Decoupling sources of natural and anthropogenic impact using lake sediment archives: an example form Cecil Lake, Fort St. John, British Columbia, Canada

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Lake sediment archives are an established tool for examining environmental change over time. Cecil Lake is a productive shallow lake located in the Peace Region of Northeastern British Columbia and supports a variety of waterbirds, including a significant breeding population of eared grebes (*Podiceps nigricollis*). The Cecil Lake watershed was originally open grass prairie and muskeg and Bison herds fed on the new growth that was maintained through controlled burns by the Dane-Za. The region was first homesteaded in 1928, making this one of the last areas in North America to be populated by traditional European pioneers. These lands are now almost entirely agricultural and used primarily for the farming of canola and hay, conventional oil wells are also scattered across the countryside. Nearby Fort St. John is highly industrialized and supports a variety of petroleum-handling facilities. The environmental impact of these recent changes is unknown but recent study in other northern industrial centers (e.g., Fort MacMurray) suggests substantial regional and atmospheric contributions are possible. The bulk geochemistry of the lake sediment archive at Cecil Lake is being investigated to decouple the natural and anthropogenic impacts on the environment. Three sediment cores were collected in July 2018 using a Glew gravity corer. Stratigraphic variations in bulk geochemistry (metals, $\delta^{15}N$, $\delta^{15}C$, Total C, N, poly aromatic hydrocarbons) will be determined. X-ray fluorescence will be used to determine metal concentrations. These data will provide insight into change through time and the total Pb curve will provide temporal control. The results of the analysis will provide further insight into the significance of the impacts of long-range atmospheric transportation of contaminants and regional/local environmental changes. These data will be used to determine the risk to both humans and ecologically significant species such as the eared grebe.

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