

Bedrock Mapping in the Meguma Terrane: a Long Awaited Return to the Eastern Shore of Nova Scotia

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Introduction

After a long hiatus, the Nova Scotia Department of Energy and Mines has resumed a mapping program in the Meguma terrane along the Eastern Shore of Nova Scotia. This multi-year program is aimed at producing a series of 1:50 000-scale geological maps of the Halifax to Canso area, focused on the Goldenville and Halifax groups (Fig. 1). Other than the maps produced by the Geological Survey of Canada, such as maps of the Ecum Secum area (Henderson, 1986) and Canso/Forest Hills areas (Hill, 1991), and the provincially produced map of the Governor Lake area (White and Scallion, 2011), no modern geological map of rocks exposed along the Eastern Shore exists (Fig. 1). In some areas the most recent maps are those published by the Geological Survey Department of Canada by H. Fletcher and E.R. Faribault during the late 19th and early 20th centuries (e.g. Fletcher and Faribault 1893).

This new mapping initiative will build on previous Meguma terrane bedrock-mapping projects completed elsewhere in the province. They included the southwestern Meguma (White, 2010, 2012; White and Barr, 2012; White et al., 2018), central Meguma (Horne et al., 2009a, b, c, d), and parts of eastern Meguma (Governor Lake area by White and Scallion, 2011; Halifax area by White et al., 2014) (Fig. 1). This work will complete the bedrock mapping of the Meguma terrane.

In addition, unpublished mapping data from the Musquodobit Batholith (e.g. MacDonald, 1981; Ham, 1999) and data collected during the regional-contact metamorphic study of rocks in the Eastern Shore by Douma (1988) will be incorporated in this work. The work will include establishing a whole-rock and mineral-chemistry database for the area.

The results of this mapping project, combined with the earlier projects, will provide a better understanding of the sedimentary, igneous,

metamorphic, and deformational history, all of which are important in evaluating the economic potential of the area.

Preliminary Results

During August and September of 2018, 1:10 000-scale mapping was initiated along a strip extending from the Governor Lake map area (White and Scallion, 2011) southward to the Sheet Harbour area (Fig. 1). This swath was chosen because it provides a nearly complete cross-section perpendicular the northeastly strike of the Goldenville and Halifax groups. Large areas of glacial till, however, cover or at best obscure outcrop and hence prevent the construction of a reliable geological cross-section. Mapping along strike away from these till-covered areas is required to enable construction of a cross-section.

Structural data were collected from all outcrops visited during this study, and multiple magnetic susceptibility measures were acquired from each rock type at each outcrop. In addition, approximately 150 samples were collected, slabbed, thin sectioned, and analyzed with the portable XRF (pXRF). Based on field relations, petrography, and geochemistry (pXRF), the lithologies and stratigraphy in the mapped area are similar to those in the Trafalgar area to the north (White and Scallion, 2011). The Cunard Formation, the lowest unit in the Halifax Group, was recognized in the mapped area, although the Glen Brook Formation, noted to overlie the Cunard Formation in the Central Meguma mapping project (Horne et al., 2009a), was not. The Mn-rich Beaverbank Formation, which represents the top of the Goldenville Group, was recognized, as well as the underlying Taylors Head Formation. The presence of the Tangier Formation, recognized farther to the west (Horne and Pelley, 2007), has not yet been verified.

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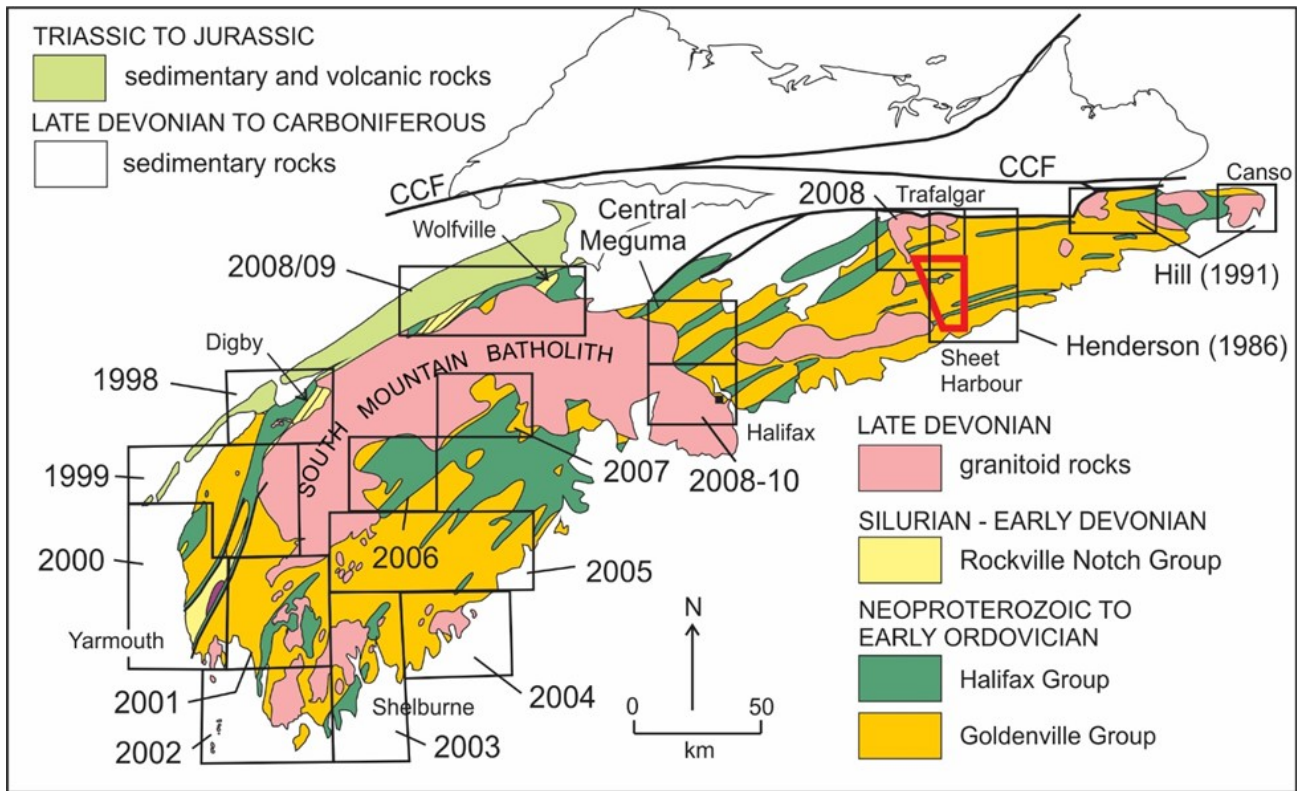


Figure 1. Simplified geological map of the Meguma terrane, southern Nova Scotia, showing the location of the 2018 map area (red box) in relation to other mapped areas (year of mapping indicated). CCF = Cobequid-Chedabucto Fault.

Based on float boulders of coarse-grained monzogranite and rare outcrops of spotted hornfels, the eastern margin of the River Lake pluton has been slightly modified from that of Horne and Pelley (2007) and extended farther to the southeast.

Future Work

Bedrock mapping is planned to continue for the next several years and will focus on (1) the production of 1:50 000-scale maps, (2) establishing chemostratigraphy using both pXRF and certified lithochemical analyses, (3) obtaining better controls on depositional age and source areas of the units using detailed U-Pb detrital zircon and isotopic studies, and (4) producing a metamorphic map to document variations in regional metamorphic grade and establish the presence of buried plutonic units. These new data will result in a better understanding of the distribution of economic mineralization and help to establish a predictive model to increase mineral exploration successes in the area.

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