



Nullarbor bioregion

Description

Area: 1 97 220 km²

The Nullarbor bioregion is dominated by broad, gently undulating limestone plains. The vegetation is predominantly chenopod, with a number of bluebush and saltbush species, sometimes with a scattered overstorey of western myall or mulga. The plains are progressively more wooded in the northern and western parts of the bioregion. Perennial grasses are common where fires have removed the chenopod vegetation. Soils are calcareous shallow loams and calcareous loamy earths. Pastoralism is the predominant land use within Western Australia, while conservation reserves occupy most of the bioregion on the South Australian side. There are no major population centres in the bioregion. Yalata is one of the smaller centres.

Location

The Nullarbor bioregion is located in the southern rangelands of Western Australia (WA; 70% of the **Interim Biogeographic Regionalisation for Australia (IBRA)** area) and South Australia (SA; 30% of bioregion). Figures 1 and 2 show the location of the Nullarbor bioregion.

Figure 1 Location of the Nullarbor bioregion

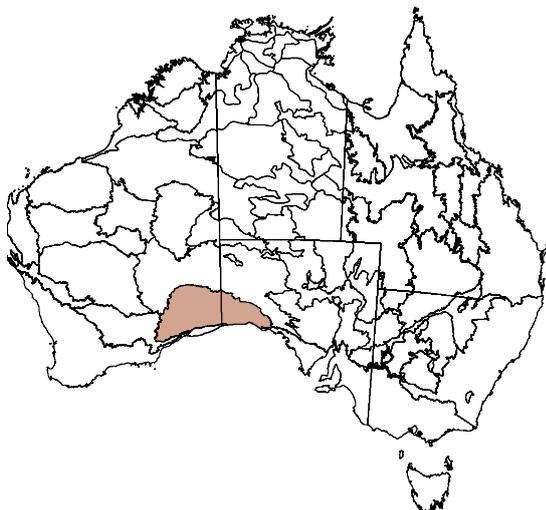
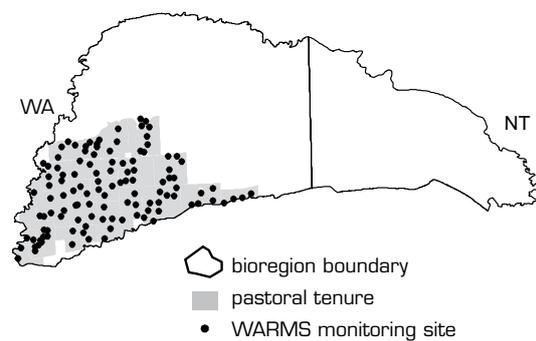


Figure 2 Western Australian Rangeland Monitoring System monitoring sites and pastoral tenure in the WA part of the Nullarbor bioregion



Data sources available

Data sources include:

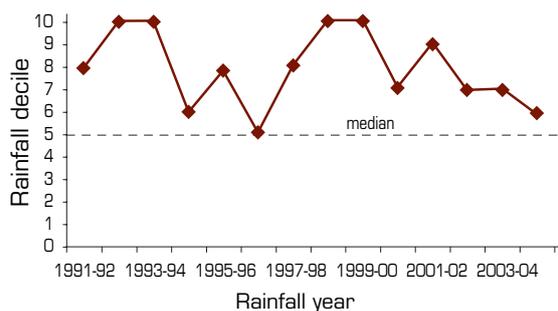
- Western Australian Rangeland Monitoring System (WARMS), which provides high reliability for reporting change, with a large number of sites in the central band, Nullarbor Plain (NUL2) sub-IBRA, quantitative data, and a focus on longer-lived plant species, which helps to filter short-term seasonal variability
- 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
- conservation estate
- land values.



Climate

The climate of the Nullarbor bioregion is arid to semiarid. Spatially averaged median (1890–2005) rainfall is 192 mm (April to March rainfall year; see Figure 3). Note that rainfall data are for the whole Nullarbor bioregion.

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.

Seasonal quality based on decile rainfall throughout the 1992–2005 reporting period was above average. Recent years (2002–2003 to 2004–2005) have seen declining rainfall (although still above the median). Spatially averaged, the Nullarbor bioregion received 14 consecutive years of median or above rainfall. This is almost certainly the best sequence of rainfall on record, better even than the mid-1970s or the first decade of the twentieth century.

Note that regional averaging of rainfall conceals spatial variability. Some parts of the bioregion experienced better *seasonal quality* and others worse during the 1992–2005 period. For example, much of the western part of the bioregion was declared to be under exceptional circumstances (drought) in 2003, with this declaration extended in 2006.

Landscape function

Change in landscape function can be reported in a number of ways using WARMS data. The information in the following sections is based on the resource capture index and population growth rate (for consistency with reporting by other jurisdictions). Reporting is for the central band, Nullarbor Plain (NUL2) sub-IBRA only based on the distribution of WARMS sites.

Nullarbor 2 sub-IBRA

Resource capture index

When *seasonal quality* was above average, 32% of sites showed a decline in the resource capture index, while 57% of sites showed an increase when *seasonal quality* was below average.

<i>Seasonal quality</i>	Number of sites	Decline: RCI < 0.90	No change: 0.90 ≤ RCI < 1.10	Increase: RCI ≥ 1.10
Above average	19	32%	32%	37%
Average	83	23%	39%	39%
Below average	14	14%	29%	57%

RCI = resource capture index

Population growth rate

No sites experienced a decline in the density of longer-lived perennial vegetation when *seasonal quality* was above average, and 86% of sites showed an increase when *seasonal quality* was below average. On average, there was a 20% increase in density and virtually no sites suffered substantial decline.

<i>Seasonal quality</i>	Number of sites	Decline: density < 95%	No change: density between 95% and 105%	Increase: density ≥ 105%
Above average	19	0%	32%	68%
Average	83	17%	28%	55%
Below average	14	0%	14%	86%

There are no suitable data for reporting change for the SA part of the Nullarbor bioregion.

Sustainable management

Critical stock forage

Decreaser shrubs declined in density at 5% of sites in the central band, Nullarbor Plain (NUL2) sub-IBRA following above-average *seasonal quality*. They increased at 90% of sites following below-average *seasonal quality*.

Seasonal quality	Species group	Number of sites	Decline: density < 0.95	No change: 0.95 ≤ density < 1.05	Increase: density ≥ 1.05
Above average	Decreaser	19	5%	26%	68%
	Intermediate	19	0%	79%	21%
	Increaser	7	n/a	n/a	n/a
Average	Decreaser	76	22%	22%	55%
	Intermediate	73	6%	38%	29%
	Increaser	15	7%	67%	27%
Below average	Decreaser	10	0%	10%	90%
	Intermediate	9	n/a	n/a	n/a
	Increaser	1	n/a	n/a	n/a

There are no suitable data for reporting change for the SA part of the Nullarbor bioregion.

Plant species richness

No WARMS sites had decreased species richness of native perennial plants following above-average *seasonal quality* and 21% of sites had increased species richness following below-average *seasonal quality*.

Seasonal quality	Number of sites	Decline: richness index < 0.80	No change: 0.80 ≤ richness index < 1.20	Increase: richness index ≥ 1.20
Above average	9	0%	53%	47%
Average	83	2%	69%	29%
Below average	14	0%	79%	21%

There are no suitable data for reporting change for the SA part of the Nullarbor bioregion.

Change in woody cover

Based on WARMS data, cover of woody species increased by one-third on average and remained the same or increased on most sites (83%). On only 1% of sites did cover drop below 50% of the initially recorded value.

There are no suitable data for reporting change for the SA part of the Nullarbor bioregion.

Distance from stock water

The percentage area of pastoral lease country in WA within three kilometres of permanent and semi-permanent sources of stock water for each sub-IBRA is:

Northern band, Carlisle (NUL1)	11.9% (5.5% of sub-IBRA analysed)
Central band, Nullarbor Plain (NUL2)	10.2% (53.1% of sub-IBRA analysed)

IBRA = Interim Biogeographic Regionalisation for Australia;
NUL = Nullarbor

Note that this analysis does not include the locations of natural waters, although these are rare in the Nullarbor bioregion. It is not possible to report change in watered area for the 1992–2005 period.

There is no commercial pastoralism in the SA part of the bioregion.

Weeds

Weeds known to occur in the Nullarbor bioregion include:

Common name	Scientific name
African boxthorn	<i>Lycium ferocissimum</i>
African love grass	<i>Eragrostis curvula</i>
Bathurst burr	<i>Xanthium spinosum</i>
Patersons curse	<i>Echium plantagineum</i>
Wild mignonette	<i>Reseda luteola</i>

See www.anra.gov.au for distribution maps

Components of total grazing pressure

Domestic stocking density

Approximately 32% of the Nullarbor bioregion is commercially grazed, almost exclusively in WA. Data from the Australian Bureau of Statistics showed that domestic stocking density was below the 1983–1991 average throughout 1992 to 2004 and decreased appreciably between 2000 and 2001. In both 2001 and 2004, stocking density was approximately 65% of the 1983–1991 average. These changes bear little direct relationship with *seasonal quality* indicated by decile rainfall (see Figure 3, above). Note that spatial averaging across grazed areas of the bioregion conceals likely actual variation in stocking density trends.

Kangaroos

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

Invasive animals

Invasive animal species known to occur in the Nullarbor bioregion include:

Common name	Scientific name
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>
Camel	<i>Camelus dromedaries</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

Data for the whole bioregion show that fires cause major, long-lasting changes in the vegetation of the Nullarbor bioregion. Typically, the chenopod shrubs are replaced by perennial grasses following fire. This occurred especially along the trans-Australian railway line, completed in the early 20th century, and in the mid-1970s following a sequence of very high rainfall.

Fire was insignificant during the 1997–2005 period, with a maximum of 0.5% of the bioregion area burnt in 2000.

The fires that were recorded occurred in the hot or dry months of the year and so were likely to be more intense.

Dust

Based on data for the whole bioregion, the mean Dust Storm Index value (1992–2005) was 1.64, which is considered low. Dust levels were relatively higher in the eastern part of the bioregion (SA) than in WA.

Biodiversity

More than 15% of the Nullarbor bioregion area is protected (Collaborative Australian Protected Areas Database, Biodiversity Working Group indicator: Protected areas; see **Section 7 of Chapter 3** of *Rangelands 2008 — Taking the Pulse*).

For the SA part of the bioregion, there are more than 500 flora survey sites and approximately 10 000 flora records of about 630 taxa (Biodiversity Working Group indicator: Flora surveys). There are more than 3500 bird records, 1000 reptile records and 600 mammal records (Biodiversity Working Group indicator: Fauna surveys).

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

- 3 threatened plant species
- 8 threatened mammal species
- 3 threatened bird species.

Socioeconomic characteristics

Land use and value

Approximately 32% of the Nullarbor bioregion is commercially grazed, exclusively in WA. This area has not changed appreciably over the 1992–2005 reporting period.

In WA, there have been very few property sales during the 1992–2005 period and it is not possible to report realistic change in the average 'lease and improvement' value of pastoral land.

Key management issues and features

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

- WA (issues relate to the central band, Nullarbor plain [NUL2] sub-IBRA):
 - The Nullarbor as a whole experienced an exceptional sequence of above-average rainfall through the 1990s and early 2000s.

Notwithstanding this, western parts of the bioregion were declared for exceptional circumstances (drought) in 2003 and this was extended in 2006.

- Over approximately the past decade, the cover and density of shrubs and trees on WARMS sites increased.
- Grazing-sensitive species were not adversely affected on WARMS sites over approximately the past decade.
- Native shrub species richness on WARMS sites increased slightly over approximately the past decade.
- Wild dog numbers and their impacts have increased markedly in recent years.
- High numbers of kangaroos contribute a significant proportion of total grazing pressure.
- About 16.1% of the bioregion within WA is within the conservation estate.

■ SA:

- The Alinytjara Wilurara Natural Resource Management Board, recently formed under the South Australian *Natural Resources Management Act 2004*, has statutory responsibility for the monitoring and evaluation of the Aboriginal lands in SA.
- Lack of water, both potable and of stock quality, is the major limiter to development.
- Much of the area has been modified by extensive fires in the past.
- All of the bioregion is held as Aboriginal land or conservation reserve.
- Increasing tourism pressure (whale watching, surfing, fishing) along the coastal fringe is evident.