Murchison

Mulga over spinifex shrublands
and flowering herbfield on
red sandplain of the Murchison
Bioregion, W.A.
Photo: N.L McKenzie

Description

Bioregional description and biodiversity values

The northern part of the Yilgarn Craton has an arid climate, with mainly winter rainfall (200mm).

There are two regions – the Eastern and Western Murchison.

The Eastern Murchison comprises the northern parts of the craton's 'Southern Cross' and 'Eastern Goldfields' Terrains, and is characterised by internal drainage and extensive areas of elevated red desert sandplains with minimal dune development. Salt lake systems are associated with the occluded paleodrainage system. Broad plains of red-brown soils and breakaway complexes as well as red sandplains are widespread. Vegetation is dominated by mulga woodlands and is often rich in ephemerals, hummock grasslands, saltbush shrublands and *Halosarcia* shrublands.

The Western Murchison is the 'Murchison' Terrains part of the Craton, and contains the headwaters of the Murchison and Wooramel Rivers, which drain the subregion westwards to the coast. The region is made up of mulga low woodlands (usually with bunch grasses and often rich in ephemerals) on outcrop, and fine-textured Quaternary alluvial and eluvial surfaces (extensive hardpan washplains that dominate and characterise the subregion) mantling granitic and greenstone strata. Surfaces associated with the occluded drainage occur throughout, with hummock grasslands on Quaternary sandplains, saltbush shrublands on calcareous soils and halosarcia low shrublands on saline alluvia.

Grazing of native pastures accounts for most land use, although unoccupied Crown land, conservation reserves and mining are also significant land uses.

Special values include calcrete aquifers with endemic faunas of aquatic invertebrates (for example, the Lake Way system, Jundee, Lorna Glen, Cunyu, Austin Downs and Killara Stations).

There are 41 vegetation associations (hummock grasslands, succulent steppe or low woodlands) that have at least 85 per cent of their total area in the bioregion. The bioregion is rich and diverse in both its flora and fauna but most species are wide ranging and usually occur in adjoining regions. A snake (*Pseudechis butleri*) is the only regionally endemic species of known vertebrate.

Refugia include:

- Lake Barlee (an intermittent salt lake that fills for approximately one year in 10 and provides breeding sites for banded stilts and other water birds),
- Wooleen Lake (a floodplain lake and associated marshes which is also an important breeding habitat for waterbirds including gull-billed terns) and
- Anneen Lake (a large saline brackish lake and marsh with numerous islands and peninsulas which is a significant breeding area for gull-billed terns and whiskered terns and other waterbirds).

Overall condition and trend

Both regions in the Murchison have a continental stress class of three but the regional ecologists argue that it should be two or even one because of the high level of environmental degradation and the small area of land reserved for nature conservation.

Wetlands are in fair or good condition and the riparian systems are poor to fair. The trend for both wetland and riparian systems is to remain static or decline. Ecosystems and species at risk are subject to a large number of threatening processes, and the trend is not known in many cases.

Conservation priorities

Management of reserves and parks in the bioregion is generally fair or good, though some issues such as control of feral animals and fires need to be addressed as quickly as possible, as does the need for further survey work.

Pastoral leases are currently being acquired and added to the conservation estate (and it is a priority for this process to continue), but these areas often face similar management issues at existing reserves and parks.

Nationally important wetlands

There are six wetlands of national importance in the bioregion, all of which are lakes: Ballard, Barlee, Marmion, Wooleen, Breberle and Anneen.

The current condition of all the lakes is fair to good with recovery possible provided some intervention occurs. The trend for all lakes is to remain static although not enough is known about some lake systems to provide a reliable prediction.

The key threatening processes that affect wetlands in the bioregion are grazing pressure, feral animals (goats, foxes, cats and rabbits) and some impact from nearby mining operations on Anneen Lake.

Wetlands of regional significance

The only wetland of regional significance is in the Western Murchison, Mungawolagudgi Claypan on Muggon Station. It is an intermittent freshwater lake and contains significant *Melaleuca uncinata* shrublands and vegetation associations associated with dunes. Both the condition and trend are static. Goats are a key threatening process, as is changed hydrology (increased inflow of sediments due to erosion of catchment).

Riparian zone

The principal streams in the Murchison bioregion are Wooramel and Murchison Rivers and their catchments of the same names. Riparian condition is poor to fair and the trend is declining. Threatening processes affecting riparian systems are grazing (particularly sheep), feral animals (goats, rabbits and foxes), weeds (buffel grass, saffron thistle, thorn apple, mexican poppy), changed hydrology and changed fire regimes.

Ecosystems at risk

No ecosystems are listed as threatened under WA State legislation but 52 communities and vegetation associations are thought to be at risk for a variety of reasons.

Subterranean fauna is generally in good condition and is not changing (except in Depot Springs where this information is not known) but is threatened by salinity, pollution and water drawdown.

Woodlands and shrublands (acacia, chenopod, melaleuca, casuarina and eucalyptus) and grasslands are generally in fair or good condition and are either declining or show a static trend. All of these communities are threatened by grazing (stock, goats and rabbits) and changed fire regimes.

Several communities are threatened by clearing, impacts of mining, erosion and sedimentation that is causing hydrological change.

Wetland and aquatic communities are in fair condition but trends are unknown. Threatening processes include grazing in catchment areas, feral fish (Tilapia) and changed hydrology.

Species at risk

Under State legislation:

- one reptile is listed as endangered, and
- three mammals, three birds and one reptile are listed as vulnerable.

More than 40 per cent of the Murchison's original mammal fauna is now regionally extinct.

Most other fauna are in fair or degraded condition, and the listed fauna species are declining or declining rapidly. Feral predators (cats and foxes), changed fire regimes and vegetation loss are the threatening processes that affect vertebrate animals.

Three plant species are currently listed as Declared Rare Flora (two of which are vulnerable) with one additional species listed under the Commonwealth Environmental Protection and Biodiversity Conservation Act 1999. The condition of both *Conospermum toddii* and *Eucalyptus articulata* is good but are experiencing some decline. All other DRF and priority species have not been studied in sufficient detail to ascertain their condition and trend. Threatening processes that affect plants include changed fire regimes, grazing pressure, feral animals (especially goats), weeds and vegetation clearing.

Management responses

Reserve system

Six nature reserves, one national park, one timber reserve and five areas of unallocated Crown land form the Department of Conservation and Land Management's conservation estate.

The management rank for all types of reserves is fair to good: there are no feral predator programs in place, wildfire management facilities are limited by resources, mining exploration is supervised (except for old exploration drill holes which often remain open), and feral herbivore grazing activities still pose a conservation risk in some areas.

Existing conservation lands cover a wide array of surfaces at all levels in the landscape. There are 60 ecosystems or vegetation associations that are high priority to reserve but are not currently represented in the Department's estate (of any kind).

Constraints on reserve acquisition include:

- competing land uses (pastoralism and mining),
- the cost of land and subsequent management,
- difficulties in identifying biodiversity values (lack of detailed biodiversity pattern data) and
- significant degradation due to pastoral practices and feral herbivores.

The Murchison is reservation class two, but with only 1.39 per cent of the area in IUCN I-IV reserve, it should be ranked as class one, the highest priority for reserve aquisition. The most important issue relating to reserve management is control of feral animals.

Off-reserve conservation for species and ecosystem recovery

There are no recovery plans for *Falco peregrinus, Polytelis alexandrae, Minuria tridens, Conospermum toddii, Eucalyptus articulata* or any stygofauna species.

There are a number of recovery plans which are applicable within the bioregion, including:

- Recovery Plan for the Greater Bilby,
- 1996 Action Plan for Australian Marsupials and Monotremes,
- Recovery Plan for Mallee Fowl,
- The Action plan for Australian Birds 2000, and
- Recovery Plan for the Great Desert Skink 2001-2011 and
- The Action Plan for Australian reptiles.

The recovery actions recommended for fauna species include habitat retention through reserves, State or private lands as well as control of feral predators (cats and foxes), and reducing grazing (feral herbivores).

Recovery actions for flora species and ecosystems differ slightly as control of weeds, suitable fire regimes and a better understanding of life history requirements for all rare flora are required in addition to actions taken for fauna species above.

The Murchison bioregion has a priority of two (significant off-reserve effort required). However, there are resource constraints and limited community capacity.

Integrated natural resource management (NRM)

The natural resource management initiatives currently being undertaken include:

- threat abatement planning (e.g. vegetation management plans, pest management),
- industry codes of practice (in relation to mining and exploration activities),
- environmental management systems,
- ecologically sustainable product marketing,
- institutional reform (through the Gascoyne Murchison Strategy and purchase of leases for conservation estate),
- integration with property management planning and catchment planning, and
- Landcare through Land Conservation District Committees in the region.

Opportunities for natural resource management actions include:

- duty-of-care legislation for leasehold and other lands,
- rural and industry reconstruction,
- new tenure and management arrangements,
- planning with local governments and National Action Plan for Water Quality and Salinity, and
- ecologically sustainable product marketing (e.g. AgWA's EMU process).

The Murchison bioregion is in the highest rank for natural resource management priority because there are major constraints to implement effective natural resource management actions that will achieve biodiversity outcomes.

Much of the native vegetation is severely degraded through past agricultural practices (primarily sheep grazing) and feral herbivores. The Pastoral Lands Act leases still require the landholder to maintain certain stock levels that do not necessarily fit with conservation values.

Pastoral industry reform is essential to achieve desired conservation outcomes. Awareness of conservation values through education of various industry (mining, pastoral) and members of the public needs to be increased and limited financial resources are also a major constraint.

Major data gaps and research priorities

The highest priority data gaps in the bioregion are:

- data on distributions, population sizes and habitat requirements for many organisms, and
- quantitative information on the effects of feral animals, weeds, changes to fire regimes and mineral extraction on communities of greenstone surfaces.