



THE GREAT
WESTERN
WOODLANDS
PROTECTING OUR BIOLOGICAL RICHNESS

The Great Western Woodlands is the largest remaining area of intact Mediterranean-climate woodland on Earth—an internationally significant region of great biological richness.

A strategy has been developed to ensure the long-term conservation of its unique natural and cultural values, establishing a vision for the region and principles which will guide its future management.



BY IAN HERFORD AND ALEXANDER WATSON

If you were to head east from Perth, over the escarpment hills of the Darling Range, you would eventually enter the great sweep of cleared country known as the Western Australian wheatbelt. Driving further east, a simple fence marks a line between the wheatbelt and the beginning of a remarkable place—the Great Western Woodlands.

Between Kalgoorlie, Esperance and the Nullarbor Plain lies a huge expanse of natural bush. This rich tapestry of

woodlands, mallee and shrublands connects Australia's south-west corner to its inland deserts. At almost 16 million hectares, it is more than twice the size of Tasmania and larger than England. Despite being biologically distinct, the region has never had a unique name, usually simply being referred to as part of the 'Goldfields' region. The name 'Great Western Woodlands' was selected because it best reflects the region's position in the west of the continent and status as

containing the largest remaining area of temperate woodland in Australia. The boundaries of this distinct bioregion, established by researchers from the Australian National University, separate the eucalypt woodlands from the mulga (*Acacia aneura*) country to the north, the treeless Nullarbor Plain to the east, the moist coastal heath to the south-east, and agricultural land to the west and south.

In modern Australia, this landscape is of great significance. The Great Western Woodlands is one of the very few large, intact landscapes remaining in temperate Australia. Temperate woodlands once covered large areas of southern Australia, and the vast majority of these woodlands have been removed—those that remain are fragmented and heavily used. The same story can be told in Asia, Europe, Africa, North and South America. As a consequence, the Great Western Woodlands now stands as a globally unique example of extensive, healthy woodland ecosystems.

A biodiversity hot spot

The diversity of the Great Western Woodlands has three key features. First, there are extraordinarily high numbers of species. Second, the taxonomic composition and structure of ecological communities vary greatly over short distances across the landscape. Third, the ecological processes which allow such richness and biomass to persist under such semi-arid and infertile conditions are remarkable.

The Great Western Woodlands is a global biodiversity hot spot on par with Western Australia's spectacularly diverse



Previous page

Main Salmon gum woodland in the Great Western Woodlands.

Photo – Marie Lochman

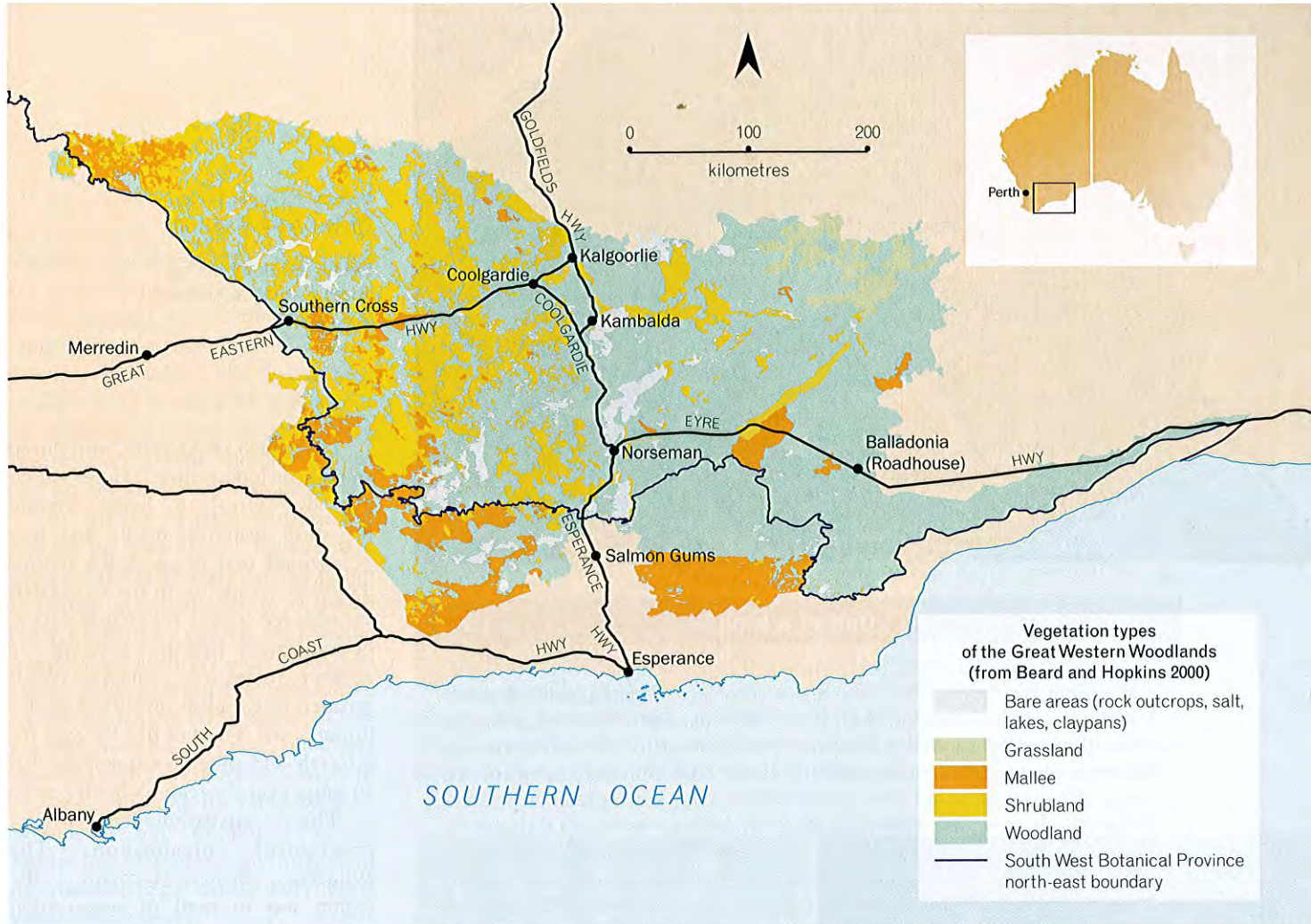
Inset Western bearded dragon (*Pogona minor*).

Photo – Jiri Lochman

Above left Pincushion hakea (*Hakea laurina*).

Left Open woodland. Large trees such as these are extremely uncommon in semi-arid areas of the world.

Photos – Amanda Keesing



south-west heathlands and forests. More than 3,200 plant species have been recorded to date, representing more than one-fifth of Australia's estimated 15,000 flowering plant species, and more than twice the number of species that occur in the whole of the United Kingdom (1,500 species). It is estimated that almost half of these species are endemic to south-western Australia.

The biological and structural diversity of plant communities across the Great Western Woodlands is known to provide different foraging, nesting or roosting habitat for an array of animals, even though relatively few comprehensive surveys have been undertaken. Forty-nine species of mammal, 138 reptile species, 14 frog species and 215 species of bird have been found in the region. Species recorded in the region include the elusive scarlet-chested parrot (*Neophema splendida*) and the Lake Cronin snake (*Paroplocephalus atriceps*), which is found nowhere else (see 'One of a kind' on next the page).

Why so many species?

The woodlands' landscape has not experienced mountain building, glacial

Right The scarlet-chested parrot is one of the 215 species of bird found in surveys so far in the Great Western Woodlands. Photo - Len Stewart/Lochman Transparencies

events, or ocean submergence for some 250 million years, so these lands have a uniquely continuous biological heritage that includes the development of the first flowering plants, the coming and going of dinosaurs, and the appearance of humans. The interplay between the age of the lands, the complexity of the soils, the climate, and isolation from eastern Australia, have all combined to allow the woodlands' exceptional diversity of species to evolve.

One of the main reasons why the Great Western Woodlands is biologically significant is that it spans two climatic and botanical zones. The region is the interzone between Australia's moist, cooler south-west corner and its desert interior, which not only means that it has elements of both these climatic zones, but that enormous speciation occurs. For example, some scientists, including the Director of the Royal Botanic Gardens in Kew, Stephen Hopper, believe that variable rainfall



has had a major effect on the speciation and current distribution of Australia's south-western flora. This area has experienced intense, long-term climatic pulses between wet and dry conditions over the past two million years, leaving the region with a very rich locally adapted flora.

At risk

For decades, the incredible diversity and beauty of the Great Western Woodlands was known



Left Lake Cronin snake.
Photo – Dave Robinson

Below left Burnt mallee.
Photo – Amanda Keesing

One of a kind

The Lake Cronin snake (*Paroplocephalus atriceps*) grows to half a metre in length, has a distinctive broad, black head and is venomous, its bite producing severe symptoms. This snake is known only from a small number of localities within the Great Western Woodlands and is believed to be endemic to the Lake Cronin area. Its very limited distribution suggests that it may have evolved to suit a specific range of conditions found only in this locality. With such a restricted range, the species is potentially vulnerable to influences such as habitat disturbance, introduced predators and the impacts of climate change, although little specific research has been conducted. The Lake Cronin snake is listed as a 'priority three' species by the Department of Environment and Conservation, meaning that further survey and evaluation of its conservation status are required before consideration can be given to its formal declaration as 'threatened fauna' under the Wildlife Conservation Act.



only to a few. That is now slowly changing as increasing knowledge of the biodiversity and importance of the region is gained. With this knowledge, however, has come the understanding that, despite its size, the Great Western Woodlands is at risk. Foremost is the

threat from frequent, large bushfires that often burn for days and occur almost every year. Over time, these frequent large bushfires have the potential to alter and degrade woodland ecosystems and their associated fauna and flora.

Like much of Australia, introduced animals including foxes (*Vulpes vulpes*) are also wreaking havoc among the small mammal, reptile and bird populations that occur in the region. Thirty fauna species in the woodlands are now recognised as being in danger of extinction. Introduced weeds are another increasing problem. Weeds threaten native plant diversity and also promote the spread of fire. Pressure for minerals and other resources also has an impact on the region's biodiversity.

The environmental non-government organisation, The Wilderness Society, recognised the region was in need of conservation management and employed scientists to write a peer-reviewed report to raise the profile and identify the key values of the Great Western Woodlands. This report—*The Extraordinary Nature of the Great Western Woodlands*—was produced with support from other organisations including GondwanaLink, The Nature Conservancy, the Pew Environment Group and the Wind-Over-Water Foundation and contains contributions by more than 20 scientists. Since the release of the report, a collaboration of environmental non-government organisations has continued to work with a wide range of stakeholders to achieve better recognition and conservation of the values of the Great Western Woodlands.

Staying ahead of the game

It is a fact of conservation management that it is preferable to prevent an area from deteriorating than to attempt to 'patch it up' afterwards. Recognising that there was an opportunity to maintain the Great Western Woodlands in its relatively intact state, the WA government made a commitment to better protect and manage the area and to ensure the long-term conservation of its unique natural and cultural values.

The first step has been to develop a conservation strategy for the Great Western Woodlands. The woodlands is a multi-purpose area, so the strategy needs to take into account the full range of economic, social and cultural activities and values. The government undertook to work with Indigenous communities, the scientific community, conservation groups and industry to develop the conservation strategy.

To provide advice during this process, the Minister for Environment appointed a stakeholder reference group including representation of a broad range of interests: mining, exploration, prospecting, conservation, Aboriginal affairs, local government, pastoralism, timber harvesting and tourism. Over a series of three meetings, members discussed and workshopped a range of challenges affecting the Great Western Woodlands and developed agreed approaches to prevent any long-term deterioration of the natural and cultural values of the area.

The strategy, which was released by the Minister for Environment, Hon Donna Faragher MLC, on 3 November 2010, is a 10-year plan that aims to address key threats to the values of the Great Western Woodlands including those posed by weeds, feral animals and damaging unplanned bushfires. The government has allocated \$3.8 million to enable the highest priority on-ground works identified in the conservation strategy to be completed.

Millennia of occupation

The Great Western Woodlands is steeped in history and cultural significance. Aboriginal people are

believed to have lived in the area for at least 22,000 years and their close relationship with this land continues today. Aboriginal people are the original managers of the area and, according to traditional rules and customs, have responsibility for its management today and into the future. These rules and customs focus on principles of respect and preservation for long-term sustainable use. They are incorporated in the regulation of traditional use of the land's varied resources.

There are significant sites and other physical evidence of this living association throughout the Great Western Woodlands. Some of these places and artefacts—such as 'water trees'—are vulnerable to the effects of land management activities. Water trees

were created when groups moving through an area jammed a rock into the fork of a sapling to create a bowl at the base of the multiple stems. As the tree grew, larger rocks were substituted until a sizable water dish was formed to provide vital pools of water in a dry landscape. These, along with trees used for spears and other implements, can be destroyed by a single fire.

Maintenance of traditional ties is vitally important to the people of the area and they have expressed a strong desire to be involved in the ongoing management and protection of the Great Western Woodlands. Joint management arrangements between the government and Aboriginal people will be pursued. Not only will this ensure that traditional knowledge helps frame management approaches,



Above right An example of a 'water tree', created by Aboriginal people.
Photo – courtesy Betty Logan and the Dimer family

Above far right Members of the stakeholder reference group discuss strategic conservation issues.
Photo – Ian Herford/DEC

Right A typical scene during the gold rush. Coolgardie goldfields, 1895.
Photo – courtesy Battye Library



but job opportunities will emerge as on-ground actions are implemented.

A new wave of settlers

The search for new pastoral lands first brought Europeans to the Great Western Woodlands. As early as the 1860s, the area's potential for pastoralism was assessed and today about 17 per cent of the Great Western Woodlands is covered by pastoral leases. But it was the discovery of the area's vast mineral

wealth that was to excite the blood of a new wave of settlers.

Prospectors came to the Great Western Woodlands in the 1890s, particularly searching for gold. The discovery of gold in the Coolgardie area in 1892 attracted more people to the area and led to the discovery of the Golden Mile in Kalgoorlie the following year and to the ensuing gold rush. People arrived from all over the world to make their fortunes, with many having to walk to the goldfields

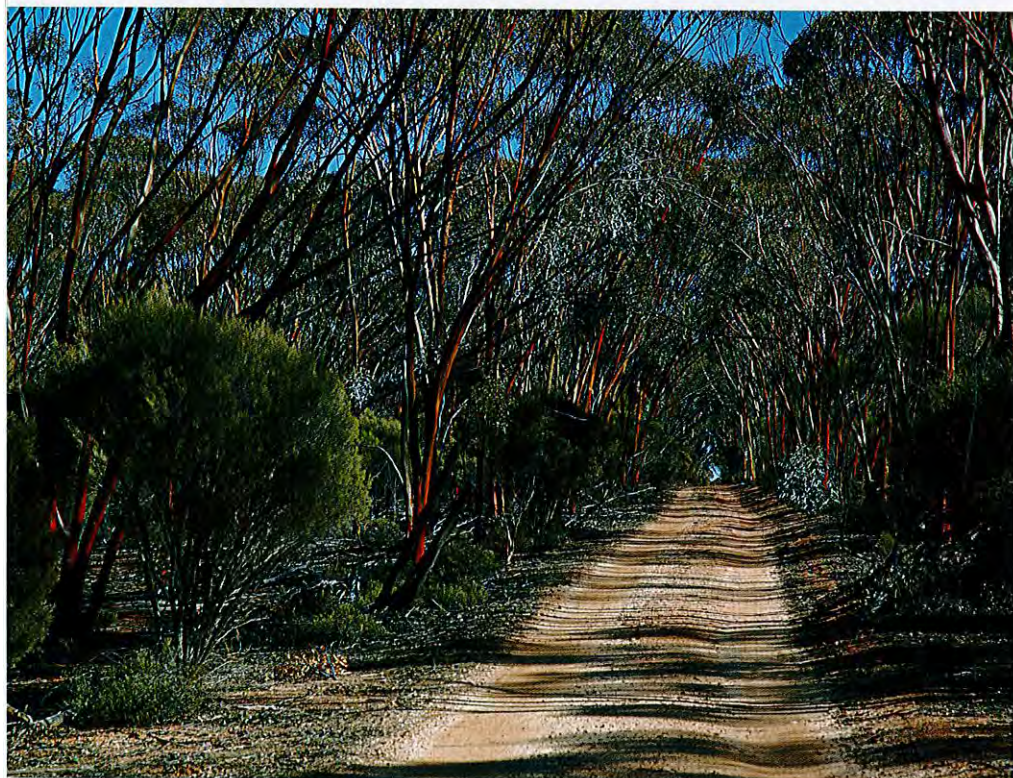
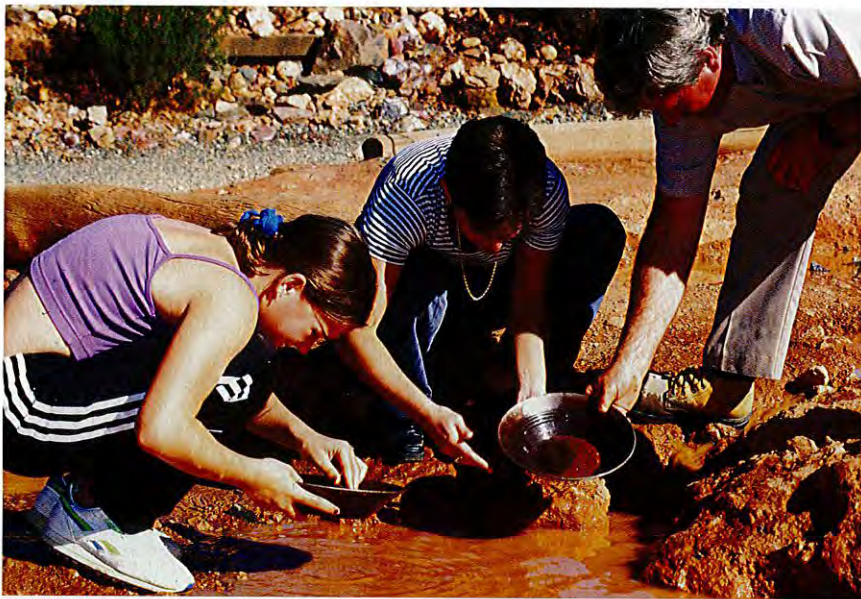
from the coast. Conditions on the early goldfields were extremely harsh, with most people living in canvas and hessian huts. Supplies were limited and miners were forced to pay high prices for water and other essentials. Disease was common and many died.

A total of 1,400 tonnes of gold has been extracted from the rich 'greenstone' ores, more than from any other single source in Australia. The mining sector is the major employer in the goldfields and provides the economic base for its residents, with nickel and other resources being extracted in addition to gold. With a workforce in the Goldfields-Esperance Region of more than 4,500 in 2006, the industry here accounted for more than 11 per cent of the WA mining workforce.

Woodlines

There is also a wealth of history associated with the early days of the mining industry in the goldfields. The history of mineral extraction and processing in the Great Western Woodlands is closely intertwined with the exploitation of local timber resources. From the 1890s, woodland timbers were cut to supply fuel to roast ore during the gold extraction process and for pit props for mines. Firewood was also essential for pumps and winders, production of fresh water in condensers, pump stations along the water pipeline, electricity generation and domestic use.

Transported on an extensive narrow-gauge rail network known as the 'woodlines', which radiated from Kalgoorlie, more than 30 million tonnes of hardwood timber were harvested between the 1890s and the 1960s. It is estimated that one-fifth of the Great Western Woodlands was impacted. Immigrants, mainly from



Above left Tourists panning for gold.
*Photo – Dennis Sarson/Lochman
Transparencies*

Left A woodline track today, regrown since earlier clearing.
Photo – Amanda Keesing



Above Victoria Rock.
Photo – Dennis Sarson/Lochman
Transparencies

Above right Salmon gum woodland.
Photo – Jiri Lochman

Europe, came to the goldfields to cut and haul timber and lived in extremely harsh conditions at the limits of the rail network, known as the 'head of the line'. The many historical sites associated with the woodlines deserve to be protected as an important part of the Great Western Woodlands' heritage. Although most of the three million hectares which were cut-over have regrown, the ecological impacts of the woodline cutting are still evident in some areas.

Spreading the word

Mosaics of woodlands and flowering heaths, rock formations and a diverse range of flora and fauna exclusive to the Great Western Woodlands combine to provide a seemingly untouched escape for travellers and locals alike. The Great Western Woodlands is an important recreational destination for residents of the area. Activities such as four-wheel driving, prospecting, bush camping and yabbing in pastoral dams are popular with local people.

Popular drive trails such as the Holland Track, Granite Woodlands Discovery Trail and Golden Quest



Survivor in an arid land

One of the most prominent trees of the Great Western Woodlands is the salmon gum (*Eucalyptus salmonophloia*). These majestic salmon-pink trees, which grow to more than 25 metres in height and more than two metres in diameter, stand out in the flat landscape. Trees of this height are common throughout the world in places with higher rainfall, but not in arid areas. In the Great Western Woodlands, they manage to attain this significant size in country which receives as little as 150 millimetres of average annual rainfall. Scientists are still not exactly sure how salmon gums manage to grow so tall in such dry and variable conditions. It is likely that the trees are able to make use of both rainfall and groundwater, but further research is required to solve the puzzle.

Discovery Trail, all of which traverse the Great Western Woodlands, help promote the area and draw increasing numbers of tourists. Some recreation sites have been developed at places of interest, with low-key management.

Despite its obvious potential as a tourism destination, the Great Western Woodlands is currently not well known nationally or even within WA. To a large extent, the wonders of the area

are still a well-kept secret shared by those lucky enough to live within it and the adventurous few who visit.

The release of the conservation strategy for this internationally significant area, along with greater promotion, will introduce the delights of this treasure trove of biodiversity and cultural values to many more tourists. This will be a bonus for the individuals who visit, and also for the economy of the region.

Ian Herford is the Department of Environment and Conservation's project coordinator for the Great Western Woodlands. Based in the department's Albany office for most of the past 21 years, Ian has coordinated planning processes for management of the conservation estate as well as at a strategic level across broader areas. He can be contacted by email (ian.herford@dec.wa.gov.au).

Dr Alexander Watson is the national program manager for the non-government organisation *Leave No Trace*. He has more than 10 years' experience working with Western Australia's forest and woodland biodiversity, including being the lead author of the report *The Extraordinary Nature of the Great Western Woodlands*. He can be contacted by email (watson.alexander@gmail.com).

- 46 To burn or not to burn: challenging decisions in fragmented landscapes
Complex relationships exist between fire and remnant vegetation in Western Australia's Wheatbelt Region.
- 52 Spineless impact assessments
The concept of short-range endemism is being used to improve the environmental impact assessment process.
- 59 Michaelmas Island, King George Sound
This relatively unexplored island off the coast of Albany was recently visited by staff from the Department of Environment and Conservation.

Regulars

- 3 Contributors and Editor's letter
- 9 Bookmarks
Thirsty Country: Options for Australia
The Untrained Environmentalist
Wonders of Western Waters: The marine life of south-western Australia
- 18 Feature park
Swan Estuary Marine Park
- 45 Endangered
Eula's planthopper
- 62 Urban Antics
Dry as...

Publishing credits

Executive editor Madeleine Clews.

Editors Joanna Moore, Samille Mitchell.

Scientific/technical advice Kevin Thiele, Paul Jones, Keith Morris, Michael Rule.

Design and production Tiffany Taylor, Lauren Tyrrell, Peter Nicolas, Gooitzen van der Meer.

Illustration Gooitzen van der Meer.

Cartography Promaco Geodraft.

Marketing Estelle de San Miguel.

Phone (08) 9334 0296 or fax (08) 9334 0432.

Subscription enquiries

Phone (08) 9219 8000.

Prepress and printing GEON, Western Australia.

© Government of Western Australia
December 2010

All material copyright. No part of the contents of the publication may be reproduced without the consent of the publishers.

ISSN 0815-4465

Please do not send unsolicited material, but feel free to contact the editors.

Published by the Department of Environment and Conservation (DEC), 17 Dick Perry Avenue, Kensington, Western Australia.

Visit DEC online at www.dec.wa.gov.au to search the **LANDSCOPE** catalogue.



Department of
Environment and Conservation

