



Gawler bioregion

Description

Area: 123 605 km²

The Gawler bioregion is characterised by rounded landscapes, rocky hills, plains and salt-encrusted lake beds. Vegetation types include spinifex grasslands, open woodlands and chenopod shrubs. Sheep and some cattle grazing is the most extensive industry (in terms of area) but mining, particularly copper, uranium and gold at Olympic Dam, provides the main source of revenue. Iron ore is also extracted in the Iron Knob area. Major population centres are Whyalla, Port Augusta, Roxby Downs and Woomera.

Location

The Gawler bioregion is located in southern South Australia (SA; see Figures 1 and 2).

Figure 1 Location of the Gawler bioregion

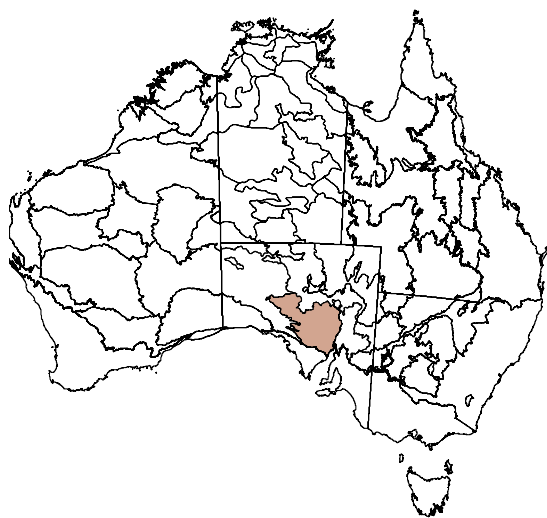
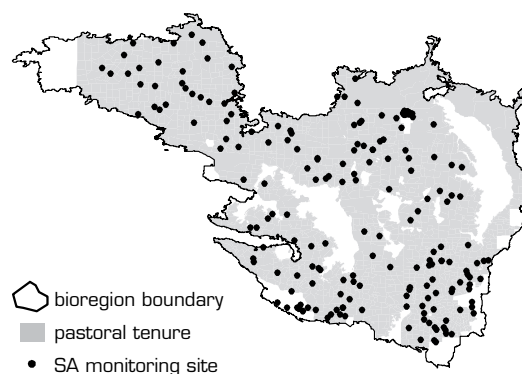


Figure 2 Monitoring sites and pastoral tenure



Data sources available

Data sources include:

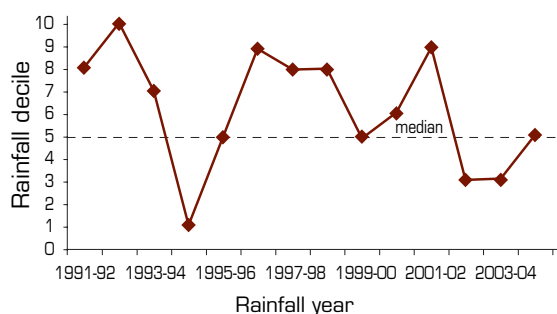
- SA pastoral monitoring sites, which provide high reliability for reporting change, with a large number of well-distributed sites, quantitative data, and a focus on longer-lived plant species (which helps to filter short-term seasonal variability)
- domestic stocking density, which provides moderate 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 Gawler bioregion has an arid climate with predominantly winter rainfall. Spatially averaged median (1890–2005) rainfall is 169 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 1994–1995 was very dry, while individual years at other times were quite wet (1992–1993, 1995–1996 and 2000–2001). Drier years prevailed at the end of the reporting period.

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

Landscape function

Density of perennial shrubs

When *seasonal quality* was above average, 18% of sites showed a decline in the density of perennial shrubs. It is not possible to report change following below-average *seasonal quality* because of low reliability associated with the very small number of sites (six sites) assessed at this time.

<i>Seasonal quality</i>	Number of sites	Decline: density < 90%	No change: density between 90% and 110%	Increase: density ≥ 110%
Above average	123	18%	21%	61%
Average	82	21%	23%	56%
Below average	6	n/a	n/a	n/a

Sustainable management

Critical stock forage

Decreaser shrubs declined in density at 16% of sites following above-average *seasonal quality*. It is not possible to report change following below-average *seasonal quality*.

<i>Seasonal quality</i>	Number of sites	Decline: density < 90%	No change: density between 90% and 110%	Increase: density ≥ 110%
Above average	107	16%	25%	59%
Average	56	21%	25%	54%
Below average	2	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 extent¹, forest cover increased from 1.90% of the bioregion in 1991 to 2.09% in 2004 — an increase of 0.19%. There is complete coverage of Landsat imagery for reporting this result.

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

Distance from stock water

The percentage area of pastoral lease country within three kilometres of permanent and semipermanent sources of stock water, including natural waters, for each sub-Interim Biogeographic Regionalisation for Australia (IBRA), is:

Myall Plains (GAW1)	69.4% (77.7% of sub-IBRA area analysed)
Gawler Volcanics (GAW2)	52.5% (87.3% of sub-IBRA area analysed)
Gawler Lakes (GAW3)	44.6% (55.1% of sub-IBRA area analysed)
Arcoona Plateau (GAW4)	45.6% (90.6% of sub-IBRA area analysed)
Kingoonya (GAW5)	30.2% (89.3% of sub-IBRA area analysed)

GAW = Gawler; IBRA = Interim Biogeographic Regionalisation for Australia

It is not possible to report change in distance from stock water for the 1992–2005 period.

Weeds

Weeds known to occur in the Gawler bioregion include:

Common name	Scientific name
African boxthorn	<i>Lycium ferocissimum</i>
African love grass	<i>Eragrostis curvula</i>
Athel pine	<i>Tamarix aphylla</i>
Bathurst burr	<i>Xanthium spinosum</i>
Bridal creeper	<i>Asparagus asparagoides</i>
Kochia	<i>Bassia scoparia</i>
Mesquite	<i>Prosopis</i> spp.
Noogoora burr	<i>Xanthium occidentale</i>
Pampas grass	<i>Cortaderia</i> spp.
Parkinsonia	<i>Parkinsonia aculeata</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 for distribution maps

Components of total grazing pressure

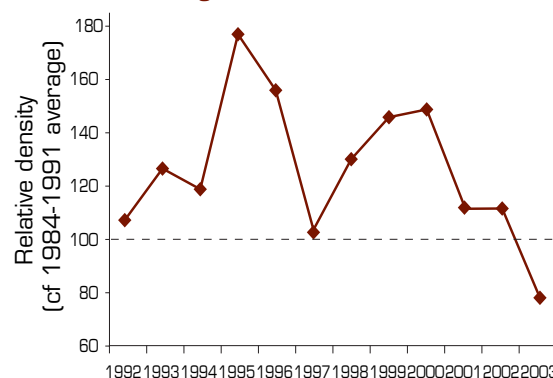
Domestic stocking density

Most (83%) of the Gawler bioregion is grazed. Data from the Australian Bureau of Statistics showed that stocking density fluctuated by up to 7% above the 1983–1991 average between 1992 and 1999. Stocking density then declined in 2000 to 89% of the 1983–1991 base, recovered to equal the base in 2002 and then declined further in 2003 (to 82% of the base). At the time of latest available data (2004), stocking density was 87% of the 1983–1991 average. The decline in the latter half of the reporting period was probably largely driven by declining *seasonal quality* (see graphed rainfall deciles above). It is probable that there was spatial variation in stocking density across the bioregion that is concealed by the spatially averaged data presented here.

Kangaroos

The combined density of red and western grey kangaroos (expressed as dry sheep equivalents) fluctuated considerably throughout the 1992–2003 period. The density was 6% above the 1984–1991 average in 1992 and approximately 20% above this base in 1993–1994. Kangaroo density then increased sharply in 1995 before declining over the next two years to equal the base. Numbers increased again to 2000 and then declined to 2003 to be 78% of the 1984–1991 average (see Figure 4).

Figure 4 Kangaroo density, Gawler bioregion



The increase and later decrease in the second part of the reporting period are broadly related to both *seasonal quality* and domestic stocking density reported above.

Invasive animals

Invasive animal species known to occur in the Gawler 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 catus</i>
Starling	<i>Sturnus vulgaris</i>
Camel	<i>Camelus dromedaries</i>

See www.anra.gov.au for distribution maps

Products that support reporting of landscape function and sustainable management

Fire

No fire was recorded for any year in the Gawler bioregion during the period of available data (1997–2005).

Dust

The mean Dust Storm Index value (1992–2005) for the Gawler bioregion was 1.75, which was a low to moderate value among all rangeland bioregions. Dust levels were higher in the northeast part of the bioregion and negligible near Kingoonya.

Biodiversity

By 2005, there were more than 24 600 bird records, 4300 reptile records and 2000 mammal records (Biodiversity Working Group indicator: Fauna surveys; see **Section 7 of Chapter 3 of Rangelands 2008 — Taking the Pulse**). There were more than 500 flora survey sites and more than 11 000 flora records (about 1700 taxa) for the bioregion (Biodiversity Working Group indicator: Flora surveys).

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

- 8 threatened plant species
- 3 threatened mammal species
- 6 threatened bird species
- 1 threatened reptile species.

Socioeconomic characteristics

Land use and value

A substantial amount (83%) of the Gawler bioregion is grazed (most of the nonpastoral area is salt lake). This area has not changed appreciably over the 1992–2005 reporting period.

The unimproved value of pastoral land has increased, on average, by approximately 65% between 1998 and 2004 (values expressed in 2005 dollars).

Key management issues and features

Key features and issues of the Gawler bioregion include the following:

- The Gawler bioregion is dominated by chenopod shrublands and low woodlands. Sheep are the predominant form of livestock.
- Some increase in woody cover is evident, possibly due to the effects of continual grazing pressure.
- There have been historically high levels of stocking.
- Available water supplies are fully exploited. Groundwater is limited in extent and is generally of poor to marginal quality.
- Rabbit numbers are recovering following the spread of rabbit haemorrhagic disease (calicivirus) in the 1990s.
- Feral goats persist in the more inaccessible areas.
- This bioregion has the most extensive rangeland monitoring program in the state. The second round of pastoral condition assessments is currently under way.