

Canada

LOCATION MAP

Joint initiative of the Geological Survey of Canada and Northwest Territories Geoscience Office, conducted under the auspices of the IOCG Great Bear as part of Natural Resources Canada's Geomapping for Energy and Minerals (GEM) program





Scale 1:500 000/Échelle 1/500 000 40 kilomètres kilometres

Universal Transverse Mercator Projection Projection transverse universelle de Mercator North American Datum 1983 Système de référence géodésique nord-américain, 1983 © Her Majesty the Queen in Right of Canada 2011 © Sa Majesté la Reine du chef du Canada 2011

Mean magnetic declination 2011, 21°21′E, decreasing 37.0′ annually. Readings vary from 17°55′E in the SE corner to 24°5'E in the NW corner of the map

NATIONAL TOP

QUATERNA	RY Unconsolidated sediments.
PALEOZOIC	Undifferentiated sedimentary rocks: thinly-bedded to laminated shale, mudstone, siltstone, columnar stromatolitic dolomite, minor dolarenite and sandstone; rare
	gypsum.
NEOPROTER FCg	ROZOIC Coronation sills: gabbro, minor ultramafic cumulate and granophyre (723 Ma; Heaman et al., 1992).
dgg	Gunbarrel gabbro: medium- to coarse-grained gabbro, forms a gently-inclined northeast striking sheet (779.6 ± 1.4 Ma; Harlan et al., 2003).
dc	Calder gabbro: medium- to coarse-grained gabbro, forms gently-inclined northeast striking sheets (779.5 ± 1.8 Ma; Harlan et al., 2003).
	ROCKS OF THE COPPERMINE HOMOCLINE
NEOPROTE	ROZOIC AND/OR MESOPROTEROZOIC RAE GROUP
PR	Basal sandstone, siltstone, shale and local regolith overlain by reddish to grey cherty dolostone; siltstone, mudstone, silty sandstone; upper cream to orange stromatolitic dolomite.
MESOPROT	COPPERMINE RIVER GROUP
CHs	HUSKY CREEK FORMATION Red sandstone and siltstone.
CHb	Red sandstone and siltstone intercalated with basalt flows.
CCb	COPPER CREEK FORMATION: Basalt flows and associated breccia, minor sandston
Cm	MUSKOX INTRUSION (1270 Ma; LeCheminant and Heaman, 1989) Gabbro, peridotite, granophyre, websterite.
Cg	Mafic sills of gabbro, diabase, minor granophyre.
DG	DISMAL LAKES GROUP GREENHORN LAKES FORMATION: Thin- to medium-bedded dolostone with stromatolites, cryptalgal laminites, intraclastic breccia, oolite, dolomitic shale, megabreccia and karstic breccia; local cyclic, medium-bedded dolostone with flat cryptalgal laminites alternating with thickly-bedded stromatolitic biostromes.
DS	SULKY FORMATION: Planar-bedded to stromatolitic dololutite with interbedded black shale, massive stromatolitic dolomite, cherty carbonate with pisolites, silicified evaporites and tepee structures.
DK	KENDALL RIVER FORMATION: Cherty dolostone, minor chert, silicified evaporites, minor black shale, stromatolitic bioherms at top.
DD	DEASE LAKE FORMATION: Cherty dolostone with lenses of mudstone containing hal casts and rare pisolites; dolomitic sandstone, oolitic dolostone, stromatolitic biostrome intraclastic breccia, mudstone, dololutite; highly contorted megabreccia near Greenhor and Sulky lakes.
DF	FORT CONFIDENCE FORMATION: Sandy shale, minor sandstone.
DL	LEROUX FORMATION: White to grey quartz arenite, conglomeratic litharenite at base
dW	WESTERN CHANNEL DIABASE (1.591 Ga; Hamilton and Buchan, 2007) Diabase, gabbro.
PALEOPRO	
HN	HORNBY BAY GROUP NARAKAY VOLCANIC COMPLEX: Mafic lapilli tuff, breccia and ashstone; lithic-rich siliceous ash-flow tuff, rhyolitic flows and associated porphyritic intrusions (1.663 Ga; Bowring and Ross, 1985).
НК	KAERTOK FORMATION: Sandstone, mudstone, minor carbonate.
HE	EAST RIVER FORMATION: Oolitic calcarenite, laminated and stromatolitic dolostone, intraformational conglomerate, minor quartz arenite, evaporite and mudstone.
HL	LADY NYE FORMATION: Buff, white and purple sandstone, conglomerate, minor mudstone.
HB	BIGBEAR FORMATION AND RIVER FORMATION: Red to buff conglomerate, sandstone; minor mudstone and breccia.
	ROCKS OF WOPMAY OROGEN
WGg	GREAT BEAR MAGMATIC ZONE GREAT BEAR BATHOLITH (1.876–1.843 Ga; Bowring, 1984) Granite suite: medium to coarse-grained biotite granite; includes potassium feldspar porphyritic phases; minor granodiorite; also includes rocks of the Bishop intrusive suite (St-Onge et al., 1991) (two colors are used to portray individual plutons and interview of the
WGgr	intrusions of the suite). Granodiorite-monzogranite suite: medium-grained hornblende-biotite and biotite hornblende monzogranite, quartz monzonite, and granodiorite (three colors are used to portray individual plutons of the suite).
WGd	Diorite-gabbro suite: mainly homblende and/or pyroxene diorite, quartz diorite, gabbro.
WGp	Hypabyssal porphryry: porphyritic intrusions with variable proportions of alkali feldspar plagioclase, hornblende, biotite and quartz phenocrysts.
WGm	Early intermediate intrusive suite: hornblende monzonite, monzodiorite, quartz monzonite, pseudosyenite, granite, diorite; typically with broad hydrothermal alteration haloes within adjacent host rocks; several members of this suite are demonstrably coeval with rocks of the LaBine Group.
	MACTAVISH SUPERGROUP (1.878–1.844 Ga; Bowring, 1984) SLOAN GROUP
WGMs	Mainly intermediate and siliceous ash-flow tuff, both intracaldera and outflow sheets; lesser amounts of andesitic lava and terrigenous siliciclastic rocks; intrusive porphyry.
WGMId	LABINE GROUP DUMAS GROUP Basal sandstone overlain by pillow basalts; includes gabbroic sills; basaltic-andesitic- dacitic-rhyolitic lavas and intermediate composition ash-flow tuff, both intracaldera and outflow sheets; siliciclastic sedimentary rocks and minor carbonate; intrusive porphyry.

REFERENCES

	d Donaldson, J.A., 1969. Geology, Coppermine, District of MacKenzie; Geological Survey of 37A, scale 1:250 000.
	d Donaldson, J.A., 1969. Geology, Dismal Lakes, District of MacKenzie; Geological Survey of 38A, scale 1:250 000.
	Uranium-lead zircon geochronology of Early Proterozoic Wopmay Orogen, Northwest Territories, nple of rapid crustal evolution; Ph.D. thesis, University of Kansas, Lawrence, Kansas, 148 p.
	Brotzinger, J.P., 1992. Implications of new chronostratigraphy for tectonic evolution of Wopmay st Canadian Shield; American Journal of Science, v. 292, p. 1–20.
	oss, G.M, 1985. Geochronology of the Narakay Volcanic Complex: Implications for the age of the nocline and Mackenzie igneous events; Canadian Journal of Earth Sciences, v. 22, p. 774–781.
Söderlund, U., 20	t, R.E., Bleeker, W., Davis, W.J., Villeneuve, M., van Breemen, O., Hamilton, M.A., and D10. Proterozoic magmatic events of the Slave Craton, Wopmay Orogen and environs; Geological a, Open File 5985, 26 p, 1 CD-ROM.
Fraser, J.A., 1973. scale 1:250 000.	The Epworth Group, Rocknest Lake area; Geological Survey of Canada, Map 1384A,
for Laurentia AP	chan, K., 2007. Precise 1.59 Ga age for Western Channel diabase, Wopmay orogen: Implications WP and reconstructions of Laurentia, Baltica and Gawler craton; Geological Society of America ograms, v. 39, no. 6, p. 285.
	n, L., LeCheminant, A.N., and Premo, W.R., 2003. Gunbarrel mafic magmatic event: A key 780 Ma odinia plate reconstructions; Geology, v. 31, p. 1053–1056.
	neminant, A.N., and Rainbird, R.H., 1992. Nature and timing of Franklin igneous events, Canada: a Late Proterozoic mantle plume and the break-up of Laurentia; Earth and Planetary Science 117–131.
	83. Geology, Echo Bay-MacAlpine Channel area, District of Mackenzie, Northwest Territories by of Canada, Map 1546A, scale 1:50 000.
	85. Rainy Lake-White Eagle Falls area, District of Mackenzie, Northwest Territories; Geological a, Map 1589A, scale 1:50 000.
	offman, P.F., and Bowring, S.A., 2010. The Calderian orogeny in Wopmay orogen (1.9 Ga), nadian Shield; Geological Society of America Bulletin, v. 122, p. 794–814.
	. Geology, northern internides of Wopmay Orogen, District of Mackenzie, Northwest Territories; ey of Canada, Map 1576A, scale 1:250 000.
	rrul, R., 1996. Geology, northern externides of Wopmay Orogen, District of Mackenzie, Northwest gical Survey of Canada, Open File 3251, scale 1:250 000.
	and Heaman, L.M., 1989. Mackenzie igneous events, Canada: Middle Proterozoic hotspot ciated with ocean opening; Earth and Planetary Science Letters, v. 96, p. 38–48.
	991. The Bell Island Bay Group, remnant of an early Proterozoic ensialic marginal basin in Wopmay of Mackenzie; Geological Survey of Canada, Paper 88-28, 43 p.
	ans, C., 1984. Hornby Bay and Dismal Lakes groups, Coppermine Homocline; Geological Survey of 63A, scale 1:250 000.
	, J.E., and Lalonde, A.E., 1991. Geology, east-central Wopmay Orogen, District of Mackenzie ries; Geological Survey of Canada, Map 1754A, scale 1:125 000.
	nation on the geological evolution of the Northern Wopmay Orogen, the reader is refered to 0) and references therein.





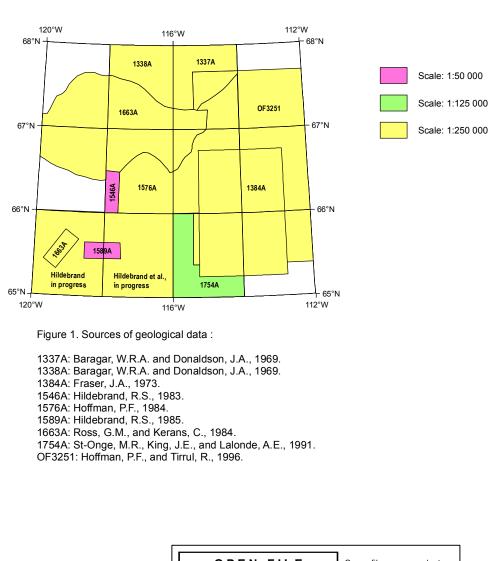
L	Е	G	Е	Ν	D	

	Wlg	TURMOIL KLIPPE: Rocks of Turmoil klippe structurally overlie rocks of Coronation Supergroup and Slave craton. They are interpreted to be part of Hottah terrane <i>Leucogranite: predominantly biotite leucogranite, crosscuts basal contact of Turmoil klippe.</i>
mudstone, one; rare	Wmyl	Mylonitic rocks of uncertain age; dominantly granitic protoliths.
	WHo	HEPBURN INTRUSIVE SUITE (1.900-1.882 Ga; Bowring, 1984) Okrark sills: feldspar porphyritic sills of hypabyssal rhyolite, variably foliated and/or lineated.
inclined	WHs	Syenite: massive pyroxene-amphibole-alkali feldspar syenite, hornblende-biotite monzonite and quartz monzodiorite (1886 ± 6 Ma; Bowring, 1984).
ed northeast	WHd	Quartz diorite, diorite, gabbro, norite: massive to weakly-foliated; agmatitic in places (1882 ± 15 Ma; Bowring, 1984).
	WHb	'Younger' granite: massive biotite leuco-monzogranite.
to grey cherty e stromatolitic	WHt	Biotite tonalite and granodiorite: typically with alkali feldspar megacrystic border zones; weakly foliated.
	WHf	'Older' granite: foliated to mylonitic biotite granite, strongly porphyritic in places; may contain abundant metasedimentary enclaves.
	WHgg	Garnet granite: mainly biotite granite with accessory garnet, (1887 ± 4 Ma; Bowring, 1984); locally contains large tabular alkali feldspar phenocrysts and metasedimentary enclaves.
	WHg	Sheared biotite-hornblende granite: commonly with amphibolite inclusions.
minor sandstone.	Wa	AKAITCHO GROUP AND BENT GNEISS Undivided rocks of Turmoil klippe: includes gneissic rocks of both igneous and sedimentary origin (Bent gneiss) and an unconformably overlying sequence (Akaitcho Group) of sandstone-siltstone, commonly pyritic, overlain by basaltic and rhyolitic lavas (1.903–1.889 Ga; Bowring, 1984), minor carbonate; includes gabbroic sills; complexly deformed and metamorphosed. Wag: granite.
		HOTTAH TERRANE Rocks of Hottah terrane occur in the western half of Wopmay orogen nd are interpreted on the basis of lithology, age, and geological relations be exotic with respect to rocks of Slave craton and Coronation Supergroup
one with shale, ne with flat	WB	BELL ISLAND BAY GROUP Basal sandstone and conglomerate overlain by basaltic, andesitic, dacitic, and rhyolitic tuff, lava and breccia (1898 ± 7 Ma; Reichenbach, 1991); intercalated sandstone and mudstone.
erbedded lites, silicified	WHp	UNDIFFERENTIATED PLUTONIC ROCKS OF HOTTAH TERRANE Biotite-hornblende granodiorite and monzogranite; minor diorite, quartz diorite, gabbro; 1914 \pm 5 Ma and 1902 \pm 7 Ma (Bowring, 1984).
ed evaporites,	WHm	HOLLY LAKE METAMORPHIC SUITE Cordierite-muscovite schist; sillimanite-mica schist; meta-andesite, basaltic lava and breccia, amphibolite; minor intrusive rocks (2.3-1.94 Ga; Bowring, 1984).
e containing halite tolitic biostromes, a near Greenhorn		CORONATION MARGIN
	Wm	MOREL AND PENINSULAR SILLS Mafic to intermediate sills; deformed and metamorphosed; mainly forms a linear swarm intruding the Rocknest Formation shelf edge; includes large sills to the east (Peninsular sills at Napatuklik Lake, 1871±1 Ma, Hamilton, unpublished data cited in Buchan et al., 2010).
harenite at base.	WT	CORONATION SUPERGROUP TAKIYUAK FORMATION: Brick-red lithic sandstone; minor siltstone and conglomerate; large-scale planar cross-bedding (easterly-directed paleocurrents); carbonate-clast megabreccia (solution-collapse breccia?) at the base.
007)	WCk	COWLES FORMATION AND KIKERK FORMATION COWLES FORMATION: Greenish-grey argillaceous limestone rhythmite; minor abiotic stromatolite (seafloor carbonate cement); minor distal feldsphathic-lithic wacke turbidites. KIKERK FORMATION: Grey argillite with nodular calcareous concretions; minor distal feldspathic-lithic wacke turbidites.
one; lithic-rich ons	WR	RECLUSE GROUP ASIAK, FONTANO AND TREE RIVER FORMATIONS ASIAK FORMATION: Proximal feldspathic-lithic wackes turbidites; minor grey argillite; flute clasts indicate south-directed turbidity-current flow; thickens westward; intertongues with Fontano, Kikerk and Cowles formations, its base climbing stratigraphically upward from west to east. FONTANO FORMATION: Steel-grey pyritic argillite with regularly-spaced carbonaceous laminations; tuff bed dated at 1882 ± 4 Ma (Bowring and Grotzinger, 1992). TREE RIVER FORMATION: Pale greenish-grey glauconitic sandstone and siltstone; minor granular ironstone: thickens eastward; conformably overlies Rocknest
tolitic dolostone, dstone.		Formation to the west, disconformably to the east. EPWORTH GROUP ROCKNEST FORMATION: West-facing carbonate-dominated rimmed-shelf and
erate, minor	WEr	slope assemblage; inner-shelf succession of 140–160 upward-shoaling cycles comprised of lagoonal dolomitic argillite and peritidal stromatolitic dolostone with abundant seafloor cement; shelf rim of non-cyclic supratidal dolostone of tepee and tepee-breccia facies; outer shore facies of dolostone grainstone and elongate, laterally-linked, columnar stromatolites and stromatolite bioherms, locally with Nontwing dytes: stored score and slope facies of dolostone rhythmite
merate,	WEo	Neptunian dykes; starved scarp and slope facies of dolostone rhythmite, rhythmite breccia and proximal megabreccia. ODJICK FORMATION: Storm-dominated marine shelf assemblage of quartz- and sub-feldspathic arenite, siltstone and greenish argillite; minor stromatolitic dolostone
sium feldspar p intrusive lutons and		and conglomerate near the base; basaltic pillow lava and hyaloclastic breccia locally developed at north end of Napaktulik Lake; basal unconformity, nonconformity with Archean basement in the east, depositional (?) contact with Stanbridge Formation to the west; crossbedded sandstone with west-directed paleocurrents in the east; 1969 ± 1 Ma (Bowring and Grotzinger, 1992); may locally include minor Archean metasedimentary rocks in the Exmouth Lake area.
nd biotite blors are used	WMs	MELVILLE GROUP STANBRIDGE FORMATION: Cherty stromatolitic dolostone and quartz-arenaceous dolostone; minor basalt and pelite.
diorite, gabbro.	WMv	VAILLANT FORMATION: Basaltic pillow lava, hyaloclastic breccia and tuff; porphyritic metabasalt at base; rhyolite lava locally at top in the Vaillant Lake area; 2014.5 ±1 Ma (Bowring, personal communication).
of alkali feldspar,	WMd	DRILL FORMATION: Feldspathic and sub-feldspathic granulestone turbidites; black carbonaceous pelite and semipelite; quartz- and granite-cobble conglomerate with outsized dolostone clasts; minor basaltic flows tuffs and sills; minor crystal-rich felsic
e, quartz ermal alteration emonstrably	ARCHEAN A	tuffs with associated carbonate and jasperite beds. Undifferentiated metamorphic and plutonic rocks of Slave craton (4.03–2.5 Ga).

Geological boundary (defined) ___ Limit of mapping Thrust fault: teeth on upper plate ----Normal fault: ticks on down-dropped side

Transcurrent fault; predominantly northeast set is right lateral, northwest set is left

lateral



OPEN FILE DOSSIER PUBLIC	Open files are products that have not gone through the GSC formal publication process.
6390	Les dossiers publics sont
GEOLOGICAL SURVEY OF CANADA COMMISSION GÉOLOGIQUE DU CANADA	des produits qui n'ont pas été soumis au
2011	processus officiel de publication de la CGC.
	·
OPEN REPORT	
2010-011	
NORTHWEST TERRITORIES GEOSCIENCE OFFICE	

Recommended citation: Hildebrand, R.S., 2011. Geological synthesis, Northern Wopmay Orogen/Coppermine Homocline, Northwest Territories – Nunavut; Geological Survey of Canada, Open File 6390; Northwest Territories Geoscience Office, Open Report 2010-011, scale 1:500 000. doi:10.4095/287890

.....