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Abstract

Wildfire Hazard and Landscape Connectivity Assessment in the Serra da Cabreira Mountain, Portugal †

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Abstract: The impacts of wildfires have been increasing in the Mediterranean Basin, and Portugal recently experienced some of the most extreme fire seasons on record. It is urgent to shift wildfire management goals by re-balancing wildfire suppression and mitigation efforts, to reduce fire intensity and increase the effectiveness of suppression operations. Our study aims at assessing wildfire hazard in Serra da Cabreira (NW Portugal) by combining landscape-scale wildfire modelling and landscape wildfire connectivity analysis. The impact of two levels of landscape treatment in wildfire hazard decrease was also assessed. We used the 95th percentile historical weather conditions (2001–2019) to simulate fireline intensity (FLI), burn probability (BP) and fire size (FS), using the Minimum Travel Time (MTT) algorithm implemented in FlamMap (Vers.6). We calculated wildfire connectivity using the simulated FLI to: (1) guide the choice of the area of the landscape to be treated; and (2) identify the relative importance of single fuel patches to overall landscape connectivity. Results showed that significant decreases in BP (36%), FS (39%), FLI (61%) and wildfire connectivity (48%) were obtained when 20% of the landscape was treated. For the same treatment level, the median FLI decreases to values below 2000 kW/m, with likely areas to burn at high intensity decreasing by 4.4%. We also estimated ca. 15% decrease in the area with fires larger than 1000 ha. We discuss the results and highlight the relevance of integrating wildfire connectivity into wildfire hazard assessment, to support landscape fuel management plans aiming at decreasing fire intensity and thus the mitigation of its impacts.

Keywords: landscape connectivity; wildfire hazard; fire spread simulations; landscape treatments

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