Appendix 1

MacDonnell Ranges bioregion

Description

Area: 39 290 km^2

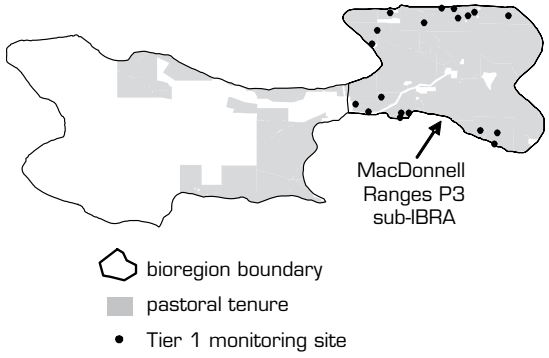
The MacDonnell Ranges bioregion is characterised by high-relief ranges and foothills. Spinifex and acacias, particularly mulga, occur throughout the bioregion. Land tenure is pastoral leasehold, conservation reserve and Aboriginal freehold. The main industries are cattle grazing and tourism. Alice Springs is the major population centre.

Location

The MacDonnell Ranges bioregion is located in the southern Northern Territory (NT; see Figures 1 and 2).

Figure 1 Location of the MacDonnell Ranges bioregion

Figure 2 Monitoring sites and pastoral tenure



Data sources available

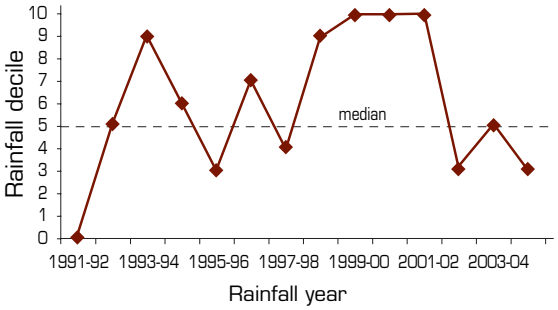
Data sources include:

- NT Tier 1 — low reliability for reporting change, with a small number of sites on the northern and southern edges of the MacDonnell Ranges P3 sub-Interim Biogeographic Regionalisation for Australia (IBRA); estimated (rather than quantitative) data; and a focus on perennial herbage species
- domestic stocking density, which provides moderate reliability
- fire extent, intensity and frequency, which provides high reliability
- dust
- distance from water
- distribution and relative abundance of invasive animals and weeds
- land use.

Climate

The MacDonnell Ranges bioregion has an arid climate, which is modified to some extent by mountain ranges. Rainfall is summer dominant, and spatially averaged median (1890–2005) rainfall is 228 mm (April to March rainfall year; see Figure 3).

Figure 3 Decile rainfall for the period 1991–1992 to 2004–2005



Annual rainfall is for the 12-month period 1 April to 31 March.

The 1992–2005 reporting period was characterised by considerable variation in rainfall. The year 1991–1992 was exceptionally dry and the 1999–2000 to 2001–2002 period was very wet.

Note that regional averaging of rainfall conceals spatial variability. Some parts of the MacDonnell Ranges bioregion may have experienced better ***seasonal quality*** and others worse during the 1992–2005 period.

Landscape function

There are no suitable data for reporting change in landscape function.

Sustainable management

Critical stock forage (MacDonnell Ranges P3 sub-IBRA)

Approximately 6% of sites showed a decline in composition (by biomass) of **palatable perennial** (2P) herbage species when *seasonal quality* was above average. It is not possible to report change following below-average *seasonal quality*.

Seasonal quality	Number of sites	Percentage of reassessed sites showing: Decline: > 20% decrease in 2P grasses	No change	Increase: > 20% increase in 2P grasses
Above average	16	6%	88%	6%
Average	3	n/a	n/a	n/a
Below average	n/a	n/a	n/a	n/a

Plant species richness

There are no suitable data for reporting change in plant species richness.

Change in woody cover

Based on the Australian Greenhouse Office definition and mapping of forest extent[1], there are no significant areas of forest in the MacDonnell Ranges bioregion. There was widespread coverage of Landsat data in making this assessment.

Distance from stock water

Based on the locations of stock waterpoints sourced from NT government mapping of lease infrastructure, the percentage area of pastoral lease country within three kilometres of permanent and semipermanent sources of stock water for each sub-IBRA is:

MacDonnell Ranges P1 (MAC1)	63.0% (17.2% of sub-IBRA analysed)
MacDonnell Ranges P2 (MAC2)	33.5% (26.7% of sub-IBRA analysed)
MacDonnell Ranges P3 (MAC3)	69.4% (46.5% of sub-IBRA analysed)

IBRA = Interim Biogeographic Regionalisation for Australia; MAC = MacDonnell Ranges

Note that this analysis does not include the locations of natural waters. The MacDonnell Ranges has many semipermanent natural waters (rock holes, springs etc). These are generally inaccessible to controlled (managed) cattle but are often a haven for feral animals (wild cattle, brumbies and donkeys).

[1] See http://www.greenhouse.gov.au/ncas/reports/tech09.html

It is not possible to report change in watered area for the 1992–2005 period.

Weeds

Weeds known to occur in the MacDonnell Ranges bioregion include:

Common name	Scientific name
African love grass	*Eragrostis curvula*
Athel pine	*Tamarix aphylla*
Bathurst burr	*Xanthium spinosum*
Lippia	*Phyla canescens*
Mesquite	*Prosopis* spp.
Mexican poppy	*Argemone ochroleuca*
Mission grass	*Pennisetum polystachion*
Noogoora burr	*Xanthium occidentale*
Parkinsonia	*Parkinsonia aculeata*
Sida spp.	*Sida* spp.

See www.anra.gov.au for distribution maps

Components of total grazing pressure

Domestic stocking density

Approximately 62% of the MacDonnell Ranges bioregion is within pastoral leases. Much of this country is mountainous, is difficult to manage and has low pastoral value.

Data from the Australian Bureau of Statistics are too sparse to report change in stocking density reliably.

Kangaroos

There are no suitable data for reporting change in kangaroo density.

Invasive animals

Invasive animal species known to occur in the MacDonnell Ranges bioregion include:

Common name	Scientific name
Feral pig	*Sus scrofa*
Fox	*Vulpes vulpes*
Rabbit	*Oryctolagus cuniculus*
Wild dog	*Canis* spp.
Feral cat	*Felis cattus*
Camel	*Camelus dromedaries*
Donkey	*Equus asinus*
Horse	*Equus caballus*

See www.anra.gov.au for distribution maps

Products that support reporting of landscape function and sustainable management

Fire

A small area of the MacDonnell Ranges bioregion burnt in 2001, extending to a considerable area in 2002 following wetter years. Fire was nonexistent or negligible at other times between 1997 and 2005. Most of the fires in the 2001–2002 period occurred between April and November and were likely less intense than summer fires.

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005
% area burnt	0.0	0.0	0.0	0.2	4.6	20.4	0.4	0.0	0.0

The frequency of fire during the reporting period was low compared with other rangeland bioregions, with a mean frequency (log_{10} transformed) of 0.01.

Dust

Dust data report for the whole bioregion. The mean Dust Storm Index value (1992–2005) was 2.90, which is a moderate value compared with all rangeland bioregions. Dust levels were slightly higher in the centre of the bioregion and lower to the east and west.

Biodiversity

By 2005, there were more than 200 bird species and more than 100 reptile species recorded in this bioregion (Biodiversity Working Group indicator: Fauna surveys; see **Section 7 of Chapter 3** of *Rangelands 2008 — Taking the Pulse*). There were approximately 1500 plant taxa recorded (Biodiversity Working Group indicator: Flora surveys).

A case study (see **Buffel grass, Transformer weeds, Chapter 3**) exists on how buffel grass transforms habitats in the bioregion (Biodiversity Working Group indicator: Transformer species).

In the MacDonnell Ranges bioregion, there are (Biodiversity Working Group indicator: Threatened species):

- 11 threatened plant species
- 16 threatened mammal species (including 6 extinct species)
- 6 threatened bird species
- 2 threatened reptile species
- 3 threatened invertebrate species.

Socioeconomic characteristics

Land use and value

Approximately 62% of the MacDonnell Ranges bioregion is pastoral leasehold. This area has not changed appreciably over the 1992–2005 reporting period.

Key management issues and features

Key features and issues of the MacDonnell Ranges bioregion include the following:

- The MacDonnell Ranges bioregion contains the highest number of vulnerable or rare species listed with conservation status nationally and at the NT level.
- Recent intense fires in the eastern part of the bioregion have removed perennial grass and shrub layers, and recovery to date from these has remained patchy.
- Coordinated programs to control feral animals are implemented opportunistically on, and adjacent to, conservation areas and reserves. These programs may involve neighbouring pastoral lessees, but generally, these control efforts have not extended far into pastoral lands.