Avon Wheatbelt

Acacia community on vegetation remnant in the foreground, wheat fields with saline flats in the background, Avon Wheatbelt Bioregion, W.A.
Photo: B. Beecham

Description

Bioregional description and biodiversity values

This region is a dissected plateau of Tertiary laterite in the Yilgarn Craton. Its climate is semi-arid (dry) warm Mediterranean. There are two subregions – the eastern and western parts.

The eastern subregion is an ancient, gently undulating plain of low relief and ancient drainage that has dissected the plateau. There is no connected drainage; salt lake chains occur as remnants of the ancient drainage systems and now only function in very wet years. Residual lateritic uplands are dominated by derived yellow sandplain covered in proteaceous scrub-heaths, which have a high number of endemic plant species. Mixed eucalypt, sheoak and jam woodlands dominate on Quaternary alluvials and eluvials.

The western subregion comprises gently undulating rises to low hills with abrupt breakaways. Its drainage is rejuvenated and comprises continuous stream channels that flow in most years. Alluvial and eluvial processes are active. Residual lateritic uplands and derived sandplains are covered by areas of proteaceous scrub-heaths (which are rich in endemics). Quaternary surfaces of erosional slopes and valley floors support woodlands of wandoo, York gum, jam and casuarina.

Land uses are primarily dryland agriculture and grazing. Smaller areas include Crown reserves (mainly conservation estate), mining operations and rural residential communities.

The region has been extensively cleared for agriculture and grazed by stock, and consequently has numerous environmental problems, threatened ecological communities and species at risk. It is an interface between the south-western forests and the Transitional Rainfall Zone, and its rich flora includes many endemics, particularly in *Grevillea, Hakea, Verticordia, Eucalyptus, Acacia, Dryandra, lhotskya, Eriostemon, Wehlia, Baeckea, Melaleuca, Chamelaucium, Micromyrtus, Thryptomene* and the Asteraceae family. Approximately 25 per cent of the declared rare flora in WA occurs in eucalypt woodlands in this region. Rare features include extant populations of critical weight range mammals, plant communities of granite outcrops, gypsum dunes, the Wongan Hills greenstone belt and associated laterite-capped mesas and Toolibin Lake.

Overall condition and trend

Remnant vegetation, wetlands, riparian systems, populations of species and ecosystems at risk are in poor condition, with the trend expected to decline. Extensive clearing of native vegetation has led to salinity problems (expected to affect up to 30 per cent of the region's area). Both subregions have a continental stress class of one (awful).

Conservation priorities

Threatened ecosystems and populations of threatened species need to be preserved. There needs to be a focus on protecting remaining populations of threatened species, both on and off reserves. Reserves and other ecosystem remnants low in the landscape need to be protected from salinity and excessive inundation. Weeds, fire, pathogens, feral herbivores and predators on reserves and other vegetation remnants should be controlled. Clearing should be halted. An integrated whole-of-landscape approach to landscape management is required.

Nationally important wetlands

The five wetlands of national importance are lakes and rock pools (Yorkrakine Rock Pools, Coyrecup Lake, Dumbleyung Lake, Toolibin Lake and Yealering Lakes System).

Their condition is fair but all are declining. Recovery will require significant management intervention. The causes of the decline are water diversion, excessive damage (by off-road vehicles to vegetation mats, water skiers and vandalism), water pollution (fouling by stock and rabbits), exotic plants (bridal creeper *Asparagus asparagoides*), salination (surface inflow, rising water table) and excessive inundation.

Siltation and eutrophication (agricultural fertilizers) are killing the remaining live trees, leading to algal blooms and the disappearance of surrounding vegetation.

Wetlands of regional significance

Four wetlands are considered to be vital to the preservation of biological processes at a regional level. These are:

- the Mollerin Lake System,
- the Buntine to Marchagee Braided Saline Drainage Line,
- Cowcowing Lake and
- the Mortlock River System.

Their condition is either good or fair but all are predicted to decline due to increases in water salinity and siltation.

Riparian zone

The principal streams and catchments are the Avon, Blackwood and Moore-Hill River headwaters and the occluded salt catchment area of the Yarra Yarra River. All watercourses are reported as being degraded as a result of virtually all native vegetation having been cleared around them. The trend is for further rapid decline. Threatening processes include vegetation fragmentation, grazing pressure, exotic weeds, pathogens, increasing salinity and altered flow regimes.

Ecosystems at risk

One Threatened Ecological Community (TEC) has been declared critically endangered, five are endangered and four are vulnerable under WA legislation. One is now presumed extinct (Morilla Swamp). The critically endangered community is the Perched Wetlands of the Wheatbelt region with extensive stands of living swamp sheoak (*Casuarina obesa*) and paperbark (*Melaleuca strobophylla*) across the lake floor, which occurs at Toolibin Lake, and on private property in the Shire of Dowerin. The trend for the critically endangered and endangered wetlands is rapidly declining; that of vulnerable TECs ranges between declining and rapidly declining. Key threatening processes are:

- vegetation clearing,
- exotic weed invasion,
- increased salinity,
- altered flow regimes and
- feral animals.

Other ecosystems at risk include:

- wetlands and riparian areas,
- thickets or forests with emergent *Eucalyptus* spp., plant assemblages of the Wongan Hills System,
- brown mallet communities low in the landscape,
- red morrell woodland communities of the western wheatbelt,
- wheatbelt mottlecah (rose mallee) and
- microbial, invertebrate and plant assemblages of natural saline seeps.

All these other ecosystems at risk are in fair condition and are declining, with the exception *Banksia prionotes* and *Xylomelum angustifolium* on low level sandplains and Tamma-Dryandra-Eremaea shrublands on cream sands of the Ulva landform unit, which are both in near pristine condition and static in trend.

All non-TEC ecosystems at risk are threatened by:

- clearing,
- landscape fragmentation,
- salinity and changed hydrology,
- grazing,
- weed invasion and
- changed fire regimes.

In addition to ecosystems listed above, vegetation associations found on valley floors and lower slopes have been extensively cleared and are subject to secondary salinity.

Species at risk

There are 45 plant species that have been declared as critically endangered, 39 as endangered, 26 as vulnerable and one is extinct under WA legislation. Critically endangered fauna include two invertebrates, both trapdoor spiders (Yorkrakine and Minnivale).

Endangered species include one mammal and one bird. Three mammals, two birds, one reptile and one invertebrate are vulnerable. More than 35 per cent of the Avon's original mammal fauna is now regionally extinct.

All plant species are threatened by:

- vegetation clearing,
- fragmentation,
- salinity and changed hydrology,
- grazing,
- weed invasion and
- changed fire regimes, and
- occasionally *Phytopthora* sp.

They are generally only in fair condition. Trends range from being static to declining rapidly.

Mammals are threatened by:

- feral predators,
- vegetation clearing and
- fragmentation.

Other animals are threatened by vegetation clearing and fragmentation, as well as salinity, changed hydrology, grazing, weeds and changed fire regimes. Large numbers of ground dwelling invertebrates are locally endemic and face extinction from salinity if their populations are confined to valley floor woodland. Fauna are declining or remaining static although the rock wallaby (*Petrogale lateralis lateralis*) is improving in condition under fox control.

Management responses

Reserve system

There are 468 nature reserves, and one conservation park in the bioregion. They range in size from less than a hectare to more than 10,000 hectares, with an average area of 452 hectares in the eastern part and 214 hectares in the western part. Most reserves are small and isolated by wheatfields. They are dominated by sandplain, pavement and breakaway surfaces high in the landscape, the uppermost reaches of valleys, and saline drainage floor surfaces.

Nineteen of 159 vegetation associations have high reservation priority because they are at risk and not yet reserved, or are reserved only as fragments. These include:

- sheoak,
- York gum,
- *Casuarina obesa* woodland,
- melaleuca woodland,
- medium woodlands and saltbush over samphire,
- mallet and blue mallet,
- salmon gum and gimlet,
- scrub-heath on sandplain,
- *Melaleuca* thicket on valley floors,
- *Allocasuarina campestris* scrub,
- *Dodonaea* scrub,
- jam, and
- mallee and broombush over samphire.

In addition, 18 at risk ecosystems are not reserved or are poorly reserved and are a high priority for reservation. These include:

- the riparian area of the Avon,
- wheatbelt mottlecah,
- Morilla Swamp,
- herbaceous plant assemblages on bentonite lakes,
- salt flats plant assemblages of the Mortlock River (east branch),
- *Banksia-Xylomelum* communities on low level sandplains,
- Tamma-Dryandra-Eremaea shrublands,
- perched clay wetlands of the wheatbelt,
- plant associations of the Billeranga, Inering, Wongan Hills, Koolanooka, and Moonagin Systems,
- assemblages of natural saline seeps and
- *Melaleuca* thickets with emergent Eucalypts.

Most ecosystems or vegetation associations with a high reserve priority are the woodlands and shrubland communities on the fertile quaternary soils of valley slopes and valley floors. These valley floors have been extensively cleared to provide land for agriculture and grazing, and are salt affected.

Constraints on reserve acquisition:

- Some ecosystems have already been cleared below CAR thresholds (generally below 10 per cent).
- Most remaining areas of lowland ecosystems will be lost to salinity.
- There are insufficient resources to acquire and manage an increased conservation estate.
- There are more than 1000 reserves that have some conservation function, but most are tiny fragments.
- There is competition with other government agencies and local government for remaining fragments.

Both subregions are in the highest class of IBRA Reservation Priority (Class 1) because clearing has been extensive, and rising saline groundwater threatens up to 30 per cent of the landscape. The reserve management standard is poor: salinisation is not managed (except for the highly localised ground water pumping at Toolibin Lake). Fox baiting occurs on 9.7 per cent of the conservation reserve estate. Fires are infrequent. Weed control is minimal.

Off-reserve conservation for species and ecosystem recovery

Priority species and ecosystems include:

- critical weight range mammals and threatened birds,
- biota of granite outcrops, and
- Declared Rare Flora especially on roadsides and of lowland communities.

Recovery actions for all species and ecosystems include:

- habitat retention through reserves, private lands and other state lands, as well as weed control,
- feral animal control,
- fencing,
- fire management,
- survey and mapping work,
- incentives for landholders to conserve communities,
- control of mining activities (particularly gravel),
- pumping to control water table (especially lowland areas),
- translocation,
- revegetation,
- germplasm storage and
- capacity building with local government authorities and landholders.

Constraints on some of these actions include:

- many species are locally extinct (particularly mammals),
- habitat patches large enough to sustain many vertebrate populations no longer exists,
- predators need to be controlled,
- there is no viable technology to control salinity,
- a lack of survey data and knowledge on habitat requirements, and
- a lack of staff resources.

Both the eastern and western parts have priority rank of 1 for off-reserve conservation.

Integrated natural resource management (NRM)

NRM initiatives include incentives for revegetation, fencing remnant vegetation and abating threats such as dieback, feral animals, fire, salinity and weeds.

To this end, industry codes of practice and integrated regional management plans exist, and environmental management systems are being prepared. State agencies and non-government organisations are interacting to build capacity among landholders and to implement strategic plans, including new industries based on native biota, particularly deep rooted perennial plants.

The main constraints on success include:

- the lack of resources (human and infrastructure) for implementation,
- the lack of rigor in the NRM area,
- a poor understanding of the relevant socio-political processes,
- the lack of economically viable technical solutions,
- the need for more controls on land clearing and
- drainage.

While various Acts protect wildlife and soils, there is no duty of care legislation.

Both the eastern and western parts have an NRM rank of 1, which indicates major constraints to implement effective NRM actions to achieve biodiversity outcomes

Major data gaps and research priorities

- A field survey of biodiversity in relation to physical landscape attributes is required in vegetation remnants. This commenced in 1999.
- Robust biodiversity surrogates need to be identified, as does population viability in the context of the region's fragmented landscape and fire.
- A standardised database and GIS application is also essential for data querying and management.