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# Early Pre-contact use of organic materials within the North Superior Region: Indirect evidence through use-wear analysis

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ABSTRACT

The research presented here indirectly determines the presence of organic materials from the Electric Woodpecker II site, an Early Holocene archaeological site within Northwestern Ontario. A detailed use-wear analysis on unifacially flaked formal and expedient tools will provide insight into utilitarian activities. Methods employed include an experimental program completed prior to archaeological analysis, macroscopic analysis, and both low- and high-powered microscopic analysis. Analysis of individual flake scars and feature analyses were completed. The findings of this research indicate the task-specific use of high-quality, formal artifacts; the hafting of informal artifacts used for multiple purposes; and the general, multi-purpose use of handheld expedient artifacts. Wear patterns are indicative of dry hide, bone, meat, grassy and woody plant materials, and wood. Evidence of hafting was found on both formal and informal artifact types.



## 1. Introduction

The use of organic materials in the North American Early Holocene for subsistence and tool-manufacturing represents a major component of recorded hunter-gatherer subsistence models (Adovasio, 2014; Hemmings, 2004; Miller, 2014). Material evidence of perishable technologies related to these activities is scarce within the archaeological record in all but the most exceptionally preserved environments. The scarcity is compounded in boreal ecozones within North America due to the poor preservative properties of the soil (Hurcombe, 2008; Odell, 1980). This poor organic preservation has resulted in a heavy bias toward lithic artifacts in most Early Holocene assemblages, and a disproportionate amount of research directed into faunal over floral resource exploitation (Gero, 1993).

Lithic microwear analysis provides a means to infer the use of Early Holocene perishable technologies otherwise invisible within a lithic assemblage (Loebel, 2013; Miller, 2014; Soffer, 2004). Understanding the function of lithic tools is integral to building an understanding of the lifeways of past peoples (Macdonald, 2014). Microwear analysis provides this understanding through extensive analyses of both microchipping and microfeatures including polish and striations on working edges and non-working surfaces of utilized artifacts. Traces such as these have been shown to relate directly to both the motions of use and the materials that were processed (Keeley, 1980; Lawn and Marshall, 1979; Levi-Sala, 1996; Macdonald, 2014; Odell, 1979; Tringham et al., 1974; Vaughan, 1985). Contrary to the initial debate between low- and high-powered microscopic analyses, methodologies now frequently include both standards as a minimum. Modern methodological combinations include light microscopy with Fourier Transform Infrared Spectroscopy (FTIR) (Cesaro and Lemorini, 2012), confocal laser scanning microscopy (Evans and Donahue, 2008; Stevens et al., 2010), Scanning Electron Microscopy (SEM) (Borel et al., 2014; Bouchard, 2016), and biochemical residue analyses (Ollé and Vergès, 2008).

This research is a study of lithic microwear from a collection of artifacts from the Electric Woodpecker II site (WPII; DdJf-12), an Early Holocene site in the Upper Great Lakes region of North America. The study focuses on the analysis of unifacial implements with an emphasis on organic material use, including plant and wood processing. The project was completed using light microscopy with both high- (100× to 500×) and low-powered (20× to 65×) magnification.

## 2. Materials and methods

### 2.1. Electric Woodpecker II

Artifacts analyzed in this study were excavated from the WPII site in the Thunder Bay Region of Northwestern Ontario, Canada (Fig. 1). As of the date of submission a finalized site report was not yet available; additional information on the site is thus not available at this time. Because of this, the study described herein represents the first completed study

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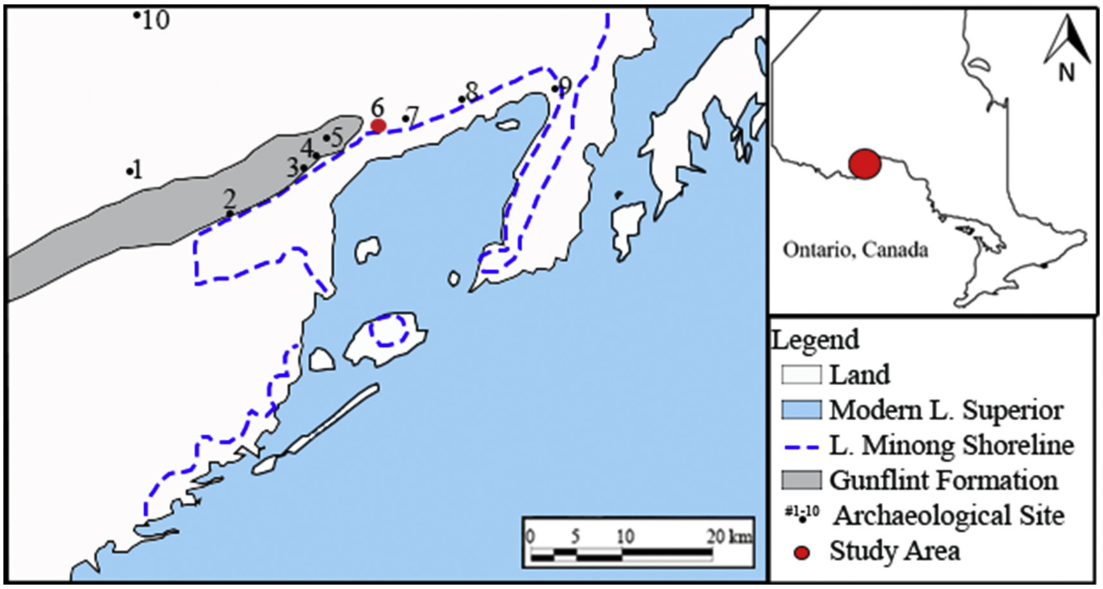


**Fig. 1.** Paleoindian sites within the Thunder Bay District of Northwestern Ontario: Crane (1), Cummins (2), Biloski (3), Simmonds (4), Cascades II (5), Electric Woodpecker I, II, III (6, marked in red), RLF (7), Mackenzie River I, II (8), Brohm (9), and Dog Lake (10). (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.) (Modified from Fox, 1975 and Julig and Mahaney, 1990).

of the site. The WPII site is one of five archaeological sites located approximately 30 km east of Thunder Bay excavated by the consulting archaeological firm, Western Heritage, between 2010 and 2012 (Bennett, 2015; Gilliland, 2012; Gilliland and Gibson, 2012; Langford, 2015; McCulloch, 2015; Norris, 2012). Though these sites currently lie inland from the northern shoreline of Lake Superior, paleogeographic reconstruction places the relict shoreline of Glacial Lake Minong at geographically contemporaneous level with this string of sites, implying that each site was used as beachfront terrain (Burwasser, 1977; Julig and Mahaney, 1990; Shultis, 2012; Philips, 1982). Accelerator Mass Spectrometry (AMS) Radiocarbon dates place occupation at 9760–9540 cal yr BP (Gilliland and Gibson, 2012). The extensive use of Gunflint formation as a source for lithic raw material, parallel oblique flaking patterns, and the association of the site with middle to late stages of Lake Minong place the WPII site in both the Paleoindian Lakehead Complex and the Interlakes Composite (Bennett, 2015; Bouchard, 2016; Fox, 1975; 1980; Hinshelwood, 2004; Langford, 2015; Markham, 2013; McCulloch, 2015; Ross, 1997; Shultis, 2013).

The tool assemblage is similar to that of other local Early Holocene sites in the Thunder Bay region, with a higher occurrence unifacially and bifacially flaked tools and detritus compared to formal tool types (Julig, 1994). The inter- and intra-morphological variability amongst

**Fig. 2.** Morphological variation amongst the unifacial tool sample.