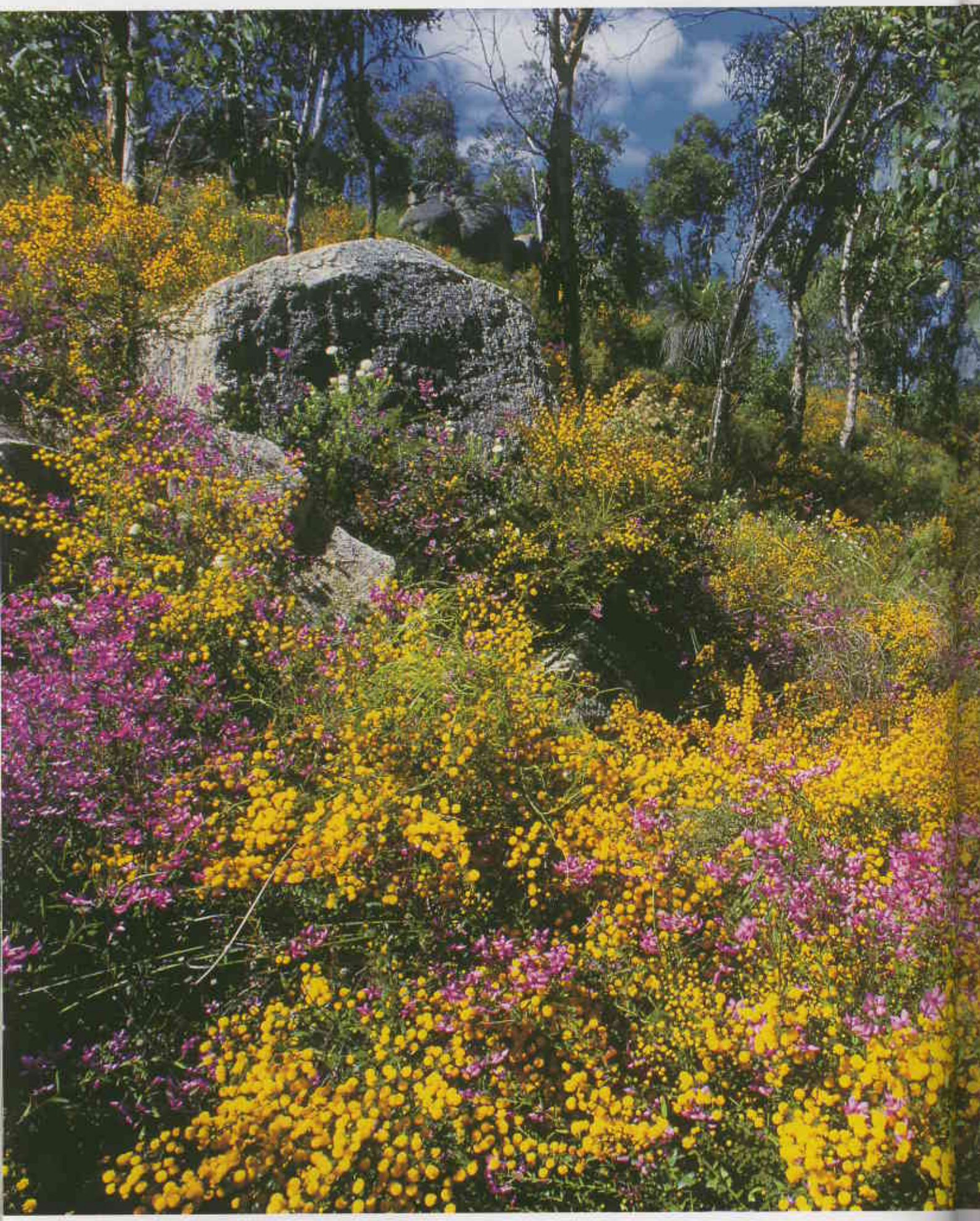
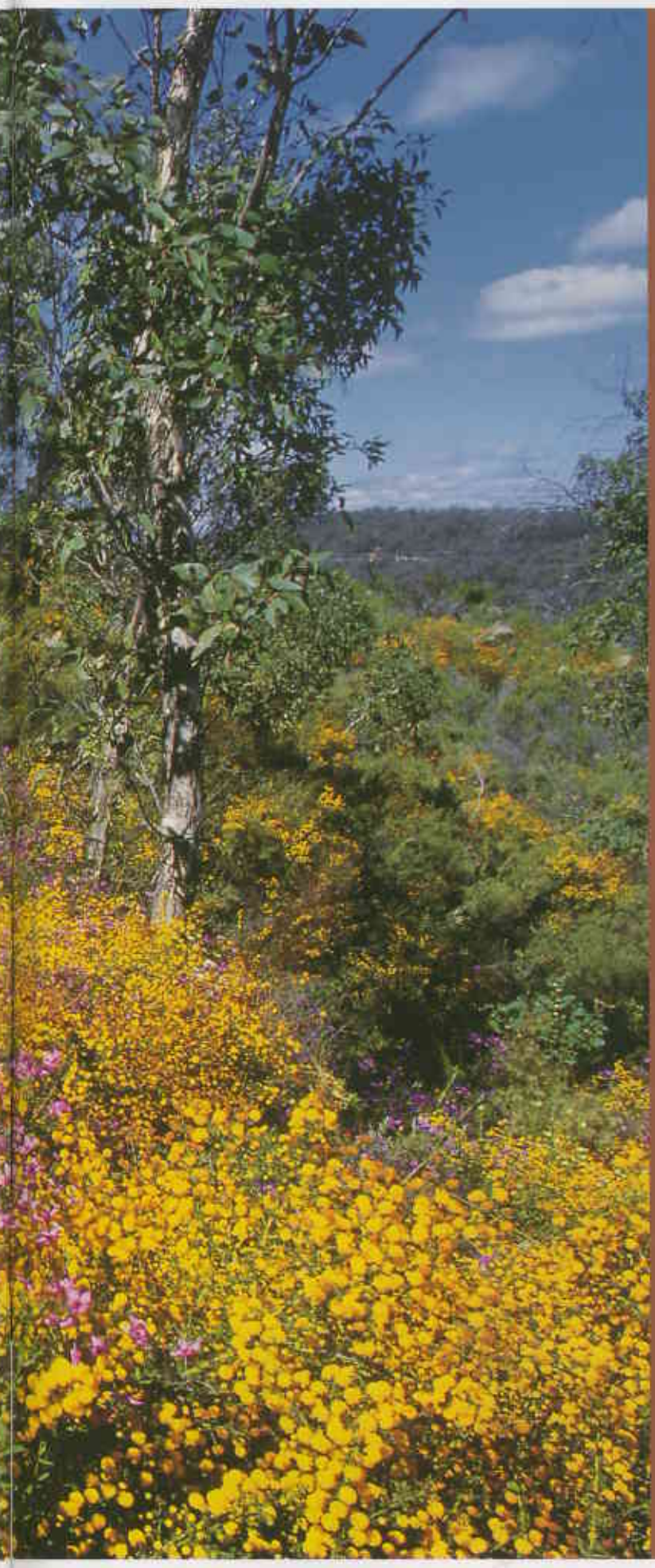




Embracing diversity
the spice of life

Western Australia has an extremely rich and unique biodiversity that is nationally and internationally recognised. However, loss of biodiversity is a major issue facing the State.

by Keith Claymore

The quality of life of all Western Australians depends on having a rich and healthy biodiversity. All of us depend on the products and ecosystem services that biodiversity provides, in order to maintain the lifestyle we all enjoy and take for granted. Living things provide food, clothes, building materials and medicines. They also help to regulate and maintain our environment, by providing clean water and air, maintaining the quality of the atmosphere, controlling climate, providing fresh water, protecting soil by preventing erosion, controlling pests and diseases, and pollinating crops. Hence, all Western Australians share a responsibility to conserve biodiversity and to ensure that the use of our natural resources is ecologically sustainable.

Biodiversity values

Western Australia is in the enviable position of having Australia's only internationally recognised terrestrial biodiversity hotspot (the South West Botanical Province), one of the world's 18 tropical marine hotspots and eight of the 15 national biodiversity hotspots. While these hotspots reflect an extremely high level of endemism and biodiversity richness, the terrestrial hotspots are subject to a high degree of threatening processes, such as: the effects of secondary salinisation and waterlogging on native habitat in the South West; altered fire regimes; inappropriate grazing; introduced

plants, animals and pathogens such as *Phytophthora cinnamomi* (see 'Alien Invaders' in *LANDSCOPE*, Summer 04-05); and direct habitat loss through clearing of native vegetation for infrastructure, agriculture and other developments.

The impending effects of climate change—and associated processes such as sea level rise—and increases in carbon dioxide will also significantly threaten biodiversity in both terrestrial and marine areas (for instance, through coral bleaching) over the next few decades.

At least 547 species, subspecies and varieties of plants and animals are now threatened with extinction in WA, while at least 18 animal species, 15 plant species and three ecological communities have been lost forever. Secondary salinisation and waterlogging in the agricultural zone of the South West may cause a further 450 plants and 400 animals, including aquatic invertebrates, to become extinct. It has also been estimated that 14 per cent of plant species in the South West Botanical Province are susceptible to dieback disease caused by *Phytophthora cinnamomi* infestation and a further 26 per cent are susceptible.

Devising a strategy

The State has been recognised internationally and nationally as being at the forefront of biodiversity conservation through programs such as the wildlife recovery program *Western Shield*. However, while there has been considerable progress in biodiversity conservation in WA, there is need for accelerated conservation action in a coordinated and targeted fashion, to halt and reverse the decline in biodiversity. A piecemeal and uncoordinated approach will fail.

WA is therefore developing a State biodiversity conservation strategy to provide an overarching framework to guide decisions, identify and clarify responsibilities, provide a coordinated and targeted approach to conservation requirements, outline institutional reforms, establish a common vision and goals for the next 25 years (phase 1 of a proposed 100-year strategy), and meet WA's national and international obligations.

Previous page
Main Wattle and black-eyed susan on a hillside. The South West of Western Australia is Australia's only internationally recognised terrestrial biodiversity hotspot.
Photo – Bill Belson/Lochman Transparencies
Inset Green tree frogs.
Photo – Ken Stepnell/CALM

Above The Queen of Sheba orchid (*Thelymitra variegata*) has a great deal of variability in its flower colour, indicating genetic diversity.
Photo – Babs and Bert Wells/CALM

Left Hummock grasslands dominate much of the semi-arid and arid areas of WA and provide a rich assemblage of plants and animals and diversity of habitats.
Photo – Keith Claymore

What is biodiversity?

The term 'biodiversity' was coined in the mid-1980s. Western Australia is a signatory to the National Strategy for the Conservation of Australia's Biological Diversity, which defines 'biodiversity' as 'the variety of all life forms—the different plants, animals, fungi and micro-organisms, the genes they contain, and the ecosystems of which they form a part'. Biological diversity is considered at three levels.

- Genetic diversity is the variety of genetic information contained in all of the individual plants, animals, fungi and micro-organisms that inhabit the earth. Genetic diversity occurs within and between the populations of organisms that comprise individual species, as well as among species.
- Species diversity refers to the variety of species on the earth.
- Ecosystem diversity is the variety of habitats, biological communities and ecological processes.

Top Prince Regent Nature Reserve in the Kimberley is one of two areas in WA classified as a world biosphere reserve (the other is Fitzgerald River National Park on the south coast).
Photos – Babs and Bert Wells/CALM

Above Ningaloo Marine Park is the largest fringing reef in Australia. The temperate and tropical currents that converge in this region result in highly diverse marine life.
Photo – Clay Bryce/Lochman Transparencies

A recent discussion paper, released by the Department of Conservation and Land Management (CALM) to commence the development of a State biodiversity conservation strategy, puts forward four primary areas that need to be considered in a biodiversity conservation strategy for WA: research into biodiversity; engaging the public; integration and coordination; and direct management. It also proposes nine key strategic directions.

Understanding biodiversity

There are significant gaps in knowledge about the State's biodiversity—and of threatening processes—so improving this knowledge is critical. In particular, much more work is required to describe invertebrates, non-flowering plants (like ferns, lichens and fungi), micro-organisms (such as cryptogams and bacteria), and marine and subterranean organisms.

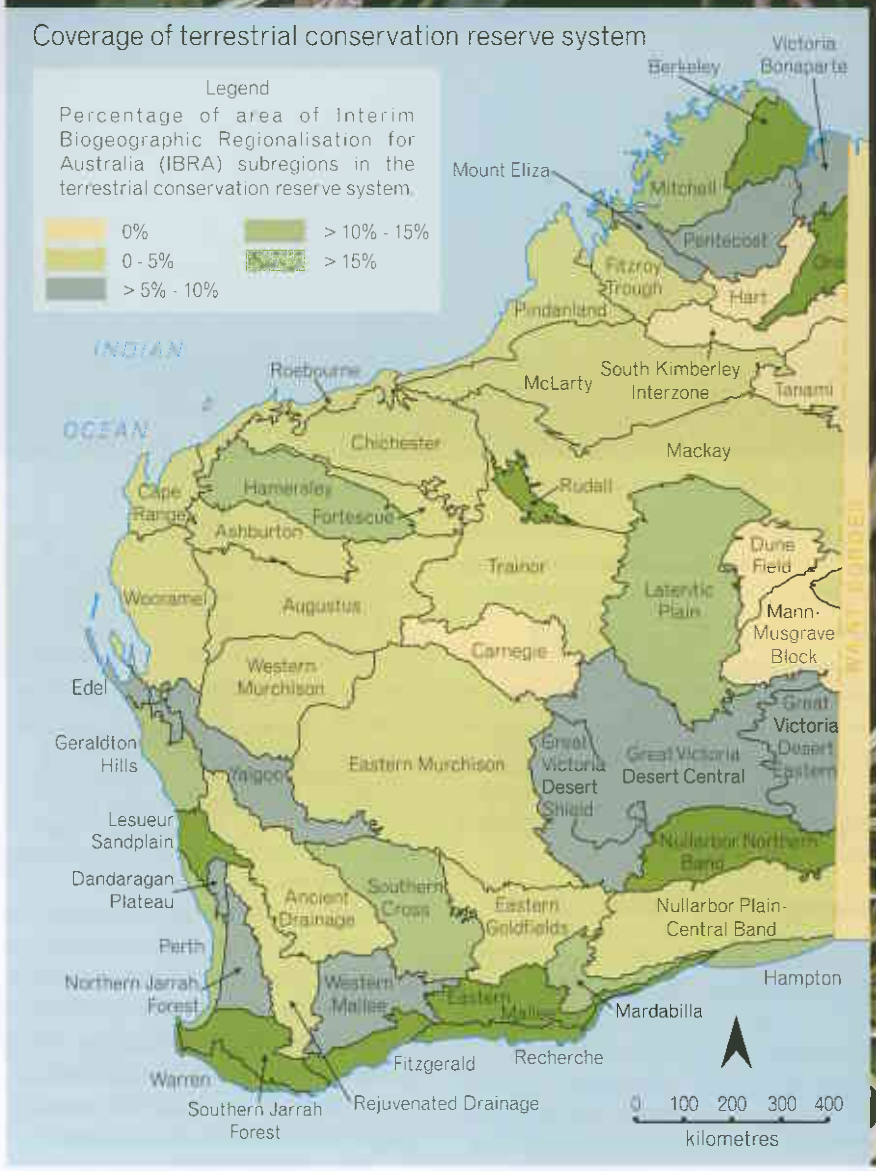
Systematic biological surveys are needed to identify and document biodiversity patterns and components, and to establish the conservation status of species, subspecies and varieties of plants and animals, and of ecological communities. A comprehensive biological survey is now underway in the Pilbara region across a range of plant and animal groups. However, around 70 per cent of WA has not been comprehensively surveyed. Hence, we need to expand the State's biological survey program to complete these gaps in coverage, and to map ecosystems at a finer scale. The information that is collected will help to determine priorities for establishing a conservation reserve system that is comprehensive, adequate and representative, and assist in planning for integrated natural resource management.

Monitoring the health of biodiversity and trends in threats is essential. It will allow us to determine whether conservation management is effective, to establish relationships between cause and effect, and to distinguish between human-induced changes and those brought about by natural disturbance. A Biodiversity Audit for Western Australia was undertaken in 2002, and provides information on terrestrial biodiversity values, threats and appropriate actions at a bioregional scale.

It will also be important to develop readily accessible databases that organise and link data from a variety


Biodiversity hotspots - Centres of species endemism in WA
Legend
National Terrestrial Biodiversity Hotspot
International Biodiversity Hotspots:
South West
Marine
Interim Biogeographic Regionalisation for Australia sub region boundary
Interim Marine and Coastal Regionalisation for Australia boundary
State waters boundary
Oceanic Shoals
Kimberley
Bonaparte Gulf
Cambridge Bonaparte
North West Shelf
North Kimberley
Mitchell
Bonaparte
Kununurra
Mount Elisa
King Sound
Canning
Broome
Pentecost
Fitzroy Trough
Ord
Hart
Pindanland
South Kimberley
Interzone
INDIAN OCEAN
Eighty Mile Beach
Pilbara (offshore)
Roebourne
Port Hedland
McLarty
Tanami
Pilbara (nearshore)
Karratha
Chichester
Hamersley/Pilbara
Mackay
Exmouth
Cape Range
Hamersley
Rudall
Ningaloo
Fortescue
Ashburton
Dune Field
Carnarvon Basin
Trainor
Lateritic Plain
Carnarvon
Augustus
Shark Bay
Wooramel
Mann-Musgrave Block
Zuytdorp
Western Murchison
Geraldton to Shark Bay sand plains
Carnegie
Geraldton Hills
Great Victoria Desert Eastern
Abrolhos Islands
Great Victoria Desert Shield
Eastern Murchison
Great Victoria Desert Central
Geraldton
Yalgoo
Mount Lesueur Eneabba
Lesueur Sandplain
Central and Eastern Avon Wheatbelt
Central West Coast
Nullarbor Northern Band
Dandaragan Plateau
Kalgoorlie
Nullarbor Plain Central Band
Perth
Eastern Goldfields
Northern Jarrah Forest
Hampton
Narrogin
Bunbury
Eucla
Leeuwin-Naturaliste
Mardabilla
Manjimup
Western Mallee
Eastern Mallee
Busselton Augusta
Esperance
WA South Coast
Warren
Locality map
National Terrestrial Biodiversity Hotspots
Albany
Fitzgerald
Fitzgerald River Ravensthorpe
Recherche
Southern Jarrah Forest
Rejuvenated Drainage
SOUTHERN OCEAN
0 100 200 300 400
kilometres

Above Taxonomic work is needed to help complete gaps in our biodiversity knowledge.
Photo – Community Newspapers



of sources and provide relevant information for biodiversity planning and on-ground conservation.

The potential impact of climate change is increasingly being recognised as posing a major threat to biodiversity. Further knowledge on the likely effects is needed, so we can develop effective response strategies, and identify biodiversity assets particularly at risk. Impacts from other impending threatening processes, such as the imminent arrival of the cane toad in the Kimberley, will also need to be examined and understood.

Engaging the public

If we are to bring about greater support for biodiversity conservation initiatives, the wider Western Australian public will need to recognise the environmental, social and economic consequences of biodiversity loss, and impacts on their wellbeing and livelihoods. This will require education and awareness—including the development of formal educational curricula at all levels—on the benefits of biodiversity, to achieve greater empathy with our natural heritage and appreciation of its values, and recognition of conservation needs.

Involvement of people in the enjoyment of biodiversity will assist in maintaining social health and help them gain an understanding of biological values. Involving people directly in conservation initiatives will help to address biodiversity threats and bring about long-term support for conservation programs. These strategies will also help to establish biodiversity conservation decision-making in mainstream businesses and government processes. All levels of government, non-government organisations, industry and the general public can help to achieve these outcomes.

Integration and coordination

A plethora of existing strategies, plans and legislation deal in some manner with biodiversity conservation. Opportunities exist to strengthen some of these mechanisms to accelerate and better coordinate and integrate biodiversity conservation initiatives.

A Biodiversity Conservation Act is proposed for WA. It is intended that the Act will provide a regulatory framework for the protection, restoration and sustainable use of biodiversity, and that it will also formally recognise conservation activities by a range of stakeholders through accredited bioregional plans, and help to broaden and strengthen protection for all species and their habitats.

Local government action plans for biodiversity, and community-based regional natural resource management strategies and investment plans, will help to better integrate and coordinate biodiversity conservation initiatives. Guidance to local government authorities for incorporating biodiversity conservation considerations into their town planning schemes will help to minimise the impact of development and urban expansion, along with environmental impact assessments under the Environmental Protection Act.

Above Codes of practice and management guidelines help ensure activities such as swimming with whale sharks in Ningaloo Marine Park are sustainable.
Photo – Western Australian Tourism Commission

Natural resource management sectors are increasingly adopting sustainability principles in plans and guidelines, and providing for biodiversity conservation. There are also many commercial opportunities to establish industries based on native species, such as oil mallees, to provide alternatives to traditional practices while at the same time providing conservation benefits.

Managing for biodiversity

Establishing and managing conservation reserves—national parks, nature reserves, marine parks and equivalent areas—is vital to help conserve biodiversity, and is a central strategy to maintaining and reversing biodiversity decline. It provides long-term protection of representative ecosystems, and establishes management protocols and standards for those areas. As well as providing the basis for conserving biodiversity, the conservation reserve system also plays an important role in the State's economy and social wellbeing by providing opportunities for sustainable nature-based tourism and recreation—increasingly being seen as vital by many regional communities.

While there have been significant additions to both the terrestrial and marine conservation reserve systems over the past few years, there is some way to go to reach the benchmark of at least 15 per cent of terrestrial ecosystems being reserved. Of the 54 terrestrial subregions in WA, only ten currently have 15 per cent or more of their area reserved (see map on page 59). Of the 18 marine bioregions, 10 have no marine reserves. There is therefore an urgent need to add additional areas to the conservation reserve system, particularly in the rangelands, and for the Kimberley and WA South Coast marine bioregions (see 'Vision Splendid', *LANDSCOPE*, Spring 2003). Nevertheless, three new marine parks, two new marine management areas and extensions to Ningaloo Marine Park and Rowley Shoals Marine Park, and 29 new national parks have been created since August 2004.

Recovery of species and ecological communities on the edge of extinction is another primary conservation strategy needed to prevent further biodiversity loss, along with special attention being given to areas of high conservation values such as wetlands and naturally restricted ecosystems and habitats.

The need for landscape-scale conservation has highlighted the important role of conservation outside reserves to complement the goals of the formal conservation reserve system, and to address threatening processes at an appropriate scale. Over the past decade, a wide range of mechanisms and programs have been developed to provide incentives for private and leasehold landholders to manage native vegetation and other habitat for conservation purposes.

Programs such as Urban Nature and Land for Wildlife provide technical advice on conservation management to private landholders. Innovative initiatives, such as market-based instruments that provide or increase financial rewards for conservation, are currently being trialed. The Bushland Benefits scheme encourages landholders to apply for funds for conservation through a tendering system, and awards funds on the basis of cost effectiveness and the best possible biodiversity conservation outcomes. Through the Biodiversity Adjustment Scheme the State government is buying high-value biodiversity conservation land and providing assistance to landholders where land should never be cleared.

These and other programs are being complemented by other voluntary conservation approaches, direct financial assistance schemes and industry-driven approaches such as environmental management systems. The expansion of these types of initiatives and advisory services will be needed to achieve effective biodiversity conservation on private and leasehold lands.

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CALM has released a discussion paper *Towards a Biodiversity Conservation Strategy for Western Australia*. Downloadable copies of the paper are available from http://www.naturebase.net/have yoursay or on request from CALM at its main office at 17 Dick Perry Ave, Kensington, phone (08) 9334 0333.

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