Upper Ordovician to Lower Silurian foreland basin rocks in the eastern Bathurst Camp: implications for exploration east of the Pabineau Thrust

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The boundary between allochthonous (i.e., accretionary wedge) and parautochthonous (i.e., foreland) rocks in the eastern part of the Bathurst Camp is represented by the north-south trending Pabineau thrust-fault zone. East of this zone, an east-west-trending stretch of the Nepisiguit River transects the core of the shallowly south-plunging Nepisiguit River antiform exposing the Knights Brook and Chain of Rocks formations of the Miramichi Group. However, south of the Nepisiguit River, along strike from the section there, three new sedimentary units, not present in the river section, have been identified. The Tomogonops Formation comprises a coarsening-upward sequence of thinly bedded calcareous siltstone, lithic- and quartz-wacke, grey slate, and conglomerate, that lies gradationally and locally unconformably on Tetagouche Group and Miramichi Group rocks. It is interpreted as a flysch derived from a southeastward-advancing accretionary wedge. A second unit, informally named the Gordon Meadow Brook Formation, consists of greenish-grey, characteristically micaceous, fine grained sandstone and siltstone, and lies locally unconformably on the Miramichi Group. The Gordon Meadow Brook Formation was probably derived from the southeast (i.e., Avalon Terrane) as no known micaceous source rocks are present in the Miramichi Anticlinorium. The Portage River Formation gradationally overlies the Knights Brook Formation of the Miramichi Group and comprises interlayered, typically micaceous, dark bluish-grey, fine- to medium-grained quartz wacke and siltstone. The Portage River Formation also contains orthoquartzite beds analogous to those in the Knights Brook Formation, and micaceous wackes typical of the Gordon Meadow Brook Formation.

The base-metal rich Brunswick horizon exists at the Brunswick Mines and Key Anacon deposits, which occur in opposite limbs of the Nepisiguit River antiform. Previous exploration programs in the area of these deposits have outlined many geophysical anomalies, but follow-up drilling typically intersected sedimentary sequences previously interpreted as Miramichi Group, i.e., below the Brunswick horizon. If these sedimentary rocks are in fact part of the Tomogonops or Gordon Meadow Brook formations, they may overlie the Brunswick horizon, concealing potential mineral deposits at depth.