

**Late-glacial and Holocene stratigraphy of Piper Lake, Pictou County, Nova Scotia:
evidence for Younger-Dryas perennial ice cover
and sustained landscape instability during the Early Holocene**

Ian M.L. MacDonald and Ian S. Spooner

Department of Geology, Acadia University, Wolfville, NS B0P 1X0, <ian.spooner@acadiau.ca>

Lake sediment stratigraphy and detailed AMS radiometric dating of sediments from Piper Lake, eastern Nova Scotia, reveal changes in productivity, sedimentation, and climate during the Late Glacial and Holocene. Piper Lake is a small, shallow (6 m), closed, glaciated basin located in the highlands of central Nova Scotia. A basal age of ca. 13,500 yr BP indicates that the site was deglaciated well before Younger Dryas (YD) cooling. The presence of gyttja (high LOI) and relatively low carbon/nitrogen (C/N) isotope ratios are indicative of a productive aquatic environment and are consistent with pre-YD warming recognized elsewhere in Nova Scotia. The Younger Dryas inorganic marker horizon (YDimh, 10,800 ^{14}C yr. BP) is a thin, very fine-grained clay layer exhibiting reduced LOI, increased magnetic susceptibility, very low organic carbon and pollen concentrations, and sharp upper and lower contacts with the

bounding gyttja. The petrology of the YD oscillation is consistent with decreased sedimentation rates associated with sustained ice cover (glacial advance?) and a hiatus in productivity.

The post YD stratigraphy and preliminary pollen analyses indicates the rapid establishment of an increasingly productive and stable landscape. This trend was abruptly terminated by a thick sediment oscillation (Early Holocene Oscillation, EHO, 9,800–7,800 ^{14}C yr. BP) that exhibited decreased LOI and increased magnetic susceptibility; pollen concentrations are sharply reduced within this unit. The EHO is a diamicton at the base and fines upwards to the contact with the overlying gyttja. The EHO is a consequence of sustained landscape instability and/or ice activity during the Early Holocene. A thin sediment oscillation (7,200–6,800 ^{14}C yr. BP), indicated by a subtle decrease in LOI and increased magnetic

susceptibility, is correlative with the HE-5 event. Following this oscillation, consistently high LOI, reduced magnetic susceptibility, and higher C/N ratios provide evidence of a productive lacustrine and terrestrial environment. The lake

sediment stratigraphy at Piper Lake demonstrates an unusually robust response to environmental change that may be a result of the unique physical conditions at the site coupled with the reinforcing effect of the regional atmospheric conditions.