



# Flinders Lofty Block bioregion

## Description

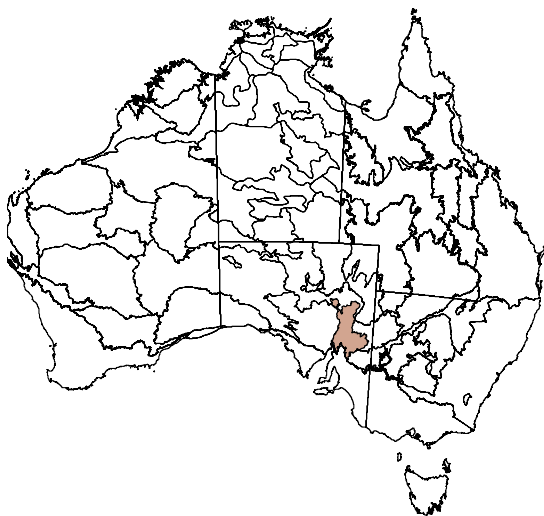
Area: 57 930 km<sup>2</sup>

The Flinders Lofty Block bioregion has a general pattern of mountain ranges, ridges and wide, flat plains. Vegetation types are related to landforms, with eucalypts on hills and ranges that receive higher rainfall, mulga in the drier areas, and sparse low shrubs or spinifex on stony areas. The area is mainly used for sheep and cattle grazing. Conservation reserves and associated tourism are also important. Coal is mined at Leigh Creek and there is limited dryland agriculture in the south and east. Major population centres are Olary, Hawker, Quorn, and Leigh Creek.

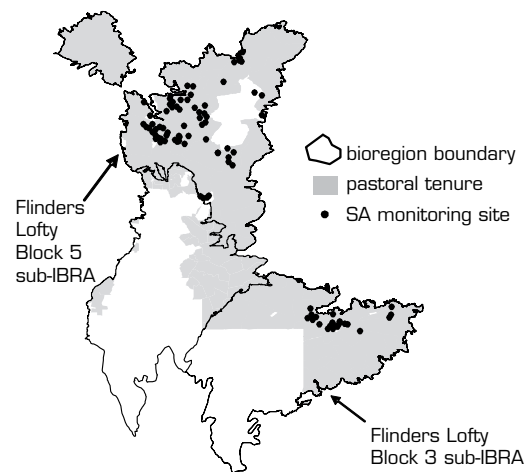
## Location

The Flinders Lofty Block bioregion is located in southeast South Australia (SA; see Figures 1 and 2).

**Figure 1 Location of the Flinders Lofty Block bioregion**



**Figure 2 Monitoring sites and pastoral tenure**



## Data sources available

Data sources include:

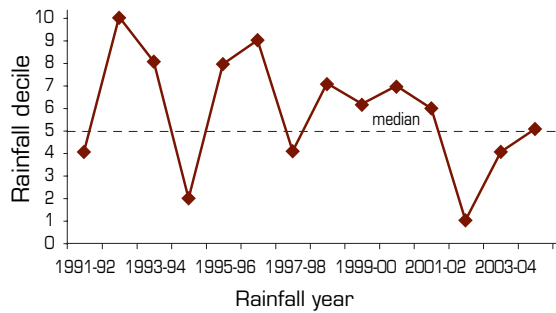
- SA pastoral monitoring sites, reporting for two sub-Interim Biogeographic Regionalisations for Australia (IBRA) — these provide moderate reliability for reporting change, with a moderate number of patchily distributed sites; quantitative data; and a focus on longer-lived plant species, which helps to filter short-term seasonal variability
- 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
- land values.



## Climate

The Flinders Lofty Block bioregion has a semiarid to arid climate with unreliable and erratic, winter-dominant rainfall. Spatially averaged median (1890–2005) rainfall is 217 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.

There was substantial variation in *seasonal quality* based on decile rainfall throughout the reporting period. The year 1992–1993 was exceptionally wet, while the years 1994–1995 and 2002–2003 were very dry.

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

## Landscape function

### Density of perennial shrubs — FLB3 and FLB5 sub-IBRAs

When *seasonal quality* was above average, 6% of sites in the Olary Spur (FLB3) sub-IBRA and 15% of sites in the Northern Flinders (FLB5) sub-IBRA showed a decline in the density of perennial shrubs. It is not possible to report change in density following below-average *seasonal quality*.

<i>Seasonal quality</i>	Sub-IBRA	Number of sites	Decline: density < 90%	No change: density between 90% and 110%	Increase: density ≥ 110%
Above average	FLB3	17	6%	29%	65%
	FLB5	55	15%	22%	64%
Average	FLB3	4	n/a	n/a	n/a
	FLB5	12	42%	8%	50%
Below average	FLB3	n/a	n/a	n/a	n/a
	FLB5	2	n/a	n/a	n/a

FLB = Flinders Lofty Block; IBRA = Interim Biogeographic Regionalisation for Australia

## Sustainable management

### Critical stock forage — FLB3 and FLB5 sub-IBRAs

Decreaser shrubs declined in density at 7% of sites in the Olary Spur (FLB3) sub-IBRA and 8% of sites in the Northern Flinders (FLB5) sub-IBRA following above-average *seasonal quality*. It is not possible to report change following below-average *seasonal quality*.

<i>Seasonal quality</i>	Sub-IBRA	Number of sites	Decline: density < 90%	No change: density between 90% and 110%	Increase: density ≥ 110%
Above average	FLB3	15	7%	20%	73%
	FLB5	49	8%	27%	65%
Average	FLB3	4	n/a	n/a	n/a
	FLB5	7	n/a	n/a	n/a
Below average	FLB3	n/a	n/a	n/a	n/a
	FLB5	n/a	n/a	n/a	n/a

FLB = Flinders Lofty Block; IBRA = Interim Biogeographic Regionalisation for Australia

### Plant species richness

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

## Change in woody cover

Data for the change in woody cover relate to the whole of the Flinders Lofty Block bioregion. Based on the Australian Greenhouse Office definition and mapping of forest extent<sup>1</sup>, there is a small amount of forest in the bioregion and there was a very small decrease in its area between 1991 and 2004 (in 1991, forest covered 4.77% of bioregion area, decreasing by 0.27% to 4.50% in 2004). There is good coverage of Landsat imagery for reporting this result.

## Distance from stock water

Data for the distance from stock water relate to the whole of the bioregion. The percentage area of pastoral lease country within three kilometres of permanent and semipermanent sources of stock water (including natural water supplies) for each sub-IBRA is:

Olary Spur (FLB3)	74.6% (57.8% of sub-IBRA analysed)
Southern Flinders (FLB4)	59.6% (8.3% of sub-IBRA analysed)
Northern Flinders (FLB5)	55.5% (47.9% of sub-IBRA analysed)

FLB = Flinders Lofty Block; IBRA = Interim Biogeographic Regionalisation for Australia

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

Large portions of the area of pastoral leases within the FLB4 and FLB5 sub-IBRAs were excluded because of their rugged terrain. Natural waters (rock holes, springs etc) in these areas are generally inaccessible to controlled (managed) sheep and cattle but are often a haven for feral animals (particularly goats).

## Weeds

Weeds known to occur in the Flinders Lofty Block bioregion include:

Common name	Scientific name
African boxthorn	<i>Lycium ferocissimum</i>
Athel pine	<i>Tamarix aphylla</i>
Bathurst burr	<i>Xanthium spinosum</i>
Blackberry	<i>Rubus fruticosus</i> aggregate
Bridal creeper	<i>Asparagus asparagoides</i>
Broom Montpellier or cape broom	<i>Genista monspessulana</i>
Gorse	<i>Ulex europaeus</i>
Patersons curse	<i>Echium plantagineum</i>
Silver leaf nightshade	<i>Solanum elaeagnifolium</i>
Wild mignonette	<i>Reseda luteola</i>

See [www.anra.gov.au](http://www.anra.gov.au) for distribution maps

## Components of total grazing pressure

### Domestic stocking density

Data for domestic stocking density relate to the whole bioregion in the rangelands. In 1992, 94% of the Flinders Lofty Block bioregion was grazed, reducing slightly to 92% in 2001. Data from the Australian Bureau of Statistics showed that stocking density declined almost continuously throughout the 1992–2004 period. Stocking density in 1992 was 15% above the average for 1983–1991 and, in 2004, was 84% of the base. Declining *seasonal quality*, particularly towards the end of the reporting period, contributed to this decrease but is unlikely to have been the sole driver. There was probable spatial variation in stocking density across the bioregion that is concealed by the spatially averaged data presented here.

### Kangaroos

Data on kangaroo populations relate to the whole bioregion in the rangelands. The combined density of red and western grey kangaroos (expressed as dry sheep equivalents) fluctuated from year to year but generally decreased between 1992 and 2003. The 1992 density was 36% above the 1984–1991 average and the 2003 density was 56% of this base value. Decrease in kangaroo density broadly corresponded with decrease in stocking density (described above) and presumably reflected declining *seasonal quality*, particularly in the latter half of the reporting period.

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

## Invasive animals

Invasive animal species known to occur in the Flinders Lofty Block bioregion include:

Common name	Scientific name
Feral goat	<i>Capri hircus</i>
Fox	<i>Vulpes vulpes</i>
Rabbit	<i>Dryctolagus cuniculus</i>
Wild dog	<i>Canis spp.</i>
Feral cat	<i>Felis cattus</i>
Starling	<i>Sturnus vulgaris</i>

See [www.anra.gov.au](http://www.anra.gov.au) for distribution maps

## Products that support reporting of landscape function and sustainable management

### Fire

No data on area burnt were available for the Flinders Lofty Block, and fire was presumably very minor in this bioregion in the 1997–2005 period.

### Dust

Dust data relate to the whole bioregion in the rangelands. The mean Dust Storm Index value (1992–2005) was 1.42, which is low compared with all rangeland bioregions. Dust levels were negligible in the northeast and low elsewhere.

## Biodiversity

Biodiversity characteristics (Biodiversity Working Group indicator: Threatened species; see **Section 7 of Chapter 3** of *Rangelands 2008 — Taking the Pulse*) for the Flinders Lofty Block bioregion include the following:

- 13 threatened plant species
- 1 threatened mammal species
- 2 threatened bird species
- 2 threatened reptile species.

By 2005, there were more than 250 fauna survey sites, more than 96 000 bird records, more than 12 000 mammal records, 8000 reptile records and almost 400 amphibian records (Biodiversity Working Group indicator: Fauna surveys).

Also by 2005, there were more than 1000 flora survey sites and more than 60 000 flora records of more than 2100 taxa (Biodiversity Working Group indicator: Flora surveys).

## Socioeconomic characteristics

### Land use and value

In 1992, 94% of the Flinders Lofty Block bioregion was grazed; this reduced slightly to 92% in 2001.

The unimproved value of pastoral land has increased, on average, by approximately 55% between 1998 and 2004 (values expressed in 2005 dollars).

## Key management issues and features

Key features and issues of the Flinders Lofty Block bioregion include the following:

- The bioregion has a long history of excessive total grazing pressure and extensive degradation.
- Much of the Flinders Ranges bioregion is now a highly modified ecosystem.
- Goat control through the Bounceback Program and associated landholder activity has been effective in reducing the feral goat population. Ongoing effort to consolidate these gains is required, and there is some evidence of recent increased populations.
- Significant vegetation recovery (including weeds) occurred following the spread of rabbit haemorrhagic disease (calicivirus) in the mid-1990s.
- Individual landholders and community groups in some areas have made commendable efforts to control rabbits following the release and spread of rabbit haemorrhagic disease.

- Wards weed, onion weed, boxthorn and wheel cactus are significant weed problems. Associated control programs have been implemented.
- Considerable woody thickening has occurred, particularly cypress (native) pine in conservation areas.
- Many pastoral leases in the bioregion are of marginal viability. This is associated with their small size and the decline in wool prices since the early 1990s.
- There is increasing diversification into tourism and other activities as an adjunct to, or replacing, the pastoral enterprise.
- A number of leases have been bought for conservation and Indigenous purposes.