

Historical forest management approaches and their influence on forest resistance to current natural hazards – a case study in Croatian beech–fir stands

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Abstract

Mixed beech–fir forests in Gorski kotar region, Croatia, were owned by several landowners during the 18th century. The interests and the organizational level of each owner appointed their approach to forest management. It is assumed that consequences of applied past management models are being manifested in the present stand structure, and also reflected in forest stability and resistance to natural hazards.

The research covered 109.000 ha that was governed by several ownership types during the last two centuries (state forests, landlords, estate and land communities). Historical archive sources were used to investigate former forest management and detect previous estate boundaries. Stratification of actual National forest inventory plot data enabled determination of present forest structure by (former and present) landowner types. In the year 2014 the whole area was affected by high intensity ice break. A sub-sample of NFI plots was remeasured after the ice break event to quantify the incurred tree damage and assess its spatial dynamics. The influence of past and present ownership type on present stand structure was analysed and its possible effect on stand resistance to ice break was assessed.

Results indicate differences in present forest stand structure according to the historical ownership types and also indirectly due to a different effect of ice break. Areas that were managed according to uneven-aged mixed forests approach are found to be more resistant to ice damage. In contrast, areas managed by owners who favoured pure conifer stands with significant share of pioneer tree species were more affected by ice break.

Keywords: beech – fir forests, history of forest management, ice break, damage, forest ownership, Gorski kotar