



Pine Creek bioregion

Description

Area: 28 520 km²

Land types of the Pine Creek bioregion are mainly hilly to rugged ridges with undulating plains. Vegetation communities include eucalypt woodlands, with patches of monsoon forests. Major land uses are conservation, pastoralism, intensive rural freehold blocks, horticulture and mining. The bioregion also contains Aboriginal land. The major population centres are Batchelor; Adelaide River; Pine Creek and Jabiru.

Location

The Pine Creek bioregion is located in the top end of the Northern Territory (NT; see Figures 1 and 2).

Figure 1 Location of the Pine Creek bioregion

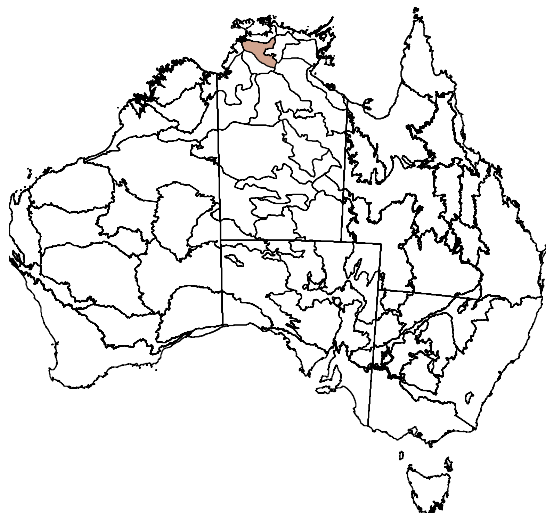
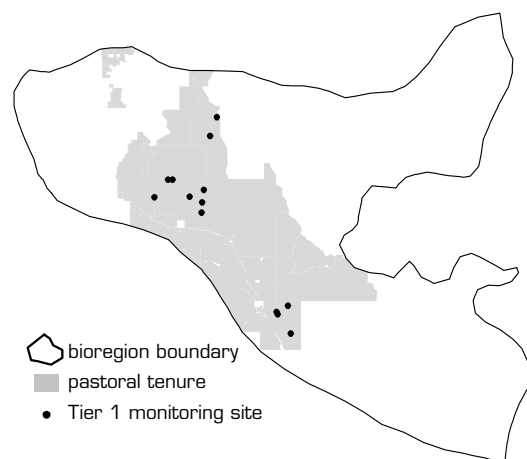


Figure 2 Monitoring sites and pastoral tenure



Data sources available

Data sources include:

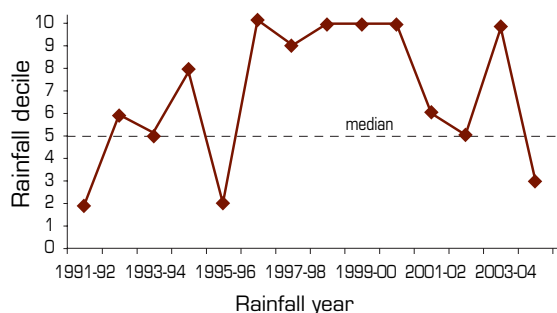
- NTTier I, which provides low reliability for reporting change, with a small number of patchily distributed sites, estimated (rather than quantitative) data, and a focus on perennial herbage species
- domestic stocking density, which provides moderate reliability
- fire extent, intensity and frequency, which provides high reliability
- dust
- distance from water
- distribution and relative abundance of invasive animals and weeds
- land use.



Climate

The Pine Creek bioregion has a tropical monsoonal climate. Around 90% of annual rainfall occurs during the wet season between November and March. Spatially averaged median (1890–2005) rainfall is 1214 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.

Seasonal quality was generally above average with exceptionally wet years in the late 1990s and early part of this decade, and again in 2003–2004. However, there were also some drier years, notably 1991–1992, 1995–1996 and 2004–2005.

The relatively small size of this bioregion means that regional averaging of rainfall is less likely to conceal spatial variability compared with other bioregions.

Landscape function

Index based on composition (by biomass) and cover of perennial herbage species

Fewer than 10 sites were assessed for above- and below-average *seasonal quality*. This is insufficient to report change reliably.

Sustainable management

Critical stock forage

Composition (by biomass) of palatable perennial (2P) herbage species

Again, there were insufficient sites assessed to report change reliably for above- and below-average *seasonal quality*.

| <i>Seasonal quality</i> | Number of sites | Percentage of reassessed sites showing: | | |
|-------------------------|-----------------|---|-----------|--|
| | | Decline: > 20% decrease in 2P grasses | No change | Increase: > 20% increase in 2P grasses |
| Above average | 8 | n/a | n/a | n/a |
| Average | 13 | 0% | 92% | 8% |
| Below average | 8 | 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 slightly from 11.69% of the bioregion in 1991 to 12.14% in 2004 (an increase of 0.45%). There was complete coverage of Landsat imagery for reporting this result.

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), 6.7% of the Pine Creek bioregion (and Pine Creek sub-**Interim Biogeographic Regionalisation for Australia — IBRA**) is within three kilometres of permanent and semipermanent sources of stock water.

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

This analysis does not include the locations of natural waters, which in this bioregion provide many 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 Pine Creek bioregion include:

| Common name | Scientific name |
|---------------------------|---|
| <i>Barleria prionitis</i> | <i>Barleria prionitis</i> |
| Bellyache bush | <i>Jatropha gossypifolia</i> |
| Cabomba | <i>Cabomba caroliniana</i> |
| Creeping lantana | <i>Lantana montevidensis</i> |
| Giant rats tail grass | <i>Sporobolus natalensis</i> and <i>S. pyramidalis</i> |
| Grader grass | <i>Themeda quadrivalvis</i> |
| Hymenachne | <i>Hymenachne amplexicaulis</i> |
| Hyptis | <i>Hyptis suaveolens</i> |
| Lantana | <i>Lantana camara</i> |
| Mimosa | <i>Mimosa pigra</i> |
| Mission grass | <i>Pennisetum polystachion</i> |
| Noogoora burr | <i>Xanthium occidentale</i> |
| Parkinsonia | <i>Parkinsonia aculeata</i> |
| <i>Salvinia molesta</i> | <i>Salvinia molesta</i> |
| Sicklepod | <i>Senna obtusifolia</i> and <i>S. tora</i> |
| <i>Sida</i> spp. | <i>Sida</i> spp. |
| Snake weed | <i>Stachylarpheta</i> spp. |

See www.anra.gov.au for distribution maps

Components of total grazing pressure

Domestic stocking density

In 1992, 47% of the Pine Creek bioregion was grazed, reducing to 42% by 1998 (with a similar percentage area grazed in 2001). Based on data from the Australian Bureau of Statistics and taking account of this reduced area, domestic stocking density increased consistently between 1992 and 1998 (equal to the 1983–1991 average in 1992 and 66% above this base in 1998). Stocking density increased more slowly to 2000 (69% above the base), decreased in 2001 (43% above the base) and remained fairly constant until

2004 (42% above the 1983–1991 average). The sustained herd buildup in the 1990s was probably facilitated by several good wet seasons. Stocking levels have continued to increase in the past few years due largely to the further development of pastoral leases (including some subdivisions) and the creation of freehold lots (of relatively large area) south of the Adelaide River–Batchelor area. These freehold blocks run small herds.

Note that spatial averaging conceals likely variation in stocking density trends across the bioregion.

Kangaroos

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

Invasive animals

Invasive animal species known to occur in the Pine Creek bioregion include:

| Common name | Scientific name |
|---------------|------------------------|
| Feral pig | <i>Sus scrofa</i> |
| Wild dog | <i>Canis</i> spp. |
| Feral cat | <i>Felis catus</i> |
| Cane toad | <i>Bufo marinus</i> |
| Water buffalo | <i>Bubalus bubalis</i> |
| Donkey | <i>Equus asinus</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

The Pine Creek bioregion, as with other northern bioregions, is characterised by extensive fire. Peak fire extents in the 1997–1999 period and 2002 were probably related to preceding well-above-average rainfall (see Figure 3, above).

| Year | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|--------------|------|------|------|------|------|------|------|------|------|
| % area burnt | 60.4 | 58.5 | 68.1 | 45.3 | 47.0 | 63.7 | 46.4 | 46.9 | 44.3 |

A point of difference between this bioregion and other northern bioregions was that much of the fire activity occurred in the early to mid- dry season (January to July), probably as a result of controlled or prescribed burning. These fires were likely less intense than late dry-season burns.

The frequency of fire between 1997 and 2005 was very high compared with other rangeland bioregions, with a mean frequency (\log_{10} transformed) of 0.69.

Dust

The mean Dust Storm Index value (1992–2005) was low at 0.75. Dust levels were negligible in the east and slight in the west.

Biodiversity

More than 15% of the Pine Creek 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*).

By 2005, there were 279 bird species, approximately 70 mammal species, more than 100 reptile species and about 2300 plant taxa recorded (Biodiversity Working Group indicators: Fauna surveys and Flora surveys). There is additional information on flora and fauna changes in Kakadu National Park (see case study **Changes in flora within a bioregion in Chapter 3**; Biodiversity Working Group indicators: Flora surveys and Fauna surveys).

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

- 6 threatened plant species
- 4 threatened mammal species
- 6 threatened bird species
- 2 threatened reptile species
- 2 threatened fish species.

Socioeconomic characteristics

Land use and value

In 1992, 47% of the Pine Creek bioregion was grazed, reducing to 42% by 1998 (with a similar percentage area grazed in 2001).

Key management issues and features

Key features and issues of the Pine Creek bioregion include the following:

- There is significant fire activity in the bioregion (particularly in the late dry season) due to large tracts of grazing lands that have nil to low levels of pastoral development and consequent minimal firebreaks and control measures.
- General observations by pastoral inspectors are that the rangelands of this bioregion remain in a stable condition.