From the Mineral Inventory Files

The Cobalt-bearing Bass River Magnetite Deposits

In the last issue I championed the Mt. Thom Cu-Co prospect as a member of the economically important Fe-oxide-Cu-Co-Au class of deposits. In this issue, I would like to highlight a series of Co-bearing magnetite deposits in the vicinity of Bass River, Colchester County (Fig. 1), and describe how these may also fall into this deposit class. The class has diverse end members, ranging from Cu-sulphide-rich breccias, to Cu-sulphide skarns, to massive low-titanium, high-phosphorus magnetite deposits. However, all share the presence of large amounts of Fe-oxides in the ore. I contend that the deposits at Bass River fall into the magnetite subclass, similar to deposits in the Fe-mining district at Kiruna, Sweden.

Prospectors discovered magnetite in boulders along the south crest of the Cobequid Mountains above the Village of Bass River in the late 1930s. The site was not explored further until 1951 when a series of trenches and a magnetometer survey outlined a magnetite-bearing zone 476 m long and up to 60 m wide (Fig. 1). At that time the zone was thought to hold 3 Mt of 40% Fe, but its high pyrite content was considered to render the ore unusable for steel production. Between 1985 and 1989, Lodestone Limited examined several aeromagnetic anomalies along the Cobequid-Chedabucto Fault System from Bass River to Economy River (Fig. 1). Magnetite was confirmed to underlie at least four of the anomalies. Lodestone then concentrated its efforts on the main Bass River zone, where it carried out further magnetometer surveys and a six hole diamond-drill program, and extracted a 2,000 tonne bulk sample. It was then that pyrite associated with the magnetite was found to be rich in cobalt, with the average grade of unprocessed magnetite ore being 500 ppm Co, while a sulphide concentrate separated from the ore averaged 0.9% Co.

The magnetite deposits are hosted by fine-grained siltstone and sandstone of the Carboniferous Londonderry Formation and occur very close to the east-trending Londonderry Fault. The deposits are lens shaped, and dip to the south at 50°. The magnetite zones appear to fill extensional openings created by the intersection the east-trending Londonderry Fault and one of a series of north-trending offsetting faults that occur along the south flank of the Cobequid Mountains (Fig. 1). Banded, recrystallized carbonate along the hanging wall of the magnetite deposits may represent interbedded carbonate rocks or, more likely, is the result of massive carbonate alteration of hydrothermal origin. The magnetite is fine grained and occurs as breccia, fracture-fillings and replacement of the siltstone country rock.

The Bass River magnetite deposits display several features typical of the Fe-oxide deposit class. There is an obvious spatial relationship to the Cobequid-Chedabucto Fault Zone. Furthermore, pyrite-bearing granite, identical to the main phase of the nearby Pleasant Hills Pluton (Fig. 1), occurs as fragments and micro-veinlets within the magnetite breccias. The Pleasant Hills Pluton is Early Carboniferous in age and, more importantly from a genetic viewpoint, is an 'A-type' granite. 'A-type' granites, or granites of alkaline character, are often thought to be likely sources of fluids and metals in the formation of Fe-oxide-Cu-Co-Au deposits. The facts that such an intrusion exists at Bass River, and that both fragments and veins of it are present within the mineralized zones, strongly suggest a genetic link.

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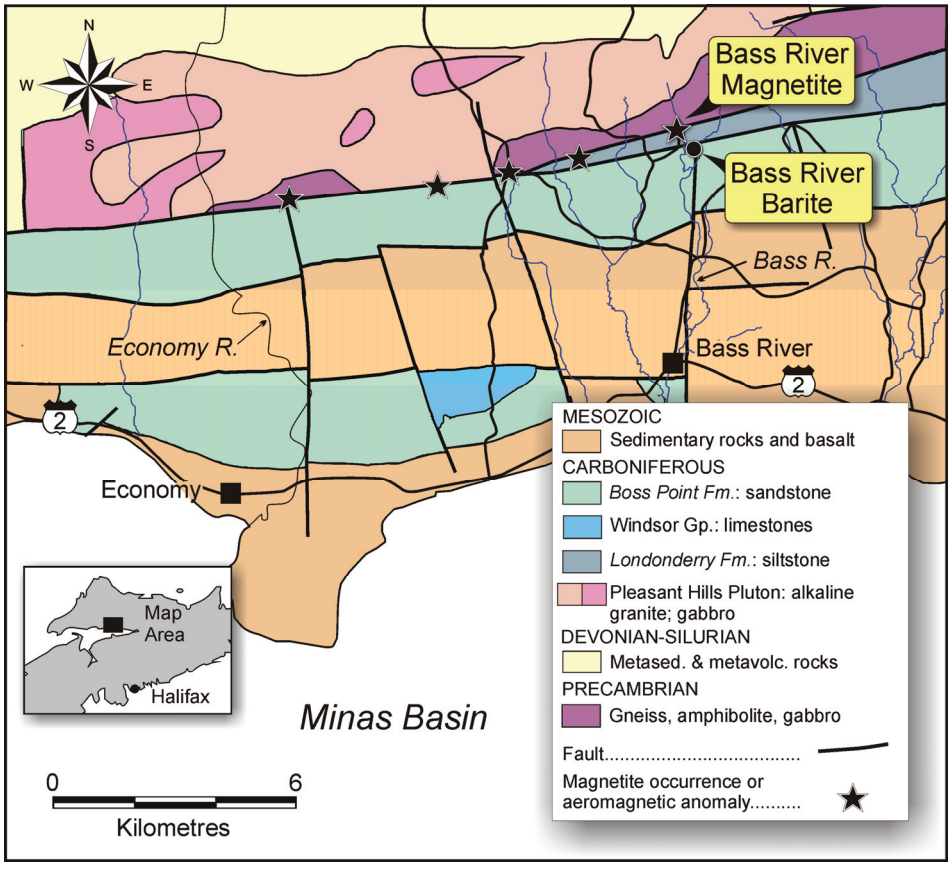

***Figure 1**. Geology of the Bass River area, showing locations of the magnetite deposits.*