

A tale of two tills in the McDougall Lake area, southwestern New Brunswick, Canada

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The New Brunswick Geological Survey has collected basal till samples at 567 locations within the McDougall Lake area (NTS 21 G/07) as part of their provincial regional and followup till geochemistry programs. Laboratory analytical results have been released to the public, with minimal geochemical interpretation. During the most recent sampling effort, it became obvious that at many locations, most of the till's matrix is derived from distal, red sedimentary sources (up to 31 km north). The "red" till is in sharp contrast to the locally-derived, granite- or metasedimentary rock-rich till that is usually found nearby, or even at the same location.

Using field note descriptions as a guide, 23 red and 23 brown (granite-rich) till samples were selected for geochemical comparison. The 59-element Na₂O₂ Fusion ICP-MS data suggest that the red till population is relatively elevated in B, Ba, Co, Cr, Cu, Fe, Mg, Sb, Sc, Ti, and V, while the brown till population is relatively elevated in Bi, Ce, Hf, Nb, Pb, Sn, Ta, Th, Tl, Tm, U, W, Yb, and Zr. The brown till population also demonstrates large compositional variation for many incompatible elements, which is attributable to the diverse plutonic bedrock compositions of the Saint George batholith. The small compositional variation amongst the red till population suggests that the samples were derived from the same bedrock source. Given its broad spatial extent, the Shin Formation (Mabou Group) red beds would be a reasonable candidate for this source, although nearby Piskahegan Group red beds may have a similar chemical composition.

For the purpose of drift prospecting, it is advised that the red till samples be examined separately from locally-derived till. The results discussed here also enable the discrimination of a mixed till population, which could be included with either the red or brown till. Provided that till properties are quantified, multivariate statistical treatment is a good candidate for population discrimination. Given the ubiquity of red sedimentary rock in New Brunswick, this type of discrimination may be useful, and could form the basis for a more objective attribute-based till classification to complement genetic classification. Discrimination within the McDougall lake area is particularly easy given that the relatively firm, clay- and silt-rich red till contrasts sharply with locally derived sandy till.