

**A petrographical and geochemical analysis of the Fountain Lake Group,
Cobequid Highlands, Nova Scotia**

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The Diamond Brook and Byers Brook formations of the Fountain Lake Group outcrop in the eastern portion of the Cobequid Highlands. The Diamond Brook Formation consists of aphyric and porphyritic basalt, and conformably overlies the Byers Brook Formation, which consists of rhyolite flows, minor hypabyssal intrusive rhyolite, and thick pyroclastic deposits.

The basalt is exposed in two major regions, the Scotsburn Anticline and the Earltown-Byers Lake belt. The Scotsburn Anticline basalt is among the most primitive basalt in the Cobequid Highlands. In contrast, the titanium-rich basalt of the Earltown-Byers Lake belt has been modified during petrogenesis. The distribution of feldspar megacrysts as well as chemical evidence (Pearce Element Ratios) suggest fractional crystallization of plagioclase as one process. Higher values

for Ga/Al, Th/Sr, and high-field-strength elements indicate some crustal contamination or felsic magma assimilation. The geochemical evolution of the succession has been studied in a section across strike in the Earltown-Byers Lake belt. Passing stratigraphically upward, there is an increase in some major components such as TiO₂, Fe₂O₃, CaO, and P₂O₅, as well as trace elements such as Zr, Y, Ni, Cr, and V.

The Byers Brook Formation is a within plate, felsic volcanic unit, geochemically similar to the Wentworth Pluton (Hart Lake-Byers Lake granite). Since the felsic unit is older than the mafic unit in the region, two or more magma chambers are required to produce the Fountain Lake Group, rather than the extensive fractionation of one magma chamber. The presence of two magma chambers provides means for assimilation and modification of the magmas.