

Fire regimes in arid hummock grasslands and *Acacia* shrublands

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Introduction

The flammability of arid *Triodia* hummock grasslands and *Acacia* habitats (shrublands and woodlands) was highlighted when wildfires swept across central Australia in 2001 and 2002 (Allan 2009) (Figure 9.1). These conflagrations constituted the most extensive ‘fire event’ in inland Australia since the mid-1970s, burning more than 500 000 km² in the southern Northern Territory alone. Such fires go largely unnoticed by the mostly urban Australian population and concern for potential ‘environmental disaster’ has not resonated with the general public. Since the last synthesis of fire in these landscapes (see Allan and Southgate 2002; Hodgkinson 2002) a steady flow of new research has focused on fire regimes and their impacts on species and habitat structure. Uncertainty still remains about how to manage fire regimes for biodiversity benefits, but we recommend a trait-based framework as a way forward. This approach differs from the overly simplistic dichotomisation of arid biota as ‘fire tolerant’ or ‘fire sensitive’ and moves towards the circumscription of demographic tolerance thresholds for focal species groups, with explicit emphasis on the interactions of climate and fire.

Biome distribution and plant composition

The arid interior of Australia supports vast tracts of highly flammable *Triodia* hummock grassland/savanna (‘spinifex country’) (Burbidge 1944; Beadle 1981). Together, these grassy habitats occupy close to one-third of the Australian landmass, in areas receiving 125–500 mm of yearly rain (Griffin 1984; Mott and Groves 1994). The major alliances show strong regional patterns. Habitat structure and species composition change according to weather-since-fire, soil type and geographic region. These grasslands characteristically support a diversity of *Acacia* shrubs as well as eucalypt and proteaceous trees (*Grevillea* and *Hakea*), many of which are used by Aboriginal people. Hummock grasslands have low pastoral value owing to the low palatability of *Triodia*, but are often still grazed.

Contrasting with the *Triodia* grasslands, *Acacia* habitats are a low flammable fuel type and are of relatively high grazing value. There is a long history of detailed study of *Acacia* habitats (see Slatyer 1965). *Acacia aneura* (mulga) is the most characteristic and ubiquitous woody dominant of the interior, occupying as much as 20% of the continent (Johnson and Burrows 1994; Hodgkinson 2002). This exceptionally drought tolerant and long-lived species occurs mainly as mono-dominant stands, but also in association with other widespread inland *Acacia* species (Beadle 1981). The structure and composition of mulga habitat change with gradients