Delineation of glacial dispersal patterns in areas of thick overburden and multiple ice-flow events, northeastern New Brunswick

M.L. Dickson[1], B.E. Broster[1], and M.A. Parkhill[2]
[1]*Quaternary and Environmental Studies Group (QUEST), Department of Geology, University of New Brunswick, P.O. Box 4400, Fredericton, New Brunswick E3B 5A3, Canada*
[2]*New Brunswick Department of Natural Resources and Energy, Geological Surveys Branch, P.O. Box 50, Bathurst, New Brunswick E2A 3Z1, Canada*

Drift prospecting is often the best tool for mineral exploration in areas where mineralized bedrock is concealed by thick overburden. However, the data can sometimes be misleading where a region has experienced multiple ice-flow events. In these areas, dispersal of a particular lithology or mineralogy from a known occurrence can be used to model dispersal patterns for comparison with anomalous concentrations of mineralized till clasts or matrix geochemical content from unknown sources. These results must be assessed with a competent understanding of local bedrock geology, Quaternary stratigraphy and glacial movements.

Cu-Mo skarn occurrences have previously been identified in the Popelogan Lake area of northeastern New Brunswick by geophysical surveys and diamond drilling programs. Bedrock exposure in the area is minimal due to the thick (>2 m) covering of basal till, but the skarn deposits were considered to represent distinctive targets for studying glacial dispersal. Approximately 328 till matrix geochemical samples and 171 till clast samples were analyzed for the study area; obtained from archival samples and from field sampling during surficial mapping. The boundary of the study area and sample spacing were based on the location of the skarn occurrences and the direction of ice flow. Sampling of clasts and matrix was conducted on a detailed 100 m grid in the area of the largest skarn occurrence, and on a 2 km grid in other areas.

Our results infer that the area experienced a complex style of glaciation during the Late Wisconsinan. Glacial landform orientation and striae data indicate three major directions of ice movement in the area: (1) southeast, (2) east, and (3) northeast. However, dispersal patterns of till clasts and matrix geochemistry only reflect movement to the northeast. Anomalous concentrations of mineralized clasts and Cu-Mo geochemistry indicate the presence of other, previously unknown, buried sources of mineralization in the area. Clast dispersal trains 2 km in length and geochemical dispersal trains extending 1 km, indicate that source areas for the buried anomalies are likely within 2 kms to the west-southwest.