



Mitchell Grass Downs bioregion

Description

Area: 335 320 km²

The Mitchell Grass Downs bioregion consists of largely treeless plains with some occasional ridges, rivers and gorges. The dominant vegetation type is Mitchell tussock grasslands. Land use is predominantly grazing by cattle (in the Northern Territory — NT) or cattle and sheep (in Queensland). Major population centres are all in Queensland: Longreach, Blackall and Hughenden.

Location

The Mitchell Grass Downs bioregion extends across central Queensland (72% of the **Interim Biogeographic Regionalisation for Australia — IBRA**) into the NT (28% of bioregion area). Figures 1 and 2 show the location of the bioregion, as well as monitoring sites and pastoral tenure.

Figure 1 Location of the Mitchell Grass Downs bioregion

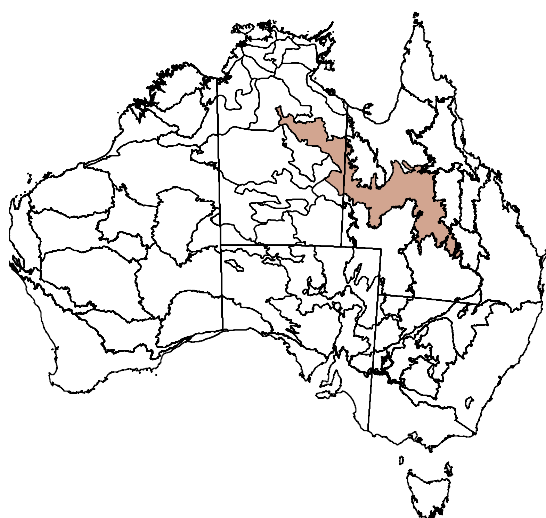
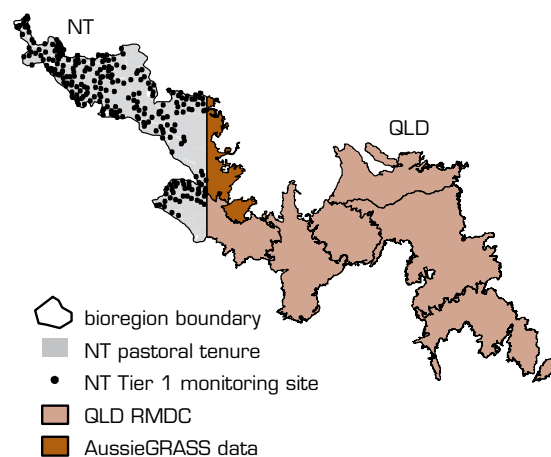


Figure 2 Monitoring sites and pastoral tenure



Data sources available

Data sources include:

- NT Tier 1 — moderate reliability for reporting change, with a high number of sites with a generally uniform distribution; estimated (rather than quantitative) data; and a focus on perennial herbage species)
- Queensland — **Rapid Mobile Data Collection (RMDC)** supported by **AussieGRASS** simulation (of pasture growth and utilisation) and remote sensing (**Multiple Regression Bare Ground Index, version bi1**); these provide moderate reliability for reporting change (RMDC — road traverses and visual estimates; AussieGRASS — entire rangelands, simulated results with some ground validation)
- domestic stocking density — moderate reliability
- fire extent, intensity and frequency — high reliability
- dust

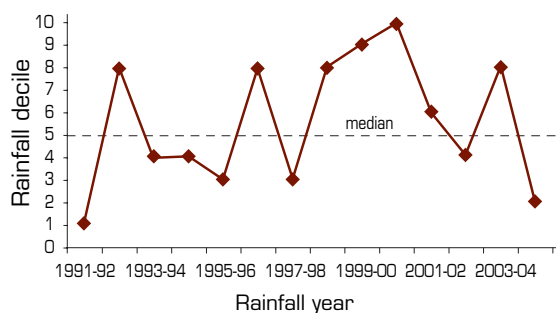


- distance from water
- distribution and relative abundance of invasive animals and weeds
- land use
- land values.

Climate

The Mitchell Grass Downs bioregion has a dry monsoonal to semiarid climate in the south and subhumid tropical climate in the north. Spatially averaged median (1890–2005) rainfall is 332 mm (April to March rainfall year) but some parts receive more than 500 mm each 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.

Decile rainfall was variable during the reporting period, with very dry years at the start and end and a wetter period between 1999–2000 and 2000–2001.

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

Landscape function

Northern Territory

Tier 1, index based on composition (by biomass) and cover of perennial herbage species

When *seasonal quality* was above average, 13% of sites showed a decline in the index of landscape function, while 36% of sites showed an increase in landscape function when *seasonal quality* was below average.

<i>Seasonal quality</i>	Number of sites	Percentage of reassessed sites showing:		
		Decline: > 3 decrease in index	No change	Increase: > 3 increase in index
Above average	175	13%	58%	30%
Average	63	10%	48%	43%
Below average	39	21%	44%	36%

Queensland

RMDC, change in visually assessed vegetation and soil attributes contributing to landscape function score

There was a significant loss of function for the Georgina Limestone sub-IBRA. Some loss of function occurred in the Southwestern Downs, Kynuna Plateau, Northern Downs, Central Downs and Southern Wooded Downs sub-IBRAs. The Barkly Tablelands sub-IBRA (in Queensland) was not assessed adequately with RMDC data to report. **AussieGRASS** simulation suggests no change in landscape function for this area.

Sustainable management

Critical stock forage

Northern Territory

Tier 1, composition (by biomass) of palatable perennial herbage species

When *seasonal quality* was above average, 10% of sites showed a decline in palatable perennial (2P) herbage species, while 33% of sites showed improvement when *seasonal quality* was below average.

<i>Seasonal quality</i>	Number of sites	Percentage of reassessed sites showing:		
		Decline: > 20% decrease in 2P grasses	No change	Increase: > 20% increase in 2P grasses
Above average	210	10%	71%	19%
Average	124	4%	73%	23%
Below average	45	7%	60%	33%

Queensland

AussieGRASS, levels of simulated pasture utilisation and change

Three sub-IBRAs (Georgina Limestone, Northern Downs and Barkly Tablelands) had levels of simulated annual pasture utilisation between 1991 and 2005 that were less than the specified safe threshold. The utilisation level for the Barkly Tablelands sub-IBRA (in Queensland) was considerably less than the safe threshold. The Kynuna Plateau and Southern Wooded Downs had the highest utilisation levels during the same period (27% and 26% respectively). These are at a level that causes loss of palatable perennial grasses and are therefore of considerable concern. Average utilisation elsewhere (Southwestern Downs and Central Downs) was close to the safe threshold.

Utilisation in the Barkly Tablelands sub-IBRA declined by nearly 10% in relative terms (absolute decline of 1%) and this appears consistent with the improvement in 2P grasses observed in the Northern Territory section of the Barkly Tablelands. Larger decreases in average utilisation (27% relative, 7% absolute) were noted for the Northern Downs. Increased pasture growth resulting from the well-above-average *seasonal quality* between 1999 and 2001 probably contributed to this decline.

Plant species richness

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

Change in woody cover

Northern Territory

Australian Greenhouse Office-defined and mapped change in forest extent

Based on the Australian Greenhouse Office definition of forest extent¹, there is minimal area of forest in the NT portion of the Mitchell Grass Downs bioregion.

Forest extent increased from 0.07% of the bioregion area in 1991 to 0.14% in 2004. In reporting this result, there was incomplete coverage of Landsat imagery for 1991 (complete coverage in 2004).

Queensland

Statewide Landcover and Trees Study mapping of woody cover

The 1991 levels of woody cover in Queensland sub-IBRAs of the Mitchell Grass Downs bioregion varied from 3.65% (Barkly Tablelands) to 29.96% (Southern Wooded Downs). Change in the 1991–2003 period varied from nil to 3.81% loss of woody cover (Southern Wooded Downs). Cumulative clearing during the same period was nil for the Barkly Tablelands and 4.61% for the Southern Wooded Downs. Historically, woody cover in the Southern Wooded Downs was much higher before concerted clearing of gidgee scrubs began in the 1950s. Before that, myall trees were often cut for drought fodder in the bioregion.

Distance from stock water

The percentage of sub-IBRA area within three kilometres of permanent and semipermanent sources of stock water is summarised in the following table. Note that for the NT, the locations of stock water-points were sourced from NT mapping of lease infrastructure, and watered area is reported as the percentage of pastoral tenure within each sub-IBRA. Queensland data were obtained from Geoscience Australia's GEODATA TOPO 250K vector product (Series 3, June 2006), and watered area is the percentage of sub-IBRA area. These differences mean that the percentage watered areas reported for each data type are not directly comparable.

¹ See <http://www.greenhouse.gov.au/ncas/reports/tech09.html>

Sub-IBRA	Northern Territory		Queensland	
	% sub-IBRA within 3 km of water	% sub-IBRA area analysed	% sub-IBRA within 3 km of water	% sub-IBRA area analysed
Mitchell Grass Downs P1 (MGD1)	22.0	94.2	25.8	100
Barkly Tableland (MGD2)	32.3	87.1	31.6	100
Georgina Limestone (MGD3)	46.7	97.2	16.9	100
Southwestern Downs (MGD4)			29.2	100
Kynuna Plateau (MGD5)			34.5	100
Northern Downs (MGD6)			67.0	100
Central Downs (MGD7)			82.5	100
Southern Wooded Downs (MGD8)			85.9	100

IBRA = Interim Biogeographic Regionalisation for Australia;
MGD = Mitchell Grass Downs

Note that this analysis does not include the locations of natural waters or bore drains, which are a very significant source of stock water across much of the Queensland component of this bioregion. Thus the percentage area within three kilometres of stock water for some sub-IBRAs is probably understated significantly.

It is not possible to report change in watered area for the 1992–2005 period. Again, this is a significant issue in parts of Queensland where numerous, formerly free-flowing bores (and their associated bore drains) now have controlled flows and water reticulation by means of polythene pipe, tanks and troughs.

Weeds

Weeds known to occur in the Mitchell Grass Downs bioregion include:

Common name	Scientific name
African boxthorn	<i>Lycium ferocissimum</i>
Athel pine	<i>Tamarix aphylla</i>
Bellyache bush	<i>Jatropha gossypifolia</i>
Chinee apple	<i>Zizyphus mauritiana</i>
Giant rats tail grass	<i>Sporobolus natalensis</i> and <i>S. pyramidalis</i>
Hyptis	<i>Hyptis suaveolens</i>
Mesquite	<i>Prosopis</i> spp.
Mexican poppy	<i>Argemone ochroleuca</i>
Mother of millions	<i>Bryophyllum tubiflorum</i> and hybrids
Noogoora burr	<i>Xanthium occidentale</i>
Parkinsonia	<i>Parkinsonia aculeata</i>
Parthenium weed	<i>Parthenium hysterophorus</i>
Prickly acacia	<i>Acacia nilotica</i> subsp. <i>indica</i>
Rubber vine	<i>Cryptostegia grandiflora</i>

See www.anra.gov.au for distribution maps

Components of total grazing pressure

Domestic stocking density (reporting for whole bioregion)

Most (96%) of the Mitchell Grass Downs bioregion is grazed. Data from the Australian Bureau of Statistics showed that stocking density decreased between 1992 (17% above the 1983–1991 average) and 1996 (which was approximately equal to the 1983–1991 average) in line with generally deteriorating *seasonal quality* (see Figure 3, above). Stock numbers increased appreciably from 1999 to 2001 (26% above the 1983–1991 base at that time) during wetter years. Stocking density then declined markedly, with drier years in 2002 and 2003 (to equal the 1983–1991 average) before increasing to 10% above the 1983–1991 base in 2004. Note that spatial averaging conceals likely variation in stocking density trends across the bioregion.

Kangaroos

Northern Territory

There are no suitable data for reporting change.

Queensland

Kangaroo density data are available for all or most of the Southern Wooded Downs, Central Downs, Northern Downs and Kynuna Plateau sub-IBRAs (Queensland). The density of red and eastern grey kangaroos (on a dry sheep equivalent basis) decreased in a fluctuating manner between 1993 and 1997 compared with the average density for the 1984–1991 period (when the 1997 density was 61% of the 1984–1991 average). Kangaroo density then increased rapidly and markedly to 2000 (more than 1.5 times the 1984–1991 average) before decreasing in the early years of this decade in response to poorer *seasonal quality* in 2002 and 2003 (2003 density was 10% above the 1984–1991 base).

Invasive animals

Invasive animal species known to occur in the Mitchell Grass Downs bioregion include:

Common name	Scientific name
Feral pig	<i>Sus scrofa</i>
Feral goat	<i>Capri hircus</i>
Deer	<i>Cervidae</i> family
Fox	<i>Vulpes vulpes</i>
Rabbit	<i>Dryctolagus cuniculus</i>
Wild dog	<i>Canis</i> spp.
Feral cat	<i>Felis catus</i>
Starling	<i>Sturnus vulgaris</i>
Cane toad	<i>Bufo marinus</i>
Horse	<i>Equus caballus</i>

See www.anra.gov.au for distribution maps

Products that support reporting of landscape function and sustainable management

Fire

Fire data report for the whole bioregion. Fire was insignificant, with a maximum of 5.5% of the bioregion burnt in 2001. The frequency of fire between 1997 and 2005 was low, with a mean frequency (\log_{10} transformed) of 0.04.

Dust

Dust data report for the whole bioregion. The mean Dust Storm Index value (1992–2005) was 1.69, which was a low to moderate value among all rangeland bioregions. Dust levels were higher in the central portion of the bioregion (Barkly Tablelands sub-IBRA in the vicinity of the NT–Queensland border; Georgina Limestone and Southwestern Downs sub-IBRAs). Dust levels were negligible further into the NT and low in the far east of the bioregion (Central Downs and Southern Wooded Downs sub-IBRAs).

Biodiversity

In Queensland, regional ecosystems are defined by Sattler and Williams (1999) as vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil. Descriptions of regional ecosystems can be sourced from the Regional Ecosystem Description Database.²

In the Queensland sub-IBRAs of the Mitchell Grass Downs bioregion, 54 regional ecosystems have been described. Under the *Queensland Vegetation Management Act 1999*, four of these are listed as 'of concern', and one is listed as endangered. For two of these regional ecosystems, less than 10% of their pre-clear distributions are currently represented in reserves (Accad et al 2006) (Biodiversity Working Group indicator: Threatened communities; see **Section 7 of Chapter 3** of *Rangelands 2008 — Taking the Pulse*).

In this bioregion, there are (Biodiversity Working Group indicator: Threatened species):

- 12 threatened plant species
- 8 threatened mammal species (includes two extinct species, the desert rat-kangaroo and the lesser stick-nest rat; also includes the western quoll, which is listed as Vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), but is extinct from this bioregion)
- 9 threatened bird species
- no threatened reptile or amphibian species
- 2 threatened fish species.

² See http://www.epa.qld.gov.au/nature_conservation/biodiversity/regional_ecosystems/how_to_download_REDD/

Socioeconomic characteristics

Land use and value

Most (96%) of the Mitchell Grass Downs bioregion is grazed. This area has not changed appreciably over the 1992–2005 reporting period.

In Queensland, the unimproved rangeland values as at June 2006 were, on average, \$4792 ± \$261/km² (values expressed in 2005 dollars). There was a large range in average unimproved value across sub-IBRAs (\$333 to \$6668/km²). It is not possible to report change in land values for the 1992–2005 period.

In the NT, the unimproved land value of pastoral leases increased marginally (on average) between 1991 and 2003, by approximately 4% (in 2005 dollars).

Key management issues and features

Major regional features and issues of the Mitchell Grass Downs bioregion include the following:

■ Queensland:

- There are high levels of pasture utilisation (in two sub-IBRAs and in individual years). This has implications for the persistence and recovery of palatable and productive perennial grasses.

- There has been Mitchell grass death with areas of nonrecovery to date.
- Species composition has changed to more *Aristida* species.
- There are increasing numbers of woody weeds of national significance, particularly *Acacia nilotica*.
- There are also increasing woody trees and shrubs (eg mimosa and gundabluely).

■ NT:

- Between 1992 and 2004, the condition of the Mitchell Grass Downs bioregion as a whole is considered to have steadily improved.
- Recent intense fires and less effective wet seasons have resulted in a decline in land condition (2004–2005). Recovery was apparent following the most recent wet season (2006).
- As a result, properties in the bioregion reduced cattle numbers to cope with the poorer seasonal conditions.
- There has been a steady increase in the amount of woody weeds, in particular around waterpoints and areas with a long history of grazing. Properties are actively managing these problems with control or eradication programs.