Great Victoria Desert

Low open woodland of Bara gum and mulga over spinifex hummock grassland in southern Great Victoria Desert Bioregion, W.A.
Photo: N.L. McKenzie

Description

Bioregional description and biodiversity values

This is an active sand-ridge desert of deep Quaternary aeolian sands with a tree steppe of *Eucalyptus gongylocarpa*, Mulga and *E. youngiana* over hummock grassland, dominated by *Triodia basedowii*.

The climate is arid, with summer and winter rain averaging between 150 and 190mm annually. Landforms consist of red sand plains with patches of aeolian dunefields, salt lakes on major valley floors with lake derived dunes, and silcrete-capped mesas and plateaus (breakaways).

There are three subregions – Shield, Central and Maralinga.

Shield – the western end – is underlain by Yilgarn Craton and has the highest proportion of sandplains.

Central is active sand-ridge desert with extensive dune fields of deep Quaternary aeolian sands overlying Permian strata of the Gunbarrel Basin.

Maralinga is the eastern end, crossing the State borders to South Australia, and is underlain by Devonian sediments of the Gunbarrel Basin with extensive sandplains of deep Quaternary aeolian sands.

A tree steppe of *Eucalyptus gongylocarpa*, spinifex (*Triodia* spp) and mallee (*Eucalyptus kingsmillii, E. youngiana*) over hummock grassland dominated by *Triodia basedowii* occurs on the aeolian sands, with *Acacia*, mulga and *Eremophila* and *Santalum* spp. occurring on the colluvial soils. Scattered marble gum (*E. gongylocarpa*) and native pine (*Callitris* spp) occur on the deeper sands of the sand plains. Halophytes such as salt bush (*Atriplex*), bluebush (*Kochia*), and samphire (*Arthrocnemum*) occur near the salt lakes and in saline drainage areas.

Rare species include the:

- princess parrot,
- samphire thornbill,
- sandhill dunnart,
- marsupial mole,
- mulgara,
- rock wallaby,
- *Lerista puncticauda,*
- *Egernia kintorei,*
- *Conospermum toddii,*
- *Calytrix warburtonensis,*
- *Dampiera ramosa,*
- *Dicrastylis nicholasii,*
- *Eremophila aureivisca,*
- *Eucalyptus articulata,*
- *E. undulata,*
- *Labichea deserticola,*
- *Micromyrtus helmsii,*
- *Olearia arida,*
- *Ptilotus stipitatus,* and
- *Thryptomene wittweri.*

Threatened Ecological Communities include the yellow sandplain communities of the Great Victorian Desert, assemblages of Queen Victoria Spring and the Mirramiratjarra dune field. One hummock grassland vegetation association is confined entirely to Shield and more than 85 per cent of two vegetation associations are confined to the Central subregion.

Overall condition and trend

Condition is good, apart from the western fringes of the Shield, which have been degraded by grazing stock. Critical weight range species have declined or become extinct. Feral herbivores (camels and rabbits) and large, intense summer wildfires have reduced vegetation biomass throughout the region, although the grazing effects are more pronounced in wetlands. The continental stress class is between five and six (near pristine). The Shield and Maralinga subregions are both six, while the Central is five.

Conservation priorities

Management priorities are:

- feral herbivore and carnivore control,
- fire management regimes that reduce the size and impact of summer wildfires, and
- ecological surveys to gain more knowledge of the bioregion.

Resourcing and isolation are major constraints to management activities. However, increasing interests in mineral prospects and the possibility of mine development will require management.

The bioregion has a medium priority for reserve consolidation with 9.4 per cent in IUCN I-IV reserves, with a minimal regional bias.

Nationally important wetlands

The Yeo Lake and Lake Throssell complex has national significance. These lakes are in good condition with recovery expected in the short term with minimal intervention. Both are old pastoral leases. Yeo Lake is now a nature reserve and Lake Throssell was never taken up or developed as a pastoral lease and is a proposed reserve. The trend is condition improving, with the removal of stock aiding in the recovery. The threatening process is mainly feral animals, including rabbits, goats, foxes, cats and stray stock.

Wetlands of regional significance

There are two wetlands of regional significance: Lake Minigwal and Lake Rason. Both are significant for the maintenance of ecological processes.

Lake Minigwal is a seasonal intermittent saline lake with a static trend and in good condition. Threatening processes include feral animals and a changed hydrology due to de-watering of mine sites and discharge of hypersaline water into lake beds.

Lake Rason is also a seasonal intermittent saline lake with a static trend, but it is in near-pristine condition. Mineral exploration and feral animals are threatening processes.

Riparian zone

The bioregion has no external drainage. Riparian vegetation is confined to major creek systems that only flow intermittently, and are of limited extent. Riparian zone vegetation is degraded on pastoral leases on the western edge of the bioregion but it is near-pristine in remaining areas. The trend is declining on pastoral leases and static for the remainder. Threatening processes include:

- grazing pressure on pastoral lease areas in the western section,
- feral animals,
- changed fire regimes, and
- changed hydrology from de watering of mines and lowering of water tables.

Ecosystems at risk

Three ecosystems are considered vulnerable – the yellow sandplain communities, assemblages of Queen Victoria Spring and the Mirramiratjarra dune field.

The yellow sandplain communities of the Great Victoria Desert have diverse mammal and reptile faunas. Their distinctive plant communities are threatened by grazing, feral animals, mining and changed fire regimes.

The assemblages of Queen Victoria Spring are threatened by grazing, feral animals and changed fire regimes while the Mirramiratjarra dune field is an unique dune formation with a vegetation and drainage system threatened by grazing pressures and feral animals.

Species at risk

Forty per cent of the Great Victoria Desert's original mammal fauna is now regionally extinct.

The southern marsupial mole, princess parrot and two plants (*Eucalyptus articulata* and *Conospermum toddii*) are considered endangered. One bird species, one skink, four mammals and one plant are considered vulnerable. Other flora species are listed either priority one or two under WA State legislation. The general condition of fauna is fair and that of plants varies from degraded to good. The trend for many species at risk is unknown. Threatening processes to both fauna and flora include carnivorous and herbivorous feral animals, changed fire regimes, and grazing pressures.

Management responses

Reserve system

The existing system comprises seven reserves and includes the Great Victoria Desert Nature Reserve, the largest reserve in WA. There are five A-class nature reserves and one C-class nature reserve with a total area of 1.9 million hectares. They include examples of 17 of the region's 39 vegetation associations – hummock grass, mallee, mulga and various eucalypt communities as well as communities of the Queen Victoria Springs yellow sandplain.

In addition to the ecosystems at risk described above, eight vegetation associations have a high priority for reservation. These are:

- mallee scrub shrublands,
- low Mulga woodlands between sandridges,
- low *Allocasuarina cristata* woodlands,
- mulga and marble gum over hard spinifex,
- succulent steppe with an open low woodland comprising of Mulga over saltbush,
- grassland and shrub steppe of mulga and mallee over soft spinifex,
- succulent steppe of saltbush and bluebush, and
- the Mirramiratjarra dune field complex.

The main constraints on filling these gaps are resource related in terms of management and research, although competing land uses (pastoral industry) and prospective mineral exploration and mining leases are also factors.

Aboriginal Land Agreements will probably enhance biodiversity conservation.

Overall 9.4 per cent of the bioregion is reserved in IUCN I-IV reserves and the bioregion is IBRA reservation Class five. However the Maralinga region is considered Class four. The three subregions have the following percentages in IUCN I-IV reservations – Shield 7.8 per cent, Central 10.3 per cent and Maralinga 8.4 per cent. This data is for the WA regions.

Reserve management standard is ranked 'fair' because biodiversity values and management issues are poorly identified and some resource degradation is occurring, although retrievable.

Predator control through aerial dog baiting programs has occurred in pastoral areas, and the impact of feral herbivores is unknown. Wildfire management is non-existent although mining exploration activities are supervised.

Off-reserve conservation for species and ecosystem recovery

The main recovery actions required for ecosystems and species at risk include habitat retention, if not by reservation then by agreements with landholders.

Fire management to reduce the effect of large intense, summer wildfires on biota is a high priority.

Feral animal control is also required, as it will assist in the recovery of critical weight range mammal species.

Further research is needed to determine species status and distribution, which will help to increase knowledge of the biodiversity values and conservation issues in the region.

Limited off-reserve measures for the various species and ecosystem conservation/recovery efforts listed above are needed in all three regions. There are few major conflicting land uses because much of the desert is unallocated Crown land, Aboriginal reserve or conservation reserve.

Pastoral industry, mineral exploration and possible mine establishment are considered the main conflicting land uses, but these are localised. Once the 'Spinifex Agreement' with Indigenous peoples is implemented, extensive areas of the desert will be managed for conservation.

Integrated natural resource management (NRM)

Existing natural resource management initiatives include the Wildlife Conservation, Pastoral Lands and Mining Acts. The last two include clauses related to protection of land and natural vegetation. Pest management including feral animal control is a priority in threat abatement planning. There are industry codes of practice guidelines on the extent of vegetation that should be removed during mineral exploration and restorative actions to mitigate damage.

Opportunities include:

- reviews of industry codes of practice to strengthen protection of biodiversity, and duty of care for leasehold and other lands;
- threat abatement planning in relation to vegetation and threatened species management plans,
- pest management and
- fire management plans.

Capacity building with the community, landholders, industry and institutions is another opportunity for NRM. However the region's remoteness and absence of infrastructure adds to the costs of implementing NRM. Other impediments include the Land Administration Act, the extent of mining leases and tenements, and limited financial and staff resources. These NRM priorities apply equally to all Great Victoria Desert subregions.

Major data gaps and research priorities

- Regolith mapping is unavailable at better than 1:25, 000 resolution.
- No systematic biological survey has been made of the region, although there has been some assessment of biota on proposed and current reserves and a number of localised studies have been completed.
- There is little fine scale floristic data available for the subregion.
- There is little data on habitat requirements of virtually all invertebrate species, most ephemeral plants, persisting critical weight range mammals and uncommon vertebrate and plant species.
- There is no data to provide a regional context on life-history (including population trend) of any species, even rabbits, and no quantitative data on the affect of exotic predators, introduced herbivores or weed colonisation.