SEVERITY OF SHORT-INTERVAL REBURN MEDIATES COMPOSITIONAL SHIFTS IN FIRE-ADAPTED MONTANE SHRUBLANDS

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Montane chaparral is a shrub community dependent on fire for its persistence in areas where it intergrades with the dry mixed-conifer forests of northern California. In these fire-prone regions, irregular patterns of mixed-severity fire on the landscape historically created forest gaps and clearings where shrublands could persist. Decades of fire exclusion facilitated the invasion of conifer forests into these gaps, reducing the extent of shrub-dominated ecosystems. Evidence exists that large, stand-replacing wildfires of recent years may be reversing this trend in some areas. Previous studies have documented vegetative type-conversion to chaparral occurring where high-severity fire has eliminated forest cover. These state shifts are especially persistent in short-interval reburn areas, where conifer regeneration is often limited, and fire-adaptive strategies of chaparral species allow for post-fire shrub dominance. As an ecosystem, chaparral is well known to be tolerant of high-severity fire, though species typical to this ecosystem possess divergent post-fire regenerative strategies, and each species’ response to wildfire severity and frequency can differ according to these adaptations. These regeneration mechanisms are often broadly grouped into species that rely on soil seed banks for post-fire germination, and species that store carbohydrates in underground structures to facilitate post-fire sprouting. While burn severity- and interval-dependent vegetative shits are well studied, little attention has been given to the influence of differential severity and frequency on the species assemblages of these subsequent plant communities, given the divergent adaptive strategies that occur. In order to assess the influence of adaptive strategy and burn severity on shrub community dynamics, we examined shrub abundance and species composition across a spectrum of burn severity combinations in a 9,000 ha reburn area with a 12-year interval between wildfires in the Lassen National Forest, CA. Our results indicate that chaparral species with the capacity to resprout after stand-replacing wildfire are advantaged over those that depend on fire-cued germination from latent seedbanks following repeated high-severity fires.

We hypothesized that differences in species’ regeneration strategies would influence species assemblages following short-interval reburn along a gradient of burn severities.