environmental sciences proceedings

Abstract

Modelling the Effects of Fuel Management Strategies on Fire Risk in a Mediterranean Coastal Area: The Case Study of Porto Conte Regional Natural Park (Italy) †

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† Presented at the Third International Conference on Fire Behavior and Risk, Sardinia, Italy, 3–6 May 2022.

Keywords: fire prevention; fire simulation; silvicultural practices; risk reduction

Fires represent a threat to several Mediterranean ecosystems. The combination of unmanaged vegetation, land abandonment, and the increase in the amount and continuity of flammable fuels contribute to increasing fire proneness.

This work was conducted under the framework of the Med-Foreste project, aiming to address and improve the ability of public institutions to manage fire risk and handle future choices about prevention in fire-prone areas affected by strong touristic pressure.

The aim of this work is to analyse the effects of fuel management strategies through the application of fire simulation modelling. The study area is located in northwest Sardinia (Italy). It includes the Regional Natural Park of Porto Conte, a region of high environmental and natural value that is affected by strong touristic pressure during the summer season. The area is mainly covered by Mediterranean shrubland vegetation and conifer forests. During the last few decades, a lack of fuel management of the conifer forest led to the growth of the understory vegetation and dead fuel.

To achieve the study objective, we identified several management strategies, including the reduction of surface fuel loading and of horizontal and vertical continuity through silvicultural practices (pruning and thinning). Fuel characteristics were described through field observations and with the help of local experts in terms of the forest understory, the canopy, and potential fire behaviour. We then investigated the treatment's benefits with respect to the fire risk, applying simulations based on the Minimum Travel Time algorithm of FlamMap. Finally, we created burn probability and flame length maps pre- and post-treatment that were compared and discussed in order to show the advantages of managing forests.

The obtained results could be useful for the fuel management strategies of protected natural regions and in addressing future choices about fire prevention in fire-prone areas.

Author Contributions: Conceptualization, G.P. and C.S.; methodology, C.S., G.P., M.S. and M.d.; software, M.S., L.D.G. and C.S.; validation, C.S., M.S. and L.D.G.; formal analysis, C.S., G.P., M.S., V.B.; investigation, M.d.; resources, M.d., C.S., B.A., A.V.; data curation, M.S., C.S. and G.P.; writing—original draft preparation, C.S.; writing—review and editing, C.S., G.P., P.D. and V.B.; visualization, M.C., L.D.G., M.S., A.V. and P.D.; supervision, C.S., G.P. and B.A.; project administration, G.P.; funding acquisition, G.P. All authors have read and agreed to the published version of the manuscript.

Funding: This work was funded by "Med-Foreste" (grant no. B85I1900010007), "MED-Star" (grant no. E88H19000120007), and "Med-Coopfire" (grant no. B81I1900010007) projects, supported by the European Union under the cross-border Programma Italia-Francia Marittimo 2014–2020, and the

Citation: Scarpa, C.; d'Angelo, M.; Salis, M.; Del Giudice, L.; Ventura, A.; Arca, B.; Bacciu, V.; Casula, M.; Duce, P.; Pellizzaro, G. Modelling the Effects of Fuel Management Strategies on Fire Risk in a Mediterranean Coastal Area: The Case Study of Porto Conte Regional Natural Park (Italy). *Environ. Sci. Proc.* **2022**, *17*, 58. https://doi.org/10.3390/environsciproc2022017058

Academic Editors: Donatella Spano and Costantino Sirca

Published: 10 August 2022

"FOE2019 - Climate Change: risk mitigation for sustainable development" (Ministerial Decree no. 856/19) project, funded by the Italian Ministry of Education, University and Research (MIUR).

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

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