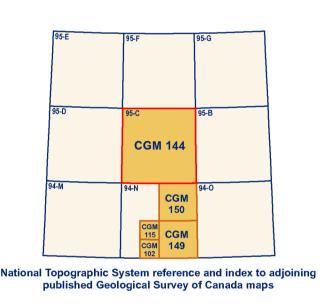


The La Biche River map area (NTS 95-C), Yukon and

Northwest Territories occupies the Liard Plateau and the southern termination of the Franklin Mountains. It is situated between the northern Rocky Mountains to the south and the Mackenzie Mountains to the north. The area is thickly vegetated and varies from hilly in the western portion to mountainous in the east. Bedrock exposures are sparse and concentrated along streams. with a few open ridge tops in the west half and with better exposure along open ridge tops of the Beavercrow, La Biche, Kotaneelee, and Liard ranges of the east half. The area is underlain by Proterozoic to Late Cretaceous sedimentary strata, along with Neoproterozoic and Eocene intrusions. Folds and faults preserved in the area were generated during two deformational events, a Neoproterozoic event and a Late Cretaceous to Eocene Laramide deformation. Within the Kotaneelee gas field, gas has been produced from a Devonian carbonate reservoir beneath the Mount

Yukon et dans les Territoires du Nord-Ouest, occupe le plateau de Liard et l'extrémité sud des monts Franklin Elle est située entre la partie nord des montagnes Rocheuses au sud et les monts Mackenzie au nord. La région présente une végétation dense et sa topographie varie de vallonneuse à l'ouest à montagneuse à l'est. Les affleurements rocheux sont rares et se concentrent le long des ruisseaux, avec quelques sommets de crêtes dénudés dans la moitié ouest et de meilleures zones d'affleurements le long des sommets de crêtes dénudés des chaînons Beavercrow, La Biche, Kotaneelee et Liard dans la moitié est. Le sous-sol de la région est occupé par des roches sédimentaires s'échelonnant du Protérozoïque au Crétacé tardif, que recoupent des intrusions du Néoprotérozoïque et de l'Éocène. La région présente des plis et des failles hérités de deux épisodes de déformation, l'un remontant au Néoprotérozoïque et l'autre associé à la déformation du Laramide du Crétacé tardif à l'Éocène. Dans le champ de gaz de Kotaneelee, du gaz a été produit depuis des réservoirs carbonatés du Dévonien situés dans les profondeurs de l'anticlinal de Mount

La région cartographique de La Biche (SNRC 95-C), au



Cover illustration iew looking northeast across La Biche syncline and taneelee anticline at Kotaneelee Gap toward the iard Range, Northwest Territories. Vegetation and elief is typical of eastern La Biche River map area. Photograph by I.R. Smith. 2013-307

Natural Resources Ressources naturelles

du Canada

Catalogue No. M183-1/144-2013E-PDE ISBN 978-1-100-22360-5 doi:10.4095/294606 © Her Majesty the Queen in Right of Canada, as represented by the Minister of Natural Resources Canada, 2014

CANADIAN GEOSCIENCE MAP 144

Canada

Yukon-Northwest Territories



Quaternary sediment: gravel, sand, and silt: poorly consolidated to unconsolidated.

Paleogene conglomerate: conglomerate and sandstone: compositionally immature, various shades of brown and reddish-brown, sandstone is typically crossbedded, poorly to well indurated; and minor basalt: aphanitic, dark grey, amygdaloidal to massive; unit is locally preserved in modern river valleys. olivine-, nepheline-, and pyroxene-phyric, black to grey to greenish-grey,

Beaver River Alkaline Complex: volcanic rocks: plagioclase-, amphibole-, unfoliated; trachyte: feldspar-, amphibole-, and pyroxene-phyric, very finely crystalline, light to medium grey or greenish-grey, massive to weakly foliated, forms resistant plugs; and conglomerate: clasts of trachyte and quartz arenite, rounded granule- to cobble-sized clasts, light brown.

Ting Suite: syenite: dominated by white feldspar with lesser biotite, coarsely crystalline, grey, unfoliated; and intrusive breccia; aphanitic, greyish-red and pale green; xenoliths include coarsely crystalline pink syenite, volcanic rocks, and quartz sandstone.

Dunvegan Formation: sandstone: lithic wacke, light grey to beige, laminated, crossbedded, or massive; interbedded with minor conglomerate: chert-pebble, brown to grey; shale: silty, dark grey; and coal.

Lepine Formation and Sully Formation: shale: dark grey; interbedded with mudstone: dark grey; and siltstone: slightly sandy, dark grey, locally laminated; minor sandstone: lithic wacke, grey or greenish-grey, thin-bedded, sideritic

Sully Formation: shale: dark grey, sideritic concretions; and siltstone: dark grey, sideritic concretions; interbedded with shale: silt content increases in upper part of unit. Sikanni Formation: sandstone: lithic wacke, commonly glauconitic or

KSk calcareous, greenish-grey, thick-bedded, typically thinly laminated and crosslaminated; interbedded with minor siltstone: greenish-grey or grey; and shale: dark grey. Lepine Formation: mudstone: dark grey, sideritic concretions; interbedded with

shale: silty, dark grey to black, fissile, recessive; lower part of unit contains ammonites. Scatter Formation: sandstone: lithic wacke, glauconitic, greenish-grey, thin- to thick-bedded, laminated, locally bioturbated; minor mudstone: brown to dark grey, sideritic concretions; Zoophycos burrows common; mudstone more

Tussock Member: sandstone: lithic wacke, glauconitic, greenish-grey, thin- to thick-bedded, laminated; interbedded with minor siltstone: grey; Zoophycos burrows common; semiresistant.

Wildhorn Member: mudstone: brown to dark grey, sideritic concretions; recessive. Bulwell Member: sandstone: lithic wacke, glauconitic, greenish-grey,

KSc-B thin- to thick-bedded, laminated and crosslaminated; interbedded with

minor siltstone: grey; Zoophycos burrows common; ridge-forming. Chinkeh Formation and Garbutt Formation: Chinkeh Formation: sandstone and conglomerate: variably cherty and silty, brown to grey, locally laminated or bioturbated, a few metres thick; overlain by Garbutt Formation: shale and siltstone: locally sandy, dark grey to black, interbedded, sideritic concretions.

sideritic concretions; minor sandstone: brown to grey, thin-bedded, finely laminated. Chinkeh Formation: sandstone: quartz arenite to lithic wacke with variable chert content, brown to grey, laminated, bioturbated; interbedded with siltstone: argillaceous, grey; conglomerate: chert-pebble, at base of unit;

voody or plant debris common; 2–40 m thick.

Garbutt Formation: shale and siltstone: dark grey to black; interbedded,

Grayling Formation and Toad Formation: shale: grey, red, and green: interbedded with sandstone: brown, thin- to thick-bedded, laminated or massive, locally bioturbated; minor siltstone: brown to grey; locally calcareous r phosphatic; shalier and more recessive at base.

Tika formation and Fantasque Formation: Tika formation: limestone and dolostone: shalv. siltv. or sandv. medium to dark brown, beige-weathering, very thin- to medium-bedded, massive to crosslaminated or crossbedded, rare brachiopods; overlain by Fantasque Formation: chert: dark grey to white, rusty-weathering, well bedded, spiculitic; rhythmically interbedded with shale and siltstone: siliceous, dark grey to dark brown; unit locally cliff-forming.

> Mattson Formation: sandstone: quartz arenite, locally cherty or calcareous grey to beige, grey- to orange-weathering, thin- to very thick-bedded, crossbedded; interbedded with minor shale or siltstone: dark grey; limestone grey, fossiliferous; and dolostone: orange; ridge- or cliff-forming. Mattson Formation, middle and upper members: sandstone: quartz

arenite, locally cherty or calcareous, grey to beige, massive or

ossbedded; interbedded with minor limestone: grey, fossiliferous; and shale: dark grey; ridge- or cliff-forming. Mattson Formation, upper member: sandstone: quartz arenite, locally cherty, calcareous, or dolomitic, light to medium grey, commonly shows large-scale crossbedding; interbedded with minor limestone: rey, cherty and siliceous, typically fossiliferous with crinoids, brachiopods, bryozoans, and corals; dolostone; brown to orange; and shale: grey to green; resistant.

Mattson Formation, middle member: sandstone: quartz arenite, locally cherty, grey to beige or brown, thick-bedded, fine- to large-scale ssbedding, poorly to well indurated; interbedded with minor siltstone and shale: medium to dark grey; unit typically contains sharp-based fining-up packages; resistant. Mattson Formation, lower member: sandstone: quartz arenite, very

fine- to fine-grained, light grey or beige, grey- to orange-weathering, thin- to medium-bedded, typically crosslaminated, well indurated,

race fossils common; interbedded with minor siltstone and shale dark grey; dolostone: orange, massive; unit typically contains coarsening-up packages; moderately resistant. Flett Formation and Golata Formation: Flett Formation: limestone: cherty, grey, skeletal wackestone to packstone and lesser grainstone, massive; interbedded with minor shale, mudstone, or siltstone; calcareous, spiculitic; and sandstone; overlain by Golata Formation: shale and mudstone: silty, dark grey to black;

minor limestone and dolostone: fossiliferous; and sandstone: muddy. Solata Formation: shale and mudstone: silty, dark grey to black; minor nestone and dolostone: fossiliferous; and sandstone: muddy; proportion of arbonate decreases whereas sandstone increases upsection.

Prophet Formation: chert: spiculitic, calcareous or dolomitic, dark grey, CP greyish-orange-weathering, well bedded; rhythmicallly interbedded with limestone: cherty, medium to dark grey, skeletal wackestone to packstone; sandstone; and shale: black to dark grey; mega-scale intraformational truncation surfaces common.

Besa River Formation: shale: dark grey to black, locally beige-weathering,

scattered siderite nodules; interbedded with minor sandstone; siltstone; lithoclast breccia: brown, grey- to orange-weathering; and dolostone or limestone: orange to grey, uncommon with increasing proportion upsection. Headless Formation: limestone: argillaceous, dark grey to black. medium-grey-weathering; interbedded with minor limestone; crinoid-bearing grainstone, grey, thin-bedded, contains a distinctive variety of crinoid ossicle

with a double axial canal; and shale: black; unit is resistant. **Dunedin Formation:** limestone: locally dolomitic, mudstone to wackestone to DD skeletal grainstone, medium to dark grey, grey-weathering, medium- to thick-bedded, crinoid debris locally abundant, unit is resistant.

SILURIAN to DEVONIAN Road River Group: shale and siltstone: locally calcareous, dolomitic, or siliceous, dark grey to black fresh and weathered surfaces, locally graptolitic; ninor sandstone: very fine-grained; chert: very finely crystalline (porcellanite), edded; and limestone: locally fossiliferous.

Road River Group, upper part: shale and siltstone: siliceous, dark grey to black fresh and weathered surfaces, sparsely fossiliferous; sandstone: very fine-grained, medium-bedded. Road River Group, lower part: shale and siltstone: locally calcareous

or dolomitic, dark grey to black fresh and weathered surfaces, graptolitic; minor sandstone: very fine-grained, medium-bedded; chert: very finely crystalline (porcellanite), bedded; and limestone: brachiopods and crinoids locally present. Muncho-McConnell Formation and Stone Formation: dolostone: locally sandy, Geological contact

. · · · · Change in mapping precision

Fault, motion undefined

Thrust fault, symbol on hanging-wall side

Normal fault, symbol on hanging-wall side

Defined

/ Inferred

Concealed

/ Approximate

———· Approximate

----- Defined

----- Inferred

----- Concealed

Defined

--▼--- Inferred

····▼······▼ Concealed

— Ţ — · Approximate

Anticline, upright

Anticline, inclined

Anticline, overturned

Syncline, upright

Syncline, inclined

Syncline, overturned

Monocline, anticlinal bend

Monocline, synclinal bend

Monocline, overturned anticlinal bend

Visited outcrop, measurements not shown

Bedding, horizontal

⊹ Estimated

Fossil locality

Outcrop observed remotely from ground or air

Bedding strike and dip, upright, inclined

Younging direction evidence unknown

Bedding strike and dip, overturned

Younging direction evidence unknown

Younging direction known

53Ma Radiometric date with age shown

Status undefined

Dry and abandoned

Younging direction known, estimated measurement

Petroleum well with well name (see data tables for full list)

Younging direction evidence unknown, estimated measurement

Younging direction known

----- Inferred

______ Defined

----- Inferred

— J Defined

----- Inferred

Defined

Defined

--¥---- Inferred

--**≭**---- Inferred

_______ Defined

—**廿**——· Approximate

--\\documeq------ Inferred

______ Defined

--∳---- Inferred

Defined

—▼——· Approximate

—▼——· Approximate

— ★ — — · Approximate

—♥ — · Approximate

— ♠ — · Approximate

—

—— Approximate

— → — · Approximate

/ Approximate

finely crystalline, light to medium grey, beige- to grey-weathering, medium- to nick-bedded, locally laminated, locally vuggy, unfossiliferous; minor siltstone: olomitic, laminated; unit is resistant. **ORDOVICIAN to DEVONIAN**

Ordovician to Devonian carbonate: dolostone and limestone: light to medium

grey, beige- to grey-weathering, generally thick-bedded, locally vuggy, locally fossiliferous; unit is resistant, but not well exposed. ORDOVICIAN to SILURIAN

Ordovician to Silurian carbonate: dolostone: fine- to medium-crystalline, dark grey, dark grey-weathering, medium- to thick-bedded, fetid, fossiliferous; and chert: black, occurs as discontinuous lenses; unit is resistant. Ordovician sandstone: sandstone: quartz arenite, locally conglomeratic, grey

ne-grained, very thick-bedded, bioturbated; unit is resistant. ORDOVICIAN Sunblood Formation: dolostone and limestone: fine- to medium-crystalline. light to dark grey, mottled light brownish-grey- to beige-weathering, locally minated, commonly bioturbated; minor siltstone: dolomitic, tan fresh and eathered surfaces, laminated; unit is resistant.

CAMBRIAN to ORDOVICIAN Rabbitkettle Formation: limestone: silty, light grey to brownish-grey, finely rystalline, nodular-bedded; and siltstone: locally dolomitic or sandy,

to beige fresh and weathering surfaces; conglomerate: quartz-pebble, clasts

ubround to round; minor sandstone and siltstone: slightly dolomitic, very

rownish-grev. thin-bedded. Crow Formation: sandstone: locally calcareous or dolomitic, very fine- to coarse-grained or conglomeratic, greyish-red to white, medium- to thick-bedded, locally crossbedded; conglomerate: quartz-pebble and quartz sandstone-pebble; and minor siltstone: micaceous, locally calcareous or dolomitic, shaly, maroon or green, laminated; unit is resistant.

Pool Creek syenite: syenite: dominated by pink potassium-feldspar with lesser dark chloritized biotite, medium- to coarsely crystalline, pink fresh and eathering surfaces, unfoliated; unit is resistant. Neoproterozoic argillite: argillite or siltstone: banded green to grey or greyish-red; and sandstone: very fine-grained, laminated or very thin-bedded, soft-sediment slump folding is common; minor conglomerate: natrix-supported, green; and a unique 20 m thick bed of conglomerate; clast-supported, greyish-red, dominated by basalt clasts; unit is resistant and

Proterozoic quartzite: sandstone: quartz arenite to quartzite, very fine- to Ps medium-grained, white to light grey or greenish-grey, massive to laminated or ripple crosslaminated; interbedded with minor siltstone: dark grey to black, aminated; unit is resistant and commonly hornfelsed

commonly hornfelsed.

ACKNOWLEDGMENTS

The following acknowledgments address work done by the Geological Survey of Canada and the Yukon Geological Survey based out of Fort Liard, Northwest Territories in 1997, 2000, 2001, and 2002 as part of the Central Foreland NATMAP project. The authors would like to thank the following GSC and YGS field assistants for their hard work:

N. Utting, and A. Yanko. The authors would also like to thank the following residents of Fort Liard for their assistance in the field: A. Bertrand, D. Kotchea, J. Harris, M. McQuaid, M. Bertrand, and J. Bertrand.

The following petroleum exploration companies kindly contributed geological expertise in the field as well as assistants: Crestar Energy, Conoco Canada, Gulf Canada Resources, PetroCanada, and Nexen. Expertise on aspects of the economic potential of the area was provided by R. Freeman of the Yukon Oil and Gas Branch and A. Fonseca of the Yukon Geological Survey.

M. Ebner, L. Evans, R. Fraser, D. Hodder, K. Kennedy, R. Kennedy, A. McNeill, K. McWilliam,

Logistical support and accommodations in Fort Liard were provided by Liard Valley Motel, Riverside Inn, Flett Mountain Camp Services Ltd., with camp management by J. O'Rourke. Helicopter and fixed-wing support was provided by Talon Helicopters, Wildcat Helicopters, Mustang Helicopters, Deh Cho Helicopters, and South Nahanni Airways. The authors wish to thank M. Cecile and L. Currie for critical review of the map.

The geology of the La Biche River map area was previously published by Douglas (1976) Additional stratigraphic and structural observations since then have allowed for a refinement of Douglas' interpretation, presented here. Revisions to map units and stratigraphic relationships in the area have been derived from various sources (Fig. 1). Terminology for igneous rocks is derived from Rowins and Francis (1995), Harrison (1981), and Pigage (2009). Stratigraphic terms for the upper part of the sedimentary succession are taken from Stott (1982) and Leckie et al. (1991) for Cretaceous units; Gibson (1975) and MacNaughton (2002) for Triassic units; Harker (1963), Bamber et al. (1968), and Richards (1989) for Late Devonian, Carboniferous and Permian units. Early Permian carbonate, herein assigned to the informal Tika formation, had been correlated with the Kindle Formation of northeast British Columbia (Henderson, 1989), but Chung (1993) demonstrated that the Kindle Formation is Late Mississippian to Early Pennsylvanian, overlapping with the Mattson Formation, so the term 'Kindle Formation' is not used here.

Within lower Paleozoic strata, the La Biche River map area straddles the boundaries between the MacDonald carbonate platform to the south, the Mackenzie carbonate platform to the north and east, and the Selwyn shale basin in the northwest (Fig. 2). The resulting map-unit terminology is drawn from each of these geological regions as follows: Taylor and Mackenzie 1970), Norford et al. (1966), and Morrow (1978) describe units from the MacDonald platform Morrow and Cook (1987), Morrow (1982), and Ludvigsen (1979) describe units from the Mackenzie platform, and Gabrielse et al. (1973), Cecile and Norford (1979), and Pyle and Barnes (2000) describe shale-dominated units of the Selwyn basin. Pigage (2009) summarizes he relationships between these units within the western La Biche River area and discusses locally defined Neoproterozoic and Cambrian units (see Fig. 2).

The following discussion outlines stratigraphic features that influenced the organization of map units across the La Biche River area. Lepine and Sully formations are combined where the intervening Sikanni is not well developed; the combined interval includes Sikanni-equivalen strata. Chinkeh and Garbutt formations are combined where the Chinkeh becomes too thin to map separately. Although the Chinkeh Formation was not observed in the western part of the La Biche area, it may be present at the base of the Garbutt Formation. A pre-Cretaceous southern tilt to the region is recorded by erosionally thinned Permian and Triassic strata beneath the Cretaceous strata in the north. Exposures of Triassic strata are generally few and incomplete but a coarsening-upward trend within the combined Grayling and Toad unit was observed. The shale-dominated base can be assigned to the Grayling Formation, and the sandier upper portion probably belongs in the Toad Formation. Permian units, Tika formation and Fantasque Formation, are combined because they are too thin to map separately on steep fold limbs; both become increasingly shaly and recessive westward and may be indistinguishable from each other and the base of the Triassic Graying and Toad unit. Poor exposure combined with possible facies variations is the reason for combining some or all of the members of the Mattson Formation in the western portion of the map area. Thinning of the Golata Formation in the northeast corner of the map required inclusion of the Golata with the underlying Flett Formation. Though not shown separately, the Dunedin Formation east-southeast of Larsen Lake has locally developed Manetoe facies dolomitization. Along the western edge of the map area, where quality of exposure and biostratigraphic control are poor, the Ordovician to Devonian carbonate unit may correlate with the Beaverfoot, Nonda, Muncho-McConnell, and Stone formations of the MacDonald platform to the south. The Ordovician to Silurian carbonate unit attempts to separate Beaverfoot and Nonda formation equivalents from Siluro-Devonian Muncho-McConnell and Stone formations. To the north, facies in this interval change to Road River Group of the Selwyn Basin and Headless Formation of the Mackenzie Platform. Coarse siliciclastic units in the western part of the map area, Crow Formation and the Ordovician sandstone unit, are preserved around a paleotopographic high centered on the Pool Creek syenite. In the case of the Crow Formation, it is distinct from the laterally equivalent regional unit, Rabbitkettle

Laramide deformation in the La Biche River map area is recorded as abundant folds with associated faulting; and structural style varies across the area largely as a function of the mechanical properties of the rock types at surface. In the northwest, where shale-dominated lower Paleozoic units are abundant, folds are common with subordinate faulting in the carbonate units. To the southwest, faulting is more common due to the prevalence of more resistant units of lower Paleozoic carbonate and sandstone, yet topographic relief is subdued in the west. Through the south-central and eastern portions of the map area, a regular pattern of longwavelength (10-20 km) folding dominates, with minor faulting associated with upper Paleozoic and Mesozoic siliciclastic strata. Anticlines in this region are detached within the Besa River Formation and outlined by resistant units of the Mattson Formation, forming high ridges above the treeline, whereas valleys are underlain by recessive Triassic and Cretaceous strata. The sinuosity of the Kotaneelee and La Biche ranges is a function of en échelon linking of multiple anticlinal culminations (e.g. Mount Martin and Kotaneelee anticlines). Trends of individual structures vary from northeast to northwest, in contrast to the consistent northwest trend of structures in the northern Rocky Mountains and Foothills to the south (Taylor and Stott, 1973, for example). Major features identified by Douglas (1976) are recognizable in this compilation, although higher resolution mapping, particularly in the west, has modified some structures in detail and refined the stratigraphic units. In particular, new observations do not support the previous interpretation of a significant northeast-trending fault bisecting the northwest portion of the map area – the Beaver Fault of Douglas (1976; see also Morrow and Miles, 2000). Misalignment or termination of structures north and south of the Beaver River near Gold Pay Creek are the basis for the inferred Gold Pay structure. The northwest trend is constrained by the surface structures and may reflect trends of postulated reactivated faults originating a deeper structural levels in Proterozoic or Lower Paleozoic strata. A similar origin may explain other northwest-trending structures in the map area (Toobally-Crow Fault, Caribou Thrust, and Jedhi Deh Thrust). An older deformation and intrusive event involving Proterozoic strata is recorded near the western edge of the map, represented by east-west-trending folds involving only Proterozoic strata and the ~650 Ma Pool Creek syenite. Eccene intrusions in the western portion of the map area appear to be post-tectonic.

Historical petroleum exploration in the area has concentrated on Devonian carbonate targets on anticlinal structures in the subsurface. The Kotaneelee gas field, on the east flank of Mount Martin has produced from one such target. More recent exploration, focused in the Liard Basin to the south, has targeted Devonian and Triassic organic-rich shale units exposed in this map area. Mineral showings exposed in the western portion of the map area are dominantly le zinc, and barium deposits concentrated in Silurian and Devonian carbonate and shale, or associated with intrusive bodies.

More detailed information regarding field observations, structural measurements, measured sections, fossil localities, radiometric ages, wells, mineral localities, and original sources can be found in the accompanying digital GIS files.

Bamber, E.W., Taylor, G.C., and Procter, R.M., 1968. Carboniferous and Permian stratigraphy of northeastern British Columbia; Geological Survey of Canada, Paper 68-15, 25 p.

Cecile, M.P. and Norford, B.S., 1979. Basin to platform transition, Paleozoic strata of Ware and Trutch map areas, northeastern British Columbia; in Current Research, Part A; Geological Survey of Canada, Paper 79-1A, p. 219-226. Chung, P., 1993. Conodont biostratigraphy of the Carboniferous to Permian Kindle, Fantasque, an unnamed and Belloy Formations, Western Canada; M.Sc. thesis, University of Calgary, Calgary, Alberta, 189 p. Douglas, R.J.W., 1976. Geology, La Biche River, Yukon Territory-District of Mackenzie; Geological Survey of Canada, Map 1380A, scale 1:250 000. doi:10.4095/109155 Gabrielse, H., Blusson, S.L., and Roddick, J.A., 1973. Geology of the Flat River, Glacier Lake and Wrigley Lake map-areas, District of Mackenzie and Yukon Territory; Geological Survey of Canada, Memoir 366 (Parts I and II), 421 p. doi:10.4095/100705 Gibson, D.W., 1975. Triassic rocks of the Rocky Mountain Foothills and Front Ranges of northeastern British Columbia and west-central Alberta; Geological Survey of Canada, Bulletin 247, 61 p. doi:10.4095/103976 Harker. P., 1963. Carboniferous and Permian rocks, southwestern District of Mackenzie; Geological Survey of Canada, Bulletin 95, 91 p. doi:10.4095/100614 Harrison, J.C., 1981. Petrology of the 'Ting Creek' alkalic intrusion, southeast Yukon; M.Sc. Thesis, University of Toronto, Toronto, Ontario, 299 p.

Henderson, C.M., 1989. Absaroka Sequence - the Lower Absaroka Sequence: Upper Carboniferous and Permian; in Western Canada Sedimentary Basin – a case history, (ed.) B.D. Ricketts; Canadian Society of Petroleum Geologists, Special Publication No. 30, p.203–217. Leckie, D.A., Potocki, D.J, and Visser, K., 1991. The Lower Cretaceous Chinkeh Formation: A frontier-type play in the Liard Basin of Western Canada; American Association of Petroleum Geologists Bulletin, v. 75, p. 1324-1352. Ludvigsen, R., 1979. A trilobite zonation of Middle Ordovician rocks, southwestern District of Mackenzie: Geological Survey of Canada, Bulletin 312, 99 p. MacNaughton, R.B., 2002. Sedimentology of Triassic siliciclastic strata, Mount Martin and Mount Merrill map areas, Yukon Territory; Geological Survey of Canada, Current Research, 2002-A4,

doi:10.4095/122458

Survey of Canada, Memoir 373, 37 p.

Columbia; Geological Survey of Canada, Bulletin 186, 62 p.

Morrow, D.W., 1978. The Dunedin Formation: a transgressive shelf carbonate sequence; Geologcial Survey of Canada, Paper 76-12, 35 p. Morrow, D.W., 1982. Correlations between the Sunblood, Esbataottine and Whittaker formations in the Lower Paleozoic sequence of the southern Mackenzie Mountains; in Current Research, Part A: Geological Survey of Canada, Paper 82-1A, p. 95-98. Morrow, D.W. and Cook, D.G., 1987. The Prairie Creek embayment and Lower Paleozoic strata of the southern Mackenzie Mountains; Geological Survey of Canada, Memoir 412, 195 p.

Morrow, D.W. and Miles, W.C., 2000. The Beaver River Structure: a cross-strike discontinuity of possible crustal dimensions in the southern Mackenzie Fold Belt, Yukon and Northwest Territories, Canada; Bulletin of Canadian Petroleum Geology, v. 48, p. 19-29. Norford, B.S., Gabrielse, H., and Taylor, G.C., 1966. Stratigraphy of Silurian carbonate rocks of the Rocky Mountains, northern British Columbia; Canadian Society of Petroleum Geologists, Bulletin of Canadian Petroleum Geology, v. 14, p. 504-519. Pigage, L.C., 2009. Bedrock geology of NTS 95C/5 (Pool Creek) and NTS 95D/8 map sheets, southeast Yukon; Yukon Geological Survey, Bulletin 16, 150 p. Pvle. L.J. and Barnes. C.R., 2000. Upper Cambrian to Lower Silurian stratigraphic framework of

platform-to-basin facies, northeast British Columbia; Bulletin of Canadian Petroleum Geology, v. Richards, B.C., 1989: Uppermost Devonian and lower Carboniferous stratigraphy, sedimentation, and diagenesis, southwestern District of Mackenzie and southeastern Yukon Territory; Geological Survey of Canada Bulletin 390, 135 p. doi:10.4095/127662 Rowins, S.M. and Francis, D.M., 1995. The late Tertiary to Recent Beaver River alkaline complex, southeastern Yukon, Canada; Geological Society of America, 1995 annual meeting, Abstracts with Programs – Geological Society of America, 1995, v. 27, Issue 6, p. 46. Stott, D.F., 1982. Lower Cretaceous Fort St. John Group and Upper Cretaceous Dunvegan Formation of the foothills and plains of Alberta, British Columbia, District of Mackenzie and Yukon Territory; Geological Survey of Canada, Bulletin 328, 124 p. doi:10.4095/119100 Taylor, G.C. and Stott, D.F., 1973. Tuchodi Lakes map-area, British Columbia; Geological

Taylor, G.C. and Mackenzie, W.S., 1970. Devonian stratigraphy of northeastern British

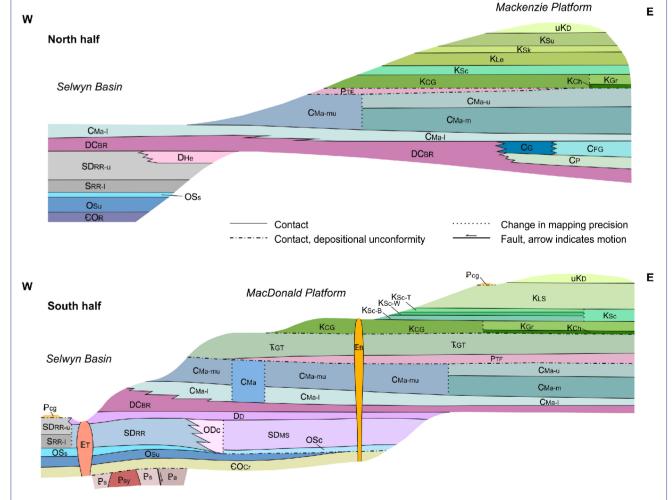


Figure 2. Schematic diagram showing stratigraphic and intrusive relationships within La Biche River map area (NTS 95-C).

Fallas, K.M., Lane, L.S., and Pigage, L.C., 2014. Geology, La Biche River, Yukon-Northwest Territories; Geological Survey of Canada, Canadian Geoscience Map 144, scale 1:250 000.

Authors: K.M. Fallas, L.S. Lane, and L.C. Pigage

Geological compilation by K.M. Fallas, L.S. Lane, and L.C. Pigage, 2007–2013 Geological field observations by M.P. Cecile, L.D. Currie, C.A. Evenchick, K.M. Fallas, G.F. Hynes, L.S. Lane, R.B. MacNaughton, and I.R. Smith of the Geological Survey of Canada, 1996–2002; G. Abbott, T.L. Allen, and ...C. Pigage of the Yukon Geological Survey, 2000–2002; and A.K. Khudoley of St. Petersburg State University, 2001–2002

Historical geological observations by W.B. Brady, 1959, P. Burt, 1983, R.J.W. Douglas, 1957, J.C. Harrison, 1978, R.P. Hill, 1978, T.E. Kubli, 1996. M.R. McDonough, 1995, R. Parrish, 1982, and J.C. Sproule, 1958 Stratigraphic sections measured by E.W. Bamber, A. Couch, P. Harker, E.D. Kindle, D.A. Leckie, R.B. MacNaughton, D.W. Morrow, B.C. Richards, and D.F. Stott of the Geological Survey of Canada, 1943–2002; MSc student J.H. Frank of the University of Alberta, 1999; and PhD student D.M.S. Jowett of

Carleton University, 2000–2001

LA BICHE RIVER Yukon-Northwest Territories

CANADIAN GEOSCIENCE MAP 144

Geomatics by K.M. Fallas, S.D. Orzeck, and R. Chan Cartography by S.D. Orzeck Scientific editing by A.J. Weatherston Joint initiative of the Geological Survey of Canada and the Yukon Geological Survey, conducted under the auspices of the Central Foreland NATMAP Project Map projection Universal Transverse Mercator, zone 10. North American Datum 1983

Base map at the scale of 1:250 000 from Natural Resources Canada,

with modifications.

Elevations in metres above mean sea level.

Magnetic declination 2014, 20°50'E, decreasing 23' annually. Readings vary from 21°10'E in the NW corner to 20°28'E in the SE corner of the map. The Geological Survey of Canada welcomes corrections or additional information from users.

See documentation accompanying the data. Additional references are included in the map info document. This publication is available for free download through GEOSCAN (http://geoscan.nrcan.gc.ca/).

Data may include additional observations not portrayed on this map.