Abstract

Assessing the Benefits of a National Fuel Break Network to Reduce Wildfire Exposure in Portugal †

Bruno A. Aparício [1,*], Fermín Alcasena [2], Alan Ager [3], Woodam Chung [4], José M. C. Pereira [1] and Ana C. L. Sá [1]

1   Forest Research Centre, School of Agriculture, University of Lisbon, 1649-004 Lisboa, Portugal
2   Department of Agricultural and Forest Engineering, Universitat de Lleida, 25003 Lleida, Spain
3   USDA Forest Service, Rocky Mountain Research Station, Missoula Fire Sciences Laboratory, 5775 US Highway 10W, Missoula, MT 59808, USA
4   Department of Forest Engineering, Resources and Management, Oregon State University, Peavy Hall, Corvallis, OR 97331, USA
*   Correspondence: bruno.a.aparicio@gmail.com
†   Presented at the Third International Conference on Fire Behavior and Risk, Sardinia, Italy, 3–6 May 2022.

Abstract: The impact of rural fires in the Mediterranean Basin are rapidly increasing as extreme fire seasons become the new norm. Following the catastrophic 2017 fire season in Portugal, a national-scale fuel break network (FBN) was designed by the Rural Fire Management Agency (AGIF), and implementation of fuel treatments were initiated alongside it. The FBN used strategically placed fuel breaks on ridgetops and other locations where suppression efficiency was maximized. To date, a large majority of the FBN has not been built, and doubts still remain about regional priority. In this study, we used Monte Carlo methods and mechanistic wildfire spread modelling to simulate 10,000 plausible fire seasons in Portugal. The modelling system was calibrated to local fuels and weather at monthly time steps. We then assessed how the proposed fuel break network: (a) intersects simulated fires; (b) protects residential buildings and designated protected areas; and (c) is effective for suppressing large fires. From these outputs we were able to compare priorities as determined from the simulation system to the FBN implementation plan by AGIF. Our results show that the FBN has the potential to provide fire suppression anchor points for 30% of the simulated large fires, to reduce exposure to communities and families, and to reduce the total area burned in the protected areas both by up to 15%. However, the results also reveal that in many cases, the FBN intersects large fires after they have grown to over 500 ha, suggesting that in particular areas the fuel break network should be densified with additional fuel treatments. We contrast the priorities as assessed from the current AGIF implementation versus those derived from the wildfire simulation system.

Keywords: wildfire impact; wildland urban interface; extreme wildfires

Informed Consent Statement: Not applicable.

Conflicts of Interest: The authors declare no conflict of interest.