



**GEOLOGY OF NEOPROTEROZOIC (EDIACARAN) ROCKS ALONG  
THE EASTERN MARGIN OF THE HOLYROOD HORST AND  
EASTERN CONCEPTION BAY, EASTERN NEWFOUNDLAND**  
(Parts of NTS map areas 1N/7, 1N/10 and 1N/15)  
**MAP 2007 - 04**

G.W. Sparkes and S.J. O'Brien

**LEGEND**

**EARLY PALEOZOIC**

- Cambrian**  
**ADEYTON and HARCOURT GROUPS (undivided)**  
33 Red and black shale and interbedded grey limestone; locally massive, poorly sorted boulder conglomerate at base

**LATE NEOPROTEROZOIC**

- Ediacaran**  
**BEAVER HAT INTRUSIVE SUITE<sup>1</sup>**  
32 Fine- to coarse-grained, massive gabbro (age of intrusion uncertain)

- ST. JOHN'S GROUP**  
31 Unseparated Trepassey, Fermeuse and Renewes Head formations; thinly laminated, black to dark green siltstone; thin- to medium-bedded, locally graded and contorted beds of sandy siltstone containing rare nodular silty layers

- CONCEPTION GROUP**  
**Mistaken Point Formation**  
20 Thin, regularly bedded, light green turbiditic sandstone; fine-grained, thinly laminated to thin-bedded red and green sandstone and interbedded siltstone  
**Drook Formation**  
29 Mannings Hill Member: Thick-bedded, grey to dark green, medium- to coarse-grained siliceous sandstone and interbedded pale green, thin- to medium-bedded siltstone; includes minor chert

- 28A 28B Torbay Member: Dark green, thin- to medium-bedded, parallel- to streaky-laminated, medium-grained siliceous sandstone (locally intercalated with Mannings Hill and Bauline Line members); includes thin- to medium-bedded, red to green siliceous siltstone and buff-brown-weathering sandstone (Unit 28B)  
27 Bauline Line Member: Green to red silty sandstone, matrix-supported conglomerate (mixite); intercalated with the Torbay Member  
26 Broad Cove River Member: Medium- to thick-bedded, medium-grained, green sandstone containing rare siltstone rip-ups, and interbedded thin- to medium-bedded dark green siltstone; includes medium- to very thick-bedded pale green chert

- HORSE COVE COMPLEX<sup>1</sup>**  
25 Mafic and felsic dyke swarm contained within unseparated submarine, epidote-rich mafic volcanic rocks, dark green volcanoclastic sandstone, and minor massive diorite

- HERRING COVE DIORITE<sup>1</sup>**  
24 Fine- to medium-grained, massive, moderately magnetic diorite

- WYCH HAZEL POND COMPLEX<sup>2</sup>**  
23 Dark red to purple, weakly to strongly magnetic, hematite-rich massive and pillowed basalt, affected by abundant syn-volcanic brecciation; contains rafts of red, thin- to medium-bedded siltstone and interbedded fine-grained sandstone (Princess Lookout Formation of King, 1990).  
22 White-weathering, thin- to medium-bedded siliceous sandstone and interbedded brown-weathering sandstone; contains minor unseparated fine-grained gabbro (Portugal Cove Formation of King, 1990).  
21 Massive, brown-weathering, epidote-rich volcanoclastic sandstone, containing abundant mafic volcanic detritus; minor unseparated epidote-rich submarine mafic volcanic rocks and associated hyaloclastite  
20 Moderately vesicular, locally amygdaloidal, epidote-rich, dark green to purple, massive to locally pillowed basalt; associated hyaloclastite  
19 Thin- to medium-parallel-bedded, moderately to strongly siliceous, green to red siltstone and interbedded medium- to coarse-grained subarkosic sandstone and minor pumiceous tuff, locally with pebble to boulder conglomerates at base; includes minor unseparated mafic volcanic flows and associated breccias and unseparated feldspar porphyry  
18 Dark purple to grey-green, weakly to moderately feldspar-phyric flow-banded rhyolite with locally developed autobrecciation

- MANUELS VOLCANIC SUITE<sup>2</sup>**  
17 White- to yellow-weathering silica-sericite-pyrite-pyrophyllite-diaspore-rutile hydrothermal alteration (with varying proportions of each mineral)  
16 White- to pale yellow-weathering sericite-silica hydrothermal alteration containing patchy development of pyrite; alteration is associated with prominent shear zones  
15 Fine-grained, dark brown- to dark green-weathering, moderate to weakly magnetic, locally amygdaloidal and plagioclase-phyric basalt; minor mafic intrusive  
14 White, pervasive silica alteration without pyrophyllite-diaspore  
13 Massive crystal-rich ash-flow tuff, containing mm-scale white crystals, rare cm-scale, dark purple, collapsed pumice fragments and minor disseminated pyrite in a dark green to red groundmass  
12 Dark purple-weathering, massive volcanoclastic breccia containing subangular to sub-rounded fragments; contains minor unseparated aphanitic massive rhyolite  
11 Dark purple to grey-green, white-weathering aphanitic rhyolite with locally developed lithophysae and rare porphyritic zones containing mm-scale white feldspar crystals

- WHITE HILLS INTRUSIVE SUITE<sup>3</sup>**  
10 Pale purple-weathering, quartz-feldspar porphyry, containing fine- to medium-grained phenocrysts of plagioclase, quartz and K-feldspar within a light purple aphanitic groundmass  
9 Unseparated quartz-feldspar porphyry and medium- to coarse-grained equigranular granite  
8 Hydrothermally altered (silica-sericite-chlorite-pyrite), grey-green to pale pink-weathering, medium- to coarse-grained, equigranular, quartz-K-feldspar-plagioclase-bearing material  
7 White-weathering monzonite containing coarse-grained, pale green plagioclase and fine- to medium-grained chlorite, quartz and K-feldspar; locally contains 2 - 10 cm diameter fine-grained dioritic xenoliths

- HOLYROOD INTRUSIVE SUITE**  
6 Propylitized granite with a pale pink-white-green-weathering, generally equigranular to quartz-phyric, containing sub-equal amounts of plagioclase, K-feldspar and quartz  
5 Pink- to orange-weathering equigranular, biotite-rich, fine- to coarse-grained granite  
4 4a Buff to orange-weathering quartz-K-feldspar-phyric, medium- to coarse-grained granite, locally with chlorite-pyrite alteration (Unit 4a)

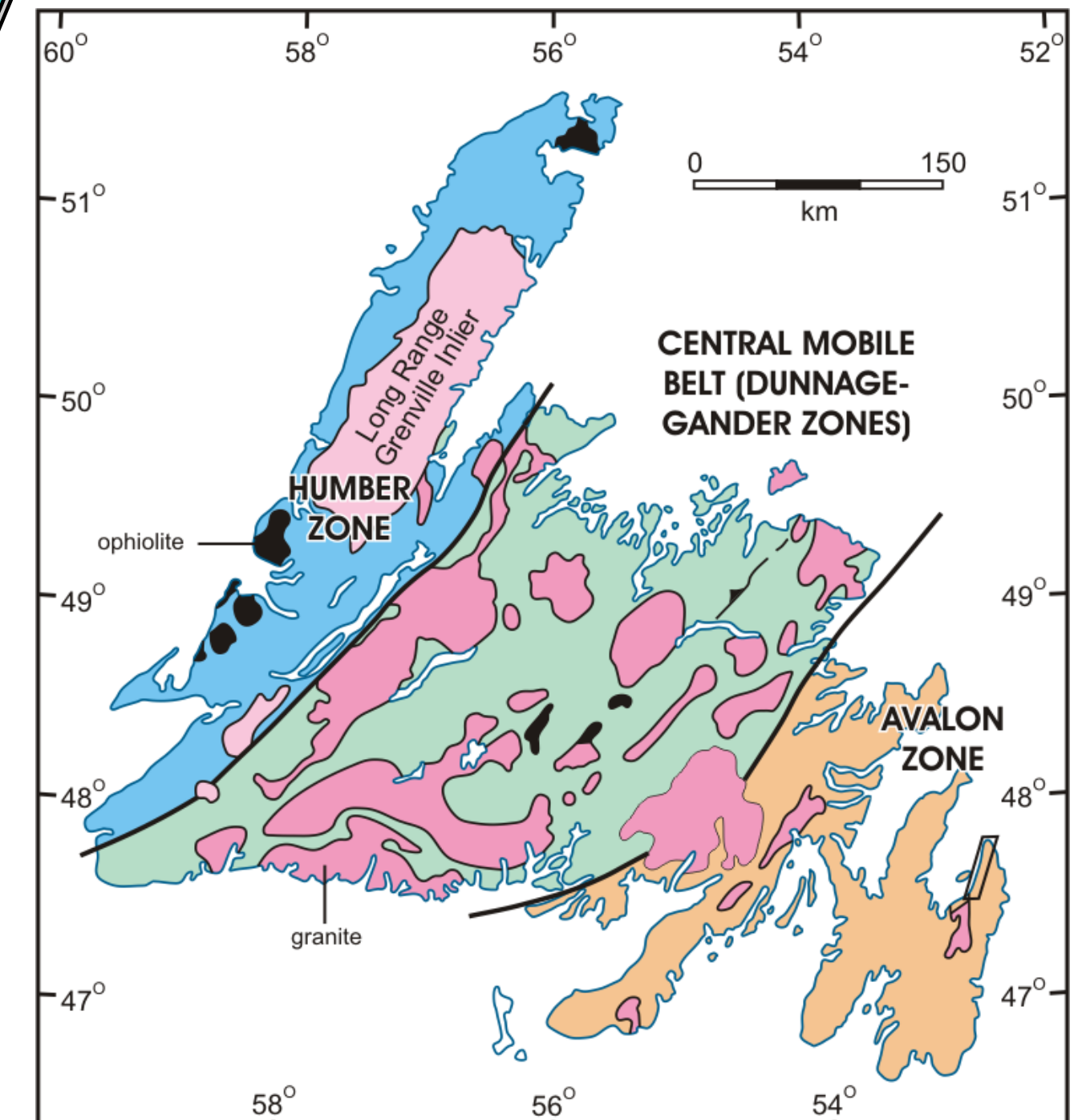
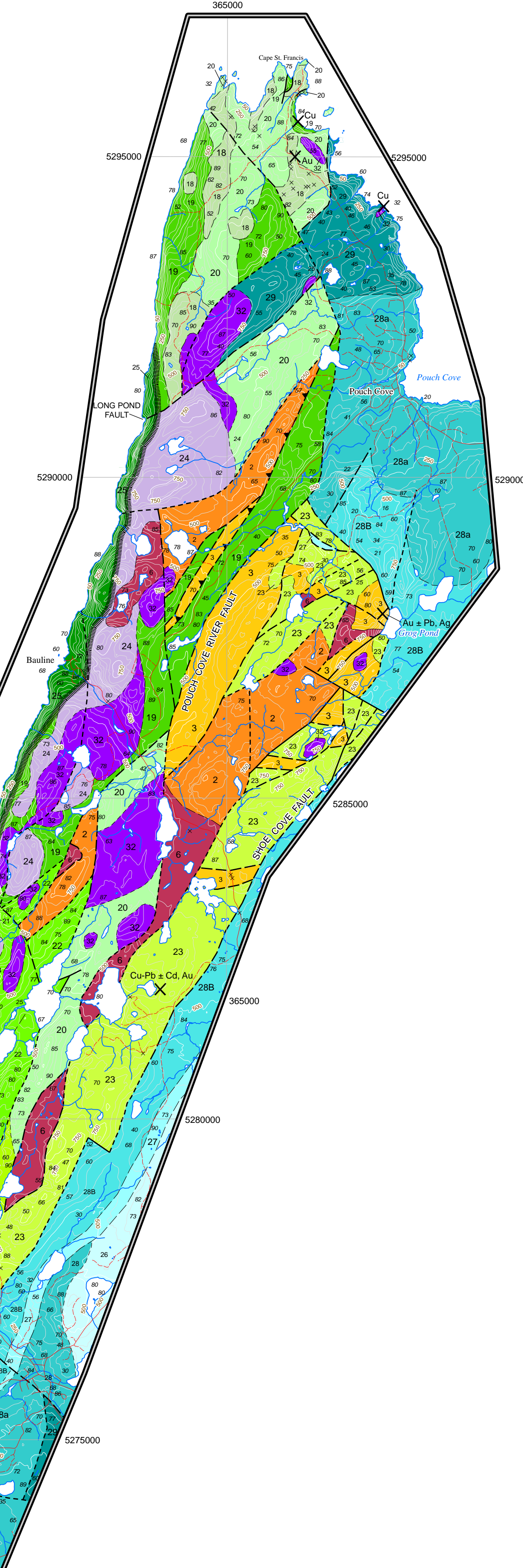
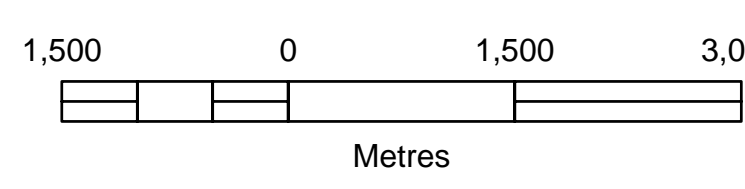
- WHITE MOUNTAIN VOLCANIC SUITE<sup>3</sup>**  
3 Massive, crystal-rich lapilli tuff, containing mm-scale euhedral crystals of biotite, locally altered to sericite, minor agglomerate  
2 Purple to grey-green rhyolite with fine- to medium-grained feldspar crystals within a flow-banded groundmass and minor flammé bearing ash-flow tuff, minor dark to pale green or pale pin, matrix-supported agglomerate containing sub-rounded to rounded fragments; fragments are dominantly bright pink, potassic-altered material  
1 Fine-grained, brown- to dark-green-weathering mafic volcanic rocks

**SYMBOLS**

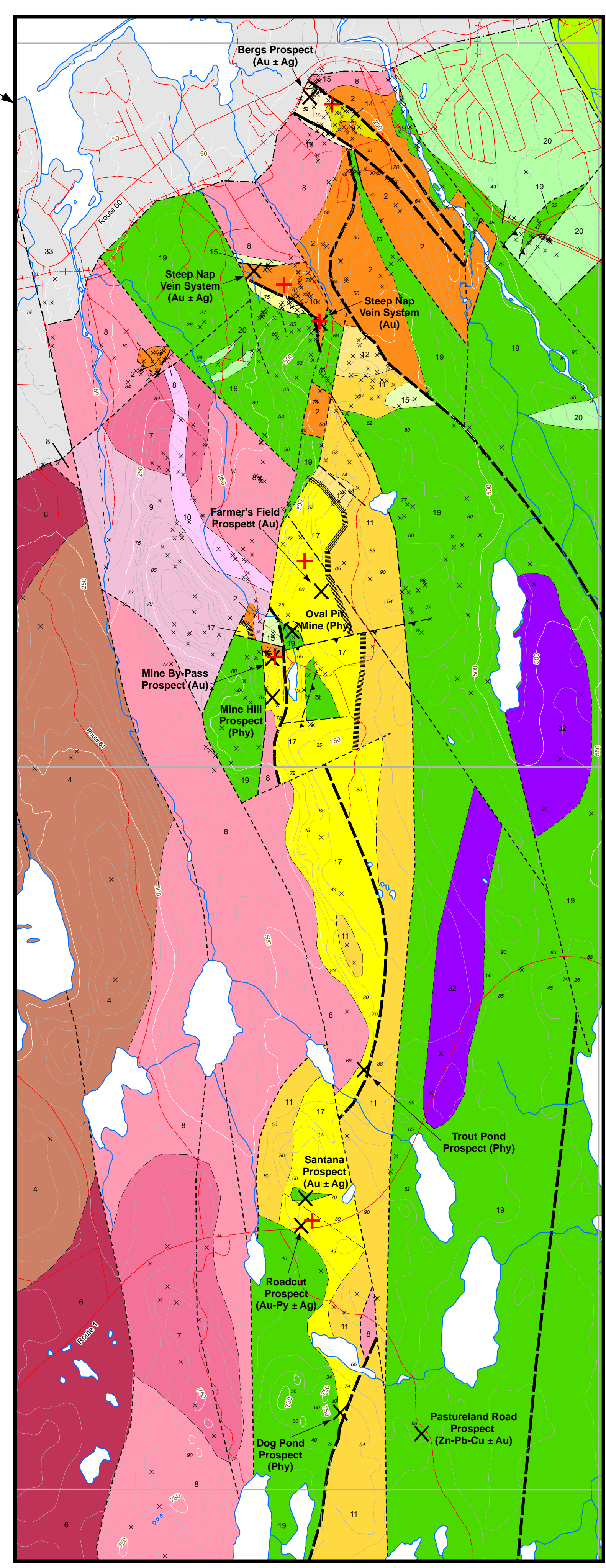
- Geological contact (defined, approximate, assumed, gradational).....  
Fault (defined, approximate, assumed).....  
Thrust fault (defined, approximate).....  
Shear zone (defined, approximate, assumed).....  
Unconformity.....  
Fold axis (anticline, syncline, with direction of plunge).....  
Bedding (inclined, vertical).....  
Cleavage.....  
Foliation.....  
Flow banding.....  
Mineral occurrence.....  
Occurrence of silica - hematite veins and breccia.....  
Outcrop location.....

**ABBREVIATIONS**

- Copper..... Cu  
Cadmium..... Cd  
Gold..... Au  
Lead..... Pb  
Pyrite..... Py  
Pyrophyllite..... Phy  
Silver..... Ag  
Active mine site.....



**GEOLOGICAL INDEX MAP**



Metres  
SCALE 1:20,000  
NAD 27, Zone 22

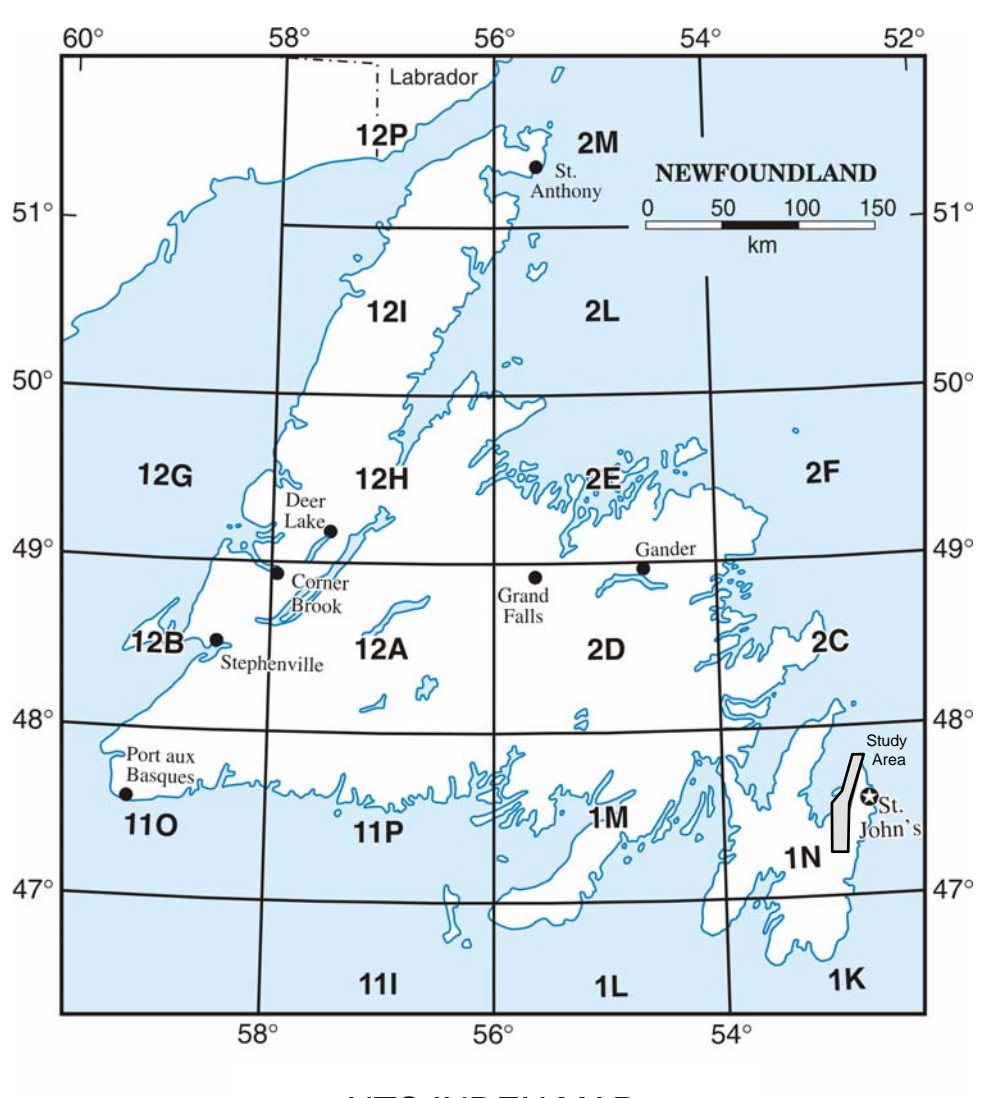
<sup>1</sup> Informal nomenclature after Sparkes, G. W. 2006  
<sup>2</sup> Informal nomenclature after O'Brien et al., 2001  
<sup>3</sup> Informal nomenclature after Sparkes et al., 2005

Note:  
Nomenclature is informal and, where possible, follows that established for the region west of the Tospail Fault.  
Geological mapping east of the Tospail Fault by G.W. Sparkes, 2005, incorporates previous work by King (1990) and Hsu (1975), and unpublished work of S.J. O'Brien, Geological Survey, Newfoundland and Labrador, and Rubicon Minerals Corporation.

Geological mapping west of the Tospail Fault by S.J. O'Brien, 1997, 2001, & 2002, and G.W. Sparkes, 2002-2003 and incorporates previous published and unpublished work by S.J. O'Brien, Geological Survey, Newfoundland and Labrador, and B. Dubé, Geological Survey of Canada (e.g., O'Brien et al., 2001).

**REFERENCES**  
Hsu, E.Y.C.  
1975: Pouch Cove - St. John's. Newfoundland Department of Mines and Energy, Mineral Development Division, Map 7836.  
King, A.F.  
1990: Geology of the St. John's area. Newfoundland Department of Mines and Energy, Geological Survey Branch, Report 90-2, 88 pages.  
O'Brien, S.J.  
2002: A Note on Neoproterozoic Gold, Early Paleozoic Copper and Basement-cover Relationships on the Margins of the Holyrood Horst, Southeastern Newfoundland. In Current Research, Newfoundland Department of Mines and Energy, Report 02-1, pages 219-227.  
O'Brien, S. J., King, A.F. and O'Driscoll, C.F.  
1997: Late Neoproterozoic geology of the central Avalon Peninsula, Newfoundland, with an overview of mineralization and hydrothermal alteration. In Current Research, Newfoundland Department of Mines and Energy, Geological Survey Report 97-1, pages 257-282.  
O'Brien, S.J., Dunning, G.R., Dubé, B., O'Driscoll, C.F., Sparkes, B., Israel, S. and Ketchum, J.  
2001: New insights into the Neoproterozoic geology of the central Avalon Peninsula (parts of NTS map areas 1N6, 1N7 and 1N3), eastern Newfoundland. In Current Research, Newfoundland Department of Mines and Energy, Geological Survey, Report 01-1, pages 169-185.  
Sparkes, G.W.  
2006: Late Neoproterozoic Geology of the East Coast of Conception Bay, Newfoundland Avalon Zone. In Current Research, Newfoundland Department of Natural Resources, Geological Survey, Report 06-1, pages 265-279.  
Sparkes, G.W., O'Brien, S.J., Dunning, G.R. and Dubé, B.  
2006: U-Pb geochronological constraints on the timing of magmatism, epithermal alteration and low-oxidation gold mineralization, eastern Avalon Zone, Newfoundland. In Current Research, Newfoundland Department of Natural Resources, Geological Survey, Report 05-1, pages 115-130.  
Copies of this map may be obtained from the Geoscience Publications and Information Section, Geological Survey, Department of Natural Resources, P.O. Box 8700, St. John's, NL, Canada, A1B 4J6  
Department: <http://www.gov.nl.ca/mines/energy/>  
Geological Survey: <http://www.gov.nl.ca/mines/energy/geosurvey/>  
e-mail: [pub@gov.nl.ca](mailto:pub@gov.nl.ca)  
Recommended citation:  
Sparkes, G.W. and O'Brien, S.J.  
2007: Geology of Neoproterozoic (Ediacaran) rocks along the eastern margin of the Holyrood Horst and eastern Conception Bay, eastern Newfoundland (Parts of NTS 1N07, 1N10, and 1N15). Government of Newfoundland and Labrador, Department of Natural Resources, Geological Survey, Map 2007-04 Open File 05/1N0708  
PUBLISHED 2007

Note:  
Open file reports and maps issued by the Geological Survey Division of the Newfoundland and Labrador Department of Natural Resources are made available for public use without being formally edited or peer reviewed. They are based upon preliminary data and evaluation. The purchaser agrees not to provide a digital reproduction or copy of this product to a third party. Derivative products should acknowledge the source of the data.  
Disclaimer:  
The Geological Survey, a division of the Department of Natural Resources (the "authors and publishers"), retains the sole right to the original data and information found in any product produced. The authors and publishers assume no legal liability or responsibility for any alterations, changes or misrepresentations made by third parties with respect to these products or the original data. Furthermore, the Geological Survey assumes no liability with respect to digital reproductions or copies of original products or for derivative products made by third parties. Please consult with the Geological Survey in order to ensure originality and correctness of data and/or



NTS INDEX MAP