

# **The Geology and Geochemistry of the Laird Lake Property, Red Lake Greenstone Belt, Ontario**

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The Laird Lake property is situated on what has been previously interpreted as 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 extremity 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 assemblage has a more calc-alkalic affinity and comprises mafic to felsic volcanic rocks. The Laird Lake property lies within the metamorphic aureole of the Killala-Baird batholith ( $2704 \pm 1.5$  Ga), but amphibolite facies has been attributed to regional metamorphism. Multiple gold occurrences are found on the property and generally occur within 200 m of the interpreted unconformity in multiple rock types. Some of the highest recorded values from grab samples include quartz veins (101.90 g/t), banded-iron formation (35.34 g/t), altered mafic volcanic rocks (38.57 g/t) and quartz-feldspar porphyritic crystal-tuff ( $>0.1$  g/t). This study will develop an integrated model for the geology and gold mineralization of the Laird Lake area by 1) characterizing the primary host rocks and 2) investigating the nature, timing and origin of the gold mineralization. Mapping and sampling of the various rock types in the field area at surface and within five drill cores that intersect the gold mineralized zone will provide the geological constraints for this study. Petrographic and SEM analysis will characterize the textures and mineralogy of the rocks, whereas whole rock geochemistry will be used to characterize their composition in order to differentiate the Balmer and Confederation assemblages. Quartz vein samples (barren and mineralized) will be analyzed for oxygen isotopes and fluid inclusion work will be conducted if possible. Previous models suggest that the Balmer and Confederation assemblages cannot be distinguished in the field, however, observations made over the field season indicate that the two assemblages show meaningful differences. The Balmer assemblage comprises a fine-grained, aphyric mafic metavolcanic, locally pillowed biotite and carbonate unit with local zones of garnet porphyroblasts and banded-iron formation. The Confederation assemblage was observed to have phenocrystic (feldspar and/or amphiboles) mafic metavolcanic rocks intercalated with intermediate and felsic metavolcanic rocks. The mafic to felsic volcanic rocks show weak to strong fabric with no pillows observed and display much weaker alteration than the Balmer assemblage.