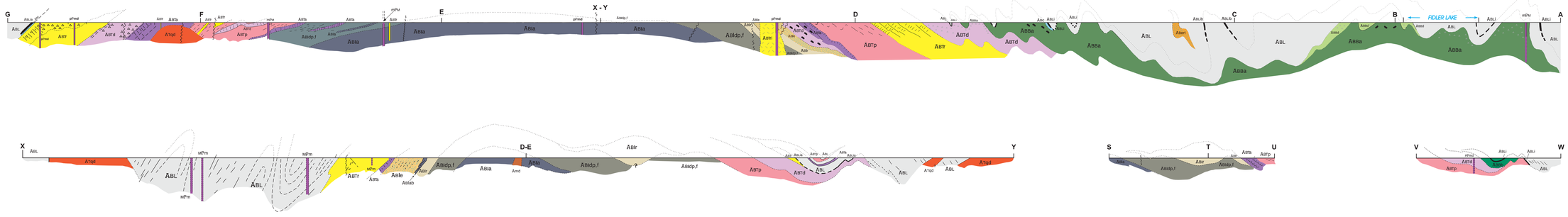
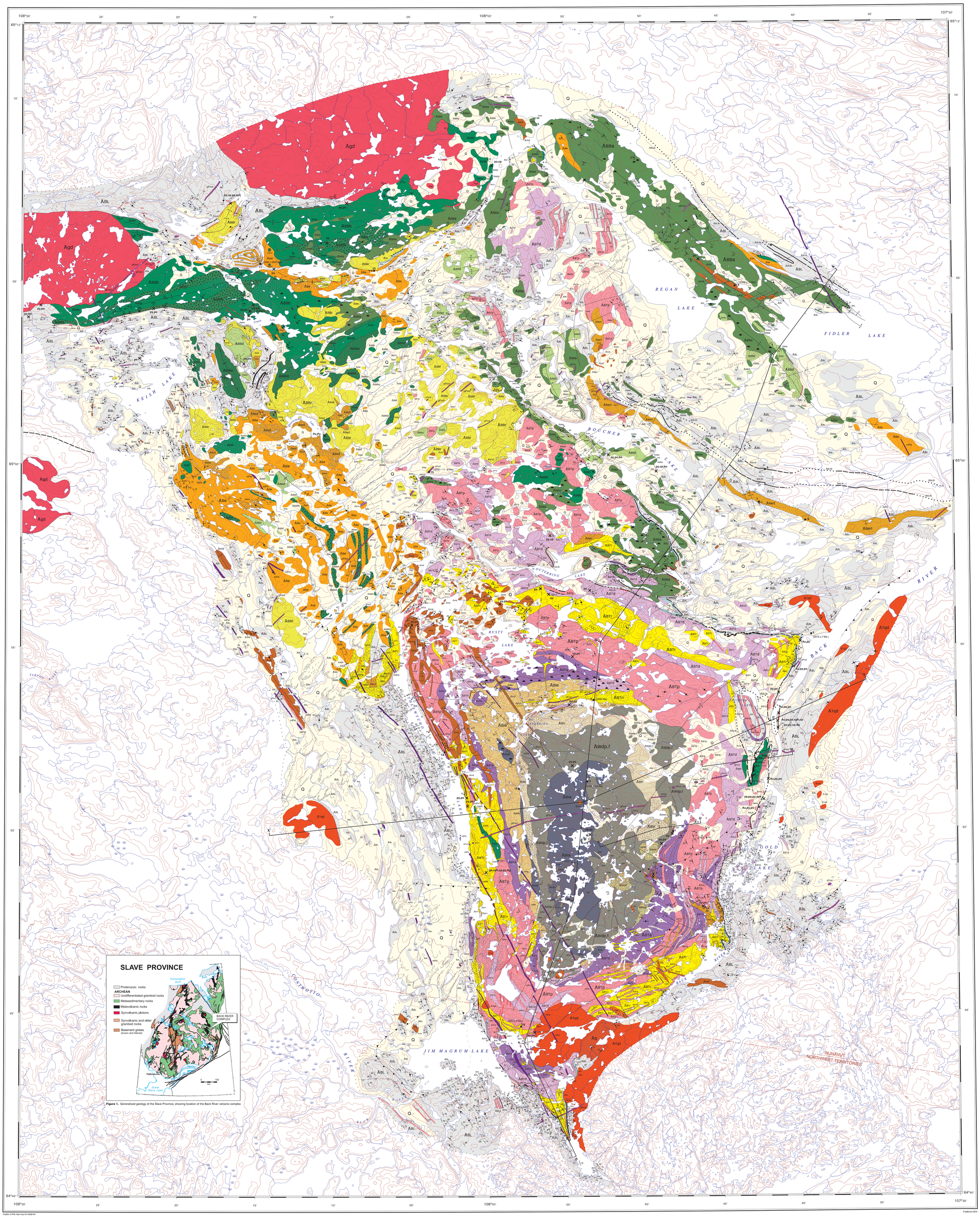
Natural Resources Canada | Ressources naturelles Canada

GEOLOGICAL SURVEY OF CANADA | COMMISSION GÉOLOGIQUE DU CANADA





LEGEND

PHANEROZOIC
QUATERNARY
PLEISTOCENE-RECENT

Q — *Unconsolidated material; sand, gravel, boulder fields, glacial drift, eskers, kames, and fluvial deposits.*

MESOPROTEROZOIC

mPm — *MACKENZIE DYKES: Gabbro, quartz gabbro, diabase, locally with granophyric centres; unmetamorphosed northwesterly trending dyke swarm; pronounced aeromagnetic expression (U-Pb zircon igneous age 1267 ± 2 Ma).*

PALEOPROTEROZOIC

pPmd — *Gabbro and basalt dykes, weakly metamorphosed; including northeasterly trending Malley diabase (U-Pb zircon igneous age 2233 +9/-6 Ma) and easterly to east-northeasterly trending Mackay diabase (2.21 Ga).*

ARCHEAN

Agd — *Biotite-hornblende granodiorite, medium- to coarse-grained, porphyric (U-Pb zircon igneous age 2588 ± 8 Ma).*

ATqd — *TARANTULA QUARTZ DIORITE: Biotite-hornblende diorite, quartz diorite, quartz monzodiorite, minor granite (U-Pb zircon igneous age 2816 + 7/-6 Ma from pluton 25 km southeast of the map area).*

An — *Coarse- to exceptionally coarse-grained, plagioclase-bearing pyroxene hornblendite forming small stocks and dykes; possibly mafic differentiates related to unit ATqd.*

Ag — *Mixed unit including granitic gneiss, diorite, quartz diorite, and enclaves of biotite schist.*

Amd — *Metagabbro, metadiabase, meta-quartz gabbro; folded sills and dykes; massive, fine- to coarse-grained, ophitic, equigranular to hornblende-phyric; may include part of unit ABIbb or unit ABIbc; one dyke yielded U-Pb baddeleyite age 2586 ± 5 Ma.*

YELLOWKNIFE SUPERGROUP

BEECHEY LAKE GROUP

ABL / ABLi — *Greywacke–mudstone turbidite, siltstone, grit, minor conglomerate, graphic shale, tuffaceous sandstone, and tuff. These sedimentary rocks range in metamorphic grade from lower greenschist facies along the eastern and northern sides of the volcanic complex, increasing into amphibolite facies beara staurolite, cordierite, and andalusite near Jim Magrum Lake; ABLic iron-formation, laminated oxide (chert-jasper-hematite), silicate (amphibole), sulphide (pyrite, pyrrhotite), and carbonate facies; ABLib iron-formation within turbidite sequence; magnetite–sulphide–, siderite–, chert–, silicate (hornblende-gruenerite-garnet-pyrrhotite)–, argillitic to cherty magnetic iron-formation; chert nodules.*

BACK GROUP
EPICLASTIC VOLCANIC ROCKS

ABe / ABed / ABer / ABert — *Epiclastic volcanic sedimentary rocks, thin- to thick-bedded, grey to green polymictic arenite, conglomerate, volcanic siltstone to massive coarse rudite with rhyolite, dacite, and andesite clasts; massive debris avalanche deposits, rhyolite megabreccia; locally crossbedded mine tuff; may contain some of unit ABTp. ABed: debris avalanche deposits; massive to crudely bedded, coarse polymictic (rhyolite, dacite, andesite blocks) scree, talus, lahar deposits; ABer: polymictic granule- to pebble rudite and volcarenite, poorly sorted, forming clastic aprons; green-weathering coarse wacke and pebbly arenite that contain hornblende- and plagioclase-phyric andesite clasts; ABert: rhyolite-derived turbidite; thinning- and fining-upward cycles containing rhyolite pebble- and boulder-conglomerate, very coarse to fine-grained rhyolite sand to thin-bedded pelite-rich turbidite.*

ABc — *Carbonate-cemented grit, breccia; bedded carbonate, minor oolite, stromatolitic lenses; possible tuffa; calc-mylonite in shear zones.*

BOUCHER - REGAN SEQUENCE

ABBr — *Rhyolite domes and lava flows; massive, blocky jointed, autoclastic flow breccia, megabreccia (carapace breccia); white-, buff-, and pink-weathering, aphanitic to sparsely porphyritic (plagioclase, K-feldspar, quartz) rocks; local volcaniclastic rocks; local carbonate-cemented monolithic breccia and massive to bedded, pebbly grit; minor polymictic breccia.*

ABBd — *Dacite lavas and domes; massive, minor flow-layering, blocky jointed, autoclastic flow breccia; pale- to dark-grey-weathering, dark grey, aphanitic to porphyritic (plagioclase, K-feldspar, hornblende) rocks.*

ABBa — *Andesite (to metabasalt), hornblende (metagyrorene)- or hornblende plagioclase-phyric; pillowed and massive lavas, hyaloclastite and associated breccia, commonly with coarse calcite-filled amygdals, pale grey-green-, green- to dark green- (locally reddish-green) weathering; may include some of unit ABBb.*

ABBb — *Tholeiitic basalt pillow lavas and associated breccia, green-to red-brown-weathering, dark green, aphanitic to fine-grained; may include andesitic lavas, breccia or volcaniclastic material; minor shale and siltstone.*
Basalt sills and flows, massive; ABBbh: hornblende-phyric; ABBbo: ophitic, fine-grained to aphanitic; gossans associated with this unit typically contain disseminated pyrite, pyrrhotite, and locally chalcopyrite; may include some of unit Amd.

THLEWYCHO SEQUENCE (relative age not strictly implied)

ABTd — *Felsic lavas and tuff dominantly of dacitic composition; pale grey-, greenish-grey-, buff-, to white-weathering, porphyritic metadacite with phenocrysts of quartz, plagioclase, K-feldspar, and locally hornblende, in dark grey, aphanitic matrix; massive to brecciated; minor pillow lavas; may include part of unit ABTr. Phenocysts in varied size and portions. Generally these rocks are darker on weathered and fresh surfaces, have viable mafic minerals, and have higher crystal content than typically white-weathering rhyolite of unit ABTr.*

ABTr / ABTrl / ABTrbx — *Rhyolite lava domes; massive, flow-layered, flow breccia, megabreccia (interpreted as scree, avalanche, and carapace breccia); sparsely porphyritic (quartz, feldspar), white, buff-weathering rock; local bedded volcaniclastic rocks (tuff, volcarenite), and autointrusions; breccia commonly cemented with carbonate; may contain dacite facies; U-Pb (zircon) igneous age 2692 ± 2 Ma. ABTr: rhyolite intrusions; U-Pb (zircon) igneous age 2690 Ma; ABTrbx: rhyolite boulder megabreccia, breccia carapace and apron, minor conglomerate.*

ABTp — *Dominantly pyroclastic rocks; crystal-, lithic- and coarse-ash-tuff, blocky tuff, ash-flow tuff, welded tuff; minor epiclastic volcarenite, volcrudite; polymictic breccia, conglomerate, and siltstone; may include part of unit ABe.*

ABTa — *Andesite lavas, and associated flow breccia, locally plagioclase- and hornblende-phyric rocks; minor volcaniclastic material; pillow lava and hyaloclastite; carbonate-cemented breccia that are dominantly andesite flow breccia; local debris flow; scree, and coarse volcaniclastic rocks.*

INNERRING SEQUENCE

ABIe / ABIed — *Epiclastic volcanic rocks, thin- to medium-bedded and very thick massive units; polymictic breccia, debris avalanche deposits, rudaceous volcarenite, siltstone; all contain dominantly quartz-feldspar dacite, aphanitic dacite, rhyolite and porphyritic andesite similar to rocks comprising units ABIa and ABIb,1; minor tuff, water-laid fine-ash tuff, ash-flow tuff; ABIed: debris avalanche deposit; very coarse polymictic breccia, containing a variety of felsic clasts (rhyolite, quartz-plagioclase-phyric dacite, aphanitic dacite) in a brown-weathering, carbonate grit matrix containing abundant mafic minerals; massive, unsorted.*

ABIi — *Iron-bearing sedimentary rocks; black shale, slate, laminated siltstone that contain abundant disseminated pyrite and pyrite-rich layers, sulphidic chert, and green volcanic siltstone.*

ABIr — *Rhyolite to dacite lava and domes, massive, breccia and related dykes and sills, white-weathering, aphanitic to K-feldspar-plagioclase-quartz-phyric; monomictic rhyolite carapace breccia and flow breccia; carbonate-cemented breccia, minor rhyolite pebble conglomerate, and coarse arenite.*

ABIdp,f — *Dacitic, dominantly pyroclastic rocks and lava-flow units (undifferentiated); grey- to white-weathering, buff, pale greenish-grey, fine-ash tuffs, ash-flow tuffs, lithic lapilli tuffs and finely quartz feldspar-phyric lavas; minor andesitic tuff. Lithologies have the following general distribution. Northern parts: massive lava; western and eastern sides: quartz–or quartz-plagioclase-phyric dacite, volcanic types not distinguished, but probably mainly volcaniclastic rock; southwestern side: ash-flow tuffs, crystal-lithic tuffs, and tuff breccia with dacite clasts; minor lava. Near western side, some coarse clastic rocks have carbonate cement.*

ABIa / ABIab — *Andesite lavas, plagioclase-phyric, locally vesicular; crystal plagioclase-rich andesitic tuffs in southern part of the area; U-Pb zircon igneous age 2708 ± 0.8 Ma.*
Andesite and basalt pillow lavas.

Geological boundary (defined, approximate, assumed)
Limit of mapping
Bedding, top known (inclined, vertical, overturned)
Bedding, top unknown (inclined, vertical)
Primary foliation in igneous rock
Flow layering in lava (inclined)
Eutaxitic foliation (inclined)
Pillow lava (strike and dip unknown, dip unknown; inclined; overturned)
Main foliation generation unspecified (inclined, vertical)
First foliation (inclined, vertical)
Second foliation (inclined, vertical)
Third foliation (inclined)
Joint (inclined, vertical)
Fold hinge (first, second, third generation)
Lineation, unspecified (crenulation, bedding cleavage intersection)
Anticline or syncline (defined, inferred; arrow indicates plunge)
Anticline (overturned)
Anticline (first, second, third generation)
Syncline (first, second, third generation)
Fold asymmetry "M" or "Z" form (arrow indicate plunge)
Structural trend
Fault (defined, approximate, assumed)
Shear zone
Iron-formation (defined, approximate, assumed)
Metamorphic isograds (symbol on high-grade side)
See Figure 39, Lambert (in press) for generalized metamorphic zones.
Division between lower- and upper-greenschist facies; marked by first appearance of biotite and containing various proportions of biotite, chlorite, and muscovite (approximate, assumed)
Division between greenschist and amphibolite facies; marked by first appearance of amphibole and containing various assemblages of amphibole, garnet, epidote, cordierite, staurolite, biotite, chlorite, and muscovite (defined, approximate, assumed)
Cordierite-in isograd in metasedimentary rocks (defined, approximate, assumed)
Breccia (undifferentiated, carbonate cemented)
Conglomerate
Columnar joints, vertical to steeply plunging
Gossan
Lava-flow units defined
Drift lobes, alluvial fans
Esker
Glaciation striations, grooves
Reference locality (age million of years) (2692 ± 7 Ma)
Stromatolite locality
Mineral occurrence or prospect Au

MINERALS

Gold	Au	Chalcopyrite	cp	Pyrrhotite	po
Silver	Ag	Galena	ga	Pyrite	py
Bornite	bo	Magnetite	mt	Sphalerite	sph

Geology by M.B. Lambert, 1975, 1976, 1977, 1981, 1989, 1991, 1995; R.M. Easton, 1975, 1977; J. Lafleur, 1975; A. Miller, 1975; J. Ostler, 1975; W.N. Houston, 1976; D.L. Beaumont, 1977; J. Percival, 1977; J.P. Sorbara, 1977; D. Burbidge, 1989; C.J. Beaumont-Smith, 1989, 1991; D. Paul, 1991

Geological compilation by M.B. Lambert, 2002

Digital cartography by J.A.Y. Pratt, Earth Sciences Sector Information Division (ESS Info)

This map was produced from processes that conform to the ESS Info Publishing Services Subdivision Quality Management System, registered to the ISO 9001: 2000 standard

Any revisions or additional geological information known to the user would be welcomed by the Geological Survey of Canada

Digital basemap from data compiled by Geomatics Canada, modified by ESS info

Mean magnetic declination 2004, 18°50 E, decreasing 26.1' annually

Elevations in metres above mean sea level

REFERENCE

Lambert, M.B.
in press: Back River volcanic complex: an archean stratovolcano, Nunavut–Northwest Territories; Geological Survey of Canada, Bulletin 581.

SLAVE PROVINCE

Proterozoic rocks
ARCHEAN
Undifferentiated granitoid rocks
Metasedimentary rocks
Metavolcanic rocks
Synvolcanic plutons
Synvolcanic and older granitoid rocks
Basement gneiss (known and inferred)

Figure 1. Generalized geology of the Slave Province, showing location of the Back River volcanic complex

Published 2004

Copies of this map may be obtained from the Geological Survey of Canada:
601 Booth Street, Ottawa, Ontario K1A 0E8
3303-33rd Street, N.W., Calgary, Alberta T2L 2A7
101-605 Robson Street, Vancouver, B.C. V6B 5J3

MAP 2041A

GEOLOGY

BACK RIVER VOLCANIC COMPLEX

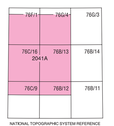
NUNAVUT–NORTHWEST TERRITORIES

Scale 1:50 000/Échelle 1/50 000

kilometres 1 0 1 2 3 4 kilometres

Universal Transverse Mercator Projection
North American Datum 1927
© Her Majesty the Queen in Right of Canada 2004

Projection transverse universelle de Mercator
Système de référence géodésique nord-américain, 1927
© Sa Majesté la Reine du chef du Canada 2004



Recommended citation:
Lambert, M.B.
2004: Geology, Back River volcanic complex, Nunavut–Northwest Territories; Geological Survey of Canada, Map 2041A, scale 1:50 000.