From the Mineral Inventory Files

The Moshers Island Formation is an Important Metallotect

A metallotect is generally defined as a specific tectonic, geological, mineralogical or geochemical feature which hosts mineral deposits and played a key role in controlling their formation. Nova Scotia's lower Paleozoic Meguma Supergroup has an excellent example of a metallotect in the Moshers Island Formation (MIF) and its laterally equivalent Bloomfield (Yarmouth area) and Beaverbank (central mainland) formations. Prior to their designation as formations by DNR's C. E. White in 2010, these rock units were informally known as the Goldenville-Halifax Transition Zone (GHT) and their association with mineral deposits has been recognized since the 1970s.

The MIF is a 200-500 m thick metasiltstone sequence at the top of the Goldenville Group and marks a distinctive contact between the Goldenville and Halifax groups throughout the Meguma Zone (Fig. 1). Many of the beds in the MIF are calcareous and high in manganese (10-20% MnO). In 1986 Zentilli et al. (GSC Paper 86-1A, p. 423-428) recognized that these beds also contain elevated levels of other metals such as Ba, Zn, Pb, Cu, Mo, W and Au. Although elevated metal concentrations in the Meguma are not unique to the MIF, a characteristic feature of the MIF is the presence of pink "coticule" beds and manganiferous nodules (lenses) consisting essentially of massive, spessartine garnet. It's thought that the Mn enrichment and elevated metal content of these rocks is the result of Mn-carbonate precipitation from pore fluid near the sediment-water interface during early diagenesis by oxidation of organic matter. The metal enrichment that accompanied these diagenetic processes was facilitated by highly anoxic conditions on the ocean bottom when the sediments were deposited. These conditions of formation resulted in the MIF's evolution into a sequence of chemically peculiar, carbonate- and metal-rich rocks that were very receptive to migrating hydrothermal fluids.

There is a diverse inventory of mineral deposits in MIF rocks (Fig. 1). There are locations, such as the Lake Charlotte and Rocky Lake Mn prospects, where exploration for Mn took place. The MIF is compositionally homogeneous so wherever it occurs, it will likely have a consistent Mn content. As a result, the MIF could be considered as one laterally continuous Mn occurrence, although unfortunately from an economic standpoint, almost all of this Mn is tied up as refractory Mn-garnet. There are numerous other more economically significant prospects within the MIF. At the Eastville Zn Prospect (*NS Minerals Update*, v. 17, no. 1) sphalerite occurs as fracture-controlled and disseminated skarn at three sites along 10-15 km of MIF strike length. Within the Southwest Nova Scotia Tin Domain several metasediment-hosted Sn-Zn-Cu-In-Ag prospects occur in MIF rocks. These include the Dominique (*NS Minerals Update*, v. 22, no. 2), Egypt Road and Dunn's Lake prospects near Wedgeport and the Duck Pond, Gardners Meadow Brook and Pearl Lake prospects (all in MIF rocks) along strike to the southwest of the large greisen-hosted East Kemptville Sn-Zn-Cu-Ag deposit. At the Lazy Head W, Zn, Cu, Mn prospect near Canso, scheelite, sphalerite and chalcopyrite occur in MIF rocks in two stratiform skarn beds, 1.5 m thick each, that occur along 80 m of shoreline exposure.

The MIF is also associated with several Meguma Zone lode Au deposits. Production at the Blockhouse Au District, which occurs within MIF rocks, came from a rich ore shoot on the Prest quartz fissure vein that averaged 2.5 oz. Au/ton. This ore shoot occurs at the intersection of the Prest vein with a particular, 1-2 m thick siliceous bed within the MIF country rock. This same relationship was also noted at the Fifteen Mile Brook Au District north of Liverpool where Au enrichment occurs in the main producing quartz fissure vein where it intersects beds of the enclosing MIF country rock. Similarly, at the Cow Bay Au District just outside Dartmouth, several discordant cross-veins occurring within MIF rocks were found to be enriched in Au where they cut through peculiar, pyrrhotite-rich beds of the wallrock. Prospectors and mineral exploration geologists exploring properties in proximity to the MIF metallotect should keep in mind its genetic implications.

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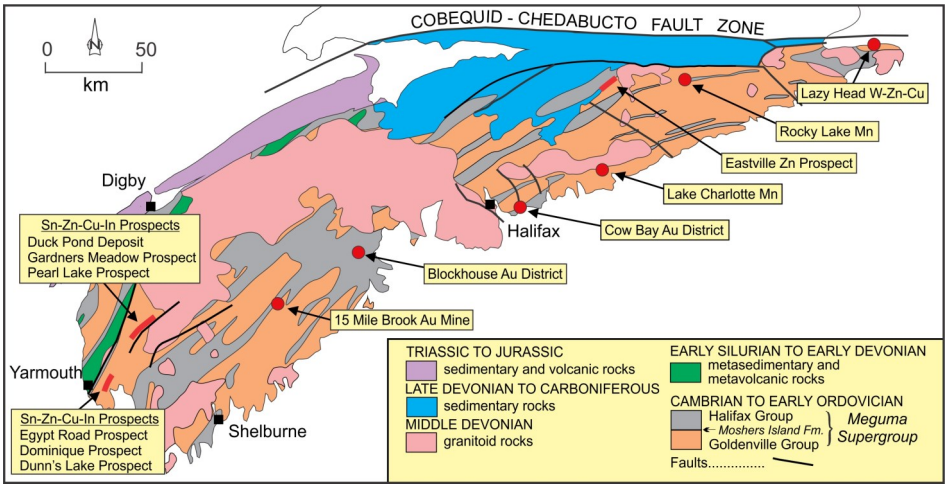

Figure 1. *Geology map of the Meguma Zone of mainland Nova Scotia showing the distribution of the Moshers Island Formation and several of its mineral deposits.*