

Figure 1. Northeast Carcajou Canyon map area (NTS 96-DNE) showing seismic lines on record with the National Energy Board that were used to augment the bedrock geology interpretation. Line names are provided in the data files.

Abstract

The northeast quadrant of the Carcajou Canyon map area (NTS 96-D) straddles the Mackenzie Mountains and Mackenzie Plain, Northwest Territories, rising from relatively flat, low-lying plain in the northeast to mountainous terrain in the southwest. Much of the Mackenzie Plain here underlies an oil or very gently folded Cretaceous to Paleocene siliciclastic strata. Exposures in the Mackenzie Mountains include siliciclastic and carbonate strata ranging in age from Neoproterozoic to Devonian. These older strata have been brought to the surface by compressional faults and in the cores of anticlines associated with Cordilleran deformation. Structural features are dominated by a northwest-trend, the expression being the northeast-trending Gamblit Fault. Public-domain seismic-reflection lines, archived with the National Energy Board, help constrain the location of contacts between sparsely exposed Cretaceous units, petroleum exploration by private industry in the area targets Cambrian or Devonian strata in the subsurface of the Mackenzie Plain.

Résumé

Le quadrant nord-est de la région cartographique de Carcajou Canyon (SNRC 96-D) chevauche les monts Mackenzie et la plaine du Mackenzie (Territoires du Nord-Ouest), où le terrain s'élève depuis une basse plaine relativement plane, au nord-est, à un terrain montagneux vers le sud-ouest. La majeure partie de la plaine du Mackenzie repose sur des strates silicoclastiques du Crétacé au Paléocène. Les affleurements dans les monts Mackenzie comprennent des strates silicoclastiques et carbonatées d'échelonnement au Néoproterozoïque au Dévonien. Ces strates plus anciennes ont été amenées à la surface le long de failles de compression et dans le cœur d'anticlinaux associés à la déformation cordillère. La tendance des entités structurales est à prédominance nord-ouest, à l'exception de la faille de Gamblit de direction nord-est. Des profils de sismique d'exploration du domaine public, archivés par l'Office national de l'énergie, ont aidé à circonscrire les contacts des unités du Crétacé peu représentées en affleurement. Dans la région, l'exploration pétrolière par l'industrie a ciblé les strates du Cambrien ou du Dévonien enfouies dans les profondeurs de la plaine du Mackenzie.

CGM 101	CGM 100	CGM 91
CGM 94	CGM 95	CGM 92
CGM 97	CGM 96	CGM 93

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

Cover illustration

View looking east along the Rouge Mountain River from the flank of the Rouge Mountain anticline. Red and orange rocks in the foreground belong to Proterozoic Little Dal Group. The yellow exposure downslope is locally intra-Cordilleran Franklin Mountain Formation. Photograph by K.M. Fallas, 2012-146

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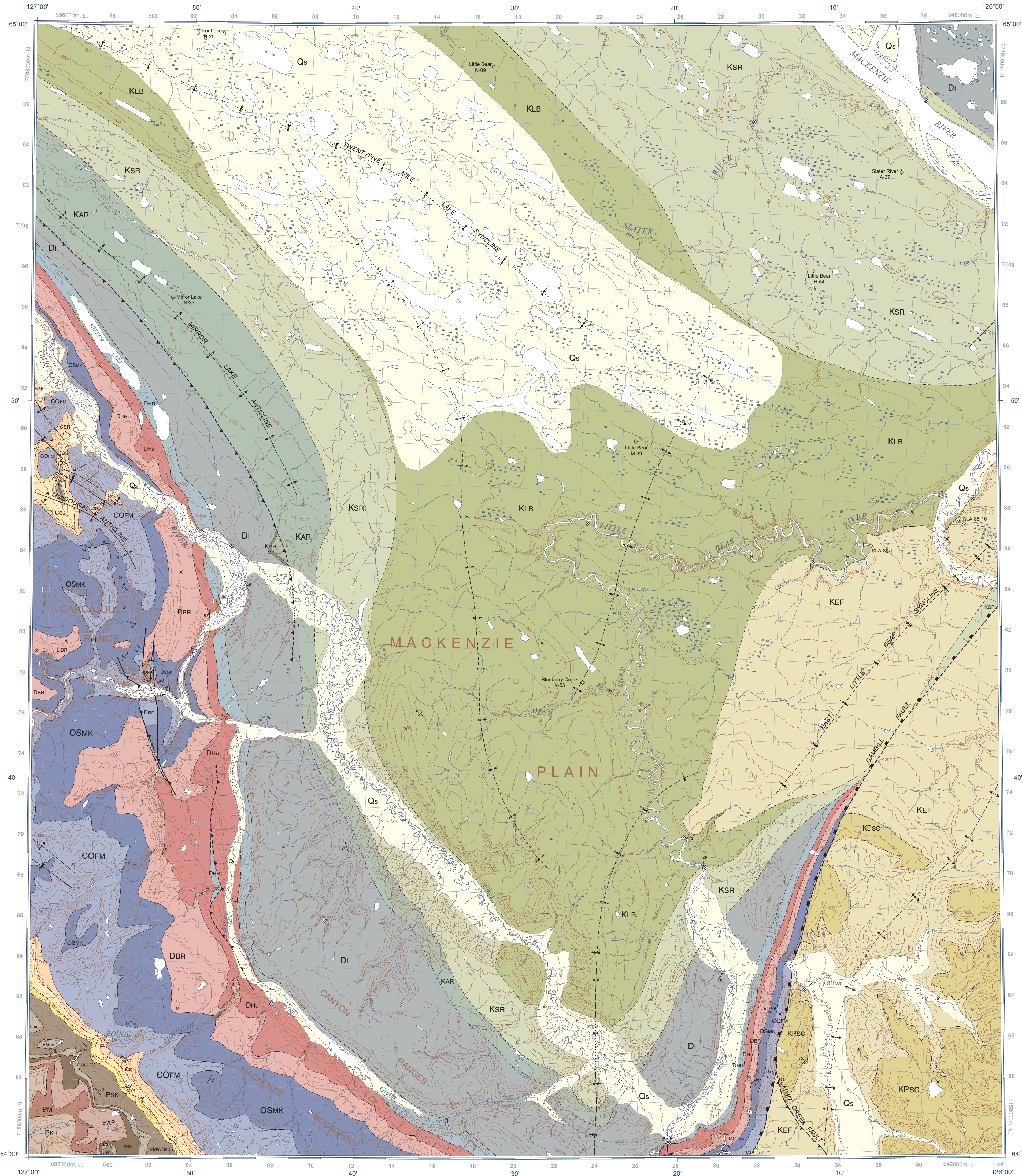
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Map projection Universal Transverse Mercator, zone 9, North American Datum 1983

Base map at the scale of 1:50 000 from Natural Resources Canada, with modifications.

Elevations above mean sea level are expressed in feet north of 64°45' and metres south of 64°45'

Some geographic names on this map are not official.

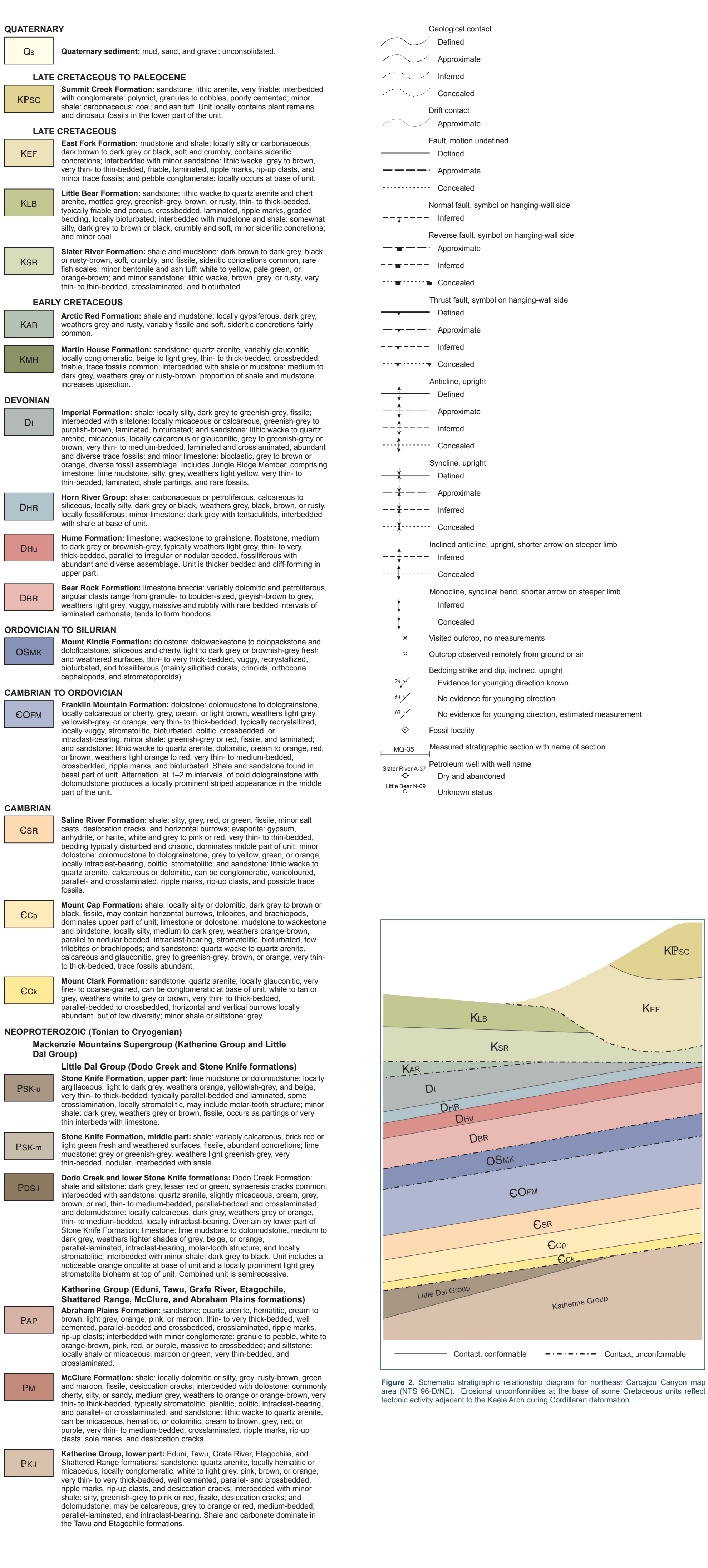
Mean magnetic declination 2013, 23°9'E, decreasing 30' annually. Readings vary from 23°18'E in the NW corner of the map to 22°59'E in the SE corner of the map.

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

Data may include additional features not portrayed on this map. See documentation accompanying the data.

Additional references are included in the map information document.

This publication is available for free download through GEOCAN (http://geoscan.nrcan.gc.ca/)



NOTES

The authors have updated and revised map unit terminology from the Operation Norman map (Aiken et al., 1974). In general, terminology for Cambrian units is that of Dixon and Stasiuk (1998) with modifications by Fallas and MacNaughton (2012). Silurian and Devonian usage follows that of Morrow (1991), and Cretaceous to Paleocene formation names are those of Dixon (1989). Neoproterozoic to Ordovician units have recently undergone revision to their terminology, as outlined below.

Recent stratigraphic work in the Mackenzie Mountains has formalized the Mackenzie Mountains Supergroup and revised its formation-level nomenclature. Within the Katherine Group, the Eduli, Tawu, Grate River, Etapochile, and Shattered Range formations of Long and Turner (2012) correspond to the lower part of the Katherine Group as shown on the GSC maps for Carcajou Canyon (Aiken et al., 1974), and to the K1 to K5 divisions of Aiken et al. (1978) and Long et al. (2008). Delineation of these new formations depends on the ability to recognize the recessive Tawu and Etapochile formations. These formations are seldom exposed in the mapping area and so the five lower formations of the Katherine Group were grouped during mapping. The McClure and Abraham Plains formations correspond to the upper Katherine Group on the Carcajou Canyon map (Aiken et al., 1974), and to the K6 and K7 divisions of Aiken et al. (1978) and Long et al. (2008).

The Little Dal Group previously was mapped in this region as two units: H5, and Little Dal Formation (Aiken et al., 1974). Regionally, those two units were reorganized into seven informal units of formation scale by Aiken (1981). In the present mapping area, Aiken's terminology can be applied as follows: the lower part of H5 corresponds to the "Mudcracked formation"; the upper part of H5 and the Little Dal Formation correspond to the "Basinal Assemblage". Most recently, Turner and Long (2012) have formalized the internal stratigraphy of the Little Dal Group. Their nomenclature applies as follows to the present study area: the Mudcracked formation is now the Dodo Creek Formation; the Basinal Assemblage is now the Stone Knife Formation, consisting of four informal members (1, 2, 3, and 4). In the present series of maps the Dodo Creek Formation and the lower Stone Knife Formation (equivalent to its member 1) have been combined due to similarity of weathering profile and colour. Our middle Stone Knife Formation corresponds to the lower part of member 2 (typically a bright red shale in this area), and the upper Stone Knife Formation encompasses the upper part of member 2 (carbonate dominated).

Previous work by the Geological Survey of Canada in northeast Carcajou Canyon map area (Aiken and Cook, 1974) subdivided the Cambro-Ordovician Franklin Mountain Formation into three informal units. In ascending order they are: Cyclic member, Rhythmic member, and Cherty member (Norford and Macquenn, 1975). On the present maps, the three unit names correspond, in ascending order, to informal lower, middle, and upper members of the Franklin Mountain Formation. These lower, middle, and upper members correspond to units 1, 2, and 3 of the Franklin Mountain Formation described by Turner (2011).

For detailed information on surficial deposits, here shown as "Quaternary sediment", see Duk-Rodkin and Hughes (2002).

The names Summit Creek Fault, Twentyfive Mile Lake syncline, Mirror Lake anticline, and East Little Bear syncline have been introduced to facilitate discussion of these structural features. The names Gamblit Fault and MacDuggall anticline have been incorporated from the Carcajou Canyon map (Aiken et al., 1974). Cordilleran deformation in this map area has generated folds and thrusts interpreted to be detached within Proterozoic, Cambrian, or Devonian strata. The Gamblit Fault is represented as a reverse fault on the basis of seismic-reflection data showing the development of a salt wall above steep faults in Proterozoic strata (MacLean and Cook, 1999).

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REFERENCES

Aiken, J.D., 1981. Stratigraphy and sedimentology of the upper Proterozoic Little Dal Group, Mackenzie Mountains, Northwest Territories, in: Proterozoic Basins of Canada, (ed.) F.H.A. Campbell, Geological Survey of Canada, Paper 81-10, p. 47-71.

Aiken, J.D. and Cook, D.G., 1974. Carcajou Canyon map-area, District of Mackenzie, Northwest Territories. Geological Survey of Canada, Paper 74-13, 28 p.

Aiken, J.D., Cook, D.G., Ballkwill, H.R., and Yorath, C.J., 1974. Geology, Carcajou Canyon, District of Mackenzie, Geological Survey of Canada, Map 1390A, scale 1:250 000. doi:10.4095/109028

Aiken, J.D., Long, D.G.F., and Semikhatov, M.A., 1978. Progress in Helikian stratigraphy, Mackenzie Mountains; in: Current Research, Part A: Geological Survey of Canada, Paper 78-1A, p. 461-484.

Dixon, J., 1989. Mesozoic-Cenozoic stratigraphy of the northern Interior Plains and plateaus, Northwest Territories. Geological Survey of Canada, Bulletin 536, 56 p.

Dixon, J. and Stasiuk, L.D., 1998. Stratigraphy and hydrocarbon potential of Cambrian strata, northern Interior Plains, Northwest Territories; Bulletin of Canadian Petroleum Geology, v. 46, no. 3, p. 445-470.

Duk-Rodkin, A. and Hughes, O.L., 2002. Surficial geology, Carcajou Canyon, Northwest Territories. Geological Survey of Canada, Map 1980A, scale 1:250 000. doi:10.4095/236116

Fallas, K.M. and MacNaughton, R.B., 2012. Distribution of Cambrian formations in the eastern Mackenzie Mountains, Northwest Territories; Geological Survey of Canada, Current Research 2012-12, 12 p. doi:10.4095/289498

Long, D.G.F. and Turner, E.C., 2012. Formal definition of the Neoproterozoic Mackenzie Mountains Supergroup (NW1), and formal stratigraphic nomenclature for terrigenous classic units of the Katherine Group; Geological Survey of Canada, Open File 7113 40 p. doi:10.4095/282168

Long, D.G.F., Rainbird, R.H., Turner, E.C., and MacNaughton, R.B., 2008. Early Neoproterozoic strata (Sequence B) of mainland Northern Canada and Victoria and Banks Islands: a contribution to the Geological Atlas of the Northern Canadian Mainland Sedimentary Basin; Geological Survey of Canada, Open File 7207, 27 p. 1 CD-ROM. doi:10.4095/288070

MacLean, B.C. and Cook, D.G., 1999. Salt tectonics in the Fort Norman area, Northwest Territories, Canada; Bulletin of Canadian Petroleum Geology, v. 47, no. 2, p. 104-135.

Morrow, D.W., 1991. The Silurian-Devonian sequence in the northern part of the Mackenzie Shelf, Northwest Territories; Geological Survey of Canada, Bulletin 413, 121 p.

Norford, B.S. and Macquenn, R.W., 1975. Lower Paleozoic Franklin Mountain and Mount Kindle formations, District of Mackenzie; their type sections and regional development; Geological Survey of Canada, Paper 74-34, 37 p.

Turner, E.C., 2011. A lithostratigraphic transect through the Cambro-Ordovician Franklin Mountain Formation in NTS 96D (Carcajou Canyon) and 96E (Norman Wells), Northwest Territories; Geological Survey of Canada, Open File 6994, 28 p. doi:10.4095/289612

Turner, E.C. and Long, D.G.F., 2012. Formal definition of the Neoproterozoic Mackenzie Mountains Supergroup (NW1), and formal stratigraphic nomenclature for its carbonate and evaporate formations; Geological Survey of Canada, Open File 7112, 57 p. doi:10.4095/282167

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