	UWI	Well Name
1.	200C010E094N0700	JOINT VENTURE NO.1 C-010-E/094-N-07
2.	200A039B094N0800	SUNCOR ET AL DUNEDIN A-039-B/094-N-08
3.	200D075E094N0800	IOE DUNEDIN D-075-E/094-N-08
4.	200D057K098N0200	KMCL SHELL TOAD D-057-K/094-N-02

Table 1. List of wells.

REFERENCES

Geotex Consultants, 1984. Liard River Development, Devils Gorge and Beavercrow projects; unpublished geological maps prepared for BC Hydro, scales 1:10 000 and 1:50 000. P.B. Read, principal compiler.

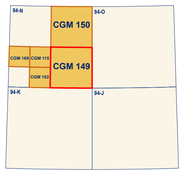
Kindle, E.D., 1944. Geological reconnaissance along Fort Nelson, Liard and Beaver Rivers, northeastern British Columbia, and southeastern Yukon: Geological Survey of Canada, Paper 44–16, 14 p.

Abstract

The Toad River southeast map area (NTS 94-N/SE) in western Liard Basin is underlain by a thick Triassic to Cretaceous clastic rock-dominated succession. A prominent escarpment held up by resistant Upper Cretaceous sandstone and conglomerate of the Sikanni and Dunvegan formations marks the west limb of the Liard syncline. To the east, exposure is limited to more incised drainages, mainly of the Dunvegan Formation. A few discontinuous gentle folds occur. To the west the amount of deformation decreases noticeably northward. In the southwest, the Foothills are characterized by a well developed terrain of northwest-trending, open folds beautifully outlined by resistant Triassic sandstone of the Liard Formation. North of Liard River only a few gentle north or northwest-trending folds deform Triassic and Lower Cretaceous strata in the transition zone to the southern Liard Fold and Thrust Belt. Drilling has shown the prominent Toad River Anticlinorium overlies uplifted Proterozoic and Paleozoic strata.

Résumé

La portion sud-est de la région cartographique de Toad River (SNRC 94-N/SE), dans la partie ouest du bassin de Liard, repose sur une épaisse succession à dominante de roches détritiques du Trias-Crétacé. Un escarpement saillant formé de grès et conglomérats résistants du Crétacé supérieur des formations de Sikanni et de Dunvegan délimite le flanc ouest du synclinal de Liard. À l'est, les affleurements sont limités aux cours d'eau plus encaissés et représentent surtout la Formation de Dunvegan. Quelques plis peu développés et discontinus sont présents. À l'ouest, l'intensité de la déformation diminue de façon notable vers le nord. Au sud-ouest, les Foothills sont caractérisés par un terrain bien organisé de plis ouverts de direction nord-ouest mis en évidence de façon spectaculaire par des grès résistants du Trias de la Formation de Liard. Au nord de la rivière Liard, seuls quelques plis ouverts de direction nord ou nord-ouest déforment les strates du Trias et du Crétacé inférieur dans la zone de transition menant à la zone de plissement et de chevauchement de Liard. Des forages ont démontré que l'anticlinorium saillant de Toad River surmonte des strates soulevés du Protérozoique et du Paléozoique.



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

Cover illustration
Chevron folded sandstone of the Liard Formation exposed near the Toad River, northeast British Columbia. Photograph by M.E. McMechan. 2013-309

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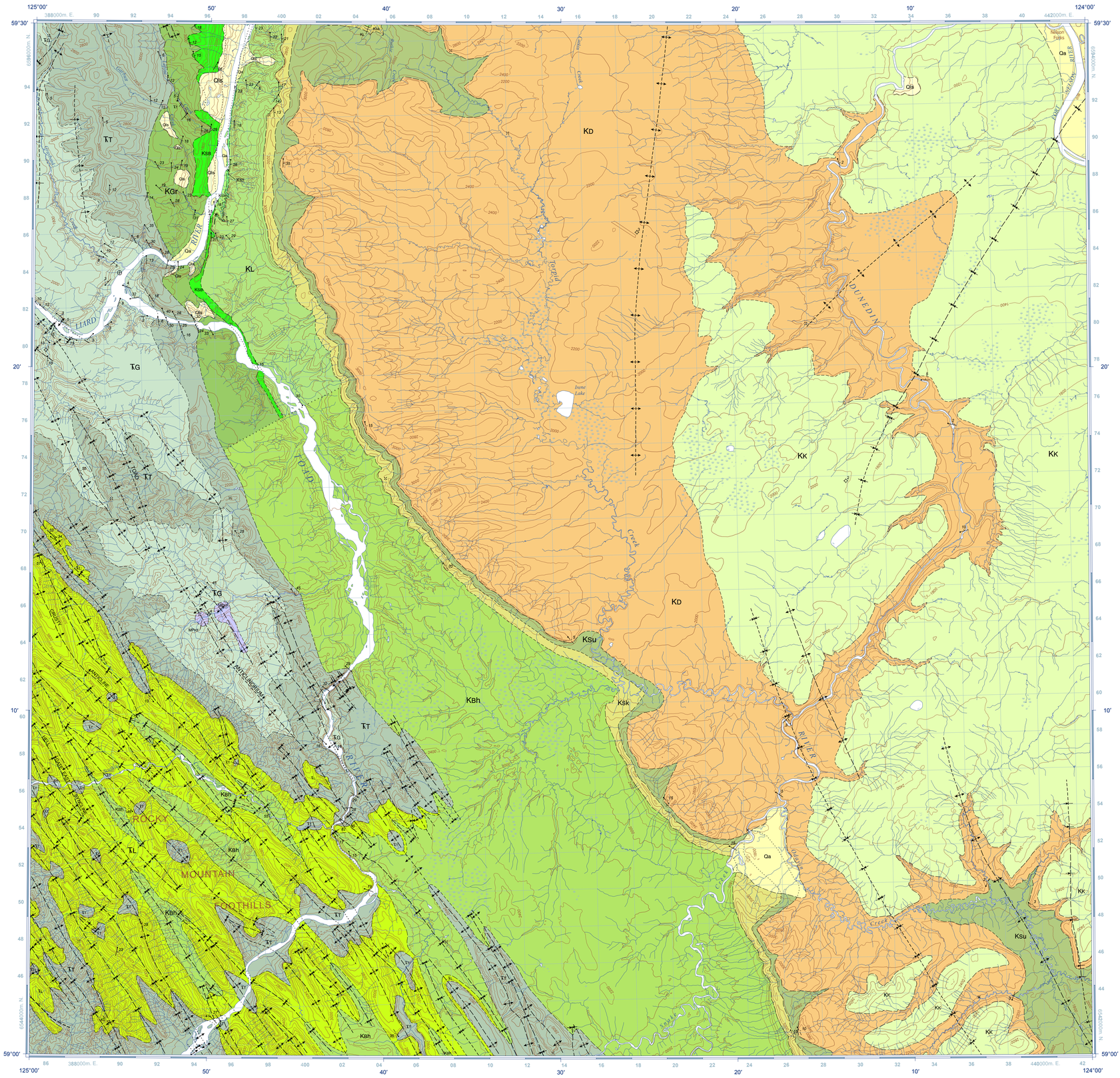
Natural Resources Canada Ressources naturelles du Canada

CANADIAN GEOSCIENCE MAP 149
GEOLOGY
TOAD RIVER (SOUTHEAST)
British Columbia
1:100 000



QUATERNARY

Qls — **Landslide:** slumps and/or blocks of nearby bedrock.

Qa — **Till, alluvium, colluvium, lake silt:** deposits of gravel, sand, and silt. This unit is shown only where these deposits cover the bedrock extensively.

CRETACEOUS

UPPER CRETACEOUS

Kk — **Kotaneelee Formation:** shale: dark grey to black, rusty-weathering with siderittic concretions and a few intervals of sandstone: fine- to medium-grained, thin- to thick-bedded, brown-weathering, locally crossbedded, burrow-mottled, fossiliferous, in the upper part of formation.

Kd — **Dunvegan Formation:** pebble to cobble conglomerate, variably sandy with common crude horizontal stratification and large-scale crossbeds in resistant conglomerate-dominated cycles with sandstone. Sandstone is fine-grained to conglomeratic, brown-weathering, commonly laminated or crossbedded and may grade upwards into siltstone and silty mudstone. Cycles overlie a resistant basal sandstone commonly capped by a thin coal or carbonaceous mudstone. A thick interval of variably carbonaceous mudstone and siltstone with minor sandstone and rare thin coal forms the recessive upper part of the formation in the Dunedin River area. Multistage channel cut-and-fill infilled with interbedded siltstone and very fine-grained to pebbly sandstone with local ripple crosslamination and crossbeds are common in the upper part of the formation.

LOWER AND UPPER CRETACEOUS

Fort St. John Group (Kgr–Ksu)

Ksu — **Sully Formation:** mudstone: silty, dark grey to black, rusty-weathering with reddish brown-weathering siderittic concretions; shale: black, medium to light grey-weathering, flaky to fissile with interbeds of light grey-weathering platy siltstone; interbeds of sandstone: fine-grained, grey, thin-bedded, laminated and crosslaminated, occur near the top.

LOWER CRETACEOUS

Ksk — **Sikanni Formation:** sandstone: siliceous, fine-grained, grey, light brown-grey-weathering, finely laminated, locally crosslaminated, coarse-grained, or conglomeratic, in 3 or 4 resistant units up to 30 m thick, separated by recessive intervals of dark grey to black mudstone with a few concretions.

KL — **Lepine Formation:** shale: black, flaky to fissile; overlain by mudstone: silty, dark grey, commonly rusty-weathering with reddish brown-weathering concretions and minor interbedded platy siltstone in middle and upper part. South of 50°23.5′ the Lepine Formation includes the stratigraphic equivalents of the Wildhorn and Tussock members of the Scatter Formation, and silty, black, concretionary mudstone with common ammonites in concretions, and a few units of argillaceous siltstone form a basal unit.

Ksb — **Buckinghorse Formation:** mudstone: dark grey, concretionary (upper part); siltstone: very thin- to thin-bedded with dark grey, silty shale interbeds (middle part); shale: silty, dark grey to black, locally rusty-weathering with reddish-weathering concretions and a few thin bentonite seams.

Scatter Formation (KSB–KST)

KST — **Tussock Member:** alternating units of sandstone, siltstone and silty mudstone; sandstone: argillaceous, glauconitic, silty, greenish grey, thin- to thick-bedded with common burrow-mottling, worm trails, laminae; sandstone: grey, crossbedded; siltstone: argillaceous, dark grey, grey-or rusty-weathering, finely laminated; mudstones: silty, black, weather blocky and rusty.

KSW — **Wildhorn Member:** mudstone: silty, black, dark-grey to rusty-weathering dark grey, reddish brown-weathering siderittic concretions become more common in the upper part. Thin beds of argillaceous siltstone and sandstone occur near the top.

KSB — **Bulwell Member:** sandstone: fine- to very fine-grained, grey and greenish grey, thin- to thick-bedded, commonly glauconitic, laminated, abundant ripple-marks, worm burrows, trails, castings, crossbedding, interbedded with argillaceous silty sandstone and silty mudstone. Sandstone grades into siltstone and shale southward. South of Garbutt Creek the member comprises lower and upper sandstone units separated by a thick shale-dominated interval.

KGr — **Garbutt Formation:** shale: silty, dark grey, dark grey-weathering, with numerous thin, parallel laminated or crosslaminated siltstone to sandstone lenses and beds giving the unit a striped appearance (lower part); mudstone and shale: dark grey, commonly rusty-weathering, rubbly, with rows of reddish brown-weathering concretions and common interbeds of grey, planar or crosslaminated, very fine-grained, sandstone to siltstone near the top (upper part). Slump structures occur locally. Sandstone: argillaceous, glauconitic, fine-grained up to 1.5 m (4–5 feet) occurs locally at the base. Elsewhere glauconitic mudstone or a few chert nodules mark the base.

TRIASSIC

TL — **Liard Formation:** sandstone: calcareous, very fine- to locally medium-grained, medium to dark grey, light grey- to orange-brown-weathering, medium- to very thick-bedded, crossbeds, ripples, laminations, scour features, burrows, and concretionary or coquinoid layers are locally common; minor limestone: sandy or conglomeratic, light to dark grey, buff- to light grey-weathering, medium- to very thick-bedded; minor interbedded dark grey siltstone and shale.

TT — **Toad Formation:** siltstone: calcareous, dark grey, dark grey- to brown-weathering, thin- to thick-bedded, commonly laminated, platy; minor shale: calcareous, dark grey to black, dark grey- or brown-weathering; minor sandstone: calcareous, very fine- to fine-grained, commonly laminated and sharp based, more common in the middle and upper part.

TG — **Grayling Formation:** shale: noncalcareous, medium grey, light grey-weathering, flaky, laminated with minor interbeds of sandstone: fine-grained, medium grey, brown-grey weathering, very thin- to thin-bedded; and minor shale: dolomitic, medium grey, laminated. Sandstone: calcareous or dolomitic, very fine- to fine-grained, medium grey, brown-weathering, medium- to very thick-bedded, interbedded with dark grey fissile shale, occurs at base.

MISSISSIPPIAN, PENNSYLVANIAN, AND PERMIAN

MPkF — **Kindle and Fantasque formations:** siliceous siltstone, siliceous dolomitic siltstone: dark grey (Kindle Formation); siliceous shale, cherty shale and chert: all dark grey (Fantasque Formation).

Station
- Outcrop, visited
- Aerial observation

Bedding
- Horizontal, top known
- Inclined, top known
- Inclined, top unknown
- Inclined, estimated remotely, top known
- Inclined, estimated remotely, top unkown

Cleavage
- Cleavage, inclined

Wells
- Petroleum well, dry and abandoned

Contacts
- Approximate
- Inferred
- Concealed
- Change in stratigraphic nomenclature

Faults
- Back-thrust fault, approximate
- Back-thrust fault, inferred

Folds
- Anticline, upright, approximate
- Anticline, upright, inferred
- Anticline, upright, concealed
- Anticline, asymmetrical, upright, approximate
- Anticline, asymmetrical, upright, concealed
- Monocline, anticlinal bend, upright, approximate, flat to dipping
- Monocline, anticlinal bend, upright, inferred, flat to dipping
- Monocline, synclinal bend, upright, approximate
- Monocline, synclinal bend, upright, inferred
- Syncline, upright, approximate
- Syncline, upright, inferred
- Syncline, upright, concealed
- Syncline, asymmetrical, upright, approximate

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Canadian Geoscience Maps

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Geology by M.E. McMechan based on ground and aerial observations by M.E. McMechan (2011–2012), ground observations by F. Ferri (2011–2012), J.F. Psutka (1982) and D.M.S. Jowett (2002) and unpublished geological map compilations by Geotex Consultants (1984) P.B. Read, principal compiler for the area along the Liard River, and studies of vertical air photographs and high resolution orthorectified satellite images by M.E. McMechan.

Geomatics and cartography by T. Konopelky and M. Le

CANADIAN GEOSCIENCE MAP 149
GEOLOGY
TOAD RIVER (SOUTHEAST)
British Columbia
1:100 000

2 0 2 4 6 8 km

Initiative of the Geological Survey of Canada, conducted under the auspices of the Yukon Sedimentary Basins project as part of Natural Resources Canada's Geo-mapping for Energy and Minerals (GEM) program and the British Columbia Ministry of Natural Gas Development, Geoscience and Strategic Initiatives Branch.

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 feet above mean seal level

Mean magnetic declination 2014, 20°18′E, decreasing 21′ annually. Readings vary from 20° 07′E in the SE corner to 20° 28′E in the NW corner of the map.

The Geological Survey of Canada welcomes corrections or additional information from users.

Data may include additional observations not portrayed on this map. *See* documentation accompanying the data. Additional descriptive notes and references are included in the map information document.

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Preliminary publications in this series have not been scientifically edited.

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