



Australian Government



Fire management



Managing for biodiversity in the rangelands

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This paper is a summary of the report prepared for the Australian Government Department of the Environment and Heritage by the Tropical Savannas CRC and the Desert Knowledge CRC.

Myers B, Allan G, Bradstock R, Dias L, Duff G, Jacklyn P, Landsberg J, Morrison J, Russell-Smith J, Williams R. 2004. Fire Management in the Rangelands. Tropical Savannas CRC, Darwin.

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This project was funded by the Natural Heritage Trust (NHT) and was managed by the Department of the Environment and Heritage (DEH).

ISBN: 0642551243

Acknowledgements

Collaboration was an important feature of this project and many organisations that were not formally part of the project, but could see its value, put in considerable effort to provide valuable information. This cooperation among state and territory government agencies is a positive outcome of the project and provides a good foundation for future collaboration.

Images provided by:

Geordie Akeroyd, p26 photo2. Grant Allan, front cover photo 1, front cover photo 2, p1, p2 photo 2, p4, p8 photo 2, p10, p12, p16, p19, p20 photo 1, p21, p22, p23, p24 photo 1, p32, p33, p36, p37, p42 photo 2, back cover. Martin Armstrong, courtesy NT DNRETA, p28 photo 2. John Baker, Department of the Environment and Heritage, p31 photo 1. Joe Benshemesh, p46. Fred Bohner, p31 photo 2. © CSIRO, p7 photo 1, p14 photo 2, p44 photo 2. © CSIRO Land and Water, p47. Department of the Environment and Heritage, p2 photo 1, p7 photo 2, p13, p17 photo 2, p20 photo 2, p28 photo 1, p30 photo 2, p31, p40 photo 1, p42 photo 1, p44 photo 1, p46, p48 photo 1. Director of National Parks, p8 photo 1, p24 photo 2, p42 photo1, p48 photo 1. Stephen Garnett, p17 photo 1, p30 photo 1. D. Greig © Australian National Botanic Gardens, p26 photo1. Peter Jacklyn, p18 photo 1. Joseph Lafferty, p39 photo 1, p40 photo 2. A. Liedloff, courtesy CSIRO, front cover photo 3, p14 photo1, p18 photo 2. Chris Materne, p27. Amanda Morvell, Department of the Environment and Heritage, p3, inside back cover. John Morley, inside front cover. Arthur Mostead, p13. Trevor Preston, Department of the Environment and Heritage, p39 photo 2, Merran Williams, p44 photo 1.

Design: See-Saw Illustration and Design

Editing and publication coordination: Econnect Communication

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Abstract



Understanding and implementing appropriate fire management principles in the Australian rangelands is of national significance. The rangelands of Australia have a high biodiversity value, they provide significant economic returns for the communities they sustain, and they are an important feature of the Australian identity.

Compared with the areas of intensive agriculture in most other parts of Australia, the rangelands are relatively intact. Yet, despite this relatively low level of disturbance, the abundance and richness of rangeland biodiversity is declining, and inappropriate fire regimes are considered partly responsible. Fire is an integral part of the ecosystems of Australia's rangelands and is considered one of the few management tools available to land managers in this zone.

Sound fire practices, over both the short and long term, are an important contributor to sustainable pasture production and have a significant impact on biodiversity conservation.

No single fire regime applied at landscape scales can meet the needs of any one major land management objective (e.g. biodiversity conservation), let alone multiple land management objectives. Appropriate fire management practices will vary with factors such as the desired management outcomes, the climate, terrain, flora and fauna, and the scale and patchiness of the ecosystem.

While some elements of rangeland ecosystems are resilient to changes in fire regime, others are sensitive to fire intensity and/or to fire interval.

Outlining useful information for managers, this paper aims to help managers develop appropriate fire management practices. It includes a checklist for fire management plans, definitions of commonly-used terms and concepts, and descriptions of fire ecology, fire management, and knowledge gaps for each of the major vegetation types.

This paper is part of a series of related publications on Managing for Biodiversity in the Rangelands, intended to provide government agencies, land managers and others with relevant information on protecting biodiversity in the rangelands.

Fire Management in the Rangelands

Introduction

The rangelands of Australia have a high biodiversity value with high species diversity, and unique ecosystems and habitat for rare and endangered species. The rangelands are relatively intact with little clearing compared with the areas of intensive agriculture in eastern, southern and south-western Australia. Despite the relatively low level of disturbance in the rangelands, the abundance and richness of rangeland biodiversity is declining and there is evidence that inappropriate fire regimes are partly responsible.

Fire is an integral part of the ecosystems of Australia's rangelands. Fire management is one of few management tools available to land managers in this zone. Sustainable pasture production is dependent on the maintenance of soils and pastures through sound fire management practices in the short and long term. These fire management practices can have significant impacts on biodiversity conservation.

This project

The purpose of this project was to assist sustainable fire management in the Australian rangelands. It provides information, drawn from past projects and best practice, to improve the region's ability to plan and implement fire management strategies. The project also provides a framework to help assess the effectiveness of proposed rangeland fire management programs.

The main objectives of the project were to:

- synthesise information related to the fire ecology of rangeland ecosystems and vegetation types
- recommend, where possible, fire-frequency thresholds for major vegetation types in the rangelands
- recommend how fire management research in other regions could be applied to the rangelands

- develop a checklist for good fire management planning
- assess gaps in current fire management knowledge and information
- identify priority regions in the rangelands where fire management plans are needed or should be improved i.e. fire management hotspots
- develop a list of past projects to include proponent details, funding amounts, date, location, category (e.g. vegetation type, season, management objective), and a brief summary

A summary of the project findings is presented in this paper. For further details, consult the main report (refer to Further information).



Definitions

Aerial control burning (ACB)	Strategic aerial burning operations undertaken from a helicopter or aeroplane to develop typically linear firebreaks; especially useful in remote and rugged terrain
Annual plants	Plants whose reproductive life cycles are completed within one year
Back burn	A backing fire often applied in fire control operations as a means for directing a relatively low-intensity fire into the path of an oncoming wildfire
Fire behaviour	Physical attributes of individual fires: height and depth of flames, rate of spread, intensity, size and shape of various burning fronts
Fire intensity	The rate at which heat is released from a linear section of the fire front; usually expressed in units of kilowatts per metre of fire edge (kW/m)
Fire regime	Attributes of fires in any one region over a number of years including extent, seasonality, frequency, intervals between fires, intensity, and patchiness
Fire sensitive species	Plant species that are readily killed by fires; typically comprises obligate seeder species, but also includes a variety of less fire-hardy resprouters that may be susceptible to relatively low intensity fires
Fire suppression	The containment and eventual extinguishing of an unwanted fire
Fire weather	The combination of climatic conditions important for influencing fire behaviour i.e. temperature, wind speed, and relative humidity
Fuel load	The amount of standing grass and litter fuel, usually expressed as oven-dry weight of fuel per unit area e.g. tonnes per ha or kg per sq. m
Hotspots	Sites detected by thermal satellite sensors as being relatively hotter than surrounding areas e.g. fire fronts
Litter	That component of the fuel load comprising dead leaves, small twigs, etc.
Mosaic burning	Burning with the intention of creating small patches, resulting in a landscape characterised by habitat patches of different fire ages
Obligate seeder	A plant that regenerates solely from seed held on the plant or in the soil after the plant has been killed by fire
Perennial plants	Plants that live for two or more years
Prescribed fire	Any fire that is lit for management purposes
Resprouter	A plant with the capacity to resprout from dormant buds on stems, or from root bases, following a fire
Species fire attribute	The characteristics of a species that strongly affect the response of that species to various fire intensities and fire frequencies, particularly relating to survival and reproductive potential; for plant species, the attributes mainly relate to seeding and resprouting biology
Strategic burning	The use of prescribed fire, including aerial control burning, to strategically break up paddocks, properties or large regions
Sustainability	Continued long-term productivity of a management system, or continued long-term function and integrity of an ecosystem