

Contemporary and Fossil Distribution of Beavers in Permafrost Areas: A Literature Review

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1. INTRODUCTION

Several animal species on Earth modify the environment to suit their ecological needs, with beavers (*Castor* spp.) being among the most transformative. Research indicates that beavers (family *Castoridae*) began to appear in the late Eocene (Korth 2001) and have evolved into various species and genera across the globe until the present day (Calede 2022). They inhabit the Northern Hemisphere, which is why world literature has located beaver sites in areas currently covered by permafrost. These places indicate the presence of beavers in the past (e.g. bones, pieces of wood gnawed by beavers, sediments) and today.

The aim of this study is to identify locations in the Northern Hemisphere, in the permafrost zone, where beaver remains have been found or where beavers still dwell.

2. MATERIALS AND METHODS

The Scopus journal database was used to identify locations where beavers were described. The search involved using the terms “beaver” and “Siberia” or “beaver” and “Arctic Regions”. This resulted in 20 entries for „Siberia” and 16 for the “Arctic Regions”. Selected entries that referred to beavers were plotted on a permafrost map. The entries that were excluded contained only toponyms incorporating the word “beaver” or related terms, without providing any evidence of actual beaver presence.

3. RESULTS

Sixteen articles from Arctic regions were selected, each presenting contemporary research on the impact of beavers on the environment (3 articles) or fossil evidence of their presence on Ellsemere Island (3 articles). The remaining articles focused on studies of pollution, the diet of various mammals, or studies conducted in geographical units that include the word “beaver” in their name.

Twenty studies related to Siberia were identified, but not all of them concerned sites associated with the current extent of permafrost. Of the articles on beavers, three were contemporary

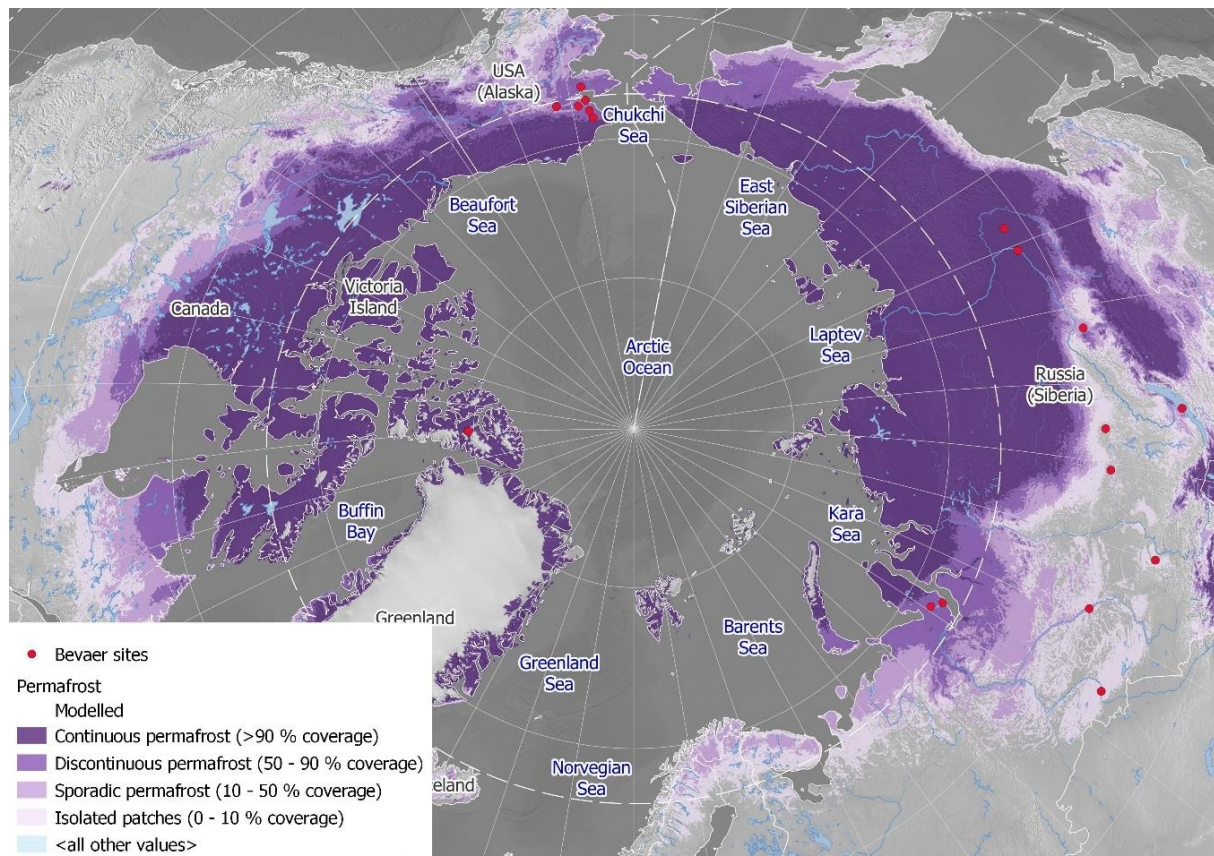


Fig. 1. Beaver sites in different permafrost zones.

research, and six described beaver skeletal remains from the Pliocene, Pleistocene, and Holocene epochs. Other studies focused on topics such as beaver hunting weapons, skin and textile analysis, beaver populations in Russia, or the sites described were located outside the permafrost range.

Contemporary studies of beaver impacts in North America focus on Alaska, while studies of past beaver impacts have been conducted only on Ellsemere Island. In Siberia, fossil evidence of beaver presence is concentrated on the Yamal Peninsula and the Lena River (Fig. 1). Research was conducted in the Novosibirsk area on the impact of beavers that have inhabited riverside areas.

The location of beaver sites indicates that beavers have inhabited or continue to inhabit various types of permafrost. These sites are located on all types of permafrost, which is an excellent factor preserving evidence of their presence, as is the case in Canada.

4. CONCLUSIONS

The presented data indicate that beavers have been changing the environment since the Pliocene (Canada). Both past and present beaver sites indicate that they chose water-related habitats (river valleys, wetlands). Contemporary observations indicate that their role in shaping permafrost areas is related to changes in water conditions, geological structure, and vegetation. Evidence of their presence is recorded in the landforms and sediments in permafrost areas. In the era of current climate change (and related permafrost loss), they may accelerate fluvial processes in river valleys in these areas.

References

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