

### **Stratigraphy, geochemistry and age of the White Rock Formation in the Yarmouth area, Nova Scotia**

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The White Rock Formation in the Yarmouth area occurs in a faulted synclinal structure underlain by slate and phyllite of the Halifax Formation. The formation is divided into 7 stratigraphic units based on field mapping, petrographic study and published geophysical maps. The stratigraphically lowest unit consists of mainly metapelitic rocks that are schistose on the eastern limb near the faulted contact with the Brenton Pluton. The unit grades into a quartzite unit which becomes fine-grained near the top. The third unit consists of metavolcanic and metasedimentary rocks near the base and mafic metavolcanic rocks in the upper part. On the eastern limb, the upper metavolcanic rocks are felsic. Unit four is a sequence of mafic metavolcanic and metasedimentary rocks, which include conglomerate near the top. The fifth unit is a predominantly mafic metavolcanic unit with minor metasedimentary rocks. Metavolcanic rocks include pillow basalt and towards the top, felsic and intermediate tuffaceous rocks (including ignimbrite). The sixth unit consists of intermediate and mafic metavolcanic rocks (with pillows) with minor metasedimentary rocks, grading upwards into slate near

the top. The stratigraphically highest unit preserved in the syncline is predominantly mafic tuff and flows. All units are commonly intruded by mafic dykes and/or sills, which also occur in the adjacent Halifax Formation. Metamorphic grade increases from greenschist facies in the south to amphibolite facies in the north.

The Brenton Pluton occurs on the eastern limb of the syncline and appears to be in faulted contact with unit 1 of the White Rock Formation to the west, and slate of the Halifax Formation to the east.

Mafic volcanic rocks of the White Rock Formation have chemical features indicating alkalic affinity and within-plate tectonic setting. The felsic volcanic rocks are chemically similar to the Brenton Pluton and both have characteristics of within-plate A-type granites. Preliminary results of U-Pb dating of zircon from ignimbrite in unit 5 yield an age of 438 ± 31/-35 Ma. This supports the Silurian age of the White Rock Formation, based on fossil evidence from the formation elsewhere in southern Nova Scotia.