

LEGEND

PHANEROZOIC

PLEISTOCENE AND HOLOCENE

Swamp, bog and peat accumulations; marl; fluvial and lacustrine silt, sand, gravel; glaciofluvial sand, gravel, boulders; sandy, bouldery glacial till

UNCONFORMITY POST-MIDDLE ORDOVICIAN

25a Calcite-barite fissure veins locally containing concentrations of galena 25b Calcite-fluorite fissure veins

FAULT CONTACT **PALEOZOIC**

24 Clastic and Chemical Sedimentary Rocks: Unsubdivided: includes Shadow Lake Formation (calcareous red and green arkosic sandstone, siltstone and shale); Gull River Formation (pale grey and brown, sublithographic to lithographic limestone, minor dolostone); Bobcaygeon Formation (bioclastic limestone, nodular

MESOPROTEROZOIC

Pink, red and white, quartz-alkali feldspar pegmatite Monzonite-Diorite Suite Intrusive Rocks (1090-1070 Ma)

Granite
22a Massive monzogranite with igneous textures 22b Massive alkali feldspar granite with igneous textures Massive alkali feldspar syenite, minor quartz-alkali

> Mafic Rocks: Massive diorite with igneous textures REGIONAL METAMORPHISM

Alaskite Suite Intrusive Rocks (1250-1240 Ma)

19a Gneissic, metaluminous to marginally peraluminous alaskite with augen structure and relict igneous 19b Unit 19a with laminated structure and a metamorphic

19c Gneissic, grey, porphyritic alaskite with augen structure and relict igneous textures 19d Gneissic, contaminated, metaluminous to marginally peraluminous alaskite, formed by the assimilation and reaction of marble with alaskite magma.

hornblende monzogranite and quartz syenite. 19e Gneissic alaskite with augen structure and relict igneous textures; derived from porphyritic, fine- to medium-grained alaskite and granophyric alaskite; local albite-rich phases 19f Massive, peralkalic alaskite with igneous textures

19g Massive, peralkalic, granophyric alaskite with igneous textures 19h Massive, fine-grained, aphanitic alaskite with igneous textures 19j Massive alkali feldspar syenite and quartz syenite,

peralkalic alaskite and minor hornblende-rich alkali feldspar syenite; skarn xenoliths locally abundant 19k Unit 19j dominated by hornblende-rich alkali feldspar svenite 19l Unit 19j dominated by peralkalic alaskite

19n Aphanitic alkali feldspar syenite and peralkalic alaskite with igneous textures 190 Massive diorite and gabbro with igneous textures 19p Massive anorthosite and gabbroic anorthosite with igneous textures 19q Tourmaline-biotite-alkali feldspar dike

Diorite Suite Intrusive Rocks (1270-1240 Ma) 18 Felsic Intrusive Rocks 18a Massive granodiorite and monzogranite with igneous textures

18b Massive granodiorite and trondhjemite with igneous textures; locally fine grained and 18c Unit 18b lacking aphanitic phases

17 Mafic Intrusive Rocks 17a Massive quartz diorite and tonalite with igneous 17b Massive diorite, minor gabbro; with igneous

17c Massive gabbro, minor diorite; with igneous 17d Pyroxenite and peridotite, partly uralitized; with igneous textures 17e Massive gabbro and diorite sills, dikes and

17f Gneissic phase of unit 17e with a metamorphic fabric; igneous textures locally preserved a Subvolcanic Intrusive Rocks of the Calc-Alkalic to Alkalic Rhyolite Suite (1260-1245 Ma)

16 Felsic Intrusive Rocks 16a Massive, fine-grained, aphanitic, leucocratic albite granite with igneous textures; locally syenitic and calcite-bearing where contaminated by marble 16b Unit 16a containing aphanitic albite granite, with medium-grained albite and minor quartz

quartz veins Late Trondhjemite Suite Intrusive Rocks (1280-1270 Ma) 15 Trondhjemite and Granodiorite:

Nepheline Syenite Suite Intrusive Rocks (<1290 >1250 Ma) Alkalic Syenite: Gneissic, leucocratic, potassium-feldspar-bearing albite syenite with augen to laminated structure and a metamorphic fabric; locally hornblende- and pyroxene-bearing, with relict igneous textures

Nepheline Syenite: Gneissic potassium feldspar-nepheline syenite, albite-nepheline syenite and minor oligoclase-nepheline syenite; with laminated structure and a metamorphic fabric; small, late, albite-nepheline pegmatite dikes

13M Mafic Alkalic Rocks: Gneissic olivine gabbro, pyroxenite and peridotite; with augen structure and relict igneous textures

METASEDIMENTARY ROCKS^e Calcareous Metasedimentary Rocks^f

12 Calcitic Marble (Medium to High Metamorphic Grade) 12a Medium- to coarse-grained, grey to white, gneissic,

calcitic marble containing up to 20% siliceous impurities; locally contains intercalated units of siliceous marble 12b Medium- to coarse-grained, gneissic, siliceous calcitic marble containing 20 to 60% siliceous impurities; commonly contains thin intercalated

units of amphibole-rich metasedimentary rock 12c Skarn developed from calcitic marble; light to dark green, dominated by various mixtures of diopside, amphibole, epidote, titanite, garnet, potassium feldspar, scapolite, calcite and quartz

11 Calcitic Marble (Very Low to Low Metamorphic Grade) 11a Fine-grained, dark grey, calcitic marble containing up to 20% siliceous impurities; locally contains intercalated units of siliceous, fine-grained marble; well-preserved sedimentary fabric and bedding

10 Dolomitic Marble

preserved sedimentary fabric and bedding features

10c Medium- to coarse-grained, gneissic variety of

10d Medium- to coarse-grained, gneissic variety of

a Metamorphosed calcareous mudstone and

porphyroblasts and a metamorphic fabric (diopside-amphibole-plagioclase gneiss locally containing phases rich in potassium feldspar,

quartz, biotite, scapolite, epidote, carbonate,

9b Unit 9a containing thin intercalated units of siliceous

preserved; thin interbedded units of siliceous marble (units 11b and 11d) common; may in part

9d Unit 9c containing thin interbedded units of siliceous

metagreywacke-metasiltstone with a sedimentary

eroded from volcanic terranes and deposited by

fabric and well-preserved bedding features; presence of fine-grained volcanic clasts and bedding features suggests that these rocks were

clastic metasedimentary rock (unit 8b) 9c Fine-grained, calcareous mudstone and sandstone. locally with chlorite-actinolite porphyroblasts; sedimentary fabric and bedding features well

be derived from calcareous tuff

Micaceous Sandy and Conglomeratic

tuffaceous deposits

volcanic clasts

(units 5 and 6)

Felsic Metavolcanic Rocks

igneous textures

METAVOLCANIC ROCKS

8a Fine- to medium-grained, feldspathic

turbidity currents; probably includes

8b Medium to high metamorphic grade, gneissic

variety of unit 8a with a metamorphic fabric

clasts of marble and minor volcanic rocks

8d Polymictic metaconglomerate containing mainly

7a Slate with a sedimentary fabric and containing

lenses and discontinuous beds of quartz-pebble

Micaceous gneiss and schist with a metamorphic

fabric and containing porphyroblasts of one or

more of muscovite, biotite, garnet, staurolite,

sillimanite and cordierite; possibly represents

fine-grained tuffaceous deposits associated with the calc-alkalic to alkalic rhyolite suite

Calc-Alkalic to Alkalic Rhyolite Suite (1260-1245 Ma) 9

6a Pinkish to maroon, peralkalic rhyolite and minor

6c Massive to schistose, metaluminous to peralkalic

rhyolite and trachyte flows, ash flows and

6e Massive to schistose, potassium feldspar-free,

fragment-poor tuff, with relict igneous textures

6d Gneissic equivalent of unit 6c, with a metamorphic

sodic rhyolite and rhyodacite flows, ash flows

and fragment-poor tuff, with relict igneous

6f Gneissic equivalent of unit 6e, with a metamorphic

Massive to schistose, calcareous tuff with relict

trachyandesite and trachydacite, with igneous

5b Massive to schistose andesite and minor basalt,

Biotite-hornblende-plagioclase gneiss and

amphibolite derived from andesitic and

basaltic flows; metamorphic fabric with

poorly preserved flow features such as

4a Massive to schistose, rhyodacite to dacite tuff and

4b Massive to schistose, rhyodacite to dacite flows and

4d Gneissic equivalent of unit 4a, with a metamorphic

4e Gneissic equivalent of unit 4b, with a metamorphic

4f Gneissic equivalent of unit 4c, with a metamorphic

textures; possibly related to unit 4 volcanism

a Massive to schistose andesite and basalt, with relict

intercalated biotite-hornblende-plagioclase gneiss

4g Massive, felsic, aphanitic dikes with igneous

igneous textures and flow features

3b Gneissic equivalent of unit 3a, consisting of

and amphibolite with a metamorphic fabric

lapilli tuff, with relict igneous textures

ash flows, with relict igneous textures 4c Massive to schistose agglomerate

pillows, flow breccia, grain gradation

Andesite-Dacite Suite (1280-1270 Ma) h

6g Massive to gneissic agglomerate

5a Massive, locally amygdaloidal, basalt,

with relict igneous textures

igneous textures

Mafic Metavolcanic Rocks

Felsic Metavolcanic Rocks

Mafic Metavolcanic Rocks

rich in basalt

potassium-rich metasomatism; poorly preserved

6b Rocks of unit 6a overprinted by sodium- and

trachyte, with igneous textures

Micaceous Shaly Metasedimentary Rocks

and, locally, biotite and garnet porphyroblasts

8c Unit 8a containing metaconglomerate rich in coarse

Metasedimentary Rocks

clastic metasedimentary rock (unit 8a) Siliceous Clastic Metasedimentary Rocks^f

marble (unit 12b) common; may in part be derived

minerals); thin intercalated units of siliceous

sandstone with feathery amphibole

titanite, pyrite and iron-titanium oxide

unit 10a, with a metamorphic fabric

unit 10b, with a metamorphic fabric 10e Skarn developed from dolomitic marble

Amphibole-Rich Metasedimentary Rocks

from calcareous tuff

Ontario Geological Survey 11b Unit 11a containing 20 to 60% siliceous impurities and thin interbedded units of calcareous sandstone MAP P.3402 and mudstone 11c Fine- to medium-grained variety of unit 11a; poorly preserved sedimentary fabric and bedding features PRECAMBRIAN GEOLOGY 11d Fine- to medium-grained variety of unit 11b; poorly

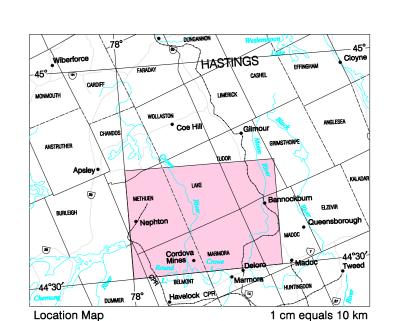
10a Fine-grained, dark grey, dolomitic marble with up to 20% siliceous impurities; well-preserved sedimentary fabric and bedding features 10b Fine-grained, dark grey to buff, dolomitic marble with abundant chert beds, containing silicified 0 stromatolites and algal mats

NTS Reference: 31 C/12

③ Ontario

BANNOCKBURN AREA

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SYMBOLS

Pillowed flow; top known, magnitude of dip uncertain Foliation (vertical, sedimentary, volcanic or other, with facing inclined, magnitude (inclined, magnitude of dip uncertain) of dip uncertain) Lineation (with plunge, magnitude of Bedding; sedimentary, volcanic plunge uncertain) or other, with facing (vertical, overturned) sedimentary, volcanic Synform; plunge may or other, facing be indicated unknown (vertical, of dip uncertain) Antiform; plunge may layering and/or parallel be indicated tectonic foliation (horizontal) Anticline; plunge may be indicated Compositional layering and/or Contact metamorphic parallel tectonic foliation (vertical)

SOURCES OF INFORMATION

Base map derived from map 31 C/12 of the National Topographic System, scale 1:50 000.

Compositional

layering and/or

parallel tectonic

uncertain)

UTM co-ordinates.

foliation (inclined,

magnitude of dip

Users should be aware that this map sheet lies adjacent to the UTM Zone 17/Zone 18 boundary. To ensure continuity with existing maps of this series to the west, this map is published using a Zone 17 UTM grid, even though most of the area covered by this map lies within UTM Zone 18. Users need to take this into account when making comparisons between the UTM grid on this sheet and Ontario Basic Mapping (OBM) sheets covering this area; when using Global Positioning System (GPS) instruments to determine location, if position is expressed in UTM co-ordinates; and when plotting data on this map from literature sources where location is expressed in

Lumbers, S.B., Heaman, L.M., Vertolli, V.M. and Wu, T.W. 1990. Nature and timing of Middle Proterozoic magmatism in the Central Metasedimentary Belt, Grenville Province, Ontario; in Mid-Proterozoic Laurentia-Baltica, Geological Association of Canada, Special Paper 38,

Published maps and reports of the Geological Survey of Canada and the Ontario Geological Survey.

Unpublished undergraduate and post-graduate theses. Magnetic declination approximately 12°19'W in the centre of the Bannockburn area in 1999. Geology not tied to surveyed lines.

3c Unit 3b with amphibolite predominant; probably Tholeiitic Basalt Suite (1290-1275 Ma)

Felsic Metavolcanic Rocks 2a Massive to schistose, potassium feldspar-free, sodic rhyolite and rhyodacite tuff and lapilli tuff, with relict igneous textures 2b Massive to schistose, potassium feldspar-free, sodic rhyolite and rhyodacite flows and ash

2c Massive to schistose agglomerate Mafic Metavolcanic Rocks: Massive to schistose, low- to intermediate-K tholeiitic basalt flows, with relict igneous textures and well-preserved flow features

flows, with relict igneous textures

Rusty-weathering, graphitic, pyrite- and pyrrhotite-bearing schist i

/ IF Layered magnetite-chert and hematite-chert

a Only the thickest and most extensive Cenozoic deposits in which bedrock outcrops are absent or scarce are shown.

b Igneous rock suites and their ages are from Lumbers et al. (1990). ^c Present only in the gneissic Precambrian rocks; only the largest known dikes and areas of marked dike concentrations are shown. **d** Multiple ages represented. Some sills and dikes may be related to volcanism (units 1 to 6). ^e The metasedimentary rocks form part of the 1300 to 1240 Ma Hastings Supracrustal Sequence (Lumbers et al. 1990) and are either younger than, or intercalated with, the metavolcanic rocks.

f Rocks of these groups are subdivided lithologically and the order does not imply age relationships either within or between groups. **9** Metavolcanic rocks of the calc-alkalic to alkalic rhyolite suite are in part contemporaneous with plutonism of the alaskite suite. h Metavolcanic rocks of the andesite-dacite suite are in part contemporaneous with plutonism of the late trondhjemite suite. Most rusty schists are probably hydrothermal replacement deposits in shear zones, but some may represent tuffaceous ironsulphide-bearing sediments or black shales.

CREDITS

Geology by S.B. Lumbers and V.M. Vertolli, 1979-1989. Geological compilation by S.B. Lumbers and V.M. Vertolli, 1987-1990. Drafting by L. Coffin.

Drafting revisions by E. Amyotte. Digital conversion under the direction of B. Berdusco. Geology and legend reviewed by M. Easton and B. Berdusco. To enable the rapid dissemination of information, this map has not

Ontario Ministry of Northern Development and Mines does not assume liability. Users should verify critical information. This map covers an area in the vicinity of other previously released maps (e.g., P.3385, Precambrian Geology, Bancroft Area) and upcoming maps. Although the rock codes for the same lithologic unit may not correspond from map to map, an attempt has been made to standardize the colour

received a technical edit. Discrepancies may occur for which the

used on all maps to represent the same rock type. Issued 2000.

Information from this publication may be quoted if credit is given. It is recommended that reference to this map be made in the following

Lumbers, S.B. and Vertolli, V.M. 2000. Precambrian geology, Bannockburn area; Ontario Geological Survey, Preliminary Map P.3402, scale 1:50 000.