

Discovery of a possible Zn-Pb-Ag SEDEX basin, Bathurst Mining Camp, New Brunswick, Canada

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SEDEX deposits host greater than 50% of the world's Zn and Pb resources with combined grades and tonnages that are an order of magnitude greater than VMS deposits. Mineral exploration in polydeformed rocks of the California Lake and Sormany groups in the northern part of the Bathurst Mining Camp has focused on a sedimentary sequence and base-metal occurrences that are collectively interpreted as possible evidence of SEDEX-type mineralization. A road cut on the property exposes a sequence of steeply inclined rocks of the Canoe Landing Lake Formation, including pyritic, quartz-veined, silicified, and chloritized mafic volcanic rocks, and overlying limestone/dolomite, pyritic argillite, cherty argillite, chert, and rare 1–2 cm beds of semi-massive to massive pyrite. The sequence is interpreted as part of a sea-floor hydrothermal vent complex complete with a footwall feeder system and associated exhalites. Along strike 1.5 km to the southwest, a 0.36m-wide massive sulphide unit is hosted by or, alternatively, partially replaces a unit of dolomite.

Twelve clusters of angular bedded/banded Zn-Pb-Ag-Cu-Au massive sulphide boulders have been discovered on the property, primarily in Holocene rivers and streams. These clusters are spatially related to pyritic, graphitic argillite/ mudstone, Zn-Pb-Ag-Cu-Au massive sulphides, immature clastic sedimentary rocks, pyritic cherty exhalite, pyritic felsic tuffs, and limestone/dolomite in the Millstream, Boucher Brook, and Canoe Landing Lake formations. Deposition of carbonates is interpreted to have developed in a thirdorder sedimentary basin, the "Millstream Basin". The Rocky Brook-Millstream Fault bounding the northern margin of the basin, and the "66 Fault" bounding the western margin are, respectively, proximal to massive sulphide zones and boulder clusters. Skarn, hornfels, silica, carbonate, sericite, and Mn alteration zones are present, and pronounced Mn alteration of dolomite is observed near several clusters of massive sulphide boulders. Assays from one boulder cluster yielded an average of 0.77% Zn, 1.73% Pb, 0.81% Cu, 124 ppm Ag, and 1.1 ppm Au; 600 m to the east, assays from a second cluster averaged 16.87% Zn, 5.09% Pb, 0.41% Cu, 217 g/t Ag, and 0.90 g/t Au. Sulphide boulders returned Sn values up to 3400 ppm.