

Fire and riparian ecosystems in landscapes of the western USA

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Abstract

Despite the numerous values of riparian areas and the recognition of fire as a critical natural disturbance, few studies have investigated the behavior, properties, and influence of natural fire in riparian areas of the western USA. Riparian areas frequently differ from adjacent uplands in vegetative composition and structure, geomorphology, hydrology, microclimate, and fuel characteristics. These features may contribute to different fire environments, fire regimes, and fire properties (frequency, severity, behavior and extent) in riparian areas relative to uplands. In certain forested riparian areas, fire frequency has generally been lower, and fire severity has been more moderate than in adjacent uplands, while in other areas, fires have appeared to burn riparian areas with comparable frequency.

Impacts of land use and management may strongly influence fire properties and regimes in riparian areas. Fire suppression, livestock grazing, logging, damming and flow regulation, agricultural diversions, channel modifications, and introduction of invasive species have led to shifts in plant species composition, structure and distribution of fuel loads, and changes in microclimate and aerial extent of riparian areas. Cumulative impacts of human alterations are likely to exert the most pronounced influence on fire behavior during periods of drought and under conditions of extreme fire weather.

Riparian plant species possess adaptations to fluvial disturbances that facilitate survival and reestablishment following fires, thus contributing to the rapid recovery of many streamside habitats. Given the critical resource values of riparian zones, additional data are needed to understand interactions between fire and riparian ecosystems, and how riparian zones affect spatial and temporal patterns of fires at the landscape scale. An

improved understanding of fire ecology and effects in riparian areas is needed to prescribe ecologically sound rehabilitation projects following fire.

Keywords: riparian areas, Western USA, fire behavior, fire severity, riparian fire regimes, land use, riparian-aquatic habitat, post-fire recovery