

# Metamorphism and Structure of the White Rock Formation in the Yarmouth Area, Nova Scotia<sup>1</sup>

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The White Rock Formation (WRF) of the Meguma terrane forms a belt of mostly mafic metavolcanic and shallow-marine metasedimentary rocks in the Yarmouth area of Nova Scotia. The WRF, together with the adjacent, comagmatic Brenton Pluton formed during the latest Ordovician to earliest Silurian in a within-plate tectonic setting. Acadian (Devonian) deformation in the Meguma terrane is manifested in NE-trending, upright, regional-scale folds with a well-developed axial-planar cleavage. In the Yarmouth area, a regional synclinal structure is suggested by the presence of Cambrian-Ordovician Halifax Formation either side of the WRF and by magnetic anomaly maps. However, younging directions on the coastal section consistently face southeast and no clear stratigraphic repetition is apparent. The contacts of the WRF with the Halifax Formation lie within broad Alleghenian shear zones. Original contact relations are unclear.

Low-pressure metamorphism accompanied Acadian deformation elsewhere in the Meguma terrane, however mineral assemblages preserved in the WRF of the Yarmouth area suggest metamorphism under moderate-pressure conditions. Metamorphic grade ranges from upper greenschist to lower amphibolite facies in the WRF. Staurolite-bearing pelites are widely developed in the southeastern part of the area and are locally present within the Cranberry Point Shear Zone. Those in the southeast preserve common staurolite-garnet-biotite assemblages, whereas staurolite appears in association with oligoclase porphyroblasts in the northwest. Peak-metamorphic porphyroblasts overgrow the main regional schistosity (S1) and the well-developed, gently southwest-plunging stretching lineation (L1) throughout the area. Textures in staurolite-oligoclase porphyroblastic pelite within the Cranberry Point Shear Zone indicate peak metamorphism was synchronous with localized crenulation of S1 around steep axes. Peak-metamorphic porphyroblasts pre-date a transposition fabric developed in bounding Alleghenian shear zones. Bounding shear zones juxtapose amphibolite facies rocks of the WRF against greenschist facies Halifax Formation. These shear zones have therefore accommodated significant post-peak- metamorphic displacement and may represent major crustal structures.

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