The Laird Lake Project: Geological and geochemical comparisons to the past-producing Madsen Gold Camp, Red Lake greenstone belt, Ontario

BR Gélinas, PN Hollings

Department of Geology, Lakehead University, Thunder Bay, Ontario

The Laird Lake property encompasses the angular unconformity between the Balmer (2.99 to 2.96 Ga) and the Confederation (2.74 to 2.73 Ga) assemblages on the south-western end of the Red Lake greenstone belt, north-western Ontario. The Balmer assemblage is characterized by tholeiites, ultramafic flows, local banded-iron formations, and minor felsic volcanic rocks, whereas the Confederation has a more calc-alkalic affinity and comprises mafic to felsic volcanic rocks. Multiple gold occurrences are found on the Laird Lake property and generally occur within 200 m of the interpreted unconformity. Only 10 km east of the study area is the past-producing Madsen Mine, which yielded over 75.16 t of gold and 12.99 t of silver from 1938 to 1976, with ore grades averaging 10 g/t Au. The Madsen Mine lies on the north side of the angular unconformity between the Balmer and Confederation assemblages and the ore is locally defined by the Austin and McVeigh ore zone, which displays a characteristic mineral banding. The Laird Lake area lies along strike from the Madsen Mine and the Starratt–Olsen deposit and potentially includes the continuation of the same gold system. Previous models suggest that the Balmer and Confederation assemblages cannot be distinguished in the field, however, observations made over the previous field seasons indicate that the two assemblages show clear textural differences. Primitive mantle-normalized trace element profiles for Balmer and Confederation volcanic units show distinct trends that support the subdivision of assemblages within the field. The Balmer assemblage typically exhibits flat REE patterns with tholeiitic to komatiitic affinities with variable LREE profiles and Ti anomalies, whereas the Confederation assemblage rocks have calc-alkalic affinities with enriched LREE, flat HREE, high Th/Nb ratios, and strong negative Ti anomalies. Field work in 2016 located a new gold zone at the southeast side of Lee Lake, less than 100 m from the unconformity. The area contains the same mineral banding as observed on the Madsen property and is defined by interlayered biotite, amphibole, quartz/feldspar, and diopside layers with local layers rich in arsenopyrite. The exploration program, ran by Bounty Gold Corp., received assay values up to 17 g/t Au over 20 cm and 5.4 g/t Au in hand samples, after their initial sampling of the area during the summer of 2016.