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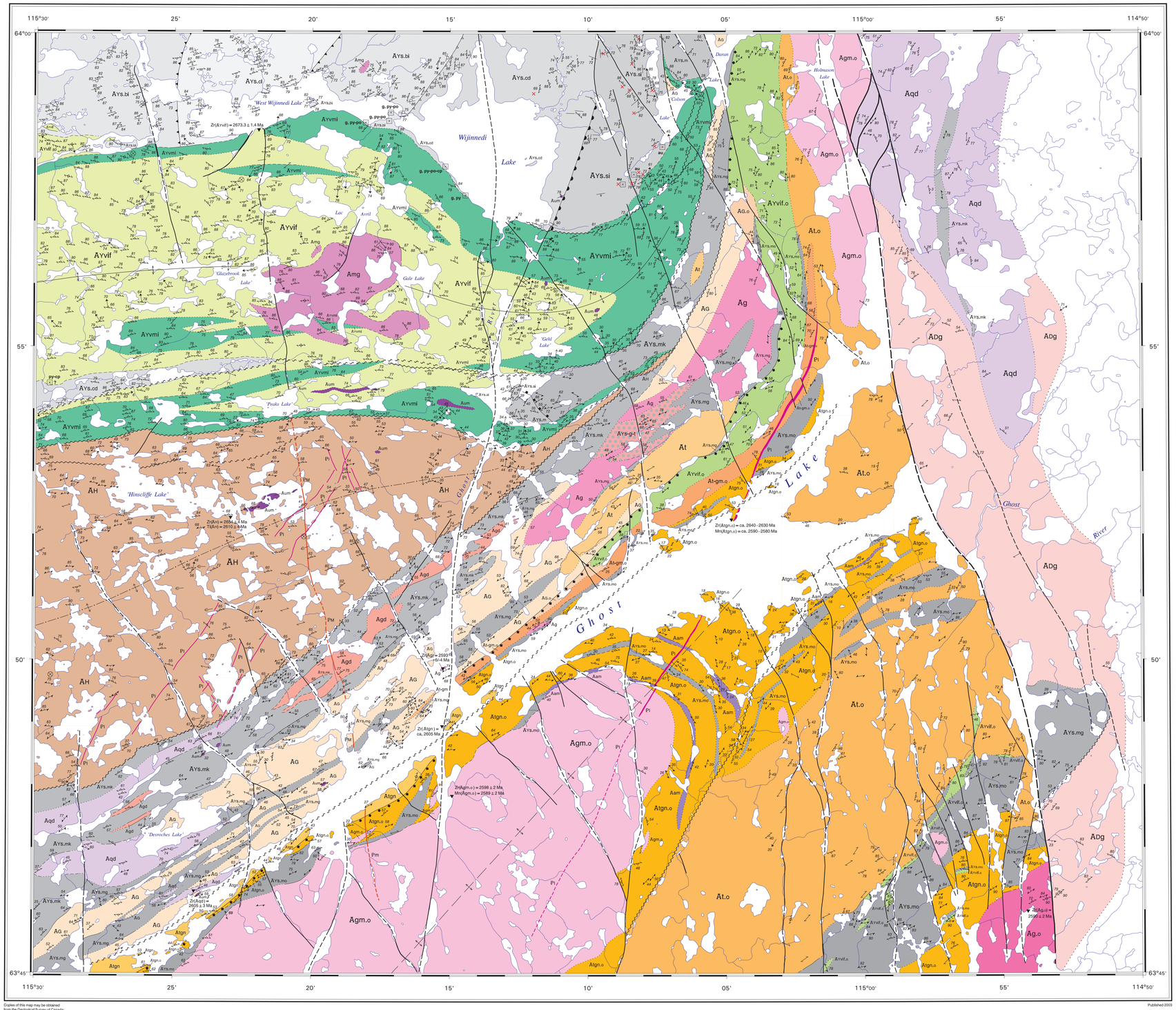

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LOCATION MAP

Canada

MAP 2023A

GEOLOGY

WIJINNEDI LAKE AREA

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
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Projection transverse universelle de Mercator
Système de référence géodésique nord-américain, 1927
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Geology by F.G. Smith, 1939, G.M. Wright, 1949, J.B. Henderson, 1992–1993, S.E. Schaan, 1992

Geological compilation by J.B. Henderson, 1997 and 2000

Digital cartography by M. Proulx, Earth Sciences Sector Information Division (ESS Info)

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

Digital base map from data compiled by Geomatics Canada, modified by ESS Info

Some geographical names subject to revision

Mean magnetic declination 2003, 24°28'E, decreasing 25.9' annually

86 B/4	86 B/3	86 B/2
85-O/13	85-O/14 2023A	85-O/15
85-O/12	85-O/11	85-O/10

NATIONAL TOPOGRAPHIC SYSTEM REFERENCE

LEGEND

MESOPROTEROZOIC

PM — *MACKENZIE DYKES: diabase, gabbro; northerly trend; pronounced aeromagnetic expression; solid segment, dyke observed in outcrop or apparent from airphotos; dashed segment, dyke interpreted from aeromagnetic expression.*

PALEOPROTEROZOIC

PI — *INDIN DYKES: diabase, gabbro; northeasterly and northwesterly trend; unaltered to weakly metamorphosed (chlorite-actinolite-epidote) with northwesterly trending dykes typically more altered; conflicting crosscutting relationships; weak aeromagnetic expression; abundant throughout area (only a few more prominent examples shown on map); solid segment, dyke observed in outcrop or apparent from airphotos; dashed segment, dyke interpreted from aeromagnetic expression.*

ARCHEAN

AG / AG.o — AG: *Granitoid rocks of the Ghost domain, undivided; at any given location the unit consists of varied proportions of many of the granitoid units described below as well as metasedimentary migmatite and diatexite at a scale that can not be resolved at the present scale of mapping.* AG.o: *similar undivided granitoid rocks at granulite grade.*

ADG — *Granitoid rocks of the Dauphinee domain, undivided; granite, granodiorite, and minor tonalite; pink to white; medium- to coarse-grained, commonly sparsely megacrystic; massive and typically homogeneous on local scale; contains moderate to minor amounts of biotite. The unit is extensively altered and fractured toward western domain boundary.*

AYS-G-I — *Mixed granitoid rocks and Yellowknife Supergroup metasedimentary migmatite bodies in more or less equal proportions, but at too small a scale to be resolved on the map; granitoid rocks consist largely of pink granite, granodiorite (unit Ag), and tonalite (unit At).*

AG / AG.o — Ag: *Granite, granodiorite; pink to greyish pink; medium- to coarse-grained, inequigranular; generally massive, but locally foliated; contains varied amounts of biotite; locally contains veins of leucocratic granite to pegmatite and inclusions of mainly metasedimentary rocks; U-Pb (zircon) age 2593 +6/-4 Ma.* Ag.o: *Granite, granodiorite; yellow to greenish brown to brown; medium- to coarse-grained, equigranular to locally weakly megacrystic; weakly foliated to massive; clinopyroxene-orthopyroxene-biotite-bearing; locally large inclusions of tonalite (unit At.o); U-Pb (zircon) age 2589 +1/-2 Ma.*

AGM.O — *Syenogranite; pink; coarse-grained, coarsely megacrystic with microline crystals up to 8 cm; massive; biotite abundant with rare orthopyroxene in the southwestern body, orthopyroxene or its altered equivalents more abundant in the northeastern body, minor garnet near contact with metasedimentary rocks, particularly in smaller intrusions; U-Pb (zircon) age 2598 ± 2 Ma, U-Pb (monazite) age 2589 ± 2 Ma.*

AGD — *Granodiorite, tonalite; white to grey; medium- to coarse-grained, commonly contains megacrysts of microcline and/or plagioclase; weakly to moderately foliated; contains moderate to abundant biotite and minor or trace amounts of muscovite; metasedimentary inclusions, and less commonly dioritic to quartz dioritic inclusions locally abundant.*

AQD — *Quartz diorite, diorite; medium grey; medium-grained and locally weakly inequigranular, generally weakly to moderately foliated; hornblende-, biotite-, and, less commonly, clinopyroxene-bearing; recrystallized metamorphic texture particularly west of Ghost Lake; U-Pb (zircon) age 2605 ± 3 Ma.*

The ages and relationship of the following three mafic to ultramafic units relative to each other is not known. They are presumed to be probably older than the granitoid units described above.

AMG — *Metagabbro, leucogabbro; dark green to black to grey; originally medium- to coarse-grained, but now finely recrystallized, relict igneous texture commonly evident; massive to locally weakly to moderately foliated; consists of hornblende to actinolitic amphibole and plagioclase with minor quartz in more leucocratic varieties. Metagabbro occurs both as the plutonic complex in the central part of the Yellowknife Supergroup intermediate to felsic volcanic complex and as numerous thin dykes that occur throughout much of the volcanic complex and to a lesser extent in the metasedimentary rocks to the north. The dykes are particularly abundant south and east of the metamorphosed mafic pluton.*

AAM — *Amphibolite; dark green to black; medium- to fine-grained; contains assemblages of plagioclase, hornblende, biotite, clinopyroxene, and orthopyroxene. The amphibolite occurs most commonly as layers associated with the tonalite gneiss unit, but also occurs elsewhere in Ghost domain in relatively thin, unmapped layers.*

AUM — *Metapyroxenite; dark green to black, medium- to coarse-grained, inequigranular, massive. The rock is now composed almost entirely of actinolite with relict clinopyroxene cores preserved in the coarser amphibole grains.*

AT / AT.o — *Tonalite, granodiorite; divided into three subunits, each of which is further divided on the basis of the presence or absence of granulite-grade conditions:*
At: tonalite, white to grey, medium- to coarse-grained, commonly equigranular, but locally sparsely megacrystic; generally weakly to moderately foliated, but locally massive; mafic content is varied in amount and proportion and includes abundant biotite, minor clinopyroxene, altered pyroxene, and locally minor hornblende.
At.o: Tonalite, granodiorite; yellow, yellow-brown to greenish, mafic minerals include orthopyroxene, biotite, and less commonly clinopyroxene and hornblende; locally, particularly in northernmost exposures contains sparse K-feldspar megacrysts; similar in most other respects to unit At. Tonalite originally crystallized and to some extent was recrystallized under granulite-grade conditions.

ATGN / ATGN.o — *Atgn: Tonalite gneiss; dominated by tonalite that is similar in most respects to tonalite unit At. It also contains granitic and granodioritic phases all of which are texturally and compositionally layered due to greater deformation. Also present are amphibolitic and metasedimentary layers on a variety of scales. A granodioritic phase is ca. 2605 Ma.*
Atgn.o: Tonalite gneiss; similar in most respects to unit Atgn but at granulite grade, locally retrogressed, in most cases biotite-, orthopyroxene-, or altered pyroxene-bearing; U-Pb (zircon) age of between 2640 Ma and 2630 Ma and U-Pb (monazite) age of between 2590 Ma and 2580 Ma on a tonalite phase from one sample.

AT-GM / AT-GM.O — *A+gm: Granite, granodiorite; pink, medium-grained to megacrystic.*
A+gm.o: Tonalite, granite, granodiorite; dark yellow-brown to grey depending on metamorphic grade; medium- to medium-coarse-grained and variably megacrystic with microcline that is commonly pink; moderately to strongly foliated; mafic minerals abundant and include assemblages of biotite, orthopyroxene, and rarely clinopyroxene and hornblende. The amount of microcline megacrysts present is highly varied resulting in rock compositions that grade from tonalite with no megacrysts to granite with abundant coarse megacrysts reminiscent of the megacrystic syenogranite (unit Agm.o). The compositional variations are typically gradational and in general the more densely megacrystic phases occur in the northern part of the unit.

AH — HINSCLIFFE COMPLEX
Trondhjemite, minor granodiorite and tonalite, rare pegmatite, and foliated to gneissic equivalents; pale grey to pinkish grey; fine, sugary recrystallized texture with original coarser grained texture locally evident; layering defined by minor compositional and textural variations; moderate to weak foliation defined by biotite; disrupted and partially recrystallized pegmatite, variably present, parallels layering and foliation; U-Pb (zircon) age 2654 ± 4 Ma, U-Pb(titanite) age 2610 ± 4 Ma. The least deformed rocks occur in the central part of the complex, south and southeast of 'Hinscliffe Lake'. Throughout the complex, zones of variably deformed, metre-scale amphibolite inclusions are present that are thought to represent synplutonic mafic dykes. At both the north and south margins of the complex is a several hundred metre-wide zone containing inclusions distinctly layered on a centimetre scale with compositions varied between metadiorite and metagabbro. Rare, minimally deformed, late pegmatite and small granite veins to small stocks, possibly related to unit Ag, occur locally.

YELLOWKNIFE SUPERGROUP
Metamorphosed mudstone with thin intercalations of metasiltstone and rare metagreywacke; occurs mainly in thin bedded, but locally up to metre-scale, pelite-dominant, graded couplets characteristic of turbidity current deposits; sedimentary rocks variably metamorphosed from greenschist grade to granulite grade as follows:
AYS.CL — *AYS.cl: chlorite zone.*
AYS.BI — *AYS.bi: biotite zone.*
AYS.CD — *AYS.cd: cordierite–andalusite zone.*
AYS.SI — *AYS.si: sillimanite zone.*
AYS.M — *AYS.m: migmatite zone.*
AYS.MK — *AYS.mk: K-feldspar-bearing migmatite zone.*
AYS.MG — *AYS.mg: garnet-bearing migmatite zone.*
AYS.MO — *AYS.mo: orthopyroxene-bearing migmatite zone.*
In the northwestern part of its outcrop area, the unit locally contains several metre thick, yellow-brown, fine-grained, greywacke-dominated units. Metre-scale, thinly layered silicate iron-formation units with layering defined by varied proportions of grunerite, hornblende, garnet, and recrystallized silica that are locally sulphide-bearing occur immediately west, southwest, and northwest of 'Colson Lake'. Thin metagabbro sills, thought to be related to unit Amg, are locally present in the northwestern part of the unit.

AYVMI — *Metabasalt, meta-andesite; dark green to dark grey-green; massive to strongly foliated; fine-grained; chlorite-actinolite- to hornblende-bearing. The mafic volcanic rocks consist of massive and less commonly pillowed flows and volcaniclastic units that are best preserved at and west of Wijinnedi Lake. Their more deformed and more highly metamorphosed equivalents occur to the east and south. Minor carbonate lenses occur locally at the contact between the metavolcanic and overlying metasedimentary rocks.*

AYVIF / AYVIF.o — AYVIF: *Metadacite, minor meta-andesite and metarhyolite; grey, grey-green, yellow-grey, and pinkish grey; dacite sparsely feldspar-phyric and less commonly quartz-phyric, minor local zones of more mafic composition; mainly volcaniclastic breccia with less common volcaniclastic sandstone, extrusive flows, and shallow intrusive bodies; U-Pb(zircon) age 2673.3 ± 1.4 Ma. The volcanic centre consists of mainly thick units of deformed, decimetre-scale clasts with primary layering typically not apparent. Units of volcaniclastic sandstone are less common. The volcanic rocks are intruded by metagabbro dykes that are particularly abundant in the eastern and southeastern parts of the volcanic centre and are related to the central metagabbro plutonic complex (unit Amg). Less common are thin, subparallel foliated, fine-grained, strongly recrystallized felsic sills in the southern part of the centre.* AYVIF.O: *Migmatitic paragneiss; olive green to rusty brown; consists of thinly interlayered, finer grained melanosome and coarser grained leucosome in both layers and anastomosing veinlets and wispy lenses; contains assemblages of orthopyroxene, clinopyroxene, biotite, and hornblende; locally grades into metasedimentary migmatite. This high metamorphic grade unit is considered to have been derived from an intermediate volcanic protolith.*

Geological boundary (defined, approximate, assumed)
Limit of geological mapping
Bedding, tops known (inclined, vertical, overturned, dip unknown)
Bedding, tops unknown (inclined, vertical, dip unknown)
Foliation (inclined, vertical, dip unknown)
Gneissosity (inclined, vertical, dip unknown)
Stretching lineation
Mineral lineation
Glacial striae (direction of ice movement assumed)
Anticline
Antiform (defined, assumed)
Fault, Proterozoic (defined, assumed)
Cataclastic shear zone, Proterozoic (defined, assumed)
Shear zone, Archean (defined, assumed)

Metamorphic mineral zone boundaries (symbol on high-grade side)
Biotite
Cordierite
Sillimanite
Migmatite
Migmatite with K-feldspar
Migmatite with garnet
Orthopyroxene

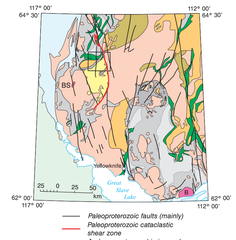
Diatreme locality
Silicate iron-formation
U-Pb radiometric ages: Zr = zircon, Ti = titanite, Mn = monazite
Economic mineral showing — po

Gossan — g; Pyrite — py; Gold — au; Pyrrhotite — po; Chalcopyrite — cp

Note on map unit codes:

The map unit codes represent temporal, lithostratigraphic or lithodemic, lithological and metamorphic terms where relevant. The first, largest letters in the code designate the age of the unit (Proterozoic (P) or Archean (A)). The second, smaller font, upper-case letter designates a lithostratigraphic or lithodemic unit where appropriate (Yellowknife (Y)). Hinscliffe (H)). Lower-case letters of the third group represent the dominant lithology present in the unit, in some cases with an appropriate modifier (granite (g), granodiorite (gd), megacrystic granite (gmg)). If the unit consists of more than one lithology that cannot be separated at the present scale of mapping, the appropriate letter codes are separated by a hyphen (=s-g-t). Metamorphic information for metamorphic rocks or for plutonic rocks that crystallized under high metamorphic grade conditions is given by the zone mineral abbreviation following a dot at the end of the code (.cl).

Geographical names in single quotation marks are unofficial names that are considered important in the history of the area.



PHANEROZOIC
Sedimentary rocks
PALEOPROTEROZOIC
Wopmay orogen and East Arm terrane
Alkaline granitoid intrusions of the Blachford Intrusive Suite (B) and the Bigspruce Complex (BS)
ARCHEAN
Post-Yellowknife Supergroup granitoid intrusions
Yellowknife Supergroup metasedimentary rocks; greenschist, amphibolite, and migmatite
Yellowknife Supergroup metavolcanic rocks
Undifferentiated paragneiss and orthogneiss
Syn-or pre-Yellowknife Supergroup granitoid gneiss and foliated granitoid rocks

High-magnetic relief area outlined by 60 000 nT isomagnetic contour that approximates the area underlain by high-grade metamorphic rocks and intrusions

Paleoproterozoic faults (mainly)
Paleoproterozoic cataclastic shear zone
Archean metamorphic isograd

Figure 1. Geology of the southwestern Slave Province showing the location of the Wijinnedi Lake map area at the boundary between an area, to the south, of Archean high-grade metamorphic rocks and granitoid intrusions, in large part at granulite grade, and, to the north, lower metamorphic grade rocks, both of which are part of a major Paleoproterozoic uplift.

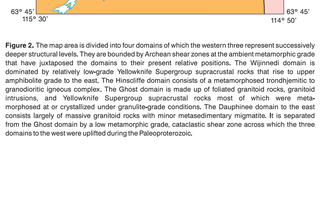


Figure 2. The map area is divided into four domains of which the western three represent successively deeper structural levels, They are bounded by Archean shear zones at the ambient metamorphic grade that have juxtaposed the domains to their present relative positions. The Wijinnedi domain is dominated by relatively low-grade Yellowknife Supergroup supracrustal rocks that rise to upper amphibolite grade to the east. The Hinscliffe domain consists of a metamorphosed trondhjemitic to granodioritic igneous complex. The Ghost domain is made up of foliated granitoid rocks, granitoid intrusions, and Yellowknife Supergroup supracrustal rocks most of which were metamorphosed at or crystallized under granulite-grade conditions. The Dauphinee domain to the east consists largely of massive granitoid rocks with minor metasedimentary migmatite. It is separated from the Ghost domain by a low metamorphic grade, cataclastic shear zone across which the three domains to the west were uplifted during the Paleoproterozoic.

Recommended citation:
Henderson, J.B.
2003: Geology, Wijinnedi Lake area, Northwest Territories; Geological Survey of Canada, Map 2023A, scale 1:50 000.