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Assessing European wild fire vulnerability

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Abstract

Wild fire vulnerability is a measure of potential socio-economic damage caused by a fire in a specific area. As such it is an important component of long-term fire risk management, helping policy-makers take informed decisions about adequate expenditures for fire prevention and suppression, and to target those regions at highest risk. This paper presents a first approach to assess wild fire vulnerability at the European level.

A conservative approach was chosen that assesses the cost of restoring the previous land cover after a potential fire. Based on the CORINE Land Cover, a restoration cost was established for each land cover class at country level, and an average restoration time was assigned according to the recovery capacity of the land cover. The damage caused by fire was then assessed by discounting the cost of restoring the previous land cover over the restoration period. Three different vulnerability scenarios were considered assuming low, medium and high fire severity causing different levels of damage.

Over Europe, the potential damage of wild land fires ranges from 10 – 13, 732 Euro*ha^{-1}*yr^{-1} for low fire severity, 32 – 45,772 Euro*ha^{-1}*yr^{-1} for medium fire severity and 54 – 77,812 Euro*ha^{-1}*yr^{-1} for high fire severity. The least vulnerable are natural grasslands, moors and heathland and sclerophyllous vegetation, while the highest cost occurs for restoring broad-leaved forest. Preliminary validation comparing these estimates with official damage assessments for past fires shows reasonable results.

The restoration cost approach allows for a straightforward, data extensive assessment of fire vulnerability at European level. A disadvantage is the inherent simplification of the evaluation procedure with the underestimation of non-markets goods and services. Thus, a second approach has been developed, valuing individual wild land goods and services and assessing their annual flow which is lost for a certain period of time in case of a fire event. However, due to limitations in data availability, this approach of environmental accounting is not fully implemented yet.

Keywords: fire vulnerability, damage assessment, land cover restoration, long-term fire risk, European scale