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EFFECT OF FUEL TREATMENTS ON CROWN FIRE BEHAVIOR IN ALEPPO PINE FORESTS OF GREECE: A SIMULATION STUDY

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Abstract

This study models the potential effect of various fuel treatments on crown fire behavior by using two crown fire simulation models in Aleppo pine (*Pinus halepensis* Mill.) stands. Fuel complex characteristics that influence fire behavior were measured in a representative Aleppo pine stand in northern Greece, using standard surface and canopy fuel inventory methods. Nine different fuel treatments (control, prescribed burning, controlled grazing, thinning without slash removal, thinning with slash removal, thinning and prescribed burning with slash removal, thinning and controlled grazing with slash removal, thinning and prescribed burning without slash removal, thinning and controlled grazing without slash removal) were simulated by adjusting surface fuels (total load, load-by-size class, depth) and canopy fuels (available canopy fuel load, canopy base height, canopy bulk density) under dry and normal fuel moisture conditions. Under normal conditions, stand thinning followed by prescribed burning and/or controlled grazing with slash removal prevented crown fire initiation in most cases. Under dry fuel moisture conditions, the simulation showed that the proposed fuel treatments did not appear to be effective in averting crown fire initiation and spread. Combinations of prescribed fire and/or controlled grazing can be used to reduce wildfire hazard in Aleppo pine forests. Management of Aleppo pine forests should include an analysis of how the proposed actions (logging, thinning, etc.) may affect fuel complex properties. Fuel treatment plans should be an essential component of forest management in Aleppo pine forests in Greece, in order to reduce fire hazard.

Key words: Aleppo pine forests, crown fire modeling, Cruz's crown fire initiation model, fuel treatments, Van Wagner's crown fire type model

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