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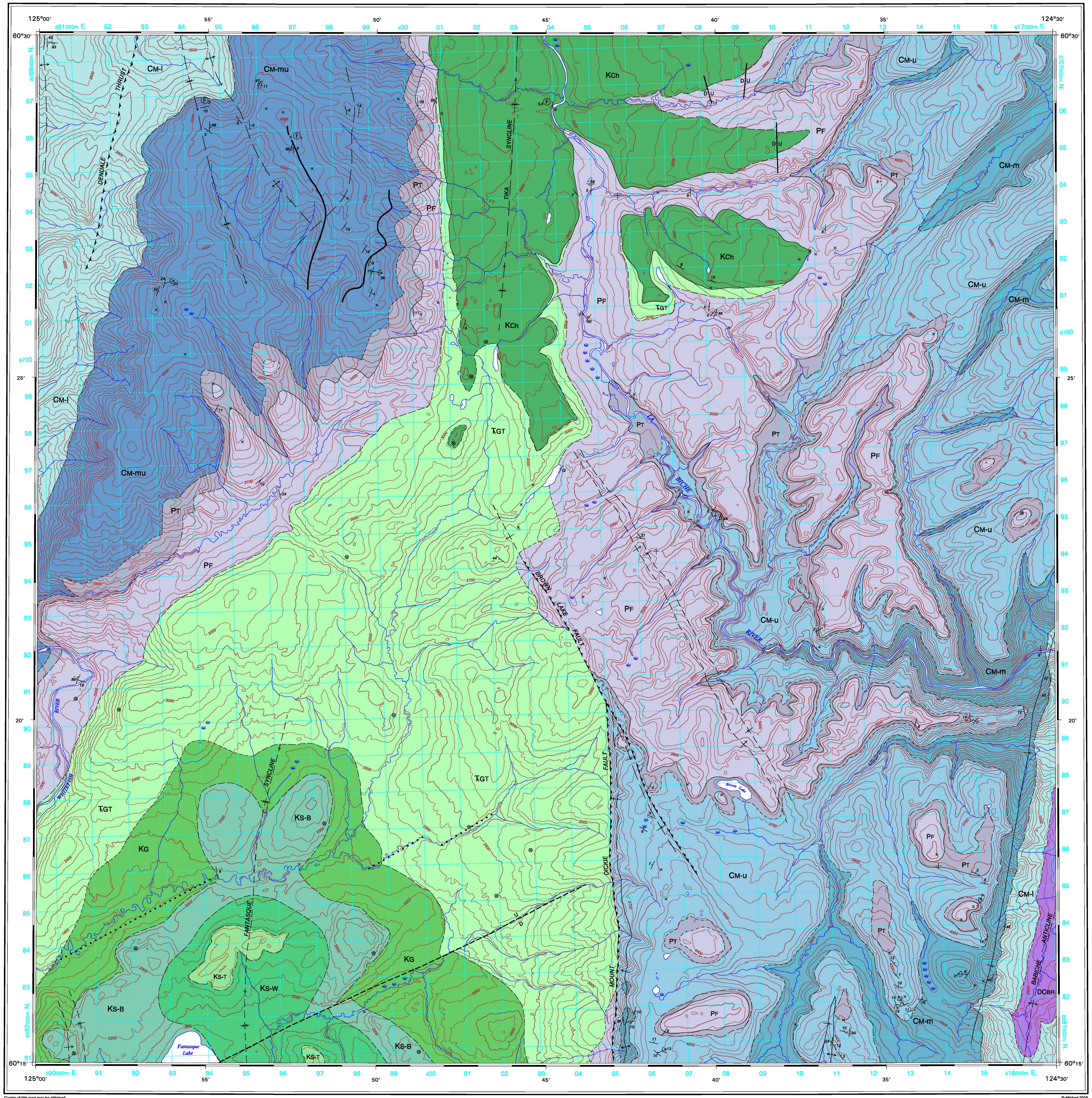
GEOLOGICAL SURVEY OF CANADA COMMISSION GÉOLOGIQUE DU CANADA



Published 2006

LEGEND

CRETACEOUS

LOWER CRETACEOUS

FORT ST. JOHN GROUP (units KCh - KS-T)

SCATTER FORMATION

Tussock Member

KS-T — ***Sandstone**: lithic wacke, glauconitic, greenish grey, thin- to thick-bedded, laminated; minor **siltstone**: grey, interbedded with sandstone. Resistant; **Zoophycos** burrows common.*

Wildhorn Member

KS-W — ***Mudstone**: brown to dark grey, sideritic concretions. Recessive.*

Bulwell Member

KS-B — ***Sandstone**: lithic wacke, glauconitic, greenish grey, thin- to thick-bedded, laminated; minor **siltstone**: grey, interbedded with sandstone. Resistant; **Zoophycos** burrows common.*

KS — *SCATTER FORMATION undivided. Schematic diagram only.*

GARBUTT FORMATION

KG — ***Shale and siltstone**: dark grey to black, interbedded, sideritic concretions; minor **sandstone**: brown to grey, thin-bedded, finely laminated. Recessive.*

CHINKEH FORMATION

KCh — ***Sandstone**: quartz arenite to lithic wacke with variable chert content, brown to grey, laminated, bioturbated; minor **siltstone**: argillaceous, grey, interbedded with sandstone; **conglomerate**: chert-pebble, at base of unit. Woody or plant debris common; locally too thin to map or discontinuous.*

TRIASSIC

GRAYLING AND TOAD FORMATIONS

TGT — ***Shale**: grey, red and green, interbedded with **sandstone**: brown, thin- to thick-bedded, laminated or massive, locally bioturbated; minor **siltstone**: brown to grey, interbedded with shale and sandstone. Locally calcareous or phosphatic; higher proportion of shale and more recessive at base.*

MESOZOIC

PERMIAN

ISHBEL GROUP (units PT - PF)

FANTASQUE FORMATION

PF — ***Chert**: dark grey to white, rusty weathering, well-bedded, spiculitic; minor **shale and siltstone**: siliceous, dark grey to dark brown, rhythmically interbedded with chert. Resistant.*

Tika formation

PT — ***Limestone and dolostone**: silty or sandy, medium to dark brown, buff weathering, medium-bedded, massive to crosslaminated; minor **siltstone and shale**: calcareous, dark brown or grey, rhythmically interbedded with limestone and dolostone; **sandstone**: glauconitic, grey, crossbedded, at base of unit. Rectilinear fracture pattern typical; rare brachiopods and trace fossils.*

CARBONIFEROUS

LOWER CARBONIFEROUS

MATTSON FORMATION (units CM-l - CM-mu)

Middle and upper members

CM-mu — ***Sandstone**: quartz arenite, grey, massive or crossbedded; minor **limestone**: grey, fossiliferous; and **shale**: dark grey. All lithologies interbedded; resistant. See Note 1.*

Upper member

CM-u — ***Sandstone**: quartz arenite to sub-chert-arenite, locally calcareous or dolomitic, fine- to coarse-grained, light to medium grey, commonly shows large-scale crossbedding; minor **limestone**: grey, chert nodules and silicified fossils, typically fossiliferous with crinoids, brachiopods, bryozoans, and corals; **dolostone**: brown to orange; and **shale**: grey to green. All lithologies interbedded; resistant.*

Middle member

CM-m — ***Sandstone**: quartz arenite and lesser sub-chert-arenite, fine-grained, grey to buff to brown, thick-bedded, fine- to large-scale crossbedding, poor- to well-indurated; minor **siltstone and shale**: medium to dark grey, interbedded with sandstone. Typically forms sharp-based fining-up sequences; resistant.*

Lower member

CM-l — ***Sandstone**: quartz arenite, fine- to very fine-grained, light grey or buff, grey to orange weathering, thin- to medium-bedded, typically crosslaminated, well-indurated, trace fossils common; minor **siltstone and shale**: dark grey, interbedded with sandstone; **dolostone**: orange, massive; **lithoclast breccia**: variable composition, uncommon. Typically forms coarsening-up sequences; moderately resistant.*

MIDDLE DEVONIAN TO LOWER CARBONIFEROUS

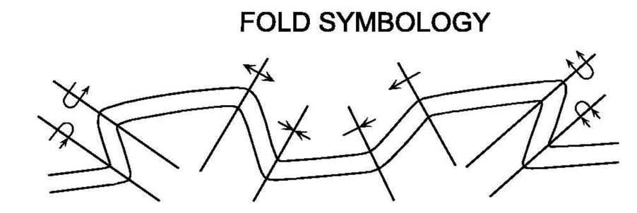
BESA RIVER FORMATION

DCBR — ***Shale**: dark grey to black, locally weathers buff, scattered siderite nodules; minor **sandstone, siltstone and lithoclast breccia**: brown, grey to orange weathering, interbedded with shale; **dolostone and limestone**: orange to grey, uncommon with increasing proportion upsection. Recessive.*

PALEOZOIC

Outcrop stations . . . . ×
Outcrop; observation by helicopter . . . . ⊗
Geological boundary (defined, approximate, assumed)
Marker beds
Lineament
Bedding (inclined, estimated, horizontal); tops known by sedimentary structures and/or stratigraphic order 46 9
Crossbedding (dip direction and dip; uncorrected) 13
Joint set 85
Anticline (defined, approximate, assumed; arrow indicates plunge)
Syncline (approximate, assumed; arrow indicates plunge)
Anticlinal kink fold (defined, approximate, assumed) (see diagram below)
Synclinal kink fold (defined, approximate, assumed) (see diagram below)
Thrust fault (approximate, assumed)
Fault, unknown type (defined, approximate) (U on the upthrown side, D on the downthrown side) U/D U/D
Fossil locality (map symbols may be slightly displaced for map clarity) Ⓕ

FOLD SYMBOLOGY

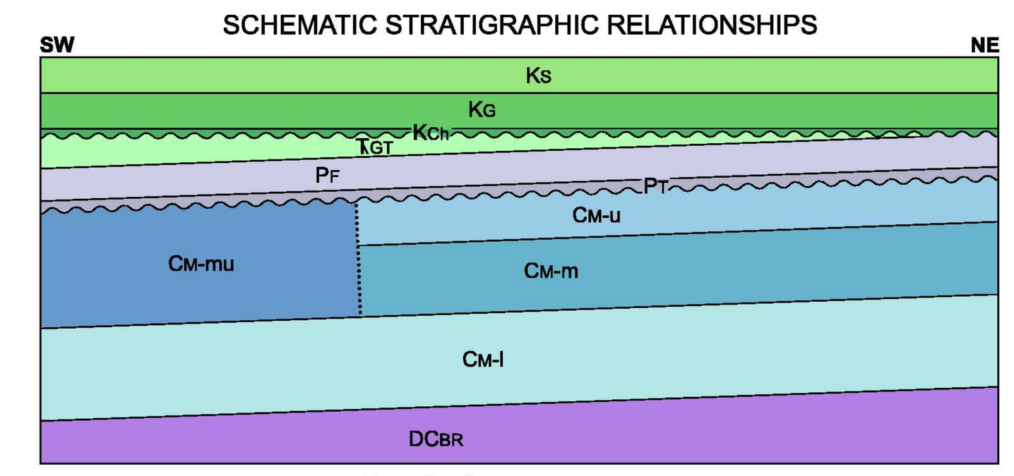


Fold symbols as used on the map apply to folds having cross-sectional geometries depicted in this diagram (see Stockmal et al., 2002)

FOSSIL LOCALITIES

LOCALITY	CATALOGUE NUMBER	FOSSIL	AGE	EASTING, NORTHING (NAD83)	REFERENCE
F1	C-417663	*conodonts*	*Early Carboniferous*	*396876, 6705813*	*Orchard, 2004*
F2	C-417659	*conodonts*	*Silurian to Early Triassic*	*394573, 6706688*	*Orchard, 2004*
F3	C-416546	*dinoflagellates*	*Barremian to Albian*	*404002, 6706463*	*McIntyre, 2005*
F4	C-416553	*palynomorphs*	*Albian or younger*	*404002, 6706463*	*White, 2001*

SCHEMATIC STRATIGRAPHIC RELATIONSHIPS



Unconformity . . . . . .

ABSTRACT

The geological map and data are derived from regional mapping in the Brown Lake (NTS 95C/7) 1:50 000 scale map area, as part of the Geological Survey of Canada's Central Foreland NATMAP project. The Brown Lake map area is situated to the west of the southern end of the Franklin Mountains in a foothills physiographic setting. The geology of the area is characterized by sedimentary strata with a predominance of terrigenous rocks of Late Devonian to Early Cretaceous age. Subparallel unconformities at the base of Permian, possibly one within the Permian, and at the base of Triassic successions are recognized. Lower Cretaceous units overlie Triassic and Permian units with a low-angle unconformity. Predominant structures are regional-scale, north-trending box-like folds with narrow limbs and wide hinge zones with subhorizontal bedding. Locally, the east limb of the Fantasque Syncline is cut by a west-directed thrust fault of minor displacement. Stratigraphic refinements from previous A-series mapping include recognition of the informal Permian Tika formation above the Mattson Formation, assignment of Triassic strata to the Grayling and Toad formations, and recognition of the Chinkeh Formation at the base of Lower Cretaceous succession.

NOTES

1. Middle and upper members of the Mattson Formation are not divided in the western part of the map area because of generally poor exposure.
2. Large bedrock slumps are common in the western part of the map (Smith, 2003). These may result in locally inaccurate structure orientations or buried contacts. Most outcrops are frost-disturbed. In areas with shallow bedding dips, this disruption may result in significant local errors in strike and dip.
3. The Tika formation was extended and mapped in 2002. Definitions of the age, contact relationships and stratigraphic status of this unit are in preparation.

REFERENCES

McIntyre, D.J.
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2004: Report on conodonts and other microfossils, Trutch (94G), Fort Nelson (94J), Fort Liard (95B), and La Biche River (95C), 36 samples collected by L. Lane, L. Pigage, A. Khudoley, and K. Fallas; Geological Survey of Canada, Internal Paleontological Report MJO-2004-5.

Smith, I.R.
2003: Surficial Geology, Brown Lake (95C/7), Yukon Territory; Geological Survey of Canada, Open File 1771, scale 1:50 000.

Stockmal, G.S., Kubli, T.E., Currie, L.D., and McDonough, M.R.
2002: Map symbology and analysis of box and polyclinical folds, with examples from the Rocky Mountain Foothills of northeastern British Columbia and the Liard Ranges of southeastern Yukon Territory and southwestern Northwest Territories; Canadian Journal of Earth Sciences, v. 39, p. 145-155.

White, J. M.
2001: Palynological report on 3 samples of Neocomian, Late Jurassic to Paleogene, and Albian or younger ages, from NTS95C/01,07, Yukon, as requested by K. Fallas, GSC Calgary; Geological Survey of Canada, Internal Paleontological Report 5-JMW-2001.

Authors: A.K. Khudoley and K.M. Fallas

Geology from fieldwork by A. K. Khudoley 2001, with contributions from K.M. Fallas and L.S. Lane

Compilation by A.K. Khudoley and K.M. Fallas based on fieldwork and studies of vertical air photographs in 2001-2005. This map is a product of the Central Forelands Natmap Project. Significant funding from the Yukon Oil and Gas Management Branch, Department of Energy Mines and Resources, is gratefully acknowledged

Geological cartography by M.C. Crockett and S.D. Orzeck

Any revisions or additional geological information known to the user would be welcomed by the Geological Survey of Canada

Digital base map from data compiled by Geomatics Canada, modified by the Geological Survey of Canada (Calgary)

A GIS dataset with additional structural and lithological information is also available with this map

Mean magnetic declination 2006, 25°57' East, decreasing 24.7' annually

Elevations in feet above mean sea level

Copies of this map may be obtained from the Geological Survey of Canada:
601 Booth Street, Ottawa, Ontario K1A 0E8
3303-33rd Street, N.W., Calgary, Alberta T2L 2A7
101-605 Robson Street, Vancouver, B.C. V6B 5J3
490, rue de la Couronne, Québec, Quebec G1K 9A9
1 Challenger Drive, P.O. Box 1006, Dartmouth, Nova Scotia B2Y 4A2

LOCATION MAP

MAP 2083A

GEOLOGY

BROWN LAKE

YUKON TERRITORY

Scale 1:50 000/Échelle 1/50 000

kilometres 1 0 1 2 3 4 kilomètres

Universal Transverse Mercator Projection
North American Datum 1983

Projection transverse universelle de Mercator
Système de référence géodésique nord-américain, 1983

95 C/11	95 C/10	95 C/9
95 C/6	95 C/7 2083A	95 C/8 2088A (in press)
95 C/3	95 C/2 2091A (in press)	95 C/1 2087A (in press)

NATIONAL TOPOGRAPHIC SYSTEM REFERENCE AND INDEX TO ADJOINING GEOLOGICAL SURVEY OF CANADA MAPS

NATMAP CARTNAT
Canada's National Geoscience Mapping Program
Le Programme national de cartographie géoscientifique du Canada

Canada

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2006: Geology, Brown Lake, Yukon Territory; Geological Survey of Canada, Map 2083A, scale 1:50 000.