Throughout northern Fennoscandia, reindeer husbandry is a central part in the cultural heritage of the indigenous Sámi people. Subjected to colonization of Sápmi from the 18th century and onwards, sámi culture and living has undergone significant changes and adaptations: land and crucial resources were lost to exploitation, such as constructions of hydroelectric power plants and timber extraction. Migration routes, calving grounds and winter grazing resources are particularly essential key elements in the herding year and thus vulnerable to disruption.

The importance of productive winter pastures is highlighted by researchers as well as by indigenous reindeer herders as a “bottleneck” determining the size of reindeer herds. Since the 1950’s, when clear cutting of forests replaced selective logging, industrialized forestry has reduced the abundance of both terrestrial and arboreal lichens, the most important forage during wintertime. Arboreal lichens (e.g. Bryoria fuscescens, Alectoria sarmentosa) are of highest importance in late winter, when snow conditions are unfavorable for reindeer to dig through the snow cover for ground-growing lichens. Forestry has heavily decreased the amount of old-growth forests, being a main prerequisite for a high biomass of arboreal lichens.

To understand how forest management has changed and will change potential arboreal lichen abundance over time, we model lichen abundance with historical forest data, present-day field work, and simulation of different future forest management scenarios. Binary regression analysis was used to model species abundance in the fragmented forest landscape. Forests older than 63 years were found to provide sufficient time and habitat to begin accumulating any significant amount of lichens. While such forest stands covered about 80% of the study area in 1925, modern forestry has progressively reduced the area to ⅓ of the study area at present. This implicates a significant restriction in the adaptive space for reindeer herders to adjust to future changes, e.g. if deteriorating snow conditions due to climate change would require a stronger reliance of reindeer on arboreal lichen as forage. To enable a sustainable reindeer husbandry, future forestry should therefore focus on longer rotation times than currently applied to reduce negative effects on arboreal lichens.