

Figure 1. Southwest Mahony Lake map area (NTS 96-F/SW) 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 southwest quadrant of the Mahony Lake map area (NTS 96-F) lies within the Franklin Mountains, Northwest Territories and features relatively flat, low-lying plains around Brackett and Mahony lakes, as well as prominent ridges such as the Norman Range. The area is well vegetated, with bedrock exposure more common on the high ridges or along stream banks. Conditions from the southwest have uplifted Paleozoic strata, dominated by carbonates, along reverse or thrust faults, and anticlinal folds. Cambrian evaporitic strata of the Saline River Formation in the hanging walls of some faults, and the cores of anticlines, indicates this unit is likely a local detachment layer for faulting and folding. Cratonic to Paleozoic siliciclastic strata are preserved in the intervening synclinal features, particularly south of Brackett Lake. A paleogeographically high feature known as the Keele Arch can be identified through the central part of the map area where Ordovician to Devonian strata are generally absent beneath the sub-Cretaceous unconformity. Public-domain seismic-reflection profiles, archived with the National Energy Board, reveal the presence of numerous folds with associated faults hidden beneath unconsolidated Quaternary deposits south of Brackett Lake. Exploration by petroleum companies in the area targets potential reservoirs in buried Cambrian or Devonian strata.

Le quadrant sud-ouest de la région cartographique de Mahony Lake (SNRC 96-F) se situe dans les montagnes Franklin (Territoires du Nord-Ouest) et est caractérisé par de basses plaines autour des lacs Brackett et Mahony, ainsi que par des crêtes prononcées telles que le chaînon Norman. La région présente un bon couvert végétal et des affleurements du socle rocheux y sont plus communs sur les hauteurs crées et le long des rives des ruisseaux. La déformation tectonique en provenance du sud-ouest a soulevé les strates du Paléozoïque, à dominante carbonatée, le long de failles inverses ou de failles de chevauchement ainsi que par le jeu de plis anticlinaux. Les strates évaporitiques du Cambrien de la Formation de Saline River dans le lot de certaines failles, ainsi que dans le cœur d'anticlinaux, indiquent que cette unité a probablement servi de surface de décollement locale pour les failles et les plis. Les strates silicoclastiques du Crétacé au Paléozoïque sont conservées dans les structures synclinales intermédiaires, particulièrement au sud du lac Brackett. Une hauteur paléogéographique appelée arche de Keele peut être identifiée dans toute la partie centrale de la région cartographique où les strates de l'Ordovicien au Dévonien sont généralement absentes sous la discordance à la base du Crétacé. Des profils de sismogéologie du domaine public, archivés par l'Office national de l'énergie, révèlent l'existence de nombreux plis associés à des failles masquées par la couverture de dépôts meubles du Quaternaire au sud du lac Brackett. Les travaux d'exploration menés par des compagnies pétrolières dans la région ont ciblé de possibles réservoirs dans les strates enfouies du Cambrien ou du Dévonien.

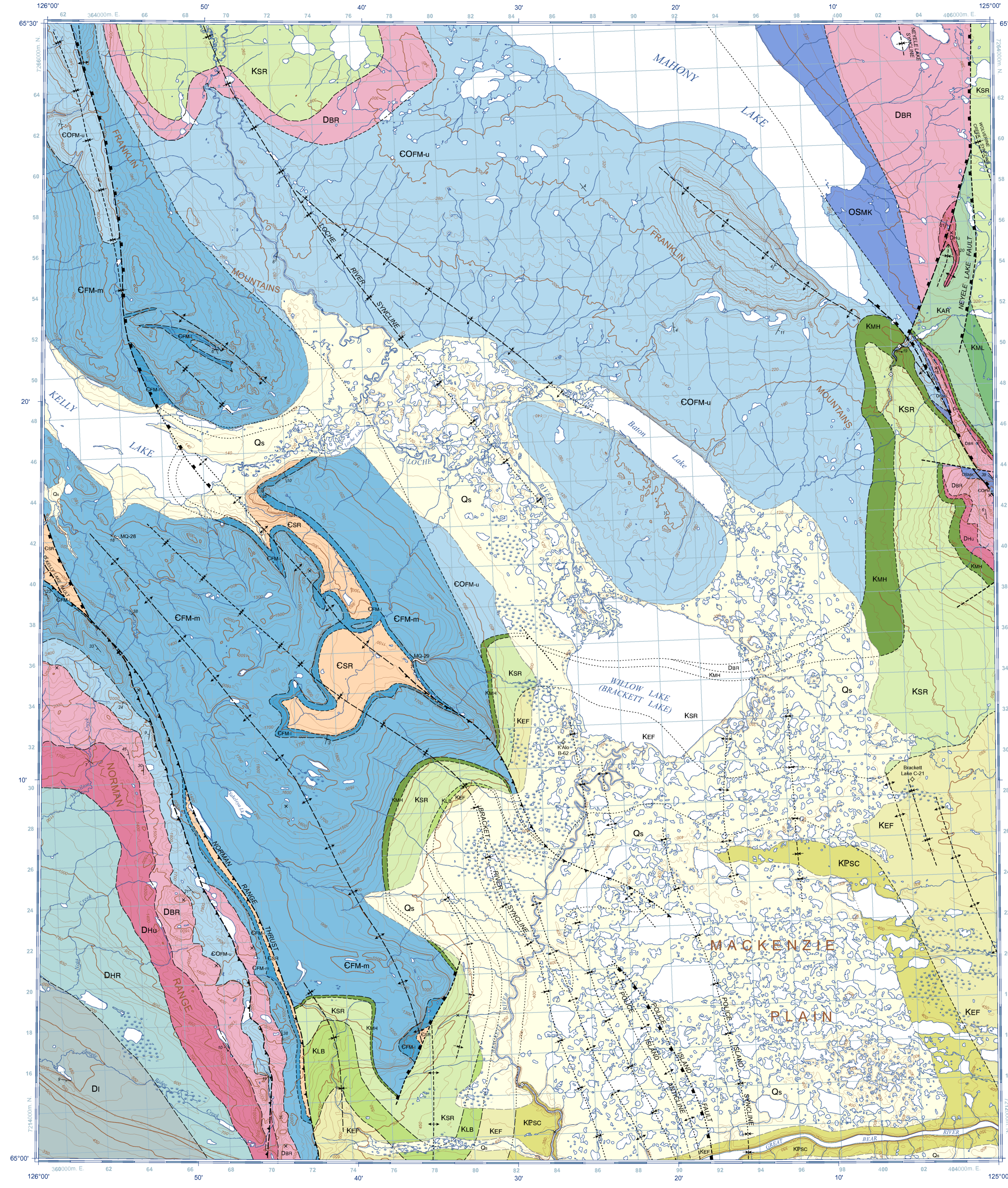
Table with 3 columns: NE, NW, SE, SW and 4 rows of CGM numbers (CGM 99, 98, 88, 89; CGM 100, 91, 90, 92; CGM 95, 92).

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

Cover illustration: View looking southeast at Devonian carbonate strata exposed in the hanging wall of the Norman Range Thrust, along the Norman Range of the Franklin Mountains, Northwest Territories. Photograph by K.M. Fallas, 2012-131. Catalogue No. M183-191-2012E-PDF. ISBN 978-1-100-20895-5. doi:10.4095/292283. © Her Majesty the Queen in Right of Canada 2013.

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CANADIAN GEOSCIENCE MAP 91 GEOLOGY MAHONY LAKE (SOUTHWEST) Northwest Territories 1:100 000



Geological contact legend table with symbols for defined, approximate, inferred, concealed, and drift contacts, as well as fault types and structural features.

NOTES: The authors have updated and revised map unit terminology from the Operation Norman map (Aiken and Cook, 1976). In general, terminology for Cambrian units is that of Dixon and Stasiuk (1998), Silurian and Devonian usage follows that of Morrow (1991), and Cretaceous to Paleocene formation names are those of Dixon (1969). 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 Cambrian-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 Chabert et al. (1975). The names Norman Range Thrust, Neyele Lake Fault, Police Island Fault, Kelly Lake Fault, Locher River syncline, Brackett River syncline, Police Island anticline, Wolvener Creek syncline, and Neyele Lake syncline have been introduced to facilitate discussion of these structural features. Crustal deformation in this map area has generated two types of faults: thrust faults, which are interpreted to be detached within the Cambrian Saline River Formation, and reverse faults, which are interpreted to be inverted normal faults with steep dips at depth. In Proterozoic strata, seismic-reflection data are the basis for interpreting the Norman Range Thrust as a thrust fault, and the others as reverse faults. The inverted normal faults are shown schematically in Figure 2.

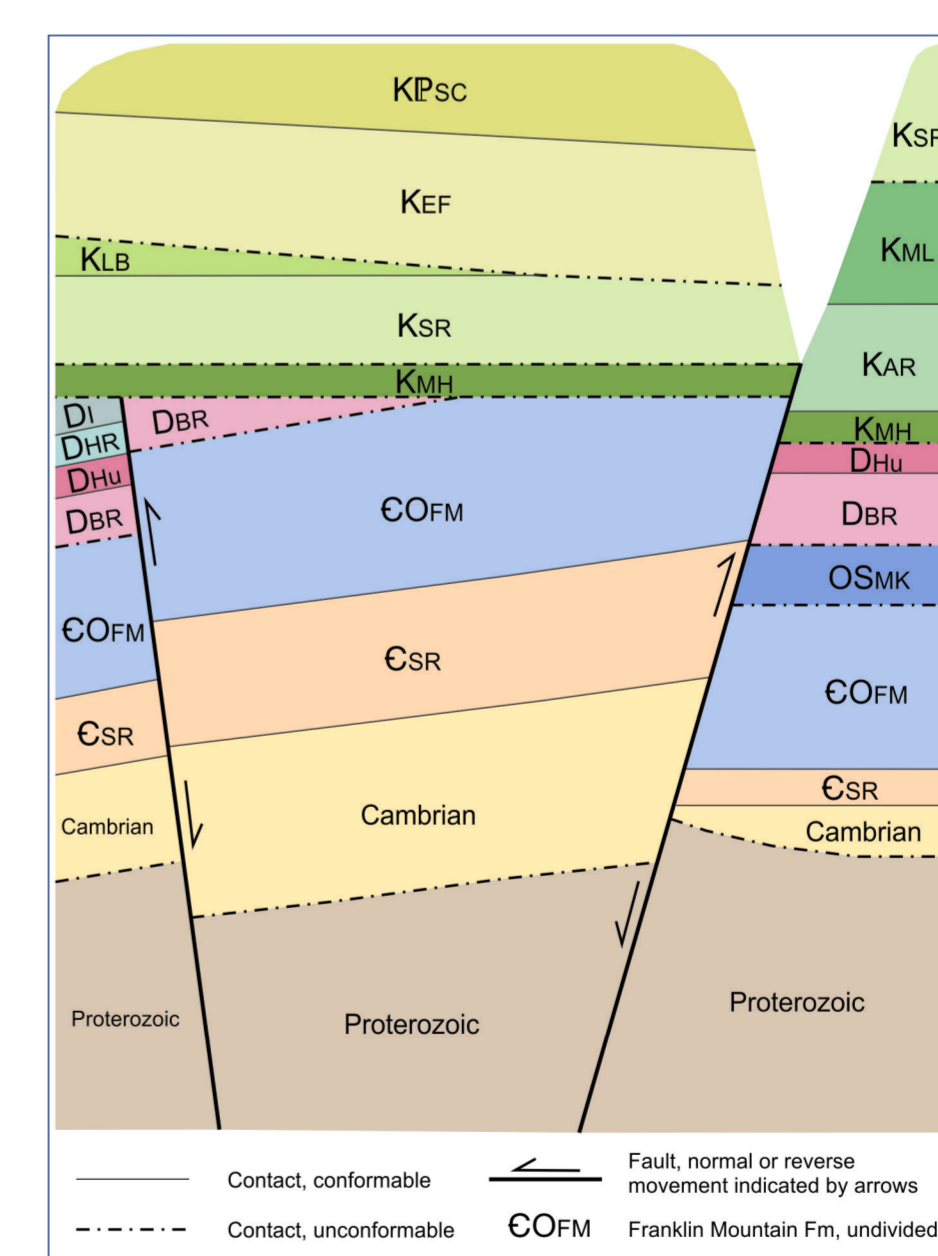


Figure 2. Schematic stratigraphic relationship diagram for southwest Mahony Lake map area (NTS 96-F/SW). Subsurface units are constrained by well and seismic data. Changes in thickness and preservation of map units across reactivated fault systems is an expression of movement and erosion on the Keele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

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GEOLOGY MAHONY LAKE (SOUTHWEST) Northwest Territories 1:100 000. 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'. Map projection: Universal Transverse Mercator, zone 10, North America Datum 1983. Logistical support provided by the Polar Continental Shelf Program as part of its mandate to promote scientific research in the Canadian North. PCSP 062606, 01310, and 00411. 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'.

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