# When a Tree Falls…
# A New Approach to Interpreting Archaeological Sites in Northern Alberta

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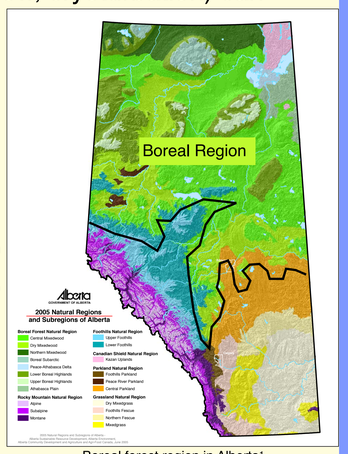
## Introduction

Many archaeological sites in northern Alberta's boreal forests are difficult to interpret compared to non-boreal sites because:

- artifact assemblages are dominated by lithics that have limited interpretive value
- poor organic preservation prevents radiocarbon dating
- slow sediment accumulation rates can contribute to poor preservation of occupation layers and/or to mixing of artifacts from different time periods in the same layer
- disturbance processes (tree throw, cryoturbation) can redistribute artifacts
- incomplete understandings of site formation processes can result in erroneous or incomplete interpretations of archaeological sites

These conditions are obstacles to effectively interpreting, managing, and protecting the archaeology of past cultures that inhabited the northern Alberta region, an area that is undergoing intensive developmental pressure.



Boreal forest region in Alberta[1].

## Goal

To increase understandings of boreal forest archaeology sites by improving the nature and quality of the data collected during routine historic resources impact assessments (HRIAs).

## Methods

Economical, efficient, and easy

Sediment-based approach:

- Field descriptions of texture, colour
- Portable optically-stimulated luminescence
  ***(POSL); Uses an optical signal to measure time since sediment was last exposed to sunlight*

Study sites from HRIAs conducted in northern Alberta during 2013 and 2014 field seasons


Field sampling for POSL- almost as easy as shovel testing!

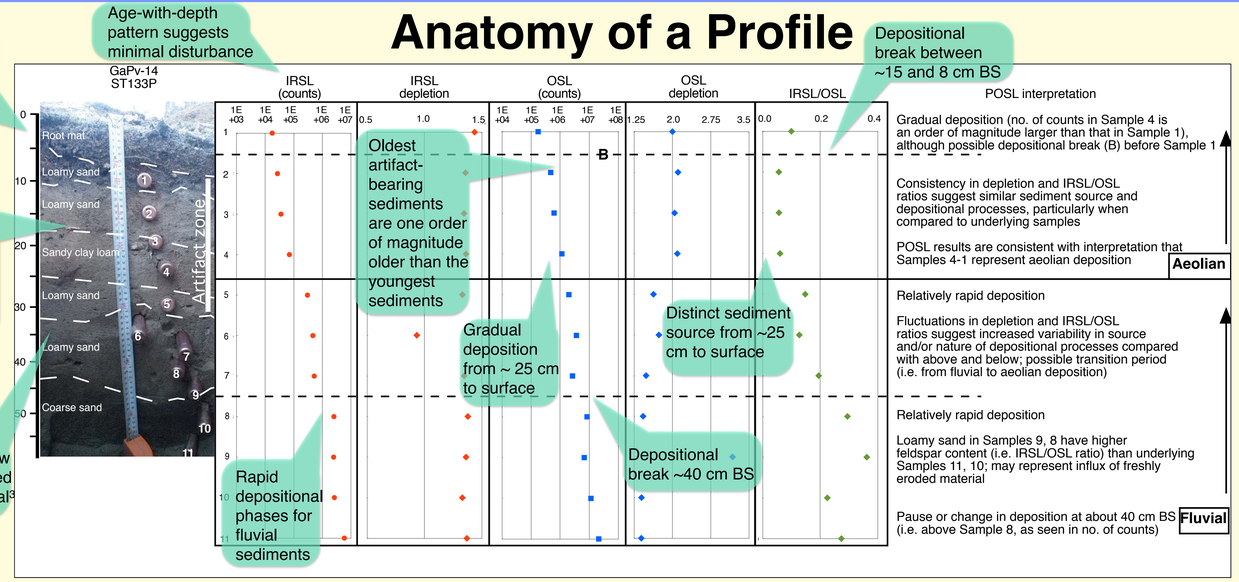
## Anatomy of a Profile

Field texture and colour are especially important to note for more accurate interpretations

Age-with-depth pattern suggests minimal disturbance

Over 200 lithic flakes recovered from between 5-30 cm BS but no visible stratigraphic breaks- Disturbance? Intact?

Coarser sands below 30 cm are interpreted as fluvial/glaciofluvial[3]




Oldest artifact-bearing sediments are one order of magnitude older than the youngest sediments

Depositional break between ~15 and 8 cm BS

Gradual deposition from ~ 25 cm to surface

Distinct sediment source from ~25 cm to surface

Depositional break ~40 cm BS

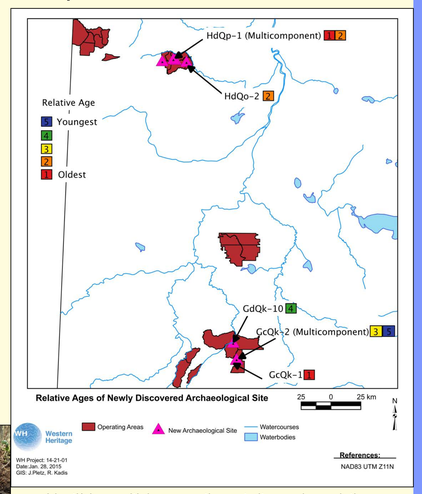
Rapid depositional phases for fluvial sediments

**Conclusions**

- Disturbance does not appear to be responsible for artifact distributions
- Distinct break at ~25 cm BS likely corresponds to onset of Holocene aeolian deposition
- At least 2 occupation periods likely
- Oldest occupation may be considerably older than younger one
- May be able to date the site using OSL

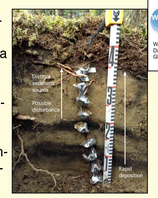
## Increasing Understandings

- Identifying possible multiple occupations
- Documenting extent of disturbances
- Suggesting that some sites are of considerable antiquity
- Correlating relative chronologies locally and regionally
- Contributing to regional palaeoenvironmental reconstructions



Identifying multiple occupations at sites and correlating relative chronologies across a region

POSL of this Swan Hills profile indicated that both buried soils and the overlying sands likely date to a similar time period, and that the sands overlying the buried soils share a similar source that the underlying soils do not. This work has the potential to influence current and future palaeoenvironmental and archaeological reconstructions in the region.



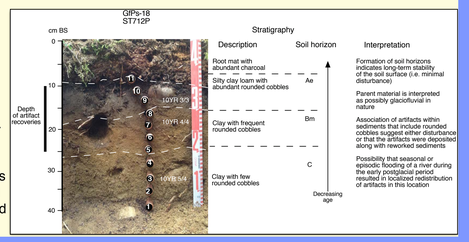

## New Perspectives

- Some sites appear to be of considerable antiquity
- OSL dating could produce archaeologically meaningful ages
- The extent of site disturbance is difficult to detect visually
- Possibility of distinguishing multiple occupation periods at a site or group of sites
- Archaeological stratigraphies can contribute enormously to past understandings of cultural and environmental dynamics of the region

## Unsolved Mysteries

- Can we work toward establishing regional chronologies using OSL calibration curves[4]?
- What do OSL signals of boreal forest sediments represent?
- How do site formation and disturbance processes in the boreal forest actually work?
- How to improve correlations of artifacts with sediments?

Artifact distributions are within sediments that appear to be fluvial or glaciofluvial in nature. Visual observation, soil characteristics, and POSL suggest this profile is intact. Future work should focus on investigations of site formation processes and correlating artifact recoveries with their associated sediments.

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**Acknowledgements**

Charles Schweger, Department of Anthropology Palaeoecology Laboratory, University of Alberta
Tim Kinnaird, David Sanderson, and Simon Murphy, Scottish Universities Environmental Research Centre
Robin Woywitka, Alberta Culture and Tourism
Canadian Forest Products and Millar Western Whitecourt