Addressing wildfire risk in eucalypt forest management scheduling

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Abstract: Research aiming at the development of management scheduling models that may take into account wildfire risk for even-aged Eucalyptus globulus Labill forest ecosystems in Portugal. A stochastic dynamic programming (SDP) approach is proposed to determine the stand management policy (e.g. fuel treatment, sprout selection, coppice cycles and rotation length) that produces the maximum expected discounted net revenue under wildfire risk. SDP stages are defined by the number of harvests. The different nodes of the DP network reflect the possible states for each stage, while the arcs take into consideration the range of decisions that have to be taken for each state. Wildfire occurrence and damage probabilities are introduced in the model to analyze the impact of wildfire risk on the optimal policy for the stand management schedule. A mixed integer programming (MIP) approach is also proposed to address wildfire risk in eucalypt forest management planning. This approach introduces wildfire resistance indexes that take into account both stand characteristics and its spatial context. Portuguese eucalypt forest areas are used as test cases.

Keywords: Risk, wildfire, eucalypt, forest management, dynamic programming, mixed integer programming

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