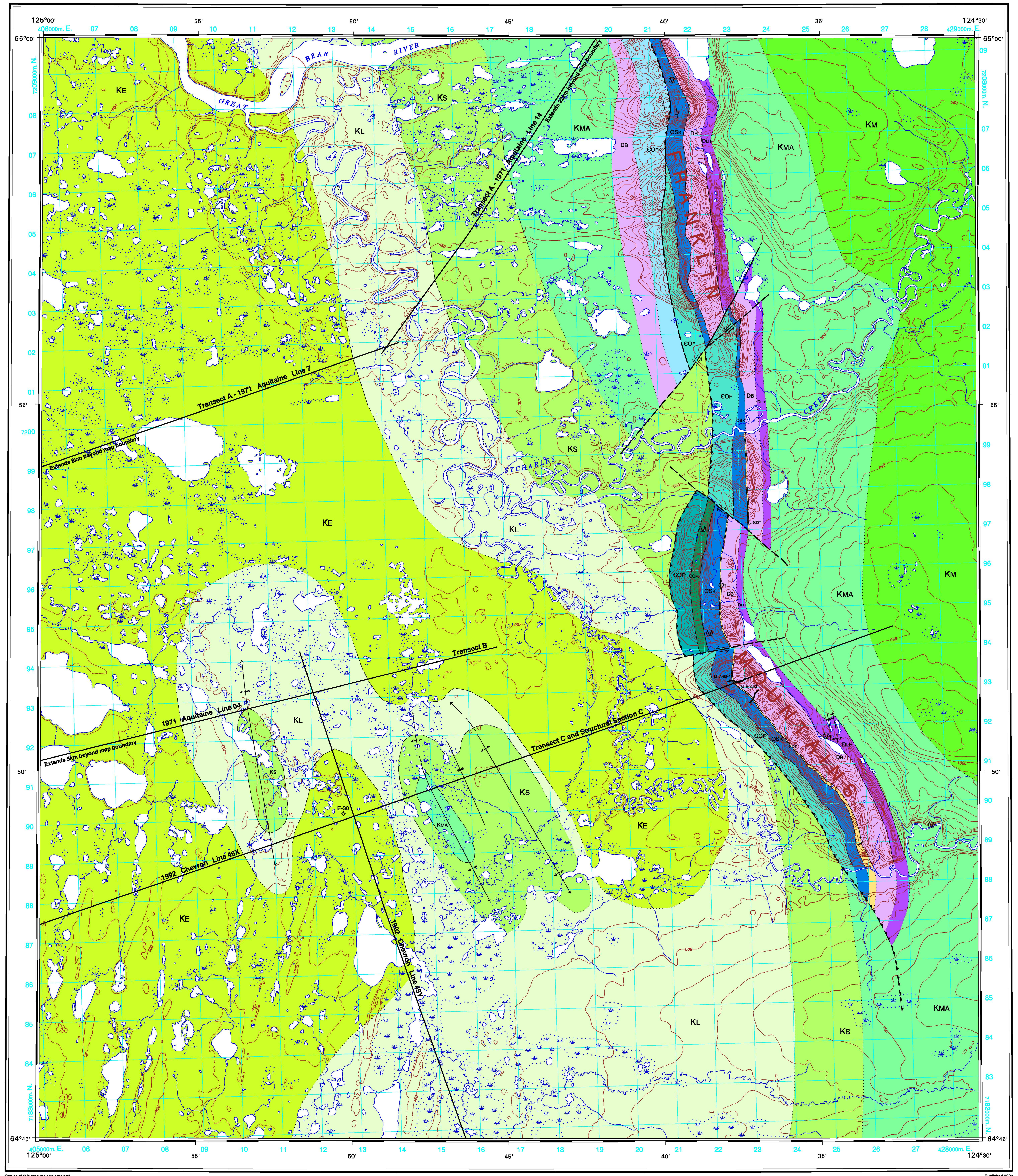
Natural Resources Canada / Ressources naturelles Canada
GEOLOGICAL SURVEY OF CANADA / COMMISSION GÉOLOGIQUE DU CANADA



LEGEND

Note: Legend also relates to other maps in a series.

Coloured legend boxes indicate map units that appear on this map or in sections.

UPPER CRETACEOUS
East Fork Formation
KE — Shale.

Little Bear Formation
KL — Sandstone.

Slater River Formation
KS — Shale.

UPPER CRETACEOUS — Slater River, Little Bear and East Fork formations
KSE — Shale, sandstone. In sections only.

LOWER CRETACEOUS
Mahoney Lake Formation
KM — Sandstone; shale.

Arctic Red Formation
KA — Siltstone, shale. In sections only.

Martin House Formation
KMH — Sandstone. In sections only.

LOWER CRETACEOUS — Martin House and Arctic Red formations
KMA — Sandstone; siltstone, shale.

MIDDLE DEVONIAN
Hare Indian Formation
DHI — Shale, grey.

Hume Formation
DH — Limestone, fossiliferous; minor shale.

LOWER DEVONIAN
Landry Formation
DL — Limestone, dark grey, alternating thick- and thin-bedded, ribbed appearance.

Bear Rock Formation
DB — Limestone breccia. May include Tsetso Formation locally at base.

LOWER AND MIDDLE DEVONIAN — Landry and Hume formations
DLH — Limestone; minor shale.

LOWER AND MIDDLE DEVONIAN — Bear Rock, Landry, and Hume formations
DBH — Limestone; limestone breccia; minor shale. In sections only.

SILURIAN AND DEVONIAN
Tsetso Formation
SDT — Dolomite, partly sandy or argillaceous; sandstone, dolomitic.

SILURIAN AND LOWER DEVONIAN — Tsetso and Bear Rock formations
SDTB — Dolomite, partly sandy or argillaceous; sandstone; limestone breccia.

UPPER ORDOVICIAN AND LOWER SILURIAN
Mount Kindle Formation
OSK — Dolomite; fossiliferous, siliceous; minor chert.

Upper member
OSKu — Dolomite, alternating dark grey and light grey weathering.

Basal and Resistant members
OSKr — Dolomite, dark grey weathering (Resistant member); dolomite, argillaceous, recessive (Basal member).

ORDOVICIAN, SILURIAN, AND DEVONIAN — Mount Kindle, Tsetso, Bear Rock, Landry, and Hume formations
ODKH — Limestone; limestone breccia; dolomite; sandstone; minor shale.

UPPER CAMBRIAN AND LOWER ORDOVICIAN
Franklin Mountain Formation
COF — Dolomite, argillaceous; chert; minor flat-pebble conglomerate.

Cherty member
COFch — Dolomite, with silicified stromatolites, drusy quartz; chert.

Rhythmic member (COFr)
COFr / COFrl — Dolomite, alternating greyish brown weathering, fine- to medium-crystalline, and greyish orange weathering, very fine-crystalline. **Limestone facies** (COFrl) Limestone.

Cyclic member (COFc)
COFc / COFcl — Dolomite, shaly, stromatolitic, alternating argillaceous and very fine-crystalline; minor flat-pebble conglomerate. **Limestone facies** (COFcl) Limestone, shaly.

CAMBRIAN, ORDOVICIAN, AND LOWER SILURIAN — Franklin Mountain and Mount Kindle formations
COFK — Dolomite; chert.

UPPER CAMBRIAN
Saline River Formation
CS — Shale, siltstone, sandstone, red; anhydrite; gypsum; dolomite. In sections only.

UPPER CAMBRIAN
Mount Cap Formation (*Glossopleura unit*)
Cg — Shale, limestone, siltstone. In sections only.

LOWER AND MIDDLE CAMBRIAN
Mount Clark and Lower Mount Cap formations
CMC — Quartz sandstone. In sections only.

CAMBRIAN — LOWER AND MIDDLE CAMBRIAN — Mount Clark and Mount Cap formations
CMC — Quartz sandstone, shale, limestone, siltstone. In sections only.

PROTEROZOIC
Unnamed
P — Shale, siltstone, dark grey; possibly equivalent to part of Mackenzie Mountains Supergroup. In sections only.

Geological boundary (defined, approximate, assumed)
Bedding, from aerial photographs or estimated from helicopter (upright, overturned)
Ground observation (mapping station)
Traverse
Measured stratigraphic section (D.W. Morrow and N.C. Meijer-Drees) — MTA-80-4
Thrust fault (defined, approximate; teeth on upthrust side)
Strike slip fault (arrows show relative sense of displacement) (defined, assumed)
Fault, sense of displacement unknown (assumed)
Anticline, trace of axial plane (defined, approximate; arrow indicates plunge)
Syncline, trace of axial plane (defined, approximate)
Migrated seismic line
Exploration well (dry and abandoned) — E-30

Authors: D.G. Cook, B.C. MacLean and D.W. Morrow

Geological compilation by D.G. Cook (2005) based on studies of vertical aerial photographs and air and ground observations by J.D. Aitken (1969), D.G. Cook (1969, 2003, 2004) D.W. Morrow (2003, 2004) subsurface seismic and well studies by B.C. MacLean (2005)

Geological cartography by S.D. Orzeck

Elevations in feet above mean sea level

Contour interval 50 feet

NOTES

Introduction

St. Charles Creek map area (NTS 96C/15) displays the southern end of an unnamed mountain range (hereafter the 'range') that extends from about latitude 64° 49', northward to Mahony Lake (about latitude 65° 20'). The 'range' marks the deformation front of the northern Franklin Mountains and rises 1200 ft (365 m) above the surrounding plains reaching elevations up to 1600 ft (485 m). It was previously mapped during Operation Norman, a regional, reconnaissance, helicopter-supported mapping program of the Geological Survey of Canada. The geology of St. Charles Creek (NTS 96C/15) was published as part of the 1:250 000 scale Fort Norman (NTS 96C) sheet (Cook and Aitken, 1977). St. Charles Creek (96 C/15) was revisited by D.G. Cook and D.W. Morrow in 2004 in conjunction with re-mapping of the northern McConnell Range to the south. Formation identifications made at ground stations, combined with data from published stratigraphic sections, permitted extrapolation of stratigraphic units along strike via helicopter-born observation and interpretation of aerial photographs. The direction of ice flow during glaciation was from east to west resulting in extensive accumulation of glacial deposits masking bedrock along the west or 'downstream' side of the range. 'Assumed' contacts and structures interpreted in areas of no exposure are subjective. Seismic data acquired for hydrocarbon exploration within St. Charles Creek, interpreted primarily by B.C. MacLean, augmented by data from exploration wells in the region, were incorporated into the interpretation of the subsurface stratigraphy and structure, and enabled interpretation of sub-till distribution of Cretaceous formations.

Structure

The 'range' occurs along the east flank of the Keele Tectonic Zone (MacLean and Cook, 1999). From Early Cambrian to Early Ordovician a zone of extension occurred along the east flank of the Cambrian Mackenzie Trough, whereas during the Cretaceous the Keele Tectonic Zone was compressionally uplifted. Extension to form Mackenzie Trough during Early and Middle Cambrian, is recorded by Mount Clark and Mount Cap strata being thin to zero thickness on Mahony Arch (Dixon and Stasiuk, 1998) immediately east of the 'range', and thickening to at least 1 km west of the 'range' (see Transect A). Less dramatically, the Late Cambrian Saline River and Cambro-Ordovician Franklin Mountain formations also thicken westward from Mahony Arch into the area of Mackenzie Trough (see Transect A). Further south Cook and Morrow (2008 a, b, c) inferred that the east side of the Cambrian extensional Mackenzie Trough was inverted during Laramide orogenesis to form the McConnell Range. In contrast, along the trend of the 'range', earlier pre-Turonian-inversion is recorded by very abrupt thickening eastward of Lower Cretaceous (pre-Slater River Formation) strata (Transect A). Apparently the Lower and Middle Cambrian extension zone was inverted by pre-Turonian uplift of Keele Arch (defined by Cook, 1975) with the consequent removal or thinning of Lower Cretaceous strata from the arch and preservation of thick Lower Cretaceous strata east of the arch in Great Bear Basin. Thus 720 m of Lower Cretaceous strata, comprising Martin House, Arctic Red, and Mahony Lake formations are preserved east of the 'range' whereas only a thin section of Martin House and Arctic Red occurs beneath Slater River Formation to the west (Transect A).

Unlike the McConnell Range to the south the Laramide development of the 'range' seems not to have been the result of reactivation of underlying 'basement' faults. Instead, we interpret it to be cored by a salt pillow (Transect A and Section C) that formed above a detachment in salt beds of the Saline River Formation as a consequence of post-Late Cretaceous compressional tectonics. Its development on the west flank of Mahony Arch, was likely controlled by the eastern limit of Saline River Formation salt rather than by reactivation of underlying basement faults. Salt flow in St. Charles Creek map-area is best recorded on Transect C where a salt pillow is clearly imaged above Mount Cap and Mount Clark strata. An early, pre-Devonian, phase of salt flow is indicated by sub-Devonian thinning of the Franklin Mountain Formation across the structure. However, post-Cretaceous (Laramide) salt flow was more significant. The pillow forms the core of a complex anticline (interpreted here as a dome), with structural relief of about 1200 m. On the time section of Transect C an apparent down to the east flexure of older units was found to be due to the presence of thick, relatively low velocity Cretaceous strata in the upper section as it was removed during the depth conversion to Structural Section C. The dome plunges out abruptly northward such that it is expressed only as a gentle bulge on Transect B. We interpret it to plunge out in similar fashion southward although, due to lack of seismic data, that interpretation is unconfirmed. We use the documented salt pillow of Transect C as a model to interpret a similar pillow coring the 'range' (see Transect A and Section C). We consider the 'range' to be cored by salt along its entire length.

An along-strike vergence reversal in the 'range' was probably accommodated by salt flow concurrent with Laramide orogenesis. The southern end of the 'range' comprises an eastward dipping panel of Paleozoic carbonates with the classic morphology of a west-verging thrust plate (Transect C). We interpret the unseen footwall structure to be an upturned westward dipping panel. In contrast, in the northern part of the 'range' in 96C/15, an eastward verging thrust fault juxtaposes west-dipping Franklin Mountain Formation with overturned Mount Kindle Formation. Thus, the gross structure of the 'range' is considered to be that of a ruptured asymmetric anticline, detached below, and cored with, Saline River Formation salt, with the asymmetry changing from west-verging in the south (Transect C) to east-verging in the north (Transect A). The east-verging and west-verging segments are separated by a northeast trending transverse fault that crosses the 'range'. The reversal implies minimal shortening on both faults. Such along-strike reversals are common in the Franklin Mountains to the northwest (Cook and Aitken, 1973). The conjugate set of strike-slip, transverse faults offsetting the 'range' implies longitudinal shortening in conjunction with lateral shortening.

Stratigraphy

Proterozoic strata imaged on seismic Transects A, B, C do not outcrop within the map-area. Weak west-dipping reflections in the western part of Transects B and C were considered (MacLean and Cook, 1999) to represent equivalents of the Mackenzie Mountains Supergroup, whereas east-dipping and sub-horizontal reflections in the eastern part of Transects A and C are considered (MacLean and Cook, ibid) to represent equivalents of the Hornby Bay Group that outcrops on Coppermine Homocline to the east.

Lower and Middle Cambrian Mount Clark and Mount Cap formations were penetrated in the region by exploration wells and are imaged within the map-area on Transects A, B, and C. They are thin to absent along Mahony Arch (Dixon and Stasiuk, 1998) just to the east of the 'range' yet thicken abruptly westward into Mackenzie Trough (Mackenzie Plain Depocentre of Dixon and Stasiuk, ibid). The dramatic thickness change is illustrated on Transect A where undivided Mount Clark and Mount Cap are estimated to be about 60 m thick at the eastern end of the transect and thin to zero thickness immediately adjacent to the 'range'. In sharp contrast, about 1 km of these rocks are imaged on the western part of the line. The sub-Cambrian unconformity on the western part of Transect A was extrapolated with confidence from further west (see MacLean and Cook, 1999). A distinctive marker in the upper part of the Mount Clark - Mount Cap interval was identified by MacLean and Cook (1999) as the base of their informally designated '*Glossopleura* unit', a Middle Cambrian shale penetrated in the Shell Keele River L-04 well (Shell Canada Ltd., 1965) about 65 km to the southwest. Mount Clark Formation sandstones, an established exploration target, probably occur at the base of the Cambrian section

In the area of Mount Clark, about 50 km south of the south end of the 'range', Cook and Morrow (2008a) discussed abrupt Lower and Middle Cambrian thickness changes from thin (zero to 125 m) on Mahony and Bulmer arches east of the McConnell Range to thick (greater than 1300 m) in Mackenzie Trough under the Mackenzie River valley. MacLean and Cook (1999) interpreted normal faults bounding the west side of Mackenzie Trough and considered the trough a Cambrian extensional basin. Accordingly Cook and Morrow (ibid) suggested that the hinge line on the east side of the trough was probably a normal fault or series of closely spaced normal faults. Although Transect A crosses the trough-to-arch transition seismic quality is poor at the level of the sub-Cambrian unconformity, and therefore the nature of the transition cannot be seen clearly. The data permit the interpretation of a set of down-to-basin normal faults, but do not support the interpretation of a large trough-bounding normal fault.

The Upper Cambrian Saline River Formation is nowhere exposed in St. Charles Creek (96C/15) nor elsewhere along the 'range' to the north. Regionally the Saline River comprises three members (Meijer-Drees, 1975; Dixon and Stasiuk, 1998). In ascending order they are: Lower clastic member, Evaporite member, and Upper clastic member and are shown on the depth model accompanying Transect C. The Evaporite member, being principally salt with interbeds of shale, dolostone, and anhydrite (Dixon and Stasiuk, 1998) played a major role, through salt flow, in the formation of northern Franklin Mountain structures (MacLean and Cook, 1999) including, we believe, development of the 'range' as discussed above. The Saline River Formation is missing on Mahony Arch immediately east of the 'range', presumably due to non-deposition, but is present in Mackenzie Trough, west of the 'range', where salt pillows of various ages have been found. The most striking example in St. Charles Creek map-area is recorded on Transect C where a salt pillow, lies above Mount Cap and Mount Clark strata. The salt pillow of Transect C served as a model to interpret a pillow coring the 'range' on Section C and Transect A. As discussed under 'structure' we consider the 'range' to be cored by salt along its entire length.

The Franklin Mountain Formation conformably overlies the Saline River Formation and comprises three members. Regarding the internal nomenclature of the Franklin Mountain, Macqueen (1969) described three subdivisions which he named (1970) the Cyclic unit, Rhythmic unit, and Cherty unit. Subsequently, this three-part terminology has been variously applied (see Cook and Morrow, 2008a). In choosing Franklin Mountain Formation terminology for this and related maps we follow Pugh (1993) and Morrow (1999) and use Cyclic member, Rhythmic member, and Cherty member. The basal Cyclic member conformably overlying the Saline River Formation was not identified in outcrop although it probably subcrops beneath Quaternary deposits, in the lower slopes of the 'range'. If present it is included in the overlying Rhythmic member. The Rhythmic member, comprising cliff-forming platformal dolomites, is the principle resistant unit defining topography of the 'range', and forms a mappable unit that extends its entire length within the St. Charles Creek map-area. The Cherty member of the Franklin Mountain Formation, characterized by prominent white stromatolitic chert beds, was identified in a structural panel mid-way along the 'range'. It no doubt occurs elsewhere, unrecognized, along the 'range' but is known to be discontinuous due to pre-Mount Kindle Formation erosion. For example, the Cherty member is missing beneath Mount Kindle Formation at Mount St. Charles about 5 ½ km north of the north boundary of St. Charles Creek (96C/15) (Macqueen, 1969). The undivided Franklin Mountain Formation, as interpreted on Transect A, is about 200 m thick to the east of the 'range' and thickens to about 660 m west of the 'range'. This dramatic thickness change seems to mimic changes within the Early/Middle Cambrian Mackenzie Trough. The east to west thickness change is probably due to erosional truncation of the Franklin Mountain at the sub-Mount Kindle unconformity.

The Mount Kindle Formation unconformably overlies the Franklin Mountain Formation. In St. Charles Creek map area the Mount Kindle is generally a cliff-forming unit comprising dark brownish-grey-weathering finely to medium crystalline dolomite characterized by silicified halysitid, favositid and solitary corrals and orthoconic cephalapods representing the Resistant member of Norford and Macqueen (1975). The Mount Kindle, based on map expression, is estimated to vary from 100 m to 350 m thick, comparable to thicknesses of 130-240 m in the subsurface of Great Bear Plain to the east (Pugh, 1993). Reddish sandstone and shale beds representing the Basal member of Norford and Macqueen (1975) were observed at about 64° 52'; 124° 38.5'. There, the member seems to be at least 200 m thick and forms a recessive unit extending for about 3 ½ km along strike. At 200 m, its thickness is anomalous considering that Pugh (1993) reported Basal member thicknesses ranging from 1 to 16 m in the subsurface to the east. The occurrence is interpreted as a local clastics-filled channel or depression on the sub-Mount Kindle unconformity. Elsewhere along the 'range' the basal member presumably is present but was not recognized during reconnaissance mapping.

The Mount Kindle is present in exploration wells to the east, and outcrops along the full length of the 'range', but has not been identified in wells immediately to the west, specifically in Old Fort Point E-30 (Aquitaine Co. of Canada Ltd, 1971), the only well drilled within the St. Charles Creek map-area. E-30 is situated on Section C. Apparently the sub-Devonian erosional edge of the Mount Kindle corresponds closely to the 'range'.

The contact between dark grey weathering Mount Kindle Formation and light grey weathering Tsetso and Bear Rock formations is a dependable marker for mapping and interpreting the structure of the 'range'. The Tsetso Formation (Meijer-Drees, 1993), comprising light yellow weathering, laminated, and platy dolomite, locally silty and/or sandy, unconformably overlies the Mount Kindle Formation. It is mappable in the southern part of the 'range' and was reported (Morrow and Meijer-Drees, 1981) in two measured sections MTA-80-3 and 80-4 where it is 52 m and 31.5 m thick. The interval in MTA-80-3 contains conglomeratic sandstone beds with chert pebbles. These sandstones are discontinuous channel deposits that are barely represented in MTA-80-4. Their presence is relevant to the interpretation of enigmatic sandstones in the Aquitaine Old Fort Point E-30 well as discussed below. The Tsetso Formation was identified (Meijer-Drees, 1993) in the subsurface to the east but has not been recognized in the northern part of the 'range'. If present it is included in the Bear Rock Formation map-unit. In the subsurface to the west the Aquitaine Old Fort Point E-30 well (Aquitaine Company of Canada Ltd., 1971) on Transect C penetrated, at 1980 ft (600 m), an unconsolidated chert-rich quartzose sandstone 170 ft (51 m) thick. That sandy interval lies within an interval of dolomites and limestones and has been variously interpreted (see MacLean and Cook, 1999) as basal Cambrian Mount Clark Formation, Cretaceous sandstone overthrust by Franklin Mountain Formation, and simply an interval of sand within the Franklin Mountain Formation. Seismic data (Transect C) preclude both the Mount Clark and the Cretaceous sandstone interpretations, and a mid-Franklin Mountain sandstone would be an unlikely anomaly. Accordingly, MacLean and Cook (1999) suggested that the enigmatic sands infill a local channel on the sub-Devonian unconformity. We follow that interpretation and suggest that the sands are stratigraphically and sedimentologically equivalent to the sandstones at the base of the Tsetso at section MTA-80-3 in the 'range'. In support of assigning the sands to the 'Tsetso', the sub-Devonian unconformity of Transect B can be projected into Transect C via Line 1982 Chevron Line 45X, and tied directly to the stratigraphic level of the enigmatic sand in Old Fort Point E-30.

The Bear Rock Formation (Morrow, 1991) comprises an oligomictic limestone dissolution particulate rubble breccia. The breccias are bedded to non-bedded and form a structurally homogeneous unit. The Bear Rock was described by Morrow and Meijer-Drees (1981) in Sections MTA-80-3 and 80-4 where the brecciated formation includes intervals of bedded dolostone. Morrow and Meijer-Drees also reported a section containing bedded gypsum and anhydrite in a section 9.6 km north of Mount St. Charles in the adjacent map area to the north (1:250 000 scale Mahony Lake NTS 96 F). Morrow and Meijer-Drees (1981, p.114), in discussing the origin of the breccias, observe that "the fact that all surface exposures of Bear Rock are brecciated and are generally lacking in evaporite minerals whereas adjacent subsurface Bear Rock well sections are composed of bedded anhydrite and dolomite is compelling evidence that dissolution of evaporite minerals played the dominant role in brecciation". They considered the exposure north of Mount St. Charles, containing evaporite minerals, to represent an intermediate step in breccia development. In the subsurface (Transects A, B, and C) a seismically layered interval is identified as undivided Bear Rock and Tsetso equivalents. On the east end of Transect A the Bear Rock Tsetso interval is carried into the section from well control in Great Bear basin to the east. West of the 'range' the layered interval seems to be unconformable on strata of the Franklin Mountain Formation. As noted above under 'Tsetso', the unconformity identified on Transect B can be traced on seismic data to the 'anomalous' sandstones found in Aquitaine Old Fort Point E-30.

The Landry Formation, conformably overlying the Bear Rock, is composed of alternating thin and thick-bedded limestone, dominantly unfossiliferous pelletal packstones (Morrow, 1991). The Landry is normally overlain by fossiliferous Hume Formation. Limestone beds that outcrop low on the east facing slope of the 'range' are mapped as undivided Landry and Hume formations. To the north in Mahony Lake (96C) Hume Formation occurs on both sides of the 'range' (Cook and Aitken, 1975). In the subsurface of St. Charles Creek (96C/15) the Landry/Hume is tentatively identified on Transect C. It is interpreted to have been truncated westward by pre-Cretaceous erosion.

Cretaceous strata underlie the plains areas both west and east of the 'range'. To the east, in the subsurface of Great Bear Basin, Dixon (1999) identified three Lower Cretaceous formations, from oldest to youngest, as Martin House (sandstone), Arctic Red (shale and sandstone), and Mahony Lake (interbedded sandstone, siltstone and shale). The Upper Cretaceous strata may be represented in one or two wells in Great Bear Basin to the east (Dixon, 1999), but are otherwise confined to the area west of the 'range'. Thus the sub-Slater River unconformity is mostly 'in the sky' in Great Bear Basin. At surface along the east flank of the 'range' Martin House sandstones presumably overlie Devonian strata but have not been observed. Within St. Charles Creek (96C/15) Cretaceous strata outcrop at one locality, a creek bank on the east side of the southern end of the 'range'. We assign Albian silty shales, there, to the Arctic Red Formation. Those shales are overlain by sandstones upstream (off map) to the east and in turn are overlain by shales (Cook and Aitken, 1977). We tentatively correlate the sandstone and overlying shale with Dixon's Mahony Lake Formation and consider the upper shale to be an interval within the Mahony Lake. Similarly, sandstones forming the St. Charles Rapids on Great Bear River, about 4 km north of the north boundary of 96 C/15, and the shales overlying them, are assigned here to the Mahony Lake Formation. Accordingly, the Arctic Red – Mahony Lake contact is drawn sub-parallel to the 'range' in the eastern part of St. Charles Creek (96C/15). Ages for these outcropping strata are generally Albian with some determined as Albian to Cenomanian (see Yorath and Cook, 1981). Consequently, Late Cretaceous Slater River or younger strata have not been identified on the east side of the 'range' within St Charles Creek (96C/15). Although in the subsurface the Lower Cretaceous Martin House, Arctic Red, and Mahony Lake formations total about 700 m thick east of the 'range', Mahony Lake Formation is missing in the west and the undivided Martin House and Arctic Red comprise a wedge of strata that thins westward from only 240 m thick adjacent to the 'range' to zero thickness (see Transect A). In the plains west of the 'range' we interpret both Lower and Upper Cretaceous strata based on seismic interpretation (Transects A, B, and C) and a single well, Aquitaine Old Fort Point E-30. Basal Martin House Formation sandstones occur in E-30 (Transect C). The sandstones and overlying shale are carried as undivided Martin House and Arctic Red formations on Transects A, B, and C. The undivided unit comprises a westward thinning wedge seemingly truncated by an unconformity at the base of the Upper Cretaceous Slater River Formation. Above the Slater River Formation we interpret a relatively thin (191 ft) of Upper Cretaceous Little Bear Formation in Old Fort Point E-30, based on extrapolation via seismic tie-lines from Police Island L-66 into Transects C and B. Little Bear Formation is interpreted on Transect A based on seismic character. Identifying units on the three transects permitted us to interpret the subsurface distribution of Cretaceous formations in considerably more detail than was possible on maps produced to the south. The interpretation of sub-surface Cretaceous stratigraphy west of the 'range' is based on minimal stratigraphic control and we can anticipate improvements as new data are acquired. We note, however, that the structures portrayed derive primarily from the tracing of seismic markers regardless of their designation. Thus the interpreted structural configuration is more or less independent of the nomenclature.

Above Cretaceous strata a prominent unconformity is clearly imaged on Transect B and is readily interpreted on Transects A and C. We assume that the unconformity marks the base of Quaternary deposits. Assuming a velocity of 2500 m/s for unconsolidated sediments (till and/or glaciofluvial) the deposits would reach up to 170 m thick, unusually thick for Quaternary deposits this far north in the Mackenzie Valley (A. Duk-Rodkin, pers. comm., 2008). The possibility that superincumbent strata represent some previously unnoted Tertiary strata (post Paleocene Summit Creek) cannot be discounted.

REFERENCE

Aquitaine Company of Canada Ltd.
1971: Seismic reflection survey report, Brackett Lake, Northwest Territories; National Energy Board File 673-06-05-006.

Cook, D.G.
1975: The Keele Arch – A pre-Devonian and pre-Late Cretaceous paleo-upland in the northern Franklin Mountains and Colville Hills; in Geological Survey of Canada, Paper 75-1C, p. 243-246.

Cook, D.G. and Aitken, J.D.
1973: Tectonics of northern Franklin Mountains and Colville Hills, District of Mackenzie; in American Association of Petroleum Geologists, Arctic Geology, Memoir 19, p.13-22.

Cook, D.G. and Aitken, J.D.
1975: Norman Wells (96E) and Mahony Lake (96F) Map-Areas, District of Mackenzie; Geological Survey of Canada, Open File Report 304.

Cook, D.G. and Aitken, J.D.
1977: Geological Maps of Blackwater Lake (96B) and Fort Norman (96C), District of Mackenzie; Geological Survey of Canada, Open File Report 402.

Cook, D.G. and Morrow, D.W.
2008a: Geology, Saline River, Northwest Territories; Geological Survey of Canada, Open File 5468, scale 1:50 000.

Cook, D.G. and Morrow, D.W.
2008b: Geology, unnamed NTS 96C/9, Northwest Territories; Geological Survey of Canada, Open File 5467, scale 1:50 000.

Cook, D.G. and Morrow, D.W.
2008c: Geology, Old Fort Point, Northwest Territories; Geological Survey of Canada, Open File 5472, scale 1:50 000.

Dixon, J.
1999: Mesozoic-Cenozoic stratigraphy of the northern Interior Plains and Plateaux, 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, p. 445-470.

MacLean, B.C. and Cook, D.G.
1999: Salt tectonism in the Fort Norman area, Northwest Territories, Canada; Bulletin of Canadian Petroleum Geology, v.47, p. 104-135.

Macqueen, R.W.
1969: Lower Paleozoic stratigraphy, Operation Norman, 1968, in Report of Activities, Part A, Geological Survey of Canada Paper 69-1 Part A, p.238-241.

Macqueen, R.W.
1970: Lower Paleozoic stratigraphy and sedimentology; eastern Mackenzie Mountains, northern Franklin Mountains (96 C, D, E, F; 106 G, H); in Geological Survey of Canada, Paper 70-1, Part A, p. 225-230.

Meijer-Drees, N.C.
1975: Geology of the Lower Paleozoic formations in the subsurface of the Fort Simpson area, District of Mackenzie, N.W.T.; Geological Survey of Canada, Paper 74-40, 65 p.

Meijer-Drees, N.C.
1993: The Devonian succession in the subsurface of the Great Slave and Great Bear plains, Northwest Territories; Geological Survey of Canada, Bulletin 393, 222 p.

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

Morrow, D.W.
1999: Lower Paleozoic stratigraphy of northern Yukon Territory and northwestern District of Mackenzie; Geological Survey of Canada, Bulletin 538, 202 p.

Morrow, D.W. and Meijer-Drees, N.C.
1981: The Early to Middle Devonian Bear Rock Formation in the type section and in other surface sections, District of Mackenzie; in Geological Survey of Canada, Paper 81-1A, p107-114.

Norford, B.S. and Macqueen, 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.

Pugh, D.C.
1993: Subsurface geology of pre-Mesozoic strata, Great Bear River Map Area, District of Mackenzie; Geological Survey of Canada, Memoir 430, 137 p.

Shell Canada Limited
1965: Report of 1964-65 exploratory drilling in the intermontane belt, Wrigley-Redstone area, Northwest Territories, Shell Keele River L-04, Shell Canada Limited Northern Division Exploration. Unpublished, on file at National Energy Board, Calgary, Canada

Yorath, C.J. and Cook, D.G.
1981: The Cretaceous and Tertiary Stratigraphy and Paleogeography, Northern Interior Plains, District of Mackenzie; Geological Survey of Canada, Memoir 398.

Published 2009

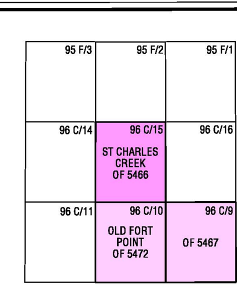

LOCATION MAP

OPEN FILE 5466
GEOLOGY
ST CHARLES CREEK
NORTHWEST TERRITORIES

Scale 1:50 000/Échelle 1/50 000

kilometres 1 0 1 2 3 4 kilomètres

Universal Transverse Mercator Projection / Projection transverse universelle de Mercator
North American Datum 1983 / Système de référence géodésique nord-américain, 1983



NATIONAL TOPOGRAPHIC SYSTEM REFERENCE

OPEN FILE / DOSSIER PUBLIC
5466
GEOLOGICAL SURVEY OF CANADA / COMMISSION GÉOLOGIQUE DU CANADA
2009
SHEET 1 OF 2 / FEUILLET 1 DE 2

Open files are products that have not gone through the GSC formal publication process.
Les dossiers publics sont des produits qui n'ont pas été soumis au processus officiel de publication de la CGC.

Sections accompany this map

Recommended citation:
Cook, D.G., MacLean, B.C., and Morrow, D.W.
2009: Geology, St Charles Creek, Northwest Territories; Geological Survey of Canada, Open File 5466, scale 1:50 000.