

Mineral Inventory Studies in Cape Breton Island

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Mineral Occurrence Database Activities

Completion of the Mineral Occurrence Database compilation for the Targeted Geoscience Initiative Project study area was the focus of the Cape Breton Island Mineral Inventory Studies Project in 2002. Version 6 of the Mineral Occurrence Database, released in December 2002, includes numerous new and updated occurrence records for NTS map areas 11F/14 and 11F/11. Initially, the Targeted Geoscience Initiative (TGI) studies were restricted to these two map sheets, but the study area was expanded in 2002 to include the west half of 11F/10 and a small corner of 11F/15 (Fig. 1). Metallic mineral occurrence records for most of Cape Breton Island, including the TGI study area, were completed prior to the commencement of the TGI project, but new data from the mineral exploration assessment files continue to be compiled and added to the database as they become available.

Literature compilation of Mineral Occurrences Database Records continued in 2002-2003, with the addition of nine new industrial mineral occurrence records. A review of the available literature for the TGI Project study area continues, so the addition of more records to the database is expected before Version 7 of the database is released in April 2003.

Carbonate Resource Studies

Resource mapping surveys and mineral inventory site visits were completed on the Glenn Brook, Lamey Brook, MacEachern Road, Skye Mountain and Kewstoke Brook carbonate deposits. New data collected at these sites in 2002 have been compiled and added to the Mineral Occurrences Database. In addition, 1:20 000 scale carbonate resource maps are being produced in ArcView® for the Glen Brook, Lamey Brook and MacEachern Road deposits. The updated database and resource maps

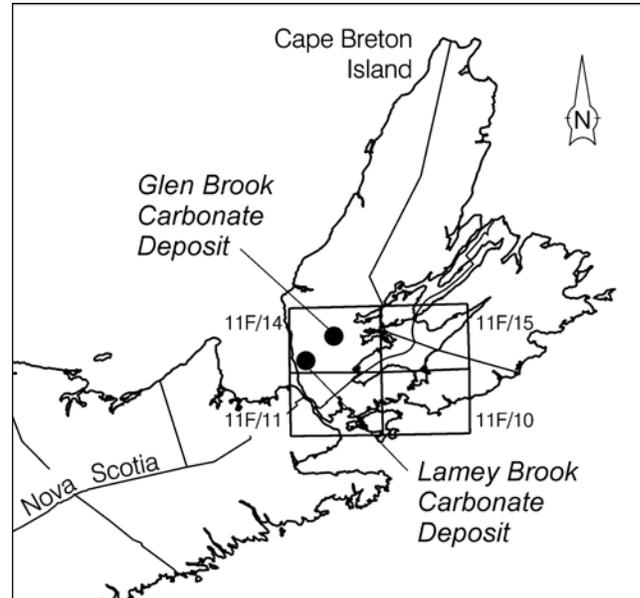


Figure 1. Location of the 2002 study area in Cape Breton Island, including the Glen Brook and Lamey Brook carbonate deposits.

will be released with the TGI Project final report in 2003.

The detailed resource mapping surveys provided considerable new insight into the geology of the carbonate deposits. Analysis of rock samples collected as part of this study also help to identify the various grades of dolomite and limestone resources found at these sites. A summary of new information from resource mapping surveys of two of the carbonate deposits are provided below.

Glen Brook

Milligan's (1967) geological map of the Creignish Hills illustrates the occurrence of a large area of white to blue-white limestone along the north side of Glen Brook (formerly Diogenes Brook). This limestone unit, which is part of the Precambrian Blues Brook Formation (formerly George River Group), was the focus of a detailed resource mapping survey undertaken in 2002.

Extensive carbonate outcrops are exposed along the north side of Glen Brook, on the side of a 100+ m high south-facing slope. The outcrops are composed of two principal rock types: (1) blue to grey limestone, and (2) buff, grey and white dolomite or magnesian-limestones. These occur as distinct units which are readily mappable in the field.

Other rock units found in the study area include green mafic volcanics, grey quartzite or greywacke, tan feldspathic quartzite, white quartzite and granite. The white quartzite is difficult to distinguish from white dolomite in areas where the two are in contact, as they have similar colour, texture and grain size.

Grey to black siltstone and shale are interbedded in the limestone. The areal extent and volumes of these two rock types are difficult to estimate because they are subject to deep preferential weathering and, therefore, are poorly exposed. This is a resource mapping problem, because the siltstones and shales are mostly covered by overburden and difficult to detect on the steep slope, hence giving the false impression that the slope is underlain entirely by limestone.

The carbonate rocks illustrated on Milligan's (1967) map occur in a northeast-trending band, sub-parallel to the east-west Glen Brook Valley. Traverse lines for the 1967 mapping survey were primarily restricted to brook valleys and roads. Numerous cross-country traverse lines, completed as part of the 2002 resource mapping survey, provided abundant new outcrop data which allow for a different interpretation of the local geology. Along the north side of Glen Brook, bedding was found to trend northwest to west-northwest, with steep north dips. The bulk of the carbonate rocks exposed here are either dolomite or magnesian-limestone, with limestone constituting <30% of the total carbonate outcrops. The Diogenes Brook (now called Glen Brook) Cave is found in a narrow limestone bed along the west side of the study area.

Metamorphic grade of the Blues Brook Formation appears low, likely lower greenschist facies, because no metamorphic minerals are apparent in hand specimens collected in this area.

The metamorphic grade is even low in areas adjacent to granite bodies.

Considerable grain size variation was observed in the carbonate rocks. The buff to white dolomite is generally medium- to coarse-grained, but grey dolomite and limestone are usually fine grained. Further studies are required to determine the reason for this variation, but preliminary observations suggest that it could be reflecting variances in the primary crystal grain size. Metamorphic recrystallization is also considered to be a factor locally, particularly near contacts with the granite dykes.

Analysis of samples collected from the various limestone beds suggests that high calcium stone is found here, but the presence of interbedded siliclastic rocks place constraints on the mineable widths of clean limestone beds. This unfortunately may diminish the economic viability of opening a quarry at this location. Mapping has indicated that large volumes of white dolomite or magnesian-limestone occur in this area. These rocks could be an interesting exploration target if markets are found for a high brightness carbonate filler.

Lamey Brook

The Lamey Brook carbonate deposit is illustrated on Fletcher's (1884) geological map, but a mineral exploration assessment report search suggested that it has never been explored. This discovery came as a bit of a surprise, because the deposit's proximity to the Point Tupper ship-loading facilities should make it an excellent exploration target.

The detailed resource mapping survey outlined a large deposit of grey, white and buff dolomite or magnesian-limestone. These rocks are part of the Precambrian Blues Brook Formation (formerly George River Group). Other rock units found in the Precambrian strata at Lamey Brook include grey quartzite, grey to black limestone, and mafic dykes.

A white rock composed of brecciated, coarse grained quartz was initially thought to be a distinct quartzite unit, but further mapping revealed that it is actually a vein. These veins are abundant locally and appear to penetrate the dolomite in intensely

fractured zones. Mafic dykes of unknown age are common in this deposit. An apparent lack of deformation in these dykes suggests they are younger than the Precambrian Blues Brook Formation rocks they intrude.

Pervasive red hematite alteration of the dolomite is common in some areas of the deposit, particularly along the south side of Lamey Brook. MacLeod Resources Limited staked the deposit and plans to explore these red zones further in 2003 to determine if they are suitable for production of red marble building stone blocks.

The economic possibilities for development of this deposit appear limited, because the bulk of it is

composed of grey dolomite, a rock type which is unsuitable for most prospective carbonate markets. The best opportunity for development of this resource lies in the red marble building stone markets.

References

Fletcher, H. 1884: Geology, Island of Cape Breton; Geological Survey of Canada, Map No. 22, scale 1:63 360.

Milligan, G. C. 1967: Geological Map of the Creignish Hills; Nova Scotia Department of Mines, scale 1:31 680.