References

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Suggested Readings

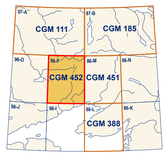
Craig, B.G., 1960. Surficial geology of north-central District of Mackenzie, Northwest Territories; Paper 60-18, Geological Survey of Canada, 8 p. https://doi.org/10.4095/101204

Abstract

Preliminary surficial geology, based on airphoto interpretation and limited legacy field data of Bloody River map area, records a dynamic Late Wisconsin glacial landscape. Streamlined till and bedrock landforms, relating to Laurentide ice originating east of the map region, indicate regional westward flow diverged northwestward and southwestward at the eastern end of two topographic highs. Ice then converged between and south of these two highs, then diverged at the western end of these highlands. During deglaciation, ice stagnated in northwestern and central highland regions, forming extensive hummocky moraine, large kames, recessional moraines, and kame moraines. In other parts of the map area, hummocky till, small moraines, and undifferentiated till ridges, were deposited over fluted till. Outwash plains, eskers, and meltwater corridors record northwestward to southwestward meltwater flow. Glaciolacustrine sediments associated with glacial Lake McConnell occur in the southeast, up to 280 m elevation. Other unrelated, isolated glaciolacustrine deltas indicate small ice-marginal lakes between 400 and 460 m elevation.

Résumé

La cartographie préliminaire de la géologie des formations superficielles de la région cartographique de Bloody River, fondée sur l'interprétation de photos aériennes et une quantité limitée d'anciennes données de terrain, rend compte d'un paysage glaciaire dynamique du Wisconsin supérieur. Les reliefs profilés du till et du substratum rocheux, liés à de la glace laurentidienne dont la source se situe à l'est de la région cartographique, indiquent que l'écoulement régional en direction de l'ouest a divergé vers le nord-ouest et le sud-ouest à l'extrémité est de deux hauteurs topographiques. La glace a ensuite convergé entre ces deux hauteurs et au sud de celles-ci, puis a divergé à l'extrémité ouest de ces hautes terres. Pendant la déglaciation, la glace a stagné dans les hautes terres du nord-ouest et du centre, formant de vastes moraines bosselées, de grands kames, des moraines de retrait et des moraines de kame. Dans d'autres parties de la région cartographique, du till bosselé, de petites moraines et des crêtes de till non différencié se sont déposés sur du till cannelé. Des plaines d'épandage, des eskers et des couloirs d'eau de fonte rendent compte d'un écoulement des eaux de fonte dans une direction variant du nord-ouest au sud-ouest. Des sédiments glaciolacustres associés au Lac glaciaire McConnell se trouvent dans le sud-est, jusqu'à 280 m d'altitude. D'autres deltas glaciolacustres isolés et non apparentés révèlent l'existence de petits lacs de front glaciaire entre 400 et 460 m d'altitude.



National Topographic System reference and index to adjoining published Geological Survey of Canada maps

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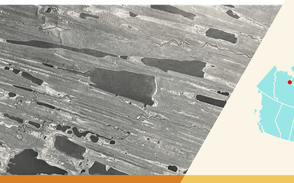
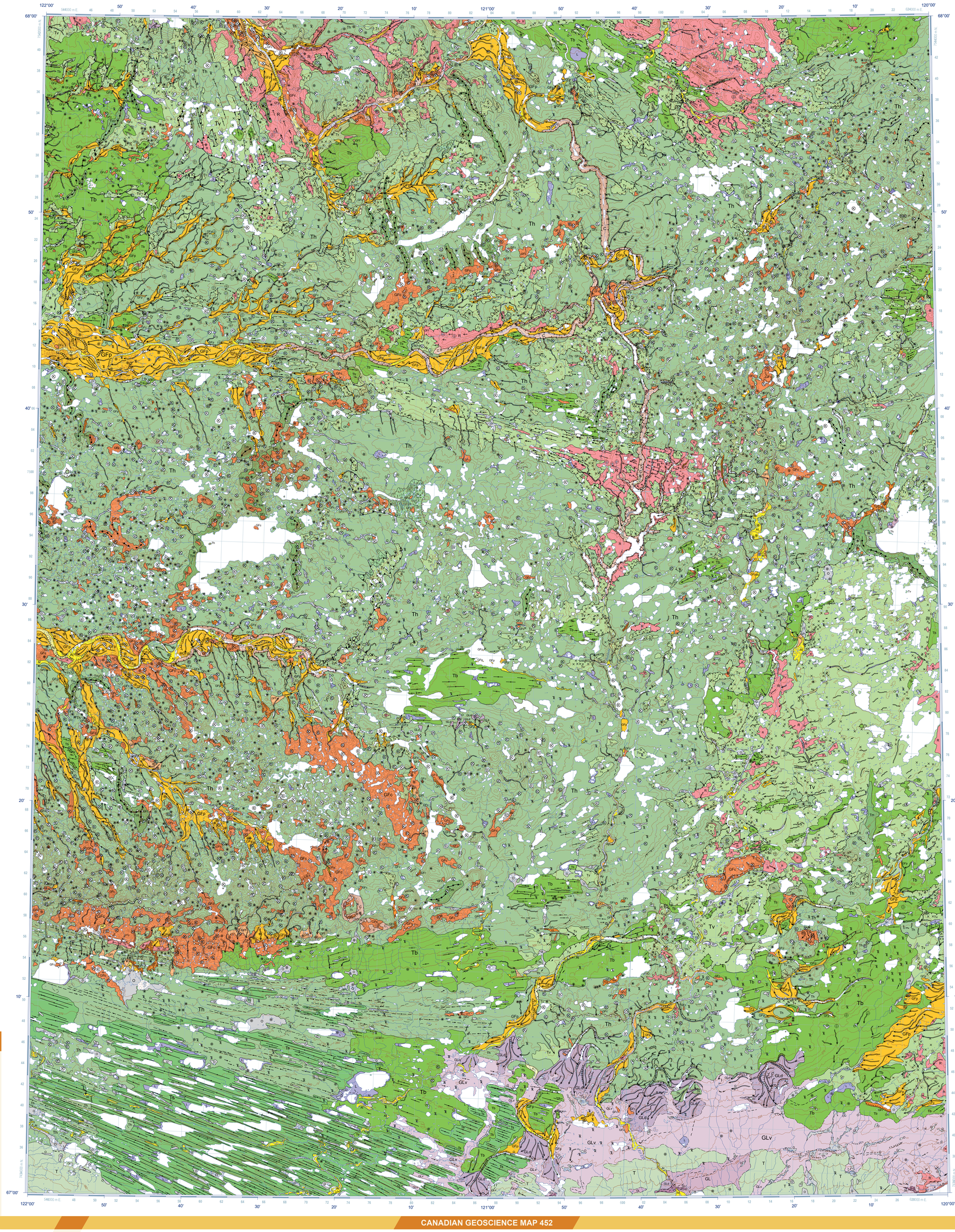
CANADIAN GEOSCIENCE MAP 452
RECONNAISSANCE SURFICIAL GEOLOGY
BLOODY RIVER
Northwest Territories–Nunavut
NTS 96-P
1:125 000





QUATERNARY

HOLOCENE

POSTGLACIAL ENVIRONMENT

O — **Organic deposits, undifferentiated:** fen, bog, and muskeg; 0.5 to 2 m thick or more; associated with poor surface drainage, depressions; widespread and commonly overlie glaciolacustrine and alluvial sediments, and till.

E — **Eolian sediments, undifferentiated:** fine to medium sand; variable thickness; may contain active and stabilized dunes, and blowouts; sediments reworked or deposited by wind action; derived primarily from glaciofluvial sediments.

C — **Colluvial deposits, undifferentiated:** diamicton; variable thickness; material resulting from downslope movements, covering steep gullies and bedrock escarpments, dominantly in river valleys; may include small bedrock outcrops.

ALLUVIAL SEDIMENTS: silt, sand, and gravel deposited by modern streams and rivers since deglaciation; inactive surfaces may be vegetated.

Ap — **Floodplain sediments:** silt, sand, and gravel; variable thickness; seasonally flooded by active streams and rivers; may include small fans; more elevated inactive surfaces may exhibit paleochannels.

Af — **Fan sediments:** silt, sand, and gravel; variable thickness; forming a fan deposited by past and present active or intermittent streams.

At — **Terraced sediments:** silt, sand, and gravel; variable thickness; deposited by streams and rivers; forming raised terraces along active and inactive floodplains; surface may be vegetated.

A — **Alluvial sediments, undifferentiated:** silt, sand, and gravel; variable thickness; deposited by modern streams and rivers; may include various alluvial environments.

LACUSTRINE SEDIMENTS: silt and sand, deposited in modern lakes and ponds.

Ld — **Deltaic sediments:** silt and sand; variable thickness; low-lying sediments infilling shoreline of modern lake at the mouth of a river.

L — **Lacustrine sediments, undifferentiated:** silt and sand; variable thickness; associated with small drained, partially drained, or infilled lakes; may be vegetated, may exhibit thermokarst activity.

LATE PLEISTOCENE (WISCONSIN GLACIATION)

PROGLACIAL AND GLACIAL ENVIRONMENT

GLACIOLACUSTRINE SEDIMENTS: sediments deposited at or beyond a retreating ice front by meltwater entering a glacial lake, including short-lived ice-dammed lakes; include some lacustrine postglacial sediments associated with ancestral Great Slave Lake; may contain ground ice.

GLr — **Beach sediments:** sandy gravel, may contain cobbles and boulders; variable thickness; derived mainly from reworked glaciofluvial sediments; forming raised beaches associated with glacial Lake McConnell in southern map area.

GLd — **Deltaic sediments:** silty clay to sand and gravel; variable thickness; associated with glacial Lake McConnell in the south, and other smaller isolated ice-dammed lakes; forming a gently sloping delta deposited as proglacial outwash or ice-contact sediments by meltwater; surfaces may exhibit paleochannels, patterned ground, and may contain ground ice.

GLv — **Glaciolacustrine veneer:** silt to gravel; less than 2 m thick but may be thicker locally; may be overlain by organics; generally overlies till in areas submerged by glacial Lake McConnell; may include thermokarst features and reworked till surfaces.

GL — **Glaciolacustrine sediments, undifferentiated:** silty clay to fine sand; variable thickness; deposited in nearshore to offshore environments; generally overlie till in areas submerged by glacial Lake McConnell; may be overlain by organic or lacustrine sediments, may include reworked till surfaces.

GLACIOFLUVIAL SEDIMENTS: sand and gravel, may include minor silt and clay; deposited by meltwater flowing from, or in contact with, glacier ice; may contain ground ice; surface may be vegetated.

GFp — **Outwash plain sediments:** sand and gravel; variable thickness; generally flat to gently undulating plain, may include minor terraces and ice-contact sediments; surfaces exhibit braided meltwater paleochannels and patterned ground.

GFt — **Terraced sediments:** sand to cobbles; variable thickness; forming raised terraces above modern rivers; confined to valleys; surfaces may exhibit paleochannels and patterned ground.

GFf — **Outwash fan sediments:** sand and gravel; variable thickness; forming proglacial outwash fans sourced from eskers and meltwater channels; surfaces exhibit meltwater paleochannels.

GFc — **Ice-contact sediments:** sand and gravel to cobbles; variable thickness; flat to irregular, hummocky surface; surface characterized by ridges, kames, kettled topography, collapse features where supporting ice was removed, and short eskers; associated with stagnant ice, and hummocky moraine in northwest and west-central regions.

GFr — **Esker sediments:** sand and gravel to cobbles; variable thickness; deposited by glacial meltwater; forming flat-topped to peaked ridges deposited in tunnels, channels, or openings in glacier; may contain kettles; may exhibit beaches where submerged by glacial Lake McConnell.

GLACIAL ENVIRONMENT

GLACIAL SEDIMENTS (TILL): unsorted glacial debris, diamicton; deposited beneath glacier ice as lodgment till, meltout till, and gravity-flow deposits; may contain ground ice.

Th — **Hummocky till:** diamicton; variable thickness but greater than 2 m; deposited directly by stagnant glacier throughout map area; forms small, low, subdued, circular to irregular hummocks and hills, locally steep-sided mounds, dissected by meltwater channels; contains short, disorganized major and minor moraine ridges in north and central regions; surface may be pitted with small ponds, thermokarst depressions, kettles, kames, and meltwater erosional depressions; may contain minor unspecified ridges and large ice-wedge polygons; locally underlain by streamlined till or till blanket.

Tm — **Moraine complex:** diamicton, sand, gravel; variable thickness; generally north-south-trending recessional moraine ridges, up to 10 km long, associated with hummocky till.

Tr — **Ridged till:** diamicton; variable thickness; areas of minor, irregular to sinous morainal and other undifferentiated ridges; orientations generally transverse to ice flow; ribbed moraine may include scoured till veneer, meltwater channels, crevasse fillings, and kames.

Ts — **Streamlined till:** diamicton; variable thickness; strongly fluted till in the southern map area defined by narrow, low-relief, parallel drumlinoids, drumlins, and megascale glacial lineations up to 5 km or more long; may grade laterally into fluted till blanket; may be overlain by organics or glaciolacustrine veneer, and include reworked till surfaces in areas submerged by glacial Lake McConnell.

Tv — **Till veneer:** diamicton; less than 2 m thick but may be thicker locally; may be fluted and modified by glaciofluvial or glaciolacustrine processes locally; surface mimics topography of underlying bedrock; may contain small bedrock outcrops, glaciofluvial and glaciolacustrine veneer, and alluvial sediments in valleys.

Tb — **Till blanket:** diamicton; greater than 2 m thick; occurs as a continuous, gently rolling to fluted surface; masks underlying bedrock topography; may include reworked cover or veneer of glaciolacustrine sediments in areas submerged by glacial lakes.

T — **Till, undifferentiated:** diamicton; variable thickness but generally greater than 2 m thick; subdued to hilly topography with rare flutings; surfaces may be washed, and include glaciolacustrine silt and sand veneer below 290 m elevation.

PRE-QUATERNARY

R — **Bedrock, undifferentiated** various lithologies; large areas of glacially fluted and meltwater-scoured bedrock; also exposed as smaller, isolated outcrops in all map units.

Geological boundary:
- *Defined*
- *Approximate*

Debris-flow, landslide track direction

Landslide escarpment, active

Landslide scar, may include retrogressive thaw flow, may be active or stabilized, direction known

Thermokarst depression

Patterned ground, ice wedge polygons

Terrace scarp

Beach crest, depositional and erosional, trim line

Kettle

Meltwater channel:
- *Minor, direction unknown*
- *Minor, direction known*
- *Lateral, ice marginal (uphill on left)*
- *Lateral, ice marginal (uphill on right)*
- *Major channel scarp, proglacial*

Meltwater erosional depression

Subglacial meltwater corridor margin

Moraine ridge:
- *Minor, ribbed, may include other unspecified ridges*
- *Major, recessional, interlobate*

Ice-contact scarp

Kame

Esker:
- *Direction unknown*
- *Direction inferred*
- *With beach ridges, direction inferred*

Drumlinoid ridge:
- *Buried*
- *Large, 1 = oldest, 2 = youngest*

Drumlin ridge:
- *Buried*
- *Large*

Crag-and-tail ridge:
- *Buried*
- *Large*

Fluted bedrock ridge

Striation:
- *Direction unknown*
- *Direction known*

Small outcrop

Station location, remote observation

Recommended citation
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CANADIAN GEOSCIENCE MAP 452

Geological Survey of Canada
Canadian Geoscience Maps

Author: D.E. Kerr

Geology by D.E. Kerr, 2020 and 2021, based on air photo interpretation of 1:70 000 scale NAPL airphotos taken in June 1953 and July 1954; striations from Craig et al.,1960; station locations from B. Craig, unpublished fieldnotes, 1959.

Geological data conforms to Surficial Data Model v. 2.4.0 (Deblonde et al., 2019).

Geomatics by L. Robertson

Cartography by D. Viner

Scientific editing by L. Ewert

Initiative of the Geological Survey of Canada, conducted under the auspices of the Supporting Adaptation in Permafrost Regions project as part of Natural Resources Canada's Climate Change Geoscience program

Map projection Universal Transverse Mercator, zone 10
North American Datum 1983

Base map at the scale of 1:50 000 from Natural Resources Canada, with modifications
Elevations in metres above mean sea level

RECONNAISSANCE SURFICIAL GEOLOGY
BLOODY RIVER
Northwest Territories–Nunavut
NTS 96-P

1:125 000

2 0 2 4 6 8 10 km

Mean magnetic declination 2022, 19°27'E, decreasing 17.4' annually
Readings vary from 19°07'E in the SE corner to 19°45'E in the NW corner of the map.

This map is not to be used for navigational purposes.

Title photograph: West-northwest-oriented drumlinoids and megascale glacial lineations. Photo from the National Air Photo Library. NAPL photo A13608-69

The Geological Survey of Canada welcomes corrections or additional information from users (gscpublications-cgcpublications@nrcan-rncan.gc.ca).

Data may include additional observations not portrayed on this map. See map info document accompanying the downloaded data for more information about this publication.

This publication is available for free download through GEOSCAN (https://geoscan.nrcan.gc.ca/).

CANADIAN GEOSCIENCE MAP 452
RECONNAISSANCE SURFICIAL GEOLOGY
BLOODY RIVER
Northwest Territories–Nunavut
NTS 96-P

Canada