

Holocene Fire History Reconstruction for the *Parc National de la Gaspésie*: Considerations for Old-growth Stands and Caribou in the Face of Climate Change

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Research context

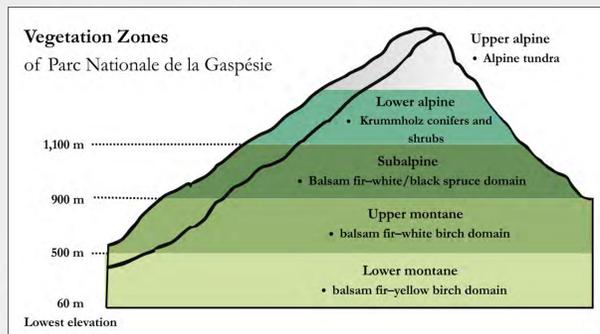
This project will produce a high-resolution fire history reconstruction for the Parc national de la Gaspésie (PNG) covering the full Holocene. Currently, no fire history reconstruction exists for PNG. This represents a major gap in understanding how the park's old-growth forests responded to past changes in fire frequency and severity, which are key factors for sustainable forest management and conservation of the last southern caribou.

Research objectives

- 1) Identify the fire return intervals over the Holocene
- 2) Determine whether changes in fire regimes correspond to changes in forest composition
- 3) Explore aspects of future forest management and caribou conservation

Study area

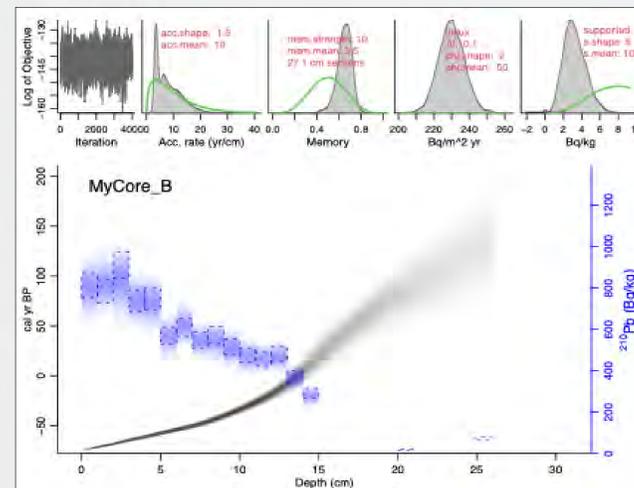
The Parc national de la Gaspésie, located in eastern Québec, is characterized by high topographical and ecological variation. The study site, **Lac du Volume**, is located west of Mont Albert within the Chic-Choc Mountains. The lake lies at ~620 m elevation within the upper montane vegetation zone of the balsam fir–white birch bioclimatic domain.



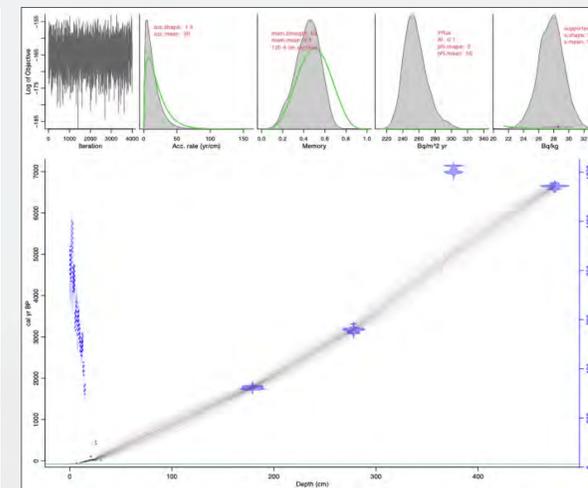
Vegetation zones of Parc national de la Gaspésie along an elevational gradient.

Methodology

Using pollen, macro-charcoal, radiocarbon and ²¹⁰Pb dating, I will reconstruct past ecological and environmental changes from deglaciation to the present day. Macro-charcoal will be analyzed at high resolution (~10 years) and paired with a lower resolution pollen analysis. Variations in charcoal abundance and pollen composition will be used to infer long-term relationships between fire regimes and ecosystem dynamics.



Bacon age–depth model with ²¹⁰Pb dates for the surface drive of the core



Bacon age–depth model with ¹⁴C ages derived from the first five of eight drives forming the core

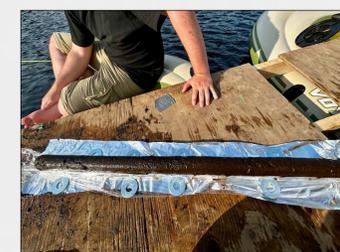
Field sampling



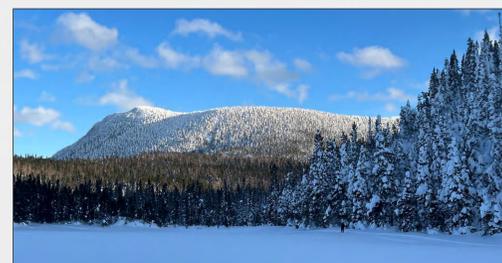
Lac du Volume in summer



Coring off platform



Sediment core – brown gyttja



Lac du volume in winter

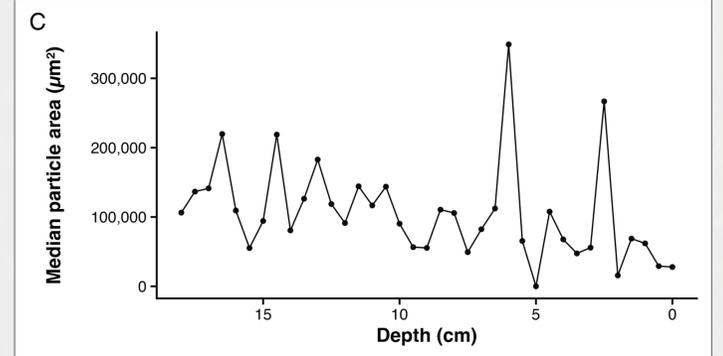
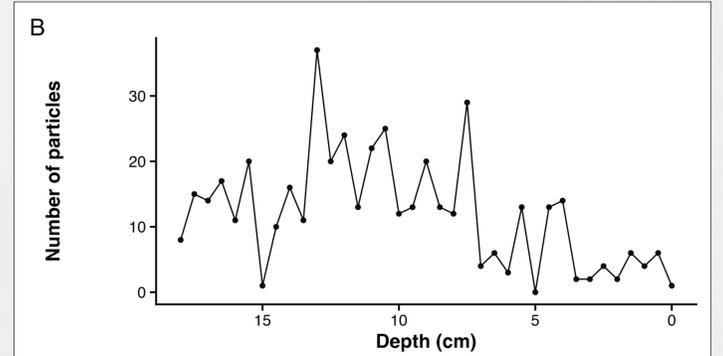
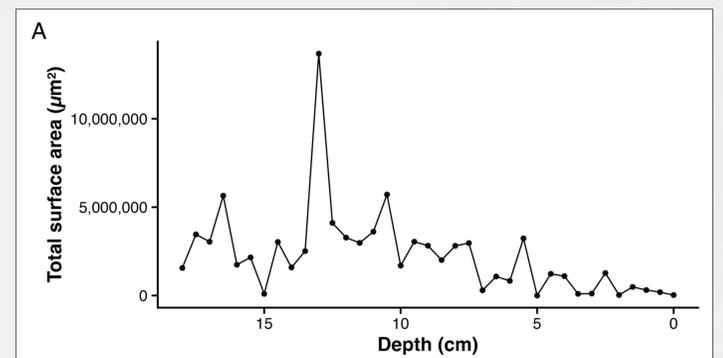


Coring on ice

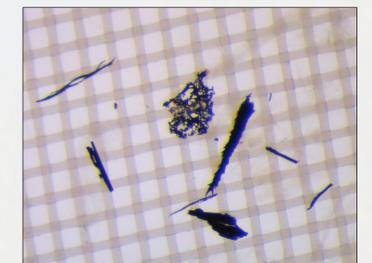
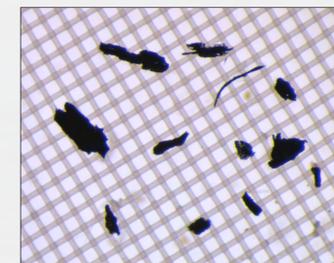


Sediment core - clay

Preliminary Results



Charcoal particle metrics versus sediment depth (cm) for the upper 6 m of the Lac du Volume surface core: (A) total particle surface area (μm^2), (B) number of particles, and (C) median particle area (μm^2)



Charcoal particles under a microscope