

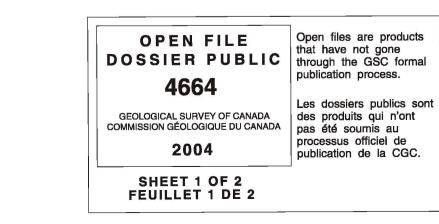
LA BICHE RIVER SOUTHWEST (95C/SW)

Système de référence géodésique nord-américain, 1983

YUKON TERRITORY - BRITISH COLUMBIA Scale 1:100 000 Échelle 1/100 000 0 2 4 6 Kilomètres Universal Transverse Mercator Projection Projection transverse universelle de Mercator

North American Datum 1983

GEOLOGICAL SURVEY



INTRUSIVE ROCKS Geological boundary (defined, approximate, assumed) BEAVER RIVER ALKALINE COMPLEX (Et) Trachyte plugs: Resistant-weathering, light- to medium-grey or greenish-grey, very finely crystalline, feldspar-, amphibole-, and pyroxene-phyric trachyte; massive to Nomenclature change Outcrop stations; visited TING SUITE (Eib, Ebsy) Intrusive breccia: Greyish-red and pale green, aphanitic, intrusive breccia; xenoliths Outcrop; remote observation include coarsely crystalline pink syenite, volcanic rocks, and quartz sandstone. Bedding; measured (inclined, overturned) Biotite syenite: Grey weathering, grey, coarsely crystalline, unfoliated, dominated E bsy by white feldspar with lesser biotite. Bedding; estimated (inclined, vertical) **PROTEROZOIC** Crossbedding (dip direction and dip; uncorrected) Pool Creek syenite: Pink, medium to coarsely crystalline, unfoliated syenite; dominated by randomly oriented pink potassium-feldspar crystals with lesser, dark, strongly Cleavage (inclined) STRATIFIED ROCKS **QUATERNARY** Anticline (defined, approximate, assumed) Glaciolacustrine, glaciofluvial, and fluvial sediment: Poorly consolidated to unconsolidated gravel, sand, and silt. Syncline (defined, approximate, assumed) Overturned syncline (approximate, assumed) BEAVER RIVER ALKALINE COMPLEX (Ec, EV) Conglomerate: Light brown-weathering, light brown conglomerate; rounded granule- to Anticlinal kink fold - (approximate, assumed) cobble-sized clasts of medium- to dark-grey trachyte, reddish to grey quartz arenite, and (See adjacent diagram) Porphyritic volcanic rocks: Black to grey to greenish-grey, plagioclase-, amphibole-, olivine-, nepheline-, and pyroxene-phyric with an aphanitic matrix; unfoliated. Synclinal kink fold- (approximate, assumed) (See adjacent diagram) Sediment and basalt: Poorly to well-consolidated silt, sand, and gravel approximately Fault, thrust or reverse (approximate, assumed) Pssc 150 m thick; capped by dark grey, aphanitic, amygdaloidal to massive basal approximately 20 m thick; top 5-10 m of sediment below the basalt is well indurated. Fault, dip-direction unknown (approximate, assumed) (U on upthrown side, D on downthrown side) CRETACEOUS Fault, unspecified type (approximate, assumed) LOWER CRETACEOUS FORT ST. JOHN GROUP Lineament, unknown affinity (approximate) GARBUTT FORMATION: Recessive-weathering, grey shale and siltstone with sideritic concretions; minor thin-bedded, finely laminated sandstone. The semi-resistant-weathering Structural cross-section line Chinkeh Fm (2-40 m of conglomerate and sandstone) was not observed in this area but may be locally present at the base of the Garbutt Fm. Measured stratigraphic section (long, short) Fossil locality (at locality, near locality) GRAYLING and TOAD formations undivided: Grey, maroon, and green shale interbedded with thin- to thick-bedded brown to buff sandstone; recessive- to semi-resistant-weathering; locally calcareous or phosphatic; horizontal trace fossils locally common. Mineral locality Petroleum well (dry and abandoned)

CENTRAL FACIES

andstone and conglomerate: Grey to buff quartz arenite to quartz-pebble

conglomerate and conglomeratic sandstone; clasts subround to round; subordinate beds up to 2 m thick of bioturbated, slightly dolomitic, very

SUNBLOOD FORMATION: Light brownish-grey- to buff-weathering, mottled,

locally include strata equivalent to the Esbataottine Formation.

possibly equivalent to Muskwa Assemblage strata.

equivalent to Muskwa Assemblage strata.

Dendale Lake

Tika Creek

GSC OF 1460 GSC OF 1676

GSC OF 1660 GSC OF 1674

Lake Mountain

GSC OF 4267 GSC OF 1563 95C/2 95C/1

Mount Mount Merrill Martin

GSC OF 4264 GSC OF 3402

light to dark grey dolostone and limestone; fine to medium crystalline; commonly oturbated; locally laminated; minor tan, laminated, dolomitic siltstone; may

Sandstone, conglomerate, and siltstone: Greyish-red to white, medium- to thick-

Sandstone: White to light grey or greenish-grey, very fine- to medium-grained quartz arenite to quartzite; massive to laminated to ripple cross-laminated; interbeds of dark grey to black, laminated siltstone; unit is commonly hornfelsed;

Green argillite: Green to grey, locally greyish-red, banded argillite or siltstone with

very fine-grained sandstone; sandstone occurs as laminae or as 1 to 5 cm thick beds; soft-sediment slump folding is common; minor green, matrix-supported conglomerate

beds; a 20m bed of greyish-red, clast-supported conglomerate dominated by basalt clasts is present in the lower part of the unit; unit is commonly hornfelsed; possibly

conglomeratic sandstone; quartz-pebble and quartz-sandstone-pebble conglomerate

maroon, micaceous, laminated silty shale; sandstone and siltstone locally calcareous

fine-grained sandstone and siltstone.

SILURIAN to DEVONIAN

Beaver River map unit: Buff- to grey-weathering, light to medium grey, thick-bedded, finely crystalline, unfossiliferous

bicaula. Correlative with Muncho-McConnell, Stone, and

NONDA FORMATION: Dark grey, fetid, medium- to

thick-bedded, fine- to medium-crystalline, fossiliferous

dolostone; discontinuous lenses of black chert.

dolostone; small vugs commonly present; uppermost interval

contains interbeds of fossiliferous dolostone with Gasterocoma?

LEGEND

FANTASQUE FORMATION: Rusty-weathering, dark grey to white, well-bedded, spiculitic

can only be mapped locally (see Note 5).

MATTSON FORMATION

DEVONIAN to CARBONIFEROUS

NORTHWEST FACIES

SILURIAN to DEVONIAN

MIDDLE DEVONIAN

westward; this unit can only be mapped locally (see Note 5).

chert; rhythmically interbedded with shale and siliceous siltstone; shale and siltstone

Tika map unit: Buff-weathering, light to medium brown, silty and sandy limestone or

Middle and upper members undivided: Orange-, light grey-, pinkish-grey-, or buffweathering, grey to buff, poor- to well-indurated, medium- to very thick-bedded, massive

Lower member: Alternating packages of grey- to greyish-orange-weathering, light grey or buff, well-indurated, massive to crossbedded, fine-to very fine-grained quartz arenite, and

BESA RIVER FORMATION: Pale bluish-grey-weathering, dark grey to black shale, locally carbonaceous; lesser siltstone, bedded chert, and siliceous limestone; minor

Devonian carbonate: Buff- to grey-weathering, medium grey, very finely-crystalline argillaceous limestone; medium grey to dark grey, thin- to thick-bedded, fetid dolostone; black,

discontinuous, fossiliferous (crinoid-bearing) chert bands

ROAD RIVER GROUP undivided shale: Dark grey to black

locally calcareous or dolomitic, locally graptolitic shale and

brachiopods and crinoids sporadically present.

siltstone; subordinate very fine-grained sandstone, bedded

chert (porcellanite) and limestone; recessive- weathering;

Upper member: Dark grey to black, sparsely fossiliferous, siliceous shale and siltstone:

Lower member: Dark grey to black, locally

and crinoids sporadically present.

calcareous or dolomitic, graptolitic shale and

siltstone; subordinate very fine-grained, medium-

ORDOVICIAN to SILURIAN

MIDDLE ORDOVICIAN

MIDDLE? PROTEROZOIC

River NW

La Biche

River SW

GSC OF 4664

NATIONAL TOPOGRAPHIC SYSTEM REFERENCE AND INDEX

TO ADJOINING GEOLOGICAL SURVEY OF CANADA MAPS

GSC MAP 11-1968

River

GSC MAP 46-1962

95C/SW

Toad River

GSC MAP 1955A

CAMBRIAN to LOWER ORDOVICIAN

bedded sandstone, bedded chert (porcellanite), and limestone; recessive-weathering; brachiopods

subordinate very fine-grained, medium-bedded

Gasterocoma? bicaula and other crinoids.

and nodules; local thin grainstone beds (< 10 cm) contain

to crossbedded or rippled, fine-grained quartz arenite with subordinate siltstone and dark

dark grey to black shale and lesser siltstone; packages are 10 to 15 m thick; ripples, load

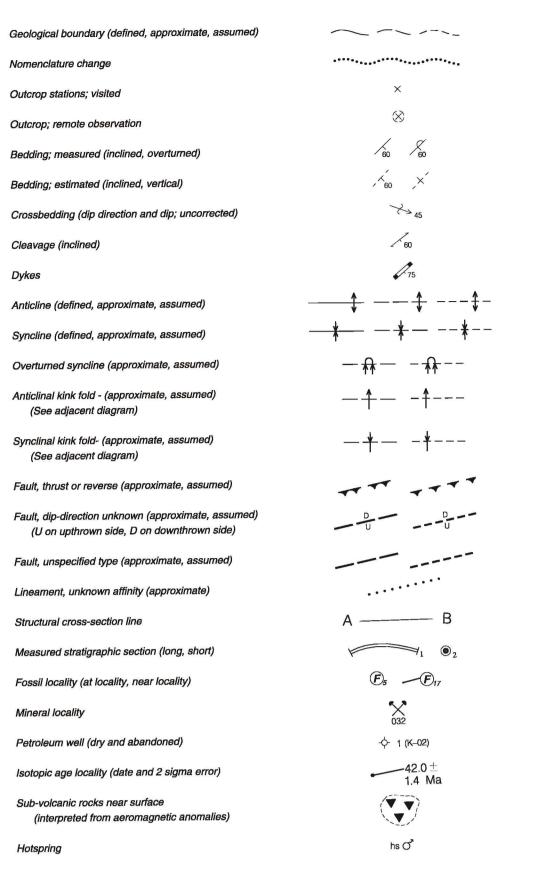
casts, trace fossils, detrital coarse muscovite and pyrobitumen locally present in sandstone.

shale; upper member locally calcareous; locally includes Tika map unit and/or the

dolostone to calcareous siltstone; medium-bedded; sparsely fossiliferous; characteristic

rectilinear fracture pattern; shale content and recessive-weathering character increase

content increases to the west causing the unit to become recessive-weathering; this unit



MATTSON FORMATION undivided: Orange-, grey-, or buff-

weathering, grey to buff, poorly to well-indurated, resistant-weathering,

subordinate siltstone and dark shale as interbeds; locally calcareous.

locally crossbedded or ripple cross-laminated, fine-grained quartz arenite;

SOUTHERN FACIES

MIDDLE DEVONIAN

SILURIAN to DEVONIAN

Larsen Lake.

siltstone locally present.

DUNEDIN FORMATION: Grey-weathering, medium to

dark grey, resistant-weathering, medium- to thick-bedded limestone and dolomitic limestone; mudstone to wackestone

facies dolomitization locally developed east-southeast of

to fossil grainstone; crinoid debris locally abundant; Manetoe-

MUNCHO-McCONNELL and STONE formations undivided:

Buff- to grey-weathering, light to medium grey, medium- to

thick-bedded, unfossiliferous, finely crystalline dolostone;

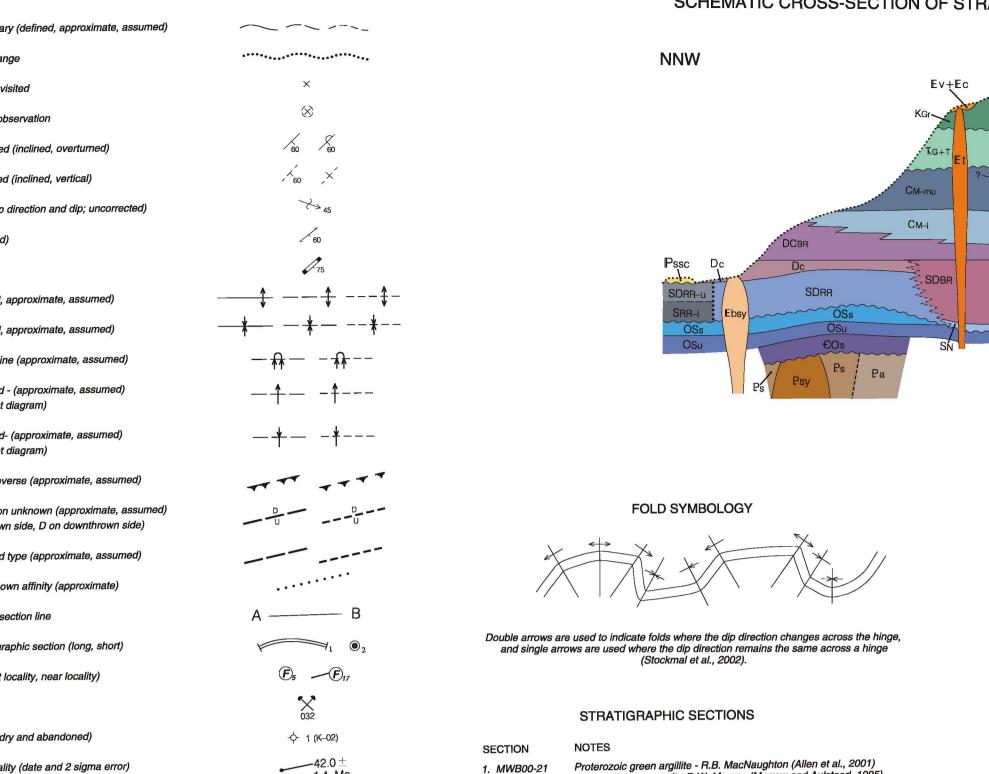
locally vuggy, laminated, or sandy; laminated dolomitic

NONDA FORMATION: Dark grey, fetid, medium- to

dolostone; discontinuous lenses of black chert.

thick-bedded, fine- to medium-crystalline, fossiliferous

MAP SYMBOLS



2. MTA-81-8 Beaver River map unit - D.W. Morrow (Morrow and Aulstead, 1995)

MINERAL LOCALITIES (Yukon MINFILE, 2002)

Beau, Dunn, Kidd, Sid, Vista Ce, Cu, La, Nb, Th, U, Y

Crow, Duffy, John, Pat, Rod

SILURIAN to DEVONIAN

by unrecognised faults.

positional accuracy: 0.5 - 1.0 km)

Co, Ni, Zn

Undivided Silurian to Devonian carbonate: Buff- to grev-

weathering, light to medium grey, generally thick-bedded

Correlative with Nonda, Muncho-McConnell, Stone, and

Dunedin formations and with Beaver River man unit

tSDc = structurally thickened interval dominated by SDc but possibly involving other stratigraphic units interleaved

(NAD83)

354240, 6699072

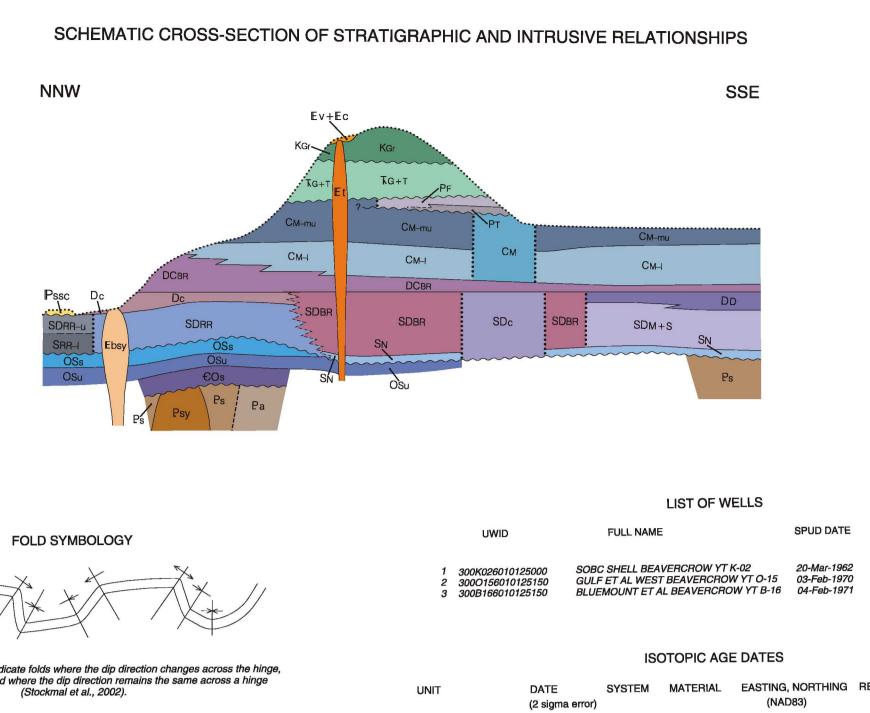
354218, 6660702

358530, 6656879

387325, 6655670 345076, 6695115

338769, 6708524

339342, 6698679



ISOTOPIC AGE DATES SYSTEM MATERIAL EASTING, NORTHING REFERENCE D. Francis (unpublished data) D. Francis (unpublished data) 41.3±0.8 Ma 40Ar-39Ar whole rock 362000, 6679200 Larsen West plug D. Francis (unpublished data) 42.0 ± 1.4 Ma 40Ar-39Ar whole rock 368300, 6677500 Larsen East plug M. Villeneuve, 2003 (pers. comm. 56.7±0.7 Ma 40Ar-39Ar whole rock 336631, 6706945 Pigage and Mortensen (2004, in press) 339341, 6700936 Biotite syenite Pigage and Mortensen (2004, in press) 344067, 6699844 652 ± 56 Ma U-Pb Pool Creek syenite * Pigage and Mortensen (2004, in press) 344248, 6697795 Pool Creek syenite 650.8±3.4 Ma U-Pb Pigage and Mortensen (2004, in press) 344811. 6697132 Pool Creek syenite 643.1±3.6 Ma U-Pb 343817, 6698820 Pigage and Mortensen (2004, in press) Pool Creek syenite 648.2±2.7 Ma U-Pb Pigage and Mortensen (2004, in press) zircon 343817, 6698820 mafic dyke (in syenite) * 650 ± 20 Ma U-Pb * Not shown on map. **FOSSIL LOCALITIES**

SURFACE LOCATION

(Easting, Northing)

387352, 6656332

SPUD DATE

LOCALITY	CATALOGUE NUMBER	AGE	EASTING, NORTHING (NAD83)	REFERENCE
⊕₁	C-417936	Devonian	360163, 6656562	McCracken, 2003a
E ₂	C-432047	Devonian?	335180, 6663257	McCracken, 2003a
© 3	C-432055	Silurian to Devonian	352860, 6657204	McCracken, 2003a
6 4	C-432060	Devonian	353393, 6658777	McCracken, 2003a
6	C-417068	Middle Ordovician	348796, 6689770	McCracken, 2003b
6	C-097618	Lower to Middle Devonian	358244, 6696728	Pyle, pers. comm., 2
© ₇	C-417638	Middle to Late Ordovician	337822, 6708581	Pyle, pers. comm., 2
€ ₈	C-417642	Late Ordovician to Early Devonian	342746, 6706610	Pyle, pers. comm., 2
\bigcirc_g	C-417635	probably Silurian	339060, 6709055	Norford, 2001
€ ₁₀	C-417636	probably Silurian	339350, 6709362	Norford, 2001
© 11	C-417637	Early Silurian	338210, 6708507	Norford, 2001
©12	C-417691	Early Silurian	345910, 6704365	Norford, 2002
© ₁₃	C-417701	Early Silurian to Early Devonian	335252, 6701015	Norford, 2002
© ₁₄	C-417706	early Middle Ordovician	341035, 6690031	Nowlan, 2004
€ ₁₅	C-417707	early Middle Ordovician	341137, 6690084	Nowlan, 2004
€ ₁₆	C-417708	Middle Ordovician to Middle Devonia	n 350194, 6686778	Nowlan, 2004
€ ₁₇	C-417718	late Early to early Middle Ordovician	338639, 6692236	Nowlan, 2004
€ ₁₈	C-417719	late Early to early Middle Ordovician	336403, 6694181	Nowlan, 2004
©19 *	C-417720	early Middle Ordovician	343123, 6706970	Nowlan, 2004
€ ₂₀	C-417721	early Middle Ordovician	343187, 6707354	Nowlan, 2004
©21	C-417722	Early Silurian	345910, 6704365	Nowlan, 2004
(F) ₂₂	C-417724	early Middle Ordovician	344755, 6704428	Nowlan, 2004
(F) ₂₃	C-417727	early Middle Ordovician	345280, 6703797	Nowlan, 2004
© ₂₄	C-417728	late Middle to Late Ordovician	350031, 6698736	Nowlan, 2004
E ₂₅	C-417736	latest Silurian to earliest Devonian	335252, 6701015	Nowlan, 2004
© ₂₆	C-432057	Early Triassic	352976, 6659378	Utting, 2004

- 1. At outcrop stations where more than one type of data was collected, bedding measurements are plotted at the station, whereas cleavage, crossbedding, and dyke orientations are plotted nearby for legibility. 2. The compilation for the west half of this map is derived and updated from published versions
- of 1:50 000 scale maps for 95C/4 (MacNaughton and Pigage, 2003) and 95C/5 (Pigage and 3. This compilation is constrained in part by data from previously published maps of this and

(NOTE: Map symbols may be slightly displaced for legibility; * not shown on map.)

- adjacent areas (Brady, 1959; Gabrielse and Blusson, 1969; Douglas, 1976; Taylor and Stott, 1999). Structural data from Brady (1959) also appear on this map.
- 4. Use of the name "West Grayling Fault" follows that of Brady (1959). "Beaver River Thrust" and "Larsen Fault" are derived from Douglas (1976) but the name Larsen Fault has been restricted to a splay of the West Grayling Fault. 5. In areas where there is insufficient exposure to map the Tika map unit and the Fantasque
- Formation separately, they are included with the underlying Mattson Formation. However, where the Permian units are recessive it is possible that some strata are included with the Triassic Grayling and Toad formations. 6. Evidence indicating the relative ages of the Proterozoic sandstone (Ps) and the Proterozoic
- argillite (Pa) is lacking and the stratigraphic position of these units relative to each other is 7. The interpretation of sub-volcanic rocks below ground surface in the area is based on the
- identification of discrete, positive, aeromagnetic anomalies. These anomalies are also associated with mapped volcanic rocks at surface. 8. The Toobally-Crow tear fault is interpreted as a steep structure that accommodates differential
- shortening across the fault, based on map relationships in this map area and Coal River (95D) map area (Gabrielse and Blusson, 1969). Fold structures cannot be correlated across the tear and therefore are interpreted to have developed independently on either side of it.
- 9. The Gold Pay structure is not exposed, but is inferred to be a structure similar to the Toobally-Crow tear fault. This interpretation is based on the lack of correspondence of structures and on the fold-plunge reversal across the Beaver River valley in the region of the inferred structure.

THIS MAP IS A PRODUCT OF THE CENTRAL FORELAND NATMAP PROJECT

R.B. MacNaughton, K.M. Fallas, L.S. Lane and I.R. Smith 2000-2002. Geological cartography by K.M. Fallas, S. J. Hinds, L.C. Pigage, and M. Ponto. This map was improved by reviews by D.G. Cook and G.S. Stockmal.

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

> Base map at the same scale published Surveys and Mapping Branch in 1971 CONTOUR INTERVAL 100 FEET Elevations in Feet above Mean Sea Level

Geology from fieldwork by L.C. Pigage, T.L. Allen, A.K. Khudoley,

Recommended citation: Fallas, K.M., Pigage, L.C., and MacNaughton, R.B. (compilers) 2004: Geology, La Biche River southwest (95C/SW), Yukon Territory and British Columbia; Geological Survey of Canada, Open File 4664, scale 1:100 000, 2 sheets.

1. Allen, T.L., Pigage, L.C., and MacNaughton, R.B. 2001: Preliminary geology of the Pool Creek map area (95C/5), southeastern Yukon. In: Yukon Exploration and Geology 2000, D.S. Emond and L.H. Weston (eds.), Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada, pp.53-72.

1959: The Geology of the Liard River Area, Northwest Territories, Yukon Territory and British Columbia; National Energy Board Report, 28-1-5-4, 99 pages + insert map and

MIDDLE? PROTEROZOIC

Undivided (in structure sections only): Sandstone, quartzite,

to Muskwa Assemblage strata.

argillite, siltstone, and minor conglomerate; possibly equivalent

- 3. Deklerk, R., (compiler) 2002: Yukon MINFILE 2002 - A database of mineral occurrences; Exploration and Geological Services Division, Yukon Region, Indian and Northern Affairs Canada. Online at http://www.geology.gov.yk.ca/minfile/index.html.
- 4. Douglas, R.J.W., (compiler) 1976: Geology, La Biche River, Yukon Territory District of Mackenzie; Geological Survey of Canada, Map 1380A, scale 1:250 000.
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- MacNaughton, R.B. and Pigage, L.C. 2003: Geology, Larsen Lake (95C/4), Yukon Territory and British Columbia; Geological Survey of Canada, Open File 1797, scale 1:50 000.

- 7. McCracken, A.D. 2003a: Report on 12 conodont samples from Middle Ordovician and Devonian strata from British Columbia collected by A. Khudoley and L. Pigage and submitted by L. Lane (GSC-C) NTS 94G/12, 95C/04, 95C/05, 95C/11, 95C/12, 95C/13; Geological Survey of Canada, Paleontological Report 6-ADM-2003.
- 8. McCracken, A.D. 2003b: Report on on conodont sample (Con. No. 1674) from Middle Ordovician strata from southeastern Yukon Territory collected by R.B. MacNaughton (GSC-C) NTS 95C/05; Geological Survey of Canada, Paleontological Report 7-ADM-2003.
- 9. Morrow, D.W. and Aulstead, K.L. 1995: The Manetoe Dolomite - a Cretaceous-Tertiary or a Paleozoic event? Fluid inclusion and isotopic evidence; Bulletin of Canadian Petroleum Geology, vol.43, pp.267-280.
- 10. Norford, B.S. 2001: Report on six collections from the Trutch and La Biche River map areas, northern British Columbia and adjacent Yukon Territory submitted by Dr. L.S. Lane in 2001 (NTS 94G/04, 95C/05); Geological Survey of Canada, Paleontological Report S-3-BSN-2001.
- 11. Norford, B.S. 2002: Report on two lots of fossils from the La Biche River map area, southern Yukon Territory, Collected by Mr. Lee Pigage and Ms. Tammy Allen in 2001 and submitted by Dr. L.S. Lane in 2001 (NTS95C/5); Geological Survey of Canada, Paleontological Report S-1-BSN-2002.
- 12. Nowlan, G.S 2004: Report on eighteen samples from Cambrian, Ordovician, Silurian and possibly Devonian strata in the southeastern part of Yukon Territory submitted for conodont analysis by Larry Lane, Rob MacNaughton and Karen Fallas (Geological Survey of Canada Calgary) and Lee Pigage and Tammy Allen (Yukon Geological Survey); NTS 095C/05; Geological Survey of Canada, Paleontological Report 002-GSN-2004. 13. Pigage, L.C., and Allen, T.L., 2001; Geological map of Pool Creek (NTS 95C/5), southeastern Yukon, 1:50 000 scale; Exploration and Geological Services
 - Division, Yukon Region, Indian and Northern Affairs Canada, Open File 2001-32. 14. Pigage, L.C., and Mortensen, J.K.
 - In press: Superimposed Neoproterozoic and Early Tertiary alkaline magmatism in the La Biche River area, southeast Yukon Territory; Bulletin of Canadian Petroleum Geology.
 - 15. Stockmal, G.S., Kubli, T.E., Currie, L.D., and McDonough, M.R. 2002: Map symbology and analysis of box and polyclinal 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, vol. 39, pp.145-155.
 - 16. Taylor, G.C., and Stott, D.F. 1999: Geology, Toad River, British Columbia; Geological Survey of Canada, Map 1955A, scale 1:250 000.
 - 7. Utting, J. 2004: Palynological study of 2 outcrop samples from Larsen Lake (La Biche SW) map area, Yukon, submitted by L.S. Lane, GSC (Calgary) (NTS 95C/4); Geological Survey of Canada, Paleontological Report 1-JU-2004.

