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DOMINGOS XAVIER VIEGAS
ADAI/CEIF, UNIVERSITY OF COIMBRA, PORTUGAL

Understanding the changing fire environment of south-west Western Australia

Lachlan McCaw

*Department of Biodiversity, Conservation and Attractions, Manjimup 6258, Western Australia
{lachie.mccaw@dbca.wa.gov.au}*

Abstract

Fire environment is the resultant effect of factors that influence the ignition, behaviour and extent of fires in a landscape. This paper synthesises information available from a variety of sources to evaluate evidence for changes over the past three decades in components of the fire environment for south-west Western Australia including climate and weather, fuel, and ignition. A combination of land use, socio-economic and organisational factors has resulted in more widespread extent of lands unburnt for several decades, increasing the risk of high severity fires with adverse impacts on the community and environment. The Mediterranean type climate of the region has become warmer and significantly drier since the 1970s, with associated changes in the timing and duration of the traditional fire season. Lightning ignition has become more common, either as result of greater summer thunderstorm activity or increased opportunity for ignitions to sustain and spread. Increased lightning ignition is significant because of the disproportionately large proportion of area burnt by lightning caused fires in SWWA. Adapting to a changing fire environment has implications for all aspects of the fire management business, and a variety of new products and services are available to inform fire managers about temporal and spatial trends in components of the fire environment.

Keywords: fire environment, climate, eucalypt forest, Mediterranean ecosystems

1. The fire environment concept

Fire environment is the resultant effect of factors that influence the ignition, behaviour and extent of fires in a landscape. Countryman (1966) defined the fire environment as comprising the fuel, topographic and airmass factors that influence or modify the inception, growth and behaviour of fire. In this paper ignition is also considered a component of the fire environment for the reason that the cause, frequency, spatial pattern and timing of ignition are characteristic of a region and a period of time. The fire environment provides a setting within which a variety of fire regimes defined by season, frequency and intensity of burning are enacted in response to a combination of chance events and human actions.

The focus of this paper is the south-west corner of Western Australia (SWWA), a region characterised by ancient landscapes, a Mediterranean type climate and a unique flora and fauna that have evolved in prolonged isolation from other parts of the Australian continent. Defining features of region include the densely populated and extensively cleared Swan coastal plain, a relatively continuous zone of open eucalypt forest comprising State forest and various categories of conservation reserve, and an extensively cleared dryland farming zone known as the Western Australian Wheatbelt (Fig. 1). Public lands occupy about 6 M ha of this region in the form of national park, multiple-use State forest and other categories of reserved land. The eastern margin of the Wheatbelt interfaces with a vast, remote and sparsely populated semi-arid zone where mining and pastoralism are the dominant economic activities. Much of this area remains as unallocated crown land, with a renewed emphasis on the role of traditional owners as custodians and managers of the land.