

**INTRODUCTION**

Indicator mineral research is currently being undertaken in partnership with the Nova Scotia Department of Natural Resources and Renewables at the Brazil Lake Lithium-cesium-tantalum (LCT) pegmatite in southwest Nova Scotia. The Targeted Geoscience Initiative (TGI) program focused on critical minerals. The pegmatites, discovered in 1900, are well known from previous detailed bedrock mapping and surface studies, and are informally named based on their relative geographic positions as the South and North pegmatites. Both pegmatites are open to 2.5 m wide veins where the South pegmatite outcrops. Spodumene-rich boulders are common on the surface of the till deposit over the North pegmatite. For these reasons, the pegmatites are excellent sites to test indicator mineral exploration methods for Li and associated critical elements (e.g., Ce, Ta).

**BEDROCK SAMPLING**

Bedrock geology of southwestern Nova Scotia is composed of White (2010), White et al. (2012, 2018). Location of study area is indicated by the red star.

**BEDROCK GEOLGY**

<table>
<thead>
<tr>
<th>Sample Name</th>
<th>Description</th>
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<tbody>
<tr>
<td>22MPB039</td>
<td>South pegmatite breccia</td>
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<tr>
<td>22MPB040</td>
<td>North pegmatite breccia</td>
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<tr>
<td>22MPB041</td>
<td>South pegmatite breccia</td>
</tr>
<tr>
<td>22MPB042</td>
<td>North pegmatite breccia</td>
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**SURFICIAL SAMPLING**

Till samples (10-15 kg) collected for detailed analyses of potential indicator minerals. These five samples were submitted for disaggregation and examination of minerals to identify the indicator mineral signature of the pegmatite. A preliminary list of indicator minerals includes mafic-dense (e.g., spodumene, taenite, blue apatite) and high-density minerals (e.g., tantalite, carbonates, spathalerite). This list is expected to expand as the detailed studies progressed. One specific indicator mineral, tantalite, is bound predominately at the contact of the pegmatite and the wallrock as mm-mm scale crystals growing perpendicular into wallrock (see figure below). Blue apatite crystals (Photo 4a) are found predominately in association with albite, variety cleavelandite, in zones of sacchroidal albite. Grains of tantalite (Photo 3c) can be found within albite-rich zones as well as along fractures of quartz grains (see figure below). Chemical analysis of indicator mineral will be undertaken to help distinguish prospective samples (i.e., sourced from the pegmatite) from others.

One important aspect of our research is the challenge to identify different pegmatite groups in Till. It is difficult to visually identify because of its large size. The size fraction is typically mid-density fraction (e.g., spodumene, tourmaline, blue apatite) and high-density minerals (e.g., tantalite, carbonates, spathalerite). Sillimanite has an intermediate density of 2.8-3.2 g/cm³ and is recovered from both the mid- and high-density mineral fractions. In photo 4c) and 4d) below, can you tell the difference in density of the two minerals?

**ACKNOWLEDGEMENTS**

This research is funded by the Geological Survey of Canada’s Targeted Geoscience Initiative (TGI) and the Nova Scotia Department of Natural Resources and Renewables. John Wightman and Cliff Stanton for access to the property, field work, and advice that guided the field work. Michell Ayscough, Acadia University, was thanked for his assistance with field work and till sample collection. Donnelly Archibald, St. Francis Xavier University, was thanked for bringing a student field trip to the Brazil Lake pegmatites during our field work and for sharing field photographs. The GIS department at Acadia University thanks the Acadia Findings for their consultations and visits to the site for the project. Staff at the South Country Cuzzinners store are thanked for excellent service and support during the multi-year sampling project.