Interior Plateau surficial geology compilation: Selection and standardization of maps and data

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Abstract

The British Columbia Geological Survey is producing a digital compilation of surficial geology for the Interior Plateau, a region in central British Columbia where thick packages of glacial drift can add complexity to mineral exploration, land-use planning, forestry, and infrastructure projects. To build the compilation, data from ~100 sources, which include multiple map types (e.g., surficial geology, terrain, soils), must be converted to a uniform standard. Converted data are validated through automated and manual QA/QC procedures to ensure geometric and topological consistency before admission into the final compilation database. Final compilation datasets will be in analytical-ready formats that may be applied, for example, to find subglacial tills and sand and gravel deposits or to investigate landslide and flood hazards.

Keywords: Digital compilation, surficial geology, Interior Plateau

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1. Introduction

Maps describing British Columbia's surficial sediments and features have been produced for decades by provincial and federal governments (e.g., Fulton, 1995; Plouffe, 2000; Ferbey et al., 2016), universities (e.g., Hashmi et al., 2015; Sauvé et al., 2025), and industry (e.g., Bobrowsky et al., 1992; Lewis, 1987; McGregor and Sacco, 2021). Catalogued in British Columbia Geological Survey spatial indexes (Arnold and Ferbey, 2019; Veness et al., 2024), these maps provide information about surficial deposits and distribution of bedrock exposures (e.g., Plouffe, 2000; Ferbey et al., 2016), terrain (e.g., Dixon-Warren et al., 1997) and soils (e.g., Farstad, 1979; Jungen, 1980). However, inconsistency in mapping methods, labelling schema, and storage locations hinders accessibility to a broad audience that may be unfamiliar with interpreting different map types.

The British Columbia Geological Survey is developing a topologically consistent digital dataset of surficial geology for the Interior Plateau (Fig. 1) that allows units and features to be queried. Equivalent to BC Digital Geology for bedrock (British Columbia Geological Survey, 2019), this compilation will be similar to surficial geology products provided from Yukon (Yukon Geological Survey, 2023) and Alberta (Fenton et al., 2013). Building on initial work in which Veness et al. (2024) scanned, catalogued, and re-released the physical collection of surface materials maps in a spatial index, we are now focusing on translating selected datasets to current BCGS mapping specifications. In this paper, we describe how we selected, ranked, and compiled source maps, present methods for converting surficial data to a uniform standard, and provide details about how the compilations may be used. Compilation data will retain original unit labels and scale, in addition to their converted label, to ensure they maintain their intended function and level of detail.

2. Study area

The Interior Plateau, the major physiographic division of central British Columbia (Holland, 1976), extends across ~200,000 km^2, or roughly 20% of the province by area (Fig. 1). The plateau extends from the Omineca and Skeena mountains in the north to the southern Canada-United States border (Fig. 2). It is flanked by the Coast and Cascade mountains to the west and by the Rocky and Columbia mountains to the east. The region is characterized by subdued, rolling topography, and is covered by glacial drift deposited during and directly following the last glaciation (e.g., Holland, 1976; Clague and Ward, 2011) that can locally be up to 200 m thick in well-developed river valleys (Kerr and Levson, 1997). Due to decades of forestry and mineral exploration activity, the Interior Plateau has the highest density of surficial geology maps in the province, and data gaps are minimal.

3. Map types

Three general map types have been used to describe surficial features in British Columbia (Fig. 3). Conventional surficial geology maps describe geological units based on material type (e.g., till, colluvium, or glaciofluvial) and surface expression (e.g., veneer, fan, or terrace). Terrain maps are similar, but units can be further divided by geomorphological processes, slope gradient, sediment texture, drainage, and/or slope stability. Soils maps focus on describing the materials produced or affected by pedogenic processes (A-, B-, and organic horizons), but they also contain descriptions of parent materials (C-horizon).

Sediment packages in maps are described using unit labels consisting of groups of letters, symbols, and numbers (components). Components are arranged so that each represents a particular characteristic of the geology or terrain (Table 1; Howes and Kenk, 1997). The components available to build a

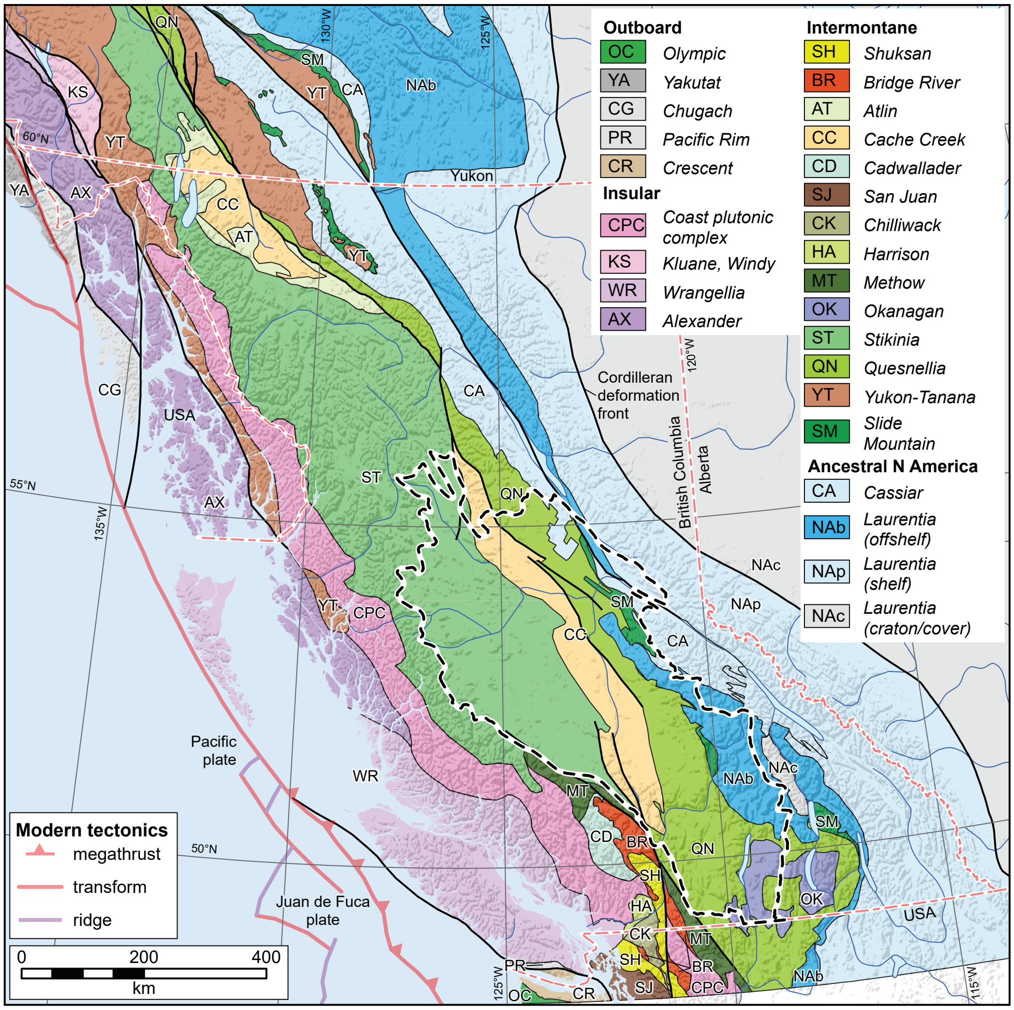


Fig. 1. Interior Plateau surficial geology compilation area. Terranes after Colpron (2020).

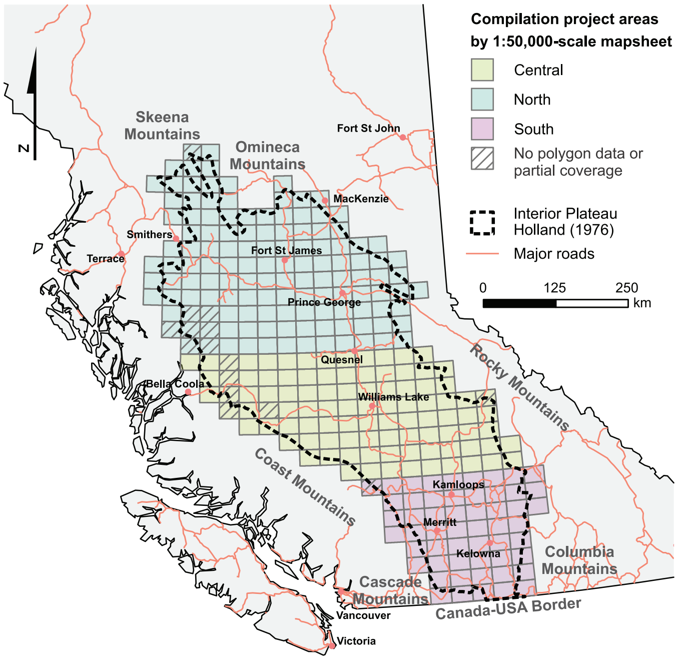


Fig. 2. Interior Plateau of British Columbia (Holland, 1976) divided into central, north, and south project areas. Project areas are subdivided into National Topographic System (NTS) 1:50,000-scale map sheets, the working scale for the compilation.

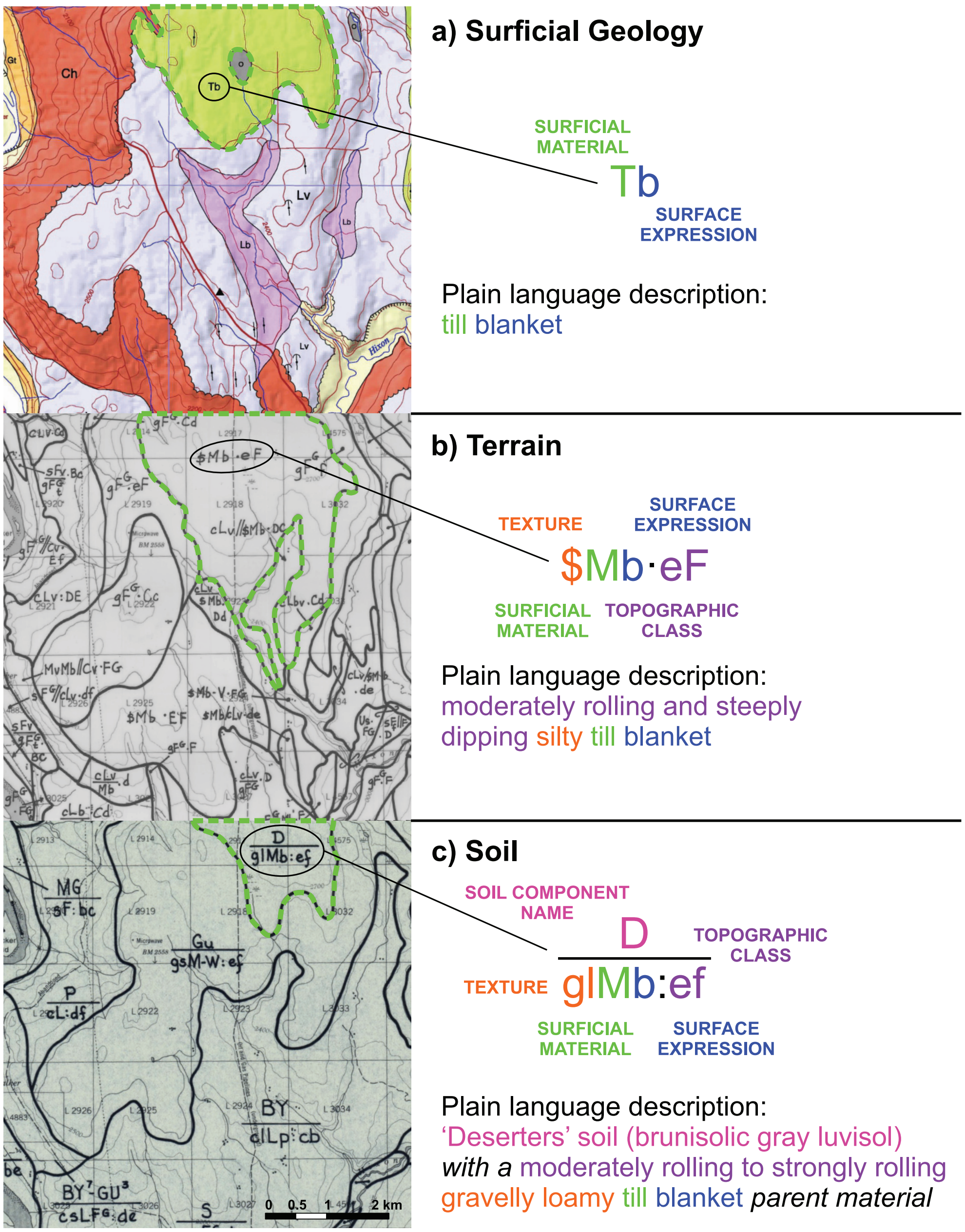


Fig. 3. Example of different map types for the same area at 1:50,000 scale. An equivalent unit in each map type is outlined with a green dashed line. Coloured words link plain language descriptions to components of the map unit label. **a)** Conventional surficial geology (Blais-Stevens and Clague, 2007). **b)** Terrain (Ministry of Environment, 1973). **c)** Soils (Farstad, 1979).

unit label depend on map type. Unit labels in terrain and soils maps can be converted to surficial geology labels with reasonable accuracy for general reconnaissance because they contain the main components of a conventional surficial geology map: surface expression and parent material type. However, maps made for different purposes, such as terrain maps for assessing slope stability, may have a greater focus on subdividing surface expressions compared to a conventional surficial geology map, and soil maps concentrate on soil associations rather than parent materials and thus influence where unit contacts are drawn. Differences in the mapping purpose may also influence addition of symbols (e.g., striations, eskers, and flutings) or create variations in unit labels and descriptions (Fig. 3).

3.1. Legend types

British Columbia's surficial materials maps either have open legends or closed legends. In open legends, geological unit labels are built from combining components of a classification system (e.g., Howes and Kenk, 1997; Canada Soil Survey Committee, 1978; E.L.U.C. Secretariat, 1978). A map user must reference the corresponding classification system to find detailed definitions for each label component. Separate maps built using the same classification system have identically defined units, for example Chr-F (hummocky ridged colluvium with slow mass movement; Howes and Kenk, 1997) units have the same meaning regardless of the map source or study area.

Table 1. Unit label components contained in surficial geology map types.

Unit label component	Description	Examples
Material type	Non-lithified, unconsolidated sediments (surficial materials) classified according to mode of deposition (Howes and Kenk, 1997).	T – Till (Deblonde et al., 2024) / M – Till (Howes and Kenk, 1997) GF – Glaciofluvial (Deblonde et al., 2024) C – Colluvium (Deblonde et al., 2024)
Surface expression	The form (shape) of the land surface or the thickness of the materials (Howes and Kenk, 1997).	b – Blanket (Deblonde et al., 2024) v – Veneer (Deblonde et al., 2024) t – Terrace(s) (Deblonde et al., 2024) h – Hummock(s) (Deblonde et al., 2024)
Geomorphological process	Geomorphological processes that are modifying, or have modified, surficial materials or landforms.	E – Channeled by meltwater (Howes and Kenk, 1997) R – Rapid mass movements (Howes and Kenk, 1997) H – Kettled (Howes and Kenk, 1997)
Texture	The size, roundness and sorting of particles in mineral sediments and the fibre content of organic materials (Howes and Kenk, 1997).	s – Sand (Howes and Kenk, 1997) g – Gravel (Howes and Kenk, 1997) $ – Silt (E.L.U.C. Secretariat, 1978) x – Angular fragments (Howes and Kenk, 1997)
Soil component/class/ association	A natural grouping of soil associates based on similarities in climatic or physiographic factors and soil parent materials. It may include a number of soil associates provided that they are all present in significant proportions (Canada Department of Agriculture, 1976).	Specific names and their relative proportions based on map or region. $\mathrm{BY}^{7}\mathrm{GU}^{3}$ – 70% Beverly soils, 30% Gunniza soils (e.g., Farstad, 1979)
Topographic class/ Slope class	Describes simple and/or complex topography to quantify the dominant slopes within a unit or landform.	A – Depressional to level (Canada Department of Agriculture, 1974) c – Undulating (Canada Department of Agriculture, 1974) 8 – Extreme slopes (Soil Classification Working Group, 1998)
Terrain stability class	A relative ranking of the likelihood of a landslide occurring after timber harvesting or road construction (Forest Practices Code, 1999).	I – No significant stability problems exist V – Expected to contain areas with a high likelihood of landslide initiation following timber harvesting or road construction.
Qualifying descriptor/ qualifier	Used where appropriate to provide additional information about surficial materials and geomorphologic processes (Howes and Kenk, 1997).	A – Active (Howes and Kenk, 1997) I – Inactive (Howes and Kenk, 1997) G – Glacial (Howes and Kenk, 1997)

Closed legends are attached to the map and contain only the units and symbols in the mapped area. Authors can customize a legend by including direct observations (e.g., unit thicknesses, sediment textures, or sorting), thus making closed legends unique to a particular map. As a consequence, different closed legends could lead to differences in how units are portrayed. For example, although similar, landslide deposits (Cz) in Sauvé et al. (2025) and Ferbey et al. (2016) have different closed legend descriptions, which could affect placement of unit contacts.

3.2. Map formats

Inputs for the compilation are available as attributed vector data (digital points, lines, or polygons) and scanned maps (raster files). Vector data are available from modern maps produced in a geographic information system (GIS; e.g., Hashmi et al., 2015; Ferbey et al., 2016; Sauvé et al., 2025) or in regional data assembly projects and compilations (e.g., Forest Renewal BC (FRBC), Morfitt, 1999; MacIntyre and Struik, 2000; Struik et al., 2007). Maps produced before computer-aided mapping (approximately 1995 or earlier) need to be manually converted to vector data by tracing unit boundaries and geologic symbols in a GIS (i.e., vectorization).

3.3. Modern BCGS surficial geology maps

The BCGS produces surficial geology maps for a general audience with a broad range of applications. Modern BCGS maps are commonly published at 1:50,000 scale with a closed legend and descriptive notes (e.g., Ferbey, 2014a; Ferbey and Elia, 2025). Unit descriptions in the legend are simple, commonly containing one surface expression and material type per unit. In addition to geological units (presented as polygons), these maps contain geological and geomorphological point and line features. These features can include ice-flow indicators, moraines, field stations, sample locations, eskers, kettles, deltas, rock glaciers, pits, or quarries. Overlays (polygons with a transparent component) are used to show additional, commonly secondary, processes or features such as mine tailings, reworked sediments, and large kettles. All BCGS maps are published as PDF maps with accompanying spatial files.

The BCGS uses the Geological Survey of Canada's (GSC) Surficial Data Model (Deblonde et al., 2024) to standardize symbols and colour geological units. This allows integration with existing GSC mapping in British Columbia, and simplifies decisions related to choosing appropriate symbols or classes. BCGS maps can contain entries that deviate from Deblonde et al. (2024), like Rs (rock steep; Ferbey and Elia, 2025), although these types of polygons are rare. Custom symbols are also rare (e.g., landslide toe; Sauvé et al., 2025), except for mineral occurrences, which are included in finished maps.

4. Map selection

To build the Interior Plateau compilation, we selected 67 vector data sources and 38 scanned maps (extending across 281 NTS 50,000-scale grid cells). The density, coverage, type, and scale of surficial materials maps are not consistent across the Interior Plateau. In many instances, maps include the same area or overlap, requiring us to manually select the best source data for the compilation. Some map sheets have incomplete coverage of point or line data, and full data gaps are most common in and around Provincial parks or at the edges of the Interior Plateau bordering more mountainous topography (Fig. 2).

For each of the NTS grid cells intersecting the Interior Plateau boundary, we visually inspected all available surficial data and maps to select sources for compilation components that best resemble those in modern BCGS surficial geology maps. We considered the map type, scale, and publication agency to guide our selection (Table 2).

5. Surficial data standard and storage

Surficial data are converted to a modified version of the BCGS geospatial frame data standard (GFD, Cui, 2021), a data model that stores the components of a geology map in point and line geometry (Table 3; Fig. 4). Using points and lines in place of polygons simplifies modification by allowing us to easily manage gaps, overlaps, or slivers between adjacent geologic units (topological errors). Storing mapping data as points and lines can improve usability and loading times on geospatial web services like MapPlace 2 by only producing polygons for specific areas or zoom levels (Cui et al., 2018; Cui, 2021). Although data are stored as points and lines, geologic polygon data will be available in compilation releases.

We developed a specifications manual to ensure all project data are compiled consistently to meet GFD standards and can be immediately integrated into the compilation database. The specifications manual is referenced during vectorization of scanned maps to avoid inconsistency when recording unit labels, drawing features, and creating digital legends. Feature Manipulation Engine (FME) is used to transform existing vector data to the modified GFD standard (i.e., converting polygons to points and lines) and enforce topology rules (Table 4). The output is stored in a PostgreSQL/PostGIS database where it undergoes secondary quality control processes to check data for adherence to database standards and proper coding. Features that fail quality control tests are corrected automatically using PostgreSQL queries or manually in QGIS.

6. Standardization of unit labels and symbols

To be used in the compilation, unit labels must be standardized across the different map types. We converted unit labels on a map-by-map basis to be consistent with Deblonde et al. (2024). For closed map legends, we interpreted unit descriptions and used regional context to determine an equivalent Deblonde et al. (2024) unit label.

Open legend maps are commonly more complex and require rules for consistent conversion and to capture the most compilation-relevant information. Original unit labels may include information not captured in Deblonde et al. (2024) such as sediment texture, geomorphological process, and stability class (E.L.U.C. Secretariat, 1978; Howes and Kenk, 1997). We

Table 2. Map priority system for selecting surficial map components for each NTS 1:50,000-scale grid cell.

Hierarchy	Scale	Producer	Type	Notes
1	1:50,000 – 1:249,999	Geological Survey	Conventional surficial geology (raster or vector)	Maps in Arnold and Ferbey (2019). Unit labels commonly use versions of Deblonde et al. (2024).
2	1:50,000 – 1:249,999	Geological Survey or Natural Resources Ministry	Terrain (raster or vector)	Maps found in Veness et al. (2024) or Arnold and Ferbey (2019). Unit labels commonly use versions of E.L.U.C. Secretariat (1978) or Howes and Kenk (1997).
3	≤1:250,000	Geological Survey	Conventional surficial geology (raster or vector)	These maps may be used over a 1:50,000-scale terrain map (e.g., GSC A-Series; Plouffe, 2000) based on visual assessment by compiler. Unit labels commonly use versions of Deblonde et al. (2024).
4	1:50,000	Natural Resources Ministry or Industry	Soils (raster or vector)	Maps in Veness et al. (2024) or Knowledge Management (2011). Unit labels commonly use versions of Canada Soil Survey Committee (1978).

Table 3. Components of surficial geology maps and their frame data geometries in database back-end.

Map component	Frame data geometry	Feature examples
point symbols	point	Striations, field stations, outcrop locations.
line symbols	line	Eskers, flutes, meltwater channels.
geologic polygons	line	Edges of geologic and overlay polygons (contacts) or limits of mapping.
	point	Data stored in geologic (Tb, Cv, etc.) or overlay (e.g., mine tailings, reworked sediments, etc.) polygons.

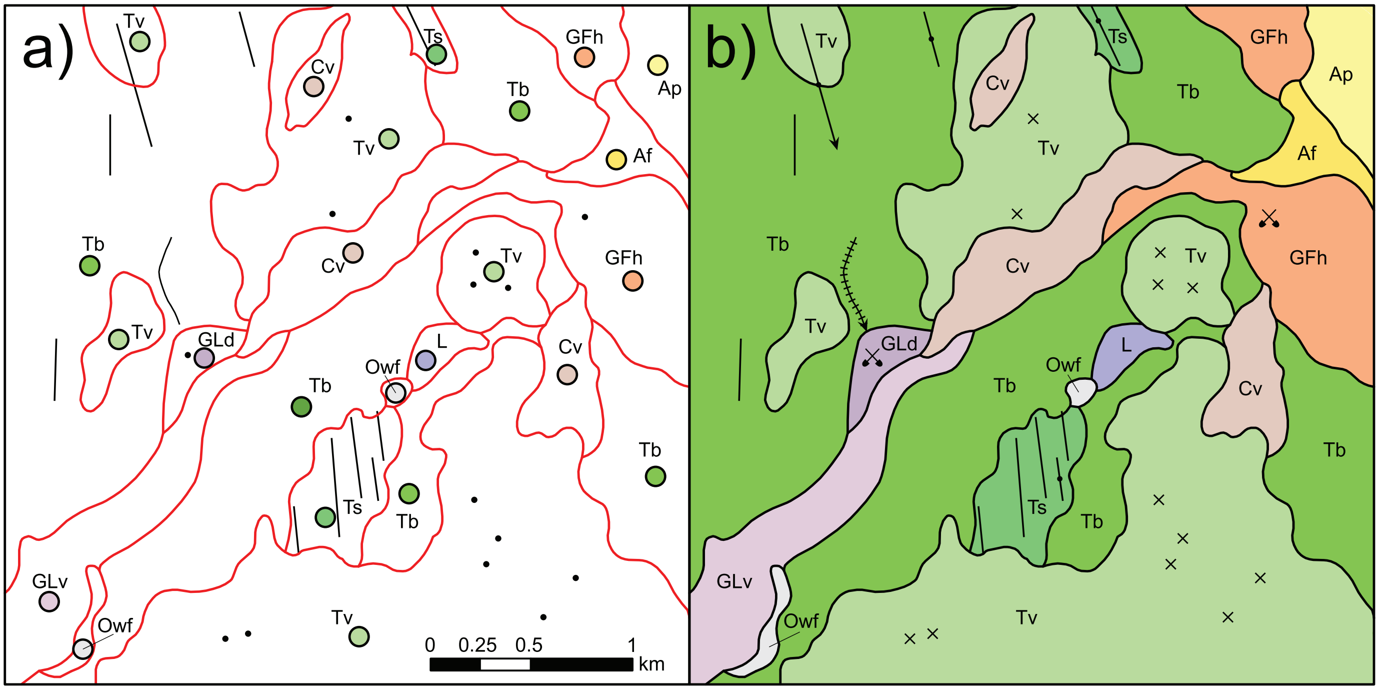


Fig. 4. Geospatial frame data. **a)** Frame data components. Coloured circles are map unit centroids, black points are point symbols (e.g., bedrock outcrops, active pits), black lines are line symbols (e.g., crag-and-tails, flutes, drumlins, meltwater channels), and red lines are geologic contacts. **b)** Client-facing data of the same map extent symbolized using Deblonde et al. (2024).

Table 4. Geospatial frame data specifications on geometric and topological consistency (modified after Cui, 2021).

Specification	Description
Allowable geometry	Single, simple, and valid LineString and LinearRing compliant to OGC Simple Features Specification (Open Geospatial Consortium, 1999) are allowed for planar geological features and topographic boundaries. A single point is allowed for centroids and point symbols.
Unit of precision	The unit of precision is at decimal m (nearest 10 cm) and can be rounded to the nearest m for coordinates in UTM or BC Albers, and rounded to the 6th floating point for coordinates in geographic.
Duplicate and overlap	Duplication and partial overlapping of LineStrings is not allowed; LineStrings within 1 m of each other are checked to be valid. Only applies to LineStrings in the same file/data type (i.e., contacts or line symbols).
Noding	All LineStrings must be noded at intersections. Only applies to LineStrings in the same file/data type (i.e., contacts or line symbols).
Connectivity	There must be no dangling nodes for contact LineStrings.
Continuity	LineStrings are not fragmented by pseudo nodes (non-node intersections), abnormal change of directions, and abnormal change of feature types.
Minimum length of LineString	All LineStrings should be digitized. Lines <10 m will be checked for validity; lines <1 m are simplified.
Distance between vertices	Distance for a line segment between two sequential coordinates should be greater than 1 m and less than 500 m (to facilitate accurate coordinate transformations).
Coordinate density	A minimum number of coordinates should be used to accurately delineate the geological boundaries at a given map scale. LineStrings with too many redundant coordinates should be simplified (1 m), and LineStrings with too few coordinates are densified (greater than one node per 500 m).
Geometric irregularity	Sharp spikes along a linear LineString are checked and removed; sharp wedges in a LinearRing are checked to be valid; sharp angles between two LineStrings are checked, validated as real, or fixed.

omitted these details to simplify the unit labels and ensure they are consistent across the compilation. The soils maps we used in our compilation are categorized as ‘soils and surficial geology’ or ‘soils and landforms’ (Veness et al., 2024). After omitting the soil associations from these maps, the remaining unit labels are similar to terrain mapping, commonly coded with material type and surface expression in a comparable classification system, and can be converted using the same methods.

Point and line symbols were converted directly to symbol codes in Deblonde et al. (2024). If not specified in the original map, all symbols became their ‘defined’ version as opposed to ‘poorly defined’ or ‘buried’. Point and line symbols not available in Deblonde et al. (2024) were recorded as a ‘feature to be defined’ and will be omitted from the public-facing data (e.g., slump direction line symbol; McCuaig, 2009). Locational confidence of geologic contacts is inconsistently defined, so all contacts were converted to a ‘defined’ version even if originally mapped as ‘approximate’ or ‘inferred’.

All project data contain a ‘src_featur’ column populated with the original unit label or symbol description. Closed map legends unmodified from original source maps are stored in separate tables and can be joined with spatial data to obtain original unit descriptions. Open legend unit labels from source maps commonly contain too many components to include full descriptions. Map users must reference the original classification system to understand these units in detail.

6.1. Unit label conversion from Howes and Kenk (1997) to those in Deblonde et al. (2024)

To demonstrate how unit label conversion is performed, we convert the unit codes in Howes and Kenk (1997), a mapping scheme that has been used extensively in the province, to those in Deblonde et al. (2024). Unit labels coded in Deblonde et al. (2024) can have one or two map units, each including a material type and surface expression. In the case of two map units, they are separated by either a complex (.) or stratigraphic (/) designator. Complex designators are used if units extend across an area too small, or their relationship is too complex to be mapped individually. The dot (“.”) separates the first more extensive unit from the less extensive secondary unit. In Howes and Kenk (1997), this designator is a forward slash (“/”) but holds a similar meaning. In Deblonde et al. (2024), stratigraphic designators with a forward slash (“/”) separate superposed units; the unit to the left of the designator is stratigraphically above the unit to the right. Howes and Kenk (1997) show this relationship through a physical separation where the upper unit(s) is placed on top of a separator (horizontal line) and the lower unit below is placed below (i.e., $\frac{\mathrm{Cb}}{\mathrm{Mp}}$).

Unit labels from terrain maps (Fig. 3b) may be converted directly after removing components not captured in Deblonde et al. (2024) (e.g., $Mb-eF → Tb). In instances where an original label contains more than two material types, we only retain the two most extensive ones (e.g., Mb/Cv/GFt → Tb.Cv). In classification systems such as Howes and Kenk (1997), a material type can have up to three corresponding surface expressions. In these cases, the most extensive expressions are kept (e.g., Cba/Tb → Cb.Ca). We only maintain stratigraphic relationships if the underlying material was in the first two most extensive material types (e.g., $\frac{\mathrm{Cb}}{\mathrm{Mp}}$ → Cb/Tp). If a unit contains two material types exposed at surface, the stratigraphic relationship is not kept (e.g., $\frac{\mathrm{Cb/Af}}{\mathrm{Mp}}$ → Cb.Af).

Areas with the surface expressions blanket (>1 m) and veneer (<1 m) commonly include discontinuous bedrock outcrop. If an original unit label has a blanket or veneer, bedrock, and an additional unit, the bedrock component can be omitted to capture a less extensive unit (e.g., Mv/R/GFb → Tv.GFb). If the most extensive unit is bedrock, then both the bedrock and blanket/veneer unit are kept (e.g., R/Mv/GFb → R.Tv). Similarly, if a single material type is linked with both blanket and veneer expressions, we can simplify the unit to be described using only the more extensive one to capture a less extensive unit (e.g., Mbv.Cv → Tb.Cv). Both expressions are kept if a unit contains a single material type and only blanket and veneer expressions (i.e., Mbv → Tb.Tv).

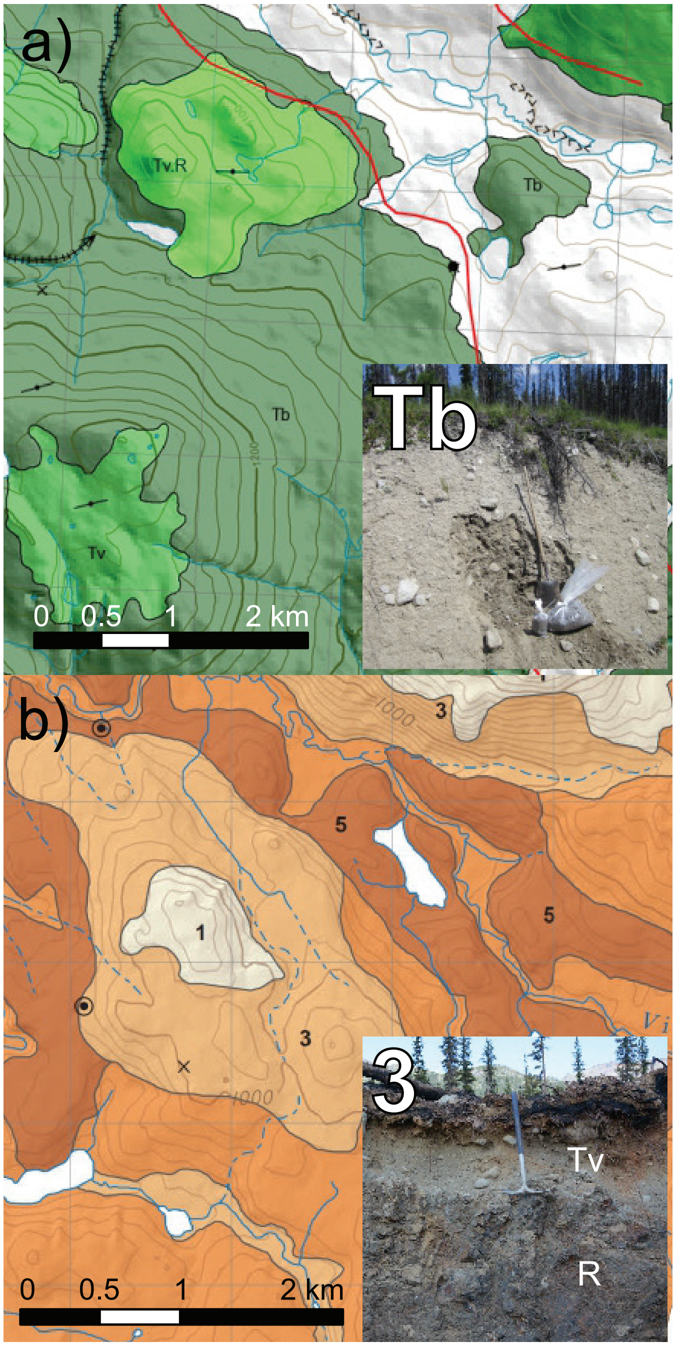
7. Compilation uses

The surficial geology compilation will be a comprehensive map of sediment type across the Interior Plateau of British Columbia. The compilation can be used to target specific material types (e.g., alluvial or glaciofluvial units) and features (e.g., eskers) that can inform aggregate exploration (e.g., Huntley and Hickin, 2010; Huntley et al., 2013). Sediments that are known to produce unstable terrain can be targeted for assessing ground conditions (e.g., peat, clay, groundwater) related to earthquakes (Monahan and Levson, 2000; Monahan et al., 2000a; Monahan et al., 2000b) or mass wasting (e.g., glaciolacustrine sediments; British Columbia Ministry of Forests and British Columbia Ministry of Environment, 1999; Brideau et al., 2026a, b). Parent materials derived from surficial geology maps can help inform silviculture, agriculture, and viticulture sectors. For example, surficial geology maps can help viticulture sectors by targeting specific Quaternary deposits used to grow grapes like glacial outwash or shoreline terraces (Hamblin, 2018).

The surficial geology compilation will be important to users interested in understanding sediment thickness or depth to bedrock. Surficial geology maps provide locations of extensive bedrock units and isolated outcrops. These locations can be used as surface inputs for depth to bedrock models (Arnold, 2021). Understanding the thickness and distribution of sediments is important for interpreting geochemical and geophysical results and for hazard risk assessment, agriculture, hydrology, and infrastructure engineering (Shangguan et al., 2016). Along with bedrock locations, units like veneers and blankets can be reclassified to build derivative maps for estimating drift thickness (Sacco et al., 2022; Wolter et al., 2022). These maps may be used to help determine suitable locations of bedrock outcrop for traditional mineral prospecting or to select sampling locations for drift prospecting.

This compilation will contain ice-flow indicators (e.g., striations, flutes, and crag-and-tails) and other glacial landforms (e.g., cirques, moraines, kettles) that contribute to the understanding of ice movement or behaviour during the Late Pleistocene (Arnold and Ferbey, 2020). Knowledge of ice flow and material type is important for designing or interpreting geochemical or mineralogical sediment samples (e.g., till or soil samples) for mineral exploration (Kerr and Levson, 1997; Plouffe and Ferbey, 2016).

Data in the Interior Plateau surficial geology compilation can be added to other compilations or used to build derivative maps. Features recorded in surficial geology maps can be added to other databases, for example landslides from this compilation can be an input for the Preliminary Canadian Landslide Database (Brideau et al., 2026a, b). Compiled digital data may be used to build derivative maps like subglacial till potential or aggregate resource maps (Fig. 5a; Ferbey, 2014b; Fig. 5c; Buchanan and Hora, 1992). The existence of these data in an analytical-ready format makes them easily applied to machine-learning (Latifovic et al., 2018; Odom and Doctor, 2023).



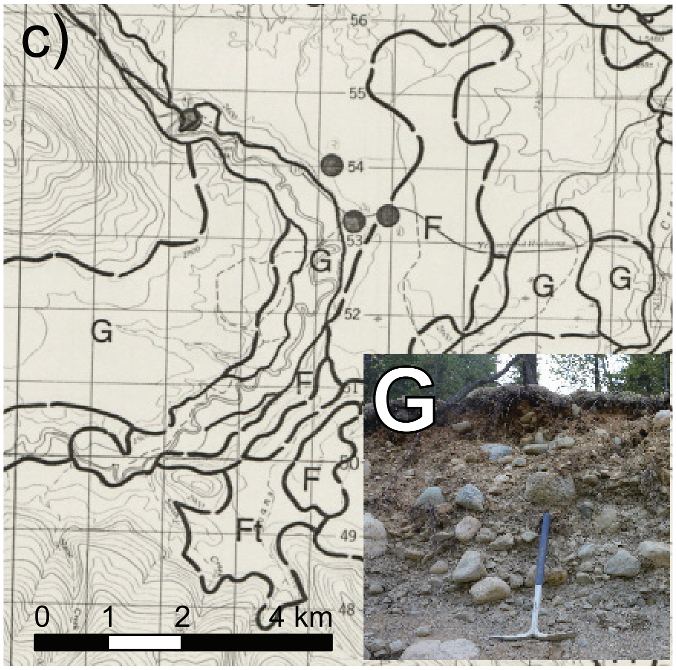


Fig. 5. Derivative maps with inset photos displaying related exposures. **a)** Basal till potential map from Ferbey (2014b); inset shows a till blanket (Tb) with till samples (Tb=high basal till potential, dark green). **b)** Till thickness map from Wolter et al. (2022); inset shows a till veneer above bedrock (Tv/R=drift thickness class 3, light orange). **c)** Aggregate resources map from Buchanan and Hora (1992); inset shows a glaciofluvial unit (G). Map plots all glaciofluvial (G) and fluvial (F, Ft) units with potential for aggregate. Black points represent gravel pit locations.

8. Conclusion

Analogous to BC Digital Geology (Cui et al., 2017), this compilation will improve public access to decades of surficial materials mapping in the Interior Plateau for multidisciplinary use. Consistent conversion to a single legend will allow users to compare multiple areas that were originally in incompatible classification systems. By presenting data using simple plain language descriptions, inexperienced users can immediately understand geological unit labels and feature symbology.

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References cited

Arnold, H., 2021. Depth to bedrock dataset for the Interior Plateau. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey GeoFile 2021-13, 6 p.

Arnold, H., and Ferbey, T., 2019. British Columbia surficial geology map index. British Columbia Ministry of Energy and Mines, British Columbia Geological Survey Open File 2019-03, 2 p.

Arnold, H., and Ferbey, T., 2020. Ice-flow indicator database, British Columbia and Yukon. British Columbia Ministry of Energy, Mines and Petroleum Resources, British Columbia Geological Survey Open File 2020-03, 1 p.

Blais-Stevens, A., and Clague, J.J., 2007. Surficial geology, Hixon, British Columbia. Geological Survey of Canada Open File 5272, 1:50,000 scale.

Bobrowsky, P.T., Giles, T., and Jackaman, W., 1992. Surficial geology map index of British Columbia. British Columbia Ministry of Energy, Mines and Petroleum Resources, British Columbia Geological Survey Open File 1992-13, 13 p.

Brideau, M-A., Brayshaw, D., Hancock, C.A., Lipovsky P., Cronmiller, D., Lewkowicz, A., Geertsema, M., McGregor, C., Tannant, D., Friele, P., Clarke, J., Steelquist, A., Wong-Teichroeb, H., Ring, C., and Wells, G., 2026a. Preliminary Canadian Landslide Database (13.0). <https://doi.org/10.5281/zenodo.10271431>

Brideau, M-A., Brayshaw, D., and Hancock C-A., 2026b. Highlights for British Columbia from the preliminary Canadian Landslide Database. In: Geological Fieldwork 2025, British Columbia Ministry of Mining and Critical Minerals, British Columbia Geological Survey Paper 2026-01, pp. 239-245.

British Columbia Geological Survey, 2019. British Columbia Digital Geology. British Columbia Ministry of Mining and Critical Minerals, British Columbia Geological Survey. Data version 2019-12-19. <https://www2.gov.bc.ca/gov/content/industry/mineralexploration-mining/british-columbia-geological-survey/geology/bcdigitalgeology>

British Columbia Ministry of Forests and British Columbia Ministry of Environment, 1999. Mapping and assessing terrain stability guidebook, 2nd ed. Forest Practices Code of British Columbia, Victoria.

Buchanan, R., and Hora, Z., 1992. Aggregate Resources, Dome Creek. British Columbia Ministry of Transportation and Highways and British Columbia Ministry of Energy, Mines and Petroleum Resources, 1:50,000 scale.

Canada Department of Agriculture, 1974. The system of soil classification for Canada. Publication 1455, 255 p.

Canada Department of Agriculture, 1976. Glossary of terms in soil science. Agriculture Canada Research Branch Publication 1459, 44 p.

Canada Soil Survey Committee, 1978. The Canadian system of soil classification. Agriculture Canada Research Branch Publication 1646, 164 p.

Clague, J.J., and Ward, B.C., 2011. Pleistocene glaciation of British Columbia. In: Ehlers, J., Gibbard, P.L., and Hughes, P.D., (Eds.), Developments in Quaternary Sciences Volume 15, pp. 563-573. <https://doi.org/10.1016/B978-0-444-53447-7.00044-1>

Colpron, M., 2020. Yukon Terranes-A digital atlas of terranes for the northern Cordillera. Yukon Geological Survey. <https://data.geology.gov.yk.ca/Compilation/2#InfoTab>

Cui, Y., 2021. A geospatial frame data model to simplify digital map compilation and integration. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey Paper 2021-03, 20 p.

Cui, Y., Zhao, S., Fortin, G., Meredith-Jones, S., and Jones, L.D., 2018. Development of MapPlace 2 geospatial web service to disseminate geoscience in British Columbia. In: Geological Fieldwork 2017, British Columbia Ministry of Energy, Mines and Petroleum Resources, British Columbia Geological Survey Paper 2018-01, pp. 183-195.

Deblonde, C., Campbell, J.E., Chow, W., Cocking, R.B., Huntley, D.H., Parent, M., Rice, J.M., Robertson, L., Smith, I.R., Weatherston, A., and Zawadzka, K., 2024. Surficial Data Model: The science language of the integrated Geological Survey of Canada data model for surficial geology maps. Natural Resources Canada, Geological Survey of Canada Open File 8236, ver. 2.5.1. <https://doi.org/10.4095/332530>

Dixon-Warren, A.B., Bobrowsky, P.T., Leboe, E.R., and Ledwon, A., 1997. Terrain geology map of Adams Plateau area (NTS 82M/4). British Columbia Ministry of Employment and Investment, British Columbia Geological Survey Open File 1997-07, 1:50,000 scale.

E.L.U.C. Secretariat, 1978. Terrain Classification System, British Columbia Ministry of the Environment, Resource Analysis Branch, 56 p.

Farstad, L., 1979. Soils & Surficial Geology, Hixon. Agriculture Canada, 1:50,000 scale.

Fenton, M.M., Waters, E.J., Pawley, S.M., Atkinson, N., Utting, D.J., and Mckay, K., 2013. Surficial Geology of Alberta. Alberta Energy Regulator, AER/AGS Map 601, 1:1,000,000 scale.

Ferbey, T., 2014a. Surficial geology of the Nadina River map area (NTS 093E/15), British Columbia. British Columbia Ministry of Energy and Mines, British Columbia Geological Survey Geoscience Map 2014-01, Geoscience BC Map 2014-09-01, 1:50,000 scale.

Ferbey, T., 2014b. Basal till potential of the Colleymount map area (93L/01), British Columbia. British Columbia Ministry of Energy and Mines, British Columbia Geological Survey Open File 2014-04, 1:50,000 scale.

Ferbey, T., and Elia, E.A., 2025. Surficial geology of the Nanitsch Lake area (NTS 94D/1), British Columbia. British Columbia Ministry of Mining and Critical Minerals, British Columbia Geological Survey Geoscience Map 2025-02, 1:50,000 scale.

Ferbey, T., Levson, V.M., and Plouffe, A., 2016. Surficial geology, Moffat Creek area, British Columbia (Parts of NTS 93A/3, 4, 5, 6). British Columbia Ministry of Energy and Mines, British Columbia Geological Survey Geoscience Map 2016-01, Geological Survey of Canada Geoscience Map 252, 1:50,000 scale.

Forest Practices Code, 1999. Mapping and assessing terrain stability guidebook. British Columbia Environment, Forest Service British Columbia, 36 p.

Fulton, R.J., 1995. Surficial materials of Canada. Geological Survey of Canada Map 1880A, 1:5,000,000 scale.

Hamblin, A.P., 2018. Message in a bottle: The wine terroir concept in Canada, from an earth sciences perspective. Natural Resources Canada, Geological Survey of Canada Open File 8365, 62 p. <https://doi.org/10.4095/308492>

Hashmi, S., Plouffe, A., and Ward, B.C., 2015. Surficial geology, Bootjack Mountain area, British Columbia, Parts of NTS 93-A/5, NTS 93-A/6, NTS 93-A/11, and NTS 93-A/12. Geological Survey of Canada Canadian Geoscience Map 209 (preliminary); British Columbia Geological Survey Geoscience Map 2015-02, 1:50,000 scale.

Holland, S.S., 1976. Landforms of British Columbia: A physiographic outline. British Columbia Ministry of Energy, Mines and Petroleum Resources, British Columbia Geological Survey Bulletin 48, 138 p.

Howes, D.E., and Kenk, E., 1997. Terrain Classification System for British Columbia: A system for the classification of surficial materials, landforms and geological processes of British Columbia. British Columbia Ministry of Environment and British Columbia Ministry of Crown Lands, Ministry of Environment Manual 10 (version 2), 102 p.

Huntley, D.H., Hickin, A.S., Chow, W., and Mirmohammadi, M., 2013. Surficial geology, Trail Lake, British Columbia (prelim. ed.). Natural Resources Canada, Canadian Geoscience Map 123, 1:50,000 scale. <https://doi.org/10.4095/292400>

Huntley, D.H., and Hickin, A.S., 2010. Surficial Deposits, Landforms, Glacial History and Potential for Granular Aggregate and Frac Sand: Maxhamish Lake Map Area NTS 94O, British Columbia. Natural Resources Canada, Geological Survey of Canada Open File 6430, 17 p.

Jungen, J.R., 1980. Soil resources of the Nelson map area (82 F). British Columbia Ministry of Environment, British Columbia Soil Survey Report No. 28, 217 p.

Kerr, D.E., and Levson, V.M., 1997. Drift prospecting activities in British Columbia: An overview with emphasis on the Interior Plateau. In: Diakow, L.J., Matcalfe, P., and Newell, J., (Eds.), Interior Plateau Geoscience Project: Summary of geological, geochemical and geophysical studies. British Columbia Ministry of Employment and Investment, British Columbia Geological Survey Paper 1997-2, pp. 159-172.

Knowledge Management, 2011. Terrestrial ecosystem information scanned map boundary. <https://catalogue.data.gov.bc.ca/dataset/terrestrial-ecosysteminformation-scanned-map-boundary> (last accessed August 2024).

Latifovic, R., Pouliot, D., and Campbell, J., 2018. Assessment of Convolution Neural Networks for Surficial Geology Mapping in the South Rae Geological Region, Northwest Territories, Canada. Remote Sensing, 19 p.

Lewis, T., 1987. TFL 24-MORESBY British Columbia Geographic System (BCGS) 81.3, Ecosystem-Terrain Classification. Western Forest Products Limited map, 1:10,000 scale.

MacIntyre, D.G., and Struik, L.C., 2000. Nechako NATMAP Project, Central British Columbia-1999 Overview. In: Geological Fieldwork 1999, British Columbia Ministry of Energy and Mines, British Columbia Geological Survey Paper 2000-01, pp. 7-14.

McCuaig, S.J., 2009. Surficial Geology, Deka Lake, British Columbia. Geological Survey of Canada Open File 6173, 1:50,000 scale.

McGregor, C., and Sacco, D.A., 2021. Surficial geology of the Saxton Lake map area (NTS 093J/03), British Columbia. Geoscience BC map 2021-03-06a, 1:50,000 scale.

Ministry of Environment, 1973. Surficial Geology (Provisional), Hixon, 1:50,000 scale.

Monahan, P.A., and Levson, V.M., 2000. Quaternary Geological Map of Greater Victoria. British Columbia Ministry of Energy and Mines, British Columbia Geological Survey Geoscience Map 2000-2, 1:25,000 (approximate) scale.

Monahan, P.A., Levson, V.M., McQuarrie, E.J., Bean, S.M., Henderson, P., and Sy, A., 2000a. Relative Earthquake Hazard Map of Greater Victoria, Showing Areas Susceptible to Amplification of Ground Motion, Liquefaction and Earthquake-Induced Slope Instability. British Columbia Ministry of Energy and Mines, British Columbia Geological Survey Geoscience Map 2000-1, 1:25,000 (approximate) scale.

Monahan, P.A., Levson, V.M., Henderson, P., and Sy, A., 2000b. Relative liquefaction and amplification of ground motion hazard maps of greater Victoria (TRIM 92B.043, 044, 0 53, 054). British Columbia Ministry of Energy and Mines, British Columbia Geological Survey Geoscience Map 2000-3. 1:25,000 (approximate) scale.

Morfitt, G.L., 1999. Forest Renewal BC: Planning and Accountability in the Corporation, The Silviculture Programs. Office of the Auditor General of British Columbia Report 1999/2000: 6, 123 p.

Odom, W., and Doctor, D., 2023. Rapid estimation of minimum depth-to-bedrock from lidar leveraging deep-learning-derived surficial material maps. Applied Computing and Geosciences. 11 p.

Open Geospatial Consortium, 1999. OpenGIS® Simple Features Specification for SQL, Revision 1.1; Open Geospatial Consortium, Inc. OpenGIS® Project Document 99-049, Release May 5, 1999, 78 p.

Plouffe, A., and Ferbey, T., 2016. Till geochemistry, mineralogy, and textural data near four Cu porphyry deposits in British Columbia. Geological Survey of Canada Open File 8038, British Columbia Ministry of Energy and Mines, British Columbia Geological Survey GeoFile 2016-10, 44 p.

Plouffe, A., 2000. Surficial geology, Manson River, British Columbia. Natural Resources Canada, Geological Survey of Canada “A” Series Map 1987A, 1:250,000 scale. <https://doi.org/10.4095/211398>

Sauvé, M., Ward, B., and Ferbey, T., 2025. Surficial geology of the Kinaskan Lake area, British Columbia (parts of NTS 104G/08, 09, 16 and 104H/12, 13). British Columbia Ministry of Mining and Critical Minerals, British Columbia Geological Survey Geoscience Map 2025-01, 1:50,000 scale.

Sacco, D.A., Janzen, B., and Jackaman, W., 2022. Mineral exploration in the Central Interior Copper-Gold Research projects area, central British Columbia (parts of NTS 093A, B, G, J, K, O): New tools for a proven approach to exploration under cover. In: Geoscience BC Summary of Activities 2021: Minerals, Geoscience BC Report 2022-01, pp. 1-10.

Shangguan, W., Hengl, T., Mendes de Jesus, J., Yuan, H., and Dai, Y., 2017. Mapping the global depth to bedrock for land surface modeling. Journal of Advances in Modeling Earth Systems, 9, 65-88.

Soil Classification Working Group, 1998. The Canadian system of soil classification. Agriculture and Agri-Food Cananda Publication 1646 (Revised), 187 p.

Struik, L.C., MacIntyre, D.G., and Williams, S.P., 2007. Nechako NATMAP Project: A digital suite of geoscience information for central British Columbia. Natural Resources Canada, Geological Survey of Canada Open File 5623. <https://doi.org/10.4095/224578>

Veness, H., Elia, E.A., and Ferbey, T., 2024. A digital update of Open File 1992-13: Surficial geology map index of British Columbia. British Columbia Ministry of Mining and Critical Minerals, British Columbia Geological Survey Open File 2024-09, 2 p.

Wolter, A., Sacco, D.A., and McGregor, C., 2022. Drift thickness of the Swift River and Quesnel River map areas (Parts of NTS 093A/13 and 093B/16), British Columbia. Geoscience BC Map 2021-08-01c, 1:50,000 scale.

Yukon Geological Survey, 2023. Surficial Geology dataset. Yukon Geological Survey. <https://data.geology.gov.yk.ca/Compilation/33> (last accessed August 2025).