

**Comparison of Auriferous Structures in New Brunswick and Their Relationship to Tectonostratigraphic Zone Boundaries**

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Gold occurs in several distinct geologic environments in New Brunswick. These include Late Precambrian and Early Ordovician, auriferous volcano-genic stratiform base metal sulphide deposits, auriferous porphyry copper deposits and a great variety of auriferous veins and stockworks in rocks ranging in age from Late Precambrian to Carboniferous. Only the auriferous veins and stockworks are discussed in this paper. The greatest concentration of these deposits are along the faulted margins of the major tectonostratigraphic zone or terrane boundaries in the province. The characteristics of the various auriferous structures reflect the complex deformational histories of each of these tectonically active belts.

Numerous auriferous quartz  $\pm$  carbonate  $\pm$  sulphide veins and stock-

works cutting rocks ranging in age from Ordovician to Devonian, have been reported in the northern Miramichi and Elmtree zones. The greatest concentration of these veins is between the northeast striking Rocky Brook - Millstream and northerly striking Antinouri Lake faults. Most veins in this area appear to fill northwest striking extension fractures associated with the Rocky Brook dextral wrench fault system, which separates the Miramichi and Elmtree zones. All the known auriferous veins in this area are in the contact aureoles of Devonian granitoid intrusions which were emplaced immediately after the Acadian orogeny.

Several recently discovered gold prospects of economic interest in northern New Brunswick occur in north-east striking, steeply dipping,

dilatant shear zones that developed during the final stages or immediately after the Acadian orogeny. These occurrences include the Smith Prospect at Upsalquitch River, the deposit discovered by Lacana Mining Corporation near Alcida and the Hickey Showing north of Alcida. The Smith prospect is in a dilatant shear zone that cuts Silurian, intensely deformed siltstone and limestone and that is intruded by mafic dykes and sills. The mafic intrusions are associated with a prominent splay of the Rocky Brook - Millstream Fault. Gold is associated with disseminated pyrite and locally hematite-rich veins. The Lacana Deposit occurs along the intensely sheared unconformable contact of the Ordovician Elmtree Group and Silurian Chaleurs Group, in the Elmtree Zone. Sheared mafic intrusions are common in this area. The Lacana shear zone is cut by numerous quartz-carbonate veinlets and contains abundant disseminated pyrite, argentiferous galena, sphalerite and stibnite.

In the northwestern part of the Magaguadavic - St. Croix Zone, there are several distinct types of gold-bearing veins. Gold- and scheelite-bearing quartz-carbonate veins occur in the contact aureole of the Devonian Poklok Batholith and its satellite plutons north and northeast of the Lake George Antimony Mine. Auriferous argillic alteration haloes with abundant arsenopyrite and bismuth minerals envelop northwest-striking, thin quartz veins that are cut by easterly-striking stibnite-bearing quartz veins in the Lake George Antimony Mine. The host-rocks for both these types of gold occurrences are tightly folded Silurian greywacke and slate.

Auriferous quartz-pyrite-chalcopyrite veins occur in prominent northeast striking, steeply dipping, dilatant shear zones in the Mascarene Peninsula along the southern margin of the Magaguadavic - St. Croix Zone. The host-

rocks are Silurian mafic and felsic volcanic, and sedimentary rocks.

Auriferous quartz  $\pm$  arsenopyrite veins are common in Early Ordovician pelitic metasediments along the southern margin of the Cookson Zone northeast of St. Stephen in southern New Brunswick. The veins occur in northeast striking, steeply dipping dilatant shear zones and in the crests of prominent steeply plunging cross folds associated with the shear zones.

A variety of gold-bearing veins and stockworks have been found along the southern margin of the Caledonia Zone, immediately north of the Cobequid - Chedabucto Fault. Northeast

striking, steeply dipping quartz-hematite veins cut Late Precambrian polydeformed, rhyolite at Dipper Harbour, southwest of Saint John. Older folded quartz veins in these rocks are not auriferous. Auriferous quartz-carbonate  $\pm$  base metal sulphide veins and stockworks occur in Carboniferous sandstone and conglomerate that unconformably overlie late Precambrian rhyolite at Little Dipper Harbour. The veins strike roughly perpendicular and parallel to the axes of easterly trending, gently plunging folds that are overturned to the north. In the Cape Spencer - Millican Lake area, east of Saint John, auriferous pyrite and locally hematite are associated with quartz veins and stockworks that occur mostly along the crests of gently north-northeast or south-southwest plunging D<sub>2</sub> folds that deform a gently dipping penetrative fabric (S<sub>1</sub>) in Carboniferous and/or older argillitized and silicified arkosic sandstone and conglomerate. The arkose unconformably overlies Precambrian or younger granite and granodiorite. The D<sub>2</sub> folds are associated with easterly- and westerly-dipping thrust faults. In addition to veins along D<sub>2</sub> fold crests, there are others roughly perpendicular to D<sub>2</sub> fold axes.