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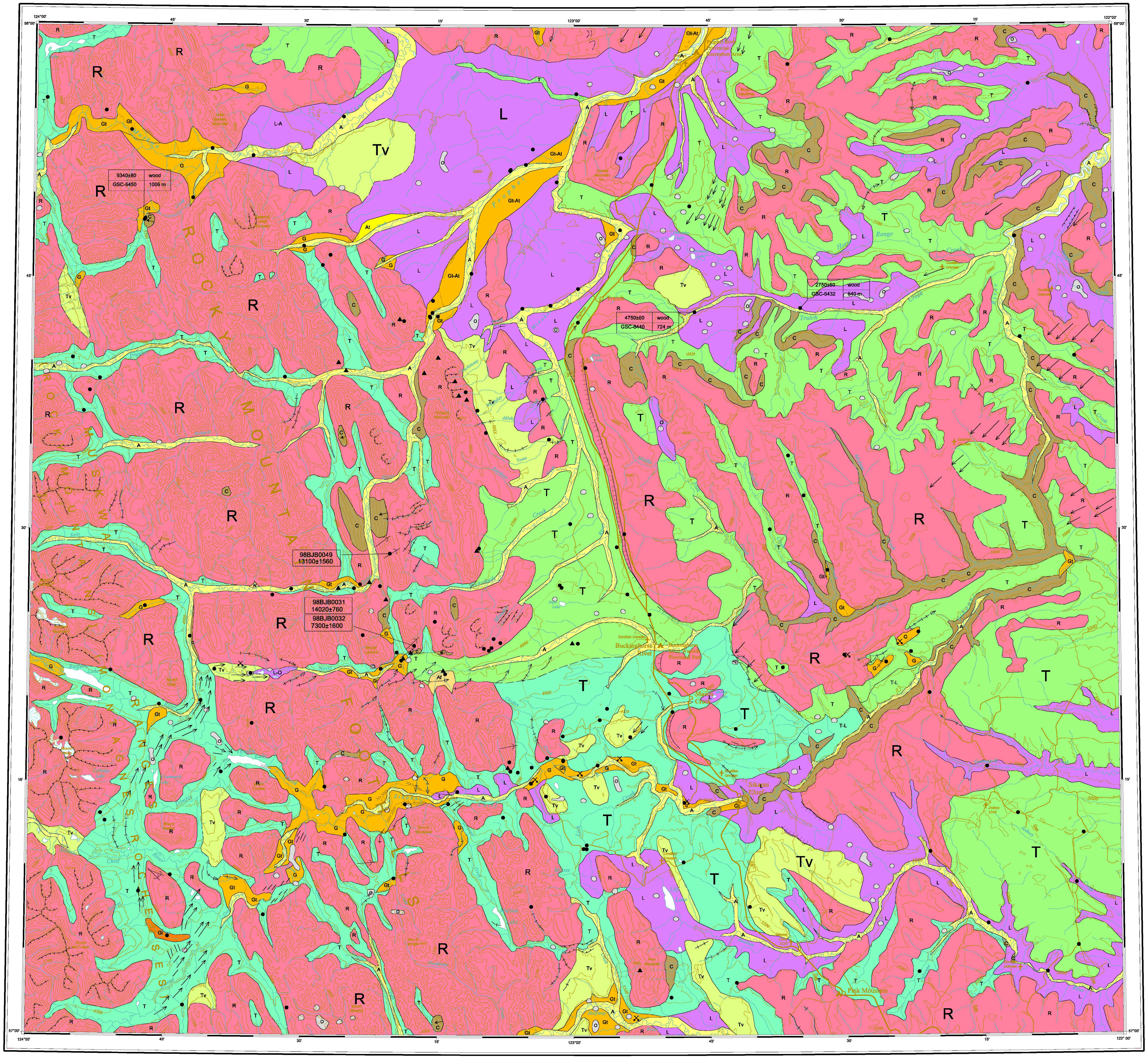


LEGEND

QUATERNARY

SURFICIAL DEPOSITS

POST LAST GLACIATION

GLACIAL ENVIRONMENT

ICE AND SNOW

NONGLACIAL ENVIRONMENTS

O — *ORGANIC DEPOSITS: organic matter; 1 to 2 m thick; formed by the accumulation of vegetation in poorly drained depressions (swamps and bogs)*

C — *COLLUVIAL DEPOSITS: active and inactive landslides, undivided; mass wasting debris 1-100 m thick*

A, At — *FLUVIAL DEPOSITS: alluvium; sorted gravel and sand >1 m thick; forming active flood plains* **A** *, and terraces* **At**

Af — *ALLUVIAL FAN DEPOSITS: poorly sorted gravel and sand >1 m thick*

POSTGLACIAL OR LATE WISCONSINAN

PROGLACIAL AND GLACIAL ENVIRONMENTS

L — *LACUSTRINE DEPOSITS: fine sand, silt, and clay, deposited in glacier-dammed lakes; > 1 m thick; often overlain by organic deposits in lowlands; level topography*

GLACIOFLUVIAL DEPOSITS: gravel, sand, minor sandy diamicton, usually 1 to 40 m thick; deposited by meltwater behind, at, or in front of glacier margins

G, Gt — *Proglacial outwash: gravel and sand deposited in front of the ice margin forming distal outwash terraces* **Gt**, *or undifferentiated* **G**

Gi — *Ice-contact glaciofluvial sediments: coarse sand and gravel interbedded with discontinuous lenses of diamicton*

TILL: nonsorted debris deposited directly by glacial ice; matrix is sandy to clayey and contains striated clasts of various lithologies; mountain till is characterized by local rock types and/or with sparse erratics transported westward from the Rocky Mountains; the plains and plateaus in the east are covered by continental till containing many Canadian Shield rocks

T — Laurentide till blanket; > 1 m thick; forming undulating topography that may be fluted and drumlinized in places; contains erratics of eastern provenance

T — Cordilleran/Montane till blanket; > 1 m thick; forming undulating topography that may be fluted and drumlinized in places; contains erratics of western provenance

Tv — *undifferentiated till veneer, < 1 m thick and discontinuous; underlying bedrock topography is discernible*

PRE-QUATERNARY

BEDROCK

R — *Sedimentary bedrock. In the west, the Rocky Mountains and foothills are characterized by Paleozoic to Mesozoic rocks forming longitudinal fault- and fold-controlled mountain ranges and valleys trending northward . The east is characterized by flat-lying Cretaceaous shales and cliff-forming sandstone units.*

Note: In areas where the surficial cover forms a complex pattern, the area is coloured according to the dominant unit and labelled in decending order of cover.

MAP SYMBOLS

Geological boundary (defined, gradational)

Cirque; cirques and arêtes; peaks and sharp ridges formed by glacial erosion

Striae

Ice moulded form in bedrock and/or till (direction of flow inferred, not inferred)

Esker (direction of flow inferred)

Abandoned meltwater channel or channel occupied by an underfit stream (large, small; direction of flow inferred, not inferred)

Escarpment (major bedrock escarpments that directed glacial meltwater along the outer Rocky Mountain Foothills)

Landslide (arrow indicates the direction of movement)

Strandline (beaches formed by former glacial lakes)

Canadian Shield erratic ▲

Sample site ●

Gravel pit

Cosmogenic chlorine-36 surface exposure date (assuming neglegible effects of erosion and snow shielding) — 98BJB0049 13100±1560

Radiocarbon date (normalized)

Date	Material
Lab. no.	Elevation

NOTES ON GLACIAL HISTORY:

The Trutch map area was glaciated during the last (Late Wisconsinan) glaciation (ca. 25 000-10 000 years ago) by the continental Laurentide Ice Sheet flowing from the northeast and by Cordilleran glaciers flowing from the west. The Cordilleran glaciers included valley glaciers originating from local cirques and the Cordilleran Ice Sheet originating west of the continental divide.

The Cordilleran Ice Sheet dispersed distinctive slate and schist erratics (Hadrynian exposures east of the Rocky Mountain Trench) to the eastern edge of the Rocky Mountain Foothills. The ice was sufficiently thick to flow unhindered by the north-south trending mountain divides. At the same time, the Laurentide Ice Sheet advanced to the mountain front from the northeast, dispersing crystalline erratics from the Canadian Shield to elevations of 1566 m above sea level. Some of these erratics originate from the Great Bear batholith, at least 600 km to the northeast. It is very likely that during the height of the last glaciation, about 18 ka BP, the Cordilleran and Laurentide ice sheets were in contact. Nonetheless, no moraine systems marking the contact were preserved. This is probably because, as each of the ice sheets withdrew, out-of-phase fluctuations of the ice margins effectively smeared the contact zone.

Cosmogenic chlorine-36 exposure dating of striated surfaces shows that Cordilleran ice retreated from summits along the mountain front as late as 14 020±760 to 13 100±1560 calendar years ago. Shortly after the Cordilleran ice retreated, the last Laurentide readvance penetrated some valleys along the mountain front. For example, Laurentide till mantles the upper Buckinghorse River valley as far as Nevis Creek, 10 km west of the mountain front.

When the Cordilleran Ice Sheet thinned during deglaciation, its flow became directed by the underlying topography. The dominant eastward flow of the glacial maximum was replaced by a northward flow in the main valleys bordering the main ranges and foothills. With further thinning of the ice, the northward flow was diverted again to the east as the Cordilleran ice assumed the character of a valley glacier system.

The Laurentide Ice Sheet blocked eastward drainage during its eastward recession from the area. This created glacial lakes in many mountain valleys. Ice-dammed lakes previously confined to the valleys expanded onto the plains as the Laurentide ice front retreated eastward. Most of these lakes were short-lived because of changing base levels as new spillways formed. The largest glacial lake occupied the lowland between the Muskwa and Prophet rivers and the lower Sikanni Chief River. Complete deglaciation was marked by glacial lake drainage and rapid fluvial incision.

Quaternary sediments and weakly lithified Cretaceous rocks were deeply incised by rivers causing extensive mass wasting. Active and relic landslides suggest that mass wasting has been occurring throughout the postglacial time. Some large failures appear to have been catastrophic (e.g. south of Mount Stearns and along Crehan Creek), whereas, a very large landslide-earthflow occupying ~7 km² along Besa River appears to be ongoing for decades. In the eastern part of the map area, extensive mass wasting occurs along deeply incised valleys and thick colluvial deposits mantle most of the valleys. Radiocarbon dates on buried trees indicate large mass movements throughout Holocene time.

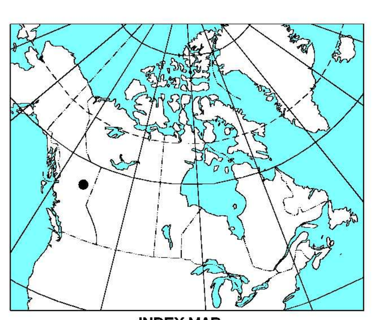
REFERENCES

Bednarski, J. M. 1999. Preliminary report of the Quaternary geology of the Trutch map area, northeastern British Columbia; in *Current Research 1999-A; Geological Survey of Canada, p. 35-43*

Chlorine-36 surface exposure dates were undertaken by Dr. F.M. Phillips, Department of Earth and Environmental Science, New Mexico Tech, Socorro, New Mexico, U.S.A.

Geochemistry and geophysical properties of surficial sediment samples are described in Geological Survey Open File (in press).

Geology by: J. Bednarski, 1998, 1999



INDEX MAP

CONTOUR INTERVAL 500 FEET
Elevations in Feet above Mean Sea Level
North American Datum 1983
Transverse Mercator Projection

OPEN FILE 3885

SURFICIAL GEOLOGY

TRUTCH

BRITISH COLUMBIA COLOMBIE-BRITANNIQUE

Scale 1:250 000 Échelle

kilometres 5 0 5 10 15 25 30 kilométres

Universal Transverse Mercator Projection
North American Datum 1983

94 K	94 J	94-I
94 F	94 G	94 H
94 C	94 B	94 A

NATIONAL TOPOGRAPHIC SYSTEM REFERENCE

OPEN FILE
DOSSIER PUBLIC
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OTTAWA
06/2000

Recommended citation:
Bednarski, J.M.
2000: Surficial geology, Trutch, British Columbia (NTS 94G); Geological Survey of Canada, Open File 3885, scale 1:250 000.

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