New palynological age dates, zonations, and stratigraphy in the Permo-Carboniferous strata of the Cumberland Basin, Nova Scotia

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Approximately 400 palynological age dates were determined for strata from the Cumberland Basin of northern Nova Scotia. The continental dominated basin-fill is up to 7 km thick and ranges from Visean to Early Permian in age (Late Devonian to Early Visean strata are present deep within the basin but are not sufficiently documented to be included).

The Cumberland (revised)/Riversdale Group rocks extend from Late Namurian to late Westphalian C - early Westphalian D. Seven distinct informal spore assemblage zones have been recognized in these rocks, strata of zones 1 to 6 (late Namurian to early Westphalian C) occur along the Joggins shoreline, from Downing Cove to Spicers Cove. Zone 7 assemblages (Westphalian C-D) are found in the Malagash Formation throughout most of the basin. The Pictou Group (revised) ranges in age from late Westphalian D to Stephanian in the Balfrom and Tatamagouche formations to Early Permian in the Cape John Formation. Spore samples from the Mabou Group (Canso) Middleborough Formation, and adjacent rock units suggest a Visean to Namurian age. The Middleborough is in part an age equivalent to the upper Windsor Group.

Substantial reworking of spores was found to occur throughout the basin and especially in the Joggins Section. Similar reworking of spores are recognized in the Sydney Basin. Abundant well preserved allochthonous material indicates extensive recycling and therefore extreme caution must be used in interpreting small data sets or individual samples. The recycling appears to be cyclic in nature and may reflect periods of uplift and erosion of Carboniferous strata on adjacent highland/platform areas. The palynological results are extremely valuable in establishing relationships within and between lithostratigraphic units in the basin. Although diachronous units are problematic the sampling density has closely defined the limits of these relationships. The division between the Westphalian A and B boundary based on international assemblage ranges is not clear, even though rocks can be well defined in relative age relationships using the local informal zonations. There does not appear to be any significant break in age between the Riversdale and the Cumberland groups in the basin, and given their lithological similarities, the usefulness of the term Riversdale Group becomes obscure.