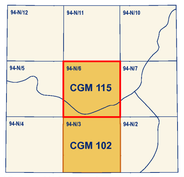
Abstract

The Grayling River area (NTS 94-N/06) in the western Liard Basin is underlain by Triassic and Lower Cretaceous shale, siltstone and sandstone. A regional unconformity at the base of the Cretaceous down cuts to the north and east. Folds dominate the structural style. These probably formed in the latest Cretaceous and are well exposed along Liard River and where the resistant Liard Formation occurs. A regionally significant change in the orientation of structures from northwest in the Rocky Mountain Foothills (southern part of the area) to north or northeast in the Liard Thrust and Fold Belt (northern part of area) occurs. Cross-cutting faults and highly variable fold trends indicate local regions where both trends are developed. This map incorporates extensive observations from a major unpublished geological study of the Liard River corridor prepared for BC Hydro in 1984 as well as new data collected during field work as part of the GEM project.

Résumé

La région cartographique de Grayling River (SNRC 94-N/06), dans la partie ouest du bassin de Liard, repose sur une succession de shale, de siltstone et de grès du Trias et du Crétacé inférieur. Une discordance régionale à la base du Crétacé s'enfonce dans la succession au nord et à l'est. Des plis constituent l'élément dominant du style structural. Ceux-ci se sont probablement formés au Crétacé terminal et sont bien représentés en affleurements le long de la rivière Liard et aux endroits où sont présentes les unités résistantes de la Formation de Liard. À l'échelle régionale, on observe un changement significatif de l'orientation des structures, qui passe de nord-ouest dans les contreforts des Rocheuses (partie sud de la région) à nord ou nord-est dans la zone de plissement et de chevauchement de Liard (partie nord de la région). Des failles transversales et des plis aux orientations très variées révèlent localement des régions où les deux grandes orientations de structures se manifestent. La présente carte incorpore un grand nombre d'observations réalisées pour le compte de BC Hydro en 1984 dans le cadre d'une importante étude géologique, aux résultats inédits, du corridor de la rivière Liard ainsi que de nouvelles données acquises lors de travaux sur le terrain d'un projet du programme GEM.



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

Cover illustration
Chevron-style anticline outlined by resistant sandstones of the Liard Formation near Boiler Canyon, Liard River. Recessive shale of the Garbutt Formation underlie valleys on flanks of fold. Photograph by M.E. McMechan. 2013-021

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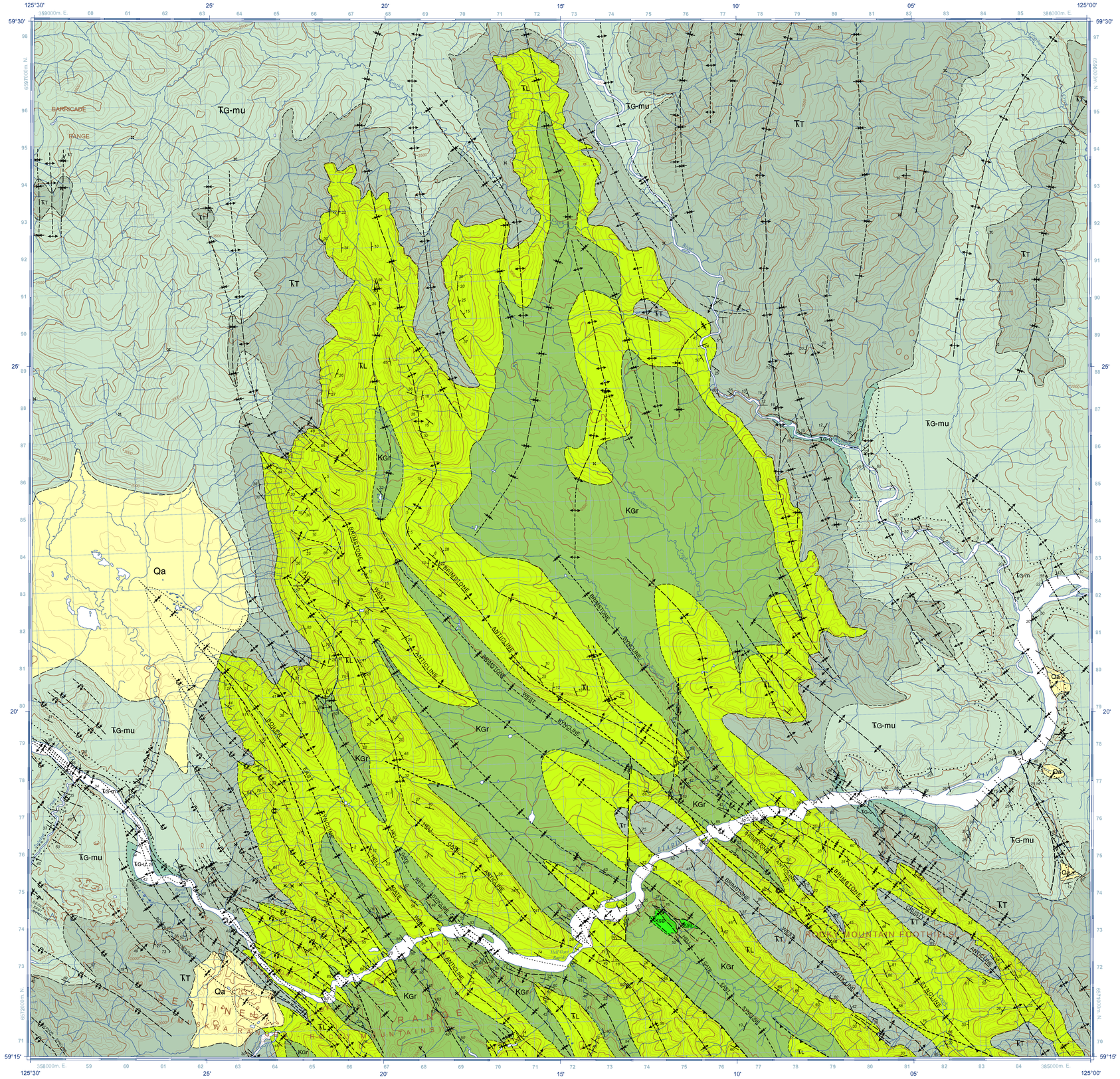
CANADIAN GEOSCIENCE MAP 115
GEOLOGY
GRAYLING RIVER
British Columbia
1:50 000



QUATERNARY

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

Lower Cretaceous

KSB — **Scatter Formation, Bulwell Member:** Sandstone: fine- to very fine-grained, grey and greenish grey, thin- to thick-bedded, commonly laminated, abundant ripple-marks, worm burrows, trails, castings, crossbedding, commonly glauconitic, interbedded with argillaceous silty sandstone and silty mudstone.

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.

ŦL — **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.

ŦT — **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.

Grayling Formation

ŦG-mu — **Grayling Formation, middle and upper parts:** Shale: noncalcareous, medium grey, light grey-weathering, flaky, laminated; shale: calcareous or dolomitic, medium grey, light medium grey-weathering; siltstone: dark to medium grey, medium grey-weathering; with interbeds of sandstone: light medium grey, brown-weathering, fine-grained, thin- to thick-bedded with locally abundant ripples, flute casts (middle part); shale: medium grey, light grey-weathering with thick laminae to very thin interbeds of sandstone: calcareous, light medium grey, brown-weathering, very fine-grained, commonly cross-laminated (upper part).

ŦG-u — **Grayling Formation, upper part:** Shale: medium grey, light grey-weathering with thick laminae to very thin interbeds of sandstone: calcareous, light medium grey, brown-weathering, very fine-grained, commonly cross-laminated.

ŦG-m — **Grayling Formation, middle part:** Shale: noncalcareous, medium grey, light grey-weathering, flaky, laminated; shale: calcareous or dolomitic, medium grey, light medium grey-weathering; siltstone: dark to medium grey, medium grey-weathering; with interbeds of sandstone: light medium grey, brown-weathering, fine-grained, thin- to thick-bedded with locally abundant ripples, flute casts, locally form sandstone dominated intervals up to 10 m thick.

Station
- × Outcrop, visited
- Aerial observation

Bedding
- Overturned, top known
- Inclined, top known
- Inclined, top unknown
- Vertical, top unknown

Cleavage
- Cleavage, vertical
- Cleavage, inclined

Contacts
- Defined
- Approximate
- Inferred
- Concealed
- Mapping precision change

Faults
- Motion undefined, approximate
- Motion undefined, inferred
- Motion undefined, concealed
- Normal fault, approximate
- Normal fault, inferred
- Normal fault, concealed
- Thrust fault, approximate
- Thrust fault, inferred
- Back-thrust fault, inferred
- Oblique-slip, sinistral, reverse fault, approximate
- Oblique-slip, sinistral, reverse fault, inferred
- Sinistral strike-slip fault, approximate
- Sinistral strike-slip fault, concealed

Folds
- Anticline, upright, approximate
- Anticline, upright, inferred
- Anticline, upright, concealed
- Anticline, upright, homeoclinic, shorter arrow on steeper limb, approximate
- Anticline, upright, homeoclinic, shorter arrow on steeper limb, inferred
- Anticline, overturned, approximate
- Anticline, overturned, inferred
- Anticline, overturned, 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, upright, homeoclinic, shorter arrow on steeper limb, approximate
- Syncline, overturned, approximate
- Syncline, overturned, inferred
- Syncline, overturned, concealed
- Syncline, asymmetrical, upright, approximate
- Syncline, asymmetrical, upright, concealed

REFERENCES

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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.

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Canadian Geoscience Maps

Canada

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Geological compilation by M.E. McMechan (2013) based on ground and aerial observations by M.E. McMechan (2012), ground observations by R.L. Brown (1982), F. Ferri (2012), J.F. Fyles (1982), J.M. Journey (1982), E.D. Kindle (1943), J.F. Psutka (1982) 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 by J. Gardner and M. Le

Cartography by J. Gardner

Joint initiative of the Geological Survey of Canada and the British Columbia Ministry of Natural Gas Development, Geoscience and Strategic Initiatives Branch, 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.

GEOLOGY
GRAYLING RIVER
British Columbia
1:50 000

1 0 1 2 3 4 km

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 sea level

Magnetic declination 2013, 20°49'E, decreasing 21' annually.

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

The 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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