A comparison of landscape planning approaches and practices for strategic fuel management in southern Europe, Australia, New Zealand and the USA

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Abstract

Landscape planning to reduce fire risk, hazard, and impacts, includes different components such as fire detection and prevention, the location of fire suppression resources and infrastructure (e.g. roads, water supply, equipment depots), and the implementation of a mosaic of strategically located fuel managed areas. Here we focus on the last of these and carry out a review of the various approaches used, technical recommendations, and effectiveness of fuel management practices in different regions of the world (SE Europe, Australia, New Zealand and the USA). The overall objective is to contrast approaches of different countries, and provide evidence (or lack of it) for the application of scientific principles in developing technical specifications, as well as in evaluating their effectiveness. For this purpose we defined fuel managed areas as parcels of land, linear or patch-shaped, where the total or partial removal of fuels is applied and maintained through physical treatments, land management practices, or use of physical barriers. We have reviewed the technical specifications included in legislation and management guidelines provided by official institutions involved in fire, forest and land management in different countries, separating it into two categories: i) overall landscape approaches (linear fuel breaks and area-wide treatments); and ii) specific regulations for the Wildland-Urban interface. We first reviewed the approaches used and the fuel management objectives for each country, including: (a) the use of legislation or technical recommendations, and whether different rules apply to different stakeholders; (b) the spatial scales at which these rules are implemented (national, regional, local levels); (c) the responsible authority for implementation and maintenance (land owners, forest administration, municipalities, regional governments); and (d) the ultimate objectives of management (reduce fire intensity, facilitate suppression of starting fires, stop wildfires from spreading, protect biodiversity, aesthetics, game management and grazing). Secondly, the existing technical recommendations were surveyed. For linear features and block treatments, specifications included: (a) objectives; (b) recommended size, width and shape (as buffers, isolated strips, to form a network); (c) criteria for planning their strategic location; and (d) type of fuel management (prescribed fire, agricultural activities, grazing, mechanical/manual treatments, biomass for energy, chemical treatments, hunting management, shift towards less flammable species). For the wildland-urban interface, we searched for technical specifications (mostly width and types of fuel treatments) for roads, isolated buildings, villages, power lines, industrial areas and camping/recreational sites. Thirdly, we searched for the existence of scientific evidence to support or provide the basis for existing technical recommendations and, in particular, evidence of fuel management effectiveness (including how effectiveness was defined). We conclude by addressing how the technical recommendations and their associated scientific basis, and the operational approaches used in their implementation varied between the various countries under analysis. We also compare the level of implementation of these recommendations, and review the scientific evidence that confirms or contradicts the effectiveness of these landscape-scale fuel managed areas.

Keywords: fuel management, landscape scale, effectiveness, fuelbreaks, wildland-urban interface