



Darling Riverine Plains bioregion

Description

Area: 103 330 km²

The Darling Riverine Plains bioregion includes the extensive alluvial plains of the network of rivers and creeks that flow into the Darling River; together with its floodplain. Vegetation includes river red gum, blackbox and coolibah woodlands with inliers of poplar box, belah, redbox and ironbark woodlands on higher parts of the landscape. Major tenure is leasehold in the Western Division and freehold in the Central Division of New South Wales (NSW). Sheep and cattle grazing is the main land use; other land uses include dryland cropping, irrigated cotton, horticulture and, at Lightning Ridge, black opal mining. Major population centres are Wilcannia, Bourke, Brewarrina, Nyngan (all in NSW) and St George (Queensland).

Location

The Darling Riverine Plains bioregion comprises the Darling River and its tributaries in NSW and Queensland (10% of the area). Rangelands are confined to the western half of the bioregion (see Figures 1 and 2).

Figure 1 Location of the Darling Riverine Plains bioregion

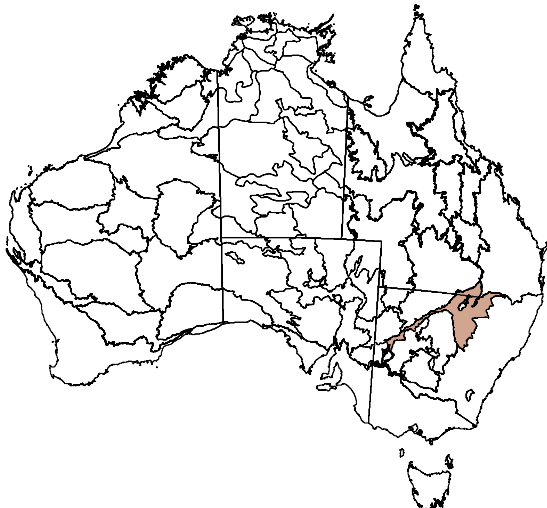
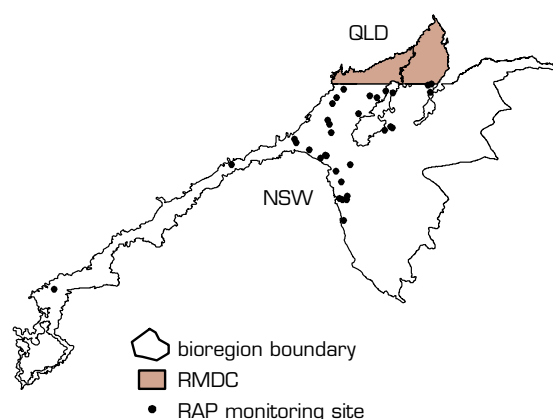


Figure 2 Rangeland Assessment Program monitoring sites (NSW) and data from the Rapid Mobile Data Collection (Queensland)



Data sources available

Data sources include:

- NSW Rangeland Assessment Program (RAP), which provides moderate reliability for reporting change, through a moderate number of sites but a low sampling density for the bioregion, patchy distribution, annual assessments, quantitative data, and a focus on perennial 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 methods provide moderate reliability (through RMDC — road traverses and visual estimates; AussieGRASS — entire rangelands, simulated results with some ground validation)
- domestic stocking density, which provides moderate reliability
- fire extent, intensity and frequency, which provides high reliability

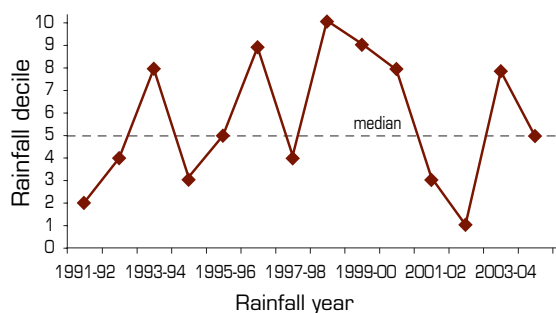


- dust
- distance from water
- distribution and relative abundance of invasive animals and weeds
- land use
- land values.

Climate

The Darling Riverine Plains bioregion has a semi-arid climate with seasonal rainfall. Summers are hot and dry, while winters are cool. Spatially averaged median (1890–2005) rainfall is 404 mm (April to March rainfall year). The winter rainfall component is much greater in the southwest extremities (NSW) compared with the northeast parts in Queensland (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 marked year-to-year variation in decile rainfall, indicating highly variable *seasonal quality*. The year 2002–2003 was very dry, while the period 1998–1999 to 2000–2001 was a wetter period.

Note that regional averaging of rainfall conceals spatial variability. The elongated 'panhandle' of the lower Darling River probably experienced different seasonal conditions from those indicated by the average. It is also likely that parts of the Darling Riverine Plains bioregion had much better *seasonal quality* and others worse than the average during the 1992–2005 period.

Landscape function

New South Wales

RAP, index based on the frequency and cover of perennial herbage species

When *seasonal quality* was above average, 2% of site–time assessments showed a decline in the index of landscape function, while 23% of site–time assessments showed an increase when *seasonal quality* was below average.

<i>Seasonal quality</i>	Number of site-by-year combinations	Percentage of reassessed sites showing:		
		Decline: > 4 decrease in index	No change	Increase: > 4 increase in index
Above average	62	2%	90%	8%
Average	62	5%	92%	3%
Below average	93	20%	57%	23%

Queensland

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

Both the Culgoa–Bokhara and Warrambool–Moonie sub-Interim Biogeographic Regionalisation for Australia (IBRA) showed significant loss of function.

Sustainable management

Critical stock forage

New South Wales

RAP, frequency of the palatable and perennial grass (2P), *Astrelba lappacea*

When *seasonal quality* was above average, 17% of site–time assessments showed a decline, while 9% of site–time assessments showed an increase when *seasonal quality* was below average.

Seasonal quality	Number of site-by-year combinations	Percentage of reassessed sites showing:		
		Decline: > 11 decrease in frequency	No change	Increase: > 12 increase in frequency
Above average	69	17%	71%	12%
Average	46	17%	65%	18%
Below average	69	9%	82%	9%

Sites selected for reporting change were restricted to those where the 2P grass *Astrelba lappacea* was present at the start of the period. Frequency data from these same sites at subsequent reassessments were then used to report change.

Queensland

AussieGRASS, levels of simulated pasture utilisation and change

Both the Culgoa–Bokhara and Warrambool–Moonie sub-IBRAs had simulated space- and time-averaged pasture utilisation in the 1991–2005 period above that considered safe for the Darling Riverine Plains bioregion. Simulated utilisation decreased by 3.6% (in absolute terms) for the Warrambool–Moonie sub-IBRA between 1976–1990 and 1991–2005. The other two rangeland sub-IBRAs (Castlereagh–Barwon and Culgoa–Bokhara) showed smaller decreases in utilisation, and these results are broadly consistent with observations in NSW. These levels of utilisation are reasonable from an average point of view but are high enough to suggest that some areas of the landscape have been subjected to damaging levels of utilisation.

Plant species richness

New South Wales

RAP, count of native perennial and annual herbage species

Approximately 11% of site–time assessments had decreased plant species richness following above-average seasonal quality and 23% of site–time assessments had increased plant species richness following below-average seasonal quality.

Seasonal quality	Number of site-by-year combinations	Percentage of reassessed sites showing:		
		Decline: > 12 decrease in no. species	No change	Increase: > 15 increase in no. species
Above average	102	11%	77%	12%
Average	68	24%	75%	1%
Below average	102	11%	66%	23%

Queensland

There are no suitable data for reporting change.

Change in woody cover

Queensland

Based on data from the **Statewide Landcover and Trees Study (SLATS)**, there was a moderate reduction in woody cover in the Culgoa–Bokhara sub-IBRA between 1991 and 2003, and a lesser decline in the Warrambool–Moonie sub-IBRA. There is high reliability for reporting change in woody cover based on SLATS.

Sub-IBRA	SLATS woody cover		Change 1991 to 2003
	1991	2003	
Culgoa–Bokhara (DRP1)	44.14%	37.06%	-7.08%
Warrambool–Moonie (DRP2)	26.11%	22.64%	-3.47%

DRP = Darling Riverine Plains; IBRA = Interim Biogeographic Regionalisation for Australia; SLATS = Statewide Landcover and Trees Study

New South Wales

Based on SLATS-type reporting, the annualised rate of woody vegetation change between 2004 and 2006 in the Darling Riverine Plains bioregion was 1468 ha based on analysis of satellite data using Queensland SLATS methods. Woody vegetation is defined as woody communities with 20% crown cover or more (eg woodlands, open forests and closed forests) and taller than about two metres (DNR 2007). The annualised rate of clearing represents the annual rate of woody vegetation change, which is largely due to cropping, pasture and thinning (DNR 2007).

At this stage, it is not possible to report change for earlier years of the 1992–2005 period using this method.

Distance from stock water

Stock water data report for the whole bioregion. Based on the locations of stock waterpoints sourced from Geoscience Australia's GEODATA TOPO 250K vector product (Series 3, June 2006), the percentage area within three kilometres of permanent and semi-permanent sources of stock water for each sub-IBRA is:

Culgoa–Bokhara (DRP1)	84.1%
Warrambool–Moonie (DRP2)	100.0%
Castlereagh–Barwon (DRP3)	36.5%
Bogan–Macquarie (DRP4)	35.5%
Louth Plains (DRP5)	56.5%
Wilcannia Plains (DRP6)	48.4%
Menindee (DRP7)	50.8%
Great Darling Anabranch (DRP8)	62.9%
Pooncarie–Darling (DRP9)	55.0%

DRP = Darling Riverine Plains

Note: the complete sub-IBRA area has been analysed

Note that this analysis does not include the locations of natural waters (eg the rivers), which provide many additional sources of water for stock. It is not possible to report change in watered area for the 1992–2005 period for either jurisdiction.

Weeds

Weeds known to occur in the Darling Riverine Plains bioregion include:

Common name	Scientific name
African boxthorn	<i>Lycium ferocissimum</i>
Athel pine	<i>Tamarix aphylla</i>
Bitou bush (New South Wales)	<i>Chrysanthemoides monilifera</i> subspecies <i>rotun</i>
Blackberry	<i>Rubus fruticosus</i> aggregate
Mesquite	<i>Prosopis</i> spp.
Mother of millions	<i>Bryophyllum tubiflorum</i> and hybrids
Parkinsonia	<i>Parkinsonia aculeata</i>
Privet (broad leaf or tree privet)	<i>Ligustrum lucidum</i>
Silver leaf nightshade	<i>Solanum elaeagnifolium</i>
St John's wort	<i>Hypericum perforatum</i>
Water hyacinth	<i>Eichhornia crassipes</i>

See www.anra.gov.au for distribution maps

Components of total grazing pressure

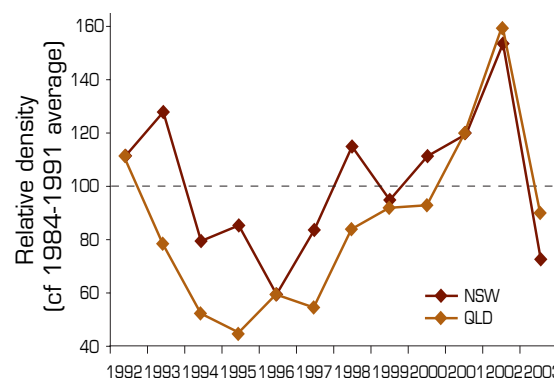
Domestic stocking density

Data for domestic stocking density report for the whole bioregion. In 1992, 88% of the area of the Darling Riverine Plains bioregion was grazed, with this area reducing to 80% in 2001. Based on data from the Australian Bureau of Statistics and taking account of this reduced area, stocking density decreased in 1992 from 11% above the 1983–1991 average to approximately 95% of the 1983–1991 base between 1993 and 1996, when dry seasonal conditions prevailed. Stocking density then increased to 6% above the base in 2000 and declined over the next three years to 84% of the base (in 2003). Stocking density increased slightly in 2004 to 88% of the 1983–1991 average. Stocking density responded to *seasonal quality* but it is likely that expanded cropping also contributed to the overall decline in stocking density. Note that spatial averaging conceals likely variation in stocking density trends across the bioregion.

Kangaroos

The combined density of kangaroos (on a dry sheep equivalent basis) declined sharply then increased appreciably (to 2002) before again decreasing markedly in 2003 (which was the end of available data; see Figure 4). The initial decrease in NSW lagged that in Queensland but the ensuing increase in the late 1990s in NSW preceded that of Queensland.

Figure 4 Kangaroo density in the NSW and QLD parts of the Darling Riverine Plains bioregion



Kangaroo densities were likely affected by changing seasonal conditions, although, this is not readily apparent from Figure 3, above.

Contributing species to kangaroo density are reds, western and eastern greys in NSW and reds and eastern greys in Queensland.

Invasive animals

Invasive animal species known to occur in the Darling Riverine Plains bioregion include:

Common name	Scientific name
Feral pig	<i>Sus scrofa</i>
Feral goat	<i>Capri hircus</i>
Fox	<i>Vulpes vulpes</i>
Rabbit	<i>Dryctolagus cuniculus</i>
Wild dog	<i>Canis</i> spp.
Feral cat	<i>Felis cattus</i>
Starling	<i>Sturnus vulgaris</i>
Carp	<i>Cyprinus carpio</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 between 1997 and 2005 (the period of available data), with a maximum of 1.4% of the Darling Riverine Plains bioregion burnt in 2005.

Dust

Dust data report for the whole bioregion. The mean Dust Storm Index value (1992–2005) was 1.40 — a low value among all rangeland bioregions. Dust levels were lowest in the far northeast of the bioregion near the NSW–Queensland border.

Biodiversity

There are Ramsar-listed wetlands in NSW and there are case studies of waterbirds (both Biodiversity Working Group indicator: Wetlands; see **Section 7 of Chapter 3** of *Rangelands 2008 — Taking the Pulse*).

In the Queensland portion of the bioregion, there are:

- no threatened plant species
- 3 threatened mammal species (includes one extinct species, the white-footed rabbit-rat)
- 3 threatened bird species (includes one extinct species, the paradise parrot)
- no threatened reptiles, amphibians or fish.

Socioeconomic characteristics

Land use and value

In 1992, 88% of the area of the Darling Riverine Plains bioregion was grazed, with this area reducing to 80% in 2001.

In Queensland, unimproved rangeland values as at June 2006 were, on average, \$10 950 ± \$1965/km² (values expressed in 2005 dollars). There was a large range in average unimproved value across sub-IBRAs (\$5272 to \$13 571/km²). It is not possible to report change in land values for the 1992–2005 period.

In NSW, the market value of a typical property in the Brewarrina area increased by approximately 80% between 1996 and 2005 (values expressed in 2005 dollars). Average property size is 812 ha (maximum size of 34 650 ha) for all land parcels bigger than 10 ha.

Key management issues and features

Key features and issues of the Darling Riverine Plains bioregion include the following:

■ NSW:

- Upstream diversion of river flows for irrigation is reducing the size, frequency and effectiveness of downstream flooding. This has reduced pastoral productivity and altered the floodplain ecosystem, particularly that of riparian corridors and wetlands.
- The merino wool industry has been in decline during most of the reporting period. This initiated a trend into cereal cropping in the eastern margins of the rangelands, peaking in the late 1990s before the implementation of native vegetation legislation. Cropping has focused on certain soil types, especially that of grasslands. Properties with the capacity to crop have greater options to maintain financial viability.
- A large loss of social infrastructure (families, Landcare network, social groups) was evident during the late 1990s and early 2000s, particularly in areas without cropping. Very few young people are now returning to properties.

- Thickening of black box (*Eucalyptus largiflorens*) and coolibah (*E. coolabah*) affects pastoral management in some areas where flooding has initiated dense regeneration.
- Perennial grasses appear to have declined across the bioregion in the longer term. Over the reporting period, there have been few opportunities for re-establishing perennial grass species, so the status of perennials is difficult to assess. The main species, curly Mitchell grass (*Astrelba lappacea*), appears to have remained stable over this period.
- The bioregion generally has low numbers of feral goats, but feral pigs are associated with the watercourse areas. Rabbits generally have a low impact.

■ Queensland:

- Excessively high pasture utilisation is likely in some parts of the landscape, including a significant contribution to total grazing pressure from kangaroo species.
- There are areas of both woodland thickening and tree death.
- There has also been a change in understorey species.