Stratigraphy, structure, and mafic sills in a section through the Halifax Group, Black River area, Kings County, Nova Scotia

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A recently constructed canal adjacent to Black River has provided an excellent opportunity to examine the upper part of the Halifax Group in a section of continuous exposure over one kilometre in length. The canal has vertical walls ca. 5–10 metres in height, and is part of the Black River hydroelectric system. It trends north-south, nearly perpendicular to the strike of the rocks. More intermittent exposures in Black River and adjacent roadcuts continue the section northwest 500 metres to the quartzite that marks the base of the White Rock Group. Similarly, roadside and stream outcrops continue the section an additional 1500 metres to the southeast, to the contact of the Halifax Group with the underlying Goldenville Group, near the middle of Lumsden Pond. This essentially complete section through the Halifax Group affords an opportunity to examine and subdivide the group, compare it to sections recognized elsewhere in southern Nova Scotia, and hence provide insight to the lateral continuity of formations proposed within the group. Preliminary examination indicates that four distinct lithologic units are present in the Black River area, varying in their sand/silt/mud ratios and overall appearance such as bed thickness and nature of layering. Contacts between units appear to be conformable and gradational, although none of the contacts is well exposed. Three of the units correspond well with the Feltzen, Delanceys, and Rockville Notch formations recognized elsewhere in the Halifax Group.

Throughout the study area, cleavage dips steeply to the south, and bedding dips steeply to the north, consistent with an unfolded stratigraphic section. Minor strike-slip and oblique-slip faults are evident, particularly in exposures along the canal, where striations and release steps provide a sense of motion on many faulted surfaces. It is not possible to measure amounts of offset, as the lithology in this section is monotonous and there are few distinct marker beds. The lack of repetition of the marker units that do occur, such as mafic sills and rare quartzite beds, suggests that movement was limited.

The section contains at least 12 highly altered mafic sills that vary in width from less than 1 m to 6 m, except one larger sill that is 65 m wide. Preliminary interpretation of

geochemical data from the sills indicates that they are alkalic, and formed in a within-plate tectonic setting. Quartz and quartz-carbonate veins and lenses are abundant in the section, mainly occurring in proximity to sills.