



Fuel dynamics by using Landscape Ecology Indices in the Alto Mijares, Spain

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Land abandonment in Mediterranean regions has brought about a number of management problems, being an increased wildfire activity prevalent among them. Agricultural neglect in highlands resulted in reduced anthropogenic disturbances and greater landscape homogeneity in areas such as the Alto Mijares in Spain. It is widely accepted that processes like forest fires, influence structure of the landscape and vice versa. Fire-prone Mediterranean flora is well adapted to this disturbance, exhibiting excellent succession capabilities; but higher fuel loads and homogeneous conditions may ally to promote vegetation recession when the fire regime is altered by land abandonment. Both succession and recession make changes to the landscape structure and configuration. However, these changes are difficult to quantify and characterize. If landscape restoration of these forests is a management objective, then developing a quantitative knowledge base for landscape fuel dynamics is a prerequisite. Four classified LandsatTM satellite images were compared to quantify changes in landscape structure between 1984 and 1998. An attempt is made to define landscape level dynamics for fuel development after reduced disturbance and fuel accumulation that leads to catastrophic fires by using landscape ecology indices. By doing so, indices that best describe the fuel dynamics are pointed. The results indicate that low-level disturbance increases heterogeneity, thus lowers fire hazard. No disturbance or severe disturbance increases homogeneity because of vegetation succession and may lead to devastating fires. These fires could be avoided by human induced disturbance like controlled burning, harvesting, mechanical works for fuel reduction and other silviculture measures; thus bringing in more heterogeneity in the region. The Alto Mijares landscape appears to be in an unstable equilibrium where succession and recession are at tug of war. The effects are evident in the general absence of the climax species of *Quercus ilex*. It has also been recognised that just one index is rarely sufficient to describe the complex dynamics in any landscape; it is usually a group of indices that needs to be consulted in order to perceive the wider picture. The study indicates that there is a need for landscape and social restoration in areas like Alto Mijares to make best use of available resources and avoid catastrophic fires.