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**The Wolves – a missing link in  
southern New Brunswick geology**

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The Wolves islands are located in the Bay of Fundy approximately 10 km offshore from mainland southwestern New Brunswick. Extensive outcrops of bedrock occur along the shores of the five islands that make up The Wolves (East Wolf, Flat Wolf, Spruce, and South Wolf islands and Green Rock). The Wolves are located in a geologically complex area through which it is difficult to trace rock units and terranes from New Brunswick into the state of Maine (USA). Because of their offshore location, The Wolves may provide one of the missing links in these correlations. The Wolves are located along strike of the Neoproterozoic–Cambrian Brookville terrane and the Silurian Kingston terrane, and east of the Oak Bay Fault which may offset these terranes into the Bay of Fundy. Prior to this study, only East Wolf Island had been mapped, and only from the perspective of mineral (gold) exploration.

Based on mapping in 2004 and 2005, the main rock type, which makes up most of The Wolves is medium- to coarse-grained, grey to pink quartz monzodiorite, gradational to monzodiorite. The rocks are unfoliated, except in proximity to small, localized shear zones. They consist of weakly zoned plagioclase, biotite, and amphibole with interstitial quartz and potassium feldspar. The amphibole contains relict cores of clinopyroxene. Cumulate texture is apparent in samples from the more northern islands, but becomes obscured by increasing alteration to the south. Average chemical composition is moderate SiO<sub>2</sub> (56%), relatively high Al<sub>2</sub>O<sub>3</sub> (18%) and low K<sub>2</sub>O (2%). Abundant meta-igneous xenoliths ultimately may provide clues about the petrogenesis of the host rocks, although they vary in mineralogy, texture, and degree of alteration.

The southernmost portion of South Wolf Island is underlain by coarse- to very coarse-grained pink granodiorite. The granodiorite consists of allotriomorphic equigranular plagioclase, quartz, and potassium feldspar with interstitial biotite and amphibole, and displays intense alteration. This rock type is more siliceous than the monzodioritic rocks on the other islands (average 73% SiO<sub>2</sub>), with lower Al<sub>2</sub>O<sub>3</sub> (14.5%) but similarly low K<sub>2</sub>O (2%). It may represent a related but more evolved magma composition.

A sample of quartz monzodiorite from East Wolf Island previously yielded a U-Pb age of 437 ± 5 Ma. Hence most, if not all, of the rocks on the Wolves are significantly younger than and unrelated to the petrologically similar Neoproterozoic to Cambrian granitoid rocks that characterize the Brookville terrane. In contrast, The Wolves rocks are similar in age to volcanic and high-level plutonic units of the more inboard Kingston terrane, but do not resemble those rocks in lithological characteristics. However, the similar ages combined with some chemical similarities, including positive epsilon Nd values, suggest that The Wolves may be linked to the Kingston terrane.