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**Bedrock geology and tectonic history of the southwestern half of the New River belt, southern New Brunswick**

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CAMERON J. BARTSCH AND SANDRA M. BARR

*Department of Geology, Acadia University,  
Wolfville, NS, B4P 2R6 <067841b@acadiau.ca>*

The southern New River belt is characterized by two Neoproterozoic igneous units, the Blacks Harbour Granodiorite and the Ragged Falls Intrusive-Volcanic Suite, that together make up most of the belt. Fault-bounded slivers of Cambrian and Ordovician rocks are a minor component. Mapping at 1:20 000 scale during the summer of 2004 focused on these units in an effort to clarify their distribution and structural relationships, provide a framework for the tectonic development of the southern New River belt, and hence to establish grounds for comparison with other units of similar age in southern New Brunswick.

The Blacks Harbour Granodiorite occupies much of the area east of the Letang Harbour Fault. It is strongly tectonized due to an extensive movement history along regional northeast-trending faults. The unit has been previously defined as containing both granite and granodiorite; however, this study indicates that the unit is dominated by granodiorite. The Ragged Falls Intrusive-Volcanic Suite, previously dated by U-Pb (zircon) at ca. 555 Ma, has been demonstrated to be much more extensive than previously interpreted, and occurs throughout almost the entire strike-length of the map area. The intrusive part of the suite consists of diorite-granodiorite, grading to syenogranite, granophyric alkali feldspar granite, and quartz-feldspar porphyry, in intrusive contact with associated overlying felsic volcanic rocks. Whole-rock chemical data for the Ragged Falls Suite indicate that most rocks are silica-rich, typically containing over 75% SiO<sub>2</sub>, with high concentrations of K<sub>2</sub>O and trace elements Rb, Nb, and Zr. These rocks likely formed in a within-plate extensional environment. In contrast, the Blacks Harbour Granodiorite shows only moderate SiO<sub>2</sub> concentrations, and a continental margin subduction zone signature based on low Y and Nb values. Juxtaposition of these two units may have occurred as late as Late Devonian.

In addition to the Neoproterozoic units, Early – Middle Cambrian fault blocks containing mafic flows, debris flows, pyroclastic rocks, and volcanogenic sedimentary rocks occur throughout much of the southern part of the map area. The Buckmans Creek Formation in Beaver Harbour contains marine faunal assemblages in volcanogenic sedimentary rocks interstratified with volcanic rocks. These rocks may have been deposited in a shallow marine environment on top of the Beaver Harbour Porphyry, the uppermost intrusive unit of the Ragged Falls Intrusive-Volcanic Suite. Rocks of similar age based on a previous U-Pb (zircon) dating occur in the Simpsons Island Formation located west of the Letang Harbour fault lack fossils. Basalt in the Simpsons Island Formation is calc-alkalic, and apparently formed in a volcanic-arc setting.

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