

## Chapter 8 - Conclusions

The Cumberland Basin contains the type sections of both the Cumberland and Pictou groups. This study pointed out that the stratigraphic nomenclature as previously applied to these groups was in need of revision. Ryan *et al.* (1991) redefined these units based on the lithological characteristics of the type areas. The stratigraphic nomenclature was simplified by abandonment of the term 'Riversdale Group' and the recommendation of adopting Belt's suggestion that the term 'Canso Group' should be replaced with the term 'Mabou Group'. Several new map units or formations were also defined by Ryan *et al.* (1991), including: Polly Brook, Joggins, Springhill Mines, Ragged Reef and Malagash formations of the Cumberland Group and the Balfron, Tatamagouche and Cape John formations of the Pictou Group. The primary emphasis of the stratigraphic study was to simplify correlation and to remove age limitations on lithostratigraphic terms.

The sedimentology of the units in the Cumberland Basin has raised several important questions. The fluvial environments that deposited the bulk of these strata range in style from anastomosing to meandering streams. There are, however, many beds that do not conform to the established stream facies models. Strata deposited by these streams appear to have characteristics of several stream types. In this report we have suggested that the lateral and stratigraphic continuity of these deposits warrant the establishment of a facies model based on these beds. This 'composite stream model' has no modern analogue because of the lack of binding grasses during the Carboniferous which makes such analogies impossible. The merit of our arguments for such a model is left to the reader but we felt it was necessary to put forward these ideas. Paleoflow (sediment dispersal) measurements from this study form an integral part of the overall Maritimes Basin study.

The structure of the Cumberland Basin and the resulting sedimentary responses were an important part of this study. This memoir documents the close relationship of the sedimentary packages to the structural

and tectonic evolution of the basin. The structures and sedimentary allocycles contained within the basin suggest that the basin developed as a result of alternating local and regional subsidence related to transform fault movements along the suture (Cobequid - Chedabucto Fault Zone) between the Meguma and the Avalon terranes. Another important contribution to the structural studies was the documentation of syn-basin development of evaporite diapirism. The presence of overturned Windsor Group strata with unconformably overlying flat beds of the Cumberland Group places time constraints on the mobilization of evaporites in the basin.

Thermal studies on the strata of the Cumberland Basin have resulted in a better understanding of the thermochronological evolution of the basin and its mineral resources. The most significant conclusion was that the Cumberland Basin was covered by 2-4 km of additional sedimentary strata in the Permian and that these strata were subsequently eroded. This observation helps to explain the organic maturation and mineral deposits in the basin. The thermochronological study also demonstrated the applicability of apatite fission track analysis in the sedimentary basins of eastern Canada.

The Cumberland Basin has significant potential for economic mineral deposits. The Cumberland Basin has had a long history of coal, copper and industrial mineral production. This study documented the occurrences of these various commodities in the basin.

The thermal and economic geology studies carried out as part of this project place constraints on the timing of mineralization within the basin. In particular, these studies suggest that redbed Cu-Ag mineralization in the basin is related to exhumation of the strata (circa 270-200 Ma). These studies also indicate that if there were basin brine expulsion events, which may have resulted in as-yet undiscovered Pb-Zn-Ba deposits in the basin, they must have occurred prior to the onset of exhumation (before 280 Ma).