Ice-Flow History, Drift Thickness and Drift Prospecting for a Portion of the QUEST Project Area (NTS 093G, H [west half], J), British Columbia

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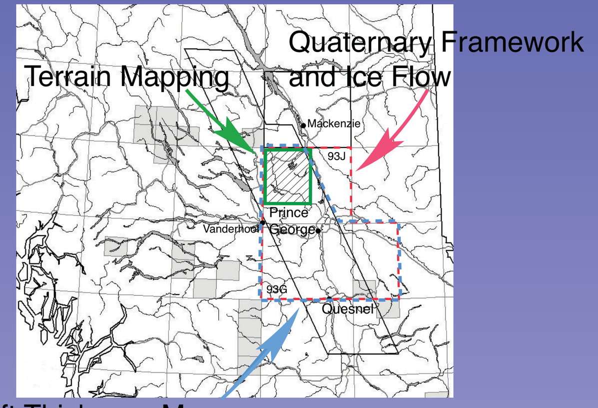
1. INTRODUCTION

The area of mountain pine beetle infestation in central British Columbia has areas of highly prospective bedrock geology, but exploration has been limited due to thick cover of surficial deposits. Knowledge of the glacial history, specifically the ice flow history and dominant transport direction is vital to interpret geochemical surveys. Significant knowledge gaps exist in the glacial history of the QUEST area and thus pose a significant hindrance to mineral exploration. This project is designed to address this knowledge gap by providing a Quaternary framework and both regional and detailed till geochemical surveys. The study area comprises NTS 93G, H/west and J (Fig. 1.1) .

This ambitious project will occur over three years and provide:
1) the regional glacial geologic framework for map areas NTS 93 G, H/west half, and J (i.e. the central portion of the QUEST area).
2) a map of approximate drift cover for areas within NTS 93 G, H/west half, and J based on existing surficial geology mapping and soils and landform mapping augmented with reconnaissance field observations.
3) Terrain mapping of six 1:50,000 scale sheets (NTS map areas 93J 5, 6, 11, 12, 13, 14)
4) Till geochemical data (trace, minor and major elements by aqua regia-ICP and INAA) and gold grain counts and heavy mineral separates for samples collected within these new sheets,
5) detailed geochemical surveys down ice of two geophysical anomalies from the recently completed geophysical surveys (See adjacent poster).

Figure 1.1. Location map showing study area in relation to NTS map areas, existing till geochemistry, and QUEST Geophysics. Red dashed line is area of Quaternary framework and ice flow. Green box is where 6 1:50,000 sheets will be mapped and till geochemistry carried out. Blue dashed line is area of drift thickness map.



2. METHODS

- The ice flow history of the study area was determined by compiling and combining existing ice flow information from existing maps, usually macro forms (Tipper 1971, Clague, 1998 a and b, Blais-Stevens and Clague, 2007) with observations made in the field.
- Ice flow indicators measured at 32 sites in the field were mainly micro-flow indicators such as grooves, striations and rat-tails.
- A relative drift thickness map is currently being constructed from a mix of existing GSC Surficial Geology mapping, soil and landform mapping and some air photo interpretation
- Till samples were collected in the vicinity of two geophysical anomalies identified within recently acquired geophysical data released by Geoscience BC. This information is located on the adjacent poster by Rabb et al. 2009.

3. QUATERNARY FRAMEWORK - CORDILLERAN ICE SHEET

3.1 GROWTH

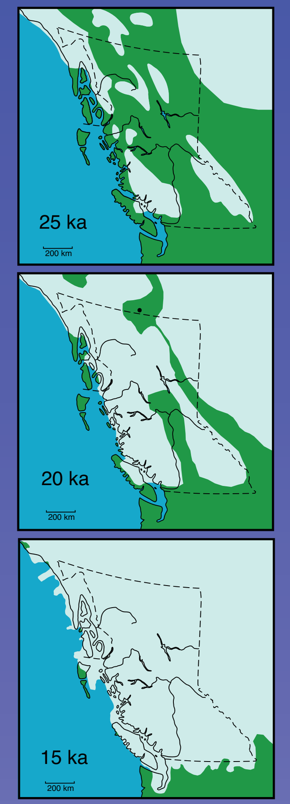


Figure 3.1.1: Generalized model of growth of the Cordilleran Ice Sheet for three time slices

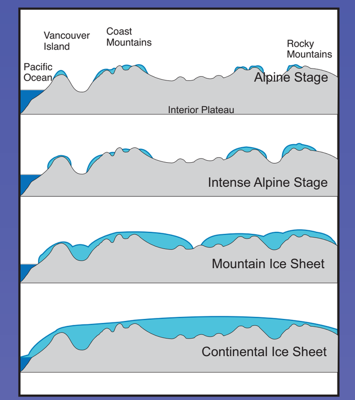


Figure 3.1.2. Hypothesized stages of growth of the Cordilleran Ice Sheet.

3.2 DECAY

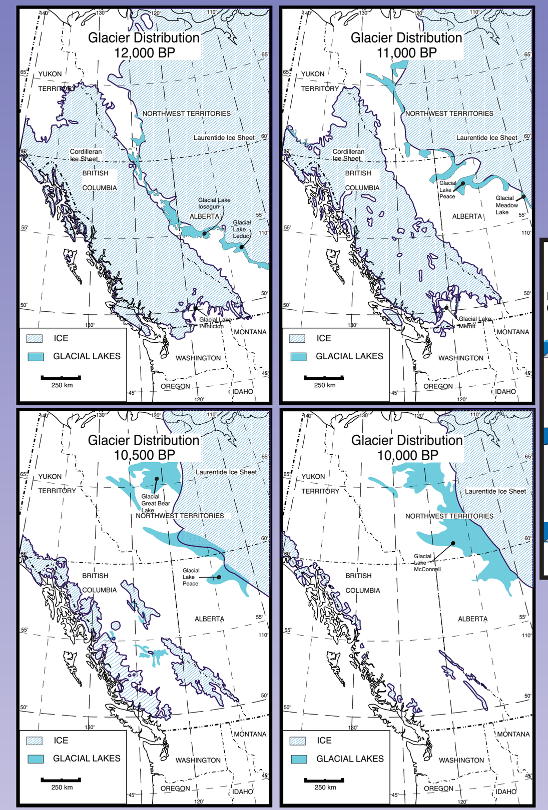


Figure 3.2.2: Generalized model of decay of the Cordilleran Ice Sheet for four time slices

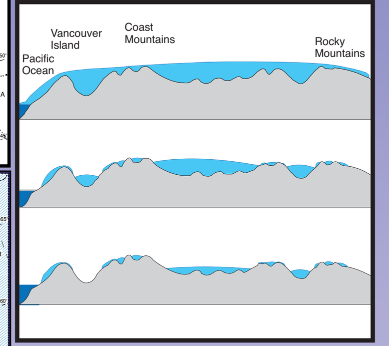


Figure 3.2.2. Hypothesized stages of decay of the Cordilleran Ice Sheet.

4. ICE FLOW

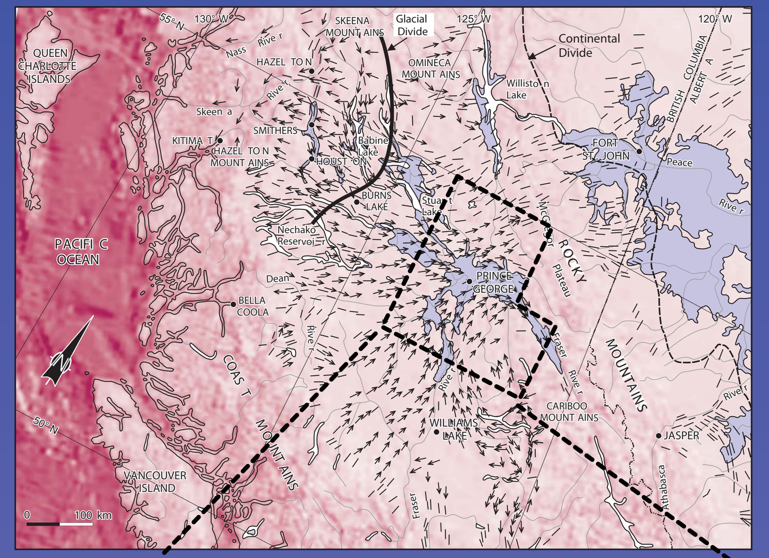


Figure 4.1. Ice flow summary for northern British Columbia and adjacent areas. Modified from Stumpf et al., 2000. Kindly provided by Andrew Stumpf, ISGS.

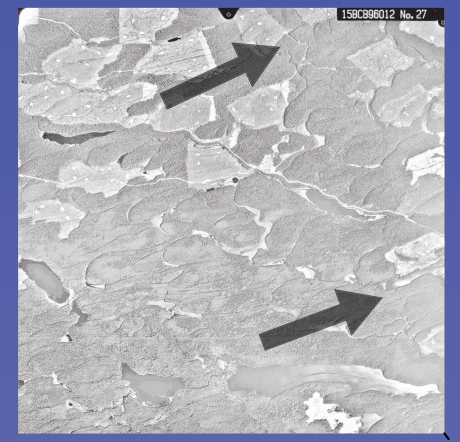


Figure 4.3. Air photo showing numerous drumlins. Ice flow to the north west.

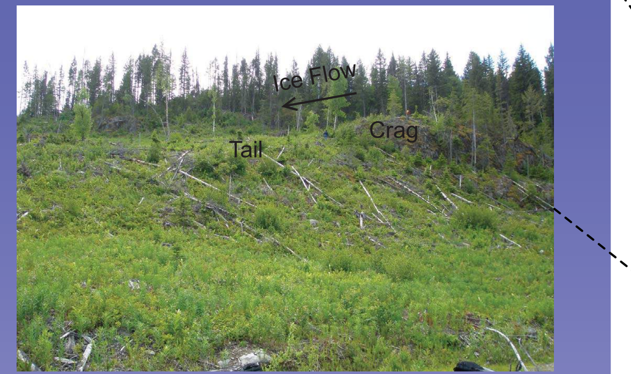


Figure 4.4. Crag and Tail from Saxton Lake detailed survey. The glacially smoothed crag and tail are indicted

Figure 4.5. Example of two faceted, striated surface, one with rat tails in Telkwa Group volcanics. Striated faceted surface (1) is older than striations and rat tails (2).

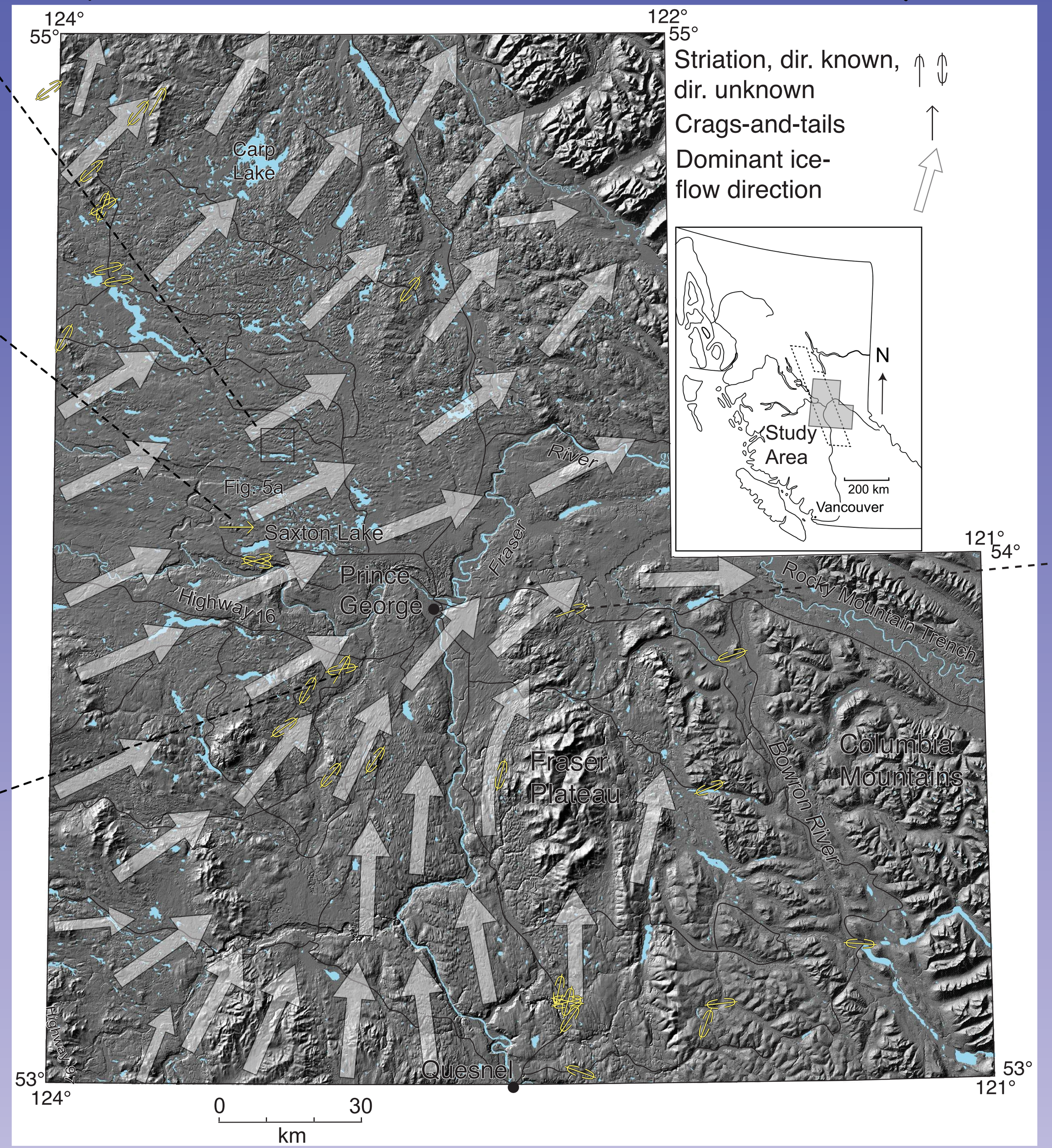


Figure 4.2. Dominant Ice flow reconstruction for the study area based largely on streamlined till forms, such as drumlins and flutings, that are evident on the DEM. Striations measured in the field are also indicated.

Figure 4.6. Example of a glacially smoothed, striated outcrop. On many outcrops till must be carefully scraped off to find striations.

Figure 4.7. Two striation directions are present on this outcrop but no age relationship could be determined.

Figure 4.8. Rat tails on a glacially smoothed outcrop along highway 16 east of Prince George. Two ages of ice flow are indicated, the older flow (1) formed the rat tails and the younger flow (2) truncated the tails.

5. DRIFT THICKNESS MAPPING

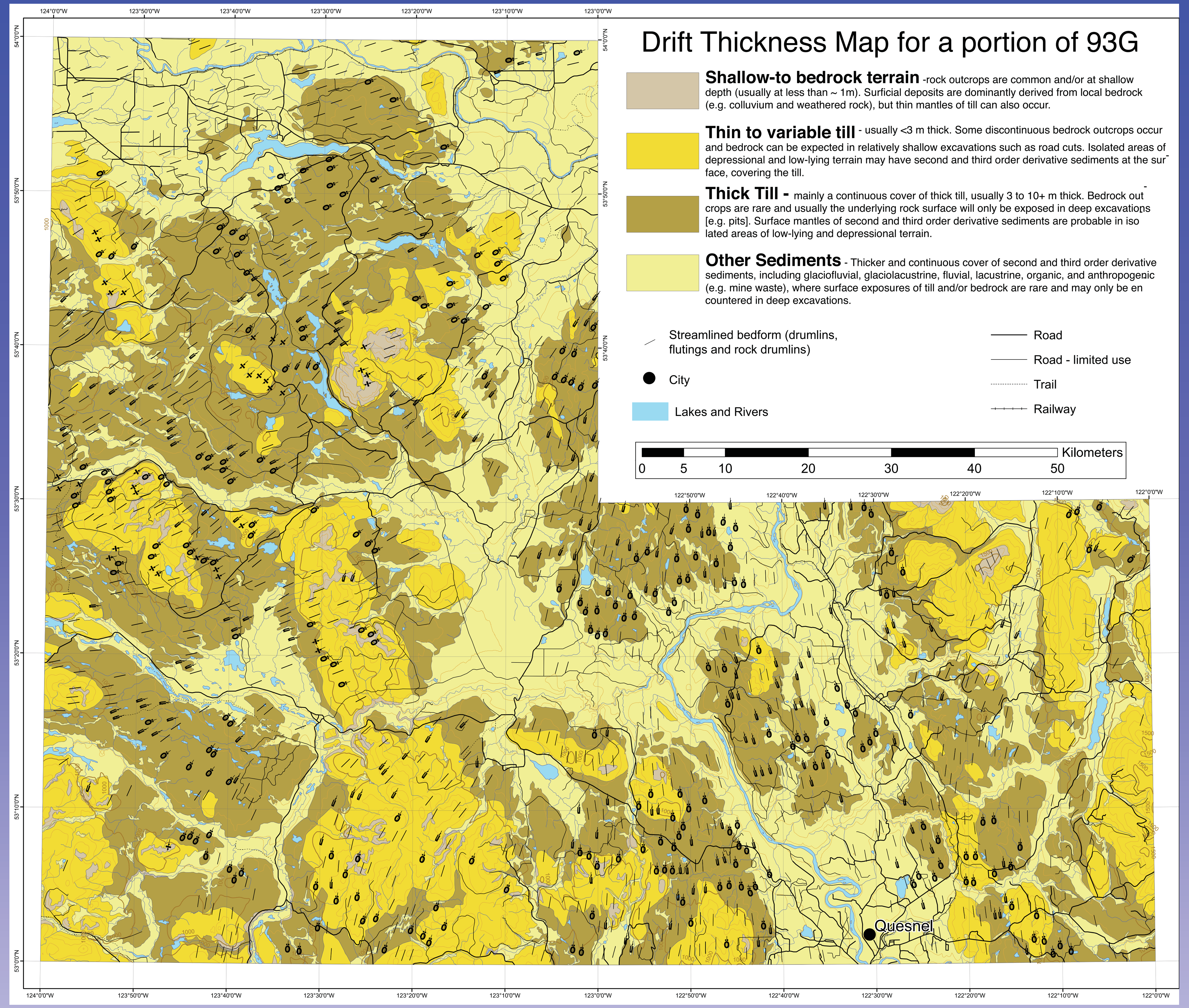


Figure 5.1. Example of proposed drift thickness mapping for a portion og 93G. Surficial geology maps at 1:100,000 exist in NW, SW and SE portions of 93G and were used to create this maps. These data will likely provide the most accurate of the pre-existing map data sets. Soil and landform mapping at 1:50,000, exists for the west half of 93H, all of 93 G but only the south half of 93J. As terrain mapping will occur in the northwest of 93J, reconnaissance mapping will be undertaken to provide drift thickness information. Unfortunately there is no terrain mapping for the entire area.

Acknowledgements

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