the BC Oil and Gas Commission's SCEK Fund. The Montney Water Project is designed to provide a comprehensive inventory of water resource related data in the Montney Gas Play area.