

Quaternary mapping and till, stream-sediment, and water geochemical surveys in northern New Brunswick: a NATMAP contribution to the Geological Bridges of Eastern Canada

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In 1997, multimedia National Geochemical Reconnaissance and multiparameter airborne geophysical surveys, with the objective of locating Cu-skarn, Carlin-type, and other mineral deposit types in central Restigouche County were completed. The regional stream sediment and water survey covered an area of approximately 4000 km² (1075 sample sites). These surveys were a pre-cursor to the NATMAP Project "Geological Bridges of Eastern Canada" (1999-2004). During 1999, airborne geophysical and NGR geochemical surveys (800 sample sites) were conducted in western Restigouche County. Analysis of: the airborne geophysics; geochemical data; radiometric maps; bedrock mapping; Quaternary mapping and sampling (800 basal till samples in the Charlo, Kedgwick and Menneval map areas); follow-up humus, stream-sediment and water geochemical surveys; and mineral deposit investigations, are ongoing in both survey areas. In the process, anomalies may prove to be related to mineral occurrences and/or larger bedrock diversity than is currently known. For example, a large As, Sb ± Au stream-sediment anomaly south of the Patapedia occurrence suggests a much wider extent of felsic intrusive rocks and associated mineralization in the area. Several of the As-Sb stream sediment anomalies have been confirmed by field checking.

The resulting geochemical patterns confirmed many of the known mineral occurrences (e.g. Legacy, Burntland Bk., Popelogan, Squaw Cap, Patapedia), and also indicated new areas of mineral potential. An aerially extensive (approximately 80 km²) Ni (up to 685 ppm), Co (up to 58

ppm), ± Cu (up to 62 ppm) anomaly in the 1997 stream sediment survey initiated follow-up till and stream-sediment sampling in the Boland Brook area that confirmed the original anomaly. Results from 21 basal till samples collected over the northern part of this Ni-Co anomaly show elevated levels of Ni (>100 ppm) and Co (generally > 15 ppm). Normal background levels for the Restigouche survey area are <75 ppm Ni and 8-13 ppm Co. The only known Ni occurrence in the area is a float occurrence along the Upsalquitch River to the east. This suggests that the anomaly is a result of unique chemical characteristics of the surface rocks of this area, or alternatively that glacial erosion has moved mafic material out of the deeply incised valleys onto the plateau surface. Glacial history of the area and the basal glacial physics favor the former. The airborne survey of the area also indicates the presence of a large magnetic anomaly in the subsurface, coinciding with the geochemical anomaly.

Detailed surficial mapping and sampling in the vicinity of the Popelogan skarn occurrences were carried out during the summer of 1998 to follow-up a detailed multimedia geochemical survey done at the Legacy skarn deposit in 1997. The skarn-type mineralization occurs in calcareous sedimentary rocks of the Silurian LaVieille Formation and the Upper Ordovician-Lower Silurian Matapedia Group, within the contact aureole of a Devonian granodiorite stock. Geochemical results (INAA and ICP) indicate glacial dispersion distances to be less than 2 km.