



# 1. Introduction and overview of Desert Fire

Glenn P Edwards

Grant E Allan

## Contributing author information

---

GP Edwards: Department of Natural Resources, Environment, the Arts and Sport, PO Box 1120, Alice Springs, Northern Territory 0871, Australia

GE Allan: Bushfires NT, Department of Natural Resources, Environment, the Arts and Sport, PO Box 2533, Alice Springs, Northern Territory 0871, Australia

## Contents

---

1.1 Subproject 1: Fire regimes of the desert regions of Australia at a continental scale .....	12
1.2 Subproject 2: Fire regimes of the desert regions of Australia at a regional scale: overview and priority setting .	12
1.3 Subproject 3: Fire regimes of the desert regions of Australia at a regional scale: case studies.....	12
1.4 Products of Desert Fire .....	15

## Tables

---

Table 1.1: Currently available products of Desert Fire and their locations .....	15
--	----

## Shortened forms

---

CLC	Central Land Council
CDU	Charles Darwin University
DKCRC	Desert Knowledge Cooperative Research Centre
NRETAS	Department of Natural Resources, Environment, the Arts and Sport, NT

# 1. Introduction and overview of Desert Fire

---

*Glenn P Edwards and Grant E Allan*

Fire is a regular and widespread feature across many Australian landscapes, including the vast desert regions, the northern tropical savannas and the southern coastal forests and heathlands. Its occurrence and impact in the desert regions is as variable as the region itself. Fire can be an annual feature of the northern desert regions fringing the tropical savannas, less regular in central and southern Australia but closely linked to the variable rainfall, or virtually absent in intensively managed grazing lands in the eastern desert region. Attitudes vary towards fire, both its value as a management tool and the threats and impacts of wildfires to infrastructure, productivity and biodiversity. These attitudes seem to vary locally and regionally, between and within community groups.

During the three-year period 2000–2002, fires were common in the central and northern regions of Australia's desert lands, following a period of above average rainfall that created exceptional grass growth and fuel production. This raised the awareness of fire but has also led to conflicts among sectors of the rural community.

The Desert Knowledge Cooperative Research Centre (DKCRC) attempted to address some of the key issues in managing fire in desert Australia through an initiative called 'Desert Fire'. Desert Fire was a collaborative project. It involved key partners of the DKCRC, including the Northern Territory Department of Natural Resources, Environment, the Arts and Sport (NRETAS Bushfires NT, Biodiversity Conservation Division, Parks Division), the Central Land Council (CLC), Charles Darwin University (CDU), the University of Adelaide, the Australian National University (ANU), key stakeholder groups and collaboration with the Bushfire Cooperative Research Centre. Desert Fire was made up of ten subprojects, linked together to meet the common goal to 'adapt and maintain appropriate fire regimes and their management based on robust research, planning, review and communication to support the diverse users and managers of desert lands to achieve a balance of their ecological, social and economic priorities'.

This report is the main technical scientific report of Desert Fire. The report chapters each form a final account of aspects of an individual subproject of Desert Fire. Not all facets of Desert Fire are covered in detail in this report. Products of the project that are already in the public domain are referred to but not reproduced here. Also, some elements of Desert Fire are documented as working papers, which are referred to but not included here. Finally, certain elements of Desert Fire formed the basis of student projects, some of which are ongoing and are not covered in this report. A complete list of the products of Desert Fire is in Table 1.1.

The following section provides a brief overview of each of the subprojects of Desert Fire. Mention is made of the key issues addressed by the subproject, whether students were involved in the subproject, and the key products so far delivered by the subproject, including accounts delivered in this report.

## 1.1 Subproject 1: Fire regimes of the desert regions of Australia at a continental scale

This is a PhD research project by student Dorothy Turner through the University of Adelaide. The main aims of this subproject were to build and maintain an accurate fire history database of where and when fires have occurred in desert Australia and to examine factors influencing this fire regime. This research built on the existing broadscale continental fire history developed for the seven-year period 1997–2003 by the Tropical Savannas CRC. This existing fire history had limited resolution and accuracy. As a result it missed many small fires, and only identified areas burnt, not the number of fires. This fire history was refined using hotspot detection of active fires to give a more accurate and higher resolution account of the fire history of desert Australia for the said period. Subsequent analyses involving fire history, rainfall, land use and vegetation were able to identify the factors driving fires in desert Australia. The final report on this subproject will be completed at a later date through agreement between the DKCRC and the University of Adelaide.

## 1.2 Subproject 2: Fire regimes of the desert regions of Australia at a regional scale: overview and priority setting

### **Subproject 2a. Identify priority areas for fire management research**

The aim of this subproject was to identify priority regional areas for fire management research. This aim should be met through recommendations arising from subproject 1 and are not reported on here.

### **Subproject 2b. Review of current ‘scientific’ knowledge relating to environmental impacts and management of fire in desert areas**

The aim of this subproject was to establish a bibliographic database of fire-related publications focusing on the desert region of Australia. This was an NRETAS (Biodiversity Conservation) initiative and the database can be viewed at the Desert Knowledge CRC website at [http://www.desertknowledgecrc.com.au/view/74429/dkrc\\_sub/desert-fire.html](http://www.desertknowledgecrc.com.au/view/74429/dkrc_sub/desert-fire.html).

As an adjunct to this subproject, a voice-over Powerpoint presentation featuring the views of Peter Latz in respect of fire management was developed. This presentation can be viewed at <http://www.desertknowledgecrc.com.au/research/projects.html>.

## 1.3 Subproject 3: Fire regimes of the desert regions of Australia at a regional scale: case studies

### **Subproject 3a. Managing fire in the southern Tanami Desert**

At the time that Desert Fire was being developed, it was known within Bushfires NT and the CLC that fire management in the southern Tanami Desert region of the Northern Territory was a contentious issue. Consequently, it was selected as a focal study site to evaluate stakeholder perspectives in relation to fire management. It was hoped that improving the dialogue in respect of fire would help to resolve some of the conflicts associated with fire. A detailed fire history of the region was developed by Bushfires NT to inform discussions with local stakeholder groups. An account of this fire history and discussions held between Bushfires NT and local pastoralists involving fire management is given in Chapter 2 of this report. Chapter 3 of this report gives an account of a CLC initiative which documented tradition-based fire knowledge, with particular emphasis on fire management in the southern Tanami Desert region.

Linked to this subproject was a student (Kristen Maclean) PhD research project through the ANU. The associated thesis ‘Creating spaces for negotiation at the environmental management and community development interface in Australia’ (Maclean 2007) has been completed and passed (see Table 1.1).

The project was a social perspective on community engagement in land management activities and contrasted the processes of engagement of local community conservation groups in rural Victoria with the involvement of pastoralists, Aboriginal communities and park managers in fire and land management issues in central Australia. Maclean collected information on fire and land management through interviews and meetings with relevant stakeholders. She also contributed information on the planning and engagement process that will inform the process of developing regional fire management strategies in desert Australia.

### **Subproject 3b. Economic assessment of fire on pastoral lands in the southern NT region of central Australia during the 2000–2002 period of widespread fires**

The Centralian Land Management Association played a key role in this subproject in partnership with Bushfires NT. The aim of the subproject was to improve our understanding of the economic impact of fires in desert landscapes. Although it was not possible to collect detailed information on all fires over the life of Desert Fire, information provided by land managers across central Australia helped build a more complete picture than had existed previously. An account of this facet of Desert Fire is given in Chapter 4 of this report.

### **Subproject 3c. Review of fire management planning and implementation on parks and reserves in central Australia and development of best practice protocols**

Conservation reserves are areas where fire is a core part of land management practices, and they provide opportunities to study the differing effects of fire on plants and animals. The aims of this subproject were to review the management of fire on conservation reserves in central Australia and to develop ‘best practice protocols’ to guide the management of fire to enhance conservation outcomes. This was an NRETAS (Biodiversity Conservation) initiative.

In order to meet the aims of this subproject, a workshop reviewing fire management on conservation reserves was held in Alice Springs in December 2005 (see Table 1.1: Working Paper number 21). In addition, extensive consultations were conducted with park rangers on a range of parks and reserves in central Australia in respect of fire management planning, implementation and reporting. The main outcome of this subproject, ‘A review of fire management on central Australian conservation reserves: towards best practice’ is in Chapter 5 of this report (Duguid et al. 2009). An additional output from this subproject, ‘The fire history data of Rainbow Valley Conservation Reserve 1984–2005’ is in Chapter 6 of this report (Gabrys et al. 2009). This was also an NRETAS (Biodiversity Conservation) initiative.

### **Subproject 3d. Using Acacia shrublands landscape change as an indicator of ecosystem health**

This subproject was carried out by CDU. The aim of this subproject was to evaluate the role that fire might play in determining the boundaries between spinifex grasslands and mulga woodland (*Acacia* spp.) communities in desert Australia. Two papers concerning this study have been published (Bowman et al. 2007, Bowman et al. 2008: see Table 1.1). No further account of this subproject is provided here.

Linked to this subproject was a Master’s research project by student Anstee Nicholas through CDU. The associated thesis ‘Characteristics and dynamics of the mulga-spinifex boundaries at Mt Denison station in central Australia’ has been completed and passed (see Table 1.1). The final report on this aspect of Desert Fire will be completed at a later date through agreement between the DKCRC and CDU.

### **Subproject 3e. Impacts of fire on biodiversity in central Australia**

The broad aim of this subproject was to examine the impacts of fire on the biodiversity of central Australia. Four research initiatives were undertaken in the context of this aim. The first was a desktop review of Northern Territory vegetation with a view to classifying species as either obligate seeders or non-obligate seeders. This research initiative was a collaboration between the Tropical Savannas CRC (with funding through the Natural Heritage Trust) and the DKCRC (through NRETAS Biodiversity

Conservation). The resulting database can be accessed through the Herbarium of the Northern Territory, Darwin. A research paper detailing this facet of Desert Fire is being written and will be published in the scientific literature. No further account of this research is provided here.

The second research initiative was the development of a vegetation fire succession model for the major plant groups of central Australia. This research was a collaboration between the DKCRC and the ANU in collaboration with the Bushfire CRC and is linked to subproject 3f below. A research paper detailing this facet of Desert Fire is being written and will be published in the scientific literature. No further account of this research is provided here.

The third research initiative was a case study on the impacts of fire on *Eremophila prostrata* (Chinnock) carried out by NRETAS (Biodiversity Conservation). *Eremophila prostrata* is nationally listed as vulnerable to extinction based on a very restricted area of occurrence and low population numbers. A brief account of this research is in Chapter 6 of this report (Gabrys et al. 2009). As a result of this study, the International Union for Conservation of Nature (IUCN) status of the species may need to be revised. A research paper detailing this facet of Desert Fire is being written and will be published in the scientific literature.

The fourth research initiative is a PhD research project by student Adam Leavesley through the ANU and in collaboration with the Bushfire CRC and the DKCRC. This project examines the dynamics of mulga woodland bird communities in relation to fire in central Australia. The PhD thesis has been submitted and the final report on this aspect of Desert Fire will be completed at a later date through agreement between the DKCRC and the ANU.

### **Subproject 3f. Modelling fire events in the West MacDonnell Ranges**

This research was a collaboration between the ANU, the Bushfire CRC and the DKCRC. The aim was to develop a 'Firescape' model of fire dynamics in the West MacDonnell Ranges region of central Australia. An extensive amount of existing spatial data was used in developing the fire regime model. It now provides the basis for testing different fire regimes in combination with future climate change scenarios to improve our understanding of fire management needs. An account of this component of Desert Fire is in DKCRC Working Paper 20 (see Table 1.1).

### **Subproject 3g. Mulga woodland dynamics influenced by fire and rainfall during the 2000–02 period in central Australia**

The aim of this subproject was to investigate the influence of intense fire and follow-up rain on mulga woodland dynamics in central Australia. This research is ongoing through the NT Department of Regional Development, Primary Industry, Fisheries and Resources and Bushfires NT and no further account of this research is provided here.

## 1.4 Products of Desert Fire

Currently available products of Desert Fire and their locations are in Table 1.1.

Table 1.1: Currently available products of Desert Fire and their locations

<b>Chapters in this volume</b>	
1	Edwards GP and Allan GE. 2009. Introduction and overview of Desert Fire, in <i>Desert Fire: fire and regional land management in the arid landscapes of Australia</i> , Eds. GP Edwards and GE Allan, pp. 9–16, DKCRC Report 37, Desert Knowledge Cooperative Research Centre, Alice Springs.
2	Allan GE. 2009. Managing fire in the southern Tanami Desert, in <i>Desert Fire: fire and regional land management in the arid landscapes of Australia</i> , Eds. GP Edwards and GE Allan, pp. 17–78, DKCRC Report 37, Desert Knowledge Cooperative Research Centre, Alice Springs.
3	Gabrys K and Vaarzon-Morel P. 2009. Aboriginal burning issues in the southern Tanami: towards understanding tradition-based fire knowledge in a contemporary context, in <i>Desert Fire: fire and regional land management in the arid landscapes of Australia</i> , Eds. GP Edwards and GE Allan, pp. 79–186, DKCRC Report 37, Desert Knowledge Cooperative Research Centre, Alice Springs.
4	Allan GE and Tschirner A. 2009. Pastoralists' perspectives on the costs of widespread fires in the pastoral lands of the southern Northern Territory region of central Australia, 2000–2002, in <i>Desert Fire: fire and regional land management in the arid landscapes of Australia</i> , Eds. GP Edwards and GE Allan, pp. 187–208, DKCRC Report 37, Desert Knowledge Cooperative Research Centre, Alice Springs.
5	Duguid A, Brock C and Gabrys K. 2009. A review of fire management on central Australian conservation reserves: towards best practice, in <i>Desert Fire: fire and regional land management in the arid landscapes of Australia</i> , Eds. GP Edwards and GE Allan, pp. 209–308, DKCRC Report 37, Desert Knowledge Cooperative Research Centre, Alice Springs.
6	K Gabrys, P Cowan, A Duguid. 2009. The fire history of Rainbow Valley Conservation Reserve 1984–2005, in <i>Desert Fire: fire and regional land management in the arid landscapes of Australia</i> , Eds. GP Edwards and GE Allan, pp. 309–338, DKCRC Report 37, Desert Knowledge Cooperative Research Centre, Alice Springs.
<b>Published papers</b>	
Bowman DMJS, Boggs GS, Prior LD and Krull ES. 2007. 'Dynamics of <i>Acacia aneura</i> – <i>Triodia</i> boundaries using carbon ( $^{14}\text{C}$ and $\delta^{13}\text{C}$ ) and nitrogen ( $\delta^{15}\text{N}$ ) in soil organic matter in central Australia'. <i>The Holocene</i> 17, 1–10.	
Bowman DMJS, Boggs GS and Prior LD. 2008. 'Fire maintains an <i>Acacia aneura</i> shrubland – <i>Triodia</i> grassland mosaic in central Australia.' <i>Journal of Arid Environments</i> 72, 34–47.	
Edwards GP, Allan GE, Brock C, Duguid A, Gabrys K, Vaarzon-Morel P. 2008. 'Fire and its management in central Australia'. <i>The Rangeland Journal</i> 30, 109–121.	
Turner D, Ostendorf B, Lewis M. 2008. 'An introduction to patterns of fire in arid and semi-arid Australia, 1998–2004'. <i>The Rangeland Journal</i> 30, 95–107.	
Vaarzon-Morel P and Gabrys K. 2008. 'Fire on the horizon: Contemporary Aboriginal burning issues in the Southern Tanami', <i>GeoJournal</i> . DOI 10.1007/s10708-008-9235-8. Published online 13 December 2008.	
<b>Theses</b>	
Maclean K. 2007. 'Creating spaces for negotiation at the environmental management and community development interface in Australia'. PhD thesis, Australian National University. Available at: <a href="http://www.desertknowledgecrc.com.au/education/graduates.html">http://www.desertknowledgecrc.com.au/education/graduates.html</a>	
Nicholas A. 2007. 'Characteristics and dynamics of the mulga-spinifex boundaries at Mt Denison station in central Australia'. Master's of Science thesis, Charles Darwin University. Available at: <a href="http://www.desertknowledgecrc.com.au/education/graduates.html">http://www.desertknowledgecrc.com.au/education/graduates.html</a>	
Leavesley A. 2008. 'The response of birds to the fire regimes of mulga woodlands in central Australia. PhD thesis, Australian National University.	
<b>Working papers</b>	
Duguid A, Gabrys K, Morse J, Rodrigo M. 2008. <i>Workshop proceedings: Fire management for conservation reserves in central Australia 5–6 December 2005</i> , DKCRC Working Paper 21. Desert Knowledge CRC, Alice Springs. Available at: <a href="http://www.desertknowledgecrc.com.au/publications/workingpapers.html">http://www.desertknowledgecrc.com.au/publications/workingpapers.html</a>	
King K, Marsden-Smedley J, Cary G, Allan G, Bradstock R, Gill M. 2008. <i>Modelling fire dynamics in the West MacDonnell Range area</i> , DKCRC Working Paper 20. Desert Knowledge CRC, Alice Springs. Available at: <a href="http://www.desertknowledgecrc.com.au/publications/workingpapers.html">http://www.desertknowledgecrc.com.au/publications/workingpapers.html</a>	
Edwards GP and McConnell K. 2009. <i>Proceedings of the Desert Fire Symposium</i> . DKCRC Working Paper 35. Desert Knowledge CRC, Alice Springs. Available at: <a href="http://www.desertknowledgecrc.com.au/publications/workingpapers.html">http://www.desertknowledgecrc.com.au/publications/workingpapers.html</a>	
<b>Databases</b>	
Fire related publications focusing on the arid zone of Australia	<a href="http://www.desertknowledgecrc.com.au/view/74429/dkrc_sub/desert-fire.html">http://www.desertknowledgecrc.com.au/view/74429/dkrc_sub/desert-fire.html</a>
Obligate and non-obligate seeders of the NT	Database held at Northern Territory Herbarium (contact the Herbarium for further details): <a href="http://www.anbg.gov.au/chah/resources/herbaria/dna.html">http://www.anbg.gov.au/chah/resources/herbaria/dna.html</a> .
<b>Powerpoint presentations</b>	
P Latz. Fire in central Australia: <a href="http://www.desertknowledgecrc.com.au/research/projects.html">http://www.desertknowledgecrc.com.au/research/projects.html</a>	

