Dampierland bioregion

Description

Area: 83 460 km^2

The Dampierland bioregion is characterised by extensive plains, ranges and spectacular gorges. The vegetation is characterised by acacia thickets with scattered trees and areas of grasslands and savannas. The bioregion contains Aboriginal land, pastoral leases and some conservation reserves. The main industries are beef cattle, horticulture and tourism. Major population centres are Broome, Derby and Fitzroy Crossing.

Location

The Dampierland bioregion is located on the northwest coast of Western Australia (WA; see Figures 1 and 2).

Figure 1 Location of the Dampierland bioregion

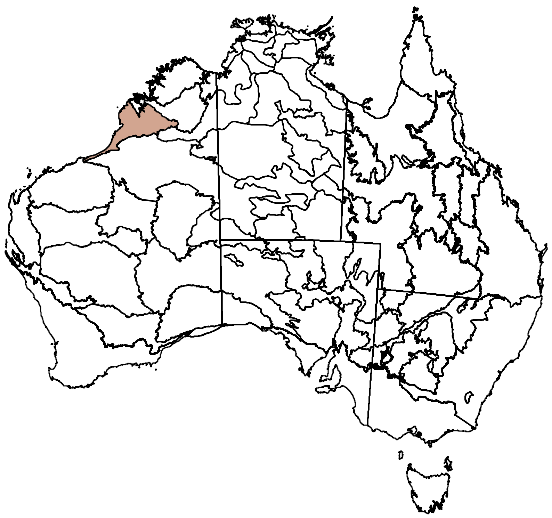
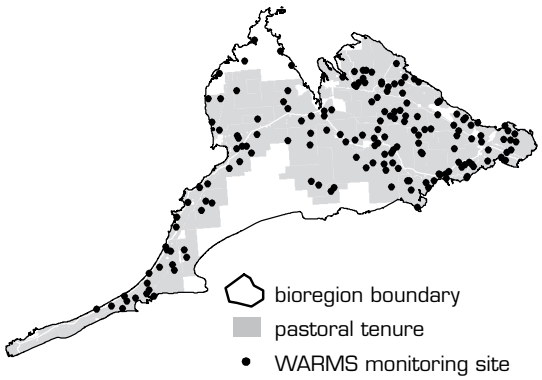


Figure 2 Western Australian Rangeland Monitoring System monitoring sites and pastoral tenure



Data sources available

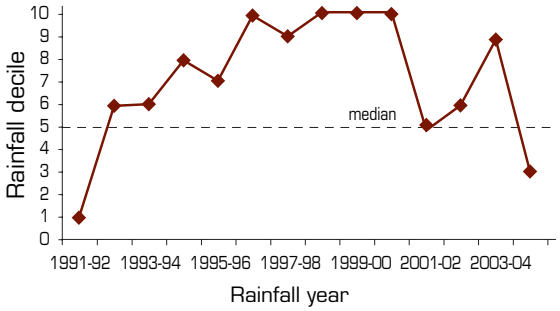
Data sources include:

- Western Australian Rangeland Monitoring System (WARMS), which provides high reliability for reporting change, through a large number of well-distributed sites, quantitative data, and a focus on perennial 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 Dampierland bioregion has a semiarid to tropical monsoonal climate. Spatially averaged median (1890–2005) rainfall is 516 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 majority of the reporting period experienced above-average ***seasonal quality*** based on decile rainfall, with rainfall above the median in all but two years and a very wet sequence from 1996–1997 to 2000–2001. The first year of the reporting period (1991–1992) was particularly dry, and the final year (2004–2005) also experienced poorer *seasonal quality*.

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

Landscape function

Change in landscape function can be reported in a number of ways using WARMS data. The following sections report on the basis of the resource capture index and frequency of perennial grasses (for consistency with reporting by other jurisdictions).

Resource capture index

When *seasonal quality* was above average, 31% of sites in the Dampierland bioregion showed a decline, while 52% of sites showed an increase when *seasonal quality* was below average.

Seasonal quality	Number of sites	Decline: RCI < 0.90	No change: 0.90 ≤ RCI < 1.10	Increase: RCI ≥ 1.10
Above average	26	31%	15%	54%
Average	55	38%	15%	47%
Below average	52	33%	15%	52%

RCI = resource capture index

Perennial grass frequency

When *seasonal quality* was above average, 11% of sites showed a decline in the frequency of perennial grasses, while 12% of sites showed an increase when *seasonal quality* was below average.

Seasonal quality	Number of site-by-year combi-nations	Decline: frequency < 0.90	No change: 0.90 ≤ frequency < 1.10	Increase: frequency ≥ 1.10
Above average	287	11%	63%	27%
Average	90	7%	81%	13%
Below average	52	15%	73%	12%

Sustainable management

Critical stock forage

Decreaser perennial grasses declined in frequency at 14% of sites following above-average *seasonal quality*. However, intermediate and increaser species declined at more sites under these seasonal conditions. Decreaser species increased at 25% of sites following below-average *seasonal quality*, but intermediate and increaser species increased on a greater percentage of sites.

Seasonal quality	Species group	Number of site-by-year combinations	Decline: frequency < 0.90	No change: 0.90 ≤ frequency < 1.10	Increase: frequency ≥ 1.10
Above average	Decreaser	282	14%	55%	31%
	Intermediate	167	26%	18%	55%
	Increaser	76	36%	14%	51%
Average	Decreaser	89	10%	68%	22%
	Intermediate	55	17%	46%	37%
	Increaser	37	27%	30%	43%
Below average	Decreaser	52	23%	52%	25%
	Intermediate	36	17%	46%	37%
	Increaser	18	28%	17%	56%

Plant species richness

When *seasonal quality* was above average, 25% of sites showed a decline in species richness of native perennial plants, while 37% of sites showed an increase when *seasonal quality* was below average.

Seasonal quality	Number of site-by-year combinations	Decline: richness index < 0.80	No change: 0.80 ≤ richness index < 1.20	Increase: richness index ≥ 1.20
Above average	289	25%	46%	29%
Average	90	14%	57%	30%
Below average	52	17%	46%	37%

Change in woody cover

Crown cover of woody species increased by 16% on average and remained the same or increased on 62% of sites. On only 7% of sites did cover drop below 50% of the initially recorded value.

Distance from stock water

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

Fitzroy Trough (DL1)	29.4% (90.3% of sub-IBRA analysed)
Pindanland (DL2)	24.2% (62.2% of sub-IBRA analysed)

DL = Dampierland; IBRA = Interim Biogeographic Regionalisation for Australia

Note that this analysis does not include the locations of natural waters, which can provide significant additional sources of water for stock, particularly in the early dry season. It is not possible to report change in watered area for the 1992–2005 period.

Weeds

Weeds known to occur in the Dampierland bioregion include:

Common name	Scientific name
Calotrope	*Calotropis procera*
Parkinsonia	*Parkinsonia aculeata*
Bellyache bush	*Jatropha gossypifolia*
Noogoora burr	*Xanthium occidentale*
Lantana	*Lantana camara*
Golden dodder	*Cuscuta campestris*
Hyptis	*Hyptis suaveolens*
Mesquite	*Prosopis* spp.
Grader grass	*Themeda quadrivalvis*
Chinee apple	*Ziziyphus mauritiana*
Chinese violet	*Asystasia gangetica* subsp. *micrantha*
Rubber vine	*Cryptostegia grandiflora*

See www.anra.gov.au for distribution maps

Components of total grazing pressure

Domestic stocking density

Approximately 73% of the Dampierland bioregion is grazed. Data from the Australian Bureau of Statistics showed that domestic stocking density was considerably below the 1983–1991 baseline between 1993 and 1999 (about 70%). Stocking density then increased over the next two years, to 96% of the baseline in 2001. Further declines occurred in 2002 and 2003 (to 60% of the 1983–1991 average) before increasing slightly in 2004 (to 68% of the baseline). Much of the period was considerably wetter than usual (see Figure 3, above) so these trends are not readily related to *seasonal quality* alone. It is probable that there was spatial variation in stocking density across the bioregion that is concealed by the spatially averaged data presented here, given that locally collected data suggest that stocking density remained relatively stable from 1999 onwards.

Kangaroos

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

Invasive animals

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

Common name	Scientific name
Feral pig	*Sus scrofa*
Fox	*Vulpes vulpes*
Rabbit	*Oryctolagus cuniculus*
Wild dog	*Canis* spp.
Feral cat	*Felis cattus*
Camel	*Camelus dromedaries*
Donkey	*Equus asinus*
Horse	*Equus caballus*

See www.anra.gov.au for distribution maps

Products that support reporting of landscape function and sustainable management

Fire

Fires were extensive throughout the bioregion between 1997 and 2001, and again in 2004.

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005
% area burnt	35.3	33.0	39.7	41.8	47.9	9.7	19.5	31.6	7.8

The largest areas were burnt between August and December of each year, and the fires were likely hotter or more intense.

The frequency of fire between 1997 and 2005 was high relative to other rangeland (IBRAs) with a mean frequency (log_{10} transformed) of 0.56.

Dust

The mean Dust Storm Index value (1992–2005) was 0.79, which is very low compared with all other rangeland bioregions.

Biodiversity

Ramsar-listed wetlands are located within the Dampierland bioregion (Biodiversity Working Group indicator: Wetlands; see **Section 7 of Chapter 3** of *Rangelands 2008 — Taking the Pulse*).

There are 2 known threatened plant species, 5 threatened mammal species, 3 threatened bird species and 1 threatened reptile species (Biodiversity Working Group indicator: Threatened species).

Socioeconomic characteristics

Land use and value

Approximately 73% of the Dampierland bioregion is grazed. This area has not changed appreciably over the 1992–2005 reporting period.

Average 'lease and improvement' values for pastoral leases in the Kimberley increased more than five-fold between 1992 and 2005.

Key management issues and features

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

- Perennial grass frequency on WARMS sites remained stable (2003 to 2005) after a period of increase from the mid-1990s.
- The cover of woody species on WARMS sites increased slightly during the 2003 to 2005 period. The threat of woody thickening will continue to be monitored.
- Grazing-sensitive perennial grasses on WARMS sites were not adversely affected during the 2003 to 2005 period.
- Native perennial species richness on WARMS sites increased slightly during the 2003 to 2005 period.
- About 15% of the pastoral leases are under Indigenous ownership and, while some are running commercial cattle herds, others are either destocked or running low numbers of livestock.
- There is a trend for a number of leases to be operated as a single management unit, with consequent declines in staffing levels and permanent habitation.
- Market demand for live cattle at specified weights has encouraged managers to turn off young cattle and better match animal numbers to feed supply. Combined with good seasons, pastoralists have an excellent operating environment in which to show improved land management.
- Most commercial enterprises (of viable size) are profitable.
- Infrastructure development has made more pastoral land accessible to livestock and raised the potential for increased livestock numbers.
- A number of noxious weed species have established populations but have not yet become widespread. They are the subject of ongoing surveillance.
- Fire management is being seen as increasingly important. Late dry-season fires tend to homogenise the vegetation structure, with mid-storey vegetation particularly at risk. They also contribute significantly to greenhouse gas emissions.
- About 1.0% of the bioregion is within the conservation estate.
- A long run of generally good to very good rainfall years has produced probably the best sequence of rainfall on record — better even than the mid-1970s.