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Introduction

This report reviews the nature conservation issues that each of Western Australia's 53 biogeographical subregions faced in 2002 (map inside front cover).

The data and interpretations presented are based on first-hand experience, being compiled by the Department of Conservation and Land Management's regional nature conservation staff between July 2001 and January 2002.

By providing an overview of the status of the species and ecosystems in each subregion's lands and waterways in terms of a consistent set of criteria, this report provides a detailed, systematic basis for assessing conservation priorities among different parts of Western Australia. It also indicates the likely consequences for biodiversity if no action is taken.

There are a range of gaps and omissions in this initial edition. For instance, no information is included for subregions that are predominantly in the Northern Territory or South Australia. Information will become more extensive as data continues to be gathered and nature conservation work in Western Australia progresses.

In many instances, the reader will become aware that a subregion or area is under ecological threat from forces ranging from grazing, to salinity, to weed control. Some of these problems are challenging, and in some places they are not being well managed. Where feasible, potential solutions have been outlined. These solutions need to become part of the day-to-day management of our lands and waters if the environment is to improve.

The report was originally compiled as Western Australia's contribution to an audit of nature conservation issues Australia-wide. The project was implemented and managed by the editors, with assistance from Gordon Graham, Terry Rose, Angas Hopkins and Damian Shepherd.

Western Australia signed contracts to complete this statewide biodiversity audit after meeting with representatives from State, Territory and Commonwealth environmental agencies April 2001.

A broader Australia-wide project was defined, carried out and published under the auspices of the Natural Heritage Trust's National Land and Water Resources Audit (Australian Terrestrial Biodiversity Audit 2002). The Australia-wide project was managed by Paul Sattler, Colin Creighton, Rochelle Lawson and Jim Tate (NLWRA), with general direction from an Audit Biodiversity Assessment Advisory Committee comprising Keiran McNamara (Chair, CALM), Gus McGown (Agforce), Ray Nias (WWF), Hugh Possingham (BDAC), Denis Saunders (CSIRO), Christine Schweizer (EA), Geoff Barrett (Birds Australia), Cynthia Maher (NFF), Stephen Hunter (Audit Advisory Council) and Phil Pritchard (AFFA). The regional boundaries are modified from the phytogeographical regionalisation devised by John Beard for Western Australia.

The Western Australian component of the project was funded by NLWRA (below) and CALM. For contributing data and providing helpful assessments of the drafts, the editors and authors thank Western Australian Museum, Perth Herbarium, Western Australian Threatened Species and Communities Unit (WATSCU), Sally Black, David Blood, Jenna Brooker, Andy Chapman, Mike Clarke, Gary Connell, John Dell, Alex George, Stuart Halse, Sheila Hamilton-Brown, Marg Wilke, Bronwen Keighery, Greg Keighery, Kevin Kenneally, Michi Maier, Libby Mattiske, Jelena May, Nathan McQuoid, Shaun Molloy, Alan Payne, David Pearson, Jeff Richardson, Tony Robinson, Geoff Stoneman, John Stretch, Roy Teale, Klaus Tiedemann, John Woinarski, Gordon Wyre and many others.

The editors and authors invite all interested people to make use of the information. We encourage robust discussion on its usages, and invite candid recommendations for improvement. We hope that it will provide a framework for the State biodiversity strategy, and for setting priorities among nature conservation activities 'on the ground'.

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Structure

The synopses follow a standardised structure which was supplied by the National Land and Water Resources Audit (a program funded by the Natural Heritage Trust). A report summarising the results and background to this Australia-wide programme was published in December 2002 (National Land and Water Resources Audit 2002).

The structure and the categorisations used in the synopses are detailed below.

Subregional description and biodiversity values

Description and area

Area of subregion and an integrated description of geology, landforms, soils and dominant vegetation types.

Dominant land use

List from one or more of 15 land-use categories in Key b of Appendix B. These include land-uses such as grazing, forestry and conservation.

Continental Stress Class

Continental Stress Class (Morgan 2001a, Morgan 2001b) values range from 1 (extremely high stress) to 6 (no stress). If the Continental Stress Class value seems inappropriate authors commented on why and what the number should be.

Known special values in relation to landscape, ecosystem, species and genetic values

Examples include high species or ecosystem diversity, rare features (e.g. volcanic plugs), rare ecosystems (e.g. ironstone range flora), rare species, centres of endemism, and refugia. In each case describe and/or list species or taxonomic groups present.

Existing subregional or bioregional plans and/or systematic reviews of biodiversity and threats

Provide information on available sources of information, including databases, results of scientific studies, previous surveys and regional management plans if they exist.

Ecosystems at risk

Threatened ecological communities (TECs)

The ecosystems listed here are listed by WATSCU as Threatened Ecological Communities (TECs) AND endorsed by the West Australian Environment Minister. Status data in the synopses are Western Australian.

Identify each threatened ecosystems (based on status across its geographical range), describe it in terms such as its vegetation, dominant species, preferred substrate and landform. For each, list a reliability rank (Rank 1 of Appendix C), relate the identified threatened ecosystem

Wetlands

Wetlands of national significance (DIWA listings)

Assess wetlands of national significance including information on wetland name and Directory of Important Wetlands of Australia (Environment Australia 2001) 'code', condition (Rank 2 of Appendix C), trend in condition (Rank 3 of Appendix C), threatening processes (Key e of Appendix B) and reliability of assessment (Rank 1 of Appendix C).

Wetlands of subregional significance (in addition to the DIWA listed wetlands)

Assess wetlands of subregional significance (in addition to nationally significant wetlands, above), including information on wetland name, location (grid reference or latitude and longitude), description (Key d of Appendix B), special values (Key c of Appendix B), condition (Rank 2 of Appendix C), trend in condition (Rank 3 of Appendix C), threatening processes (Key e of Appendix B) and reliability of assessment (Rank 1 of Appendix B).

Riparian zone vegetation

The riparian zone is the area which has a functional influence on watercourses and their biota. Provide information on condition (Rank 2 of Appendix C), trend (Rank 3 of Appendix C), threatening processes (Key e of Appendix B) and reliability of the assessment (Rank 1 of Appendix C).

to NVIS Major Vegetation Sub Groups (Key f of Appendix B), identify its West Australian status (CR = Critically Endangered, E = Endangered, V = Vulnerable, P = Priority), condition (Rank 2 of Appendix C), trend in condition (Rank 3 of Appendix C), and threatening processes (Key e of Appendix B).

Other ecosystems at risk

Describe any other ecosystems considered at risk by regional ecologists and others, as well as TECs that are not yet formally approved by the Minister for the Environment. The required information for each is the same as for "Threatened Ecological Communities" above.

Species at risk

Fauna species at risk

From Commonwealth and State listings of threatened species of fauna (including invertebrates), list species name, status (most recent listing of the Western Australian Wildlife Conservation Act (1950) - CR = Critically Endangered, E = Endangered, V = Vulnerable and P = Priority), condition (Rank 2 of Appendix C), trend in condition (Rank 3), reliability of assessment (Rank 1) and threatening processes (Key e of Appendix B).

Declared rare and priority flora

For each declared species of plant, list species name, status (most recent listing of the Western Australian Wildlife Conservation Act (1950) - CR = Critically Endangered, E = Endangered, V = Vulnerable and P = Priority), condition (Rank 2 of Appendix C), trend in condition (Rank 3 of Appendix C), reliability of assessment (Rank 1 of Appendix C) and threatening processes (Key e of Appendix B).

Due to constraints of space, time and knowledge, only priority 1 and 2 species are listed in this document so far. Many other priority species, particularly 'priority 4' species in the forest subregions, are considered to be threatened. These have not been included at this stage to maintain consistency with the other WA subregions.

Analysis of appropriate management scenarios

Ecosystem reservation priorities

Although most regional ecologists in Western Australia carried this analysis out at the IBRA subregional level, NLWRA requested, for each IBRA V bioregion (Environment Australia 2000; Thackway and Cresswell 1995), a list of: threatened ecological communities, other ecosystems at risk and vegetation associations (Hopkins *et al.* 1996; Shepherd *et al.* 2000) according to their reservation status (IUCN I-IV, V-VI, CALM leasehold or other) and priority for acquisition (L = low, M = medium, H = high).

Although more detailed vegetation mapping is available for some WA subregions, the 1:250 000 scale maps (Hopkins *et al.* 1996; Shepherd *et al.* 2000) which cover the entire State allow consistent inter-regional comparisons.

Constraints on reservation

List the subregional constraints on the reservation of poorly reserved ecosystem (Key g of Appendix B).

Bioregional and subregional priority for reserve consolidation

Bioregional NRS Priority based on reservation extent and vegetation cover only (Cummings and Hardy 2001) is

listed in Appendix D, values between 1 and 5. Regional ecologists were asked to examine the value that has been allocated to their bioregion and comment on whether or not this is appropriate. Sometimes other prioritisation is listed (Rank 4i of Appendix C)

Reserve management standard

Assessment of reserve management, as individual reserves or groups of reserves (Rank 5 of Appendix C).

Off reserve conservation

Priority species or groups and existing recovery plans

Species or priority groups of threatened species found off CALM reserve and any relevant recovery plans.

Appropriate species recovery actions

Specific recovery actions that would or do apply to species or groups identified (Key h of Appendix B). Describing major constraints if necessary.

Ecosystems and existing recovery plans

Identify specific threatened ecosystems found off CALM reserve and any relevant recovery plans.

Appropriate ecosystems recovery actions

Specific recovery actions that would or do apply to species or groups identified (Key h of Appendix B). Describing major constraints if necessary.

While these actions have been recommended for the recovery of the particular species or ecosystem, further research may reveal more effective alternatives in some cases. The listing should not be interpreted as an intent by CALM to undertake all these actions.

Subregion priority for off reserve conservation

Off reserve conservation priority for component subregions for (Rank 6 of Appendix C).

Conservation actions as an integral part of Natural Resource Management

Existing NRM actions

Identify existing NRM actions (Key i of Appendix B) in place that contribute significantly to biodiversity conservation and describe type of action and effectiveness.

Feasible opportunities for NRM

Identify feasible opportunities for NRM actions to specifically address biodiversity (Key i of Appendix B) and describe type of action and effectiveness.

Impediments or constraints to opportunities

Discuss impediments or constraints where opportunities are identified.

Subregions where specific NRM actions are a priority to pursue

Allocate subregions with an NRM priority (Rank 7 of Appendix C).

Data gaps

Gaps in data needed for the identification of biodiversity values and management responses

Identify priority data gaps in knowledge of biodiversity values and management responses (Key a of Appendix B).

Sources

References cited

Table of references that appear within the text.

Other relevant publications

Numbers refer to other publications that are relevant to the subregion but are not referred to in the text (see Appendix A).