

Surficial Geology of the Alliston Area, NTS 31D/4, southern Ontario

Scale 1:50 000

Map Index

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INTRODUCTION

NATMAP Oak Ridges Moraine Map series

Alliston is one in a series of 15 digital 1:50,000 maps summarizing the glacial and postglacial deposits of the Oak Ridges Moraine (ORM) and Greater Toronto Area (GTA) (index map). The series is sponsored by the National Mapping Program (NATMAP) of the Geological Survey of Canada in collaboration with the Ontario Geological Survey (OGS). These maps complement a series of 1:20,000 geology maps covering the central area of the ORM, published by the OGS. It also publishes two 1:50,000 sheets (Georgian and Newmarket) using map detail and the expanded legend of the 1:20,000 maps. A 1:200,000 scale compilation map of the OGS maps completes the series (Sharpe et al., 1997).

Objectives and Content

The objective of the map series is to synthesize the geology of the ORM study area as a basis for environmental analysis, particularly hydrogeology. Each map consists of 4 colored panels:

- 1) title block, series introduction and regional setting,
- 2) thematic maps,
- 3) legend, symbols and geology map, and
- 4) reference material: map notes, stratigraphic table and series bibliography.

The layout is designed to allow fields between the first three panels and to allow the main map and legend to be cut off for field use.

Thematic maps and other features

A thematic map series complements the surficial geology map by providing at a common scale:

- 1) field site locations and Voronoi polygons of sediment descriptions (Fig. 3);
- 2) geologic map (Fig. 4) for comparison with other thematic maps;
- 3) digital elevation model (DEM) (Fig. 5) to allow visualization of relief / terrain elements that shows the pattern and control on drift distribution;
- 4) bedrock topography map with bedrock geology overlay (Fig. 6);
- 5) sediment thickness map that shows variation in sediment thickness (Fig. 7).

Each map is supplemented with map notes, an explanation of the key geologic terms related to the map unit sequence (stratigraphy) and age relationships, and a series bibliography. The digital map files will be released as part of a CD-ROM data release.

Data sources and structure

The nine maps within the NATMAP area all include new field work complemented by archival field data; combined, most maps have > 1,000 data points. The six maps outside NATMAP and within the GTA (location map) have been re-mapped with a minimum of new field work but include re-assessed archival data. All maps are structured in a Geographic Information System (GIS) with supporting data in a relational database (Russell et al., 1998). This format permits map features enhancement and analysis (e.g. thematic map series, Figs. 3-7). Surficial geology forms the first layer of a set of regional themes in the area, where Quaternary sediment thickness reaches approximately 200 m. The relational database allows for the digital map files to be easily updated as new data are added.

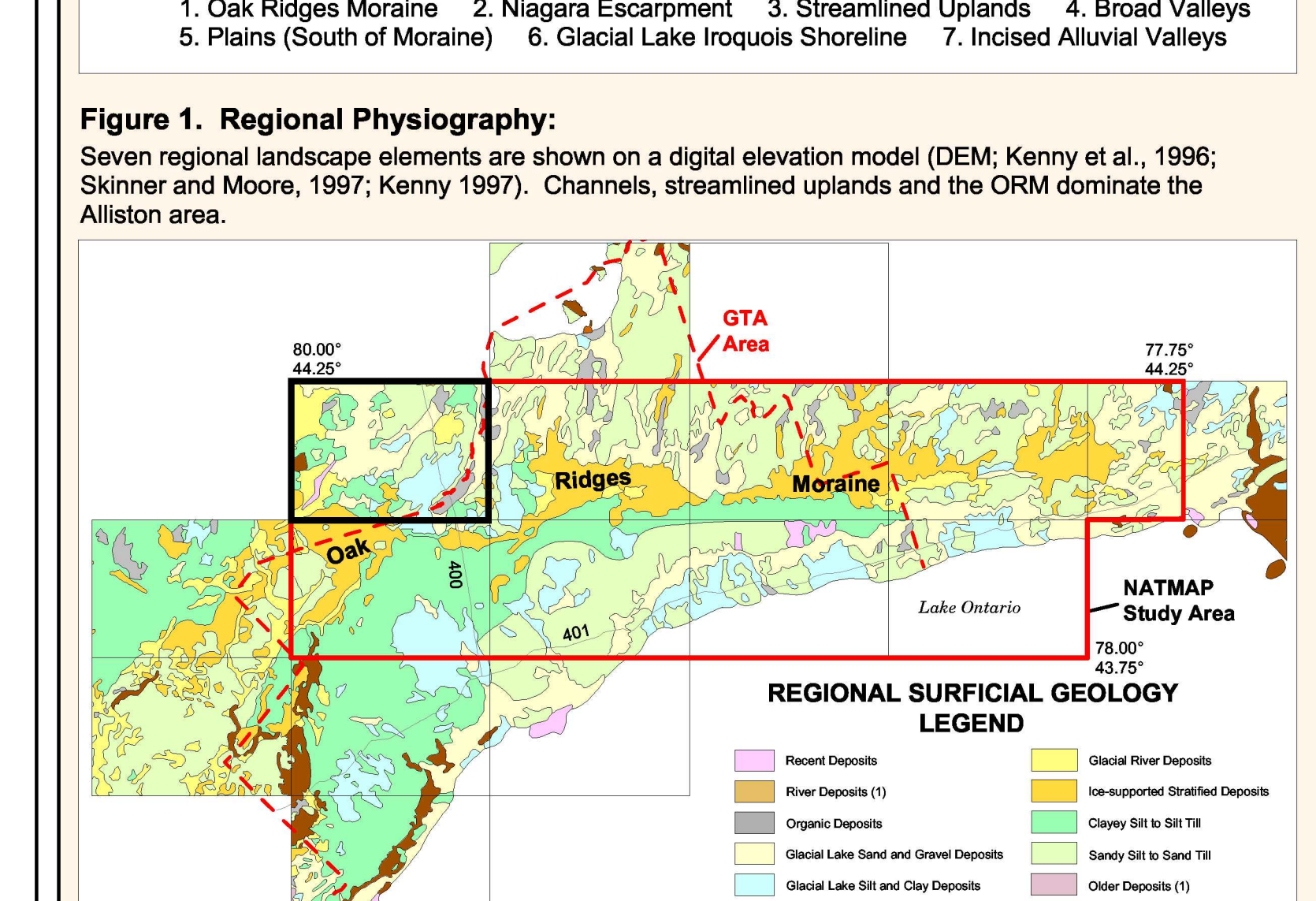
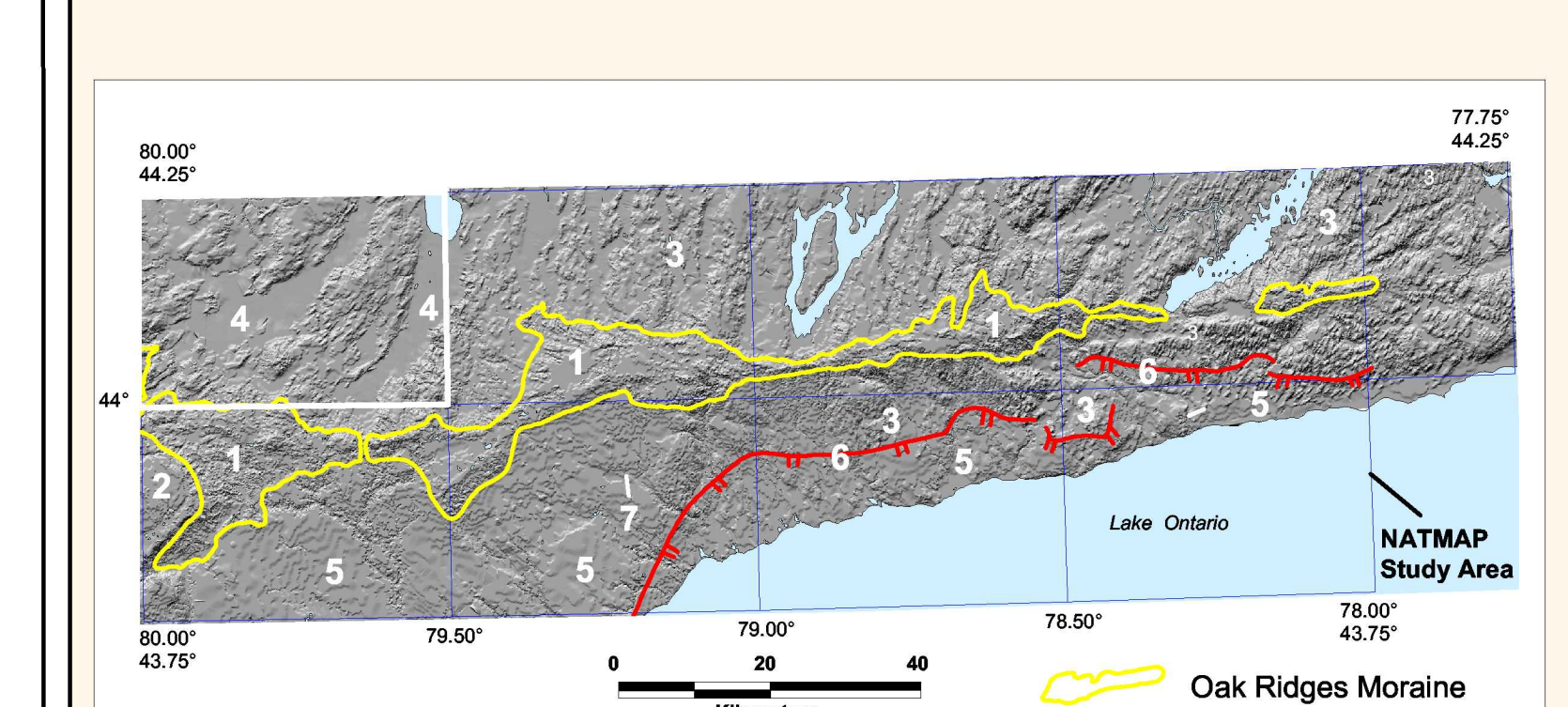


Figure 1. Regional Physiography: Seven regional landscape elements are shown on a digital elevation model (DEM; Kenny et al., 1996; Skinner and Moore, 1997; Kenny 1997). Channels, streamlined uplands and the ORM dominate the Alliston area.

Figure 2. Regional Geology: Alliston area shown in context of the regional geology map (modified from Barnett et al., 1991). The Alliston area is dominated by lowland lacustrine plains and drumlinized uplands that are part of a southwest trending system. Map legend is the same as that for the main map.

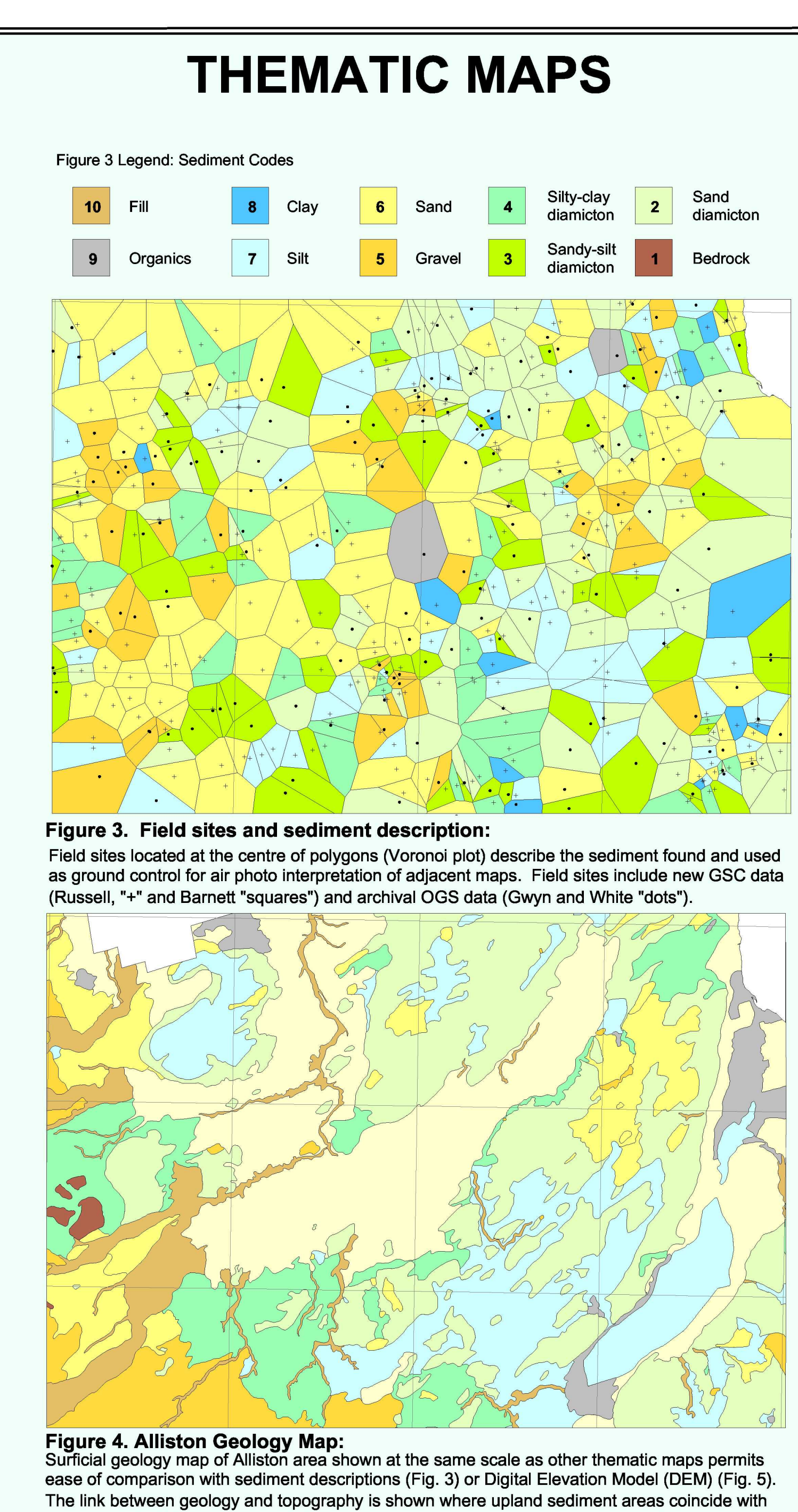


Figure 3. Field sites and sediment description: Field sites located at the centre of polygons (Voronoi plot) describe the sediment found and used as ground control for air photo interpretation of adjacent maps. Field sites include new GSC data (Russell, * and Barnett *squares) and archival OGS data (Gwyn and White *dots).

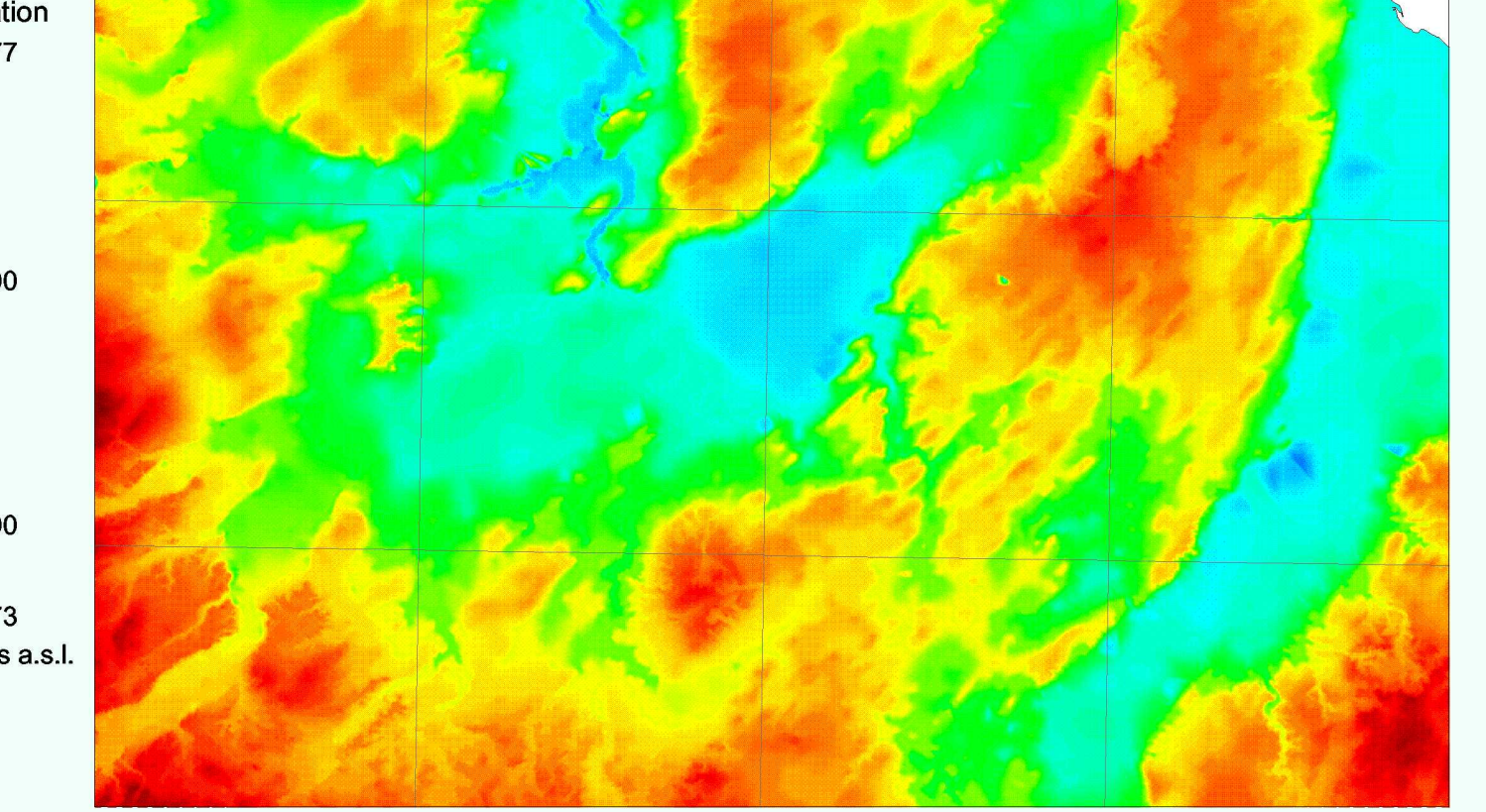


Figure 4. Alliston Geology Map: Surficial geology map of Alliston area shown at the same scale as other thematic maps permits ease of comparison with sediment descriptions (Fig. 3) or Digital Elevation Model (DEM) (Fig. 5). The link between geology and topography is shown where upland sediment areas coincide with map unit 5 (ORM) which has a distinct surface roughness. Legend is common with main map and Figure 2.

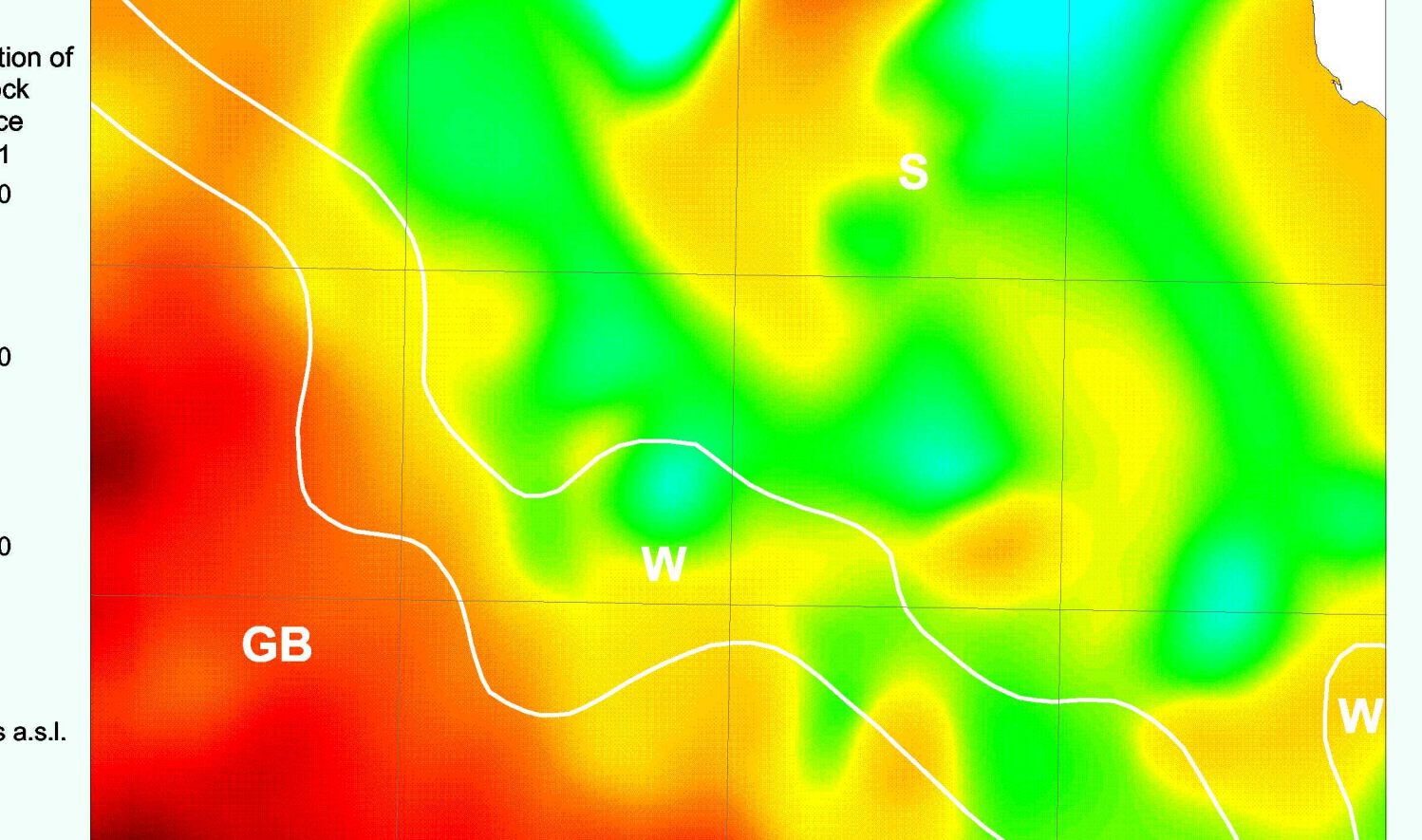


Figure 5. Digital Elevation Model (DEM): DEM (hill-shaded, colour gradient; Kenny, 1997) showing the Niagara Escarpment on the west side of the map and the sharp red colour ramp. Note the broad flat floored valleys between streamlined uplands.

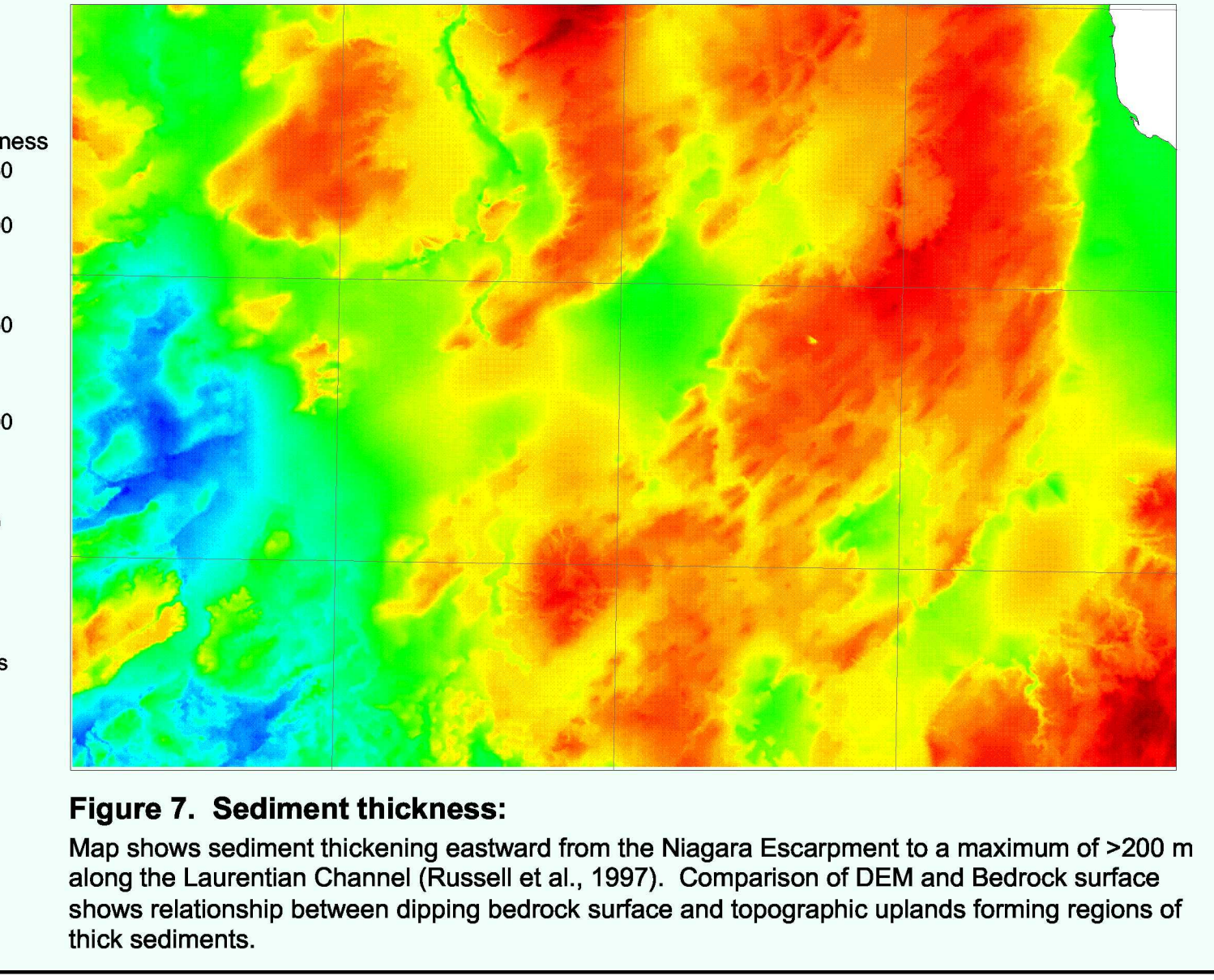


Figure 6. Bedrock topography: Map shows the bedrock surface sloping northeastward from the flank of the Niagara Escarpment. Low areas (blue) may form part of the Laurentian Channel (Spencer 1881). Simcoe (S) and limestone, Whitby Formation (W) shale and Georgian Bay Formation (GB) limestone-olistolith are shown.

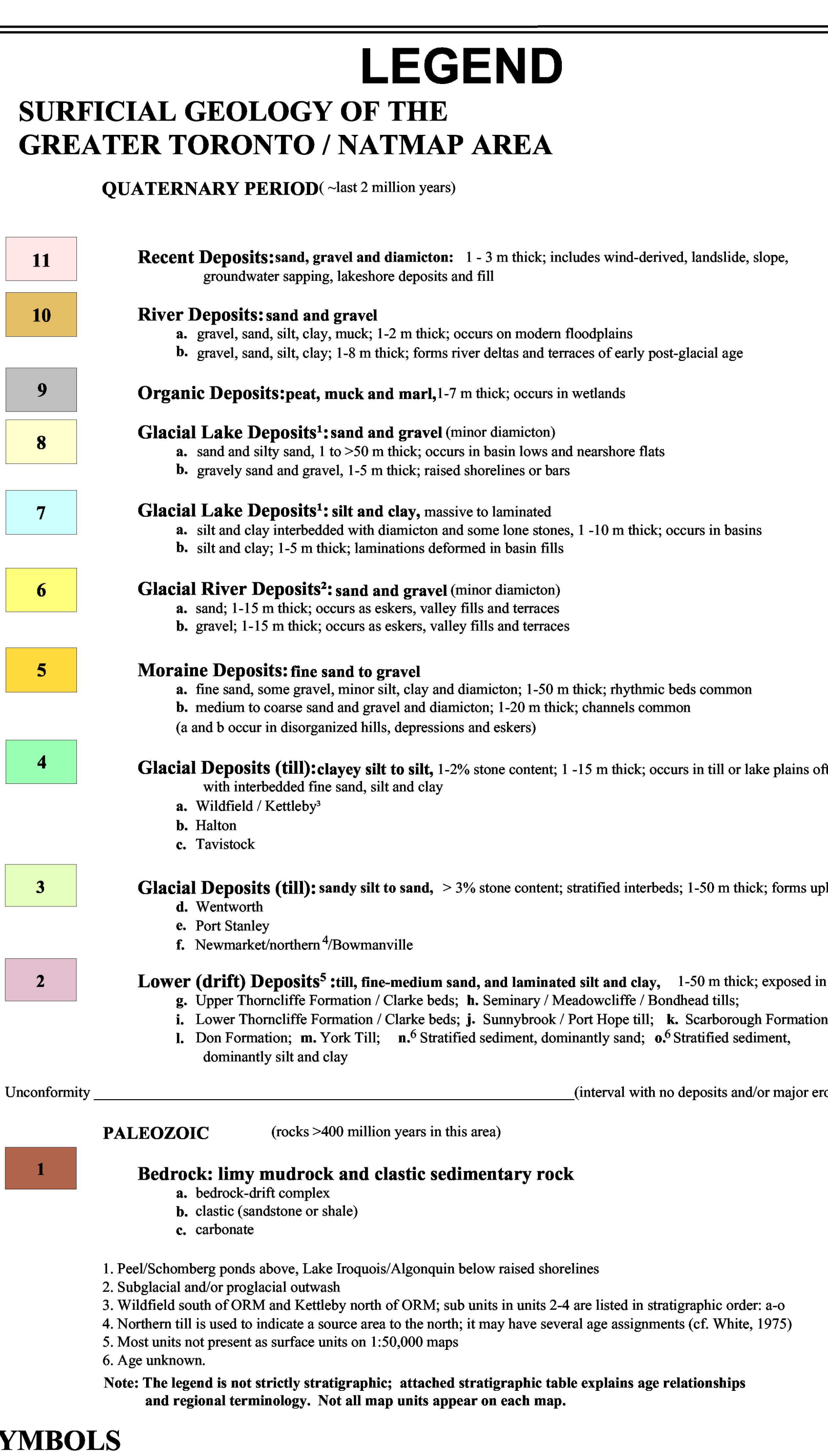


Figure 7. Sediment thickening: Map shows sediment thickening eastward from the Niagara Escarpment to a maximum of >200 m along the Laurentian Channel (Russell et al., 1997). Comparison of DEM and Bedrock surface shows relationship between dipping bedrock surface and topographic uplands forming regions of thick sediments.

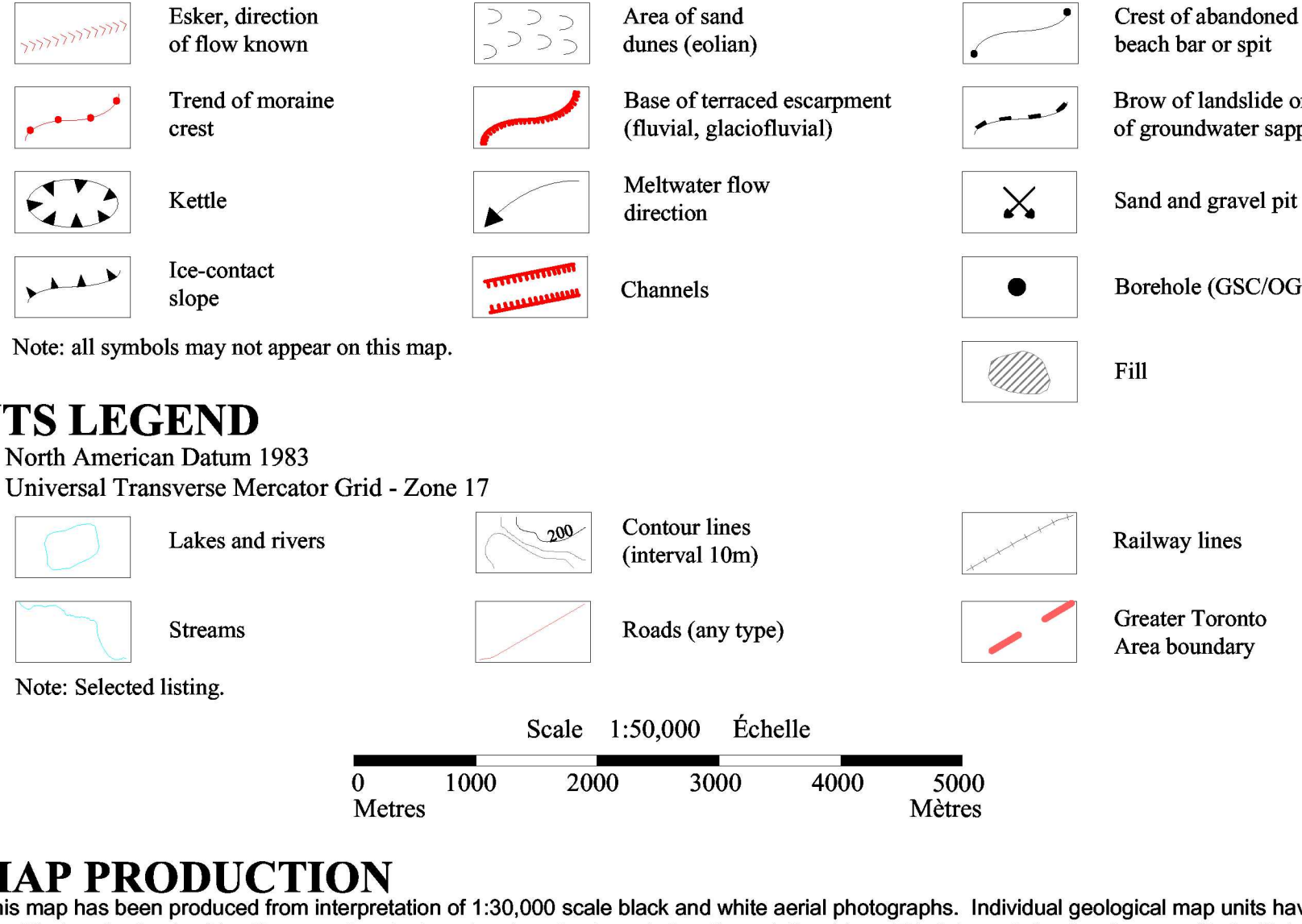


Figure 8. Bedrock topography: Map shows the bedrock surface sloping northeastward from the flank of the Niagara Escarpment. Low areas (blue) may form part of the Laurentian Channel (Spencer 1881). Simcoe (S) and limestone, Whitby Formation (W) shale and Georgian Bay Formation (GB) limestone-olistolith are shown.

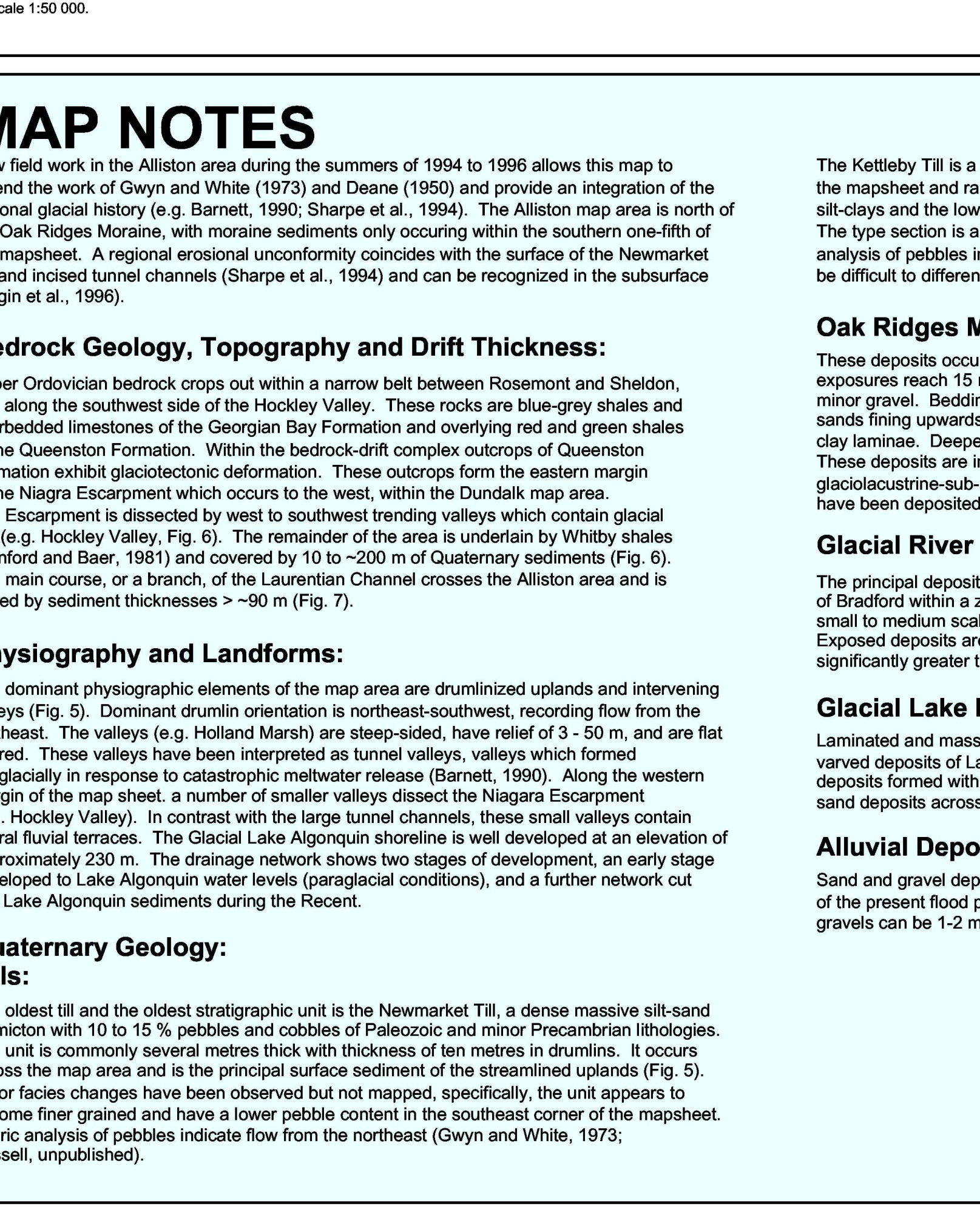


Figure 9. Regional Physiography: Seven regional landscape elements are shown on a digital elevation model (DEM; Kenny et al., 1996; Skinner and Moore, 1997; Kenny 1997). Channels, streamlined uplands and the ORM dominate the Alliston area.

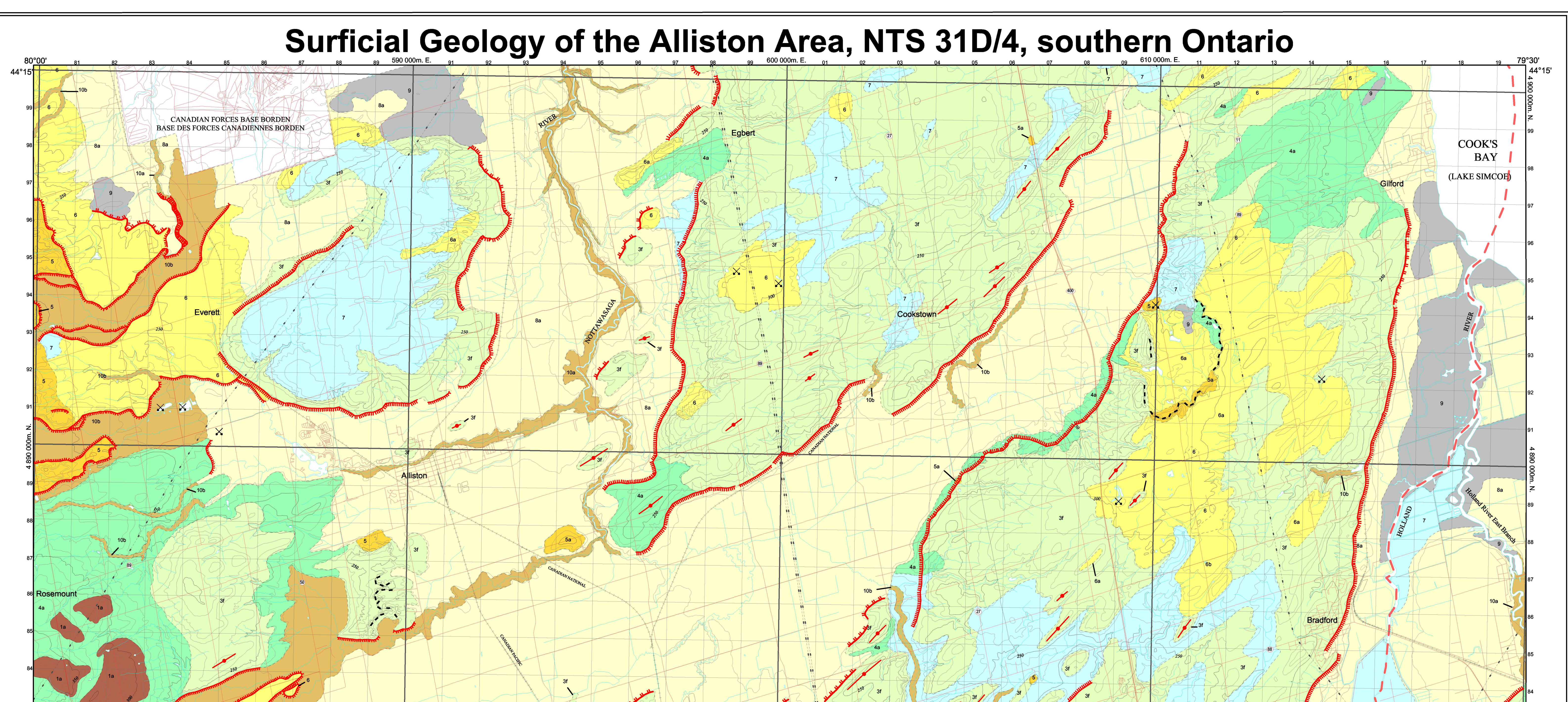


Figure 10. Legend: Recent Deposits: sand, gravel and diamictite. 1-3 m thick; includes wind-derived, landslide, slope, groundwater seepage, lakeshore deposits and fill.

