



Project acronym: REINS

Project title: Reconstructing past Environmental Impact on Northern Rangifer populations

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Discipline: Earth Sciences & Environment: Global change & Climate observation

Station(s): Kevo Subarctic Research Station (Finland)

Herd herbivores, such as wild reindeer/caribou (*Rangifer tarandus*), are essential components of Arctic ecosystems. They play important roles in sustaining local food webs, maintaining terrestrial ecosystems and acting as food sources for Indigenous peoples. The future of herding in the Arctic under projected climate change is however cause for concern. Instrumental records and Rangifer population data reveal a link between increasing temperatures and precipitation with declining Rangifer populations.

To gain longer-term insight into the sustainability of Indigenous practices under climatic changes, we aim to extend palaeoenvironmental reconstructions of Rangifer populations and climate change in Cambridge Bay, Canada and Kevo, Finland. These regions have contrasting Indigenous practices and environmental conditions as well as a wealth of available historical herding and climate data useful for calibration purposes.

Our reconstructions will be obtained from lake sediments, which incorporate and preserve indicators of environmental change. We will core lakes proximal to the CHARS and Kevo field stations and use an innovative combination of geochemical (lipid biomarkers, stable isotopes, XRF) and palaeoecological (Chironomidae) proxies to reconstruct temperature, precipitation and herbivore populations over the past 2000 years. This time period contains two prominent periods of widespread climate change: the Medieval Warm Period (MWP) and the Little Ice Age (LIA). Our palaeoenvironmental reconstructions will (1) address key questions about MWP and LIA spatial and temporal patterns, (2) advance methodological insight into emerging lipid biomarker proxies and (3) enhance understandings of the resilience of Rangifer populations to climate change, thus informing conservation priorities and future resource management strategies.