Northern Territory Government

DEPARTMENT OF LAND RESOURCE MANAGEMENT

Fire regimes in arid hummock grasslands and Acacia shrublands

Nano, C. E. M., Clarke, P. J. and Pavey, C. R. 2012. In Flammable Australia, 2nd Edition (2012) pp. 195-214.

The high flammability of arid Triodia hummock grasslands ('spinifex') and Acacia habitats (shrublands and woodlands) was driven home in the minds of land-holders and -managers when wildfires swept across the central Australia landscape in the summers of 2001 and 2002. 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 wider Aus¬tralian population and concern for potential 'environmental disaster' has not resonated with the general public. A steady flow of new research over the last decade has focused on central Australian fire regimes and their impacts on species and habitat structure. Uncertainty remains about how to manage fire regimes for biodiversity benefits.

In this book chapter, we first characterised the dominant central Australian biomes in terms of their flammability and plant composition, and hence their likelihood of repeated fire exposure and their overall vulnerability to fire driven decline. We then reported on 1) fire behaviour and 2) fire regimes in this landscape, focussing on a range of important variables. For the former, we discussed fuels, flammability and connectivity, ignition, flaming front and surface spread, and surface and soil temperatures. For the latter, we summarised what is known about pre-European and historic fire regimes and current fire regimes (seasonality, frequency, fire type, intensity and severity, and size and patchiness).

Next, we looked closely at species responses to fire. For plants, we looked at patterns of resprouting ability, seed banks, seed dispersal and post-fire seedling recruitment across the flora. For animals, we reviewed the evidence for fire-sensitivity in birds, mammals, reptiles and invertebrates, and for the efficacy of the patch-burn (fire-age mosaic) method for fauna conservation. We conclude that the overwhelming pattern to emerge is that rainfall is the dominant driver of arid systems, and fire effects, if they do occur, are secondary.

Finally, we emphasised that management of arid fire regimes for biodiversity is extremely complex, given the overriding effect of climate in not only determining fire return periods, but also the rate of post-fire population recovery. We recommended a shift away from the overly simplistic dichotomisation of arid biota as 'fire tolerant' or 'fire sensitive' and a move towards the circumscription of demographic tolerance thresholds for focal species groups, with emphasis on the interactions of climate and fire. We ultimately stressed the need for flexible 'adaptive' management that has monitoring and re-evaluation at its core. In addition, we emphasised the need to undertake manipulative experiments to provide further understanding of the complex responses of desert plants and animals to wildfire.