SURFICIAL GEOLOGY MAPPING

Newfoundland Labrador
Natural Resources

What is Surficial Mapping?

Surficial geology maps provide information on surface sediments, their morphology, properties and genesis, as well as providing ice flow, sample location, radiocarbon dates etc. These maps may be used in mineral exploration, land use planning, hazard assessment and many other applications.

Surficial mapping is the process of describing the distribution and characteristics of unconsolidated sediment overlying bedrock. Surficial sediment may be deposited through a number of processes including glacial, glaciofluvial, fluvial, colluvial, aeolian, marine and lacustrine.

Surficial Geology Maps

Sediment types (e.g., glacial, glaciofluvial, marine) are determined by examining the texture (grain size, clast content and shape), sedimentary structures, and surface morphology. The polygons defined on the air photo interpretation are modified to reflect field work and are colour coded by the assigned map labels to produce a surficial geology map. Surficial geology maps may also include ice flow data, sample locations, radiocarbon dates and other useful information. Maps are available as digital files, as well as paper maps.

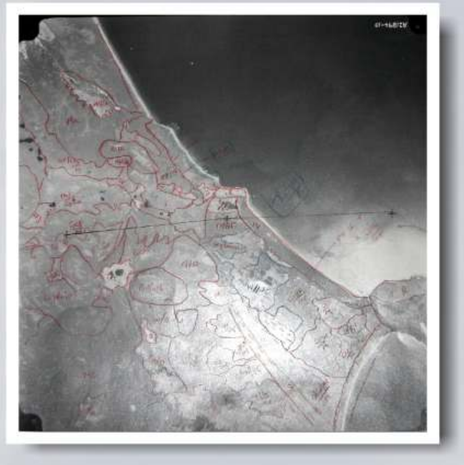
The map below is a generalised surficial geology map of the province. Each photograph adjacent to the map shows the location and briefly describes a main deposit type, morphology or landform.

The Mapping Process

The production of a surficial geology map involves a combination of air photo interpretation and field work.

A stereoscope is used to view the airphotos in 3D. This enables the viewer to see the terrain in detail. On the basis of differing tones and textures, and surface morphology an experienced mapper can differentiate sediment types.

Areas with similar sediment types and characteristics are enclosed in polygons and labeled. Interesting or questionable areas are noted and checked in the field.

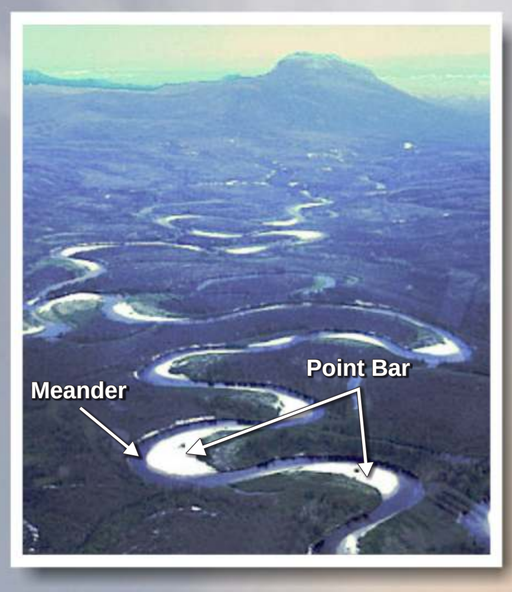


Field work involves mapping the distribution of surficial sediment and landforms, and collecting ice flow information (mostly striations) from bedrock outcrops. This is commonly combined with a till-geochemistry program which involves sampling on a grid of 1 sample per 1 km^2 to 1 sample per 4 km^2.

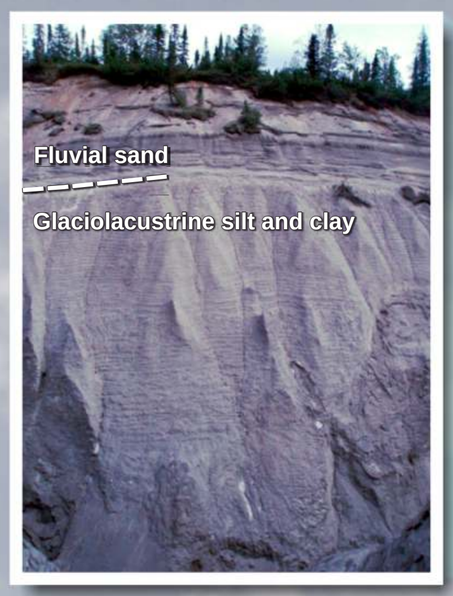
Helicopters and boats are used to access remote areas.

Glaciofluvial (G) sediments are those produced by rivers from melting glaciers. They are typically moderately to well sorted and are commonly found in valleys (near left) or as sinuous ridges or eskers (far left). The geochemistry of glaciofluvial sediments must not be combined with till geochemistry survey data.

Fluvial (F) sediments are deposited by modern rivers. To the right is the meandering Sebaskachu River found in central Labrador. Typically sediment is deposited on the inside bend (point bar), where water flows the slowest. Geochemical surveys from these sediments should not be included in analyses of till geochemistry surveys.



Emerged glaciomarine (M) sand and mud found along the Porcupine Strand, Labrador (left). These sediments are typically well sorted, fine grained and deposited in quiet environments away from the active glacier front. Geochemical analyses of these sediments should be treated separately from till geochemistry surveys.



Glaciolacustrine (L) deposits near Smallwood Reservoir composed of rhythmites of brown clay and grey silt with alternating beds of silt and very fine sand. These sediments were deposited in a pro-glacial lake more than 40 m above present river level. Geochemical analyses of these sediments should be treated separately from till geochemistry surveys.

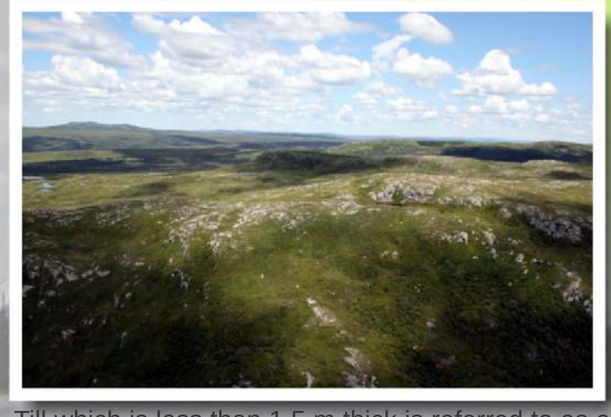
Glacial sediment or till (T) is formed from the erosion of bedrock by glacial ice. The result is poorly sorted sediment (clay to granule gravel) with a range of clast sizes (pebble to boulder). This sediment may be deposited as blankets or veneers over bedrock, or have geomorphic expression including small hills (hummocks - below) streamlined forms (flutes, drumlins), or ridges (moraines). Geochemical surveys in support of mineral exploration should concentrate on areas of till because of the well defined flow lines beneath a glacier.

Flutes, drumlins, mega flutes and other glacial lineations are all streamlined landforms (Tl) that are formed as a result of subglacial processes. They form parallel to ice flow (right). These features are generally composed of till.

Vegetated coastal dunes (Er) at Western Brook have buried and re-exposed a forest over the last century. The dune sand is continuing to move inland.

Till ridges or moraine ridges (Tr) form perpendicular to ice flow, either at the terminus of the glacier or under the ice. They form by squeezing or pushing of sediment.

Organic material (O) accumulates in areas of poor drainage as bogs or fens. These deposits are commonly thin and may be penetrated with an auger.



Till which is less than 1.5 m thick is referred to as a veneer. Till veneers (Tv) are almost always associated with bedrock outcrops (right).

Placentia (right) is built on more than 17 gravel beach ridges (Mr). The oldest is found the furthest inland and is more than 2500 years old. Marine sediments are generally unsuitable for geochemical surveys in support of mineral exploration.