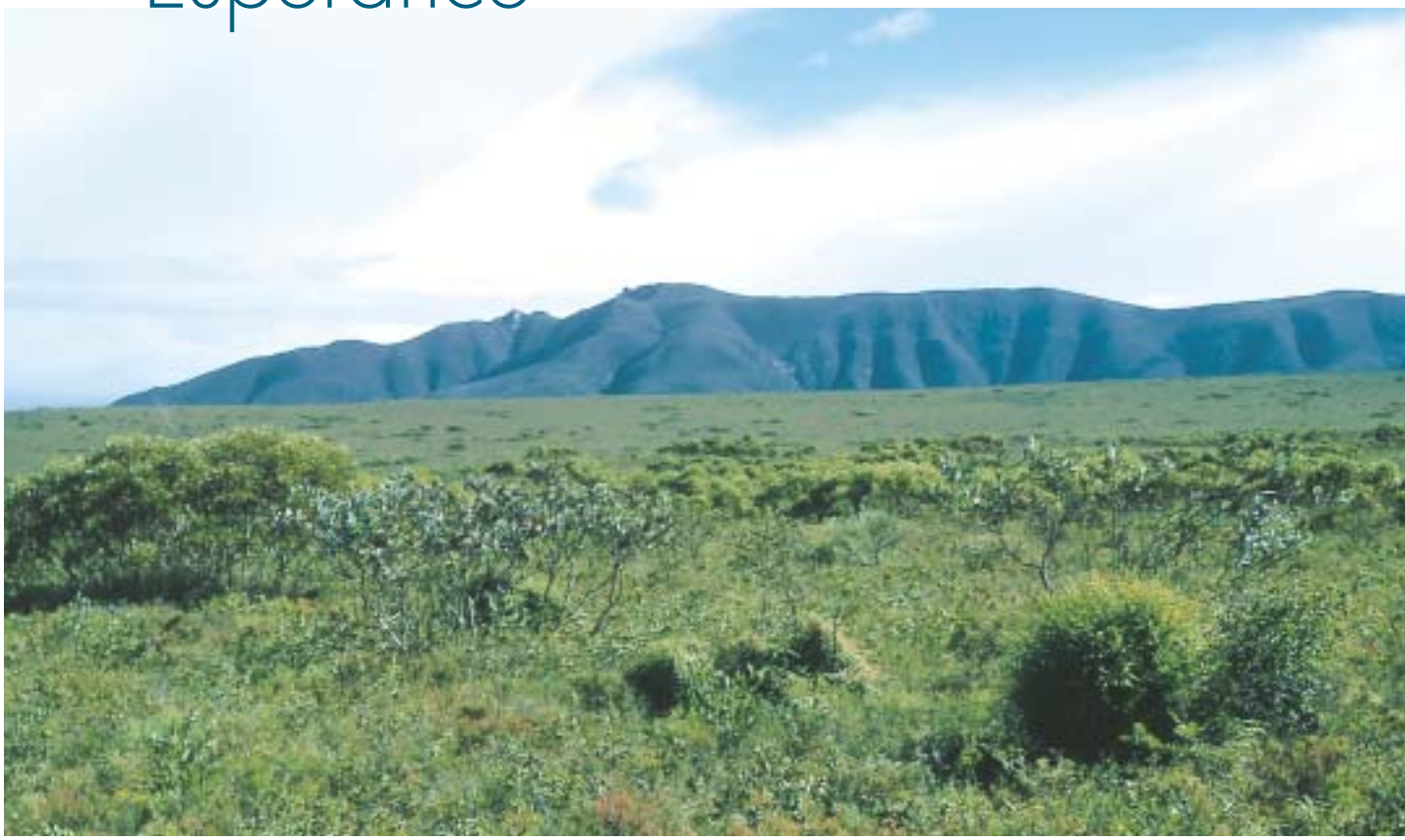
Esperance



Proteaceous heath with
emergent mallee on spongalite
sandplain in Fitzgerald River
National Park, Esperance
Bioregion, W.A.
Photo: N.L. McKenzie

Description

Bioregional description and biodiversity values

The Esperance Bioregion is made up of two subregions, Fitzgerald and Recherché.

The Fitzgerald subregion has a basement of marine sediments with small outcrops of gneiss and greenstone. It shows variable relief, comprising subdued relief on the sandplains of the coastal region, punctuated with metamorphosed granite and quartzite ranges both inland and on the coastal plain. It lies mainly on the Bremer Sedimentary Basin although its eastern and western sections are within the Albany-Fraser Orogen of the Yilgarn Craton. The subregion is dominated by yellow plains of duplex soils as well as deep and shallow sands. Shallow sandy soils occur on the mountain ranges. Sand sheets show varying levels of lateritisation. Vegetations include scrub heath, mallee heath characterised by *Eucalyptus tetragona*, coastal dune scrub, mallee, woodlands on greenstone, Yate and York gum woodlands on alluvials, and jarrah/marri woodlands in the west. Vegetation on abrupt granite and quartzite ranges that rise from the plain comprises herbfields and heaths (rich in endemics) with woodlands of *E. redunca, E. incrassata* in gullies and alluvial foot-slopes. The subregion has a temperate Mediterranean climate with a 600 to 800mm annual rainfall.

The Recherché subregion has variable relief. It comprises Quaternary coastal sandplains and dunes overlying Proterozoic gneiss and granite, as well as Eocene and more recent coastal limestones. Numerous granitic islands occur in the near-shore area of this subregion. Vegetation comprises heaths, coastal dune scrubs, mallees, mallee-heaths and granite heaths. Its climate is temperate Mediterranean, with a 400 to 700mm annual rainfall.

Major land uses include grazing of improved pasture and cultivation (dry-land agriculture). Smaller areas are used for conservation and other Crown reserves.

Special values include off-shore islands and archipelago (Bald, Glassy, Doubtful, Middle, Woody, Sunday and Investigator Islands, and the Recherché) that are refugia for seals, sea lions, and Quokkas, breeding sites for birds such as Cape Barren Geese and successfully translocated Noisy Scrub-bird. They also have distinctive vegetation including plant species restricted to islands. The Recherché Archipelago Nature Reserve incorporates some 105 islands totalling 9720 hectares.

Several rare ecosystems are contained in the bioregion, including:

- the Stirling Range Montane thicket,
- heath of the South West Botanical Province,
- Ravensthorpe Range,
- Pink Lake,
- Esperance sandplain, and
- mixed thicket complex of the Russell Range.

There is also a wide variety of rare, endangered or specially protected flora and fauna found within the bioregion.

Overall condition and trend

The condition of the region is fair to poor with a generally declining trend. Wetlands are in particularly poor condition. Threatening processes include vegetation clearing and fragmentation for agriculture, hydrological changes and salinity, feral predators and herbivores, grazing by stock and weeds. Many communities and species are localized in occurrence and vulnerable to fire events. *Phytophthora* fungi are changing the composition of coastal heath and scrub communities. The reserve system is nearly comprehensive.

The Fitzgerald subregion has a continental stress class of three (medium), while the Recherché subregion is listed as five (see Glossary). Given the level of clearing, and collateral problems, the Recherché subregion should have a stress class of three.

Conservation priorities

- The effect of salinity, inundation and root-fungus on reserves and remaining vegetation fragments needs to be restricted.
- Cats, foxes, weeds and fire on and off-reserves needs to be controlled.
- Low Moort Forest needs to be added to the reserve system.

Nationally important wetlands

There are eight wetlands of national significance in the Esperance bioregion. They range in condition from degraded to fair or good.

- Altered water flow or water quality is one of a variety of processes threatening these wetlands.
- Vegetation clearing and fragmentation, as well as changes to fire regimes, and encroachment from urban and agricultural areas are also problems.

- The Yellilup Yate Swamp System is predicted become extinct due to inundation, eutrophication, siltation and increased salinity in the water.

Wetlands of regional significance

Fifty-two wetlands of subregional significance are listed. All except seven are breeding, feeding, roosting, nursery areas and/or refugia for animal taxa, and significant for maintaining ecological processes or supporting a high diversity (in some cases including rare or threatened species). Their condition ranges from fair to good, with a declining or static trend. Threatening processes are similar to wetlands of national importance. These include:

- salinisation,
- eutrophication,
- siltation,
- weed invasion and
- vegetation clearing/fragmentation.

Riparian zone

Fourteen rivers, each with a catchment of the same name, occur in the bioregion. Most riparian zone vegetation is in poor or fair condition. However, if in reserves, vegetation and rivers are often in good condition while adjacent sections in surrounding agricultural land are degraded. Most river systems are expected to either remain static or decline, sometimes rapidly. Threatening processes include:

- changes to salinity and flow in the river,
- invasion of exotic weeds,
- drainage from agricultural lands,
- feral animals,
- vegetation clearing and
- habitat fragmentation.

Ecosystems at risk

One Threatened Ecological Community has been declared as critically endangered under WA State legislation (Montane thicket of the eastern Stirling Ranges), one is endangered (Montane Mallee Thicket Community) and two are vulnerable. Twenty-nine other ecosystems are considered to be at risk. Eight of these are mallee associations, and six are other *Eucalyptus* associations. Others are associated with lakes, wetlands and river zones, or are uplands of the Stirling, Porongurups, Ravensthorpe, Mt Manypeaks and Russell Ranges. They vary widely in condition, from near pristine to degraded, and most trends are declining or static. One ecosystem is improving - Cocanarup Timber Reserve – which comprises *Eucalyptus salmonophloia* over *Acacia acuminata* woodland on red loams.

Vulnerability can be inherent to communities at risk. For instance, the North Porongurup Ironstone community is vulnerable because of the small area and restricted distribution of the substrate it grows on. However the majority of these ecosystems are afflicted by a wide range of processes.

Wetland, lake and river ecosystems are threatened with changed hydrology and salinity level, changed fire regimes, weeds and urban encroachment by the town of Esperance.

Woodland areas are reduced and simplified by clearing and fragmentation of remnant bushland, feral animals, exotic weeds and changed fire regimes. Hilly areas tend to be threatened by mining activities, clearing and fragmentation of remnant bushland, pathogens (such as *Phytopthora* sp.) and human recreational activities.

Species at risk

More than 25 per cent of the Esperance bioregion's original mammal fauna is now regionally extinct.

Eighteen plant species have been declared as critically endangered. Thirty plants, two mammals, three birds and two invertebrates are endangered. Thirty four plants, seven mammals and six birds are declared as vulnerable under State legislation.

Species that are occasional visitors have not been included in these counts (above) but three whales, six sea birds and two sharks are also included as species at risk.

The threatening processes affecting flora almost always include restricted distribution in combination with the small number of individuals or populations (some such as *Acacia rhamphophylla, Chordifex abortivus, Nemcia luteifolia* and *Xyris exilis* are known from a single population only). Other common threatening processes for plants include pathogens (in particular *Phytopthora* fungi), exotic weeds, changed fire regimes, feral animals, and road works.

Mammal species are threatened by feral predators, changed fire regimes, pathogens, vegetation fragmentation, and small population sizes. Whales are potentially at risk from whale watching ecotourism. Sea birds and sharks are at risk from commercial fishing practices – overfishing, use of long lines, bycatch and direct control measures (sharks only). Two invertebrate species are affected by climate change and changed fire regimes.

Management responses

Reserve system

There are eight national parks (Stirling Ranges, Cape Arid, Cape Le Grand, Stokes, Waychinicup, Hassell, Fitzgerald River and Red Island), 61 nature reserves and one timber reserve in the Esperance region. Some are extensive, particularly the Fitzgerald River Biosphere and Cape Arid National Park. Although half of the area of both subregions has been cleared (51 per cent in the Fitzgerald subregion and 49 per cent in the Recherché subregion), more than half of the remaining area of vegetation is reserved for nature conservation (54 and 58 per cent respectively).

Fifteen of 63 vegetation associations in the Esperance region are not represented in the reserve system, and although priorities have not been allocated, the most threatened of these is the Low Moort forest. A priority in the Recherché subregion is to extend Nuytsland Nature Reserve northwards to the Eyre Highway. The Macro-Corridor project is a priority activity in the bioregion and attempts to link reserves to maximise conservation value.

Many reserves in the Esperance bioregion, particularly in the higher rainfall western end, are subject to loss of biodiversity due to impact from *Phytophthora cinnamomi* and minor agricultural weed invasion on sandy soils along western and northern boundaries of conservation reserves.

Wildfire management facilities beyond fire breaks and fire-access tracks are limited by resources and isolation though some prescribed fuel reduction burning is undertaken on larger reserves (Manypeaks, Waychinicup, Stirling Range, Corackerup, Fitzgerald River, Cape Arid National Park, Cape Le Grand National Park and Stokes National Park).

Feral predator control takes place on Manypeaks, Waychinicup, Stirling Range, Corackerup, Fitzgerald River, Cape Arid National Park, Cape Le Grand National Park, Stokes National Park, and Lake Shaster Nature Reserve. Feral herbivore grazing (e.g. rabbits) occurs across most reserves, although goats appear to be confined to Fitzgerald River National Park.

Constraints relate mainly to competing land uses. Major components of the landscape are covered by mines, mining tenements or exploration leases and some areas are used for grazing. Few options remain for increasing the comprehensiveness and representativeness of the reserve system, as a result of past clearing.

Most reserves are relatively well managed, with major biodiversity issues identified and being addressed. However, management of several reserves was assessed as 'fair' because biodiversity or management issues are poorly identified, but degradation is considered to be retrievable. In three cases (Stirling Ranges, Arpenteur, and Cape Le Grand) management standard was classed as poor because of high visitor numbers, unmanaged threatening processes and the likelihood that permanent degradation will occur.

Off-reserve conservation for species and ecosystem recovery

Many of the species and ecosystems considered to be at risk in the bioregion already occur in reserves. Their degrading processes are either inherent, due to their highly localised and restricted occurrence, or they are caused by clearing, pathogens, ferals and weed invasion issues in the broader landscape. These issues affect plants and animals alike. Island ecosystems, restricted communities associated with hills and ranges, wetlands and riparian zones, and valley floor woodlands in farming land all require different actions. Recovery actions for the last two categories confront broad landscape processes that require a coordinated response by government agencies and rural communities, with whole-of-landscape management plans being implemented that value the benefits of biodiversity.

Restrictions on further clearing, programmed replanting of deep-rooted perennial plants, *Phytophthora* quarantine and fire-control programs need to be rigorously implemented, together with monitoring and eradication of invasive weeds and feral animal control. Islands and uplands require specific fire and pest control programs by the State conservation agency to continue.

Integrated natural resource management (NRM)

Natural resource management actions include fencing subsidies to protect remnant vegetation (moderately effective) and private land conservation covenants.

The Soil and Land Conservation Act 1995 and the Wildlife Conservation Act are relevant, but not always enforced, and need to be replaced with comprehensive biodiversity protection legislation.

Threat abatement planning has been relatively successful (e.g. Western Shield fox control has allowed some mammals and birds to recovery, and Callicivirus has reduced rabbit populations). Industry Codes of Practice have led to revegetation in the Ravensthorpe area.

The introduction of sandalwood plantations on private land for essential oil production has resulted in ecological sustainable product marketing. Land Conservation District Committees in most areas of the bioregion provide opportunities for public participation in conservation projects (e.g. revegetation

of catchments and damaged land has been variably effective in addressing salinity and erosion problems). Local government planning, Salinity Action Plan and Ribbons of Blue projects are in place.

NRM opportunities include:

- revising Wildlife Conservation legislation to address current issues and problems of biodiversity protection more effectively;
- rural reconstruction and new management systems incorporating agroforestry, oil mallees and other specialty crops to make better use of cleared land and relieve commercial pressure on native flora;
- greater tax incentives are necessary to protect remnant vegetation on private land;
- management systems to coordinate management of feral animals and weeds across all land tenures;
- acknowledgement of the intrinsic environmental values of uncleared lands through public awareness education and
- property management planning.

The last initiative is being promoted through the South Coast Regional Initiative Planning Team (SCRIPT), an interagency environmental and conservation planning approach or Landcare groups.

Biodiversity conservation is impeded by:

- outdated legislation,
- confusion over cost-effective methods and
- lack of staff to increase community awareness.

Major data gaps and research priorities

- There is a lack of region-wide vegetation, environmental geology or soil mapping at better than 1:250,000 scale.
- Systematic flora or fauna survey quadrats are localised, and the current LTERM quadrat program is incomplete, confined to reserves and unfunded.
- There is little data available on habitat requirements of virtually all invertebrate species, most ephemeral plants (except some Declared Rare Flora), some persisting and translocated CWR mammals, and some persisting Endangered/Vulnerable birds.
- There is no data to provide a regional context on life-history (including population-trend) of most species, including foxes, except baseline information on CWR mammals at Stirling Range National Park and Fitzgerald River National Park (data collected during Western Shield Monitoring).
- The effects of *Phytophthora* sp. fungus, exotic predators, weed colonisation, fragmentation, farm clean-up and fire on flora and fauna are generally not known.
- There is no data available on the effect of mining (exploration) on greenstone communities in Ravensthorpe Range, the effect of rising water table on species composition of communities remaining within the agricultural landscape, the impact of reduced rainfall on vegetation, and no comprehensive biological survey of island biota.