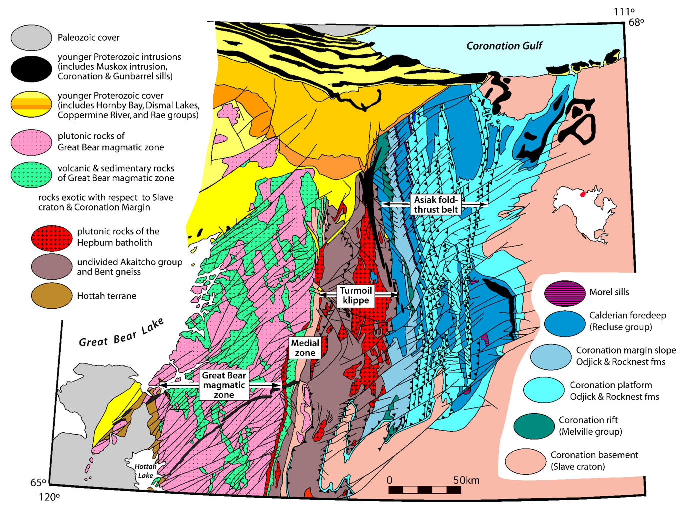

Figure 1. Generalized geological map of northern Wopmay orogen showing its major tectonic divisions (*modified from* Hildebrand et al., 2010a; Hildebrand, 2011).

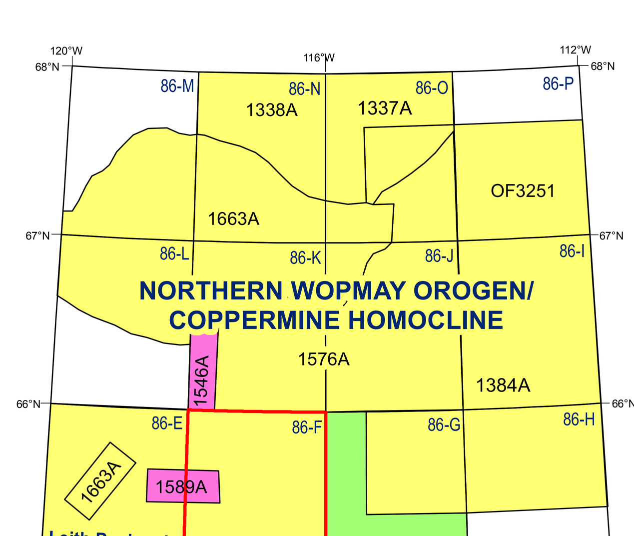

Figure 2. Sources of geological data :

1337A: Baragar, W.R.A. and Donaldson, J.A., 1969. GSC "A" Series Map 1337A.
1338A: Baragar, W.R.A. and Donaldson, J.A., 1969. GSC "A" Series Map 1338A.
1384A: Fraser, J.A., 1973. GSC "A" Series Map 1384A.
1546A: Hildebrand, R.S., 1983. GSC "A" Series Map 1546A.
1576A: Hoffman, P.F., 1984. GSC "A" Series Map 1576A.
1589A: Hildebrand, R.S., 1985. GSC "A" Series Map 1589A.
1663A: Ross, G.M., and Kerans, C., 1987. GSC "A" Series Map 1663A.
1754A: St-Onge, M.R., King , J.E., and Lalonde, A.E., 1991. GSC "A" Series Map 1754A.
OF3251: Hoffman, P.F., and Tirrul, R., 1996. GSC Open File 3251.

Scale: 1:50 000
Scale: 1:125 000
Scale: 1:250 000

Geological contact
- Defined
- Approximate
- Defined or approximate with dip

Normal fault
- Defined
- Approximate
- Inferred

Thrust fault
- Defined
- Approximate

Transcurrent fault
- Defined
- Approximate
- Inferred

Fold
- Antiform overturned
- Antiform upright
- Synform overturned
- Synform upright

Planar structure
- Bedding, normal top known
- Bedding, overturned
- Bedding, top unknown
- Foliation
- Foliation, vertical
- Eutaxitic foliation

Linear structure
- Lineation
- Outcrop-scale fold

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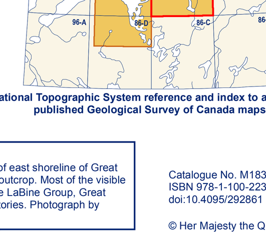
Abstract

The area includes Archean rocks of Slave craton and Paleoproterozoic rocks of Wopmay orogen. Both groups of rocks were deformed at 1.882 Ga during the Calderian orogeny (Hildebrand et al., 2010a). Rocks of Slave craton and its cover occur in the eastern part of the map area within and east of the medial zone (Hildebrand et al., 1990), where they form a crustal duplex structurally beneath rocks of Hottah terrane, which comprises metasedimentary rocks of Akaitcho group (Easton, 1982) sitting unconformably upon Bent gneiss (Hildebrand et al., 1991), and intruded by plutons of Hepburn batholith (Lalonde, 1986). Sitting unconformably atop, and intruding, the collapsed collision zone, are magmatic and sedimentary rocks of the 1.875-1.843 Ga Great Bear magmatic zone (Hoffman and McGlynn, 1977; Hildebrand et al., 1987b, 2010b). Rocks of the area were folded about northwest to northerly trending axes and cut by a swarm of strike-slip faults.

Résumé

La région de Calder River comprend les roches archéennes du craton des Esclaves et les roches paléoprotérozoïques de l'orogène Wopmay. Ces deux assemblages ont été déformés par l'orogenèse Calderian, à 1,882 Ga (Hildebrand et al., 2010a). Les roches cratoniques et celles de la couverture affleurent dans la partie orientale de la carte, à l'intérieur et à l'est de la zone médiane (Hildebrand et al., 1990). Elles forment un duplex crustal, localisé structuralement sous les roches du terrane de Hottah et comprennent les roches métasédimentaires du Groupe d'Akaitcho (Easton, 1982) reposant en discordance sur les gneiss Bent (Hildebrand et al., 1991), et recoupées par des plutons du batholite d'Hepburn (Lalonde, 1986). Cette zone de collision effondrée est surmontée en discordance, et recoupée par les roches intrusives et sédimentaires de la zone magmatique de Great Bear, qui varient en âge de 1.875 à 1.843 Ga (Hoffman et McGlynn, 1977; Hildebrand et al, 1987b, 2010b). Les roches de la région ont été plissées selon des axes orientés nord, nord-ouest et recoupées par un essaim de failles décrochantes.



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

Cover illustration
Oblique aerial photograph of east shoreline of Great Bear Lake showing typical outcrop. Most of the visible outcrops are andesite of the LaBine Group, Great Bear Lake, Northwest Territories. Photograph by R. S. Hildebrand. 204112A

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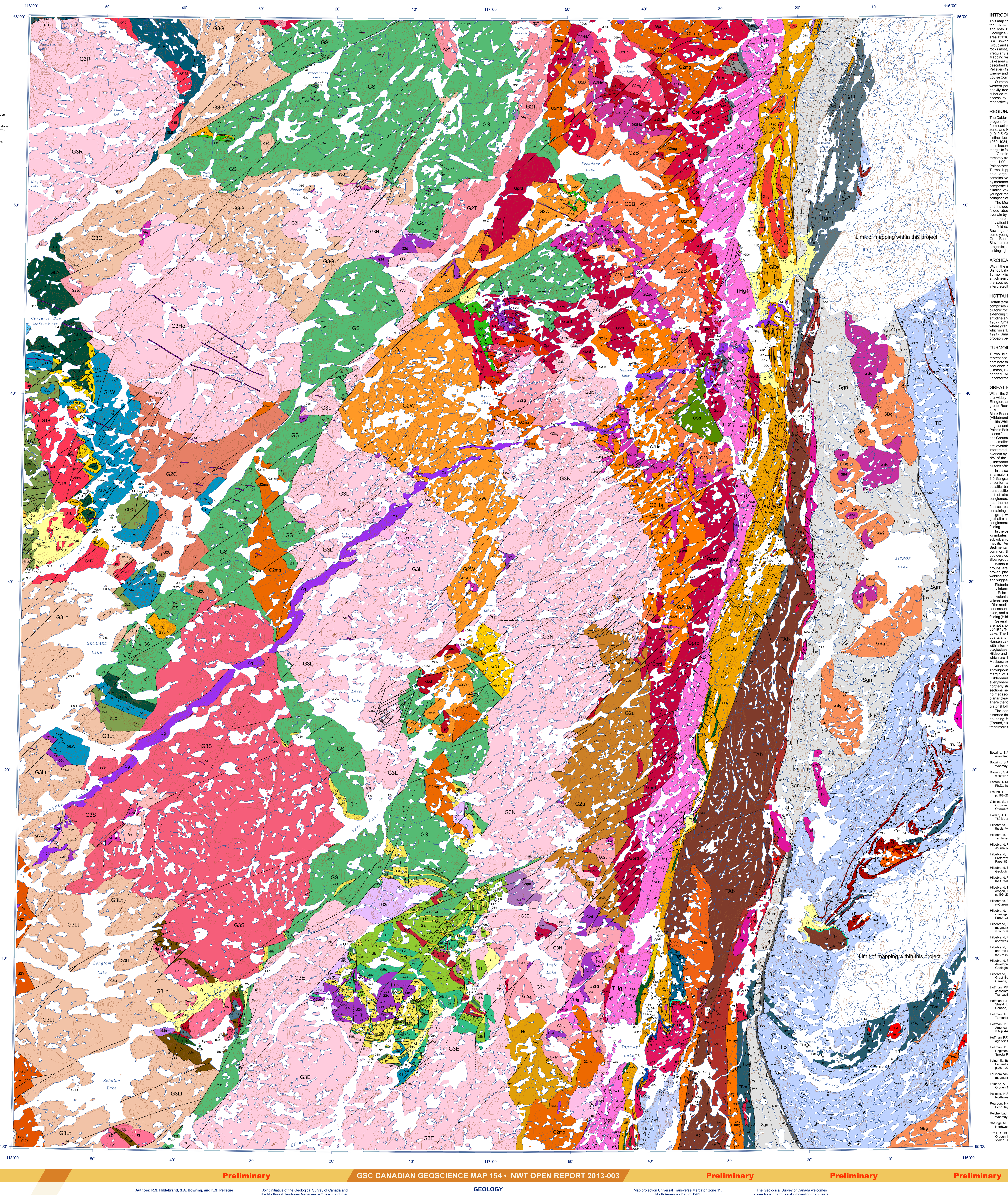
GEOLOGICAL SURVEY OF CANADA
CANADIAN GEOSCIENCE MAP 154
NORTHWEST TERRITORIES GEOSCIENCE OFFICE
NWT OPEN REPORT 2013-003
GEOLOGY
CALDER RIVER
Northwest Territories
NTS 86-F
1:125 000



DESCRIPTIVES NOTES

INTRODUCTION

This map compiles 1:16,000 scale geological mapping by the senior author and co-workers during the 1979–80 field seasons supported by the Department of Indian and Northern Affairs (DIAND) and both 1:16,000 and 1:50,000 scale during the 1986–87 and 1989–90 field seasons by the Geological Survey of Canada. K.S. Pelletier (Ellington Lake) and co-workers mapped the Ellington Lake area at 1:16,000 scale during the 1983–84 field seasons with additional work during August, 1987. S.A. Bowring and students, also supported by DIAND, mapped the northern part of the Dumas Group and associated plutonic rocks at 1:16,000 scale during 1983-85. Within areas of supracrustal rocks most, if not all, of the existing outcrops were visited, whereas within areas of plutonic rocks irregularly spaced traverses were made and contacts between mappable units were walked. Mapping was plotted on enlargements of black and white aerial photographs, except in the Clut Lake area where detailed coloured aerial photographs were available. The results of fieldwork were described by Hildebrand (1982, 1984b, 1985); Hildebrand et al. (1987a, 1988, 1990, 1991); and Pelletier (1988). Digitization and publication of the map were supported by the Geo-mapping for Energy and Minerals (GEM) Program, Multiple Metals: Great Bear Magmatic Zone project led by Louise Corriveau and Kathleen Lauzière, GSC Quebec, and Valerie Jackson, NTGO.

Outcrop throughout the area is good to excellent with few areas of extensive overburden. The western parts of the area are regionally at lower elevation, contain greater relief and are more heavily treed than the northeastern part of the area, which is dominantly higher elevation with subdued relief and sparse trees. The Calder River and Wopmay River drainages provide easy access by boat to large area of the west-central and southeastern parts of the map area, respectively. Elsewhere, abundant lakes provide more localized access by floatplane.

REGIONAL SETTING

The Calder River map area sits astride several tectonic divisions of the Paleoproterozoic Wopmay orogen, formed initially during the Calderian orogeny. The orogen is divided into five major zones, from east to west: Coronation margin, Turmoil klippe, the Medial zone, Great Bear magmatic zone, and Hottah terrane (Figure 1). Coronation margin contains basement rocks of the Archean (4.0–2.5 Ga) Slave craton overlain by a tripartite sedimentary succession representing three distinct tectonic regimes: 2014.32±0.95 Ma rift, passive margin, and foredeep (Hoffman, 1973, 1980, 1984, 1989; Hoffman et al., 2011). The supracrustal rocks of the margin were detached from their basement, folded, and transported eastward during the Calderian orogeny. The passive margin to foredeep transition, marking the onset of collision, is dated at 1882.50±0.95 Ma (Bowring and Grotzinger, 1992; Hoffman et al., 2011). The westernmost zone, Hottah terrane, developed remotely from, but in part contemporaneously with, Coronation margin. It consists of sedimentary and 1.90 Ga calc-alkaline volcanic and plutonic rocks erupted on and intruded into Paleoproterozoic continental crust (Hildebrand et al., 1983, 1984; Hildebrand and Roots, 1985). Turmoil klippe structurally overlies the westernmost parts of Coronation margin and is interpreted to be a large erosional remnant of Hottah Terrane (Hildebrand et al., 1990, 1991, 2010). The klippe contains Neoarchean to Paleoproterozoic gneissic and granitic basement unconformably overlain by metamorphosed 1.90–1.89 Ga sedimentary and volcanic rocks, all of which are intruded by the composite Hepburn Batholith (Lalonde, 1986). Great Bear magmatic zone is dominated by calc-alkaline volcanic and plutonic rocks. It is a typical magmatic arc built on continental crust and is younger than the Calderian orogeny and constitutes an overlap assemblage on the eroded and collapsed collision zone (Hoffman and McGlynn, 1977; Hildebrand et al., 1987, 1990, 2010a, b).

The Medial zone of the orogen occurs near the eastern margin of Great Bear magmatic zone and includes rocks of all the other zones—now tightly folded about northerly trending axes (Hildebrand et al., 1990). Normal faults, unconformably overlain by rocks of the Great Bear magmatic zone, occur within the zone where they placed little metamorphosed pillow basalts of Turmoil klippe over high-grade rocks of the collisional core, and they attest to the gravitational collapse of the orogen (Hildebrand et al., 1990) Based on isotopic and field data, the western edge of Slave craton lies within the Medial zone (Housh et al., 1989; Bowring and Podosek, 1989; Hildebrand et al., 1990). All of the rocks in the map area except for some younger dykes and the Hottah gabbro sheet are folded. The folds postdate magmatism in the Great Bear magmatic zone, where they mostly trend northwesterly. Where the folds affect rocks of Slave craton and its cover, such as in the Medial zone and eastward, they trend northerly. The orogen is permeated by a through-going system of conjugate transcurrent faults, forming northeast-striking right-lateral and northwest-striking left-lateral domains.

ARCHEAN ROCKS OF SLAVE CRATON

Within the map area rocks of the Slave craton occur within the Medial zone and to the east around Bishop Lake where they are dominated by 3 Ga orthogneiss that sits structurally beneath rocks of Turmoil klippe (Hildebrand et al. 1990, 1991, 2010b). Archean granite occupies the core of an anticline in the northeastern part of the sheet and Archean orthogneiss occupies another anticline in the southeast where it lies unconformably beneath amphibolite facies metasedimentary rocks interpreted to represent Odjick Formation and the structurally overlying Turmoil klippe.

HOTTAH TERRANE

Hottah terrane outcrops mostly along the western margin of the Great Bear magmatic zone where it comprises a wide variety of Paleoproterozoic metasedimentary and metavolcanic rocks cut by plutonic rocks. A substantial area of 1.9 Ga granite of Hottah terrane occurs in a narrow N-S band extending the length of the map area where it occupies the core of an eastwardly-overturned anticline and lies unconformably beneath rocks of the Dumas Group to the east (Hildebrand et al., 1987). Smaller outcrop areas of Hottah terrane occur in the Longtom and Zebulon lakes area, where granitoid rocks sit unconformably beneath rocks correlated with the Bell Island Bay group, which is a 1.90 Ga succession of sedimentary and basaltic to rhyolitic volcanic rocks (Reichenbach, 1991). Small areas of undated schist and mylonite occur near Smokey and Greenrock lakes and probably belong to Hottah terrane.

TURMOIL KLIPPE

Turmoil klippe is a dominantly Neoarchean-Paleoproterozoic composite thrust sheet interpreted to represent a fragment of the exotic Hottah terrane. Orthogneiss, with lesser quantities of paragneiss dominate the basement and are unconformably overlain by rocks of the Akaitcho Group, a 1.9–1.88 sequence comprising terrigenous clastics overlain by carbonate and bimodal volcanic rocks (Easton, 1982; Bowring, 1985). In the eastern part of the map area, stacked thin thrust slices of well-bedded Akaitcho Group metasedimentary rocks with cordierite porphyroblasts sitting unconformably atop Bent gneiss are folded in the conspicuous Robb River syncline.

GREAT BEAR MAGMATIC ZONE

Within the Great Bear magmatic zone, sedimentary and volcanic rocks of the McTavish supergroup are widely exposed in the map area. The oldest and broadly correlative groups are LaBine, Ellington, and Dumas, all of which are stratigraphically overlain by thick ignimbrites of the Sloan group. Rocks of the LaBine Group (Hildebrand, 1984a) are exposed from Conjuror Bay to Grouard Lake and include andesitic lavas of the Camsell River formation, which are associated within the Black Bear caldera prior to the intrusion of the Balachey pluton, which strongly altered its wall rocks (Hildebrand, 1984a, b, 1986). Both the pluton and its wall rock alteration predated eruption of the dacitic White Eagle tuff as documented by interfingering meso- and megabreccia containing both angular and rounded fragments of those lithologies. A buttress unconformity is exposed at Uranium Point in Balachey Lake, but the unconformity is also exposed, although less spectacularly, in many places farther south towards Clut Lake. The large patch of tuff shown on the peninsula between Clut and Grouard lakes is intracaldera megabreccia with blocks of andesitic lithologies up to a km across and smaller fragments of Balachey pluton encased in White Eagle tuff. The tuff and mesobreccia are overlain by sedimentary and tuffaceous rocks of the Uranium Point formation, which are interpreted to represent post-collapse lacustrine and fluvial fill of the caldera. In turn, they are overlain by lavas of Animal Andesite, also apparently deposited within the caldera. In the extreme NW of the map area andesitic rocks of the Surprise Lake member of the Echo Bay Formation (Hildebrand, 1983), probably correlative with Camsell River andesite, are intruded and altered by plutons of the early intermediate intrusive suite.

In the east, within the Medial zone, sedimentary and volcanic rocks of the Dumas Group crop out in a major syncline, dominantly overturned on the west limb where it unconformably overlies a 1.9 Ga granitoid, and extending the length of the map area. Sandstone and conglomerate sit unconformably upon older rocks along both limbs of the syncline and locally such as near basaltic basement are dominantly monomictic. Numerous tight to isoclinal folds, incipient transposition of bedding, and greenschist grade metamorphism affect these rocks. A 1.5 m thick unit of stromatolitic ferroan dolomite outcrops in the NE and is overlain by mudstone and conglomerate. Local conglomerate wedges containing clasts of granite to 1 m across also occur near the northeastern contact and are interpreted to have been deposited along west-side down fault scarps. Tuff units within the Dumas Group are simple cooling units mostly less than 20 m thick containing 10–25% broken phenocrysts. One was dated to be 1.87 Ga (Bowring, 1985). Rocks of the group were intruded in the north by a distinctive 1.87 Ga sill containing quartz, plagioclase, and golfball-size potassium feldspar phenocrysts (Bowring, 1985). Lithic sandstone and golfball conglomerate of the upper member sit unconformably on the sill and its wall rocks but also predate folding.

In the central part of the zone, rocks of the Ellington Lake group comprise a varied sequence of ignimbrites and lavas intercalated with a variety of epiclastic rocks and intruded by a variety of subvolcanic intrusions, including monzonites, a conspicuous fine-grained sill of diorite, and the rhyolitic Angle porphyry, which has both intrusive and extrusive phases (Pelletier, 1988). Sedimentary rocks SE of Nadin Lake are tightly folded, and although local facing directions are common, the overall younging direction of the sequence is unknown; however, because the bouldery conglomerate at the sedimentary-Sloan group contact doesn't contain tuff clasts of the Sloan group, the sedimentary sequence likely sits beneath rocks of the Sloan group.

Within the map area rocks of the Sloan group overlie the LaBine, Ellington Lake and Dumas groups; are dominantly intermediate composition densely-welded ignimbrites containing 25–40% broken phenocrysts intercalated with local beds of sedimentary rocks. The thickness, dense welding and sparseness of intercalated epiclastic units make it difficult to define stratigraphic units and suggest that they represent tuff ponded within calderas.

Plutonic rocks of the northern Great Bear magmatic zone are divided into 4 different suites: the early intermediate intrusive suite, with zoned alteration haloes and associated with Camsell River and Echo Bay andesites; the granodiorite-monzogranite suite, presumed to be intrusive equivalents of ignimbrites of the LaBine and Sloan groups; the biotite granite suite, with no apparent volcanic equivalents; and the Bishop suite, which are plutons of Great Bear age emplaced just east of the medial zone into basement of Slave craton. Virtually all of the plutonic contacts are regionally concordant to bedding of sedimentary and volcanic rocks, trend dominantly parallel to regional fold axes, and so many of the plutons are interpreted to have been emplaced as sills prior to regional folding (Hildebrand et al., 1987b, 2010).

Several porphyritic dyke swarms occur in the area and are older than the transcurrent faults but are not shown on the map. One swarm occurs to the east of a small lake located at 117°1'2"W, 65°49'18"N, another occurs in the Clut-Balachey Lake area, and the other occurs east of Hansen Lake. The first two series of dykes contain variable amounts of biotite-hornblende-plagioclase-quartz and K-feldspar phenocrysts in a dominantly brick red aphanitic groundmass whereas the Hansen Lake Group is a bimodal suite, with siliceous bodies similar to those of the other swarms but with intermediate-mafic dykes that weather dark-brown to black and contain hornblende and plagioclase phenocrysts. The dykes of all swarms trend N to NE (Hildebrand, 1984b, 1985; Hildebrand et al., 1987a). Two swarms of diabase dykes also occur in the area: Cleaver dykes, which are 1740 Ma (Irving et al., 2004), and trend just north of due west and northerly trending Mackenzie dykes, dated as 1267 Ma (LeCheminant and Heaman, 1989).

All of the volcanic rocks and all of the plutons of the Great Bear magmatic zone are folded. Throughout most of the zone, the folds trend northwest but as the axial traces approach the eastern margin of the zone, they bend progressively N-S, parallel to the edge of the Slave craton (Hildebrand et al., 1987b, 1990; Hildebrand and Bowring, 1988). The folds plunge gently everywhere. The map shows that many plutonic contacts parallel the northwest-trending or northerly striking axial traces of the younger folds and are exposed in cross section. Stratigraphic sections, several km thick, are exposed on single fold limbs and throughout most of the zone there is no megascopically recognizable planar fabric related to folding with the exception of strong axial planar cleavage within mudstones and poorly-welded tuffs, located mostly in the Dumas Group. There the folds are tighter than elsewhere due to the buttressing effect along the edge of the Slave craton (Hoffman, 1984; Hildebrand and Bowring, 1988).

The east-west shortening that created the northeasterly-trending, dextral transcurrent faults distorted the original trends of fold axes and contacts because the individual fault blocks and their bounding faults rotated in a counter-clockwise fashion during shortening of the entire orogen (Freund, 1970; Tirrul, 1992). The overall effect is to cause originally northerly-trending contacts to trend more northwesterly today.

REFERENCES

Bowring, S.A., 1985. U-Pb zircon geochronology of Early Proterozoic Wopmay orogen, N.W.T., Canada: an example of rapid crustal evolution; Ph.D. thesis, University of Kansas, Lawrence, 148 p.

Bowring, S.A. and Grotzinger, J.P., 1992. Implications of new chronostratigraphy for tectonic evolution of Wopmay orogen, northwest Canadian Shield; American Journal of Science, v. 292, p. 1–20.

Bowring, S.A. and Podosek, F.A., 1989. Nd isotopic evidence from Wopmay orogen for 2.0–2.4 Ga crust in western North America; Earth and Planetary Science Letters, v. 94, p. 217–230.

Easton, R.M., 1982. Tectonic significance of the Akaitcho Group, Wopmay orogen, Northwest Territories; Ph.D., thesis, Memorial University of Newfoundland, St. John's, Newfoundland, 432p.

Freund, R., 1970. Rotation of strike slip faults in Sistan, southeast Iran; The Journal of Geology, v. 142, p. 188–200.

Gibbins, S., 1988. The petrology and geochemistry of the Handley Page intrusive series: A concentrically-zoned intrusive sequence in the Great Bear magmatic zone, Northwest Territories; B.Sc. thesis, Carleton University, Ottawa, 68p.

Harlan, S.S., Heaman, L., LeCheminant, A.N., and Premo, W.R., 2003. Gunbarrel mafic magmatic event: A key 780 Ma time marker for Rodinia plate reconstructions; Geology, v. 31, p. 1053–1056.

Hildebrand, R.S., 1982. A continental arc of early Proterozoic age at Great Bear Lake, Northwest Territories; Ph.D. thesis, Memorial University of Newfoundland, St. John's, Newfoundland, 237p.

Hildebrand, R.S., 1983. Geology, Echo Bay-MacAlpine Channel Area, District of Mackenzie, Northwest Territories; Geological Survey of Canada, Map 1546A, scale 1:50 000.

Hildebrand, R.S., 1984a. Folded cauldrons of the early Proterozoic LaBine Group, northwestern Canadian shield; Journal of Geophysical Research, v. 89, p. 8429–8440.

Hildebrand, R.S., 1984b. Geology of the Camsell River-Conjuror Bay area, Northwest Territories: early Proterozoic cauldrons, stratovolcanoes and subvolcanic plutons; Geological Survey of Canada, Paper 83-20, 42p.

Hildebrand, R.S., 1985. Geology, Rainy Lake-White Eagle Falls, District of Mackenzie, Northwest Territories; Geological Survey of Canada, Map 1589A, scale 1:50 000.

Hildebrand, R.S., 1986. Kiruna-type deposits: their origin and relationship to intermediate subvolcanic plutons in the Great Bear magmatic zone, northwest Canada; Economic Geology, v.81, p. 640–659.

Hildebrand, R.S. and Bowring, S.A., 1988. Geology of parts of the Calder River map area, central Wopmay orogen, District of Mackenzie; *in* Current Research, Part C; Geological Survey of Canada, Paper 88-1C, p. 199–205.

Hildebrand, R.S., Bowring, S.A., and Housh, T., 1990. The medial zone of Wopmay orogen, District of Mackenzie; *in* Current Research, Part C; Geological Survey of Canada, Paper 90-1C, p. 167–176.

Hildebrand, R.S., Bowring, S.A., Andrew, K.P.E., Gibbins, S.E., and Squires, G.C., 1987a. Geological investigations in Calder River map area, central Wopmay orogen, District of Mackenzie; *in* Current Research, Part A; Geological Survey of Canada, Paper 87-1A, p. 699–711.

Hildebrand, R.S., Hoffman, P.F., and Bowring, S.A., 1987b. Tectonomagmatic evolution of the 1.9 Ga Great Bear magmatic zone, Wopmay orogen, northwestern Canada; Journal of Volcanology and Geothermal Research, v. 32, p. 99–118.

Hildebrand, R.S., Hoffman, P.F., and Bowring, S.A., 2010a. The Calderian orogeny in Wopmay orogen (1.9 Ga), northwestern Canada; Geological Society of America Bulletin, v. 122, p. 794–814.

Hildebrand, R.S., Hoffman, P.F., Housh, T., and Bowring, S.A., 2010b. The nature of volcano-plutonic relations and the shapes of epizonal plutons of continental arcs as revealed in the Great Bear magmatic zone, northwestern Canada; Geosphere, v. 6, p. 812–839.

Hildebrand, R.S., Paul, D., Pietikäinen, P., Hoffman, P.F., Bowring, S.A., and Housh, T., 1991. New geological developments in the internal zone of Wopmay orogen, District of Mackenzie; *in* Current Research, Part C; Geological Survey of Canada, Paper 91-1C, p. 157–164.

Hildebrand, R.S. and Roots, C.F., 1985. Geology of the Rivière Grandin map area (Hottah terrane and western Great Bear magmatic zone), District of Mackenzie; *in* Current Research, Part A; Geological Survey of Canada, Paper 85-1A, p. 373–383.

Hoffman, P.F., 1973. Evolution of an early Proterozoic continental margin: The Coronation geosyncline and associated aulacogens of the northwestern Canadian Shield; Royal Society of London Philosophical Transactions, ser. A, v. 273, p. 547–581.

Hoffman, P.F., 1980. Wopmay orogen: A Wilson cycle of early Proterozoic age in the northwest of the Canadian Shield: *in* The Continental Crust and its Mineral Deposits, (ed.) D.W. Strangway; Geological Association of Canada, Special, Paper 20, p. 523–549.

Hoffman, P.F., 1984. Geology, Northern Internides of Wopmay Orogen, District of Mackenzie, Northwest Territories; Geological Survey of Canada, Map 1576A, scale 1:250,000.

Hoffman, P.F., 1989. Precambrian geology and tectonic history of North America, *in* The Geology of North America–An Overview, (ed) A.W. Bally, and A.R. Palmer; Geological Society of America, Geology of Canada, v. A, p. 447–512 (also Geological Society of America, The geology of North America, v. A, p. 447–512).

Hoffman, P.F., Bowring, S.A., Buchwaldt, R., and Hildebrand, R.S., 2011. Birthdate for the Coronation paleocean: age of initial rifting in Wopmay orogen, Canada; Canadian Journal of Earth Sciences, v. 48, p. 281–293.

Hoffman, P.F., and McGlynn, J.C., 1977. Great Bear Batholith: a volcano-plutonic depression, *in* Volcanic Regimes in Canada, (ed.) W.R.A. Baragar, L.C. Coleman, and J.M. Hall; Geological Association of Canada, Special Paper 16, p. 170–192.

Irving, E., Baker, J., Hamilton, M., and Wynne, P.J., 2004. Early Proterozoic geomagnetic field in western Laurentia: Implications for paleolatitudes, local rotations and stratigraphy; Precambrian Research, v. 129, p. 251–270.

LeCheminant, A.N. and Heaman, L.M., 1989. Mackenzie igneous events, Canada: Middle Proterozoic hotspot magmatism associated with ocean opening: Earth and Planetary Science Letters, v. 96, p. 38–48.

Lalonde, A.E., 1986. The Intrusive Rocks of the Hepburn Metamorphic-Plutonic Zone of the Central Wopmay Orogen, N.W.T.; Ph.D. thesis, McGill University, Montréal, 258 p.

Pelletier, K.S., 1988. Geology of the Ellington volcanic-sedimentary complex, Great Bear magmatic zone, Northwest Territories; MSc. thesis, Carleton University, Ottawa, 113 p.

Reardon, N.C., 1992. Magmatic-hydrothermal systems and associated magnetite-apatite-actinolite deposits, Echo Bay, Northwest Territories; M.Sc. thesis, University of Ottawa, Ottawa, 154p.

Reichenbach, I.G., 1991. The Bell Island Bay Group, remnant of an early Proterozoic ensialic marginal basin in Wopmay orogen, District of Mackenzie; Geological Survey of Canada, Paper 88–28, 43p.

St-Onge, M.R., Lalonde, A.E., and King, J.E., 1991. Geology, east-central Wopmay orogen, District of Mackenzie, Northwest Territories; Geological Survey of Canada, Map 1754A, scale 1:125 000.

Tirrul, R., 1992. Geology and Structural Restoration of the East-Central Part of Asiak Thrust-Fold Belt, Wopmay Orogen, District of Mackenzie, Northwest Territories; Geological Survey of Canada, Map 1654A, 2 sheets, scale 1:50 000.

QUATERNARY

Unit	Description
Q	Unconsolidated sediments.

NEOPROTEROZOIC

Unit	Description
Cg	**Calder gabbro:** medium- to coarse-grained gabbro, forms gently inclined northeast striking sheets (779.5 ± 1.8 Ma; Harlan et al., 2003).

NEOPROTEROZOIC AND PALEOPROTEROZOIC

Unit	Description
d	Diabase; fine- to medium-grained diabase and gabbro.
Md	**Mackenzie dykes:** northerly trending, fine- to medium-grained diabase and gabbro (1267±2 Ma; LeCheminant and Heaman, 1989).
Cd	**Cleaver dykes:** north-westerly trending, fine- to medium-grained diabase and gabbro (1740 +5/- 4 Ma; Irving et al., 2004).

PALEOPROTEROZOIC: ROCKS OF WOPMAY OROGEN

GREAT BEAR MAGMATIC ZONE (1.876–1.843 Ga)

Biotite granite suite

Unit	Description
G3R	**Richardson pluton:** mainly coarse-grained hornblende-biotite monzogranite characterized by centimetre-size clots of quartz and locally by megacrysts of alkali feldspar (1858±5 Ma; Bowring, 1985).
G3L, G3Lg	**Lever pluton:** medium- to coarse-grained biotite granite; includes potassium feldspar porphyritic phases; miarolytic cavities common; locally granophyric phase, weathers pink to white (G3Lg).
G3N	**Nadin pluton:** medium- to coarse-grained biotite granite; variably potassium feldspar porphyritic; locally foliated.
G3E	**Ellington pluton:** medium- to coarse-grained potassium feldspar porphyritic and non-porphyritic hornblende-biotite granite.
G3Ho	**Hooker pluton:** medium-grained hornblende-biotite syenogranite; the presence of alkali feldspar phenocrysts up to 5 cm is distinctive.
G3H	**Housh pluton:** medium-grained hornblende-biotite syenogranite and monzogranite, containing variable amounts of potassium feldspar phenocrysts.
G3G	**Gilleran pluton:** medium- to coarse-grained potassium feldspar porphyritic and non-porphyritic hornblende-biotite granite.
G3S	**Self Lake pluton:** medium- to coarse-grained potassium feldspar porphyritic and non-porphyritic hornblende-biotite granite.
G3Lt	**Longtom Lake pluton:** monzogranite, mostly hornblende-biotite bearing, generally seriate textured plagioclase and sparse potassium feldspar phenocrysts.
G3	Medium- to fine-grained biotite granite.

Bishop suite: Bimodal suite of plutons (Lalonde, 1986) that occur east of the medial zone, but are of Great Bear age (Bowring, 1985; contacts from St-Onge et al., 1991)

Unit	Description
GBd	Diorite, quartz-diorite; generally dark-coloured and clinopyroxene-biotite-hornblende bearing, compositionally heterogeneous bodies of diorite, quartz diorite, quartz monzodiorite and monzodiorite; minor gabbronorite.
GBg	Granite; mainly pink to brick-red coarse-grained hornblende or hornblende-biotite monzogranite and granodiorite; minor syenogranite; in places potassium feldspar porphyritic with phenocrysts to 5 cm.

Granodiorite-monzogranite suite: age relations between non-adjacent bodies generally unknown

Handley Page intrusive series (Hildebrand et al., 1987; Gibbins, 1988)

Unit	Description
G2Hg	Granite; homogeneous, leucocratic, medium-grained biotite granite; intrudes G2Hgr and along its northern contact contains enclaves up to 1 km across of quartz diorite.
G2Hgr	Granodiorite-monzogranite; dominantly medium grained; intrudes G2Hd, and varies gradually inward from granodiorite to potassium feldspar porphyritic monzogranite in its most interior portions.
G2Hd	Mainly quartz diorite; medium- to fine-grained, seriate, biotite-hornblende quartz diorite grading into, and in places including, enclaves of finer-grained diorite.

Unit	Description
G2mg	Monzogranite-granodiorite; highly variable, but mostly hornblende-biotite bearing; generally seriate textured plagioclase and sparse potassium feldspar phenocrysts; lesser amounts of quartz monzonite.
G2Y	**Yen pluton:** medium-grained hornblende-biotite and biotite-hornblende monzogranite, quartz monzonite, and granodiorite; generally containing 20–25% ferromagnesian minerals; typically forming clots; prismatic hornblende to 1 cm is distinctive.
G2B	**Breadner pluton:** monzogranite, mostly hornblende-biotite bearing; generally seriate textured plagioclase and sparse potassium feldspar phenocrysts.
G2T	**Torrie pluton:** monzogranite-granodiorite, highly variable ranging from quartz diorite to granite, but mostly hornblende-biotite bearing monzogranite-granodiorite; generally seriate textured plagioclase and sparse potassium feldspar phenocrysts.
G2W	**Wyllie pluton:** monzogranite-granodiorite, highly variable ranging from quartz diorite to granite, but mostly hornblende-biotite bearing monzogranite-granodiorite; generally seriate textured plagioclase and sparse potassium feldspar phenocrysts.
G2Ha	**Hansen pluton:** monzogranite-granodiorite, highly variable ranging from quartz diorite to granite, but mostly hornblende-biotite bearing monzogranite-granodiorite; generally seriate textured plagioclase and sparse potassium feldspar phenocrysts.
G2u	**Unnamed pluton:** monzogranite-granodiorite, highly variable ranging from quartz diorite to granite, but mostly hornblende-biotite bearing monzogranite-granodiorite; generally seriate textured plagioclase and sparse potassium feldspar phenocrysts.
G2C	**Calder quartz monzonite:** hornblende-biotite quartz monzonite, minor monzogranite; typically seriate textured, and plagioclase feldspar commonly forms glomerocrysts; hornblende and biotite also commonly occur as clots; 1866±15 Ma (Bowring, 1985).
G2m	Monzonite; biotite and hornblende bearing; acicular hornblende.
G2d	Diorite-monzodiorite; mainly hornblende bearing; fine- to medium-grained, slightly porphyritic; locally brecciated wall rocks at margins.
G2qd	Quartz diorite; mainly medium- to coarse-grained hornblende bearing.
G2gf	Fine-grained biotite granite.
G2ag	Granite; fine- to medium-grained, altered, seriate plagioclase, potassium feldspar porphyritic, hornblende-biotite monzogranite to quartz monzonite; biotite clots and microdioritic enclaves are distinctive; locally has an aphanitic border phase.
G2g	Gabbro; dominantly medium-grained pyroxene gabbro.
G2qm	Quartz monzodiorite; biotite-hornblende bearing; commonly with seriate plagioclase, and quartz monzonite, hornblende-biotite; both mostly medium-grained.
G2sg	Syenogranite and monzogranite; hornblende-biotite, medium-grained; in places porphyritic.
G2	Granite; includes both syenogranite and monzogranite.
G2o	Orbicular and glomerocrystic hornblende-pyroxene quartz diorite.
G2mx	Mixed zone; megascopically comingled mafic and siliceous magmas.
G2ez	Enclave-rich zone.

Early intermediate intrusive suite: intermediate composition plutons associated with andesitic stratovolcanoes; typically have wide alteration haloes comprising an inner albitized zone, a central zone of magnetite-apatite-actinolite breccias, pods, veins and disseminations, and an outer pyrite zone (Hildebrand, 1986; Reardon, 1992)

Unit	Description
G1B	**Balachey pluton:** seriate, hornblende quartz monzonite, monzonite, and quartz monzodiorite.
G1C	**Contact Lake pluton:** dominantly medium-grained, seriate, hornblende-biotite granite with lesser amounts of granodiorite, quartz monzonite, and quartz monzodiorite.
G1M	**McLeod Lake pluton:** dominantly medium-grained, seriate, hornblende-biotite granodiorite-quartz monzonite-monzogranite.
G1E	**Eureka Lake pluton:** dominantly medium-grained, seriate, hornblende-biotite quartz monzonite-monzogranite.

Great Bear hypabyssal porphyritic intrusions: porphyritic intrusive rocks containing euhedral-subhedral phenocrysts

Unit	Description
Gpr	Rhyolite; potassium feldspar-quartz±biotite±plagioclase porphyritic; typically contains potassium feldspar phenocrysts to 4 cm, anhedral quartz blobs up to 2 cm, and plagioclase to 5 mm; commonly weathers brick red.
Gpg	"Golfball" porphyry; round to oval golf-ball-size potassium feldspar phenocrysts, also contains conspicuous quartz phenocrysts. Intrudes lower member of the Dumas Group (GDs) and unconformably overlain by the upper member of the Dumas Group (GDu). Identical bodies with the same relations in the Sloan River map area to the north are 1864 Ma (Bowring, 1985).
GpA	Angle rhyolite porphyry; rhyolitic intrusion and dome complex containing 10–25% phenocrysts of potassium feldspar to 2.5 cm in a pink- to red-weathering cryptocrystalline groundmass of feldspar, biotite, and quartz; includes autobreccia.
Gprd	Rhyodacite; potassium feldspar-plagioclase phenocrysts in roughly sub-equal proportions; may contain quartz and/or biotite.
Gpd	Dacite; plagioclase-quartz porphyritic.
Gpa	Augite porphyritic intrusions, associated with andesitic lavas of the Camsell River formation.

McTavish supergroup (1.878-1.844 Ga; Bowring, 1985): Supracrustal rocks of the Great Bear magmatic zone

Sloan group

Unit	Description
GSd	Rhyodacite ash flow tuff; subequal amounts of broken plagioclase and potassium feldspar±quartz phenocrysts.
GSr	Rhyolitic ash flow tuff and lava; minor thin-bedded tuff.
GSc	Conglomerate; in the Cruickshank Lake area a clast-supported, monomictic rock comprising dacitic cobbles and boulders in a matrix of dacitic debris; minor cross-bedded dacitic sandstone; in the Grouard Lake area typically poorly bedded cobbly to bouldery polymictic conglomerate.
GSs	Sandstone, minor siltstone, well-bedded volcaniclastic, south of Breadner Lake.
GS	**Undivided Sloan group:** dominantly dacitic ash flow tuff, generally densely-welded, eutaxitic, containing variable amounts of lithic fragments, porphyritic intrusions; minor sandstone, rhyolite flows, rhyodacitic ash flow tuff. In the Cruickshanks Lake area more than 2 km of densely welded, lithic-rich, dacitic ash-flow tuff containing 35–45% broken phenocrysts and abundant round to ovoid cognate inclusions probably represents intracauldron facies tuff.

LaBine Group

Unit	Description
GLi	Ignimbrite; simple cooling units,100–200 m thick, of mostly eutaxitic outflow facies tuff with minor intercalated siltstone, sandstone and conglomerate; most of the ignimbrites contain15–30% broken phenocrysts of potassium feldspar, quartz, plagioclase, and altered ferromagnesian minerals; includes minor sandstone and volcanic pebble conglomerate.
GLA	**Animal Andesite:** aphyric and pargasite-augite-plagioclase porphyritic andesitic lavas and breccias; some flows contain conspicuous quartz and potassium feldspar xenocrysts; minor lapilli tuff and pyroclastic breccia.
GLU	**Uranium Point formation:** predominantly sedimentary and pyroclastic rocks deposited within Clut cauldron; interbedded sandstone, siltstone, mudstone, ashstone, crystal and lapilli tuff, pebbly conglomerate; locally contains a simple cooling unit of purple-weathering, lithic-rich ash flow tuff; interpreted to represent post-collapse fluvial and lacustrine deposits within Clut caldera (Hildebrand, 1984a, b, c).
GLW	**White Eagle tuff:** densely-welded, lithic-rich, propylitized intracauldron facies tuff of Clut caldera (Hildebrand, 1984a, b, c), containing 25–35% broken phenocrysts of altered plagioclase, amphibole, biotite, and in the stratigraphically lower portions, quartz; megabreccia zone containing kilometre-size blocks of older rocks occurs between Grouard and Clut lakes.
GLWm	**Mesobreccia member:** breccia comprising dominantly angular fragments of Balachey pluton and Camsell River formation; interfingers with and grades into GLW.
GLE	**Echo Bay Formation:** amygdaloidal augite-plagioclase porphyritic andesitic, dacitic, and basaltic lava flows and breccia, explosion breccia, sandstone, ashstone, lapilli tuff, conglomerate, and laharic breccia possibly correlative with Camsell River andesite.
GLC	**Camsell River formation:** amygdaloidal, augite-plagioclase porphyritic andesitic, dacitic and basaltic lava flows and breccia, explosion breccia, sandstone, ashstone, lapilli tuff, conglomerate, laharic breccia and andesitic ash-flow tuff.
GLT	**Terra Formation:** volcanogenic lithic arkose, granular to pebbly, fine- to coarse-grained, ripple laminated and crossbedded, contains interbedded purplish brown mudstone drapes and rip-ups; minor polymictic conglomerate, finely-laminated mudstone with intercalated rhyolitic ashstone; rhyolitic lavas and breccias, interbedded argillite, dolomite, rhyolitic ashstone, sedimentary breccias deposited within the early-formed Mule Bay caldera (Hildebrand, 1984a, b, c; Hildebrand et al., 2010b).

Dumas Group: sits unconformably upon rocks deformed and metamorphosed during the Calderian orogeny and stratigraphically beneath the Sloan group

Unit	Description
GDu	**Upper member:** dominantly arkose, conglomerate containing clasts of "golfball" porphyry; minor siliceous ash-flow tuff.
GDb	Basalt; aphanitic to slightly plagioclase porphyritic.
GDa	Ash-flow tuff; mostly thin simple cooling units of outflow-facies ash-flow tuff containing 10–25% broken phenocrysts of quartz and feldspar, lesser amounts of reworked tuff (arkose), containing more than 50% broken crystals. U-Pb age from one tuff is 1875 Ma (Bowring, 1985).
GDc	Cryptalgal dolomite, typically weathers brown; locally in the northeastern part of the belt contains thin beds with wavy to irregular stratiform stromatolites, minor units of microdigitate-digitate stromatolites, and platy oncolites draped by layers of cryptalgal tufa.
GDs	Dominantly siltstone and sandstone, minor conglomerate and mudstone, commonly metamorphosed to greenschist grade; commonly cross-bedded; locally near basement contacts are coarse arkose and granite pebble to conglomerate; a few lenses of clast supported bouldery conglomerate containing subangular to subrounded clasts of granite, angular blocks of stromatolitic dolomite, and minor sandstone in a sandy matrix occur in the northeastern part of the area north of Wopmay Lake; near conspicuous basaltic lavas, conglomerate is dominated by pebbles of basalt.

Nadin succession: sedimentary rocks stratigraphically beneath Sloan group in the Nadin Lake area; probably correlative with the lower member of the Dumas Group

Unit	Description
GNc	Conglomerate, granite bouldery.
GNs	Siltstone-mudstone, thinly bedded to laminated; minor ash-flow tuff.

Ellington Lake group: rocks stratigraphically beneath Sloan group in Ellington Lake area (Pelletier, 1988)

Unit	Description
GEr	Rhyolitic and rhyodacitic ash-flow tuff; cooling units containing 5–15% broken phenocrysts of biotite-feldspar-quartz, highly variable amounts of lithic fragments.
GEd	Dacitic ash-flow tuff; cooling units containing 2–15% broken phenocrysts of biotite-feldspar-quartz, highly variable amounts of lithic fragments.
GErf	Rhyolitic lava; typically sparsely porphyritic containing 1–5% tiny phenocrysts of quartz, potassium feldspar and biotite.
GEb	Basaltic and basaltic andesitic lava; typically black weathering, generally aphanitic rocks containing 5–15% microphenocrysts of plagioclase and 1–5% augite, also includes andesitic lavas north of Ellington Lake which are weakly plagioclase porphyritic with altered hornblende and augite.
GEs	Sandstone, conglomerate, siltstone; typically arkosic, volcanogenic.
GEvb	Volcanic breccia; probable vent facies rocks comprising angular volcanic fragments with compositions similar to underlying units, displays intrusive as well as stratigraphic relations.

ROCKS OF HOTTAH TERRANE (~1.9 Ga): Rocks considered to be part of Hottah Terrane occur dominantly west of Calder map area, but throughout the map-sheet there are scattered areas of such rocks. East of the medial zone, a large klippe of rocks correlated with Hottah Terrane, based on lithology and age, occur within Turmoil klippe, which sits structurally upon rocks of the Calderian margin and Slave craton

Hepburn batholith: intrusive rocks of Hottah Terrane and Turmoil klippe

Unit	Description
THl	Leucogranodiorite; medium-grained, grey weathering, biotite-muscovite granodiorite with subordinate tonalite and monzogranite, sparse garnets locally near metasedimentary enclaves; locally contains poikilitic potassium feldspar crystals up to 2 cm.
THd	Diorite; biotite-clinopyroxene-hornblende.
THmg	Biotite-muscovite-garnet monzogranite, grey to pink, coarse grained, potassium feldspar porphyritic; contains small, 2 mm aggregates of biotite, muscovite, tourmaline, and andalusite; biotite also forms local clots.
THm	Clinopyroxene-hornblende-biotite monzonite and monzogranite with local dioritic border phase; contains potassium feldspar phenocrysts to 4 cm long; biotite defines a foliation, especially adjacent to intrusive contacts.
THg2	Granite, hornblende-biotite, medium grained.
THg1	Porphyritic biotite granite; containing potassium feldspar phenocrysts ranging in size from 2–6 cm surrounded by anhedral quartz to 1 cm, subhedral-euhedral plagioclase to 5 mm, and biotite flakes; commonly foliated; U-Pb zircon age of 1890±5 Ma (Hildebrand et al., 1987a; Hildebrand and Bowring, 1988; Hildebrand et al., 1990).
THmy	Protomylonitic porphyritic granite; white-weathering, medium- to coarse-grained protomylonitic biotite granite containing feldspar phenocrysts to 10 cm; S-C fabrics well-developed and there is typically a gently-plunging (0–35°) mineral lineation. Locally contains enclaves to 8 m of sillimanite-garnet-biotite schist and amphibolite. Occurs as fault-bounded slices within the medial zone.

Bell Island Bay group: sedimentary and volcanic cover to Hottah Terrane, in part contemporaneous with rocks of the Akaitcho Group

Zebulon Formation

Unit	Description
BZa	Andesitic lava and breccia; plagioclase porphyritic andesite.
BZs	Siliceous lavas, aphanitic, brown to grey weathering dacitic and rhyodacitic lavas, aphanitic to sparsely porphyritic.
BZb	Basaltic lava.
BBs	**Beaverlodge Lake sandstone:** dominantly fine- to medium-grained arkose and quartz arenite, commonly through crossbedded; polymictic conglomerate.

Basement rocks of Hottah Terrane

Unit	Description
Hs	Undivided metasedimentary rocks, migmatite, metasandstone, schist.
Hms	Mixed orthogneiss and metasedimentary rocks of Holly Lake metamorphic suite.
Hg	Granite; hornblende-biotite bearing; lies unconformably beneath rocks of the Bell Island Bay group.

ROCKS OF TURMOIL KLIPPE

Akaitcho Group: volcanic and sedimentary cover, in part contemporaneous with rocks of the Bell Island Bay Group to the west. Occurs within Turmoil klippe and as normal fault slices in the medial zone

Unit	Description
TAr	Rhyolitic porphyry; spherulitic quartz and potassium feldspar porphyritic hypabyssal intrusions; commonly weather white or pink.
TAg	Gabbro, diabase; typically medium- to coarse-grained pyroxene gabbro, variably metamorphosed.
TAb	Basalt; in places massive, but dominantly pillowed, cut by gabbroic sills. Minor beds a few meters thick of pillow breccia, lapilli tuff, hyaloclastite, and chert occur between flows.
TAsc	Siliciclastic sedimentary rocks; overlain by carbonate-argillite rhythmites and capped with cryptalgal dolomite. Similar to units TAs and TAc. TA: within N-S trending panels of the medial zone are metapelites and metapsammites containing conspicuous cm-size porphyroblasts of andalusite in a finer matrix of garnet, biotite, and feldspar.
TAc	Carbonate; finely interbedded carbonate and argillite generally overlain by brown-weathering, massive, cryptalgal dolomite.
TAs	Sandstone, siltstone, conglomerate; within Turmoil klippe: generally fine-grained, well-bedded terrigenous clastic rocks, locally pyritic, and metamorphosed to cordierite grade; within medial zone east of Wopmay Lake, the unit sits unconformably upon Tbg and comprises well-bedded quartz arenite, arkose and siltstone with minor intercalated beds of volcaniclastic sandstone.
TA	Undivided metasedimentary and metavolcanic rocks.

Basement rocks of Turmoil klippe

Unit	Description
Tg	Granite; variably strained, pink weathering, biotite granite; dominantly L-S tectonite, but in places there is no visible planar fabric, only a lineation; in places mylonitic; contains a well-developed weathered horizon up to 10 m thick beneath rocks of the Dumas Group. Unconformably beneath Akaitcho Group in medial zone.
Tbg	Biotite granite; generally white-weathering, potassium feldspar porphyritic biotite granite, variably deformed.
Tgm	Granitic mylonite, may include Archean rocks of Slave craton.
Ts	Schist and mylonite derived from metasedimentary rocks; minor granite.

Bent gneiss: Paleoproterozoic and late Archean (?) gneisses unconformably beneath rocks of the Akaitcho Group

Unit	Description
TBm	Undivided migmatitic paragneiss; well-layered.
TBgn	Biotite-garnet-sillimanite gneiss; with well-developed and contorted 1–3 cm compositional layering; locally migmatitic.
TBv	Gneiss; a heterogeneous assemblage of gneisses derived from sedimentary and volcanic protoliths: quartzite, semipelite, garnet-plagioclase-biotite rocks interpreted to represent meta-andesite, and a variety of metamorphosed siliceous lavas and porphyries. Granitoid intrusions cut the units and with few exceptions, were deformed with them.
TB	Mainly tonalitic orthogneiss with subordinate amounts of granitic to dioritic orthogneiss and amphibolite; includes small bodies of porphyritic and even grained, but gneissic, biotite and hornblende-biotite granitoid rocks ranging from diorite to granite; locally also includes coarse-grained, heterogenously strained metagabbroic sills. U-Pb zircon ages of about 2040 and 1995 Ma (Hildebrand et al., 1990).

ROCKS OF CORONATION PASSIVE MARGIN

Epworth Group

Unit	Description
CEO	**Odjick Formation:** quartzite and mafic metavolcanic rocks sitting unconformably upon gneisses of Slave craton (Sgn) and structurally beneath rocks of Turmoil klippe.

ROCKS OF ARCHEAN SLAVE CRATON

Unit	Description
Sg	Granite; equigranular to potassium feldspar porphyritic biotite granite and subordinate hornblende-biotite granodiorite, locally foliated. Dated just north of the map area to be about 2.5 Ga (Hildebrand et al., 1987a).
Sgn	Orthogneiss; lithologically heterogeneous assemblage of layered granitic, tonalitic, and amphibolitic gneiss. A U-Pb zircon age on rock collected from the core of the conspicuous anticline east of Wopmay Lake yielded a U-Pb zircon age of 2925±17 Ma (Hildebrand et al., 1990).
	Brecciated zone.

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GEOLOGY
CALDER RIVER
Northwest Territories
NTS 86-F
1:125 000

2 0 2 4 6 8 10 km

Map projection Universal Transverse Mercator, zone 11. North American Datum 1983

Base map at the scale of 1:250 000 from Natural Resources Canada, with modifications. Elevations in meters above mean sea level

Mean magnetic declination 2014, 19°53'E, decreasing 33' annually. Readings vary from 19°11'E in the SE corner to 20°33'E in the NW corner of the map

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