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The contradictory role of fire from the nature conservation perspective

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Fire is a globally relevant natural or anthropogenic phenomenon with a rapidly increasing importance in the era of the climate change. In each year, approximately 4% of the global land surface burns. For effective ecosystem conservation, we need to understand fire regimes, identify potential threats, and also the possibilities in the application of prescribed burning for maintaining ecosystems.

Here I provide an overview on the contradictory role of fire in nature conservation from two continents with contrasting fire histories, focusing on European and North-American grasslands. I show that the ecological effects of fire depend on the fire regime, fire history, ecosystem properties and the socio-economic environment. Catastrophic wildfires, arson, too frequent or improperly planned human-induced fire often lead to the degradation of the ecosystems, the disappearance of rare plant and animal species, and to the encroachment of weed and invasive species. I illustrate with examples that these negative fire effects act synergistically with the human-induced changes in land use systems.

I also underline with case studies that in both regions, properly designed and controlled prescribed burning regimes can aid the understanding and managing disturbance-dependent ecosystems. Conservation in these dynamic and complex ecosystems is far more than fencing and hoping to exclude disturbance; but the contrary: disturbance is needed for ecosystem functioning. Therefore, the conservation of dynamic, diverse and functioning ecosystems often require drastic interventions and an unconventional conservation attitude. However, the expanding urban-wildlife interface makes the application of prescribed burning challenging worldwide. A major message for the future is about fire policy: it is crucial to moderate the negative effects of fire, however, properly designed prescribed burning should be used as a tool for managing and conserving disturbance-dependent ecosystems.