

Figure 1. Southeast Mahony Lake map area (NTS 96-F/SE) showing seismic lines on record with the National Energy Board (NEB) that were used to augment the bedrock geology interpretation. Line names are provided in the digital data files.

Abstract

The southeast quadrant of the Mahony Lake map area (NTS 96-F) straddles the boundary between the Great Bear Plain and the Franklin Mountains, Northwest Territories. The mountain range extending north-northwest from Mount St. Charles (informally known as the St. Charles range), overlooks an area dominated by a low, undulating, forested plain with very sparse bedrock exposure. The west-flowing Great Bear River dissects both the Great Bear Plain and the St. Charles range. The plain is underlain by flat-lying to gently folded Cretaceous sedimentary strata. Folded and faulted Paleozoic carbonate strata are exposed at surface along the St. Charles range. The steep reverse faults truncating anticlinal folds are associated with Cordilleran deformation at the eastern edge of the Franklin Mountains. Cretaceous strata are preserved unconformably above Devonian strata on either side of the St. Charles range. Historical exploration for the petroleum companies in the area targeted potential reservoirs in buried Cambrian strata. Public-domain seismic-reflection profiles archived with the National Energy Board were used to help constrain the distribution of map units and structures.

Résumé

Le quadrant sud-est de la région cartographique de Mahony Lake (SNRC 96-F) chevauche la limite séparant la plaine du Grand lac de l'Ours des monts Franklin (Territoires du Nord-Ouest). Le chaînon montagneux s'étend vers le nord-nord-ouest depuis le mont St. Charles (connu sous l'appellation informelle de chaînon St. Charles) et surplombe une région principalement occupée par une basse plaine ondulante boisée où percent de rares affleurements du socle rocheux. La rivière Great Bear s'écoulant vers l'ouest découpe à la fois la plaine du Grand lac de l'Ours et le chaînon St. Charles. Le sous-sol de la plaine est composé de strates sédimentaires du Crétacé exposées à plat ou étant légèrement plissées. Des strates carbonatées du Paléozoïque plissées et recoupées par des failles affectent le long du chaînon St. Charles. Les failles inverses fortement inclinées qui tranchent les plis anticlinaux sont associées à la déformation cordillère. À la limite orientale des monts Franklin, des strates du Crétacé sont conservées en discordance sur les strates du Dévonien de part et d'autre du chaînon St. Charles. Les travaux antérieurs des compagnies pétrolières dans la région ont ciblé de possibles réservoirs dans les strates enfouies du Cambrien. Des profils de sismique-réflexion du domaine public, archivés par l'Office national de l'énergie, ont servi à circonscrire la distribution des unités cartographiques et des structures.

96-FNW	96-FNE	96-FW
CGM 88	CGM 89	
96-FW	96-FSE	96-FSW
CGM 91	CGM 90	
96-FNW	96-FNE	96-FW
CGM 92		

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

Cover illustration

View looking west-northwest along the Great Bear River at Mount St. Charles, eastern edge of the Franklin Mountains, Northwest Territories. Cambrian to Devonian carbonate on Mount St. Charles is uplifted along a reverse fault above Early Cretaceous sandstone exposed in the banks of the river. Photograph by K.M. Fallas, 2012-130

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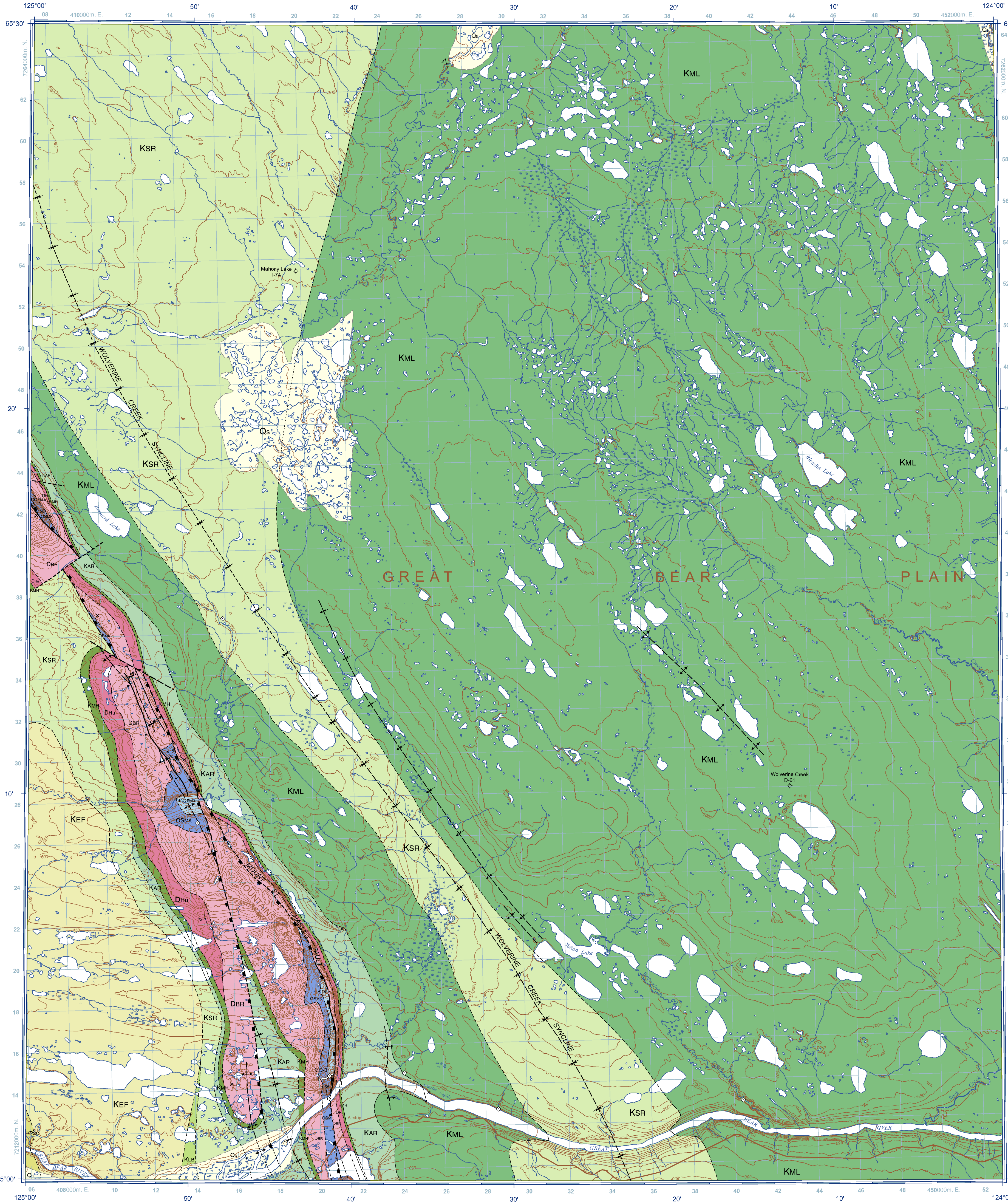
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CANADIAN GEOSCIENCE MAP 90

GEOLOGY

MAHONY LAKE (SOUTHEAST)

Northwest Territories
1:100 000



- QUATERNARY**
- Qs** Quaternary sediment: mud, sand, and gravel: unconsolidated.
- LATE CRETACEOUS TO PALEOGENE**
- KPSC** Summit Creek Formation: sandstone: lithic arenite, very friable; interbedded with conglomerate: polymictic, granules to cobbles, poorly cemented; minor shale: carbonaceous; coal, and ash tuff. Unit locally contains plant remains, and dinosaur fossils in the lower part of the unit.
- LATE CRETACEOUS**
- KEF** East Fork Formation: mudstone and shale: locally silty or carbonaceous; dark brown to dark grey or black, soft and crumbly, contains sideritic concretions, interbedded with minor sandstone: lithic wacke, grey to brown, very thin- to thin-bedded, friable, laminated, ripple marks, rip-up clasts, and minor trace fossils, and pebble conglomerate, locally occur at base of unit.
 - KLB** Little Bear Formation: sandstone: lithic wacke to quartz arenite and chert arenite, mottled grey, greenish-grey, brown, or rusty, thin- to thick-bedded, typically friable and porous, crossbedded, laminated, ripple marks, graded bedding, locally bioturbated; interbedded with mudstone and shale: somewhat silty, dark grey to brown or black, crumbly and soft, minor sideritic concretions; and minor coal.
 - KSR** Slater River Formation: shale and mudstone: dark brown to dark grey, black, or rusty-brown, soft, crumbly, and fissile, sideritic concretions common, rare fish scales; minor bentonite and ash tuff: white to yellow, pale green, or orange-brown, and minor sandstone: lithic wacke, brown, grey, or rusty, very thin- to thin-bedded, crosslaminated, and bioturbated.
- EARLY CRETACEOUS**
- KML** Mahony Lake Formation: sandstone: lithic to quartz arenite, very fine- to fine-grained, brown to grey, weathers brown, grey, and orange, thin- to medium-bedded, commonly bioturbated, locally laminated or crossbedded, interbedded with minor shale: grey, fissile.
 - KAR** Arctic Red Formation: shale and mudstone: locally gypsiferous, dark grey, weathers grey and rusty, variably fissile and soft, sideritic concretions fairly common.
 - KMH** Martin House Formation: sandstone: quartz arenite, variably glauconitic, locally conglomeratic, beige to light grey, thin- to thick-bedded, crossbedded, friable, trace fossils common; interbedded with shale or mudstone: medium to dark grey, weathers grey or rusty-brown, proportion of shale and mudstone increases upsection.
- DEVONIAN**
- DHu** Hume Formation: limestone: wackestone to grainstone, floatstone, medium to dark grey or brownish-grey, typically weathers light grey, thin- to very thick-bedded, parallel to irregular or nodular bedded, fossiliferous with abundant and diverse assemblage. Unit is thicker bedded and cliff-forming in upper part.
 - DBR** Bear Rock Formation: limestone breccia: variably dolomitic and petrolierous, angular clasts range from granule- to boulder-sized, greyish-brown to grey, weathers light grey, vuggy, massive and rubbly with rare bedded intervals of laminated carbonate, tends to form hoodoos.
- ORDOVICIAN TO SILURIAN**
- OSMK** Mount Kindle Formation: dolostone: dolowackestone to dolopackstone and dolocarbonate, siliceous and cherty, light to dark grey or brownish-grey fresh and weathered surfaces, thin- to very thick-bedded, vuggy, recrystallized, bioturbated, and fossiliferous (mainly silicified corals, crinoids, orthocone cephalopods, and stromatopores).
- CAMBRIAN TO ORDOVICIAN**
- COFM-u** Franklin Mountain Formation, upper member: dolostone: crystalline dolostone, commonly cherty and siliceous, cream to beige or grey, weathers white to light grey, very thin- to thick-bedded, vuggy and nodular, locally stromatolitic, bioturbated, intracast-bearing, or oolitic.

- Geological contact
- Defined
 - Approximate
 - Inferred
 - Concealed
- Drift contact
- Approximate
- Fault, motion undefined
- Approximate
 - Inferred
- Normal fault, symbol on hanging-wall side
- Defined
 - Approximate
- Reverse fault, symbol on hanging-wall side
- Defined
 - Approximate
 - Inferred
 - Concealed
- Anticline, upright
- Defined
 - Approximate
 - Concealed
- Syncline, upright
- Approximate
 - Inferred
- Inclined syncline, upright, shorter arrow on steeper limb
- Approximate
- Monocline, anticlinal bend, shorter arrow on steeper limb
- Approximate
- Monocline, synclinal bend, shorter arrow on steeper limb
- Approximate
- Visited outcrop, no measurements
- Outcrop observed remotely from ground or air
- Bedding strike and dip, inclined, upright
- Evidence for younging direction known
- No evidence for younging direction
- Fossil locality
- Measured stratigraphic section with name of section
- Petroleum well with well name
- Dry and abandoned
- Mahony Lake 1-74

NOTES

The author has updated and revised map unit terminology from the Operation Norman map (Aiken and Cook, 1976). In general, Silurian and Devonian usage follows that of Morrow (1991), and Cretaceous to Paleogene formation names are those of Dixon (1999). Cambrian to Ordovician units have recently undergone revision to their terminology, as outlined below.

Previous work by the Geological Survey of Canada in the Mahony Lake map area (Aiken and Cook, 1976) 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 Macqueen, 1975). On the present maps, these older 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 the 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 Chatwin et al. (1975).

The names Mount St. Charles Fault and Wolverine Creek syncline have been introduced to facilitate discussion of these structural features. The representation of the Mount St. Charles Fault as a reverse fault is based on the interpretation from seismic-reflection data that the fault originated as a steep normal fault that was later inverted during Cordilleran compression, as shown schematically in Figure 2.

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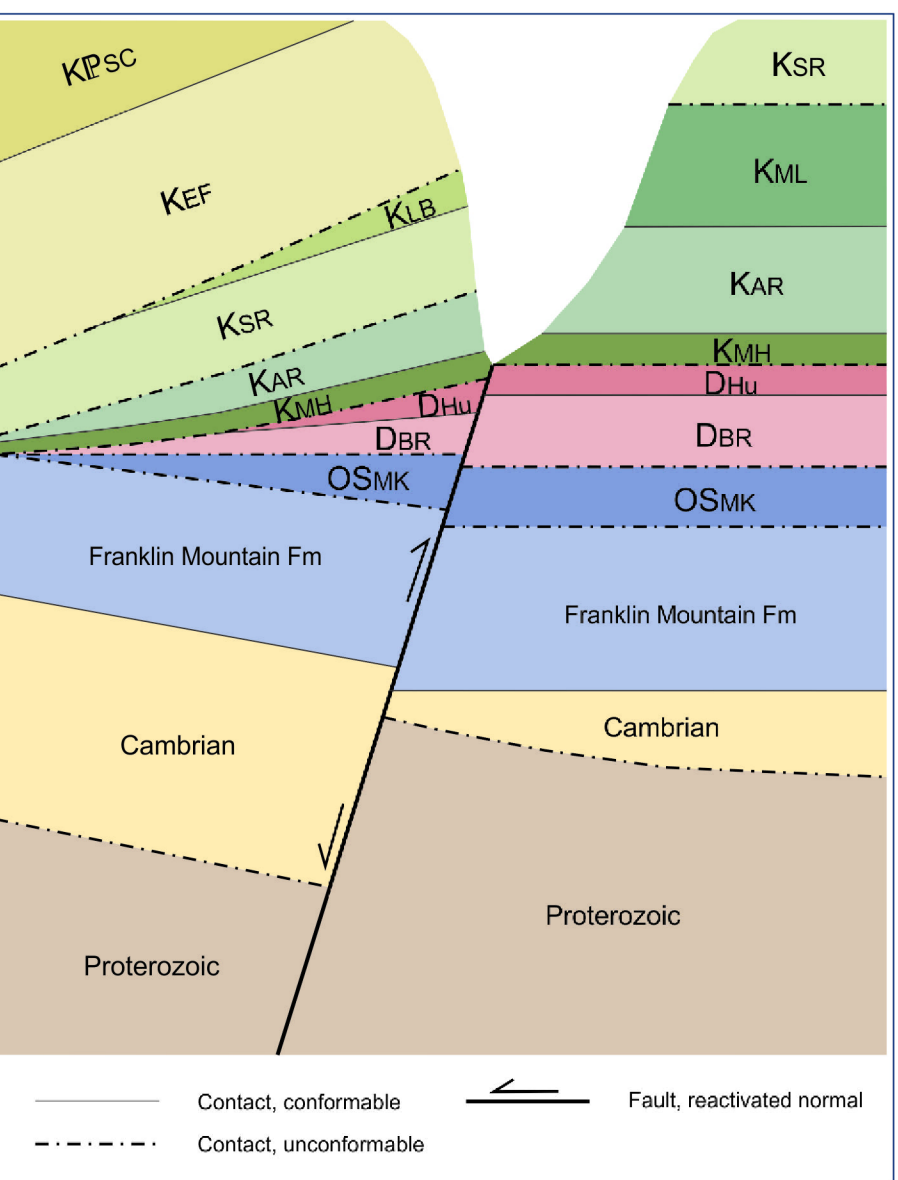


Figure 2. Schematic stratigraphic relationship diagram for southeast Mahony Lake map area (NTS 96-F/SE). Subsurface units are constrained by well and seismic data. Changes in thickness and preservation of map units across reactivated fault systems is an expression of movement and erosion on the Keele Arch, a feature underlying the southwest portion of the map area.

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Author: K.M. Fallas

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Geological field observations by K.M. Fallas, 2011, D.G. Cook, 1968-1973, and D.W. Morrow, 1960

Seismic data interpretation by B.C. MacLean, 2010-2012

Stratigraphic sections measured by R.W. Macqueen, 1969

Geomatics by K.M. Fallas, S.D. Orzech, and N. Raska

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CANADIAN GEOSCIENCE MAP 90

GEOLOGY

MAHONY LAKE (SOUTHEAST)

Northwest Territories
1:100 000

2 0 2 4 6 8 km

Initiative of the Geological Survey of Canada, conducted under the auspices of the Mackenzie Delta and Corridor Project as part of Natural Resources Canada's Geo-mapping for Energy and Minerals (GEM) Program.

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Map projection Universal Transverse Mercator, zone 10, North America 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 metres north of 65°15' and feet south of 65°15'

Some geographic names on this map are not official.

Mean magnetic declination 2013, 23°03'E, decreasing 31' annually. Readings vary from 23°14'E in the NW corner to 22°50'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.

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