

Surficial geology and glacial dispersal around the Captain North Extension massive sulphide deposit, northern New Brunswick

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The Captain North Extension (CNE) deposit (208,000 tonnes grading 7.38% Zn, 2.76% Pb) was discovered in 1978 by stream sediment geochemistry and drilling of IP survey targets. A B-horizon soil survey detected no base-metal anomaly over the deposit. Overburden drill samples from the bedrock-till interface detected anomalous Zn values directly over the deposit. Glacial transport in a westerly direction was suggested by a Zn value of 20,000 ppm, 150 m west of the deposit. Three mining campaigns from 1990 to 1992 extracted 39,278 tonnes of ore from the CNE pit.

The CNE deposit straddles the boundary between the Miramichi Highlands and the New Brunswick Lowlands. The north-northeast trending Curventon-Bathurst valley (CBV), a low lying, poorly drained area with many swamps and fluted bedrock terrain, crosses the study area, which is underlain by Ordovician Tetagouche Group felsic volcanic and sedimentary rocks. Sampling (48 samples on a 250 m grid) was done to trace glacial dispersal of anomalies in an east through to north direction away from the CNE deposit, with some sampling west and southwest (up-ice) to obtain background geochemical values.

Surficial materials include weathered bedrock; basal till; sandy-bouldery ablation till; and glaciofluvial (large esker system in the CBV), alluvial and organic deposits. Initially ice flowed in an eastward direction off the Miramichi Highlands; subsequently ice flowed north-northeast through the CBV. Late stage ice may have flowed in a northwest direction under the influence of the Escuminac Ice Center located north of Prince Edward Island in the Gulf of St. Lawrence. This may explain the high Zn values found west of the CNE deposit but high mobility of Zn makes hydromorphic dispersion more likely. Till is thicker and more clay-rich over the CNE deposit than in other parts of the area. The deposit sits in a slight topographic depression where thick till deposited by the eastward ice movement would have been protected from erosion by north-northeast moving ice. Thick overburden, lack of outcrop and poor geophysical and geochemical response of the CNE deposit make it an example of a near surface deposit that may still be found in the Bathurst Mining Camp. Data obtained from this study will be added to the existing till geochemical database (approximately 6900 samples).