

# An Early Pennsylvanian Waterhole Deposit and its Fossil Biota in a Dryland Alluvial Plain Setting, Joggins, Nova Scotia<sup>1</sup>

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The terrestrial ecology of Pennsylvanian tropical wetlands is understood in detail, but coeval dryland ecosystems remain highly enigmatic. To fill this gap in our knowledge, a Pennsylvanian (Langsettian) continental red-bed succession was studied at the classic Joggins locality, Nova Scotia. These units represent the deposits of seasonally dry, alluvial plains traversed by anastomosed drainage networks. One channel complex informally known as the 'Hebert beds' (the focus of this study) contains an unusual fossil assemblage and is interpreted as an alluvial waterhole deposit that formed following drought-induced cessation of channel flow. Adpressed and charred fossil plant remains indicate that the alluvial plain surrounding the waterhole was covered by fire-prone cordaite vegetation, with hydrophylic lycopsids and sphenopsids restricted to waterlogged riparian niches. Gigantic unionoid freshwater bivalves, locally in life position, and occurring in large numbers in the waterhole, were probably infaunal suspension feeders during periods of fluvial activity, but aestivated in channel bottom muds when flow ceased. Abundant terrestrial gastropods found clustered around fossil plant detritus mat have been deposit feeders scavenging dry portions of channel floors. Common partially articulated remains of small to medium-sized tetrapods possibly represent animals drawn to the waterhole during drought when surface water was scarce elsewhere. In terms of both sedimentology and biology, the Hebert beds alluvial complex bears a very close similarity to the seasonal drainages and waterholes of present-day central and northern Australia. This unique deposit sheds significant light on the nature of Pennsylvanian dryland tropical ecology.

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