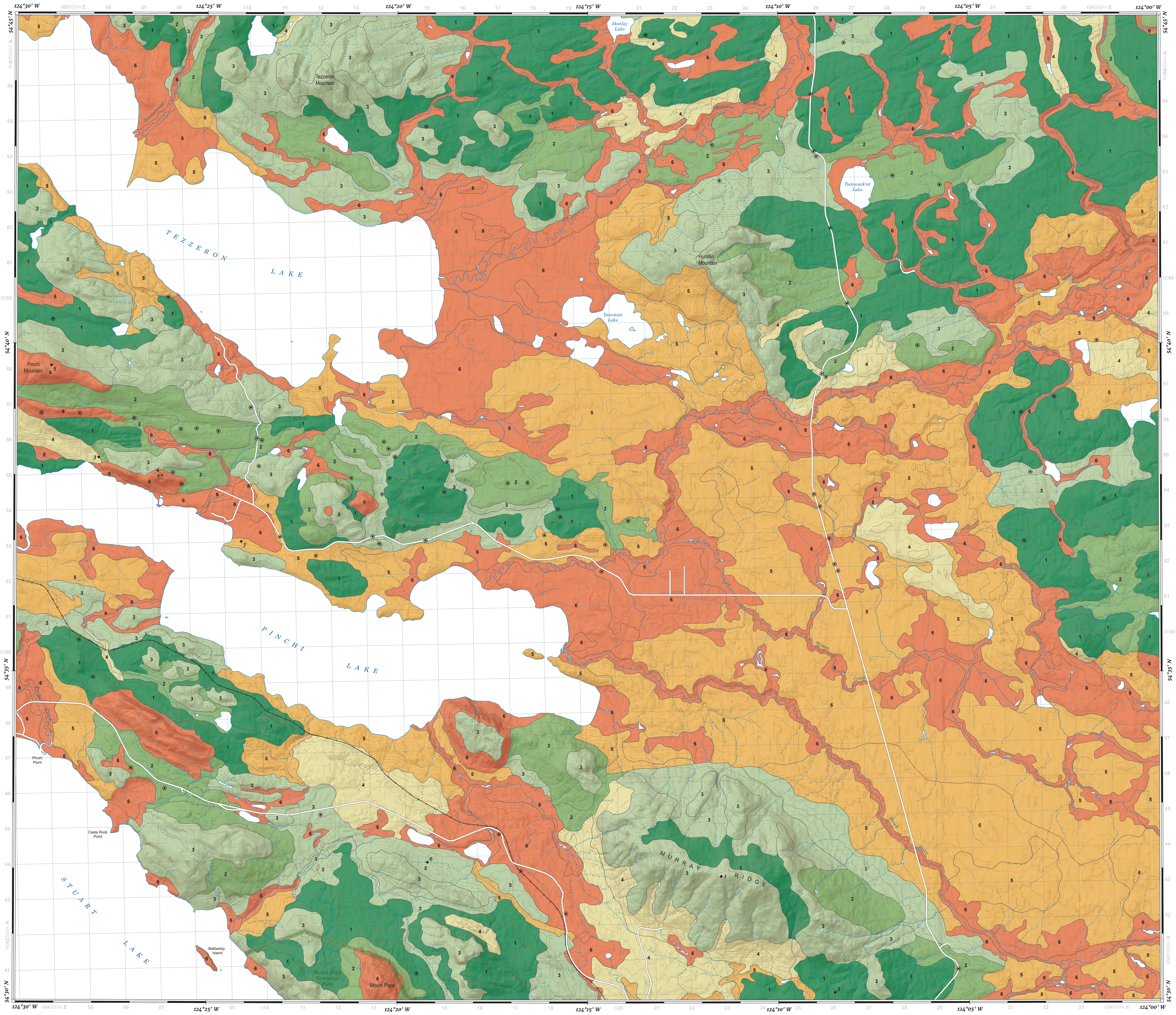

North American Datum 1983
Shaded relief and contour lines derived from the digital elevation model supplied by Natural Resources Canada. Illumination: azimuth 315°, altitude 45°, vertical exaggeration 1x.
Base map at the scale of 1:50 000 from Natural Resources Canada, with modifications.
Contour interval 10 metres. Elevations in metres above mean sea level.

ONE THOUSAND METRE GRID
UNIVERSAL TRANSVERSE MERCATOR GRID
ZONE 10 NORTH

GRID NORTH 1°01' WEST OF TRUE NORTH.
APPROXIMATE MEAN MAGNETIC DECLINATION 2021 FOR CENTRE OF MAP IS 17°07' EAST, DECREASING ANNUALLY 13.2'

Disclaimer: whilst every effort has been taken to ensure the accuracy of the information on this map, the data are provided 'as-is', without any warranty, guarantee, or representation of any kind, whether expressed or implied. It is the responsibility of the user to check the facts before enetering any financial or other commitment based upon this information. This map is not intended for navigation purposes.

Geoscience BC Map 2021-03-04b

Till sampling suitability of the Pinchi Lake area NTS 093K/09, British Columbia

Geology by C. Johnson, D. Sacco and C. McGregor

KILOMETRE SCALE (1 0 1 2 3 4 5)

Scale 1:50,000

Cartography by B. Elder

Geoscience BC

Palmer™

Legend

TILL SAMPLING SUITABILITY (TSS) CLASSIFICATION

TSS class	Description	Surficial geology map unit example*	Implications for exploration
High (1)	All subglacial till.	Tb; Tv	Surface sediment is composed entirely of subglacial till suitable for sampling or veneers of subglacial till punctuated by outcrop. Optimal conditions for till sampling. Historical samples are likely subglacial till.
Moderately high (2)	Dominantly subglacial till; all subglacial till with localized reworking.	Tb.O; Ts-RW_min	Majority of polygon area is composed of subglacial till suitable for sampling. Till polygons with the minor reworking (RW_min) overlay are interpreted to include localized areas of reworking, predominantly by meltwater processes. Till sampling can be planned throughout the majority of polygon; target topographic highs to avoid localized reworking. Historical samples are likely subglacial till.
Moderate (3)	Dominantly subglacial till with localized reworking; dominantly another surficial material with lesser amounts of subglacial till; subglacial till overlain by a veneer of another material.	Tb.GFv-RW_min; Ap.Tv; Cv/Tb	Unmodified subglacial till suitable for sampling ranges from the minor component up to roughly half of the polygon area. Suitable subglacial till may be overlain by a veneer of colluvium, organics, or glaciolacustrine sediments. Unmodified till may be found on topographic highs and away from meltwater channels.
Moderately low (4)	All subglacial till with major reworking; dominantly another surficial material with lesser amounts of subglacial till that has been locally reworked; undulating ablation till.	Tb-RW_maj; GFv.Ts-RW_min; Tu	Subglacial till is commonly affected by meltwater or overlain by ablation till in these units; suitable till for sampling will be difficult to locate. Meltwater has potential to concentrate heavy minerals or remove the fine fraction completely. Suitable till may be located by targeting topographic highs and in deposits down-ice from topographic highs that may have been partially protected. Drill-supported sampling may yield unmodified till samples where surface materials are sufficiently thick (*e.g.*, Tb). Ablation till (*e.g.*, Tu) is typically sourced from greater distances than subglacial till, assumed to have an inherent degree of reworking by meltwater and should be avoided. Tu may be sufficiently thin in some areas that underlying subglacial till can be accessed in deeper road or stream cuts.
Low (5)	Any amount of subglacial till with major reworking; Dominantly undulating ablation till or all hummocky ablation till.	Tb.GFh-RW_maj; GLv.Ts-RW_maj; Tu.O; Th	*In situ* subglacial till comprises a small proportion of these polygons; reworking by glacial or modern processes is common. Unmodified subglacial till may occur at depth in thicker till deposits that have been affected by meltwater or where it is stratigraphically overlain by other materials. Unmodified till is most likely to occur on topographic highs.
Very low (6)	No mapped till.	Ap.O; GFh.R	Unlikely to locate till for sampling; these units should be avoided in till sampling programs and historical analytical data from samples may not be suitable tot evaluate local mineral potential. Drill-supported till sampling may be useful in areas where subglacial till is likely to occur at depth (*e.g.*, beneath thick glaciolacustrine or ablation till deposits).

**For full explanation of surficial geology classification see companion map publication "Surficial geology of the Pinchi Lake map area (NTS 093K/09), British Columbia, Geoscience BC map 2021-03-04a"*

ONSITE SYMBOLS

Till sample site
Mineral occurrence (see Table 1; numbers indicate Map ID)
- Past Producer[2]
- Prospect[2]
- Developed Prospect[2]
- Showing[2]

Park or protected area
Road[1]
Rail line
Stream[2]
- Definite
- Intermittent or indefinite

1 - Roads displayed on map are from the CanVec 1:50k database (Natural Resources Canada) and do not include the extensive gravel forest service road network present in the area.

2 - Classification provided by BC Freshwater Atlas.

Table 1. Mineral occurrences from MINFILE database (MINFILE, 2020). Letter and number designation under deposit type correspond to definitions provided by Lefebure and Ray (1995) and Lefebure and Höy (1996).

Map ID	MINFILE No.	Name	Status	Commodity	Deposit Type
1	093K012	MURRAY RIDGE	Showing	Cr	M03: Podiform chromite
2	093K046	SUNSHINE	Showing	Hg	E01: Almaden Hg I08: Silica-Hg carbonate
3	093K047	CIN	Showing	Hg	E01: Almaden Hg I08: Silica-Hg carbonate
4	093K049	PINCHI LAKE MERCURY	Past Producer	Hg	E01: Almaden Hg I08: Silica-Hg carbonate
5	093K065	PINCHI LAKE	Showing	Magnesite	M07: Ultramafic-hosted talc-magnesite
6	093K079	DAD	Showing	Hg	
7	103J024	TSIMPSEAN PENINSULA	Showing	Kyanite	P02: Kyanite-sillimanite schists

INDEX TO ADJOINING MAPS OF THE NATIONAL TOPOGRAPHIC SYSTEM

Descriptive Notes

The mapping presented here is part of a series of surficial geology, till sampling suitability, and drift thickness maps completed for Geoscience BC's **C**entral **I**nterior **C**opper-**G**old **R**esearch **(CICGR)**: Surficial Exploration Project (See index map). The purpose of this map series is to inventory and characterize surficial materials and landforms to inform resource exploration (*e.g.*, mineral, water and aggregate) and infrastructure development in British Columbia. The surficial geology interpretations follow standardized mapping protocols defined by the Geological Survey of Canada (Deblonde *et al*., 2018) and used by the British Columbia Geological Survey, ensuring accordance with existing and ongoing surficial geology mapping produced by the government. Polygons are delineated based on surficial material and morphology, and overlays are used to indicate geomorphological processes. Features such as bedrock outcrop or glaciofluvial landforms that are too small to delineate as polygons are identified using point and line symbols. The surficial geology was interpreted from 1.5 m resolution colour and near-infrared SPOT satellite imagery. Pseudo-stereo models were produced from the imagery using the Canadian Digital Elevation Model (Natural Resources Canada, 2015). The till sampling suitability mapping builds on earlier drift exploration potential maps developed by Proudfoot *et al*. (1995) and basal till potential mapping (*e.g.*, Sacco *et al*., 2014; Ferbey, 2014).

This map series was initiated to streamline the CICGR regional till geochemical and mineralogical sampling program. Subglacial till is ideal for assessing bedrock hosted mineral potential in areas covered by Quaternary sediments because it is commonly the first derivative of bedrock (Shilts, 1993), it has a relatively simple and predictable transport history related to ice-flow directions, and geochemical and mineralogical anomalies in till are more extensive than its bedrock source (Levson, 2001). This mapping focuses on identifying discrete occurrences of subglacial till to guide exploration programs. In central British Columbia, it is specifically important to distinguish subglacial till facies from ablation till facies, as ablation till has a more complex transport and depositional history and, therefore, is less suitable for mineral exploration.

Till sampling suitability is derived from the surficial geology interpretations. Each mapped polygon is attributed a suitability using a multi-class index that considers the proportions of surficial materials and geomorphological processes that have affected them. Suitability ratings are ultimately a function of the proportion of a polygon that contains *in situ* subglacial till that is suitable for sampling. This helps to inform the planning and execution of till sampling surveys by identifying areas where subglacial till can be readily sampled and areas where extra efforts or alternative sampling methods or materials may be required.

Drift thickness mapping provides an indication of the relative thickness of Quaternary sediment cover based on the results of the surficial geology interpretations. Drift thickness estimations consider the interpreted surface expression of map units (polygons) and the potential for preserved stratigraphic sequences. Stratigraphic sequences are assumed where depositional environments were non-erosional and pre-existing materials are likely preserved (*e.g.*, beneath glaciolacustrine sediments and ablation till). The interpretations have not been calibrated with known depths to bedrock. Drift thickness maps can be used to inform bedrock mapping and prospecting programs because they identify areas where bedrock outcrops are likely present or where bedrock is overlain by shallow cover and may be accessed with hand tools. This mapping can also be used in combination with till sampling suitability to identify areas where drilling or trenching may be required to sample till, or provide information such as ice flow direction for drift-based exploration programs.

The surficial geology of the Pinchi Lake map area (NTS map sheet 093K/09) was previously interpreted at a scale of 1:100 000 by Plouffe (2000). The map area lies within the Fraser Basin and the Nechako Plain northern physiographic subdivisions of the Interior Plateau (Holland, 1976). The region is characterized by flat to gently rolling topography with surface elevation between approximately 700 m and 1400 m. Thick glacial sediments cover much of the region and little bedrock is exposed, except for on five discrete topographic highs dispersed throughout the map area. These topographic highs are characterized by veneers of till (**Tv**), discontinuous bedrock outcrop (**R**) and thin deposits of colluvium (**Cv**). The northwest portion of the map area is dominantly mantled by thick till deposits (**Tb**), crosscut by two northwest-oriented glaciofluvial meltwater corridors. Similarly, the southwest corner is dominantly composed of thick till, that thins to veneers on local topographic highs. A continuous mantle of glaciolacustrine sediment extends southeast from Tezzeron and Pinchi lakes indicating that an extensive glacial lake inundated much of map area that is below ~800 m a.s.l. Ablation till (**Tu, Th**) is interpreted beneath these lake sediments in some areas, suggesting stagnant ice was responsible for the impediment of drainage. Ice flow during the glacial maximum was likely to the northeast. Macroforms oriented east in the west-central part of the map area and southeast in the southwest suggest that there were late-stage changes in ice-flow direction that may affect sediment transport.

The Pinchi Lake map area is moderately suited to till sampling. The northeast and southwest have a continuous mantle of subglacial till with only localized zones of deglacial sediments and ablation till. At higher elevations, where till cover is thin (*e.g.*, Tv), till sampling efforts should focus on the down-ice side of topographic highs. Ablation till occurs in most valleys and should be avoided during till sampling programs. Where ablation till is thin, underlying subglacial till may be accessed using hand-tools or in deep road cuts. Where ablation till is thicker, or valley bottoms are covered in thick glaciolacustrine sediments, mechanical assistance (*e.g.*, drilling or trenching) will likely be necessary to access subglacial till. Areas below ~800 m a.s.l. where the glacial lake occurred are poorly suited to till sampling due to the glaciolacustrine and ablation till deposits. Subglacial till is likely preserved beneath ablation till and glaciolacustrine sediments due to the non-erosive nature of their deposition, so a drill-supported survey could be an effective method for exploration.

Acknowledgements
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