

**Stratigraphic relationships and mineralized horizons in the Heath Steele–Half Mile Lake area,
Bathurst Camp, New Brunswick**

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The Heath Steele–Half Mile Lake area is underlain by volcanic and sedimentary units of the Middle Ordovician Tetagouche Group, including, from oldest to youngest, the Patrick Brook, Nepisiguit Falls, Flat Landing Brook and Boucher Brook formations. The Patrick Brook Formation consists of dark grey to black quartz wackes and slates that

underlie relatively small areas south and west of Half Mile Lake. The Nepisiguit Falls Formation is divided into two members comprising mainly volcanic and mainly sedimentary rocks, respectively. The volcanic member consists primarily of quartz–feldspar crystal tuffs that exhibit characteristics of both lavas and pyroclastic rocks, suggesting unusual

circumstances of eruption and emplacement. The Flat Landing Brook Formation consists mainly of aphyric or feldspar-phyric felsic flows and domes, plus local felsic hyaloclastites, quartz-feldspar crystal tuff, mafic to intermediate flows, tuffs and agglomerates, mafic intrusive rocks and minor sedimentary rocks. Flat Landing Brook rhyolites are chemically distinct from the Nepisiguit Falls "porphyries", and contain higher abundances of Nb, Y, Zr, Hf, Sc, and Σ REE. The Boucher Brook Formation consists mainly of alkalic basalts and dark grey to black shales and wackes; the relative proportion of mafic volcanic and sedimentary rocks varies widely however. The transition from the Flat Landing Brook Formation to the Boucher Brook Formation is similarly characterized by different depositional histories in different places. Units of quartz-feldspar crystal tuff, basalt and iron formation may occur in variable proportions and thicknesses; locally, any or all of these may be absent from the succession.

Economic mineralization is found at three distinct stratigraphic levels characterized by well-defined lithologic associations. The Heath Steele (Brunswick) horizon includes the Heath Steele and Half Mile Lake deposits and is located within the Nepisiguit Falls Formation, typically at the contact between the volcanic and sedimentary members. The Stratmat horizon lies within the Flat Landing Brook Formation, hosted by sedimentary rocks that are enveloped by felsic fragmental rocks and feldspar-phyric or aphyric rhyolites. The Caribou horizon occurs at or near the contact between the Flat Landing Brook Formation and Boucher Brook Formation; host rocks and associated lithotypes vary from one deposit to another, and may include mafic volcanic rocks, crystal tuffs, rhyolites, or sedimentary rocks. The Wedge and Nepisiguit deposits are included in this group.