

Geraldton Sandplains



Callitris scrub on dunefield of yellow sandplain in the north end of the Geraldton Sandplain Bioregion, W.A.
Photo: N.L. McKenzie

Description

Bioregional description and biodiversity values

The Geraldton Sandplains bioregion comprises the central and northern Perth Basin, the Pinjarra Orogen, and the south end of the Carnarvon Basin. Outcrops of Jurassic siltstones and sandstones can be heavily lateralized.

Extensive proteaceous heaths and scrub-heaths often with emergent mallees, *Banksia* and *Actinostrobus*, occur on an undulating, lateritic sandplain mantling Permian to Cretaceous strata. These heaths are rich in endemics.

Sandplains are most extensive in the north and south-east where the region overlaps the edges of the Carnarvon Basin and Yilgarn Craton respectively.

Extensive York gum and acacia woodlands occur on alluvial outwash plains associated with drainage and with valleys in the hill country. Areas of coastal aeolian sands and limestone support proteaceous heath and *Acacia* scrubs.

The bioregion includes the Houtman Abrolhos and Dirk Hartog Islands. The climate is semi-arid warm Mediterranean. There are three subregions - Edel, Geraldton Hills and Lesueur Sandplain.

The bioregion contains a high percentage of rare and endemic plants with over 250 plants endemic to the Lesueur Sandplain alone, while 16 species of the genus *Scholtzia* are endemic to the Geraldton Hills. There are also Moresby Ranges communities with rare plants such as the mallee species *Eucalyptus blaxellii*, Mallee Box (*Eucalyptus cuprea*), heath, Moresby Range Drummondita (*Drummondita ericoides*) and orchid *Caladenia hoffmanii hoffmanii*. Mount Lesueur supports a large number of distinct, species-rich and geographically restricted communities. The Houtman Abrolhos islands are home to Tammar wallabies, rare breeding seabirds and sea lion colonies while Dirk Hartog Island is the largest Western Australian nesting site of loggerhead turtles (*Caretta caretta*) and a major nesting site for green turtles and reptiles found nowhere else, especially in *Lerista*, *Ctenotus* and other genera of small lizards. Endemic animals include the sandhill frog (*Arenophryne rotunda*).

The main land uses, ordered in terms of their extent, are: cultivation (dry land agriculture), conservation lands, grazing of native pastures and other Crown lands.

Overall condition and trend

Two regions have a Continental Stress Class of four and one has a Stress Class of three. The regional stress class should be between two and three because reserves are on its coastal or inland margins or generally small and threatened by salinity. In many aspects its condition and trend resemble the Avon Wheatbelt bioregion, and reserves are mainly on agriculturally unproductive lands.

Conservation priorities

Numerous vegetation associations and ecosystems at risk need to be reserved. This also applies to populations of a wide variety of threatened species. Feral animal control is a priority across all lands.

Nationally important wetlands

Three wetlands are listed as important nationally and include:

- a coastal intermittent saline lake,
- a river and estuarine system and
- a seasonal freshwater to permanent saline lake system.

All but one are in fair condition and static; the Logue-Indoon System is rapidly declining. All are affected by weeds, changing hydrology (rising water tables, increasing sediment load and salinity, respectively), and grazing by goats, rabbits and/or stock. Aquaculture and mining are also threats.

Wetlands of regional significance

There are four wetlands of regional significance – deep freshwater pools in the bed of the Greenough River, freshwater springs in the Northampton area, White and Green Lakes and the saline lakes of Coolimba-Jurien.

They support a significant number of taxa and contain rare or threatened species/ecosystems. Conditions range from degraded to good and likewise, trends vary from rapidly declining to static.

Threatening processes include:

- salinity,
- pools filling with sand,
- grazing pressure and
- exotic weeds such as glossy nightshade, saffron thistle, soursob, lupin and wild oats.

Riparian zone

There are 11 riparian zones, most of which are degraded. All river systems are declining, some rapidly. Threatening processes are:

- salinity,
- increased flow,
- ferals (foxes, cats, rabbits and goats) and
- weeds (caster oil bush, box thorn, wild oats, soursob and, lupins).

Ecosystems at risk

Six Threatened Ecological Communities (TECs) have been declared under WA State legislation comprising one critically endangered community, four endangered communities and one vulnerable community. Those in the Lesueur Sandplain are in a fair or good condition but two in the Geraldton Hills region are in degraded condition.

Clay flat assemblages of the Irwin River are already presumed totally destroyed, while the trends of other TECs are to either decline or remain static. Threatening processes are:

- grazing (particularly by goats and rabbits),
- changed fire regimes,
- salinity,
- changed hydrology and
- fragmentation of vegetation.

Twenty-six other ecosystems are also considered to be at risk. These ecosystems are broadly described as:

- shrublands,
- acacia and eucalypts forests and woodlands,
- a mixture of woodlands and shrublands,
- mixed chenopod,
- samphire and forblands,
- mangroves,
- tidal mudflat and coastal samphire,
- undescribed vegetation associations in the Lesueur area,
- cave invertebrates,
- spring communities,
- reptile and mammal communities and
- gypsum dune associations.

Three 'at risk' ecosystems are in degraded condition. Most are in fair or sometimes good condition but the trends of many ecosystems are unknown.

The main threatening processes are:

- feral animals, primarily the rabbit but also goats and pigs,
- grazing pressure,

- changed fire regimes,
- increasing fragmentation of the landscape,
- exotic weeds,
- human recreation activities and
- to a lesser extent, various forms of changed hydrology.

Species at risk

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

Under State legislation:

- 25 plant species have been declared as critically endangered,
- 23 plants, three mammals, three turtles and two bird species have been declared as endangered, and
- 17 plants, five mammals, seven birds and two reptiles are vulnerable.

The plants comprise ephemerals and perennials, including a wide variety of eucalypts, acacias and grevilleas. Reptiles include small skinks and marine turtles, while birds include a quail, a cockatoo and small passerines such as wrens.

Many mammals and birds at risk in the Edel region are from islands that occur off the coast. Most taxa are declining as a result of:

- broadscale vegetation clearing and ongoing loss of remnants,
- grazing pressure by stock, feral pigs, goats and rabbits,
- competition from exotic weeds, and
- changed fire regimes.

Vertebrate populations are under additional pressure from fox and cat predation (the marine turtles and Carnaby's cockatoo through increased predation on their eggs and hatchlings). Two pythons have special protection under State legislation.

Management responses

Reserve system

The 745,000 hectare conservation estate comprises 16.4 per cent of the bioregion and encompasses samples of 125 of the 151 vegetation associations.

There are five large national parks (Lesueur, Alexander Morrison, Kalbarri, Badgingarra and Nambung), six large nature reserves (Pinjarega, Beekeepers, Southern Beekeepers, Wandana, Toolonga and Zuytdorp), a single conservation park (Coalseam) and more than 200 smaller reserves.

Management standard is classed as poor with many reserves becoming saline or encountering rising water tables. Wildfire management facilities are limited by resources, except for firebreaks and fire access tracks which are installed and maintained (except on areas of the Beekeepers Nature Reserve and nature reserves smaller than 200 hectares).

Feral herbivore grazing activities are widespread and feral predator control systems are in place on only three large national parks. The reserve system is strongly biased. For instance, 88 per cent of the conservation estate in the Geraldton Hills region is confined to agriculturally unproductive surface-types on its northern periphery.

Twenty-three vegetation associations and five ecosystems at risk are not on reserves and have a high or medium priority for acquisition. A further 48 vegetation associations and 10 ecosystems are at risk, and have a high priority for further acquisition. The Beard vegetation associations include:

- shrublands of *Melaleuca*, *Acacia*, *Banksia*, and *Allocasuarina*,
- woodlands of York gum, wandoo, mallee and Salmon gum and
- low forest of *Acacia rostellifera*.

The ecosystems at risk are:

- Moresby Range thicket,
- *Eucalyptus macrocarpa* sandplain community,
- Irwin River assemblages,
- Hutt Lagoon assemblages,
- Moresby Range *Verticordia* dominated heath,
- Moresby Range *Allocasuarina/Melaleuca* thicket,
- *Acacia/Eucalyptus* scrub,
- Burma Road sandplain,
- Lesueur-Coomallo area,
- chert hill heaths,
- coastal lakes,
- three island communities,
- herbaceous plant of lake beds,
- spring communities and
- cave communities.

Priority acquisitions are remnants of ecosystems on agriculturally productive alluvial soils in the Lesueur Sandplain and Geraldton Hills regions, springs and soaks, succulent steppes and hill-top communities.

Competing land-use is the primary issue because cleared farming land occupies 49 per cent of the bioregion. Economic constraints include the purchase price of land and the cost of subsequent management. There are difficulties in identifying biodiversity values in some areas because biodiversity data lacks resolution

and the level of degradation due to agricultural practices and the impacts of feral herbivores is high.

Off-reserve conservation for species and ecosystem recovery

For most of the threatened species, the main recovery actions are:

- habitat protection,
- feral animal control,
- translocations,
- fire management and
- monitoring of populations.

The first two actions are relevant to birds and turtles. Habitat protection is best achieved through reservation and protection on other State lands. Protection on private lands may be essential in some cases.

Similar actions are required for ecosystem recovery, along with fencing of sensitive areas where there are heavy goat and/or rabbit numbers, and weed control. A large off-reserve effort is required in the Lesueur Sandplain and Geraldton Hills subregions, where agriculturally productive ecosystems are now fragmented and alienated, and salinity is a problem. Remaining vegetation fragments are few, small, and mostly degraded.

Integrated natural resource management (NRM)

Existing actions are:

- legislation through soil conservation and
- land clearing legislation.

However these are not always effective. Institutional reform through the Gascoyne Murchison Strategy and the purchase of leases for conservation estate are effective in the northern part of the region.

A variety of planning programs are in place, including:

- threat abatement planning (vegetation management plans, pest management),
- pastoral and mining industry codes of practice,
- capacity building through the Bushcare Program,
- property and catchment planning via a number of Land Conservation District Committees and the Northern Agricultural Integrated Management Strategy, and
- other planning opportunities such as the Batavia Coast Regional Strategy and local government strategies for controlling development and assessing proposals.

Opportunities include:

- legislation for more rigorous control of planning ideals,
- tradeable rights through carbon credits to provide impetus for new revegetation efforts,
- local government and National Action Plan planning the for water quality and salinity, and increasing the role of NRM in agricultural management, catchment planning and Landcare.

Constraints:

- The current role of Government departments in NRM and policing of activities such as land clearing is fragmented and unclear.
- Departments that have responsibility for resource exploitation may also have resource protection roles.
- Penalties for undertaking activities such as land clearing are comparatively minor and do not have the support of the greater rural community.
- There is a general lack of awareness of biodiversity benefits.
- The Land Administration Act needs to be reviewed to ensure requirements on pastoral leases operations are optimised for ecologically sustainable development.

Major data gaps and research priorities

- No region-wide vegetation, environmental geology or soils mapping is available at better than 1:250,000 scale.
- Systematic survey data are confined to flora, vertebrates and selected invertebrate taxa, is sparse and patchy.
- Most reserves don't have long-term survey data on species present, even for vertebrates.
- Currently little data is available on habitat requirements of most plants, uncommon vertebrates and virtually all invertebrate species.
- There is no data to provide a regional context on life-history (including population-trend) of most species, including rabbits, cat and fox.
- There is no quantitative data on the effects of exotic predators, weed colonisation, fragmentation, farm clean-up, fire and mineral-extraction on gypsum and lime surfaces.