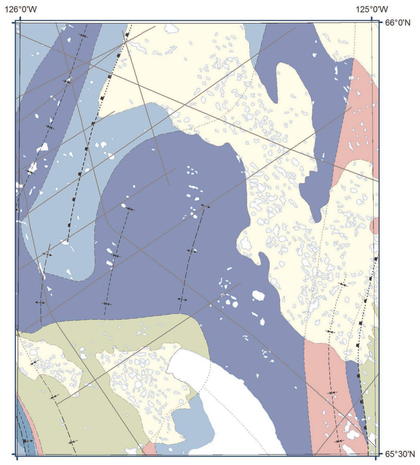


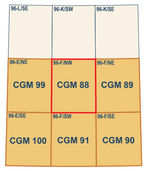
Figure 1. Northwest Mahony Lake map area (NTS 96-F/NW) showing seismic lines on record with the National Energy Board (NEB) that were used to augment the bedrock geology interpretation. Line names are provided in the digital data files.

Abstract

The northwest quadrant of the Mahony Lake map area (NTS 96-F) encompasses a low, vegetated plateau at the western edge of the Great Bear Plain, Northwest Territories. The somewhat higher ground between Mahony Lake and the Hare Indian River to the north is informally referred to as the Mahony dome. Most of the area is underlain by broadly folded Paleozoic carbonate strata, disrupted locally by steep reverse faults. The structural features suggest a geological kinship with the Franklin Mountains to the west. Due to a veneer of unconsolidated Quaternary deposits, bedrock exposures are not abundant; however, the presence of carbonate very close to surface has allowed for the development of numerous karst features, such as sinkholes, disappearing streams, and turloughs, where bedrock may be exposed. Cretaceous siliciclastic strata are preserved in a synclinal structure west of Mahony Lake. Truncations of Ordovician to Devonian strata beneath the sub-Cretaceous unconformity delineate part of the Keele Arch, a feature that stood topographically higher than the surrounding area before deposition of the Devonian strata, and again before deposition of the Cretaceous strata.

Résumé

Le quadrant nord-ouest de la région cartographique de Mahony Lake (SNRC 96-F) est occupé par un bas plateau couvert de végétation situé à la limite occidentale de la plaine du Grand lac de l'Ours (Territoires du Nord-Ouest). Le terrain quelque peu plus élevé s'étendant entre le lac Mahony et la rivière Hare Indian au nord porte l'appellation informelle de dôme de Mahony. La plus grande partie de la région est occupée par des strates carbonatées du Paléozoïque, déformées en grands plis ouverts et déplacées par endroits par des failles inverses fortement inclinées. Le style structural suggère une affinité avec les monts Franklin à l'ouest. En raison de la présence d'un placage de dépôts meubles du Quaternaire, les affleurements du socle sont peu abondants; cependant, la présence de roches carbonatées très près de la surface a permis la formation de nombreuses formes karstiques telles que des dolines, des ruisseaux infiltrants et des lacs asséchés. Des strates siliciclastiques du Crétacé ont été conservées dans une structure synclinale à l'ouest du lac Mahony. La troncature des strates de l'Ordovicien au Dévonien sous la discordance à la base du Crétacé permet de circonscrire l'arche de Keele, une entité qui s'élevait au-dessus des terrains environnants avant le dépôt des strates du Dévonien ainsi que de celui des strates du Crétacé.



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

Cover illustration
Helicopter perched atop Mount Kindle Formation dolostone exposed in a turlough (a karst feature) on the Mahony dome, north of Mahony Lake, Northwest Territories. Photograph by K.M.Fallas. 2012-085

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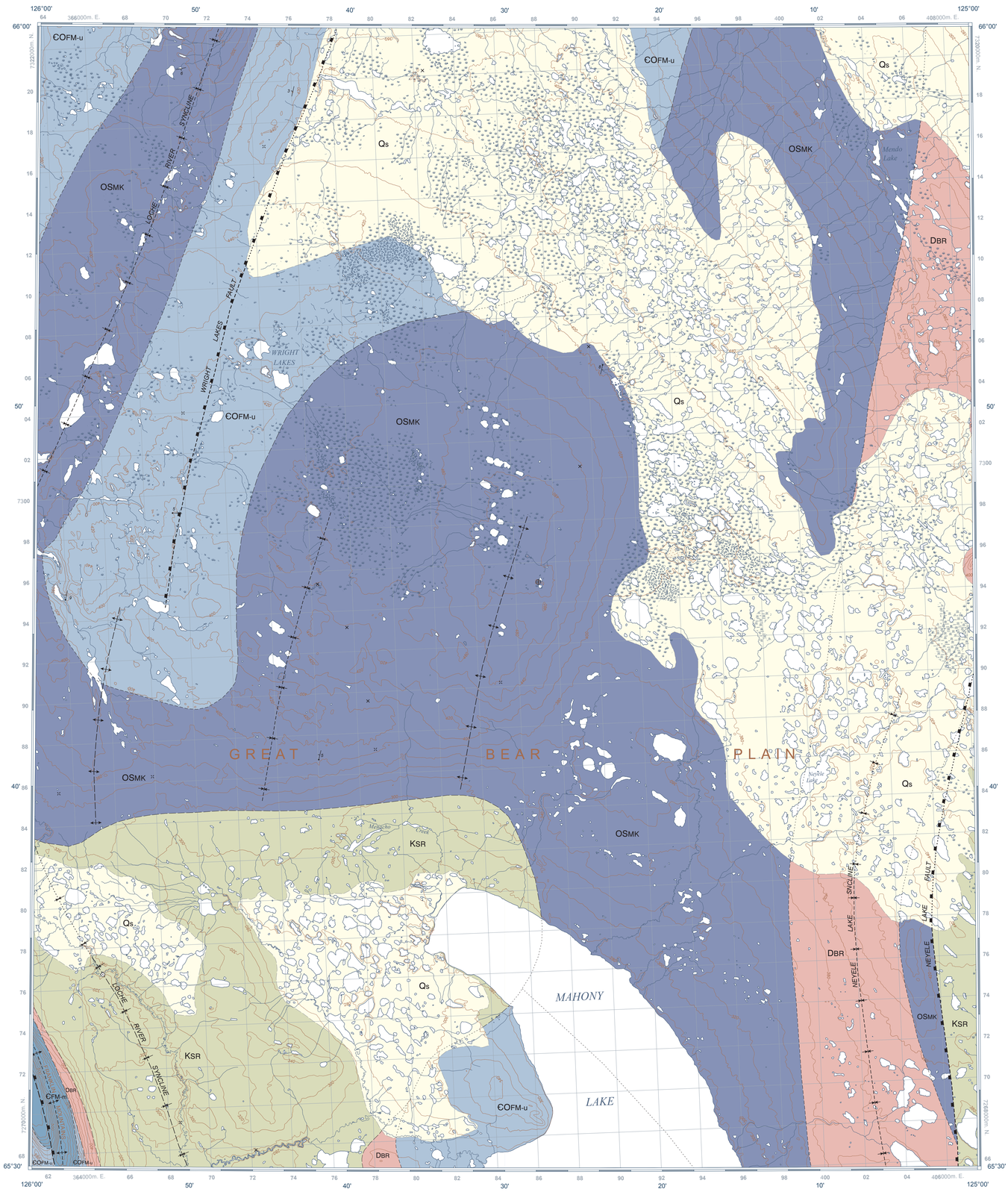
CANADIAN GEOSCIENCE MAP 88
GEOLOGY
MAHONY LAKE (NORTHWEST)
Northwest Territories
1:100 000



QUATERNARY

Qs — **Quaternary sediment:** mud, sand, and gravel: unconsolidated.

LATE CRETACEOUS

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.

DEVONIAN

DBR — **Bear Rock Formation:** limestone breccia: variably dolomitic and petroliferous, 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 dolofloatstone, 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 stromatoporoids).

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, intraclast-bearing, or oolitic.

CAMBRIAN

CFM-m — **Franklin Mountain Formation, middle member:** dolostone: dolomudstone to dolograinstone, rarely calcareous or cherty, light grey to cream or beige, weathers light yellowish-grey to orange-brown, thin- to thick-bedded, typically recrystallized obliterating primary textures, locally vuggy, stromatolitic or thrombolitic, bioturbated, oolitic, crossbedded, or intraclast-bearing; rare shale partings. Alternation, at 1–2 m intervals, of ooid dolograinstone with dolomudstone produces a locally prominent striped appearance.

- Geological contact
  - Approximate
  - Inferred
  - Concealed
- Drift contact
  - Approximate
- Reverse fault, symbol on hanging-wall side
  - Approximate
  - Inferred
  - Concealed
- Anticline, upright
  - Approximate
  - Inferred
- Syncline, upright
  - Inferred
  - Concealed
- Inclined syncline, upright, shorter arrow on steeper limb
  - Approximate
  - Concealed
- Visited outcrop, no measurements
- Outcrop observed remotely from ground or air
- Bedding, horizontal
- Bedding strike and dip, inclined, upright
  - Evidence for younging direction known
  - No evidence for younging direction
- Fossil locality

NOTES

The author has updated and revised map unit terminology from the Operation Norman map (Aitken and Cook, 1976). In general, Silurian and Devonian usage follows that of Morrow (1991), and Cretaceous to Paleocene 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 (Aitken 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 Wright Lakes Fault, Neyele Lake Fault, Loche River syncline, and Neyele Lake syncline have been introduced to facilitate discussion of these structural features. The representation of the Wright Lakes and Neyele Lake faults as reverse faults is based on the interpretation from seismic-reflection data that these faults originated as steep normal faults that were later inverted during Cordilleran compression, as shown schematically in Figure 2.

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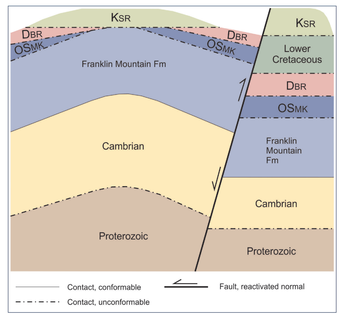

Figure 2. Schematic stratigraphic relationship diagram for northwest Mahony Lake map area (NTS 96-F/NW). Subsurface units are constrained by seismic data. The major erosional unconformity between Ordovician and Cretaceous units is an expression of a paleotopographic high, the Keele Arch, which was periodically active from Paleozoic to Cretaceous.

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Canadian Geoscience Maps

Canada

Author: K.M. Fallas

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Scientific editing by E. Inglis

CANADIAN GEOSCIENCE MAP 88
GEOLOGY
MAHONY LAKE (NORTHWEST)
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.

Logistical support provided by the Polar Continental Shelf Program as part of its mandate to promote scientific research in the Canadian North. PCSP 02509, 01310, and 00411

Map projection Universal Tranverse Mercator, zone 10. North America Datum 1983

Base map at the scale of 1:50 000 from Natural Resources Canada, with modifications. Elevations in metres above mean sea level

Some geographic names on this map are not official.

Mean magnetic declination 2013, 23°25'E, decreasing 32' annually. Readings vary from 23°36'E in the NW corner to 23°14'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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