



# Cobar Penneplain bioregion

## Description

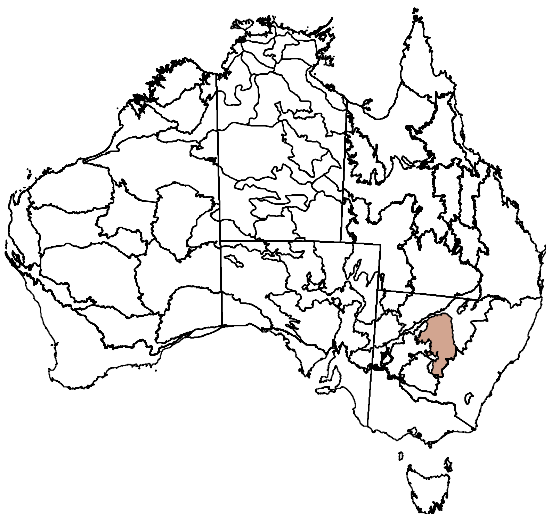
Area: 73 716 km<sup>2</sup>

The landscape of the Cobar Penneplain bioregion includes undulating low rounded ridges, rolling downs and plains. A large area of the bioregion is rangeland, where land tenure is predominantly leasehold (Western Division) and vegetation consists of poplar box woodlands, mulga communities and white cypress pine. The eastern-most part of the bioregion has freehold title (Central Division) and has largely been cleared for cereal cropping. The dominant land use (in terms of area) in the rangelands is sheep and goat grazing with some cattle production. Dryland cropping is also important within the eastern margins of the rangeland zone and becomes dominant further to the east. Copper mining occurs around Cobar, the major population centre.

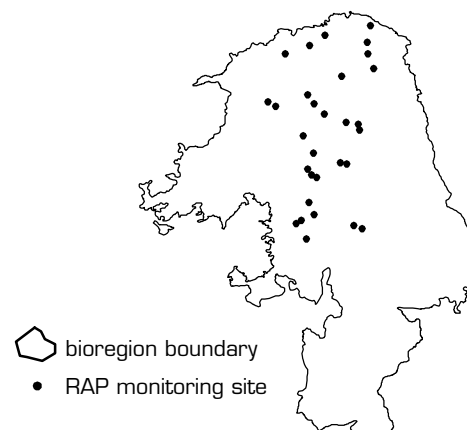
## Location

The Cobar Penneplain bioregion is located in central New South Wales (NSW; see Figures 1 and 2).

**Figure 1 Location of the Cobar Penneplain bioregion**



**Figure 2 Rangeland Assessment Program (NSW) monitoring sites**



## Data sources available

Data sources include:

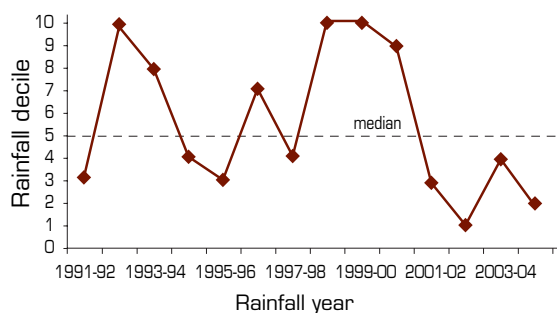
- NSW Rangeland Assessment Program (RAP), which provides moderate reliability for reporting change, through a moderate number of sites but a low density for the bioregion, annual assessment, quantitative data, and a focus on perennial species
- domestic stocking density, which provides moderate reliability
- 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 climate of the Cobar Peneplain bioregion is semi-arid with unreliable rainfall, which is dominant in summer in the north and winter in the south. Spatially averaged median (1890–2005) rainfall is 364 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.

The middle part of the reporting period (ie 1998–1999 to 2000–2001) experienced better *seasonal quality* than the mid-1990s and end of the period. The years 1992–1993, 1998–1999 and 1999–2000 were very wet. At the opposite end of the seasonal spectrum, 2002–2003 and 2004–2005 were very dry.

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

## Landscape function

### RAP sites: index based on the frequency and cover of perennial herbage species

Approximately 6% of site–time assessments showed a decline in the index of landscape function (beyond a threshold) when *seasonal quality* was above average, and 3% of sites 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	150	6%	83%	11%
Average	120	12%	85%	3%
Below average	60	5%	92%	3%

## Sustainable management

### Critical stock forage

RAP sites: frequency of the **palatable and perennial (2P) grass, *Monochather paradoxa***

Approximately 7% of site–time assessments showed a decline in the frequency of *Monochather paradoxa* when *seasonal quality* was above average, and 18% 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 frequency	No change	Increase: > 4 increase in frequency
Above average	150	7%	84%	9%
Average	120	19%	62%	19%
Below average	90	18%	64%	18%

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

### Plant species richness

Using a threshold on the count of native perennial and annual herbage species, 12% of site–time assessments had decreased species richness following above-average *seasonal quality* and 1% of site–time assessments had increased species richness following below-average *seasonal quality*.

Seasonal quality	Number of site-by-year combinations	Percentage of reassessed sites showing:		
		Decline: > 11 decrease in no. species	No change	Increase: > 15 increase in no. species
Above average	150	12%	77%	11%
Average	123	15%	63%	22%
Below average	90	40%	59%	1%

## Change in woody cover

The annualised rate of woody vegetation change between 2004 and 2006 was 7166 ha, based on analysis of satellite data using Queensland **Statewide Landcover and Trees Study (SLATS)** reporting 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

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 semipermanent sources of stock water for each sub-IBRA is:

Boorindal Plains (CP1)	87.9%
Barnato Downs (CP2)	67.9%
Canbelego Downs (CP3)	55.0%
Nymagee (CP4)	46.5%
Lachlan Plains (CP5)	19.7%

CP = Cobar Peneplain

Note: complete sub-IBRA area analysed

Note that this analysis does not include the locations of natural waters, which may provide additional sources of water for stock, particularly following good rains. It is not possible to report change in watered area for the 1992–2005 period.

## Weeds

Weeds known to occur in the Cobar Peneplain bioregion include:

Common name	Scientific name
African boxthorn	<i>Lycium ferocissimum</i>
Athel pine	<i>Tamarix aphylla</i>
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>
Privet (small leaf or Chinese privet)	<i>Ligustrum sinense</i>
Silver leaf nightshade	<i>Solanum elaeagnifolium</i>
St John's wort	<i>Hypericum perforatum</i>

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

## Components of total grazing pressure

### Domestic stocking density

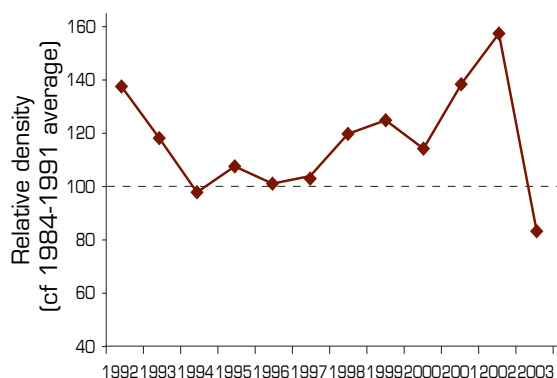
Data from the Australian Bureau of Statistics showed that stocking density decreased more or less continuously between 1992 and 2004 (which was the end of available data). At the start of the period, stocking density was 9% above the average for the 1983–1991 period. It then declined to 92% of the 1983–1991 base in 1996, stabilised near this level until 1999, increased temporarily in 2000 (to 2% above the base) and then declined sharply to 69% of the base in 2003. Stocking density in 2004 was 71% of the base. The temporary increase in 2000 probably occurred through better seasonal conditions at that time, while following very dry years likely contributed to the sharp reduction in stocking density thereafter. However, it is also likely that poor wool prices and expanded cropping also contributed to the overall decline in stocking density throughout the reporting period. Note that spatial averaging conceals likely variation in stocking density trends across the bioregion.

Many pastoral enterprises now rely on the management and harvesting of feral goats and this is not reflected in the stocking density data.

## Kangaroos

The combined density of kangaroos (on a dry sheep equivalent basis) initially declined, then stabilised and increased to 2002 before decreasing markedly in the last year of available data (2003). In all but the final year, the density was above, or equal to, the average for the 1984–91 period (see Figure 4). Contributing species are reds, and eastern and western greys.

**Figure 4 Kangaroo density in the Cobar Penneplain bioregion**



These changes reflect in a broad sense changing seasonal quality throughout the reporting period. In particular, the increase between 2000 and 2002 lagged by one year the higher rainfall deciles shown above, and the decline in 2003 probably largely resulted from drier years from 2001–2002 onwards.

## Invasive animals

Invasive animal species known to occur in the Cobar Penneplain 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>Oryctolagus cuniculus</i>
Feral cat	<i>Felis catus</i>
Starling	<i>Sturnus vulgaris</i>
Carp	<i>Cyprinus carpio</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

Fire was insignificant during the reporting period, with most years recording no fire. The maximum recorded area burnt was 0.2% of the bioregion in 1998.

### Dust

The mean Dust Storm Index value (1992–2005) was 1.64, a low value compared with all rangeland bioregions. Dust levels were fairly evenly distributed throughout the bioregion.

### Biodiversity

Wetland waterbirds have been studied within the bioregion (Biodiversity Working Group indicator: Wetlands; see **Section 7 of Chapter 3** of *Rangelands 2008 — Taking the Pulse*).

## Socioeconomic characteristics

### Land use and value

At the start of the reporting period, 90% of the Cobar Penneplain bioregion was grazed. This decreased slightly to approximately 87% between 1998 and 2004.

The market value of a typical property in the Cobar area remained relatively unchanged between 1996 and 2005 (values expressed in 2005 dollars). Average property size for the bioregion is 1870 ha (maximum size of 29 340 ha) for all land parcels bigger than 10 ha.

## Key management issues and features

Key features and issues of the Cobar Penneplain bioregion include the following:

- Well-advanced woody thickening is the driving influence in the management of these rangelands. It has hastened the decline of the wool industry, promoted the development of goat enterprises,

and been a driver for clearing and cropping in the eastern margins of the bioregion. Woody thickening developed in response to conditions of average winters followed by wet summers in 1973–1974, 1983–1984 and perhaps 1999–2000.

- With a change of vegetation structure from open woodland to closed shrubland, many properties are now of insufficient area to be considered viable.
- Fire is of very low incidence in this landscape. There were large wildfires in January 1975 and also December 1984, but otherwise fire is virtually absent. Fuel loads are generally very low due to uncontrolled total grazing pressure, so prescribed burning is seldom a land management option.
- Kangaroo populations are high due to reduced predation and increased access to water since settlement. Landholders have a limited capacity to manage total grazing pressure. The rangeland part of the bioregion supports a strong kangaroo harvest industry.
- A lack of control of total grazing pressure due to the mobility of kangaroos and goats is the greatest challenge to land management. Landholders are widely adopting improved fencing strategies to better manage grazing, which commonly include the control of access to water. This may provide opportunities for increasing ground cover and better managing woody thickening.
- There is some evidence that these rangelands are in historically poor condition. Consequently, there is little differentiation in land condition between RAP sites in terms of ecological parameters. Most sites have high potential for improvement.
- Wool prices increased through the 1980s and people generally kept high stock numbers. Removal of the floor price occurred at the end of the 1980s. Drought in 1992 had an adverse impact on land condition as sheep were difficult to offload. The merino wool industry continued to decline during the 1990s.
- The decline in the wool industry led to increased cereal cropping, which peaked during the late 1990s. Until recent changes in native vegetation legislation, clearing and cropping were significantly expanding in the eastern rangelands of the bioregion. Cereal cropping is regarded as a valuable means of diversifying in the face of declining grazing productivity and returns. It is also used to help control woody thickening.
- Export prices for goat and sheep meat improved during the mid-1990s. The harvesting of feral goats became an important source of property income, and infrastructure to support this (eg trapyards and appropriate fencing) has developed accordingly. Meat sheep and managed goats are now significant enterprises.