

# Continental ichnology of the Lower McMurray Formation at Daphne Island

*Brette Harris, Eric Timmer, Murray Gingras*

The McMurray Formation is a well-known fossil estuary, for which, the ichnology is well studied. Workers have recognized the brackish-water character of trace-fossil assemblages and those studies have contributed heavily to the interpretation of the deposit. This study considers the significance of McMurray Formation strata that contain a trace fossil assemblage that is not consistent with brackish-water trace-fossil assemblages. These exceptionally well-preserved trace fossils comprise a range of forms that hitherto now, have not been reported from the McMurray Formation. Trace fossils that contain irregular back-fill, uneven burrow diameters and disharmonic angles of branching and trace-fossil orientations are assigned to the ichnogenus *Naktodemasis*, and a range of adhesive meniscate backfilled burrows. Collectively, these trace fossils are associated with insect larvae and are taken as indicators of fresh-water sedimentation. Other trace fossils, such as *Siphonichnus*, are associated with very low salinity waters, leading to the interpretation of the outcrops as innermost estuary.

The fresh-water or low-salinity trace fossil assemblage is observed in the inclined beds of inner estuary pointbars. Abseiling techniques, high-resolution photography, trace fossil identification, lithological descriptions, sampling and thin section analyses are used as a basis for initial characterization of this trace-fossil assemblage. Moreover, continental trace fossils have not previously been described in the McMurray Formation, the impact of which offers a broader understanding of the variability and depositional affinities of inclined heterolithic stratification in the McMurray Formation.