

# Paleoenvironmental Reconstruction and Water-Level Fluctuations: Implications for Understanding Paleoindian and Archaic Archaeology in Southern Ontario

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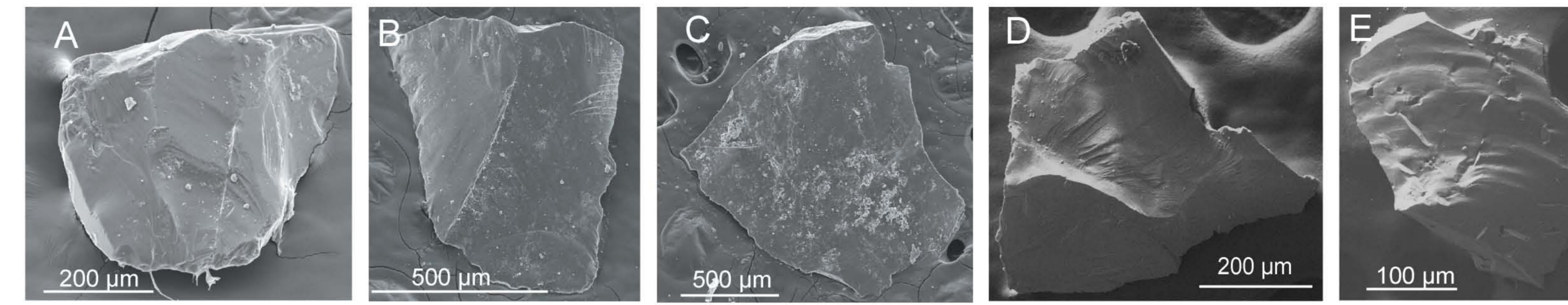
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## Water-Level Fluctuations

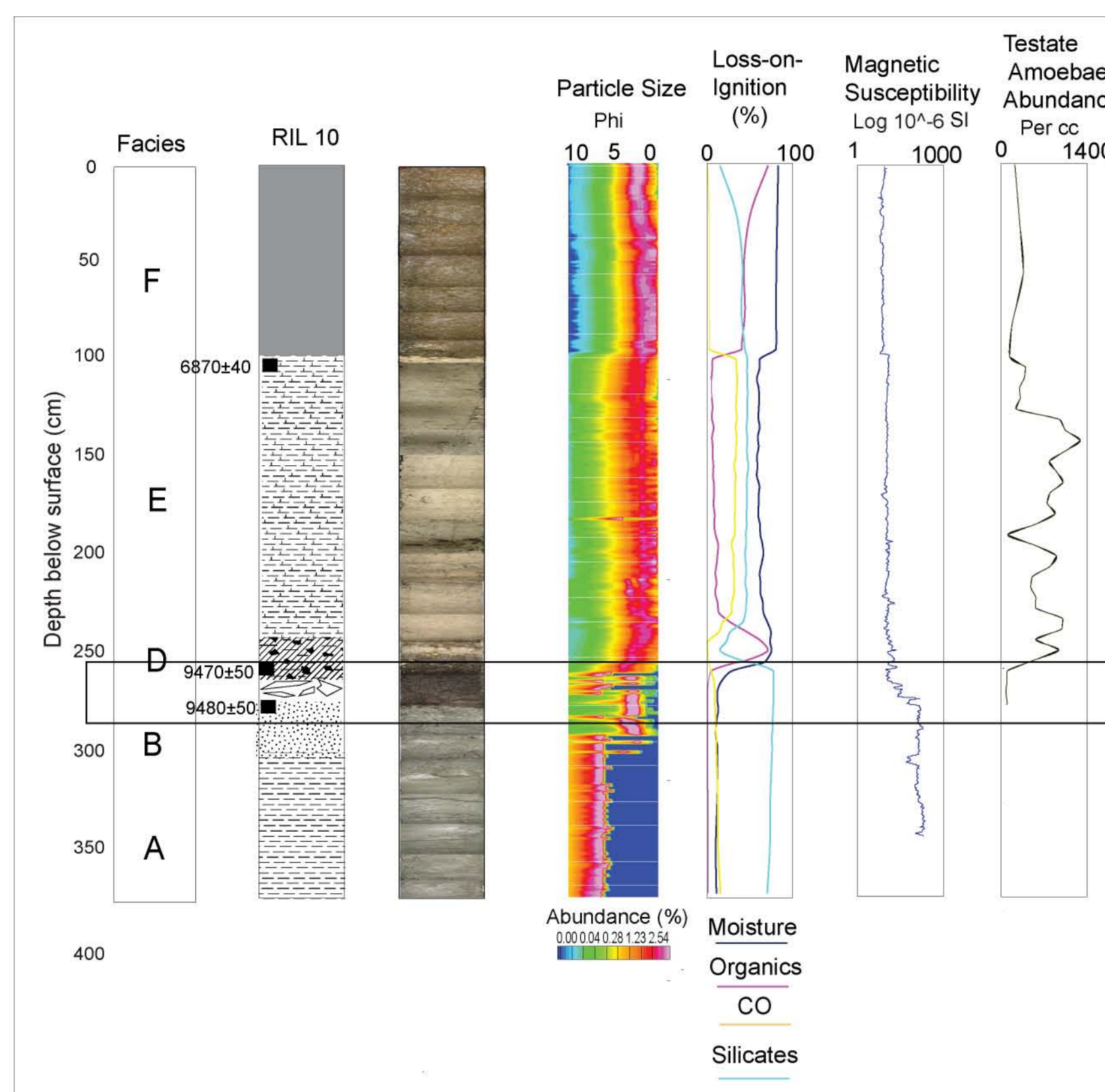
## Abstract

Rice Lake has been continuously occupied for over 11,000 years. Despite its rich archaeological record, large areas of shoreline have been inundated by rising Holocene water-levels, limiting understanding of Paleoindian and Archaic subsistence strategies and settlement patterns. To gain a better understanding of the submerged landscape of Rice Lake and identify areas of archaeological interest, geophysical survey and sediment coring was initiated. Quartz microdebitage dating to ca 10,700 cal YBP was found in cores extracted adjacent to a terrestrial Archaic archaeological site. Paleoenvironmental reconstruction indicates Paleoindian peoples were exploiting resources associated with wetland/marsh environments and choosing easily accessible materials.

The origin of the McIntyre basin is a small kettle lake, possibly groundwater-fed. Lithologic, textural and microfossil analysis clearly demonstrates that water-levels during the Paleoindian period (11-9.5 kya) in the McIntyre basin were up to 2.5 m lower than present. The center of the basin would have remained inundated, with the shoreline surrounded by fringing marsh. This area would have provided fresh water as well as abundant resources such as waterfowl, aquatic plants, and fish. By the time of the main McIntyre occupation (ca. 4 kya), the basin is close to modern water-levels.

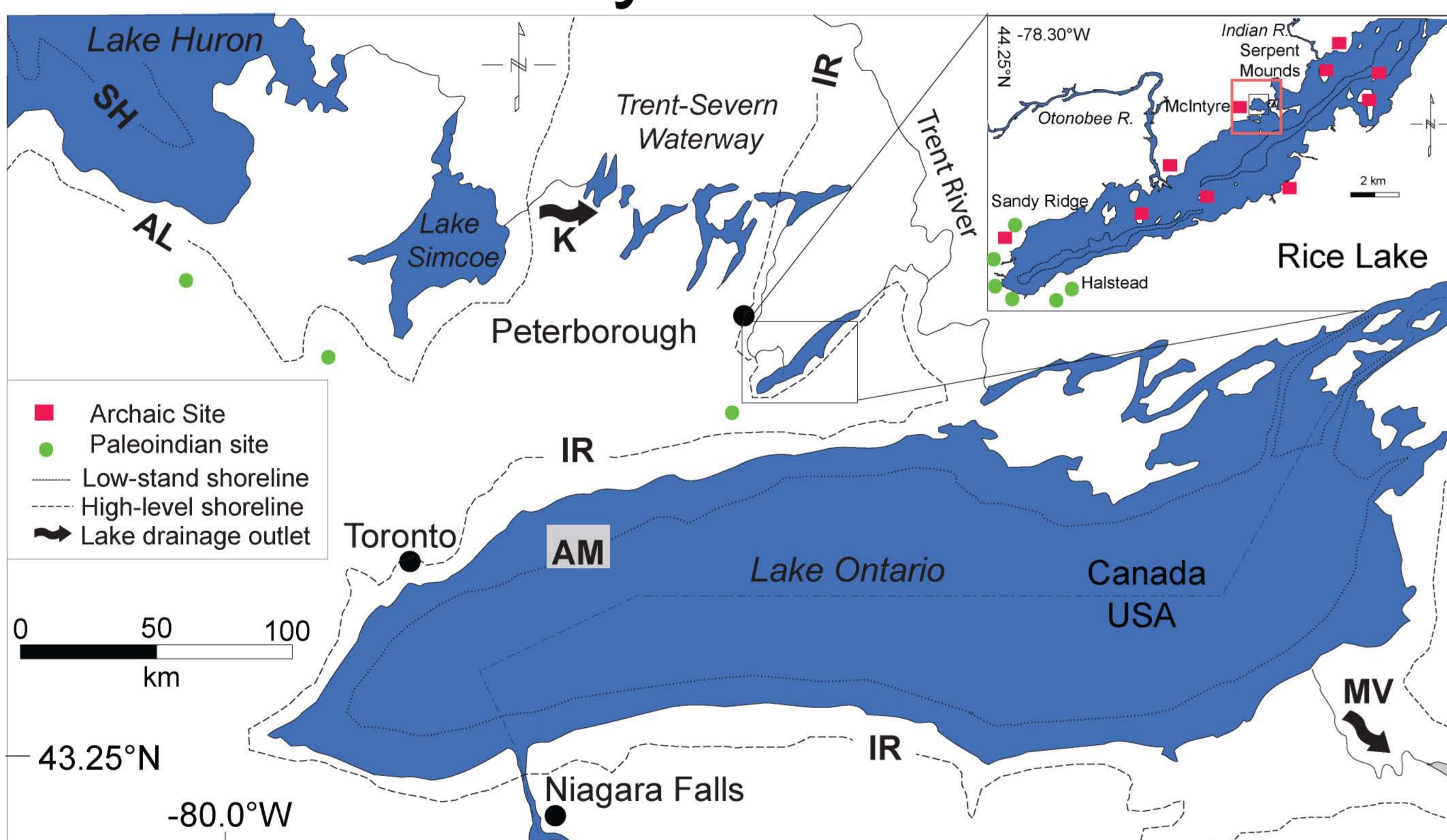


Cores were examined for microdebitage based on characteristics outlined in Fladmark (1982) and Dragovich and Susino (2001). SEM images of selected quartz microdebitage fragments from core RIL-10 (A, C, D) RIL 16 (B) and McIntyre Site (F). Note flake scars, fine edges, high angularity and lack of weathering. Similarity to naturally occurring quartz fragments in the matrix indicate the material is locally sourced.



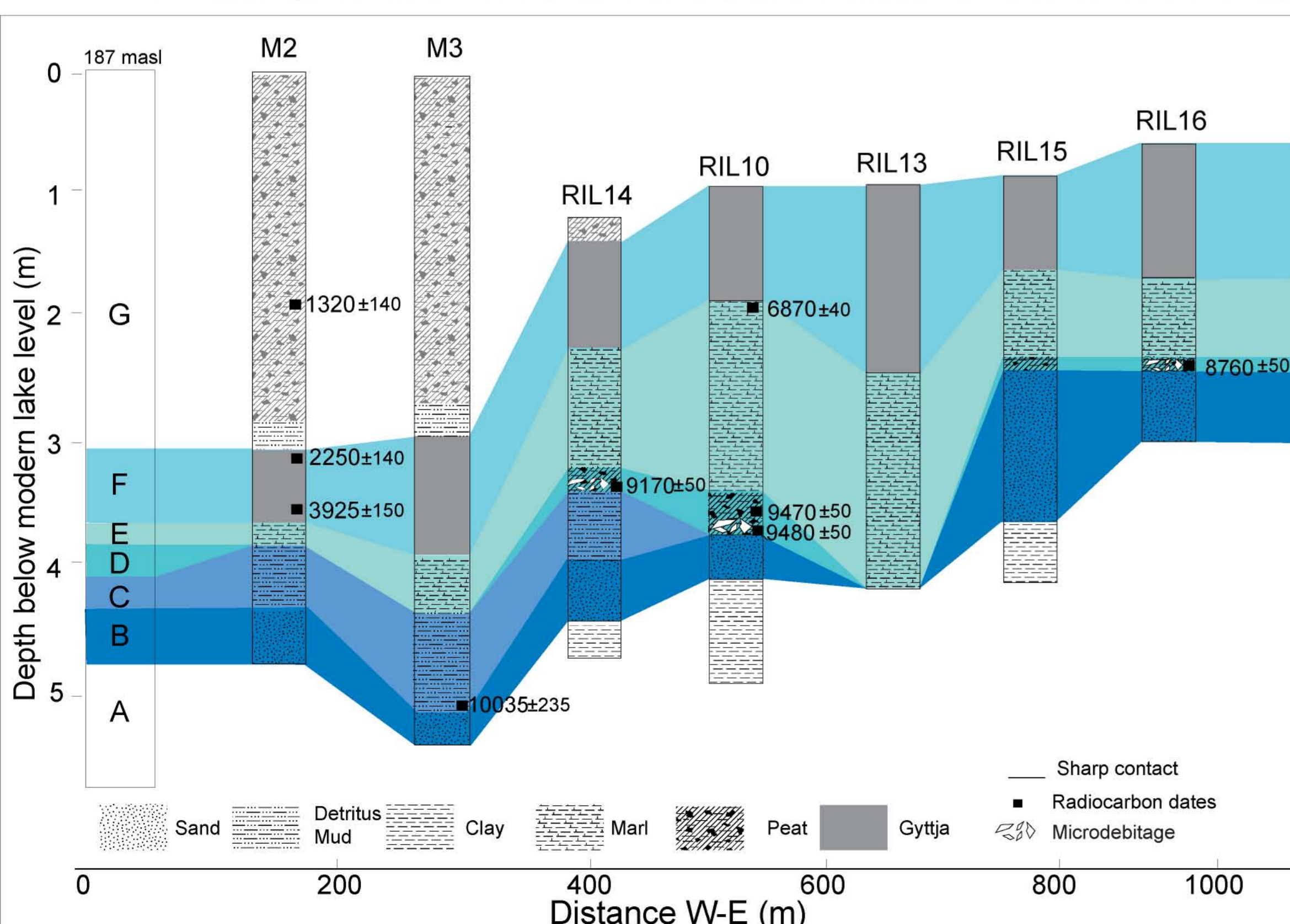
Core RIL-10 stratigraphic log with particle size abundance, composition from loss-on-ignition (LOI), magnetic susceptibility and microfossil (testate amoebae) abundances. Shifts in particle size abundance between 255-260 cm demonstrate bimodal distribution due to microdebitage fragments. Testate amoebae abundances diminish dramatically due to the establishment of soil/peat marsh conditions.

## Study Area

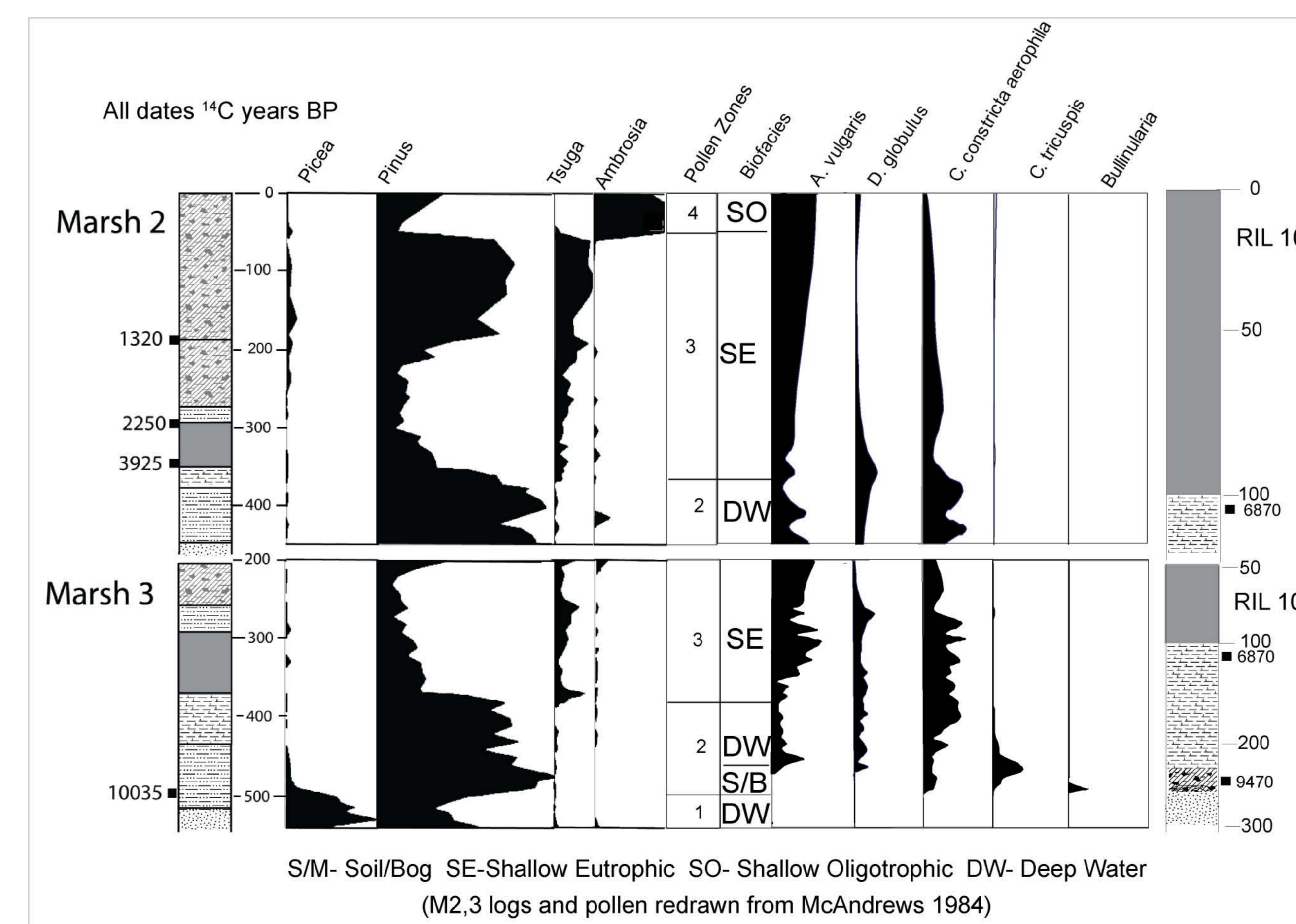


Rice Lake is located 150 km north of Toronto, Ontario. Distribution of terrestrial Paleoindian and Archaic sites and post-glacial lake shorelines (Iroquois and Algonquin) are shown. Note location of McIntyre Site.

## Paleoenvironmental Reconstruction



Reconstructed McIntyre basin stratigraphy and correlation with cores. Peat layer containing microdebitage is dated between 9480 and 8760 <sup>14</sup>C yr BP (ca. 11-9.5 k cal yr BP). M2, M3 <sup>14</sup>C dates are from McAndrews (1984).



Pollen and testate amoebae abundances for M2, M3 and RIL10. The Pollen Zone 2 *Pinus* peak corresponds with the Soil/Bog Biofacies and microdebitage layer in RIL 10. During Zone 2, there is a rapid shift from Soil/Bog species (*Bullinaria*) to Deep Water species (*Curcubittella tricuspidis*, *Arcella vulgaris*). Note that the *Bullinaria* is absent from all other biofacies. Biofacies were determined through cluster analysis.

## Implications

This study demonstrates that people were occupying the vicinity of the McIntyre site long before the late Archaic time period. This validates a previous find at the site (Jackson, 1998), and also indicates that despite changing water-levels and environments, Paleoindian and Archaic peoples returned to previously occupied areas. Quartz microdebitage found may be the result of on-the-spot quarrying to exploit wetland/marsh resources. This example shows that future searches for Paleoindian and early Archaic sites should focus on looking for microdebitage in near-shore submerged areas and areas of former wetlands near known archaeological sites.

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