WA's conservation, parks and wildlife magazine

LANDSCOPE

Volume 23 Number 1 SPRING 2007 $6.95

Partners in natural management

Valuing our national parks and protected areas

Healthy Parks, Healthy People

Marine park awareness **Protecting WA's floral wonders** Herdsman Lake Regional Park

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Photo – David Bettini

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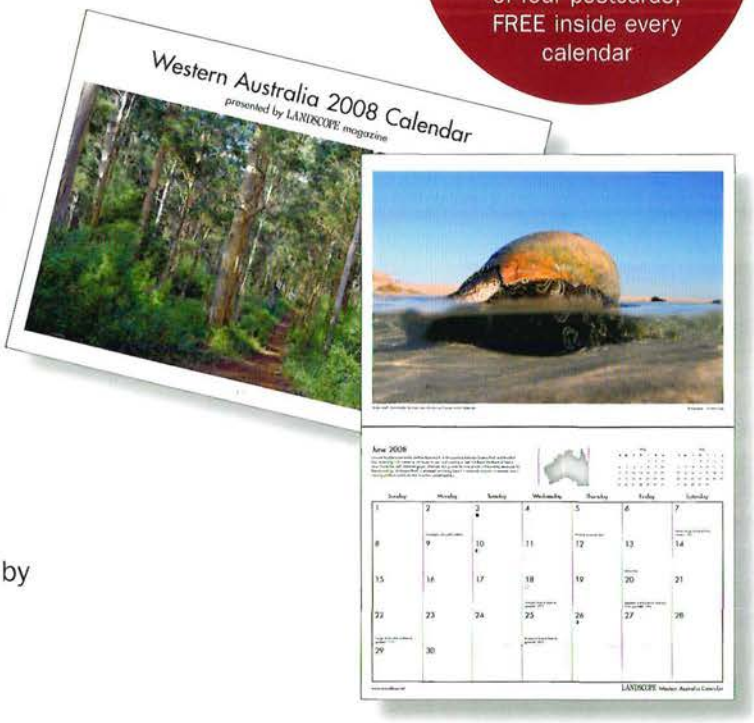

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Department of Environment and Conservation

Our environment, our future


John Bailey


Kevin Thiele

contributors

John Bailey has been the Chairman of the Conservation Commission of Western Australia since 2001. The Conservation Commission has responsibility for the management planning of the State's national parks, conservation parks and nature reserves. John has had a lifelong interest in biodiversity conservation and in 2006 became a member of the World Conservation Union's World Commission on Protected Areas. He is working on promoting the importance of protected areas for the community through the Conservation Commission and on expanding and managing national parks and reserves. He is concerned that the values of these areas may be lost sight of and has been the prime mover behind the 'Parks and Protected Areas Forum: a sense of place, for all people, for all time'.

editor's letter

The months of planning and development for the 'Parks and Protected Areas Forum: a sense of place, for all people, for all time' in Fremantle in September brings with it renewed focus on Western Australia's national parks and protected areas.

More than 26 million hectares (9 per cent) of the State is made up of national parks, conservation parks and reserves, marine parks and reserves, regional parks, nature reserves, State forest and timber reserves—and more protected areas, especially marine parks and rangeland reserves, are in the pipeline.

This edition of *LANDSCOPE* takes a look at what is happening across these diverse areas and the work under way to ensure future generations will also be able to enjoy the uniqueness of our environment.

A step towards this is to understand the different values our national parks and protected areas provide, from their role in helping to conserve the State's biodiversity to the benefits they can bring in helping improve people's physical and mental health.

It is quite fascinating to see how our attitudes have changed over the years and how environmental issues have risen to become one of the priorities of our time. It's a far cry from just a few decades ago when such matters were well outside the mainstream of public consciousness. The article 'Milestones and stepping stones in Western Australia's nature conservation history' takes us back over the years, tracking some of the key changes that have occurred in our conservation history to bring us to where we are now.

Another article, 'WA's national parks: home to a Noah's Ark of flora', gives us an idea of the extraordinary array of flora in our parks and provides a taste of the mystery in the stories behind their survival and discovery, and the enormity of what we don't know.

We also take a look at our marine environment and the amazing ecosystems along our coast. Along with the establishment of new marine parks and reserves, increasing efforts are being put into raising the awareness and understanding of these pristine areas. 'Making waves: marine park awareness', outlines the strategy behind a new public awareness campaign.

Other articles take us from the spectacular Millstream-Chichester National Park in the Pilbara and its rich Indigenous heritage, to close to the centre of Perth where Herdsman Lake Regional Park provides a valuable sanctuary on the city's doorstep. You will also find features on the increasing ties with Aboriginal people in managing national parks and reserves and the work that goes in to providing valuable interpretative information for visitors to parks and protected areas.

I hope you enjoy this taste of what is happening in our wonderful national parks and protected areas.

Kaye Verboon
Executive Editor

Kevin Thiele is a botanist and Curator of the Western Australian Herbarium, a position he took up in late 2006. Before moving to Western Australia he lived for more than a decade with his partner and young family on a small, remote farm in eastern Victoria in a solar-powered converted railway carriage, while working remotely via a satellite broadband connection at the University of Queensland. Kevin designed and created the Lucid software program, used for creating electronic identification keys, such as the widely used wattle and euclid keys to acacias and eucalypts of Australia. His main aim at the Western Australia Herbarium is to create an electronic database of the State's flora.

Fran Stanley spent the first 11 years of her career based in the Department of Environment and Conservation's (DEC's) Karratha office where she was responsible for the day-to-day management of the more than 200 island conservation reserves along the Pilbara coast. Fran's interest in protecting the marine and coastal environment developed through her involvement in public consultation processes leading to the finalisation of management plans for new marine parks and reserves around the Montebello and Barrow islands and the Dampier Archipelago. Fran is now based in Fremantle at DEC's Marine Policy and Planning Branch where she is involved in the development of strategic marine policy.

Tiffany Taylor is a DEC Senior Graphic Designer based in Crawley. She started with the department 11 years ago and is the Design and Production Coordinator for *LANDSCOPE*. Tiffany first spotted *LANDSCOPE* in a newsagency and, impressed with its design, environmental content and local production, pursued work experience with the magazine for nearly three years! Tiffany has also designed several DEC books, including *Beneath Busselton Jetty, Best of the South West LANDSCOPE* special, *Life along land's edge* and *The Turquoise Coast*. She loves working in a team environment with other creative people and is particularly passionate about book and magazine design.


Fran Stanley


Tiffany Taylor

Also contributing...

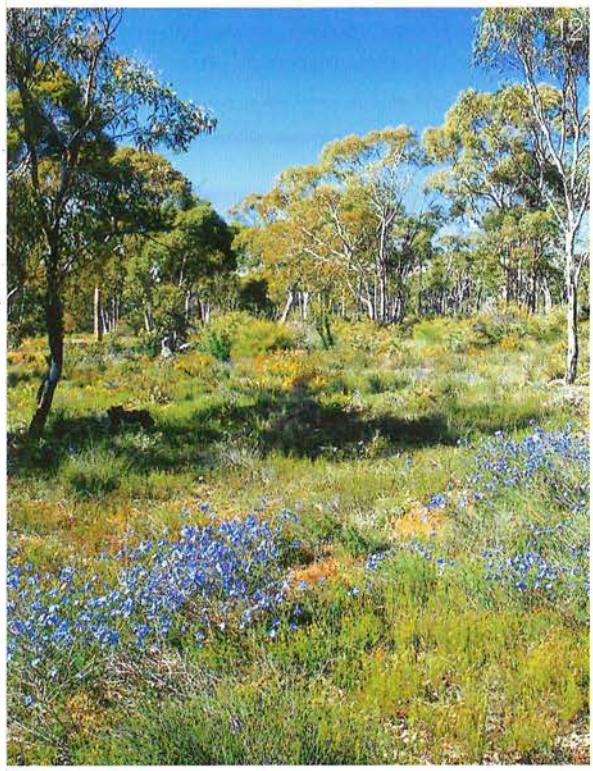
Andrew Burbidge, Peter Sharp, Samille Mitchell, Gil Field, Carolyn Thomson-Dans, Sarah Comer, Verna Costello, John Hunter and Paul Burns.

Cover illustration by Philippa Nikulinsky
Tawny-crowned honeyeaters are renowned for their tendency to flutter vertically skyward and then spiral down on outstretched wings and tail, like a falling leaf. They occur in south-west and south-east Australia and feed on insects and nectar in low shrubs, such as the red and green kangaroo paw—WA's floral emblem.

The red and green kangaroo paw—known for its striking flower heads—is common from Shark Bay to Mount Barker. It also occurs in areas such as Walyunga National Park.

Back cover photo by Ann Storrie
Falls at Walyunga National Park, Darling Range.

Features



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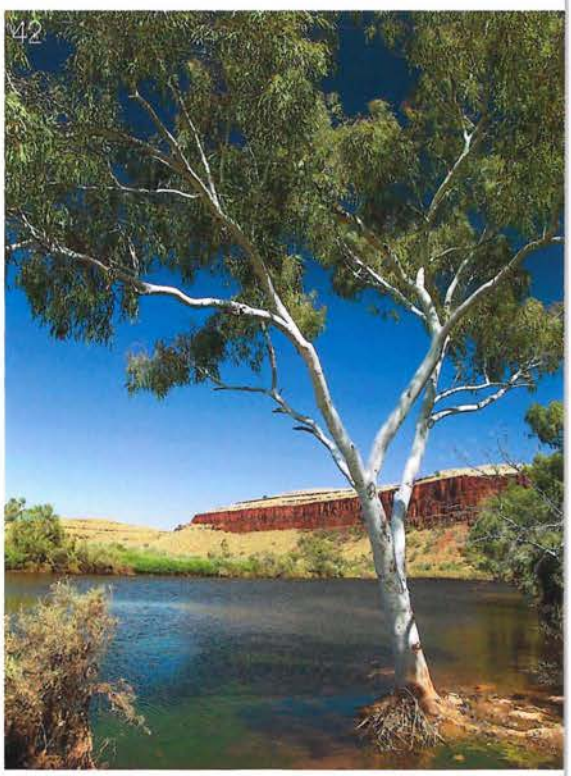
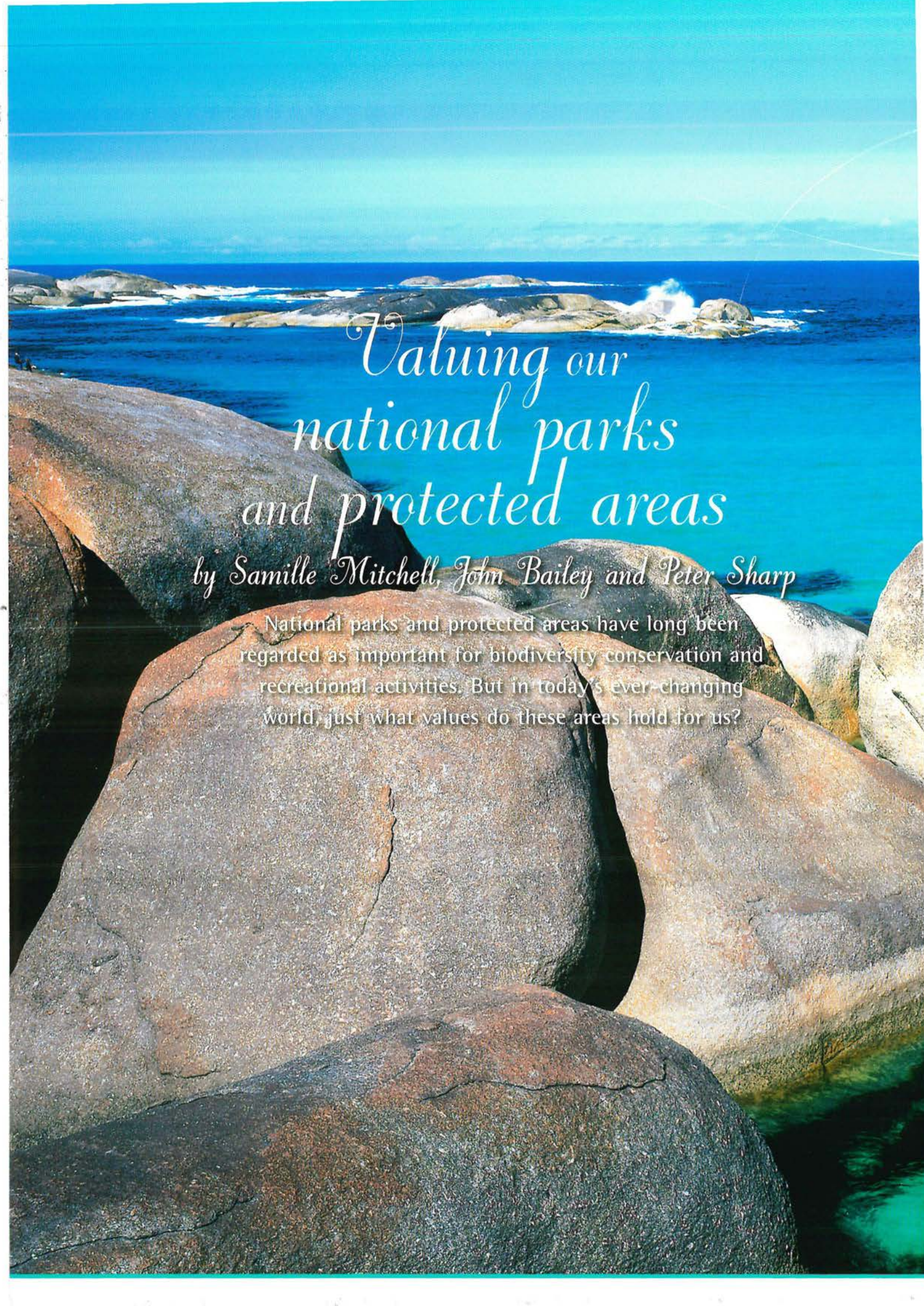
Our environment, our future

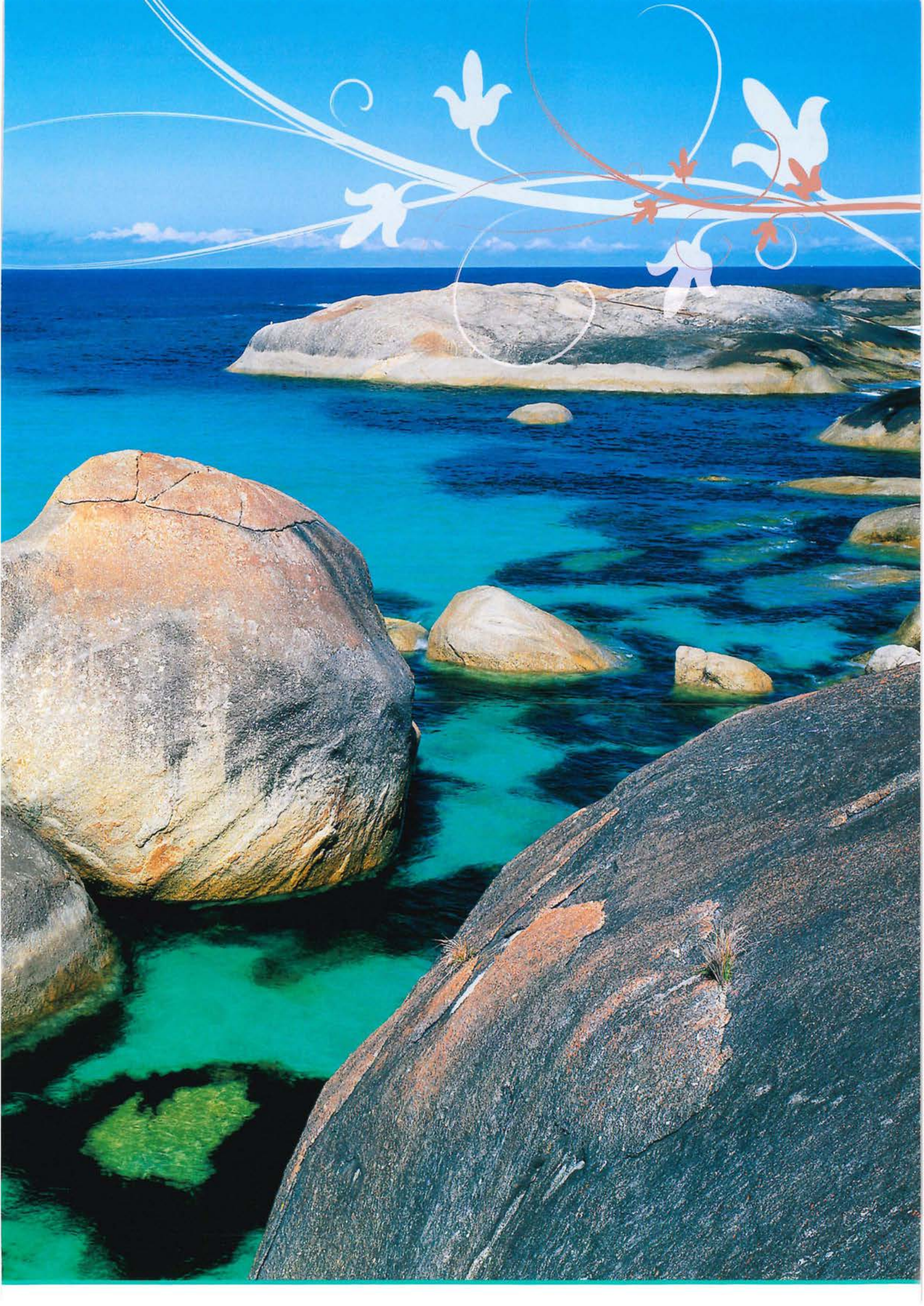


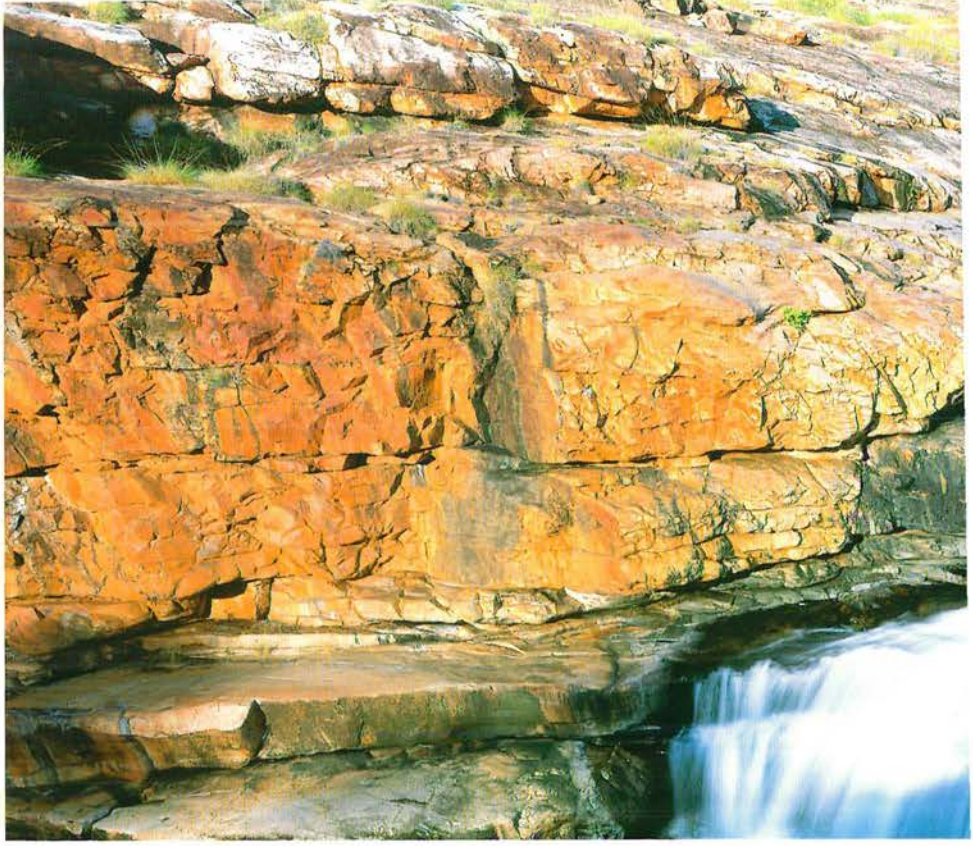


Valuing our national parks and protected areas

by Samille Mitchell, John Bailey and Peter Sharp

National parks and protected areas have long been regarded as important for biodiversity conservation and recreational activities. But in today's ever-changing world, just what values do these areas hold for us?





From the towering forests of the south-west to the ancient gorges of the Kimberley, Western Australia's national parks, conservation parks and reserves, marine parks and reserves, regional parks, nature reserves, State forests and timber reserves encompass a wide diversity of ecosystems and landscapes.

These parks provide us with places for recreation and offer settings that enable us to revel in the beauty of grandiose scenery, to marvel at the intricacies of nature's sacred balance. Some are on the doorsteps of our cities, others are located in some of the most distant reaches of the State. They have been here for many lifetimes and provide the perfect backdrop for people to rediscover themselves, re-energise, to contemplate life in all its forms.

But today, as many of us live more removed from nature than ever before, just what value do our national parks and protected areas hold? How do they fit in with a booming economy, a seemingly unquenchable thirst for development and growth? Are they simply somewhere to visit on a holiday—somewhere set aside for our personal enjoyment? Or should they be shut off to preserve their biological importance, to prevent us from trampling and loving these areas to death? Or does the answer, perhaps, lie somewhere in between? An examination of the values of such places gives us an answer.

The national park movement in Australia began in 1879 with the declaration of 'The National Park' in Sydney. However, this park was not about preserving wilderness, rather it was about providing a groomed and tamed garden for human enjoyment. Some 7000 hectares were put aside for public recreation, river-side forest was hacked down to make way for lawns and deer and exotic birds and fish were introduced. Fast forward through the years and things have changed. Today more than 26 million hectares (9 per cent) of Western Australia is made up of national parks, conservation parks and reserves, marine parks and reserves, regional parks, nature reserves, State forest and timber reserves, managed by the Department of Environment and Conservation. And more protected areas, especially marine parks and rangeland reserves, are in the pipeline.

Biodiversity value

WA's protected areas are home to a kaleidoscope of different flora and fauna species, many endemic to the State. Scientists and people from many walks of life are coming to realise that WA has globally significant natural

Previous page
Main Elephant Rocks, William Bay National Park, near Denmark.

Above Bell Falls, King Leopold Ranges Conservation Park, in the Kimberley.
Photos – David Bettini

Left Track up Mount Frankland in Mount Frankland National Park near Walpole.
Photo – Rob Olver

Left Gouldian finch.
Photo – Babs and Bert Wells/DEC

heritage. Collectively, we are responsible for caring for these plants and animals and the communities, landscapes and ecosystems in which they live.

Of the 220 terrestrial and marine mammals native to WA, 11 are already extinct. Of the remaining mammal species, 53 species, ranging from the tiny sandhill dunnart (*Sminthopsis psammophila*) to the enormous blue whale (*Balaenoptera musculus*), are formally listed as threatened. Another 43 bird species are at risk of extinction —the spectacularly coloured Gouldian finch, the tiny variegated fairy-wren and a whole list of majestic albatross species among them. Even hardy reptile species which inhabit the most inhospitable areas of the State are under threat—22 species are declared threatened.

Then there are three frog species, six fish species and two shark species declared threatened, as well as long lists of insects, crustaceans, worms and snails.

Flora too is under threat. WA is home to about 12,000 species of flora, of which 14 species are presumed extinct and about 5000 species are endemic to the State. Flora is particularly vulnerable because many flora species are endemic, not only to the State but to a particular region—often a tiny corner of WA (see 'WA's national parks: home to a Noah's Ark of flora' on page 32). Should these areas become damaged, so too would the endemic species that inhabit them. Who knows what as-yet-undiscovered medicinal properties such species may contain or what unstudied symbiotic relationships they may help to create.

But how do we place a value on the life of a flower or an animal? Is a cute, cuddly mammal more valuable than a creepy insect? And are flowers with dazzling blooms more worthy of our protection than their drabber counterparts?

To answer such questions you need simply to consider the intricate symbiotic relationships that exist between many WA flora and fauna species. Consider how an anemone fish receives protection from predators amid the anemone's stinging tentacles, and provides food to the anemone in return for the favour. Or how woylies eat truffles and spread their spores through the forest in their droppings, helping the truffles to spread and therefore flourish. Such fascinating and intricately balanced relationships show the importance of all species—not just those that prove pleasing to the eye.

By preserving the environments that harbour such species, we are also helping to provide clean air, clean water and a stable climate.

Recreational value

Parks and other protected areas provide aesthetically pleasing places for recreation. We turn to our parks when we're looking for scenic places to hike, swim, abseil or photograph. Such areas are also the scene of many treasured memories like camping expeditions, treks, picnics and family days out.

The enjoyment we humans gain from using national parks is key to their protection. While there are concerns we may be loving them to death, how are we to learn of the beauty of nature if we don't experience it? After all, the more people who appreciate nature, the more chance we have of saving it. You just need to look at the old-growth logging protests of the south or the upset over proposed development at Ningaloo in the north to realise it is the groundswell of opinion from everyday people that makes the difference in conserving our environment.

There is also benefit in enhancing the educational opportunities for people visiting our national parks. Interpretative displays can open visitor's eyes to the wonders of the landscape, be it about geology, flora or fauna. In this way visitors learn of the intricacies of nature, without feeling as though they've attended a lecture or classroom (see 'Interpretation: enriching the visitor experience' on page 50).

Health value

Parks in urban settings have been proven to encourage physical activity. Indeed, studies show that nature is a motivator for exercise (see 'Healthy Parks, Healthy People' on page 56).

The physical benefits of recreation are obvious—improved fitness and reduced obesity. This lessens the risk of the long list of diseases that are often associated with inactive lifestyles—heart disease, stroke, obesity, type-two diabetes, elevated blood pressure, osteoporosis, certain cancers, depression and Alzheimer's disease. This is particularly significant when you consider 45 per cent of females, 65 per cent of males and about 25 per cent of children in Australia are considered overweight or obese. In fact, lack of physical activity is deemed second only to smoking as being the major contributor to death and disease in Australia. It is estimated that physical inactivity costs $377 million and causes 13,000 deaths each year.

While more difficult to measure, the mental health benefits of spending time in nature are also significant. Studies show contact with nature promotes a raft of mental health benefits like reducing the risk of and improving the symptoms of mental fatigue and stress, reducing stress-related factors like blood pressure, lowering heart rate and muscle tension and increasing life satisfaction, life outlook and overall health and wellbeing.

Below The Pinnacles in Nambung National Park.
Photo – David Bettini

Above Old-growth forest in Hawke Block.
Photo – Cliff Winfield

Right Hawks Head, Kalbarri National Park.
Photo – Ann Storrie

This is significant considering depression is currently the leading cause of non-fatal disability in Australia and affects 20 per cent of the population at some point in their lives. In 20 years, depression is forecast to be the leading cause of death and disability in Australia.

Economic value

In Western Australia, national parks and other protected areas attract about 11 million visits each year, making them integral to the State's tourism industry. A Sustainable Tourism Cooperative Research Centre study into the economic value of tourism in WA's national parks, marine parks and forests found such areas are worth millions to local economies.

The 2003 study focused on the Gascoyne coast region and the southern forest region and concluded that protected natural areas generated $138 million on the Gascoyne coast and $70 million worth of direct tourism expenditure in the southern forests. The southern forest region's tourism industry is growing following the introduction of initiatives stemming from the State Government's *Protecting our old-growth forests* policy.

The towering forests of the south and the dazzling shores of Ningaloo Marine Park are not just there to protect biodiversity and act as pretty asides to human development—they generate revenue. The same can be said of national parks and reserves across the State.

Protecting natural assets through national parks also aids many industries. In some parts of WA the natural vegetation in protected areas helps boost rainfall and control salinity, thereby helping the farming areas which may surround them. While it may be difficult to place a figure on such values, it is likely to be substantial.

Spiritual values

So, protected places help preserve ecology for us to admire, they provide places for recreation, they improve our physical and mental health and they offer economic benefits. But they also offer us something bigger and wider reaching than all of that.

People have a need to experience nature—a need that we often dismiss. And in today's time-poor society this is perhaps more important than ever before. National parks provide us with somewhere to take time out, reconnect with nature and recharge our batteries. Isn't there a special place in everyone's soul that yearns for contact with natural places, a collective sense of place?

Even if we are never to see them, isn't there something wonderful in the knowledge that special corners of our State are left untouched, havens for our plants and animals to thrive? These are places for all people and for all time.

When we visit or think about these places we gain an innate sense of just how important it is to protect our natural environment.

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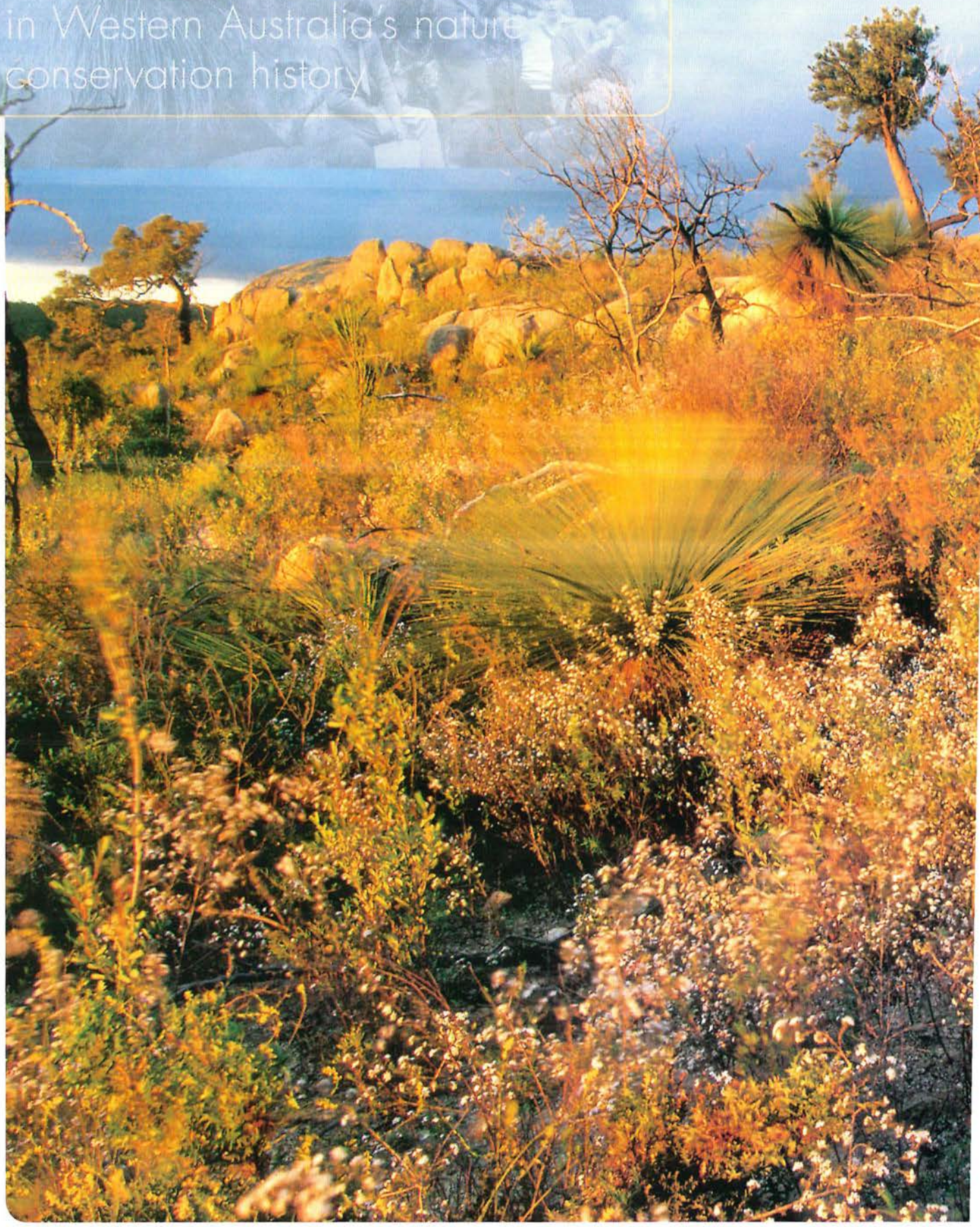
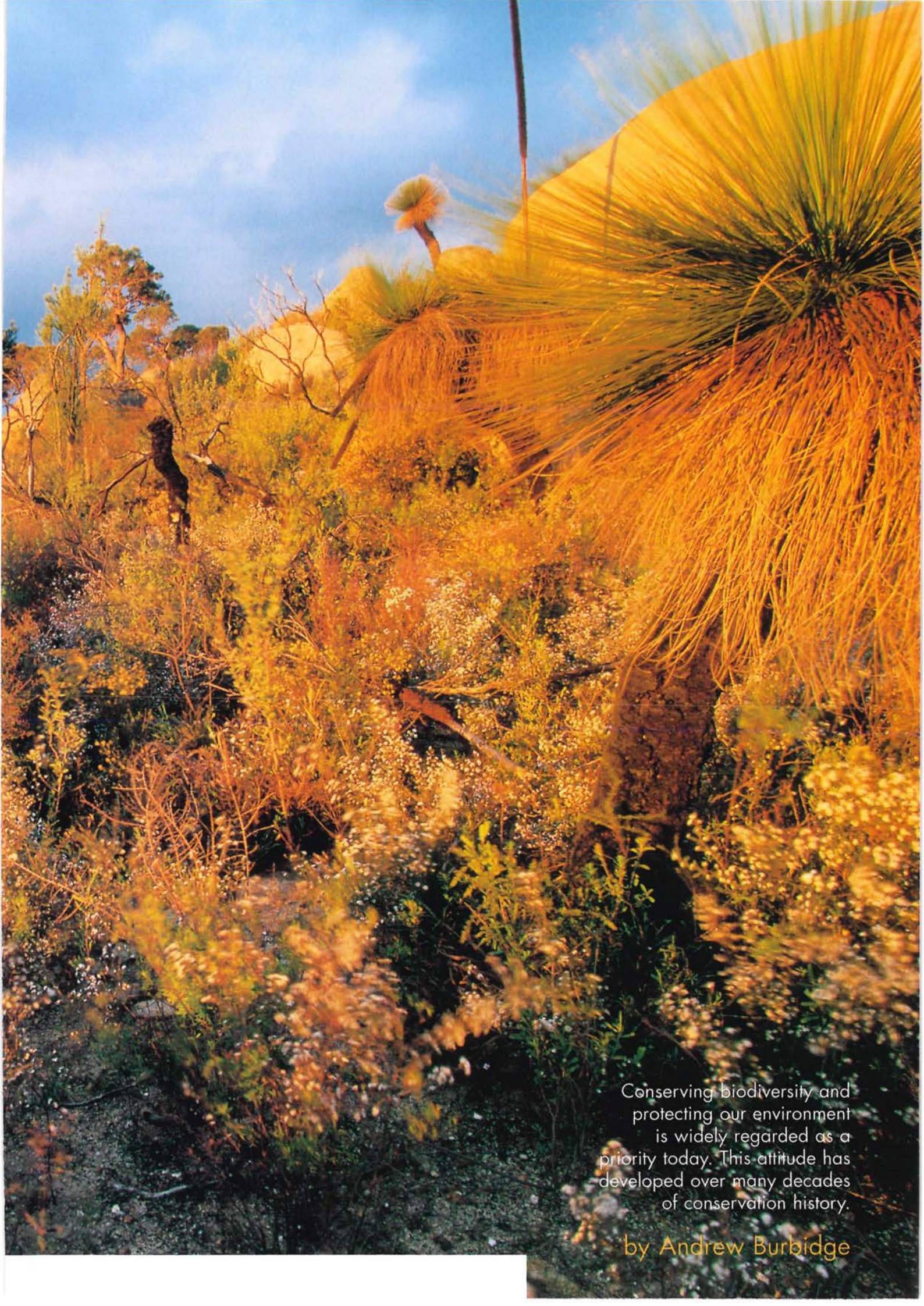
Milestones and stepping stones

in Western Australia's nature conservation history





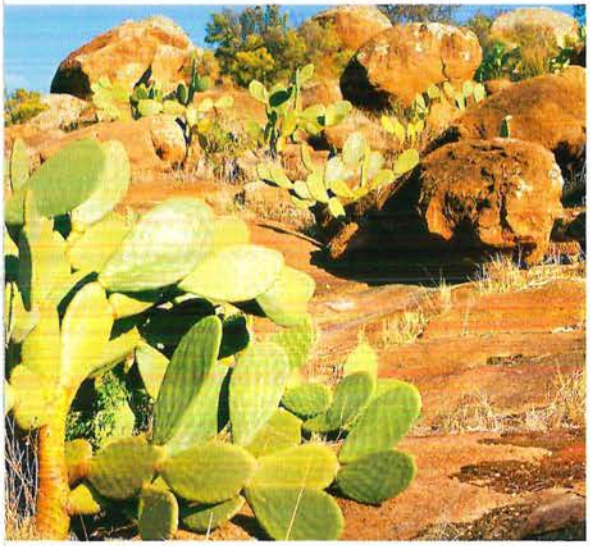
Conserving biodiversity and protecting our environment is widely regarded as a priority today. This attitude has developed over many decades of conservation history.

by Andrew Burbidge

The early Europeans settled a land that had been occupied by Indigenous people for perhaps 60,000 years and was a living museum of plants and animals that had evolved and persisted in virtual isolation from other continents. Life for the early pioneers was difficult. In order to survive they had to do battle with the bush—the Australian fauna and flora became the enemy. Early European settlers identified with their former country and many came to denigrate things Australian: the plants were useless for fodder (in fact many were poisonous) and the few large animals could not be domesticated. People who have to work hard clearing the bush in order to live are rarely able to relate to the environment they are destroying and homesick pioneers tried to 'Europeanise' the countryside, an attitude that lead to the introduction of the mammals and birds that have had a devastating effect on the Australian environment. In a place where the indigenous flora and fauna were considered an impediment to development, and land in its virgin state seemed unlimited, preservation of nature was far from people's minds.

Development of Western Australia was slow for most of the first 100 years of European settlement and clearing did not become extensive until well into the twentieth century when war service land settlement schemes and the 'million acres a year' land release and clearing catchcry of the 1950s and 1960s opened up vast tracts of land. Nevertheless, long before this many people realised that once-common animals were disappearing and moves towards nature conservation began. More and more people are now becoming concerned about biodiversity loss and carrying out or demanding conservation actions.

Biodiversity loss is due to four main processes: habitat destruction, habitat degradation, invasive species and climate change. To respond to these major threats, governments, non-government organisations, businesses and the community need to implement multifaceted conservation programs. In a democratic nation that is based on the rule of law, good legislation and its implementation is an absolute necessity. Other responses must include the development of a comprehensive, adequate and representative protected area system, conservation programs on privately owned land, invasive species eradication and control and climate change mitigation and adaptation.



Legislation to protect animals

Laws relating to animal conservation came into being fairly early, but were related to control of exploitation and made no reference to habitat. The first law was the Kangaroo Ordinance of 1853, which was aimed at meeting the food and sporting needs of settlers while preventing the wholesale killing of kangaroos, which would have

Previous page
Main Western Australia's first national park, John Forrest National Park.
Photo – Brett Dennis/Lochman Transparencies
Inset Picnic group at John Forrest National Park, 1930.
Photo – Courtesy Battye Library (004526)

Above far left Common prickly pear, an introduced species.
Photo – Len Stewart/Lochman Transparencies

Above left Rabbits were introduced to Australia by European settlers.
Photo – Jiri Lochman

Left Aboriginal kangaroo hunters.
Photo – Courtesy Battye Library (5988B)

Above The red and green kangaroo paw—the State's flora emblem—was among the first protected flora species in WA.
Photo – Willi Laufmann/Sallyanne Cousans Photography

Right Curator of the Western Australian Herbarium, Mr R D Royce, examines a specimen of *Verticordia plumosa* in the 1970s that was collected by James Drummond, WA's first Government Botanist, in 1840.
Photo – DEC

deprived Aboriginal people of food. The Kangaroo Ordinance was followed by a series of acts that provided some protection to introduced 'game', such as deer and pheasants, as well as those indigenous species that were hunted, such as wallabies and ducks. The *Game Act 1874* protected introduced animals and listed several indigenous animals, including malleefowl, bustard and ducks, which were protected during the 'breeding season'. The *Game Act 1892* also allowed for the declaration of game reserves, a large number of which were declared over Crown land, private property and land under the control of various government departments. Although game reserves had little security of tenure and were primarily to protect animals for sporting purposes, most of those declared over Crown land eventually became Land Act reserves and remain today.

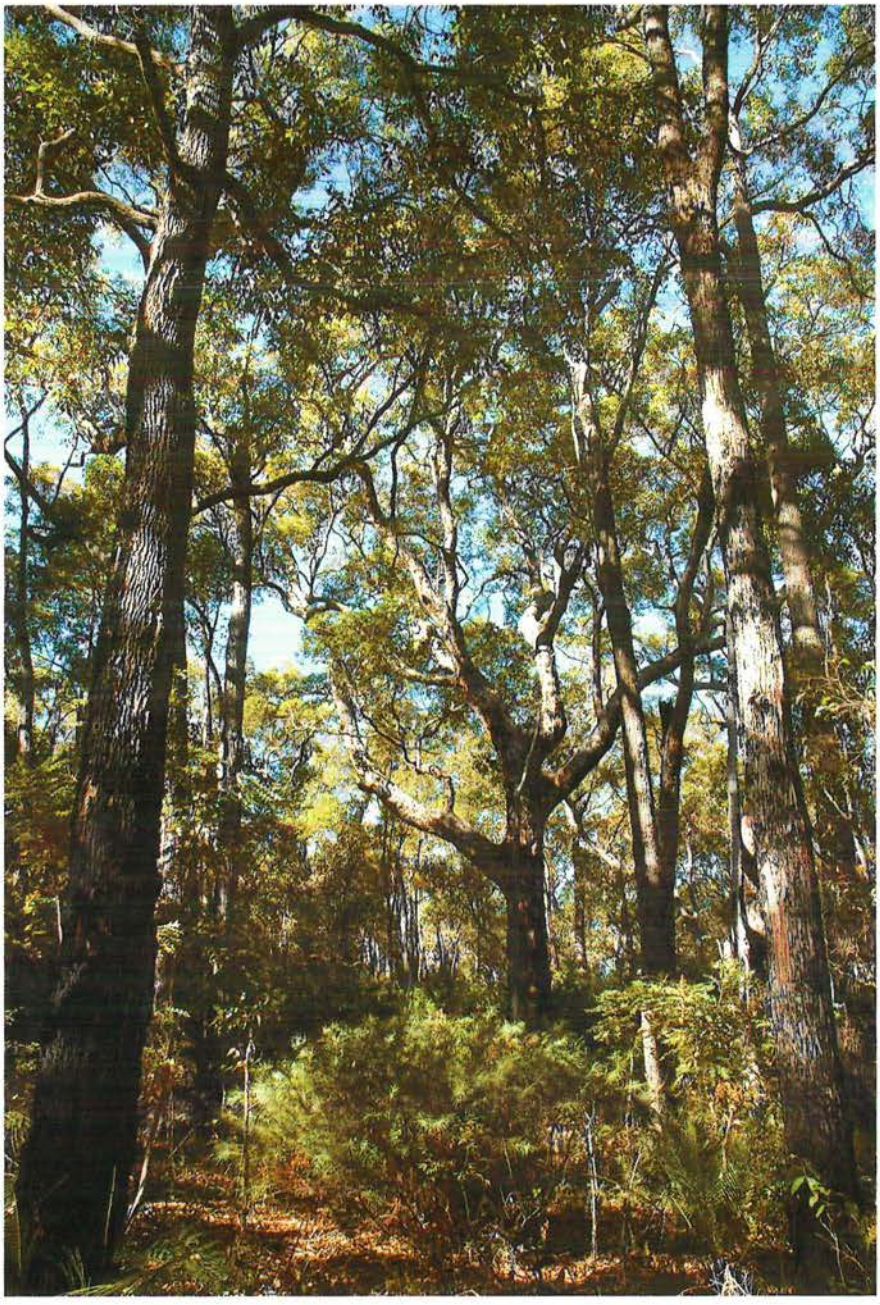
The *Fauna Protection Act 1950* took a new approach to the protection of animals. Legislation designed primarily to preserve certain animals for sport and food was replaced by legislation protecting all indigenous terrestrial vertebrate animals unless they were deemed harmful to people, their stock or their crops. The passing of this pioneering Act was due in large part to the work of the Fauna Advisory Committee, which was set up in 1944 to advise the Minister for Fisheries, who was also responsible for the Game Act. With the passing of the new Act, the Fisheries Department became the Department of Fisheries and Fauna and the Fauna Advisory Committee became the Fauna Protection Advisory Committee (FPAC), which was a statutory body allowing Land Act reserves to be vested in it.

The Fauna Protection Act has remained the basis of indigenous animal conservation in WA until the present day. It has been amended several times and its name changed in 1975 to the Wildlife Conservation Act. In 1967, the FPAC became the Western Australian Wild Life Authority, which was modified in 1975 to become the Western Australian Wildlife Authority, which existed until the proclamation of the Conservation and Land Management Act in 1985. The proposed Biodiversity Conservation Act, if passed by the WA Parliament, will update and replace the Wildlife Conservation Act.

Biological collections

Early plant collections (which are central to the study and conservation of biodiversity) were mostly sent to European herbaria, but by the 1890s local plant collections were being developed. In 1928, a decision was made to merge several growing collections at the WA Museum, the Bureau (later Department) of Agriculture and the Forests Department, to form the State Herbarium located within the Department of Agriculture, a decision that was not fully implemented until 1957. It was renamed the Western

Left Wattles in Stirling Range National Park.
Photo – Rob Olver



Below left An old-growth forest section containing many types of eucalypt at Carter State forest (near Donnelly Mill), now protected under the *Protecting our old growth forests* policy.
Photo – Tom Chvojka

Australian Herbarium in 1970. Reflecting its increasing concentration on the conservation of native flora, it was transferred to the Department of Conservation and Land Management (CALM) in 1988. The Western Australian Museum, the repository of the State's animal collections, was established in 1891 as the Perth Museum. It is a statutory authority, governed by a Board of Trustees, within the Culture and the Arts portfolio.

Legally protecting plants

Native plants did not receive legislative attention until the *Native Flora Protection Act 1912* was passed. As was the case with animals, this Act was not concerned with habitat destruction but protected certain species on Crown land. Protection was limited to wattles (*Acacia*), kangaroo paws (*Anigozanthos*), myrtles, scarlet runner and coral vine (*Kennedia*), *Lechenaultia* and the WA Christmas tree (*Nuytsia*). In 1939, the 1938 amendments to the Native Flora Protection Act came into force, allowing for the protection of all or any wildflowers on specified Crown lands. In reality, only a few species were protected until 1963, when all wildflowers in the South West and Eucla land divisions became protected on Crown land.

The Native Flora Protection Act was administered by the Forests Department and remained in force until 1980, when amendments to the Wildlife Conservation Act were proclaimed. Responsibility for the conservation of flora passed to the newly named Department of Fisheries and Wildlife. The amendments had several major provisions: all species of native plants could be (and were) protected on Crown land throughout the State, the taking of flora from Crown land for commercial or other

purposes was controlled by licences, the taking of flora on private land was restricted to the owner or a person the owner had authorised, the sale of flora taken from private land was controlled by licences and species declared as being threatened with extinction could not be taken anywhere except by written authorisation of the Minister. Provisions for compensating private land owners who could not clear land on which threatened plants occurred were included in the legislation.

The CALM Act

In 1985 the State Government amalgamated the Forests Department, the National Parks Authority and the wildlife part of Fisheries and Wildlife into a new agency—CALM. The Forests Act and National Parks Authority Act, plus sections of the Wildlife Conservation Act relating to land, were repealed and replaced with the *Conservation and Land Management Act 1983* (CALM Act). A new authority, the National Parks and Nature Conservation Authority (NPNCA), was created to hold the vesting orders for national parks, nature reserves, State forests, marine parks and other conservation areas and to advise the State Government on nature conservation issues.

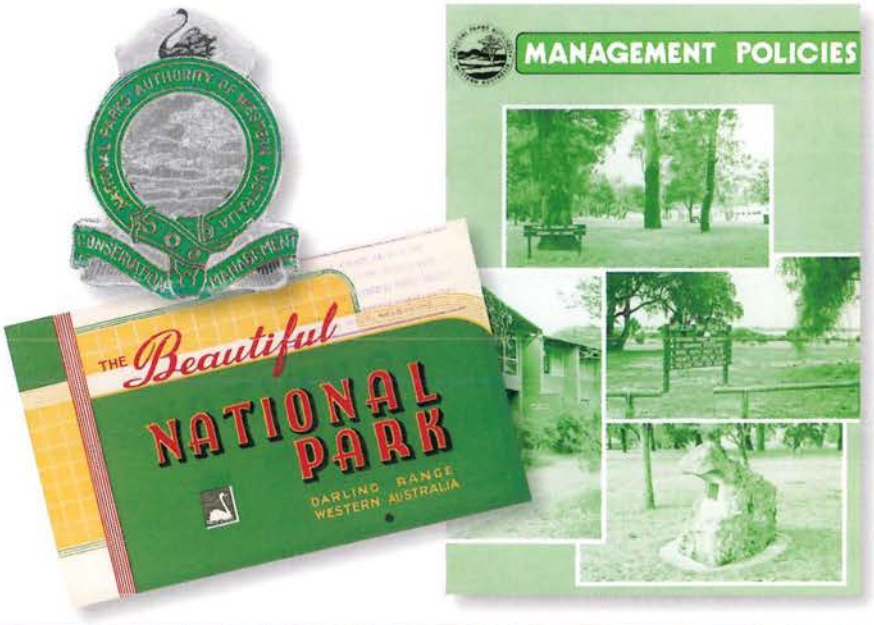
A major amendment to the CALM Act in 2000 removed CALM's timber production responsibilities and passed them to a new organisation, the Forest Products Commission. CALM became an organisation focused on biodiversity conservation. The NPNCA became the Conservation Commission of Western Australia, with responsibilities for developing and monitoring management plans for national parks, nature reserves, State forests, and other areas vested in it. As a consequence, the commission also sets the sustained yield of forest production in State forest and timber reserves via management plans.

On 1 July 2006, CALM and the Department of Environment were amalgamated to form a new agency, the Department of Environment and Conservation (DEC).

Protected areas

WA's first national park was declared in 1895. Located in the Perth hills and known for some time simply as 'national park', it is known today as John Forrest National Park. In the early years some national parks, like those near Pemberton, were managed by local boards established under the *Parks and Reserves Act 1895*. In 1953, the National Parks Board was established, also under the Parks and Reserves Act, growing from the State Gardens Board, which, after being set up in 1920, gradually became responsible for several national parks. In 1976, the first legislation designed specifically for national parks established the National Parks Authority at a time when the number and extent of national parks was increasing. In June 2007, there were 97 national parks totalling 5,595,741 hectares.

Nature reserves, protected for conservation and scientific research, were first declared in the nineteenth century. In 1894, an area in the Darling Range of about 65,000 hectares was

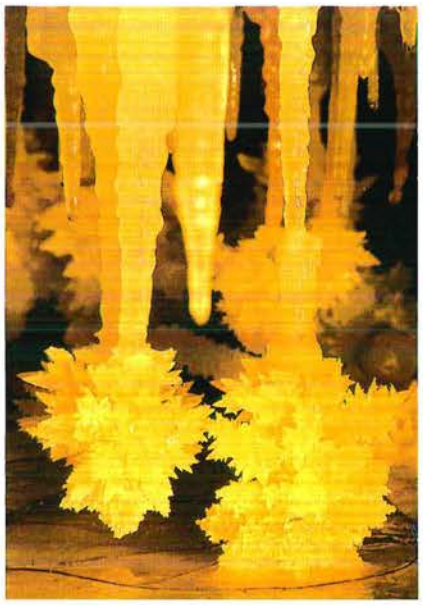


Top right Badge of the first professional officers employed to work in national parks.

Top far right Cover of first National Parks Authority management plan, released in 1977.

Above right 1930s visitor guide to the 'national park', now known as John Forrest National Park.

Right Picnic group at John Forrest National Park, 1930.
Photo – Courtesy Battye Library (004526)



Above Rare pendulite cave formation, Leeuwin-Naturaliste National Park. *Photo – Brett Dennis/Lochman Transparencies*

Left Coast near mouth of Biggada Creek, west coast of Barrow Island Nature Reserve, which was declared in 1908. *Photo – Jiri Lochman*

reserved for the 'preservation of flora and fauna'. However, it was later cancelled and added to State forest. In the early 1900s, several reserves for 'protection of caves and flora, for health and pleasure resort' were declared in the south-west. Many of them have survived until the present day and are included in the Leeuwin-Naturaliste National Park. Barrow Island, one of the world's most valuable island conservation reserves, was declared in 1908. From these small beginnings, the number and area of nature reserves gradually increased so that by 1970 there were 315 with a total area of 2.1 million hectares. Growth in the 1970s was significant and by 1980 there were 1036 nature reserves totalling 8.8 million hectares. In June 2007, there were 1271 nature reserves totalling 10,872,183 hectares.

State forests were dedicated under the *Forests Act 1917*. From being an agency mainly concerned with timber production, the Forests Department gradually developed a multiple-purpose approach to forest management and recognised a responsibility to conserve natural areas under its control. In the 1970s it developed a network of areas, known then as Special Management Priority Areas, with the priority for many being nature conservation. The selection of these areas was based on ecological surveys and on consideration of factors threatening the survival of intact ecosystems, especially the distribution of *Phytophthora cinnamomi*, the water mould that causes the plant disease known as *Phytophthora* dieback. Most of these areas have been or are being converted to national parks or other conservation reserves.

Many species and ecosystems cannot be conserved adequately within the formal conservation reserve system. While numerous landholders have quietly conserved parts of their land for a long time, formal private conservation programs are a relatively recent phenomenon. Now there are several government and private programs aimed at encouraging and assisting people to conserve biodiversity on their land; programs such as DEC's *Land for Wildlife* and WWF-Australia's *Woodland Watch* are good examples. And recent moves by organisations to purchase and protect land complement the publicly owned conservation reserves system. The Australian Wildlife Conservancy, Bush Heritage Australia and the multi-organisation 'Gondwana Link' project are making major contributions to nature conservation.

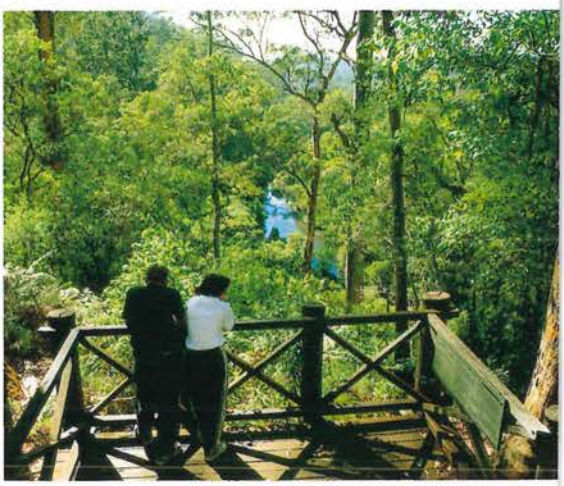
Conserving marine areas

Although the Land Act allowed areas of ground covered by tidal waters to be leased, it did not allow such areas to be reserved for public purposes. This anomaly was remedied in 1974 when the Fisheries Act was remodelled from an Act aimed at controlling the exploitation of commercial fish

stocks to one of conserving aquatic biological resources. For the first time, the Act allowed the declaration of aquatic reserves from high-water mark to the State territorial limit of three nautical miles. Declaration of reserves was, however, slow, partly because of the need to consult widely before an aquatic reserve could be declared.

The CALM Act included provisions for marine conservation areas, including marine parks and marine nature reserves. Initially, the NPNCA was responsible for marine as well as terrestrial reserves. In 1997, the Marine Parks and Reserves Authority was established and all marine reserves were vested in it. It advises on the creation of new marine reserves, develops management plans for marine reserves and monitors the implementation of management plans by the department. At 30 June 2007, there were 10 marine parks comprising 1,261,166 hectares, one marine nature reserve of 132,000 hectares and two marine management areas totalling 143,385 hectares (see 'Making waves: marine park awareness' on page 24).

Above DEC and Tiwest volunteers preparing to release tammar wallabies in Nambung National Park as part of the *Western Shield* program.
Photo – Steve Buitenhuis



Right The spectacular karri forest of the southern forests region draws many visitors.
Photo – Dennis Sarson/Lochman Transparencies

Institutional development

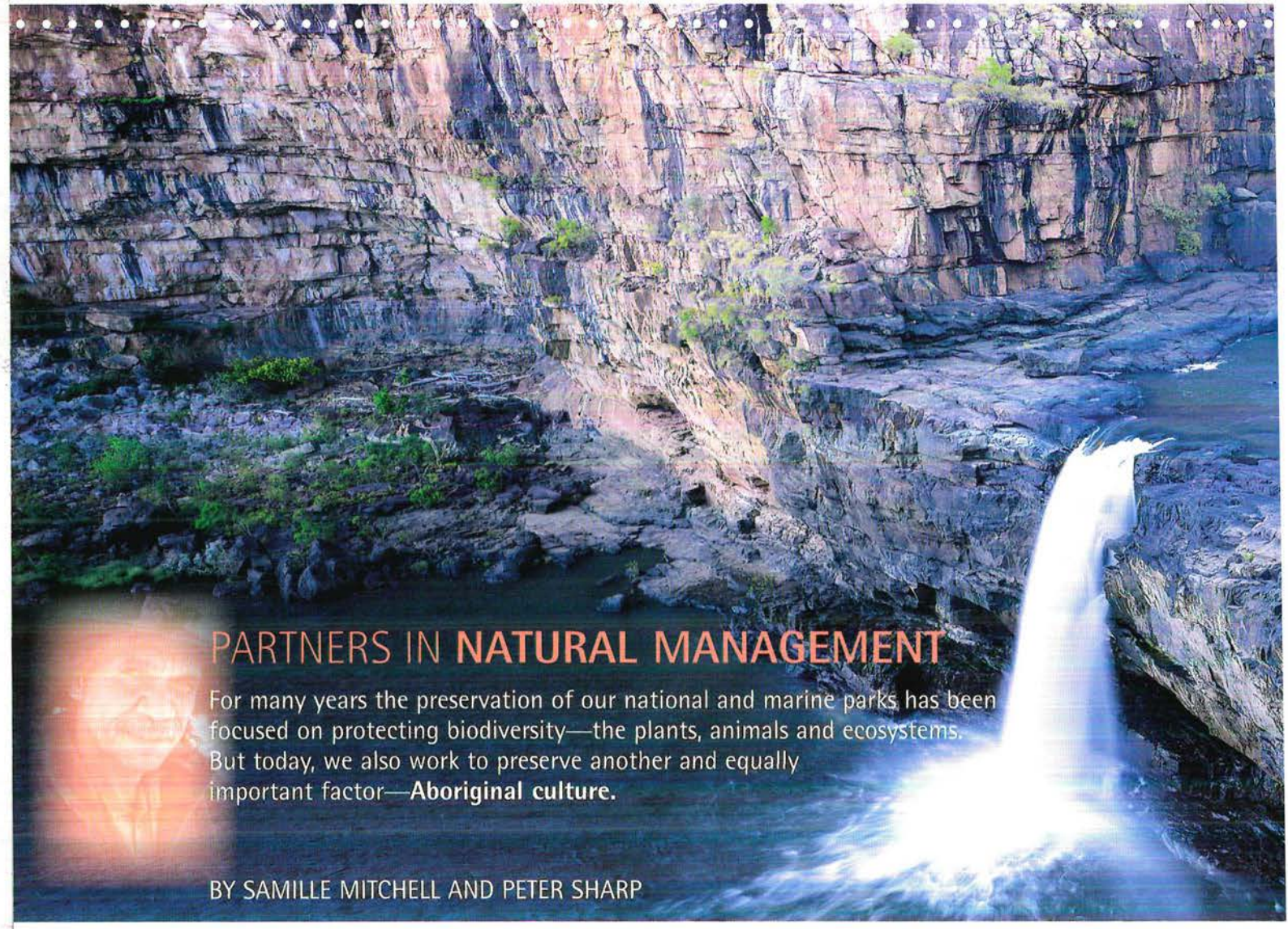
Nowadays, biodiversity conservation is a major activity of the State Government. But until the 1970s, very few people were employed specifically for that purpose. Before then, nature conservation was mainly a part-time activity of people employed primarily to do other work. Professional forestry graduates had been employed by the Forests Department for many years, but were primarily concerned with timber harvesting. In the late 1960s just two scientists were researching and advising on fauna conservation State-wide, but by the time that the Western Australian Wildlife Research Centre was opened in 1974, there were several scientists and support staff. Only in 1976 was the first professional officer employed to work in national parks. In WA, we have, more so than any other State, maintained a strong scientific basis for conservation management and developed and preserved a significant scientific research output. Growth in scientific and other staff since the 1970s has been significant and, while there will never be 'enough' resources to manage biodiversity and protected areas in such a large place as WA, there have been many achievements. One such achievement is the growth in protected areas described earlier. Another is *Western Shield*—the State's major feral predator control and fauna conservation program, which grew from scientific research into the reasons for the decline of native mammals. Most recently the State Government committed $15 million towards strategic biodiversity conservation projects through the *Saving our Species* initiative (see 'Saving our Species, Saving our State', *LANDSCOPE*, Winter 2007). There are many others.

It's not long ago that most on-ground nature conservation activity was by government. Now there are other organisations involved: large organisations such as WWF-Australia, Australian Wildlife Conservancy, Bush Heritage Australia, Greening Australia, The Nature Conservancy and many smaller local groups. Many businesses now have significant conservation programs. And lots of individuals contribute their land and their time.

Building on the best from the past

To paraphrase an old saying, 'from small seeds do mighty karri trees grow'. A closer examination of the long history of nature conservation in WA than is possible here shows that, in many cases, a single person or a few individuals have made a big difference. We should acknowledge their contribution. We still need 'champions' to ensure that important actions occur, but it will be the increasing groundswell of public opinion that will force many of the necessary future legislative and other actions necessary to conserve our amazing, valuable biodiversity.

Dr Andrew Burbidge is a Research Fellow with DEC. He joined the Department of Fisheries and Fauna in 1968 and retired from CALM in 2002. He can be contacted by email (andrew.burbidge@dec.wa.gov.au).



PARTNERS IN **NATURAL MANAGEMENT**

For many years the preservation of our national and marine parks has been focused on protecting biodiversity—the plants, animals and ecosystems. But today, we also work to preserve another and equally important factor—**Aboriginal culture.**

BY SAMILLE MITCHELL AND PETER SHARP

Western Australia's national parks and protected areas boast some of the world's oldest artefacts and artworks. Sunbaked plains are home to flints and grinding stones; caves and rocks in special areas are adorned in ancient art and trees still bear the scars from where boomerangs and shields were once carved.

While the Aboriginal people who left this art and artefacts are now long gone, their knowledge has been passed on through the generations—stories and secrets shared between father and son, mother and daughter.

As a result, many Aboriginal people today remain well versed in the magical Dreaming stories of how the landscape was formed, of the spiritual value of certain sites and the practical uses of seemingly inconspicuous plants for bush tucker or bush medicine. They feel a deep connection with the land of their forefathers, a spiritual sense of belonging.

Considering such knowledge and depth of feeling for their country as well as their responsibilities to their forebears and successors, who better to help in protecting country than the Aboriginal people themselves?

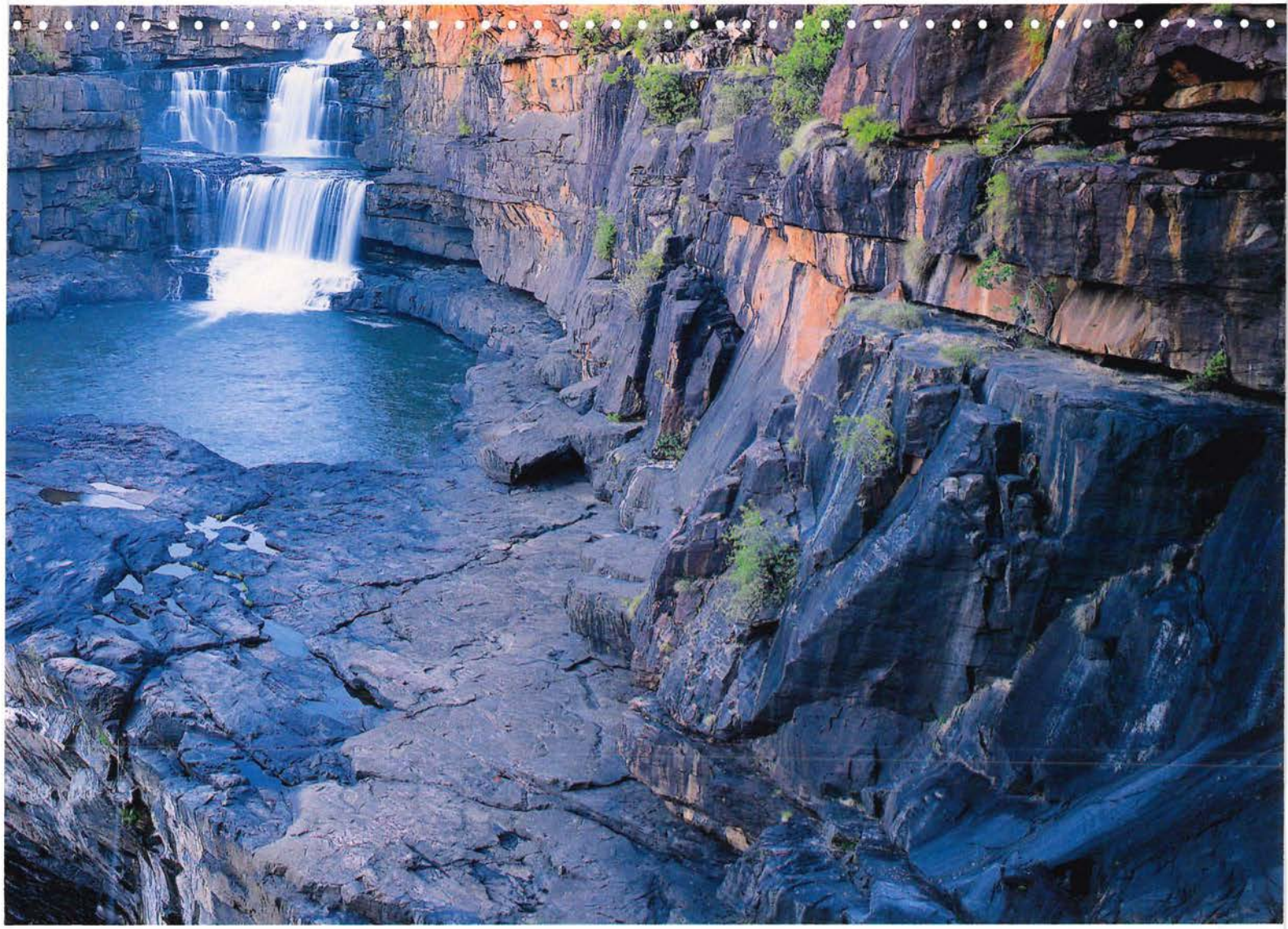
Park councils

Recognising the importance of protecting and respecting Aboriginal culture, the Department of Environment and Conservation (DEC) is implementing a joint management policy to involve Aboriginal people in the management of national parks and reserves. This means Aboriginal people will help guide the way their traditional country is protected and made available to visitors.

Key to the policy is the creation of park councils. These councils comprise representatives of Aboriginal traditional owners who collaborate with DEC to make park management decisions and advise the Environment Minister and the Conservation Commission of WA, in which the parks are vested and that is responsible for management planning. The councils meet about four times a year to decide on matters such as Aboriginal training, employment and enterprises, guidelines for operational management, promotion of cross-cultural knowledge and understanding among park staff and visitors, and capital works including location of buildings, camp sites, roads, tracks, firebreaks and other improvements.

This model began in Karijini National Park in 1995 when an interim park council was formed. The council was mooted in the Karijini National Park Draft Management Plan of 1993 to provide 'a forum for Aboriginal traditional owners to contribute to the development of policy in relation to the park'.

The model has or will be established in Millstream-Chichester (Miliyana), Mitchell River (Ngauwudu), Rudall



Above Mitchell Falls, Mitchell River National Park.
Photo – David Bettini

Above inset DEC Trainee Ranger Ken Sandy.
Photo – DEC

River (Karlamilyi), Cape Le Grand, Purnululu, Cape Range and Stirling Range national parks, Gibson Desert and Great Victoria Desert nature reserves, the Burrup Peninsula (Murjuga), Lorna Glen and Earaheedy ex-pastoral leases and the six conservation parks of the Ord River Final Agreement.

Aboriginal employment

Another key aspect of joint management is the employment of Aboriginal people. DEC aims to increase its Aboriginal employee numbers from 70 (3.3 per cent of employees) to between 10 to 15 per cent by 2016. The key to this increase is the Mentored Aboriginal Training and Employment Scheme (MATES), which provides Aboriginal people with the chance to undertake cadetships or traineeships. The cadetships enable Aboriginal people to receive financial support for tertiary studies with up to 12 weeks of paid work placements with DEC available each year. The traineeships provide trainees with the opportunity to work and learn skills on the job while achieving certificates in the conservation and land management discipline as they work towards permanent employment.

There are currently 23 trainees studying Conservation and Land Management Certificates II, III and IV over three years in 16 different work centres across the State and another 12 will be recruited later this year. Since 2002, 21 trainees have completed a Certificate IV and all now have full-time positions with DEC or other environmental organisations.

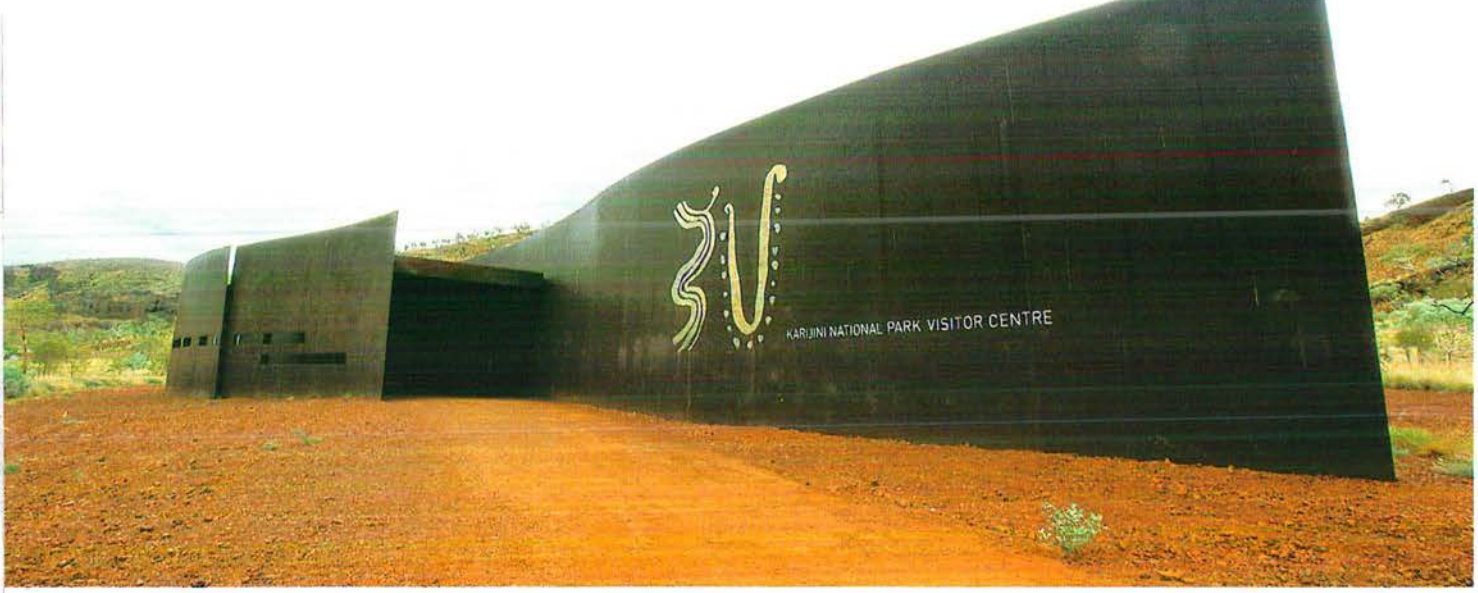
In addition, there are six cadets currently studying natural resource management-related degrees at university, sponsored through the MATES cadetship project with Department of Employment and Workplace Relations funding. This year, two cadets will graduate from university and both already have full-time positions.

Examples of the results of this push for Indigenous employees is evident at Karijini National Park where Aboriginal people staff the Karijini Visitor Centre, the Gumala Aboriginal Corporation owns the new Karijini Eco Retreat accommodation centre and an Aboriginal Ranger looks after the park.

With increased visitation to the park, it is hoped Aboriginal people will establish further tourism enterprises like guided walks, artists in residence or star gazing tours.

Management benefits

The benefits of a joint management approach can be felt on both sides



Above Karijini Visitor Centre, Karijini National Park.
Photo – Marie Lochman

Left MATES participants at Shark Bay.

Below left Ngaanyatjarra Council members and staff working to fence an important water source in the Goldfields region to protect it from wild camels.

Below far left Indigenous National Park Ranger with a native honeysuckle (*Lambertia* sp.).
Photos – DEC

of the management equation. DEC benefits from knowledge built up over millennia—information about people, plants and animals and their roles in keeping country healthy.

Such knowledge can provide a real boon to cultural tourism. Through interpretative material, visitors to joint-managed parks can learn about Aboriginal culture, how the landscapes were created according to Dreaming stories and of traditional uses of plants and animals for food and medicine.

DEC also gleans important information on fire management from Aboriginal people. Long regarded as experts on fire management to aid biodiversity, Aboriginal people used traditional firestick techniques to regenerate the land, prevent wildfires and promote native flora and fauna growth. They used fire for multiple purposes year round and, while the landscape has changed since European settlement with the introduction of new animals, plants and technologies, the use of firestick techniques and applications in protected areas like national parks makes good sense.

On the other side of the equation, Aboriginal people also benefit from joint management. They are formally involved in a partnership with DEC to manage and care for their traditional country. They have a say in protecting sacred sites, law grounds, burial places and other culturally important sites from non-Aboriginal people who might, knowingly or unknowingly, do the wrong thing at those places.

They can also gain employment in locations that might otherwise offer very little opportunity for paid work. And, perhaps most importantly, they can share their culture with the wider world, while working and living in their country.

Millstream-Chichester National Park council member Michael Woodley puts it this way:

> "Miliyana (Millstream) is where my heart is. It's where the heart of all Yindjibarndi people is. If you ask any Yindjibarndi about Millstream they will say look, this is where it all starts".

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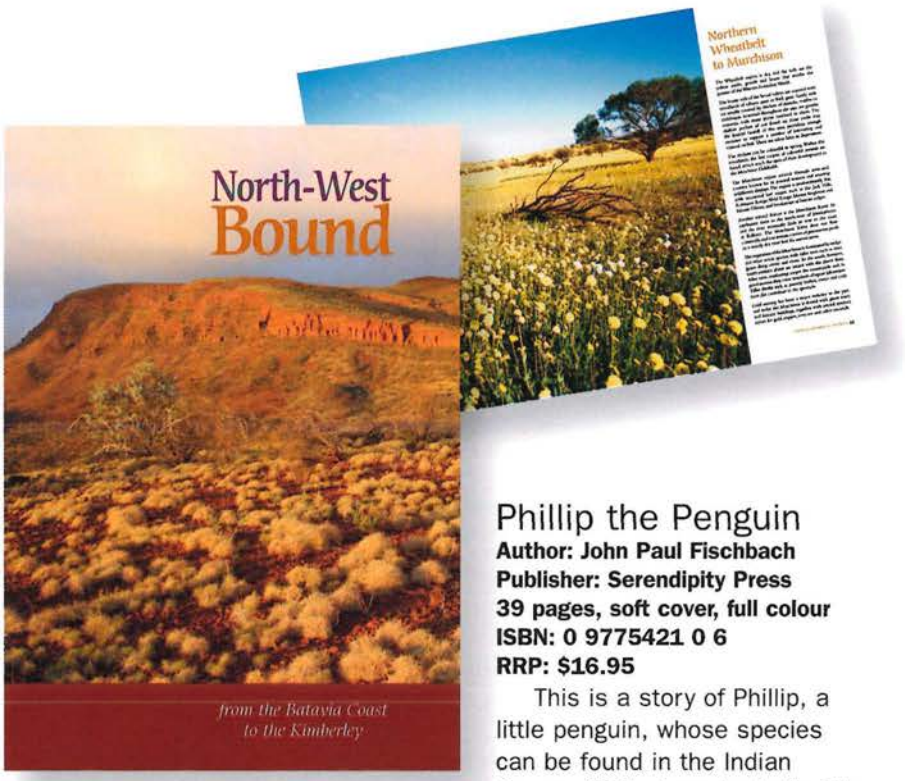
Peter Sharp is DEC's Parks and Visitor Services Acting Director. He can be contacted on (08) 9442 0300 or by email (peter.sharp@dec.wa.gov.au).

bookmarks by Verna Costello



North-West Bound

Author: Carolyn Thomson-Dans
Publisher: Department of Environment and Conservation
148 pages, soft cover, full colour
ISBN: 978 0 7307 5568 1
RRP: $29.95

This completely revised edition is for both inveterate and stay-at-home travellers. The beautifully illustrated book provides useful and important information for those embarking on a journey and is also a mine of fascinating topics and photographs for the armchair wanderer. It takes you from the unique reefs off our coast to the strangely eroded formation of the Purnululu National Park and the endless red plains of Western Australia's heartland.

Excellent maps and photographs admirably support the information-packed text.

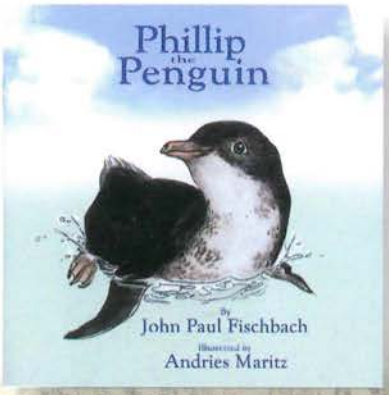
Phillip the Penguin

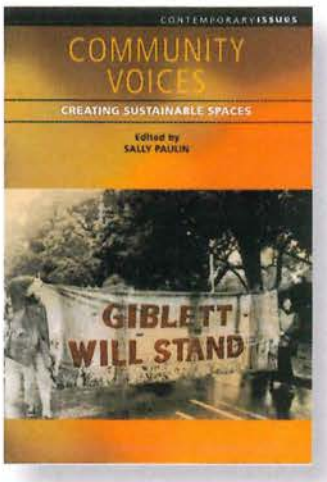
Author: John Paul Fischbach
Publisher: Serendipity Press
39 pages, soft cover, full colour
ISBN: 0 9775421 0 6
RRP: $16.95

This is a story of Phillip, a little penguin, whose species can be found in the Indian Ocean off Western Australia. The story follows Phillip embarking on an adventure that includes some fun, as well as some very unpleasant experiences, such as when he meets a 'strange beast' in the form of an oil tanker.

After the story readers will find a questions and answers page and a list of websites that provide more information on the species.

All in all, a tale to delight and inform even the most choosy of early school-aged children.





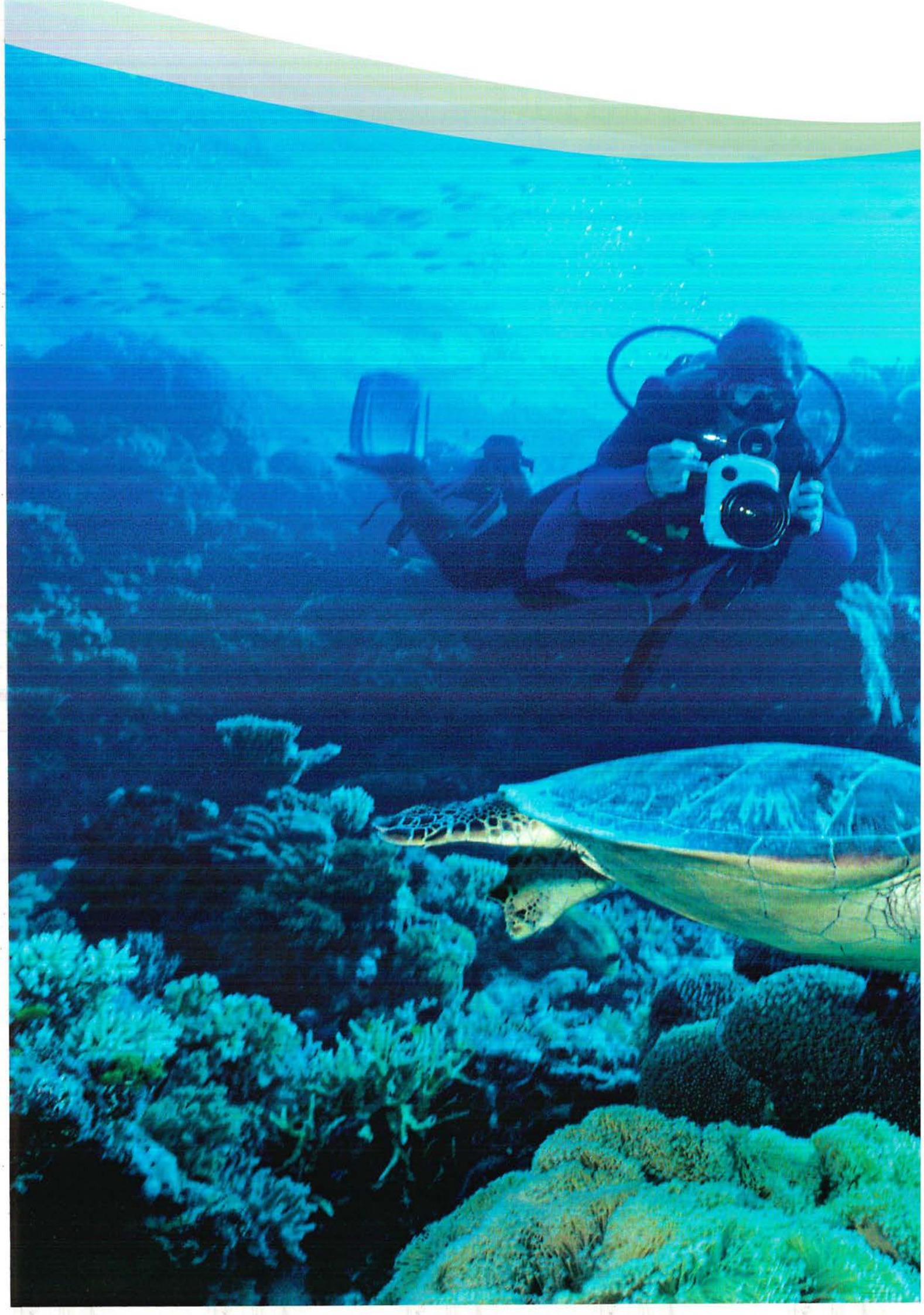
Community Voices Creating Sustainable Spaces

Editor: Sally Paulin
Publisher: University of Western Australia Press
249 pages, soft cover
ISBN: 1 920694 87 0
RRP: $39.95

If the reader is unsure about the wisdom of encouraging community engagement in decision-making processes, policy formation and implementation at local, national and global levels, this book will change the minds of all but the most intractable critics.

The book provides practical case studies, both urban and rural, to show how community engagement and participation takes place in Western Australia. The studies range from activists saving forests from excessive logging to efforts by Indigenous communities to claim a voice in the matters that concern them and their culture.

It contains chapters from academics and community members and celebrates the passion and commitment of the many people in WA who work tirelessly to influence change.



Making waves:
marine park awareness

Most of us are intrigued by the ocean. We love to swim in it or to contemplate the coastal scenery and are turned on by the mysterious plants and animals that inhabit the ocean depths. But how many of us understand that it is just as important to care for and conserve the marine environment as it is to conserve the terrestrial environment? A State-wide public awareness campaign aims to help people understand the importance of setting aside our unique ocean environment—and its wildlife inhabitants—in marine parks and reserves.

by Carolyn Thomson-Dans

How many Western Australians fully appreciate the fact that the marine ecosystems along our coast are both unique and pristine by world standards?

The offshore atolls in the Rowley Shoals Marine Park, for example, rise from tremendous depths to cradle colourful corals and fish in shallow lagoons, and are virtual 'aquariums' in the middle of the ocean! When you consider that most coral reefs throughout the world are being severely degraded by human activities, the Rowley Shoals—because of their isolation—provide one of the best chances to preserve a pristine coral reef system anywhere in the world.

Only in the Shoalwater Islands Marine Park can you find a chain of unique limestone islands within a stone's throw of a heavily populated urban centre (Rockingham) inhabited by an abundance of little penguins, Australian sealions, bottlenose dolphins and seagrass meadows, along with a fascinating temperate reef system.

Nowhere else in the world but in the Shark Bay Marine Park can you find two large shallow bays lying side by side that support the world's biggest meadows of seagrass, the most seagrass species ever recorded in one place, a population of more than 10,000 dugongs, large marine mammals such as humpback whales and, of course, the famous bottlenose dolphins of Monkey Mia.

The Ningaloo Marine Park, Marmion Marine Park and Jurien Bay Marine Park are also unique. These amazing marine parks and the ecosystems that they protect are as different from each other—and as worthy of preservation—as the tingle forests of the Walpole-Nornalup National Park are from the gorges of Karijini National Park, or the limestone Pinnacles of Nambung National Park are from the beehive-like sandstone towers of Purnululu National Park.

Previous page
Main A green turtle.
Photo – Alex Steffe/Lochman Transparencies
Inset Marine biodiversity on a temperate reef, Marmion Marine Park.
Photo – Eva Boogaard/Lochman Transparencies

Left A colourful sea slug in the proposed Dampier Archipelago Marine Park.
Photo – John Huisman

Below The proposed Walpole and Nornalup Inlets Marine Park.
Photo – Damon Annison

Expanding WA's marine reserve system

The State Government has already significantly expanded the system of marine conservation reserves in Western Australia by establishing the Jurien Bay Marine Park, the Montebello Islands Marine Park, the Barrow Island Marine Park, the Barrow Island Marine Management Area and the Muiron Islands Marine Management Area. It also expanded Ningaloo Marine Park to include the entire 300-kilometre

Right A red firefish in the Rowley Shoals Marine Park.
Photo – Ann Storrie

length of Ningaloo Reef in the park and increased the area in the Rowley Shoals Marine Park to approximately 87,500 hectares—four times its original extent—in December 2004. You can find out more about these marine parks and reserves and their special values by looking in the Park Finder section of www.naturebase.net.

In addition to the world-class marine parks and reserves in WA already mentioned, many more of the State's beautiful and diverse marine ecosystems warrant protection. As a result, the State Government recently released indicative management plans for four newly proposed marine conservation reserves. This should result in the establishment of three major new marine parks and a marine management area over the next six to eight months.

They will be the Walpole and Nornalup Inlets Marine Park (due to be established in the very near future), the proposed Dampier Archipelago Marine Park and Regnard Marine Management Area (see 'Marvellous mangroves and mud: proposed Regnard Marine Management Area' on page 39) and the proposed South-West Capes Marine Park (encompassing the waters from Busselton, around the Naturaliste and Leeuwin capes to Augusta).

At the Walpole and Nornalup inlets, about 450 kilometres south of Perth on the south coast, tall forest meets the sea. The two estuaries are joined by a natural one-kilometre-long and two-metre-deep channel, bordered by steep granite hills and rocky shores. These are known locally as 'The Knolls' and are covered with dense karri forest. The Walpole and Nornalup inlets form the only permanently open estuarine system in the south-west, so they experience marine-like conditions for most of the year and are more biologically diverse than most estuarine systems in south-western Australia.

The Dampier Archipelago Marine Park boasts the richest area of marine biodiversity known in WA, with a biodiversity comparable with that of northern Queensland (but with its own special suite of marine plants and animals). The Dampier Archipelago consists of 42 islands and islets, all within a 45-kilometre radius of the town of Dampier. Popular activities in the new marine park include boating, fishing, snorkelling and diving.

The soon-to-be declared Regnard Marine Management Area straddles the mainland coast west of Dampier and covers an area of about 62,000 hectares. It extends from Eaglehawk and West Intercourse islands eastwards to South West Regnard Island, and seaward to about 20 kilometres from the coast.

If you take the plunge off the coast between the Leeuwin and Naturaliste capes, the underwater scenery is often one of grandeur. In this underwater wilderness, you may see kelp-covered reefs and drop-offs populated with fish species such as huge blue groper that are no longer commonly seen in the metropolitan area. The proposed South-West Capes Marine Park will also include the protected, north-facing Geographe Bay, the waters of which are regularly visited by the largest animals on earth, blue whales; the exposed open ocean shores of Flinders Bay with its typical Southern

Ocean suite of marine animals; and the productive Hardy Inlet at the mouth of the Blackwood River. The local community has been actively involved in the planning process for this proposed marine park, which will hopefully be established by early 2008.

Marine parks campaign

But it is not enough to simply establish new marine parks and reserves. They must be managed to ensure they remain in pristine condition and—because a handful of rangers in a boat can't possibly hope to monitor even a tiny fraction of the activities going on within a marine park on any given day—one of the most effective ways to do this is through community education and public awareness programs.

The centrepiece of the State Government's public awareness campaign on marine parks is a 30-second television commercial that is airing throughout WA. The aim of the television commercial is to inspire wonder about our amazing marine environment so that people care about setting it aside in marine parks and reserves and want to do the right thing when using these protected areas—whether they enjoy diving, swimming, fishing, sightseeing, whale watching or other marine-based activities.

Because the concept of setting aside important natural areas in national parks is well accepted and understood, the campaign makes the link between national parks and marine parks. The advertisements look at some of our amazing national parks through the eyes of a marine turtle, who plunges into the ocean with its whale sharks, corals, tiny but endearing shrimps, huge whales, sealions and other marine wonders.

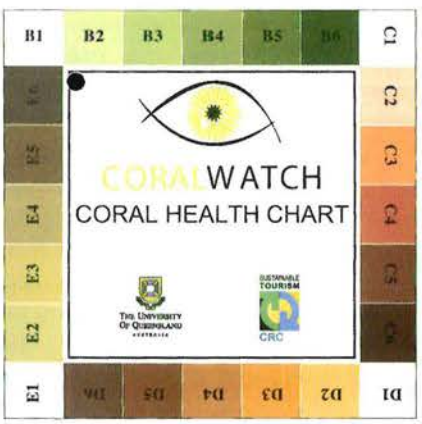
This high-profile advertising campaign has an important overarching role in tuning people in to the importance of WA's marine parks and reserves. However, if the State-wide public awareness campaign is to reach out to people in a way that cements these positive attitudes into sustainable behaviours in marine parks and reserves, it will need to be supported by effective community education programs on the ground. Managers of various marine parks and reserves understand this need and are introducing some excellent programs that help marine park users and local communities understand the importance of their local parks for marine conservation.

CoralWatch

One of the best ways to raise public awareness about marine parks is to get people involved in monitoring and management programs. Hence, in 2006 charter operators in the Rowley Shoals Marine Park were given the opportunity to trial a coral health monitoring program with their guests. CoralWatch is an organisation built on a research project at the University of Queensland that has developed a cheap, simple, non-invasive method of monitoring coral bleaching and assessing coral health. They have produced a coral health chart that displays a series of sample colours, with variations in brightness representing different stages of bleaching/recovery, based on controlled experiments. In the field, users simply compare colours of corals they see with colours on the chart and record matching codes. The colour coded coral health charts are simple and fun to use and are a great way for guests to contribute valuable data to the conservation of a pristine coral reef system. Several operators in the Rowley Shoals Marine Park have embraced the program and adopted a site.

The data is returned to Fiona Galloway, the Department of Environment and Conservation's (DEC's) Marine and Coastal Reserves

Left and below Guests on a Kimberley charter monitor the health of corals in the Rowley Shoals Marine Park using CoralWatch charts (below).
Photo – Fiona Galloway/DEC



Above Giant inflatable whale shark in DEC's marquee at the Whale Shark Festival in Exmouth.
Photo – Jamie Campell

Right A ranger shows some of the marine animals of the Jurien Bay Marine Park to members of the public.
Photo – DEC

Officer for the West Kimberley, who inputs it into the global database (www.coralwatch.org) under the location and company's name. Crew and guests can check the website and see their data and changes over time. It is hoped that participation will continue to increase in 2007.

Blessed Jurien

One marine park that enjoys excellent local support and awareness is the Jurien Bay Marine Park. Here, local managers place strong emphasis on educating the local community about the importance of the marine park, the need to observe sanctuary (no take) zones and how to behave appropriately in the park (such as properly disposing of plastic bags that could kill marine animals).

The whole Jurien Bay local community celebrates the local Blessing of the Fleet in November each year. In addition to setting up a big information tent, the local DEC office takes this opportunity to distribute showbags containing educational material on the magnificent Jurien Bay Marine Park. As well as including some fun things for kids—such as balloons, rulers and even yoyos with marine park messages on them—the showbags unashamedly target boaters and fishers, with key-ring bottle openers and tubes of sunscreen with the message 'Know your zone' emblazoned on them.

Jurien Bay Marine Park staff also run a program over the summer school holidays with fun and exciting activities for the kids (and big kids too) that promote the natural attractions and biodiversity of the region. Participants can get up close to a variety of marine life such as sea stars and sea urchins through touch pools that are set up by local staff.

DEC Marine Park Coordinator Kevin Crane said the park has a number of unique habitats and attractions, as well as some rare and endangered plants and animals.

> "Teaching people about these species and habitats and what is being done to ensure they are conserved for future generations is an important part of the department's role."

Ningaloo

Ningaloo Marine Park also runs a hugely successful school holiday program in Coral Bay and elsewhere, with touch pools, presentations on whale sharks and manta rays and fun marine-based activities. The marine park has a full-time education officer, Jamie Campbell.

As whale sharks are among Ningaloo's biggest attractions, the Whale Shark Festival, held in Exmouth in May each year, is another vehicle to spread the message that our marine parks are important and need protection. More than 1000 people enjoyed the displays in DEC's huge marquee, which included a 10-metre inflatable whale shark on loan from researcher Brad Norman, information about satellite tracking, and microscopes looking at the whale shark's main food source, plankton. There were also presentations on the biology of the whale shark and why there are codes of conduct for swimming with these massive creatures.

Other important public awareness initiatives at Ningaloo include information at boat ramps promoting sanctuary zones, a fledgling Marine Community Monitoring program that helps to promote caring for the marine park by involving members of the public in ongoing monitoring, and the

Left A volunteer measures a nesting loggerhead turtle on the shores of Shark Bay Marine Park during the 2007 *LANDSCOPE* Expedition.
Photo – DEC

Below left and below A touch pool alongside Marmion Marine Park (Trigg Beach) during one of *Nearer to Nature's* marine education activities.
Photos – Marie Milagro/DEC

annual turtle monitoring in the park, in which 118 volunteers participated this year.

Shark Bay

Internationally renowned for its bottlenose dolphin population, and positioned within the Shark Bay Marine Park, Monkey Mia is an ideal location to educate the 80,000 visitors who flock to the area each year about the importance of marine parks. Regular school holiday programs are conducted at Monkey Mia and include beachcombing, touch pools, creating a marine creature and other fun activities. The Monkey Mia Visitor Centre has interesting marine-based displays and high visitation.

Each year, DEC's Shark Bay District Office also leads two *LANDSCOPE* Expeditions, giving paying volunteers the chance to help monitor Australia's largest loggerhead turtle rookery on the northern tip of Dirk Hartog Island.

Nearer to (Marine) Nature

In the Perth metropolitan area, on the shores of Marmion Marine Park (which extends from Trigg Island to Burns Beach) and Shoalwater Islands Marine Park (offshore from Rockingham), people can learn about the wonders of the surprisingly diverse marine environment in our metropolitan waters.

DEC's *Nearer to Nature's* fun, interactive, marine activities look at rock pools and rock crabs, sea stars and sea squirts and also involve beachcombing and beach games.

Nearer to Nature's knowledgeable guides are also able to go to schools and other group venues for activities such as 'Flotsam and Jetsam', 'Legends in Limestone' and 'Swell Shells'. All of the programs are interactive, fun and a great way to explain the need for marine parks and reserves while also helping people understand the need to have fun in these areas in a sustainable way.

These are just a few examples of the kinds of initiatives that are being undertaken, both in our lounge rooms and in or adjacent to marine parks and reserves throughout the State.

While the marine environment is fascinating, many people do not think much about it or see it as something that we must all collectively take care of. The public awareness campaign on marine parks will help us all understand that, so we can enjoy unspoilt marine environments for all time, we need to act now, for the future.

Carolyn Thomson-Dans is Marine Communications Officer for DEC and a long-time contributor to *LANDSCOPE* magazine. She can be contacted on (08) 9336 0121 or by email (carolyn.thomson-dans@dec.wa.gov.au).

Many thanks to Fiona Galloway, Kevin Crane, Jamie Campbell, Tim Grubba, Cally Uren, Ron Kawalilak and Marie Milagro for their assistance in writing this article.

For further details about the *Nearer to Nature* program phone (08) 9295 2244 or send an email to n2n@dec.wa.gov.au. For more information about *LANDSCOPE* Expeditions phone (08) 9334 0561.

endangered

by Sarah Comer

Noisy scrub-bird

Although rarely seen, the endangered noisy scrub-bird (*Atrichornis clamosus*) attracts attention from bird watchers and naturalists around the world. The scrub-bird conservation story spans more than 45 years since its rediscovery in 1961.

Scrub-birds can be thought of as evolutionary relicts from an early radiation of the Australasian songbirds. Their closest relatives are the lyrebirds. They have no wishbone, the structure which is the attachment for the large flight muscles of most birds. Their short wings are not capable of sustaining flight and most of their muscle power comes from their thighs. Scrub-birds require long-unburnt habitat, with a well-developed leaf litter and associated invertebrate fauna. The female lays just a single egg each year, so recruitment can be very slow, although in optimal habitat high chick survival rates can offset this low fecundity.

From the 1920s to 1961 the noisy-scrub bird was presumed extinct. Following its rediscovery at Two Peoples Bay near Albany, conservation activities have concentrated on protecting habitat and learning more about the biology and ecology of the species. Exclusion of fire was a key strategy for conservation of scrub-bird habitat and by the mid 1970s birds were dispersing from Mount Gardner to other areas in Two Peoples Bay Nature Reserve.

In 1983 and 1985, 31 scrub-birds were captured on Mount Gardner and relocated to Mount Manypeaks. This was the first step in a translocation program that has now seen more than 200 scrub-birds relocated to areas between Dwellingup, Walpole and Albany in an attempt to establish additional breeding populations. This program was very successful and by 2000 populations of scrub-birds had been established on Bald Island and between Cheynes Beach and Norman's Inlet. However, scrub-bird translocations to the west of Albany were not so successful. Birds were also translocated to the Darling Range between 1997 and 2003 and monitoring of these birds continues. In 2006 a small number of males was released in Porongurup National Park, but a wildfire in February 2007 burnt all the release site habitat.

Thanks to translocations and habitat management, the scrub-bird population has grown from estimates of less than 100 individuals when it was rediscovered, to more than 2000 birds by 2001—a 10-fold increase from the beginning of the translocation program.

From 2000 to 2005 a series of wildfires in the Two Peoples Bay–Manypeaks area resulted in the loss of significant areas of scrub-bird habitat. Most devastating was the wildfire on Mount Manypeaks which started from lightning in late December 2004 and burnt more than 4500 hectares of scrub-bird habitat resulting in the loss of 55 per cent of the population. Despite this, sub-populations of noisy scrub-birds persisted in the original area on Mount Gardner and also (thanks to the translocation program) on Bald Island and the Cheynes Beach area. This demonstrated the need to avoid having all our eggs, or scrub-birds, in a single basket.

Anyone wanting to take part in the recovery program should contact the Department of Environment and Conservation's Albany District on (08) 9842 4500.

Photos by Sarah Comer and Alan Danks

WA's **national parks:** home to a Noah's Ark of *flora*

Western Australia's national parks are home to an astounding array of flora which we still know little about. But the more we learn, the more we're amazed by flora's fascinating habits.

by Kevin Thiele

When ranger Allan Rose saw a beautiful, pink-flowered shrub off a bush track in the eastern part of the Stirling Range National Park in 1990, he thought he'd found a common species of featherflower (*Verticordia*). But as he didn't recognise it, he carefully collected and pressed a specimen to send to the Western Australian Herbarium for identification.

Several weeks later, staff at the Herbarium tentatively identified the specimen as the keeled featherflower (*Verticordia carinata*), and immediately called botanist Elizabeth George, an enthusiast on featherflowers, for confirmation. Elizabeth was called because *Verticordia carinata* hadn't been seen for more than 150 years and was thought to be extinct.

Elizabeth dropped what she was doing, raced into the Western Australian Herbarium to look at the specimen and confirmed its identity as the lost species. A week later she was in the Stirling Range with Allan Rose, hoping to be able to catch the plants in flower, as it was already late in the season.

Inspection of the site found several plants but also brought concern, as dieback disease, caused by the pathogen *Phytophtora cinnamomi*, was in the area and the newly rediscovered species looked threatened. The next year brought more worries when a wildfire burnt through the population, killing all but a few individuals. But autumn rains saw masses of seedlings and testing showed that the species was resistant to dieback. *Verticordia carinata* now looks secure, protected by the Stirling Range National Park around it and closely monitored by rangers and other Department of Environment and Conservation staff. At last count there were more than 10,000 plants in the original population, and a second population has been found some distance away.

National parks — protecting WA flora

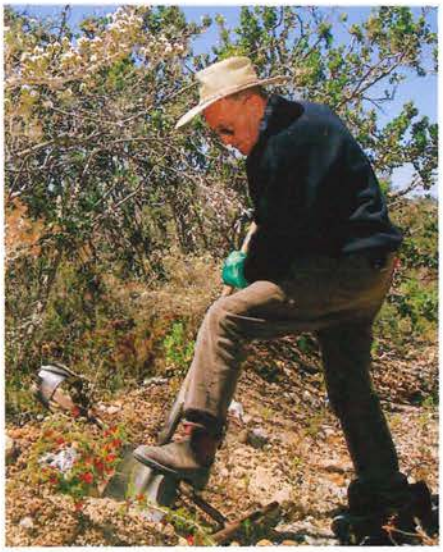
The story of the keeled featherflower is a national park success story. When it was first collected, sometime in the 1840s by Scottish botanist James Drummond, most of the south-west of Western Australia was uncleared and many species were widespread and common. With clearing of the bush and changes to fire regimes, national parks like the Stirling Range and other conservation reserves have become like arks, protecting a priceless heritage of WA's plants and animals.

But unlike Noah's Ark, parks and reserves protect not only known but also unknown and undiscovered species. No-one knows how many species of flowering plants there are in WA, but a safe bet is around 12,000 species, of which about 80 per cent have been described and documented. For other groups, particularly fungi and invertebrate animals, the percentage known is much, much smaller, perhaps as low as 10 per cent. If we are so uncertain about the species occurring in our parks, we are even less certain

Previous page
Main Wildflowers on Mondurup, Stirling Range National Park.
Photo – Rob Olver

Above A carpet of daisies in the Midwest region.
Photo – Marie Lochman

Left Coastal heathland in Fitzgerald River National Park.
Photo – Jiri Lochman



Top and above Friends of the Stirling Range transplanting seedlings from a firebreak.
Photos – Rob Olver

Right Western pygmy-possum feeding on large-fruited mallee.
Photo – Jiri Lochman

about species that are unprotected by parks and reserves. We may never even manage to collect and describe many of these plants before they are lost to extinction.

But protecting species, whether known or unknown, is only a small part of what conservation reserves are all about. Imagine, for a moment, a thought experiment. Imagine that we were able to take living samples of every species of plant, fungi and animal in WA, and to store these permanently and safely in some type of giant, high-tech Noah's Ark, cryogenically frozen perhaps or propagated through tissue culture and cloning. Every species would be safe from extinction forever. But we would still lose inestimably, because parks and reserves conserve much more than the species that live in them. They conserve stories—the stories of the myriad of complex interactions between organisms, and between organisms and their environment. Like enormous libraries, they are full of wonder and amazing tales. And we are like very, very inexperienced librarians. We're part way through the task of cataloguing the titles in the library—the species in our parks—but have scarcely begun to read their stories.

Floral tales of benefit and deceit

Consider pollination. This most fundamental aspect of a flowering plant's design and function often brings together the plant and its pollinator—an insect, mammal or bird, or maybe the wind—into an evolving relationship that results in astonishing specialisation. Some relationships are mutually beneficial, some involve trickery and deceit.

The best-known of the latter is the story of the thynnid wasps that pollinate many species of WA ground orchids. Winged male wasps emerge from pupae in the soil in spring while wingless females emerge a few days to weeks later. Climbing to the tip of twigs or grass stalks, the females lay a scent trail into the wind. Males catching the scent follow it to the female, pick her up and fly off, mating on the wing before dropping her to the ground where she seeks out burrowing beetle larvae in which to lay her eggs. But orchids have evolved that mimic the female wasps in shape, colour, orientation and, most astonishing of all, in precise details of scent. Males swooping to lift off and mate an apparent female, find themselves grappling instead with an orchid flower. In the ensuing confusion the orchid glues a pollen-sac to the head of the wasp, which then goes off and, often enough, repeats the mistake with a second orchid.

An unusual example of a mutually beneficial relationship is the pollination story of the brown boronia and its relatives. The heavily fragrant, yellow-and-brown flowers of scented boronia (*Boronia megastigma*) are familiar in gardens and as cut flowers. Equally striking relatives include the pink-flowered tall boronia (*B. molloyae*), named after the colonial botanical collector Georgiana Molloy, and the winter boronia (*B. purdieana*). All these species have odd flowers, with four infertile stamens or staminodes in addition to four fertile ones, and a curiously enlarged stigma.

These boronias appear to be pollinated by very small moths. But the flowers don't attract the moths by providing nectar. Instead, the male and female moths use the flowers to meet, greet and mate, after which the female moths lay eggs on the stigma and sterile staminodes. While laying their eggs in flower after flower, the female moths become liberally dusted with pollen and so effect pollination. On hatching, the caterpillars eat the staminodes, which are rich in oils and fats, and possibly

Top A native burrowing bee collecting pollen from a native iris flower.

Centre far left A wasp-mimicking mydid fly.

Centre left A bee fly feeding on a trigger plant.

Left A singing honeyeater feeding on a *Grevillea* flower.
Photos – Jiri Lochman

also the large stigma. But they leave the seeds intact, and so both moth and boronia persist. This close relationship between moth and boronia has proven troublesome for the cut flower industry, which finds itself unable to establish seed orchards of brown boronia outside the natural range of the moth.

These are two of the known pollination stories that can be found in parks and reserves throughout WA. There are a vast number of others that are still unknown. Why does the so-called golden rainbow (*Drosera microphylla*), have shining copper-red and green flowers while most of its relatives have plain-coloured white or pink flowers? What pollinates the smoke-bushes (*Conospermum*), many of which have tiny flowers that are almost black inside and white-woolly outside? And what do the strange little desert thread-petals (*Stenopetalum* species) do with their curiously elongated petals, so long that the flowers don't look like flowers at all at first sight? The stories of all these still need to be read.

Reproductive genius

Pollination, of course, is only one part of the story of plants. Protecting then shedding and dispersing seeds is another rich vein of stories, particularly in sandplain parks and other areas where fire plays a vital role in the landscape.

Burnt banksia cones with gaping follicles are a common sight after a wildfire. This is the final chapter in one of the most sophisticated seed dispersal stories in the world. It's a good story because banksias have a problem. Most species grow in sandplains and heaths where summer wildfires are common and hot. Their seeds are relatively large (to give the germinating seedlings the best chance of survival in dry conditions and infertile soils) and full of nutrients, making them very attractive to seed predators such as insects. So the plant needs to shed its seed at a very precise moment, onto moist soil after the onset of consistent autumn rains and after a summer wildfire, when conditions for germination are good but seed predator populations are low. Shedding the seed immediately after the fire, or in the interfire period, or even after a summer thunderstorm following the fire, would be disastrous, as the seedlings would probably not survive.

Above Banksia cone follicles open to release seeds after a fire.
Photo – Jiri Lochman

Above right Wattle and black-eyed susan in the Perth region.
Photo – Bill Belson/Lochman Transparencies

Right A community of Wheatbelt heath, featuring *Petrophile media*.
Photo – Jiri Lochman

Below right Coneflowers (*Isopogon latifolius*).
Photo – Alex Bond

Bottom right Brown boronia (*Boronia megastima*).
Photo – Andrew Davoll/Lochman Transparencies

Banksias solve this problem using a mechanism that's unique in the plant kingdom. After pollination the two ovules or eggs inside the flower develop into three structures—two seeds and a tough, woody, two-winged plate called a separator. The separator develops from the adjoining inner layers of the two seeds, which glue themselves together after fertilisation then split along a layer of crystals, forming a winged seed on either side and leaving behind the separator in the middle. Next time you see a banksia seed look carefully at the wing and you can just make out the tiny, glistening crystals that were used to break it from the separator.

The separator is used to get the timing of dispersal right. During the fire, resinous glues that hold the cone's follicles closed melt, and the follicles pop open. But the wings of the separator curve outwards as the follicle opens, forming a perfect lock that holds the seeds firmly in place. The separator wings are hygroscopic—every time the separator gets wet its wings straighten, when it dries they curve back again. This action, of straightening then

Above Sticky kurrajong (*Brachychiton viscidulus*).
Photo – Kevin Kenneally

Left Mottlecah (*Eucalyptus macrocarpa*).
Photo – Jiri Lochman

Below right Smoke bush (*Conospermum coerulescens* subsp. *adpressum*).
Photo – Alex Bond

curving back during several wetting and drying cycles, gradually levers the seeds out from the follicle. And here's where the marvelous precision comes in. The odd summer thunderstorm after the fire won't be enough to lever the seeds out. Only the onset of consistent autumn rains produces enough wetting and drying cycles to do it. So the seeds fall from the dead cones at precisely the right moment to maximise their chances of survival.

And yet here again, while there are some known stories in our parks and reserves there is still so much more that is unknown. The mechanism that banksias use to protect their seeds, and the reason why they do it, seems clear. Why then do hakeas and casuarinas, which also protect their large seeds in woody follicles that pop after a fire, have no such mechanism, instead shedding their seeds immediately? How do they get around the problem of insect predation before the onset of rains? We don't yet know.

Evolution produces a unique flora

Banksias, hakeas and casuarinas on the WA sandplains give tantalising clues of another great story, one that we can still only dimly perceive. If you compare the flora of a national park in the south-west of WA with an equivalent area in the south-east of eastern Australia, a striking pattern becomes immediately obvious. This is that the western park will be filled with bizarre and striking growth habits, leaves, flowers and fruits, while the eastern park will be filled with much more conventional plant forms, with more muted colours and less striking and varied shapes. The comparison holds over many (though, tantalisingly, not all) groups of plants. The wonderful triggerplants (*Stylidium*) provide a great example—there are not only more species but also a much wider diversity of forms in the south-west than the south-east of Australia. Eucalypts are another good example—there are no eastern equivalents of the wonderful mottlecah (*Eucalyptus macrocarpa*) or tallerack (*E. pleurocarpa*).

This pattern surely provides a hint of a big story, of the different paths of evolution in the two regions. Evolution seems to have gone a bit crazier in the south-west than in the south-east. Various factors or combinations of factors have been proposed to explain the high species diversity in the south-west. Some consider that the south-west's relatively stable climate over many millions of years has meant that extinction rates are lower here, so more species still survive, including the bizarre oddities. Others suggest the opposite—that sweeping cycles of aridity since the continent drifted north and dried out overlain on the fine-scale mosaic of rock and soil type in the south-west has driven speciation to high levels. Probably neither of these stories is wholly correct, and the real story will be stranger.

Either way, the plants and animals that tell this and other stories of the evolutionary and natural history of WA live and are protected in our national parks and other nature reserves. More than just refuges of species, parks teem with interactions, processes and patterns that hint at many more stories and many more secrets. If we and they survive the challenges ahead presented by climate change and the pressures of a full world, more of their stories will be read, and more of their lives will enrich ours.

Kevin Thiele is a botanist and the Curator of the Western Australian Herbarium. He can be contacted on (08) 9334 0505 or by email (kevin.thiele@dec.wa.gov.au).

Marvellous mangroves and mud:

proposed Regnard Marine Management Area

Together with the proposed Dampier Archipelago Marine Park to the north, the proposed **Regnard Marine Management Area** will soon be one of the State's newest marine conservation reserves. Its main claims to fame are mangroves and mud.

by Fran Stanley

The proposed Regnard Marine Management Area, formerly known as the proposed Cape Preston Marine Management Area, straddles the mainland coast west of Dampier and covers an area of approximately 62,000 hectares. It extends from Eaglehawk and West Intercourse islands eastwards to South West Regnard Island and seaward to approximately 20 kilometres from the coast. The marine plants and animals of the reserve are predominantly tropical species. The area contains large areas of sand, mud and silt. Such soft sediment habitats generally support an abundant and species-rich invertebrate fauna of molluscs (including five species of gastropod found only in the region), polychaete worms and crustaceans. However, as this invertebrate fauna has not been well studied it is possible that new species may be found in this area. It's also highly likely that species known from the proposed Dampier Archipelago Marine Park will occur in this area.

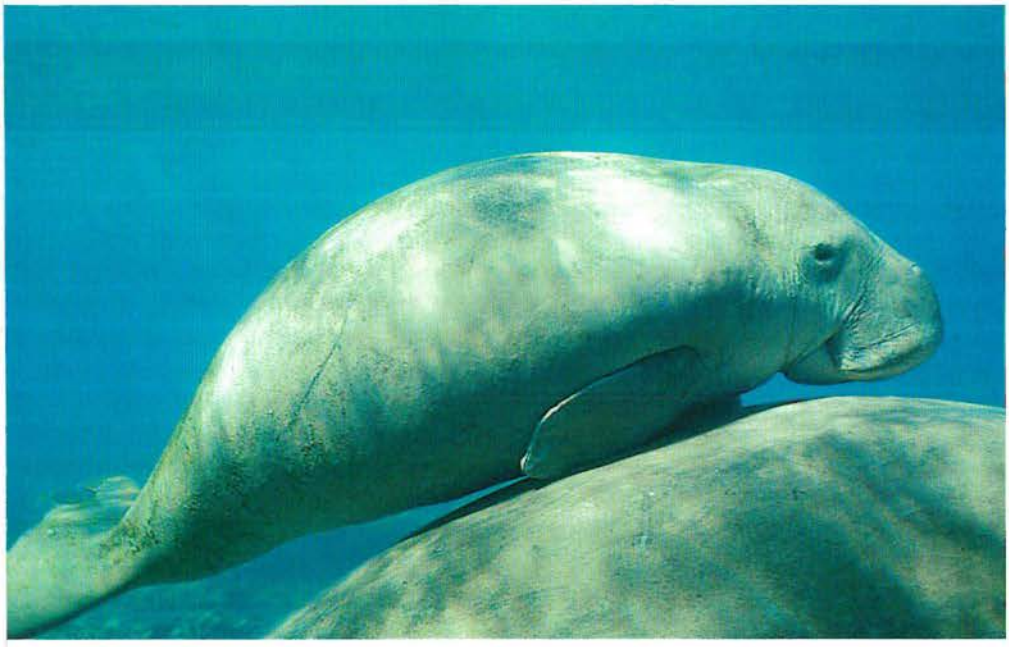
Haven for birds, plants and mammals

Numerous species of shorebirds, including migratory species, such as plovers, curlews and sandpipers, can be seen feeding in the productive soft-sediment habitats around the Regnard area. There are three seabird breeding islands in the proposed reserve. Species recorded breeding here include the wedge-tailed shearwater, white-bellied sea-eagle, osprey and Caspian tern.

Areas of limestone reef are often covered in large fleshy seaweeds such as sargassum or turf species and support invertebrates such as sponges, sea squirts and soft corals. Scattered areas of seagrass are also found in the reserves interspersed with large seaweeds. The three large islands found in the reserve, North East Regnard, South West Regnard and Eaglehawk, have limestone reefs around them.

Mangrove communities, fronted by intertidal sand and mudflats, are a common feature of the mainland shore. White mangroves (*Avicennia marina*) and red mangroves (*Rhizophora stylosa*) are very common. Yellow-leaf spurred mangrove (*Ceriops tagal*), club mangrove (*Aegialitis annulata*), ribbed-fruit orange mangrove (*Bruguiera exaristata*) and river mangrove (*Aegiceras corniculata*) also grow in the proposed reserve. Mangrove communities are home to many gastropods and other invertebrates and are important habitats for birds such as the mangrove whistler and brahminy kite. Mangroves also provide sheltered areas for juvenile fish, crustaceans and turtles. Green turtles may eat the leaves of these saltwater-loving trees.

Dugongs are frequently sighted in the proposed marine management area and feed on seagrasses that grow in the soft sediments between West Intercourse Island and Cape Preston. These shy marine mammals have a very low reproductive rate. Females may live to 70 years of age but don't produce their first calves until 12 to 17 years of age. The interval between births may vary between three and seven years. Dugongs reportedly



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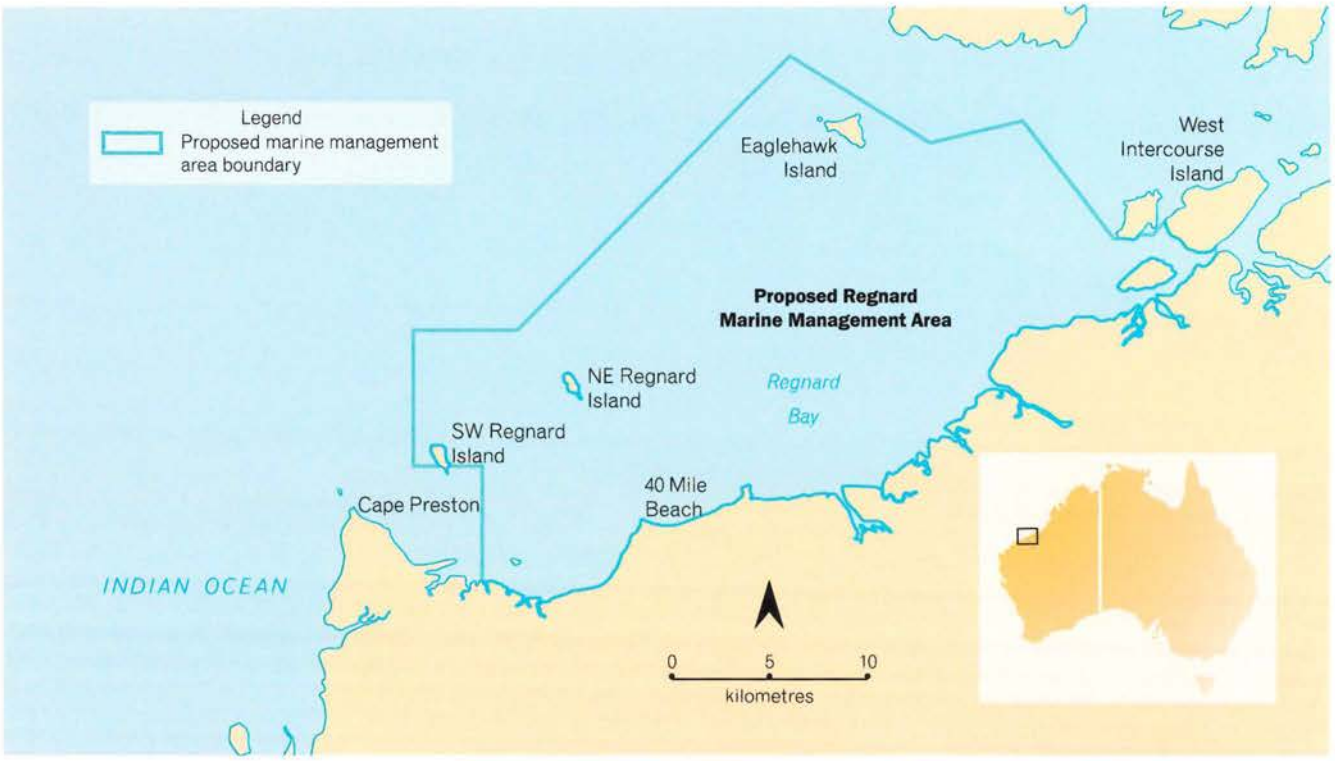
Main White mangroves with breathing roots.
Photo – Marie Lochman
Insets *(clockwise from top)*
White-bellied sea-eagle.
Photo – Sallyanne Cousans
Sea squirts.
Photo – Clay Bryce/Lochman Transparencies
Green turtle.
Photo – Jiri Lochman
Crab.
Photo – DEC

Above Sea slug.
Photo – John Huisman

Left Dugong calf with its mother.
Photo – Geoff Taylor/Lochman Transparencies



Right Mangrove prop roots.
Photo – Lauren Monks/DEC

Far right Wreck of the *McCormack*, Eaglehawk Island.
Photo – Peter Dans/DEC

give birth in very shallow water. The single calf stays close to its mother for 18 months or more. Although dugongs begin to eat seagrass within two weeks of birth, females continue to suckle their young during their long association. Young dugongs hide above their mother's back when danger threatens.

Humpback whales may pass through the area during their southerly migration to Antarctic feeding grounds and mothers and their calves may be seen resting in Regnard Bay.

Human activity in Regnard

Use of the Regnard area is dominated by commercial and recreational fishing. It is also used for other recreational activities, aquaculture, scientific research and nature appreciation. Infrastructure to support the petroleum and mining industries may become a feature in the future.

The area is particularly important for commercial prawn trawling and is used by boats licensed in the Onslow Prawn Trawl Fishery. Prawn catches are related to summer rainfall, with high catches of tiger prawns recorded during periods with abundant summer rain. The mangrove communities and creek systems provide shelter and food sources for juvenile prawns, which then move out into open water as adults.

Recreational fishing is a highly popular pastime in the Regnard area and the proposed Dampier Archipelago Marine Park. Line fishing, netting and spearfishing are used by fishers to target a variety of fish species, mudcrabs, rock lobsters and other invertebrates. Popular species include mangrove jack, barramundi, mackerel, coral trout and spangled emperor.

One wreck is known in the proposed Regnard Marine Management Area. During Cyclone Orson in 1989 the *McCormack*, a dredging barge, broke its moorings off West Lewis Island, in the proposed Dampier Archipelago Marine Park just to the north, and was wrecked on Eaglehawk Island.

Three conservation areas have been suggested to protect important plants and animals in the proposed Regnard Marine Management Area. Of these, the proposed South West Regnard Island and South Eaglehawk Island conservation zones (flora/fauna protection) are home to intertidal reefs, subtidal soft-bottom habitats, intertidal mudflats and mangroves. The proposed Maitland conservation zone (mangrove protection) protects diverse mangrove communities from human activities.

Fran Stanley is the Senior Marine Conservation Officer with the Department of Environment and Conservation's Marine Policy and Planning Branch. She can be contacted on (08) 9336 0117 or by email (fran.stanley@dec.wa.gov.au).

Natural wonderland
in the arid Pilbara

With a rich Aboriginal history, spectacular escarpments and winding tree-lined watercourses, Millstream-Chichester National Park is an ancient landscape with a living culture and a haven for wildlife. The protection of these unique features will be guided by a new management plan.

by Samille Mitchell

Long, long ago, during the Dreamtime, creation spirits sculpted the stunning environs of the Millstream-Chichester National Park. Local Indigenous people believe these spirits rose from the ground, lifted the sky and the world from the sea and, together with the sky god and the first men, moulded the landscape from a once soft and malleable earth.

The spirits, known as Marrga, still live in the rocky mountains and gullies of the region today. Aboriginal people say, if you look carefully enough, you can see the mist of the Marrga's breakfast fires hanging over the water in the mornings.

The sea serpent Warlu added to the Marrga's creations, travelling through the land and adorning it with the many fresh, deep-water pools for which the region is renowned. The Warlu still inhabits the deep waters of Deep Reach on the Fortescue River today. Such was the extent of the serpent and spirit creations here that the area is regarded as possibly the most mythologically important in the State.

A new draft management plan for the national park has been finalised and recognises this rich Indigenous heritage and protects the area's spectacular landscape.

An ancient landscape

If there is one thing that sets the Millstream-Chichester National Park apart, it is the water. The park is renowned for its oasis-like pools, native palms and streams, set amid a harsh red Pilbara landscape. This water has sparked the long Aboriginal relationship with the land, lured European explorers and pastoralists and brought about a diverse range of flora and fauna.

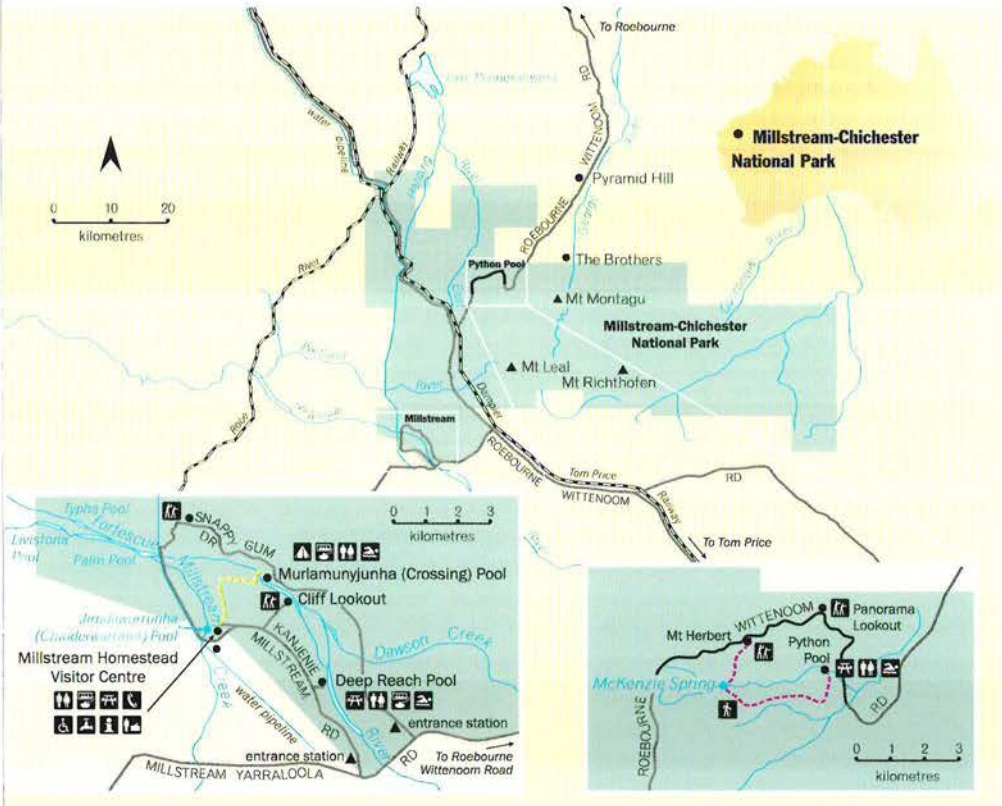
The freshwater pools near the visitor centre are fed by a natural aquifer within the Fortescue River catchment—something of a geological marvel considering the otherwise dry nature of the landscape. The Fortescue River also flows through the region and is particularly scenic at Millstream where red rocky cliffs overlook green waters reflecting the towering gums which crowd the river bank.

Such a water supply has created a number of ecosystems unique to the area, including sedgelands and woodlands of cadjeput and Millstream palm. The palms are a relic from a tropical rainforest that has since retreated, after the climate became drier and more arid five to 10 million years ago.

The geology of the region is of volcanic origin and is around two billion years old. The current landscape is the result of long periods of erosion which sculpted the land to form the ranges and plains which adorn the area today.

History

Aboriginal people are thought to have inhabited the Pilbara for the past 25,000 years. In the Millstream area, the Yindjibarndi people occupied land from the foot of the Hamersley Range across the Fortescue River and through the Chichester escarpment. The Ngarluma people lived in the region stretching from the Chichester escarpment northward to the sea.



Previous page
Main Millstream-Chichester National Park. *Photo – David Bettini*
Inset Spinifex pigeon. *Photo – Cliff Winfield*

Above Morning mist on Deep Reach in the Fortescue River. *Photo – Jiri Lochman*

Above Python Pool from above.

Right Python Pool.
Photos – David Bettini

Millstream itself is of particular cultural importance—being home to the Warlu serpent—and has also acted as an important meeting and camping place across the millennia. Walk around the area today and you can still see flaked stone artefacts, grindstones, mollusc shells, rock art and trees from which boomerangs were cut—signs of the countless generations of Indigenous people who have lived here.

Millstream's oasis-like pools and waterways also lured Europeans. Explorer Francis Gregory passed through the region in 1861 and recorded "a fine tributary from the south, running strong enough to supply a large mill". The area was consequently named Mill Stream.

Pastoralists later followed, with the first land on the Fortescue River taken up by Mr W Taylor in 1865. The area remained pastoral until 1967 when parts of Millstream and the Chichester Range were declared national parks.

In 1982 the Public Works Department bought the Millstream Station lease from the Kennedy family to use the area's water for a public water supply. Since 1968, groundwater pumped from the Millstream Dolomite aquifer has been used as a public water supply for towns in the west Pilbara. However, since construction of the Harding Dam, it is now used only when the dam's water quality or quantity is insufficient.

After the lease purchase, part of the original station was used to join the Millstream National Park with the Chichester National Park, creating one large protected area.

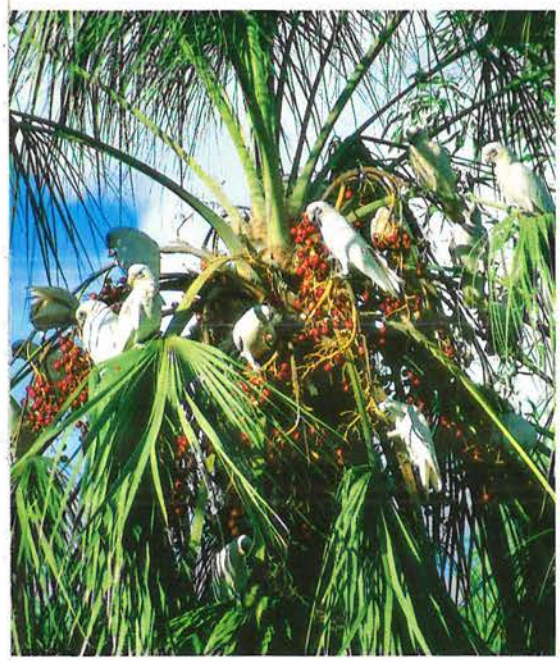
Management

The Department of Environment and Conservation (DEC) jointly manages the Millstream-Chichester National Park with the Aboriginal people whose ancestors have lived here for thousands of years.

A park council of Aboriginal elders (see 'Partners in natural management' on page 20) provides advice and direction on how to best manage and protect the land, especially in regard to culturally important sites, and is actively involved in management issues.

This joint-management approach recognises Aboriginal people's strong relationship with the area. It also enables the park council to highlight the spiritual importance of the landscape to visitors, by proving interpretative information on the park's rich cultural and mythological heritage. Indigenous staff also work in the national park helping to look after their traditional lands as their ancestors have done for centuries.

In addition to joint management, DEC is preparing a management plan which maps out management direction for the park over the next 10 years. The



plan recommends projects to control weeds, extend research on wildlife, improve camping facilities, extend and add walk trails and upgrade the visitor centre.

Millstream-Chichester National Park will also become part of the new Warlu Way drive trail which extends from Ningaloo, through Karijini and Millstream and onto Murujuga and Broome. Interpretative signage along the trail will help to open travellers' eyes to the area's rich Indigenous history and its natural wonders.

Visiting Millstream-Chichester National Park

Visitors to the park will find the bulk of tourism infrastructure near the old homestead. The original building has been converted into a visitor centre, complete with information on the natural wonders of the area and artefacts and stories from its Indigenous and pastoral history.

Signage on a walk from the homestead around the nearby Jirndawurrunha Pool gives an insight into pastoral life here in the words of former resident and pastoralist Doug Gordon through his memories as a 12-year-old. The walk meanders through the shade of introduced date palms and gums and by babbling streams and crystal clear pools, complete with lily pads (also introduced) and colourful dragon flies.

The 6.8-kilometre Murlamunyjunha Trail also sets out from here and finishes at Crossing Pool. A second trail leads off to Cliff Lookout, with views over Crossing Pool on the Fortescue River.

Top left Storm approaching Pyramid Hill, bordering Millstream-Chichester National Park.
Photo – Alex Bond

Centre left Little corellas feeding on Millstream palm fruits.
Photo – David Bettini

Centre right A little red kaluta eating a centipede.
Photo – Jiri Lochman

Left Millstream-Chichester National Park Trainee Ranger Ken Sandy shows a tree from which a boomerang was once cut.
Photo – Samille Mitchell

Right The former Millstream Station homestead is today the visitor centre.
Photo – Samille Mitchell

Below right Walking along the Murlamunyjunha Trail.
Photo – Michael Pelusey

From here you can truly appreciate the immensity of this inland waterway. The white branches of gums stand in stark contrast to the red earth and are beautifully reflected in the water. Visitors can also camp at Crossing Pool.

Camping is also available from a new campsite called Miliyana, opposite the homestead. A new camp kitchen has been constructed here, styled in the fashion of the homestead's old kitchen. A domed corrugated iron roof shelters the barbecue, table and sink. You will also find a pretty day-use site at Deep Reach—just the spot to enjoy a picnic by the water. It is here that the Warlu continues to reside.

Venturing further afield, be sure to visit Python Pool. This emerald pool at the beginning of the Chichester Range is embraced by towering red-walled cliffs. From Mount Herbert, you can set out on a 16-kilometre return walk down to Python Pool called the Chichester Range Camel Trail. The walk affords great views of the flat-topped hills or mesas of the Chichester Range. They glow brilliant red in the late afternoon sun while their spinifex cloak transforms into hues of gold.

A living land

Millstream-Chichester National Park's extensive water supplies mean the area is home to an array of plant life. Some 435 species of native plants have been recorded in the area, representing 70 families and 173 genera. The flora is used by the Aboriginal people of the area for food, medicine, materials and shelter as well as for implements, weapons and ornaments.

The permanent pools at Millstream have created refuges for water-dependent flora which are otherwise uncommon in the dry Pilbara. Plants more typical of tropical areas to the north are also found here.

Of course such flora provide habitat for fauna species. Some 36 species of mammals have been recorded in the area, with bats making up the biggest group—16 species from five families have been recorded. The region is also home to 10 carnivorous (dasyurid) marsupial species, four of which are endemic to Western Australia. There are also three kangaroo species, five rodents, one possum species and the echidna. Of the 36 species, three are endemic to the Pilbara—the little red kaluta, Rory's pseudoantechinus and the pebble mound mouse.

A diverse range of birds can also be seen here, with 146 species recorded, including 38 species of waterbird. Species include the white faced heron, the Australian pelican, the little black cormorant, the glossy ibis and the sacred kingfisher.

Millstream-Chichester National Park is also home to a wide assortment of reptiles and amphibians. Researchers have recorded 97 species of such fauna here, including 27 skink species, 14 gecko species and 12 snake species, including the giant olive python. The area's waters are also home to the flat-shelled turtle and eight species of frog. Of these reptile and amphibian species, 15 are endemic to the Pilbara.

With so much water, the area is also home to fish species. Some 11 species have been recorded here, with most found at Millstream.

The diverse range of animals is also significant to the Aboriginal people of the area, having provided food, clothing, decorations for ceremonies, pets and hunting companions. Animals were also important spiritually and different species have a place in the Yindjibarndi kinship system. They are also the subject of Dreaming songs and stories.

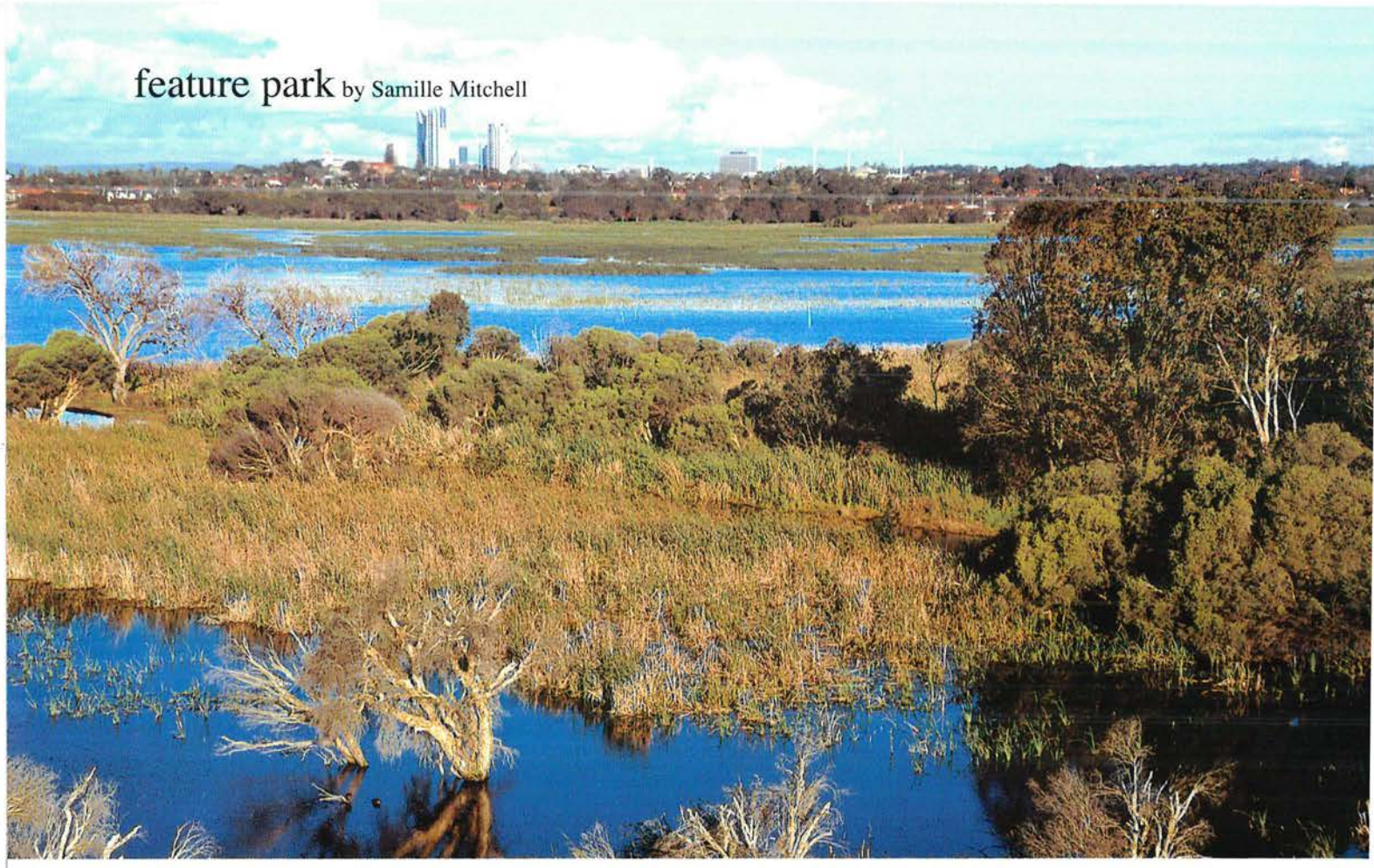
Planning for the future

The Millstream-Chichester National Park Draft Management Plan is due to be released for public comment to ensure the protection of this culturally and naturally rich area. The plan and others like it are examples of how DEC consults with the community, researches an area and affords protection to important regions through long-term planning for the future.

Samille Mitchell is a *LANDSCOPE* Editor and DEC Publications Officer. She can be contacted on (08) 9389 8644 or by email (samille.mitchell@dec.wa.gov.au).

For more information on the draft management plan please contact Clare Anthony on (08) 9921 5955 or by email (clare.anthony@dec.wa.gov.au).

feature park by Samille Mitchell



Herdsman Lake Regional Park

This Perth-based regional park is a haven for birds, as well as city slickers seeking a retreat to nature.

Above View of Perth city from Herdsman Lake Regional Park.
Photo – Rob Olver

Opposite page
Clockwise from top left Oblong tortoise.
Photo – Jiri Lochman
Cycling around Herdsman Lake.
Photo – David Bettini
Olive Seymour Boardwalk at Herdsman Lake Regional Park.
Photo – Ann Storrie
Black swans and ducks at Herdsman Lake.
Photo – Rob Olver

With rich wetland ecosystems, native vegetation and a profusion of birds, Herdsman Lake Regional Park offers a natural sanctuary in the heart of Perth's metropolitan area.

This 400-hectare park, just seven kilometres from the Perth Central Business District, is home to Herdsman Lake and wetlands which support a diverse bird life, including about 30 species that use the area as a breeding ground.

But Herdsman Lake Regional Park is not only a haven for birds. People also come here to escape the urban jungle and rekindle their passion for nature. So how is it that such an area has survived in the heart of an ever-growing city?

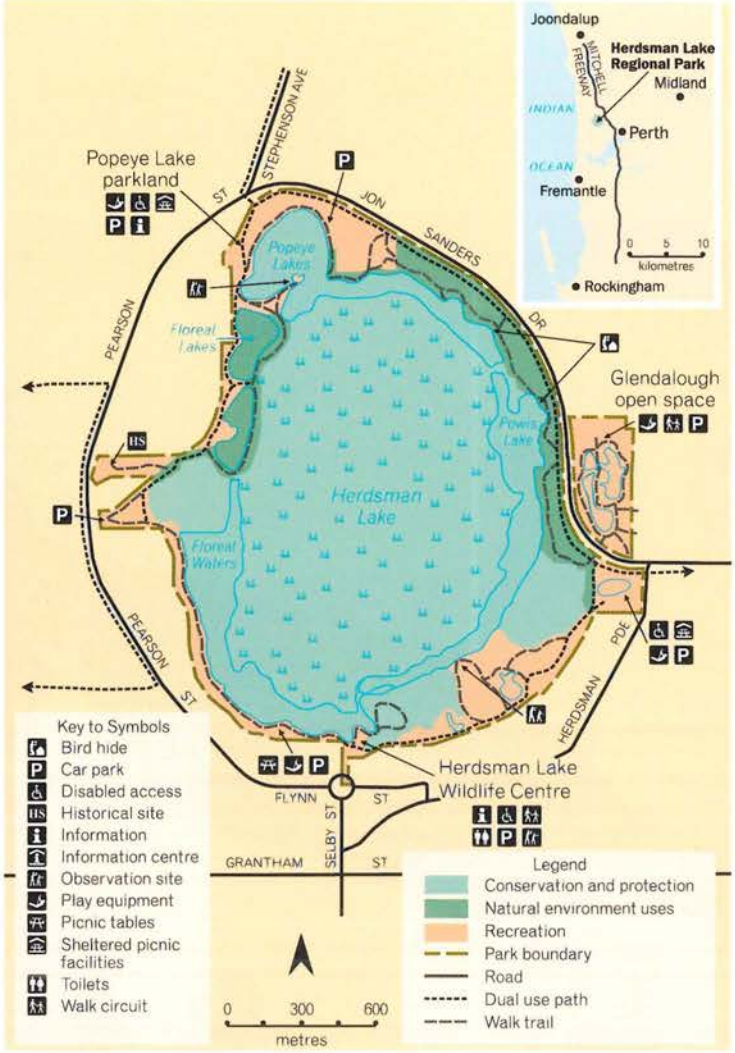
History

Well before European arrival, Herdsman Lake was home to Aboriginal people who called the region Ngurgenboro and used it as a food source and meeting point. However, with the onset of European settlement, others too started relying on the lake's resources.

By the late 1800s, the area was home to market gardens and crops as well as pig, cattle and poultry operations. Fears over flooding saw the area drained in the 1920s—a move which reduced water levels and contributed to altered vegetation, with weeds, particularly an exotic species of bulrush, replacing native plants in many places.

The area was also used for waste disposal, though a proposal to turn it into a rubbish dump was rejected thanks to a public outcry. Public passion for the area also saved it from peat mining in the 1970s. However, it wasn't until 1997 that Herdsman Lake Regional Park was declared and afforded proper protection. It is now managed by the Department of Environment and Conservation (DEC).

Despite the pressure this important area has endured over the years and the alterations that have occurred to the environment, the park continues to play an important role as a wildlife refuge in an urban environment. The lake is now managed for conservation and recreation, with conservation



efforts focusing on weed management, re-establishment of native vegetation and improvement of water quality.

Animal life

Despite the long list of pressures the park has experienced, nature proves itself hardy here. For, if there is any one thing people love about the park, it's the dazzling array of bird life. Birds Australia has recorded 107 species here while the Western Australian Gould League has recorded 162 species since 1929.

You can almost always delight in the sight of elegant black swans mirrored on the water's surface. These iconic birds use the area as a major breeding ground, meaning visitors can often see the swans' fluffy grey offspring cruising the lake's waters in the latter half of the year.

A myriad of other waterbirds also rely on the park—coots, Pacific black ducks, ibises and Australian shelducks among them. Then there are small, delicate species like the reed warbler as well as specially protected species like the peregrine falcon and Australasian bittern.

Many of the migratory birds that use the lake travel enormous distances from far-flung areas of the globe like Norway, Siberia or China to this city-based nature sanctuary. Just imagine them flying across the world, over towns, oceans and land, with their mysterious autopilots set on Herdsman Lake.

Such a natural haven is also home to reptile species like the western tiger snake (*Notechis scutatus*), which is fast being lost from other areas near Perth. The oblong or long-necked tortoise (*Chelodina oblonga*) is also found in the area and can often be seen from the boardwalks and bridges in the park. The tortoises often use neighbouring gardens to lay their eggs, digging up plants like petunias!

Mammal species, however, have not adapted to urban encroachment as well. Species like the quenda, brushtail possum and western brush wallaby once inhabited the area, but have now disappeared.

Back to nature in the city

Visitors to Herdsman Lake Regional Park can revel in its natural wonders by setting out on the Olive Seymour Boardwalk. This short walk leads you through a fairytale-like world of paperbark trees and travels above the lake's waters. Visitors can also step back in time at the Settler's Cottage for an insight into life here as an early settler. The Gould League's Herdsman Lake Wildlife Centre, established in 1984, provides information on the area's history and biology, while also offering expansive views over the lake system.

Playgrounds and picnic areas also feature while extensive dual-use paths at the park provide for walking, jogging and bike riding—recreational pursuits enjoyed at one with nature while set in the suburbs of Perth.

park facts

Where is it? Seven kilometres north-west of Perth CBD in the City of Stirling.

Total area About 400 hectares.

What to do? Visit Olive Seymour Boardwalk, WA Gould League's Herdsman Lake Wildlife Centre and Settler's Cottage. Walking, cycling, picnicking, bird watching and wildflower spotting.

Facilities Picnic areas, WA Gould League's Herdsman Lake Wildlife Centre, boardwalks, bird hides and Settler's Cottage. Disabled access is provided.

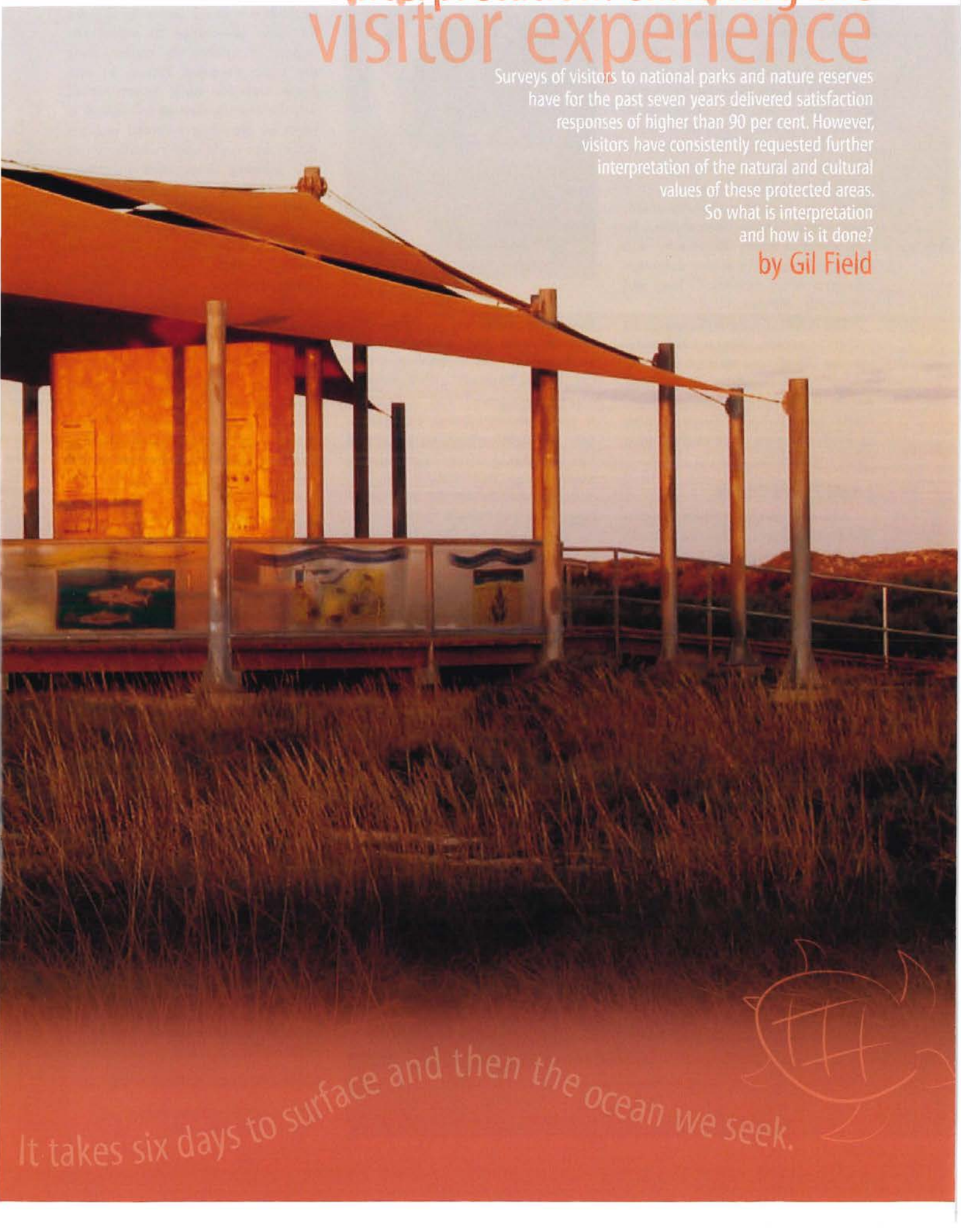
Relevant DEC office Regional Parks Unit, phone (08) 9431 6500, Level 1, 4–6 Short Street, Fremantle WA 6959.


We hatch in the sand after eight to 12 weeks,

Interpretation: enriching the visitor experience

Surveys of visitors to national parks and nature reserves have for the past seven years delivered satisfaction responses of higher than 90 per cent. However, visitors have consistently requested further interpretation of the natural and cultural values of these protected areas. So what is interpretation and how is it done?

by Gil Field



Interpretation is the craft of enriching visitor experience. It is about heightening appreciation of the wonders of our environment through an interactive process involving the visitor, the medium and the environment. Visitors are provided with information that they can relate to their life—information that reveals something that would not otherwise be apparent. But visitors are also looking for enjoyment rather than simply instruction. So interpretation needs to educate and entertain. This can be achieved through provoking ideas, evoking feelings and conveying a message.

The means of communicating with visitors to natural, cultural and historic sites are varied, ranging from signs and exhibits to multimedia displays and art. Western Australia's national parks, marine parks and other reserves feature an ever-increasing range of innovative, on-site interpretative media.

Jurabi Turtle Centre

A leading example of interpretation in a protected area is the Jurabi Turtle Centre in Jurabi Coastal Park near Exmouth, adjacent to Cape Range National Park and Ningaloo Marine Park. The centre is a cooperative venture with the Department of Environment and Conservation and the Shire of Exmouth with input from community groups and individuals. It is an award-winning example of how site development, facility design and interpretation can help with the management and conservation of protected species—in this case green, loggerhead and flatback turtles.

The centre came about in response to visitors and tour guides seeking direct encounters with nesting and hatchling turtles. There was a need to establish one beach as the focal point for turtle observation to restrict the impact of visitors on turtles along the coast. Focusing visitors to one beach and one turtle centre would help facilitate gatherings of visitors at night by providing a central location where they could observe turtles while also learning about their behaviour and conservation values through signs, exhibits and guides.

The key to the success of Jurabi was the collaboration of professionals working closely with community groups. The first task was to choose a suitable site. A landscape architect and architectural designer came up with a site within an inter-dunal swale that was positioned to prevent lights from the centre and car park shining onto the beach and disturbing nesting turtles or hatchlings. The facility itself was designed as an open-sided building featuring signs and exhibits that would cater for day and night visitors, with and without guides.

An interpretation officer was an integral member of the project team, advising on the function of the facility and its implications for interpretation. Then, a feisty and invigorated group of interpreters, graphic designers, illustrators and exhibit builders set to work on creating the interpretative experience. Their aim was to interpret the life cycle of turtles and the threats to their survival in an educational, yet entertaining manner.

One such interpretative method was the development of a transparent animation on polycarbonate. This large backlit animation enchants visitors with its vibrant colour, reminiscent of comic

Previous page
Main Jurabi Turtle Centre.
Photo – DEC
Inset Text and illustrations inspired by the interpretative signage at Jurabi Turtle Centre.

Above Loggerhead turtle hatchling.

Left Jurabi Turtle Centre display.
Photos – Tony Howard/DEC

Right A gateway through the Wilderness Wall of Perceptions at Swarbrick.

Below right One of the pieces of art designed to give a perspective of the forest.
Photos – Gil Field/DEC

book and electronic media such as the Teenage Mutant Ninja Turtles. It is displayed as a rhyming story line across a series of panels and tells the story of a turtle's life cycle. The team also created a sequence of signs to and from the facility which invites participants to 'meet' the turtles in a responsible way, with tips to turn off torches and approach nesting turtles from behind. Similar messages are scribed on the wall of the facility, further imprinting appropriate behaviour into the minds of visitors.

A wall display acknowledging the volunteer research and monitoring program was erected and also functions as an audiovisual screen used by rangers, volunteers and tour guides. On the facility's deck area, plinths with dioramas reveal up-close observations and threats to turtles which are not apparent to most visitors.

Thanks to the interpretative facility, visitors now know where to go and what to do to observe turtles appropriately. They appreciate the turtle life cycle and support turtle management and conservation through minimising their impact. Visitors also have the opportunity to better understand and support volunteers involved with monitoring and research of turtles.

Swarbrick—about changing perceptions

Interpretation can be as varied as the protected areas it seeks to enhance. In WA's south-west, the Walpole Wilderness Discovery site at Swarbrick offers an intriguing way of interpreting the environment. Here, amid old-growth karri forest now protected within the Walpole Wilderness area of more than 360,000 hectares, visitors will find interpretative quotations and exhibits that celebrate the changing perceptions of forests and wilderness over time. The site was central to a long-running forestry debate that stretches back more than 100 years. The interpretation examines how perceptions of foresters, forests and wilderness have changed during this time—from when land clearers began felling trees for agriculture, to an extensive forestry debate and the passionate environmental movements which culminated in the creation of the Walpole Wilderness area in 2001.

However, when a community is divided over changing land use from timber production to national park, and the State election is decided by the shades of green vote, interpreting the events is an intriguing challenge.

The first task in providing such interpretation was to gather historical information. A literature search of past texts and a timeline of political events was compiled and oral histories were recorded by interviewing local identities.

The interpretative team's aim was to retrace history, while also providing visitors with 'spaces for introspective contemplation of the forest and wilderness'. The intent of the exhibits was to challenge visitors' perceptions of the forest, wilderness and their protection.

A 500-metre return walk was constructed through the old-growth karri forest taking visitors on a journey past the 'Door of Perception'

Above The Wilderness Wall of Perceptions in the Walpole Wilderness area.
Photo – Gil Field/DEC

Left Interpretative sign on Darwinia Drive.
Photo – Tricia Sprigg/DEC

(a trailhead that resembles a door to have fallen from the sky) and along the 'Wilderness Wall of Perceptions' before encountering art exhibits that present perceptions of a different nature.

The Wilderness Wall of Perceptions carries more than 30 quotations from the past 100 years, along with dates of political events relevant to forestry and wilderness during that time. This information gives visitors an insight into what life may have been like in this area for a group settler, a forester, a protestor or a local in their day.

But the Wilderness Wall of Perceptions is not just a wall of words —it is a metaphor for seeing life as much more than words. The 25-metre long and three-metre high wall of mirror-quality stainless steel reflects the visitor and the old-growth karri forest behind them, creating a surreal mix of reflection and words. It almost appears as though the words float in the forest, the wall nothing but an illusion.

A break in the wall defines the transition from a world of words and events to another world of shape and form without words. Here, commissioned artworks evoke emotional responses to the changing perceptions of the forest and wilderness that they interpret. The intent is to 'mess with the mind' of the visitor so they see the differences in perception among us all. For, while we don't all see things the same way, we can celebrate differences and work together to get acceptable outcomes.

Driving the message home —the Dryandra drive trail

Another example of WA's diverse range of interpretative media can be found on the Darwinia Drive interpretative drive trail at Dryandra. Darwinia Drive is a 22-kilometre circuit on good gravel roads in the heart of Dryandra woodland, an area of State forest two hours south-east of

Perth. The drive aims to foster a greater understanding of the relationships between plants and animals at Dryandra that depend on each other for survival. It was named after a small plant that grows in only a few localities in WA's south-west, including Dryandra, and is located in one of the largest areas of remnant woodland in the State's central Wheatbelt.

At each of five stops on the drive, a large interpretative sign reveals some of the intimate relationships that exist between landforms and wildlife in the immediate environment. The signs feature photographs of animals, plants and fungi as brilliant visual compositions up to 80 times the subject's real-life size. The resultant imagery is so striking that visitors often feel compelled to stop and get out of their cars to investigate the signs. By doing so they will learn about orchids that look and smell like female wasps to attract male wasp pollinators; birds that never raise their own young because they fob them off to other bird species who become unwitting and devoted foster parents; the capsid bug that sucks the life out of other insects trapped in the sundew's sticky tentacles and repays this 'carnivorous' plant by defending it against sap-sucking aphids; the endangered mammal that depends entirely on the humble termite for its food and shelter; and the termite's symbiotic gut fauna that make all its wood-munching possible.

The signs are positioned along a route which takes visitors through a wonderful diversity of habitats and landscapes—wandoo woodland, sheoak thickets, colourful heath, granite outcrops and rugged laterite breakaways that provide extensive views of the surrounding woodland. Added to this are pockets of raspberry jam wattle, sandalwood and brown mallet. There is also a section of the drive that follows the edge of the woodland. Here visitors can wander among tall silver mallet and look out over neighbouring farmland where revegetation has been undertaken to combat erosion and salinity and provide corridors for wildlife.

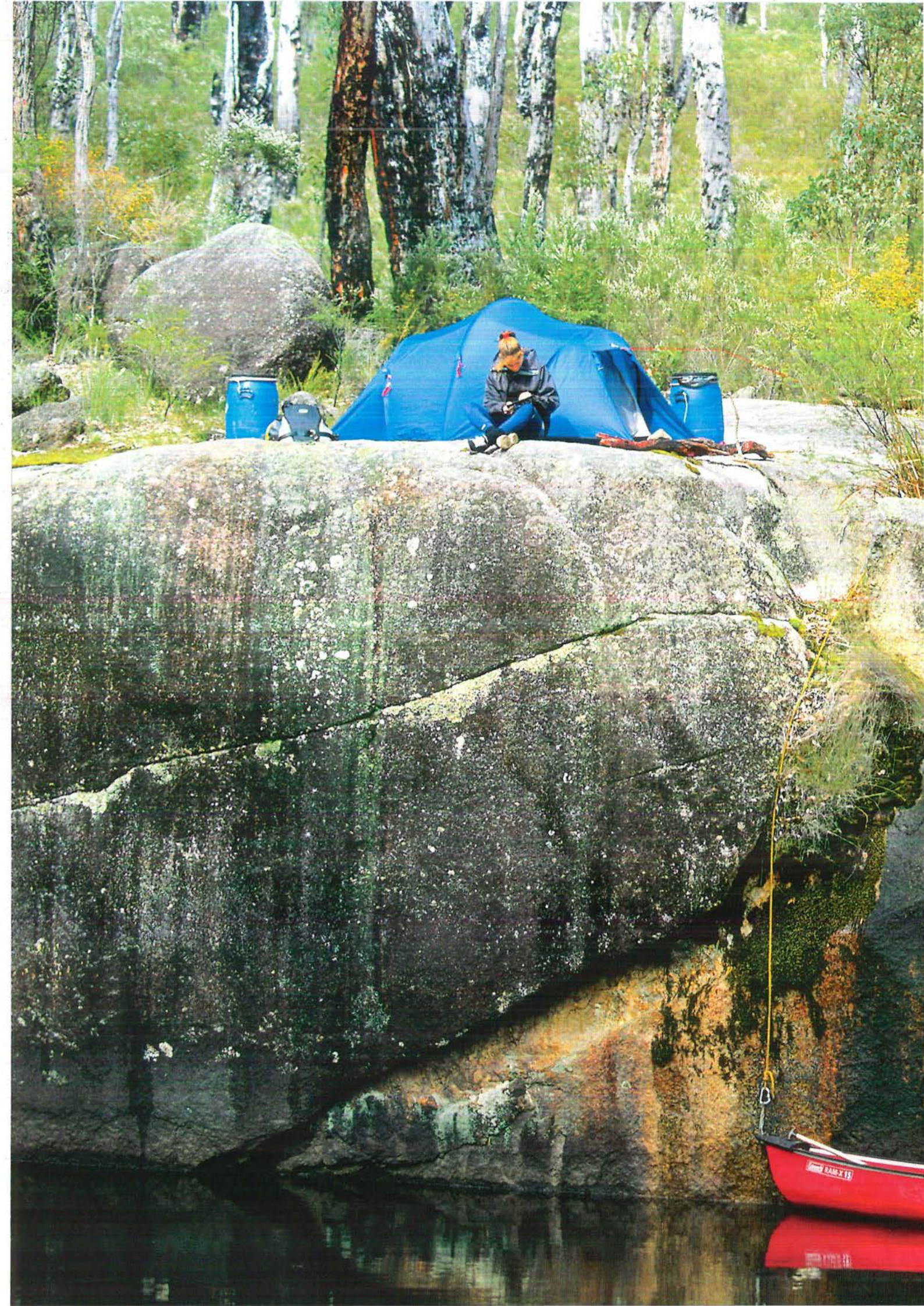
By setting out on the drive and taking in the interpretative information, it is hoped that visitors will look at the Australian bush a little differently, with a richer appreciation of its complexity, its subtlety and its fragility. Most of all, the interpretative drive seeks to show the interdependence of all elements within natural communities.

Interpretation is value adding

Sites such as Jurabi and Swarbrick and the Darwinia Drive show the rich diversity of interpretative material in WA. They reveal how effective interpretation can enrich visitor experiences of the natural, cultural and historic values of our environment. By developing stories and establishing themes and messages, interpretation can relate to the lives of the visitors while revealing the secrets of the setting. The means of conveying these values involves stage-crafting through site and facility design and choreography through the sequence and style of graphic design. All major parks and reserves have interpretative signs, displays, exhibits and facilities to further your understanding of an area. Check them out for a memorable, informative and enjoyable experience.

Right Interpretative sign at Hamelin Pool. *Photo – Ann Storrie*

Gil Field is the Coordinator of the Department of Environment and Conservation's Interpretation and Visitor Information Services section within the Parks and Visitor Services Division. In 1999 the Interpretation Australia Association awarded him the Georgie Waterman Award for his outstanding and sustained contribution to the development of the profession of interpretation in Australia. Gil and his colleagues won the Interpretation Media Award in 1998 for the Hamelin Pool Stromatolites and in 2005 for the Jurabi Turtle Centre. He has also co-authored three books on interpretation. He can be contacted on (08) 9334 0580 or by email (gil.field@dec.wa.gov.au).



HEALTHY PARKS, HEALTHY PEOPLE

Exposure to a natural environment has been shown to positively affect our health. *Healthy Parks, Healthy People* aims to improve our wellbeing by encouraging people to get out and enjoy the natural areas around them.

by Paul Burns

If someone is looking unwell, the first piece of advice they receive is often to 'go outside and get some fresh air'. But, until recently, the benefits of escaping the urban jungle have been seriously underrated. While many people walk along the beach, through parks or in bushland simply for relaxation or recreation, few realise that time spent enjoying nature has an overwhelmingly positive impact on health and wellbeing.

Separation from the natural environment has been shown to have a detrimental effect on many aspects of health, particularly mental health. Although studies are still being conducted on this connection, it has been discovered that re-establishing contact with nature can not only help prevent disease, it can also alleviate the symptoms of many health disorders. Whether it's exercising, volunteer work, or activities like meditating or having a barbecue with family and friends, spending time in the natural environment can reduce the risk of serious illness and improve your quality of life. Parks also provide an ideal setting for social interaction, which helps to strengthen the bonds within communities. It has also been shown that something as simple as owning a pet or establishing a small garden in your backyard can have a beneficial impact on personal wellbeing.

In recognition of the healing powers of nature, countries such as the UK, Canada, USA and Australia are attempting to encourage greater use of parks and recreational areas to improve community health.

The term *Healthy Parks, Healthy People* was coined by Parks Victoria in 2000. In late 2004, the then Minister for the Environment launched Western Australia's version of *Healthy Parks, Healthy People* (see '*Healthy Parks, Healthy People*', *LANDSCOPE*, Winter 2005). The then Department of Conservation and Land Management adopted the name to develop a program aimed at increasing community awareness of parks and other natural areas now managed by the Department of Environment and Conservation (DEC) and highlighting the importance of these areas to improving quality of life and physical, social and mental health.

Previous page
Main Camping on a granite outcrop along Deep River in the southern forest region. *Photo – Brett Dennis/Lochman Transparencies*
Inset Tree planting in Canning River Regional Park.

Above An organised group activity on a walk along Mundlimup Trail in State forest near Jarrahdale.

Left Bike riding through Yellagonga Regional Park.
Photos – Ron D'Raine

Above Lesmurdie Falls National Park.
Photo – Ron D'Raine

Environmental benefits

Being exposed to the outdoors not only benefits people, but it can also have a positive effect on the protection and conservation of the environment. *Healthy Parks, Healthy People* promotes volunteer work, which helps maintain and rehabilitate fragile ecosystems, while also ensuring volunteers receive a satisfying and rewarding experience. By contributing to the health of park ecosystems, volunteers can help with the survival of native species and the maintenance of biodiversity. Increasing the usage of national, regional and marine parks and other natural areas also raises the public's appreciation of nature and heightens awareness of environmental issues. Although this may seem to contradict the view that increased human activity in the natural environment is inherently destructive, it is hoped that park users will feel a sense of ownership towards these conservation areas. As a result, not only will the community benefit from physical activity, social interaction and contact with nature, parks will benefit from greater public awareness of and affection for the parks' natural beauty.

Human health benefits

One of the desired outcomes of *Healthy Parks, Healthy People* is the prevention and alleviation of disease. The largely preventable health disorders that impose the highest social and financial cost on the Australian community have been included in the Federal Government's National Health Priority Areas (NHPA). These priority areas were identified in response to the World Health Organisation's global strategy, 'Health for All by the Year 2000'. The NHPA targets include arthritis and musculoskeletal conditions, asthma, cancer, cardiovascular health, diabetes, mental health and injury prevention and control. These conditions contribute to about 80 per cent of the burden of disease in Australia so, through the *Healthy Parks, Healthy People* program, partnerships have been developed with non-government health organisations aimed at combating the incidence of such conditions. These bodies include the Heart Foundation WA, Cancer Council WA, the Asthma Foundation of WA, the Arthritis Foundation of WA, *beyondblue*: the national depression initiative, Diabetes WA and Mentally Healthy WA. These partnerships have been important in increasing awareness of the importance of the natural environment to increasing physical activity, expanding social networks and improving mental wellbeing—factors which prevent disease and alleviate symptoms while also improving the quality of life for people already suffering chronic disease. In addition to health organisations, *Healthy Parks, Healthy People* has also partnered with other State Government initiatives such as the Premier's Physical Activity Taskforce and the Office for Seniors' Interests and Volunteering.

Spreading the *Healthy Parks, Healthy People* message

In order to achieve its goal of encouraging people to realise the benefits of spending time in the natural environment, the *Healthy Parks, Healthy*

Left Whitewater rafting on the Murchison River in Kalbarri National Park.
Photo – Brett Dennis/Lochman Transparencies

Below left A family enjoying a picnic at Yellagonga Regional Park.
Photo – Ron D'Raine

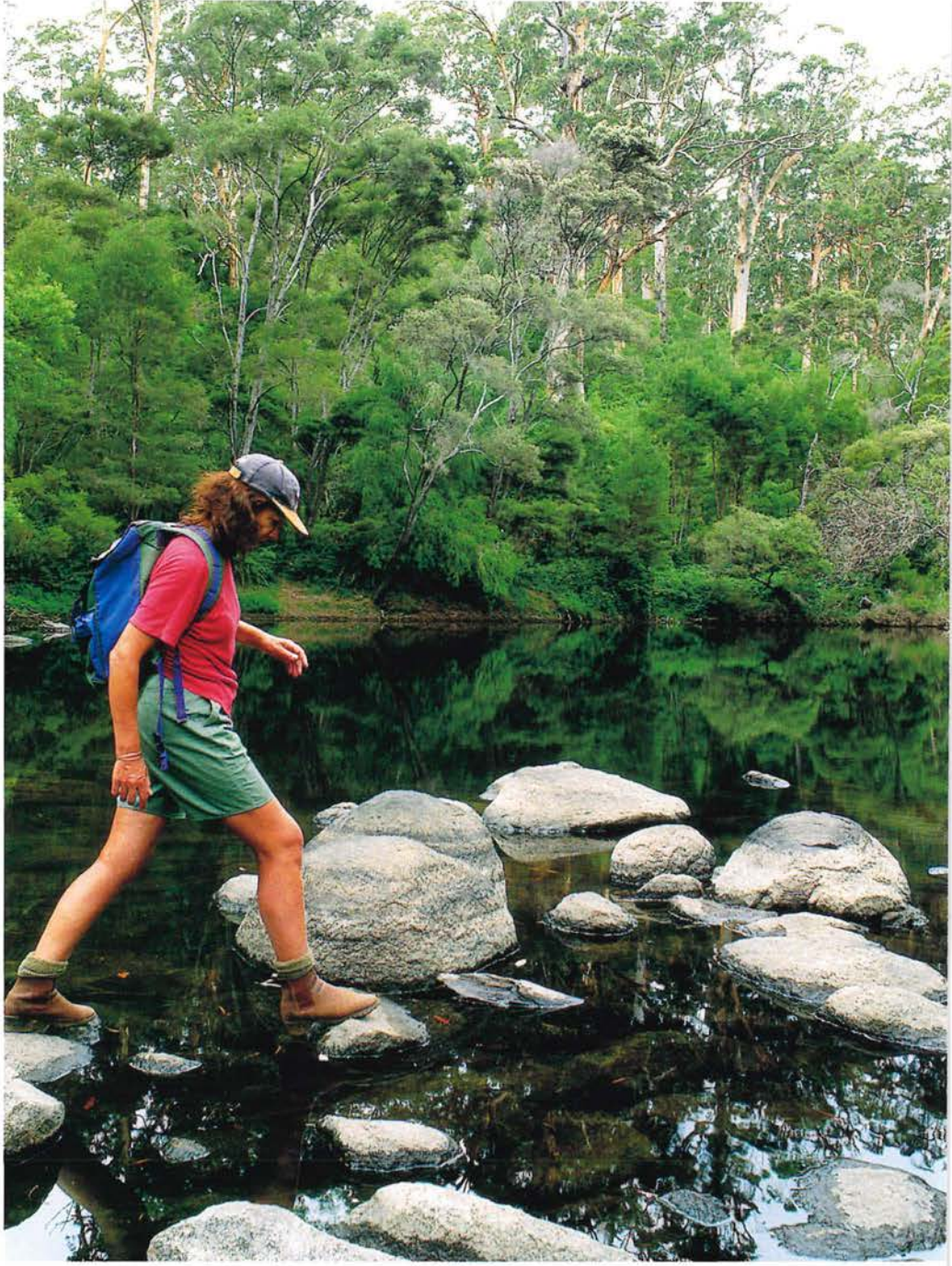
People program must spread its message and gain recognition in the wider community. This task is a continual process involving the production of promotional material and promoting the program through events that occur in DEC-managed parks. The program has released promotional items including bookmarks, brochures, posters, stickers and flyers. The *Healthy Parks, Healthy People* message is also incorporated into DEC activity programs which attract more than 300,000 participants annually. *Nearer to Nature* (see 'Getting nearer to nature', *LANDSCOPE*, Summer 2004-2005) is one such program that provides school students and the wider community with hands-on activities and the opportunity to learn about the natural world. *Nearer to Nature's* seasonal programs enable children of all ages to get a close look at native wildlife, trek through bushland, swim in marine parks and learn about outback survival skills, Indigenous culture and nature's wonders. In addition, the program promotes popular events such as 'Moonlight Meandering', which allows adults to enjoy guided walks and a sunset picnic in the picturesque Perth hills. You can also organise your own day out with families, businesses or clubs with a group booking.

Another example of how *Healthy Parks, Healthy People* is encouraging people to spend time in nature is the inclusion of the program in DEC's EcoEducation program. EcoEducation ties in with the school curriculum to bring students of all ages in contact with nature and teaches them about native plants and animals. EcoEducation's *Healthy Parks, Healthy People* school excursions encourage students to care for their park areas and to enjoy being involved in outdoor physical activities. Educating school children about the need to stay healthy and appreciate the natural world is particularly important in light of the childhood obesity epidemic and the necessity for future environmental stewardship.

Healthy Parks, Healthy People has also publicised events that take place in WA's regional, marine and national parks, such as Rotary's annual Jetty to Jetty Swim held at Woodman Point Regional Park. It also worked with Arthritis Foundation of WA to launch Arthritis Week. The launch included an organised walk in Herdsman Lake Regional Park and was designed to endorse the benefits of exercise to those suffering from arthritis, as well as to promote local parks as a venue for outdoor recreation and contact with nature. By working together, *Healthy Parks, Healthy People* and Arthritis Foundation of WA were also able to raise community awareness of serious diseases like arthritis and osteoporosis. There are plans for *Healthy Parks, Healthy People* to attempt similar collaborations for the launches of Heart Week and Diabetes Week in future years.

The most recent *Healthy Parks, Healthy People* venture has been the development and implementation of a park-based activity program for seniors, in partnership with the Physical Activity Taskforce, the Office for Seniors' Interests and Volunteering and the Bibbulmun Track Foundation. The 12-month program includes a monthly park-based activity for

Above Snorkelling in Shoalwater Islands Marine Park.
Photo – Michael James/DEC



Right A bushwalker crossing the Warren River in Warren National Park.
Photo – Dennis Sarson/Lochman Transparencies

seniors aimed at increasing levels of physical activity, encouraging social interaction, improving mental health and minimising the risk of depression. It is hoped this will provide participants with more confidence and skills to encourage frequent park visits while also expanding participants' knowledge of the natural environment and its importance to our quality of life. *Healthy Parks, Healthy People* has also been incorporated into the Department for Planning and Infrastructure's TravelSmart program by including Yellagonga Regional Park in TravelSmart materials and highlighting the importance of the natural environment for active travel. *Healthy Parks, Healthy People* is also involved with the Office for Seniors' Interests and Volunteering's Active Ageing Strategy and the Physical Activity Taskforce's Walk WA strategy.

Future plans

In the future, the *Healthy Parks, Healthy People* plan is to develop more projects in collaboration with other organisations and government departments. These include working with schools and local governments to encourage students and citizens to take part in regular volunteer work in programs like 'Adopt a Park'. Partnerships will be developed with tourism and media outlets, as well as community representatives from different cultural groups, including Aboriginal groups, to widen its appeal. The program will also work with tertiary institutions to conduct research on the association between health and park attendance and gain a better understanding of the benefits of being in nature. There is also a plan to expand the program into regional areas.

The *Healthy Parks, Healthy People* initiative is a formalised program that builds on something people have always known. The human animal is inseparable from the natural world, and there is no better place to re-establish contact with nature than in one of the many DEC-managed parks in the State. Because of the work of *Healthy Parks, Healthy People* in promoting the use of regional, national and marine parks, the community and the environment can reap the rewards now and well into the future.

Paul Burns was a final-year, creative writing student at Curtin University when he undertook his placement working on *LANDSCOPE* and provided this article.

For more information on *Healthy Parks, Healthy People*, please contact DEC's *Healthy Parks, Healthy People* Coordinator Cathy Gazey on (08) 9431 6514 or by email (cathy.gazey@dec.wa.gov.au).

urban antics by John Hunter

Quendas in the park

The national forum, 'Parks and Protected Areas Forum: a sense of place, for all people, for all time' in September provides the chance to re-evaluate our conservation assets and to perhaps discuss the need to look to, or manage for, the future with a reduced carbon footprint.

Our conservation reserves increasingly provide homes for species that have been suffering with the spread of urban development.

An urban mammal that is currently finding new life in our parks and protected places is the quenda or southern brown bandicoot (*Isoodon obesulus fusciventer*). This rat-like marsupial about the size of a rabbit has markedly declined in numbers in the south-west of the State since European settlement and is now suffering badly in the suburbs of Perth.

Once found as far north as Jurien Bay and west of a line between Moore River and Jerramungup and east on the coast to Israelite Bay, quendas are now restricted to the coastal plain area between Guilderton and Esperance.

The major threat to the quenda has been the loss of habitat through land clearing, predation by foxes, cats and dogs and competition from rabbits and stock animals.

With the introduction of the *Western Shield*—the Department of Environment and Conservation's (DEC's) wildlife recovery program—the quenda population across the south-west has rebounded and the animal has now been removed from the threatened species list. However, recent housing and industry expansion demands within the Perth metropolitan area are taking a heavy toll.

Quendas, until recently, have enjoyed a somewhat secretive existence in their most favoured outer suburban habitat of banksia–jarrah woodlands and wetland margins with thick and varying scrub understorey.

With recent extensive clearing of these outer urban areas, quendas are now more than ever frequenting home gardens where tolerance for disturbing lawns with their little conical holes in search of grubs and other invertebrates is at times low. Along with predation by family pets and increased road traffic, these bold little marsupials that often approach a human hand for a feed of fruit, grain or pet food are at extreme risk.

Over the past 11 years some 600 quendas have been translocated to 13 State and other areas protected by the *Western Shield* baiting program.

While the quenda population has generally increased within the south-west of the State, fox and feral cat eradication programs must never falter.

Unfortunately, the direct human pressures of urban expansion and development, plus feral animal predation within city bush parks, will in the future probably see the disappearance of the animal altogether from within the suburbs.

DID YOU KNOW?

- Western Australian Museum observations once noted that the quenda used a rapid scrambling and patting movement of the forefeet to kill scorpions and centipedes, then separated the relevant poison tips and heads from the bodies with razor-like incisors. There is also a record of a mouse being pounced on and completely consumed.
- Quendas do not climb, but nest in a bundle of grass and straw material in a depression within dense thicket. Their gestation period is only about two weeks.
- For more stories like this, get a copy of *URBAN ANTICS*, which brings 68 of the best Urban Antics together, from bookshops, DEC offices or online through DEC's NatureBase website (www.naturebase.net/shop).

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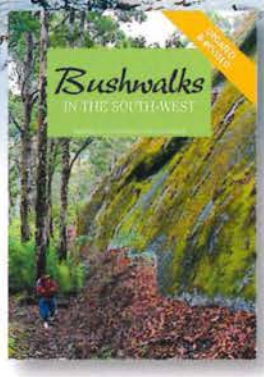

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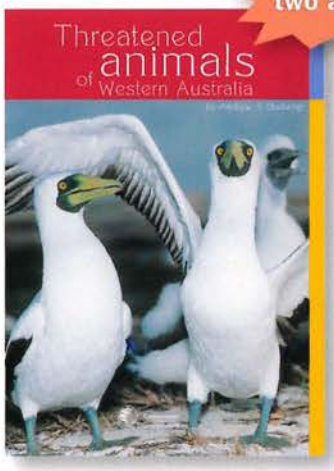

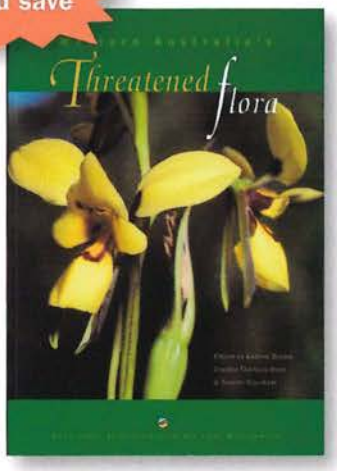

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