THE REHABILITATION OF NATIVE VEGETATION COMMUNITIES IN AN URBAN SHRUBLAND SETTING: THE ROLE OF CONTROLLED FIRE REGIMES

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ABSTRACT

Throughout Australia's biogeographical history, the vegetation over most of the continent has experienced a long and complex evolutionary relationship with fire. Many of the vegetative forms that have evolved over time, and which are uniquely Australian, rely on fire to complete one or more stages of their life cycle.

In recent years, changes to the natural fire regimes and the introduction of many new plants throughout Australia have led to changes in ecosystem functioning and species composition in many Australian shrubland areas. Research was undertaken to determine if regular low-intensity burning of urban shrubland areas can assist in the rehabilitation of native species by imposing a fire regime that will increase their abundance and diversity and decrease the abundance and diversity of invasive weed species. To test this hypothesis, sampling was undertaken over an 18-mo period in eight sites with four differing fire histories—3, 6, 8, and 10 y since the last fire. Within each of these sites, species presence and abundance were analyzed along two 100-m transects. Seed bank samples were also taken at these sites. Seeds within these samples were exposed to temperatures and smoke products present in a low-intensity burn and then germinated to determine the species composition of the next generation. Nutrient levels were measured to determine if any changes in species composition could be explained by elevated nutrient levels rather than by a specific fire regime.

The results from this study indicate that there is a peak in native abundance and diversity with an associated decrease in exotic abundance and diversity approximately 6 y after a low-intensity burn. There was no significant difference found in nutrient levels between sites, indicating that elevated nutrient levels did not play a role in the differences in vegetation composition. Seed germination showed significant variation in sites with different fire histories, demonstrating that time since last fire plays an important role in the species composition of the next generation of vegetation post-fire. This conclusion has many applications in the management of urban shrubland areas throughout the Sydney region. Determining the optimal frequency and intensity of fires in these areas provides much needed information for determining the best possible burning regimes for the ecology of native species.

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