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SUMMER 2001–2002

LANDSCOPE

WA'S CONSERVATION, FORESTS AND WILDLIFE MAGAZINE

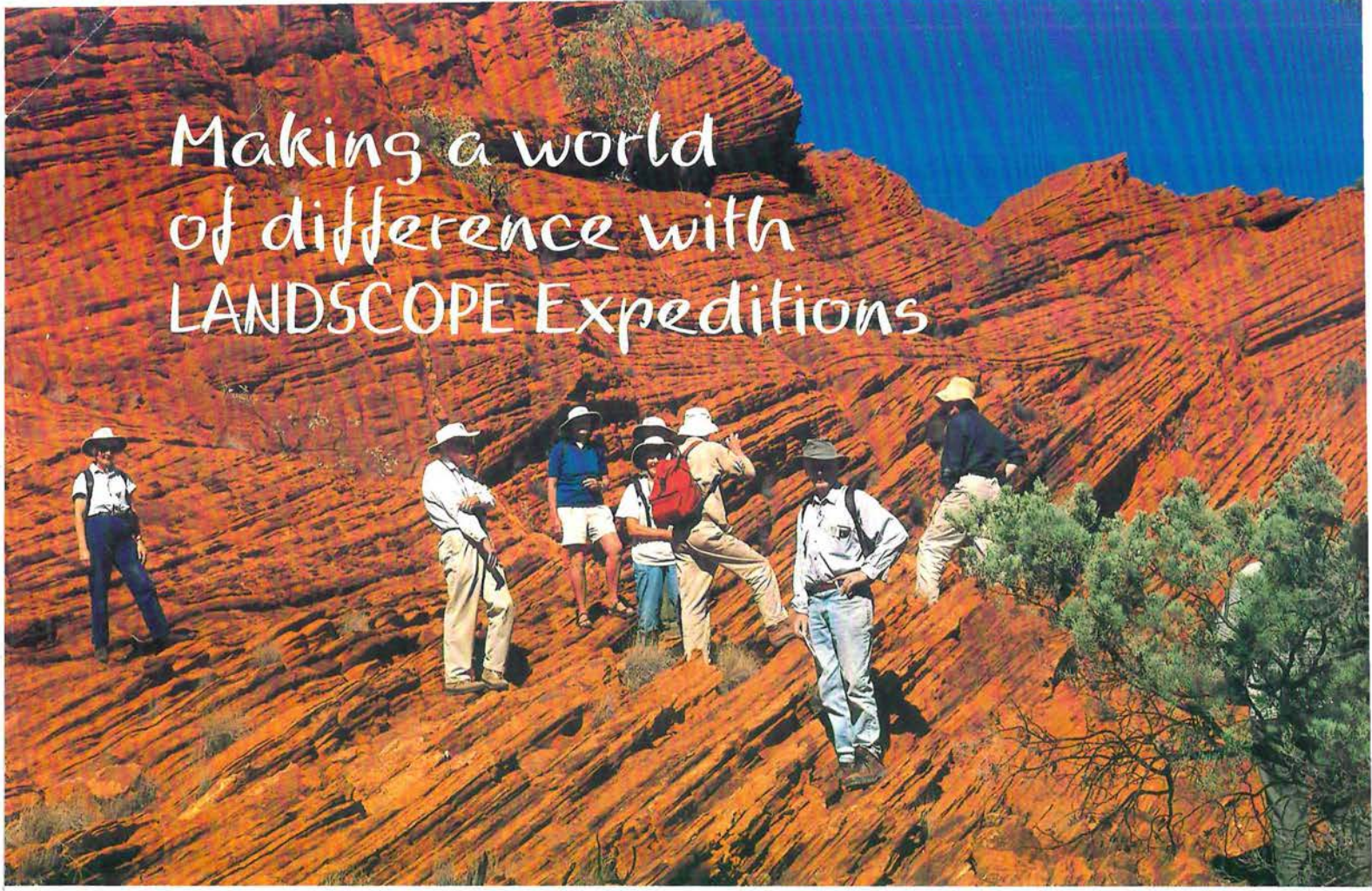
Ancient animals ancient names

Our largest island

The art of science

Karijini calling

Making a world of difference with LANDSCOPE Expeditions



Carnarvon Range, Western Australia. Photo – Kevin Kenneally

Join us in the cause of conservation in 2002, the International Year of Ecotourism

Loggerhead Turtles of Dirk Hartog Island, Shark Bay
(a) January 7–14, (b) January 14–21, 2002
Help monitor the most endangered species of turtle that nests in the Australian region on an expedition that combines history, spectacular scenery and important conservation work. You will stay on the research vessel *James Scheerer*, anchored off Cape Inscription, the 1616 landing site of Dutch explorer Dirk Hartog.

Life on Land's Edge—Shorebirds of Roebuck Bay, Broome
June 7–15, 2002
Travel to the Pearl Coast and join a team of international shorebird experts for an eco-tourism experience you'll never forget. Thousands of wading birds fly in from the northern Siberian tundra each year and this expedition will study the birds, their habitats and what they eat at Roebuck Bay, the richest known intertidal mudflats in the world.

The Last Great Wilderness—Exploring the Mitchell Plateau
June 17–26, 2002
Take a charter flight from Broome over the rugged and spectacular Kimberley coastline to the remote Mitchell Plateau, renowned for its stunning scenery and wilderness values. Help scientists study the plants and animals of this living laboratory, as they seek insights into the region's tropical biodiversity.

Exploring Barlee! Wildlife of the Barlee Range Nature Reserve
July 22–August 1, 2002
This isolated reserve, located in the Ashburton region of WA just north of the Tropic of Capricorn, is a jewel in the conservation estate of the north-west Pilbara. Access is limited and the terrain rugged. Exploration and biological survey work will be the focus of this adventurous expedition.

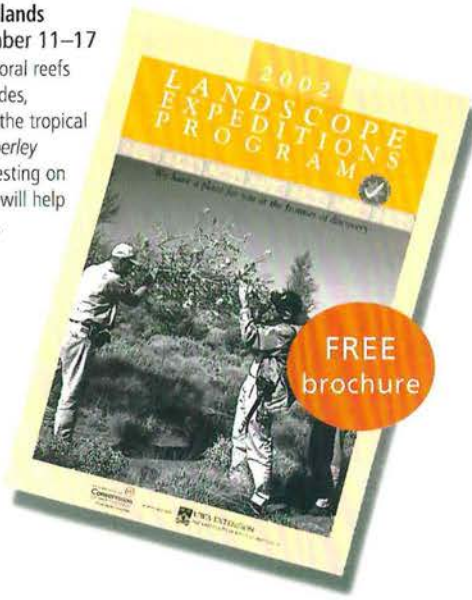
Awash in Colour—Painting a Path through the Murchison
August 9–18, 2002
Majestic Mount Augustus, sleeping under the sun, is a highlight of this Spring tour through wildflower country. Join a botanist and an artist, collect plants and paint and photograph the colourful landscapes along the way. This accommodated tour will introduce you to the best of outback hospitality.

Buckshot and Breakaways—Plants and Animals of the Gibson Desert
August 12–23, 2002
The Desert Dreaming vision is to prepare the way for the eventual reintroduction of native species to their natural desert habitat. Experience the grandeur and remoteness of an Australian desert as you work with plants and animals few people ever see.

Botanical Treasures in an Everlasting Landscape
August 31–September 7, 2002
North-east of Kalbarri lies Muggon Station in country famed for the profusion and variety of its Spring wildflowers. Help botanists look for rare plants while you experience the colour and vibrancy, vastness and peace of the outback.

Beyond the Dreaming—Project Eden
September 5–13
Help make Peron Peninsula in the Shark Bay World Heritage Area a haven for endangered animals. Highlights are close encounters with native animals, a voyage to Salutation Island, and a visit to the dolphins of Monkey Mia.

Green Turtles of the Lacepede Islands
(a) December 5–11, (b) December 11–17
Voyage to the sandy beaches and coral reefs of the remote and beautiful Lacepedes, 100 kilometres north of Broome in the tropical north-west. Based aboard the *Kimberley Quest*, you will help study turtles nesting on the islands. Information you collect will help to conserve this threatened species.



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in association with

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LANDSCOPE

VOLUME SEVENTEEN, NUMBER 2, SUMMER 2001–2002

Thirteen years in the making, the Cape to Cape Track offers a unique view of WA's most popular national park. See page 28.

Karijini's new visitor centre provides a cultural and environmental focus point for visitors. See 'Karijini Calling' on page 10.

Dirk Hartog Island is our largest island. It has a fascinating history and a valuable biodiversity. Find out why on page 17.

Does the delicate work of Western Australia's botanical artists have a place in the high-tech world of science? See page 23.

'Landscape at the Heart' is an account of the first LANDSCOPE *Expedition to the Carnarvon Range at the edge of the Little Sandy Desert. See page 40.*

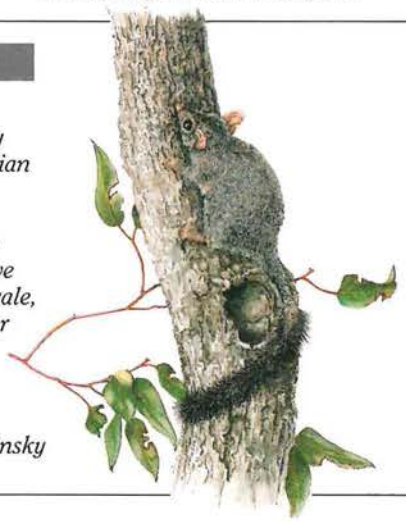
FEATURES

REGULARS

COVER

Aboriginal names have always been part of Australia's history, and many of the well known names for Australian animals are in common use today. 'Ancient animals, ancient names' (page 35) makes a case for adopting more Aboriginal names for our native mammals. The brush-tailed phascogale, for example, was known to Nyoongar people as the 'wambenga'.

Cover illustration by Philippa Nikulinsky



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DEPARTMENT OF Conservation AND LAND MANAGEMENT
Conserving the nature of WA

OUR NATURAL ATTRACTIONS

Summer's here and the kids have already taken you off to see Harry Potter, so now you need to find something else to amuse them with over the long school holidays. And what better time is there to get out and enjoy the natural attractions of Western Australia or to plan for that autumn or winter excursion.

In this issue of LANDSCOPE, *Deborah Micallef, Jane Scott and Neil Taylor take you on a journey of discovery along the Cape to Cape Track through the Leeuwin-Naturaliste National Park in WA's south-west. They tell you how the track came about and about the work done by local schoolchildren and other of volunteer groups from this popular wine-growing region. They also describe the natural attractions you'll find as you walk the track from Cape Naturaliste to Cape Leeuwin.*

Farther north, in the Pilbara region, is Karijini National Park. This area of mountains and deep gorges has attracted visitors for decades. In the photo essay 'Karijini in a Different Light', Cliff Winfield revisits the park after a break of 16 years. Much of what attracted him on his first visit remains, but travelling this time with a young family, he sees new features and new attractions.

One of those attractions is the newly opened Karijini Visitor Centre. In 'Karijini Calling', Pilbara region information officer Judymae Napier opens the doors of this remarkable and fascinating focal point for cultural and natural heritage. From the moment you pass the unusually curved exterior wall and enter the building, you will be whisked into a world of Aboriginal and pastoral history, your senses stimulated by the sights and sounds of the Pilbara.

Staying with the Pilbara, but moving far inland, we read about the first LANDSCOPE *Expedition to the Carnarvon Range, on the edge of the Little Sandy Desert. Here, expedition members immersed themselves in the wilderness and vastness of this ancient world and found fulfilment, renewal and the unexpected.*

Back to the far west coast and beyond the well known tourist destination of Shark Bay, we find ourselves at Dirk Hartog Island. WA's largest island has a fascinating history and valuable biodiversity. It was visited by early Dutch explorers in the 17th century and was, for a while, an important guano mining area. But the island is also an important breeding ground for turtles and seabirds and is now being considered for protection as a national park.

There is so much to see in this wonderful State of ours, and so little time in which to see it. But with each issue of LANDSCOPE, *we try to bring you closer to some of the natural attractions that make Western Australia a great place to visit as well as a great place in which to live.*

See you next time.

Ron Kawalilak

Ron Kawalilak

Executive Editor

NATIVE ANIMALS ON THE MOVE

The steady decline of fox populations continues to open up more opportunities for the reintroduction of native animal species into their natural habitats. The decline has been achieved by highly effective predator-control measures carried out by the Department of Conservation and Land Management as part of its Western Shield program.

Among the more recent reintroductions of native animals are about 25 woylies, which were translocated to New South Wales, and about 40 dibblers released into the proposed nature reserve at Peniup, east of Albany.

Woylies have been extinct in New South Wales for more than a century, and wildlife authorities in that State are keen to follow WA's lead in the recovery of its native wildlife. They have sought advice and technical expertise as well as help in procuring woylies from the department.

Western Shield zoologist Peter Orell, who is with the department's Wildlife Conservation Section, said the 25 WA woylies were from the Dryandra Woodland, near Narrogin.

Following an earlier release of 50 animals from South Australia, where woylies from WA have also been successfully reintroduced, the 25 woylies were flown to NSW for reintroduction into Yathong Nature Reserve, where more than 100,000 hectares have been baited to control foxes.

"Another 50 from WA may be translocated to Yathong in autumn 2002 if all goes well with the first releases," Peter said.

The aim of the dibbler release near Albany is to establish a second WA mainland population—the other mainland population being at Fitzgerald River National Park on the State's south coast.

Principal Research Scientist Tony Friend said 30 of the 40 dibblers were fitted with radio collars before their release on to the Peniup Nature Reserve, which is regularly baited for foxes by the department's Albany District staff.

"We will be able to follow closely the progress of the collared dibblers for the ten-week life of the transmitters. After that, we'll use trapping to monitor them," Tony said.

Trapping is carried out twice-yearly on Peniup, with the assistance of volunteers from the Malleefowl Preservation Group based at Ongerup.

Woylie. Photo – Babs & Bert Wells/Conservation and Land Management

DATABASING SOUTH-WEST INSECTS

Department of Conservation and Land Management Senior Technical Officer Tom Burbidge inspects a selection of WA insects in the large collection that is being recorded on the department's electronic database.

Photo – Don Palmer, courtesy of The West Australian Newspapers Ltd

More than 15,000 insect specimens found in Western Australia's south-west forests are being databased for the first time. It will make this large resource of insect fauna accessible, not only to the scientific community, but also to the general public. The community will be able to access key information about the biodiversity of insect fauna in WA's jarrah, karri, wandoo and tingle forests, that will serve to stimulate and facilitate further studies of insects and the role they play in our forest ecosystems.

Well-known forest entomologist Stephen Curry began the department's forest insect collection in 1965, while he was working with the Department of Agriculture. The collection is now managed by Department of Conservation and Land Management Senior Technical Officer Tom Burbidge, and is housed in special controlled temperature rooms at Kensington.

Tom said the collection contained a wide range of insects found in WA forests, such as spring beetles, parasitic wasps, various butterflies and moths, and timber borers.

"The majority of insects are stored as pinned specimens or in containers of preservative spirit," he said.

"There are also some wood specimens in the collection to show the damage that some insects do to forests. Eventually, these will also be databased as part of the main forest insects collection."

The database is made possible by a $30,000 grant from the Gordon Reid Foundation for Conservation, which is administered by the WA Lotteries Commission. The grant was awarded to the WA Insect Study Society to assist the department in the compilation of a database of its extensive insect collection, and to fund the employment of part-time worker, Meriel Falconer, to database the entire collection. (Meriel is also a dedicated part-time volunteer at the department's WA Herbarium.)

2001
International Year of Volunteers

CARING FOR COCKATOOS

There are three species of large black cockatoo in south-western Australia—Baudin's black-cockatoo, Carnaby's black-cockatoo (both with white tails) and the forest red-tailed black-cockatoo. All are endemic to the region and are found throughout large areas of public land, including State forest, national parks and the Water Authority's drinking water catchments.

Carnaby's black-cockatoo occurs mainly in woodlands and scrubs of the Wheatbelt, but can also occur in the forest. The other two species are confined to the south-western forest block.

Numbers of all three species have declined greatly since European colonisation, due mainly to the clearing of forests and woodlands, shooting by orchardists, loss of hollows and competition for existing breeding hollows, especially from feral bees.

The red-tailed species is classified as near threatened, while the two white-tailed species are declared threatened. According to John Blyth—Acting Manager of the Department of Conservation and Land Management's WA Threatened Species and Communities Unit—all are in need of special care.

"Because all three range over such a large area, it really needs a cooperative approach to look after these birds," he said.

The department convenes a recovery team for Carnaby's black-cockatoo that includes its own specialists and those from the Western Australian Museum and Birds Australia, as well as interested members of the farming community.

As part of the recovery effort, Birds Australia has recently received funding from the Natural Heritage Trust for part of the recovery plan and Leonie McMahon has been appointed as project officer. Leonie believes that community awareness and participation in the identification and conservation of breeding sites is vital.

"We couldn't conserve this species successfully without the support we're getting from people throughout the Wheatbelt," she said.

A major gap in knowledge required for management of Baudin's black-cockatoo relates to the identification of breeding sites. The department has provided funding to the WA Museum to assist with this process, and the Museum's Ron Johnstone said finding nests of this bird was extremely difficult.

"This is partly because they tend to nest in very tall trees, but progress is being made and we're building up a picture of their nesting requirements," he said.

The Water Corporation has joined forces with the Museum to assist the three cockatoo species in their fight for survival. The Cockatoo Care project aims to collect essential research data, install nesting boxes and control feral bees from the forest areas.

Ron Johnstone points out that 20 per cent of the Baudin's and the red-tail's nests monitored over the last five years had been lost to feral bees.

"For birds that use traditional nest sites, this must be having a major impact," he said.

People who would like to become involved in the Water Corporation project, hear and see video footage of these species, download information, enter competitions or find out more about the project, should log on to www.cockatoocare.com.

Those who would like to help Leonie with recovery of Carnaby's black-cockatoo can contact her through the Birds Australia office on (08) 9383 7749, or by e-mail to ljmcmahon@yahoo.com.

Above left: Red-tailed black-cockatoo.

Above: Carnaby's black-cockatoo.

Photos – Babs & Bert Wells/Conservation and Land Management

RARE BIRDS SURVIVE NUYTS FIRE

At least seven rare western bristlebirds have survived a fire in the Nuyts Wilderness, in Walpole-Nornalup National Park on Western Australia's south coast.
A lightning strike at the beginning of autumn 2001 started a severe wildfire that raged for five days and burnt about 2,700 hectares of the wilderness area under dry conditions. The wildfire also killed numerous quokkas, bandicoots and western ringtail possums.

Department of Conservation and Land Management scientists had been concerned that 15 western bristlebirds, translocated to the area in 1999 and 2000, had been lost in the fire. The translocation had been carried out as part of the recovery efforts for this threatened species.

Allan Burbidge, a senior research scientist with the department's Science Division, visited the area last spring with other departmental staff and volunteers, and recorded calls from seven of the birds. Most of the birds were in a strategic buffer zone the department had prescribe-burnt in 1998. The buffer had helped contain the fire along its western flank on the Thompsons Cove walk track.

Allan said the birds were four kilometres from the site near Mt Hopkins where they had been initially released. The fire had a severe impact on Mt Hopkins.

"Western bristlebirds aren't strong fliers," he said.

"They can fly in short bursts from bush to bush, but generally they spend most of their time in low bushes or on the ground.

"The birds were translocated to the Mt Hopkins area because it contained heathland vegetation that hadn't been burned for a long time, possibly 40 years or more.

"The fact we detected them in an area burned just three years earlier indicates that they can survive in younger vegetation types."

Allan said the birds' calls had been taped and would be compared with the tapes of calls recorded when the birds were first released.

"We're trying to see if we can identify specific birds and the timing of their release.

"There's a possibility that some of the surviving birds may be progeny of those released earlier. If this is so, it's great news for the recovery of the species."

The western bristlebird is found only in WA.

Photo – Simon Neville

EVERYONE WINS EXCEPT FERAL CATS

Feral cats such as this will need more than their usual cunning to avoid capture.

Photo – Ray Smith

Conservation has joined forces with an organisation employing people with disabilities to manufacture a device that helps to trap feral cats. The device makes 'miaow' sounds and, when used in conjunction with a pungent bait, is irresistible to the feral cats.

Westcare Industries, which manufactures and sells the devices to the department and other outlets around the world, provides employment for more than 175 people, including 120 with disabilities, in the printing, packaging, embroidery, safety clothing and electronics industries. Manufacturing the devices will help the 16 people with disabilities in Westcare Industries' newly acquired electronics division to continue with their valuable work.

The cat-trapping technique was invented by Department of Conservation and Land Management Research Scientist Dave Algar and his research team, and is being used as part of the department's Western Shield program, which includes an extensive state-wide feral cat control research program.

Dave said that the success of the joint venture with Westcare Industries was important to the department's nature conservation programs.

"Western Shield relies heavily on our ability to control fox and cat numbers before we can reintroduce native species," he said.

Westcare Industries' Chief Executive Richard Elsey said the devices would be manufactured at the organisation's factory in Bassendean.

"We'll be making a significant effort to promote it and increase sales because it will generate regular income," he said.

"It's also gratifying to know that our workers are gaining satisfaction from knowing they're doing something useful and beneficial to the community."

KEEP WATCH FOR FOREIGN FIRE ANTS

Above: Red imported fire ants are distinguished by the large mounds they build.

Photo – 'Bart' Drees Texas A&M University

Left: Close-up of the red ants.

Photo – Scott Bauer United States Department of Agriculture

Western Australian metropolitan and rural residents are urged to keep an eye open for any unusual, small, red ants. Red imported fire ants (*Solenopsis invicta*) are a South American species and were found in Brisbane early in 2001. They have the potential to seriously threaten agriculture, the environment and people.

While, to date, there have been no reports of the pest in WA, authorities are concerned that the red imported fire ant, which is rapidly establishing itself in Queensland, could spread into other States.

The Department of Conservation and Land Management is working with Agriculture WA (AGWEST) and the Health Department of WA to collate information about the threat of this pest being introduced into this State.

Department of Conservation and Land Management Senior Technical Officer Tom Burbidge said the threat shouldn't be underestimated.

"Many people believe it's not so much a matter of if this pest reaches WA, but when—it's only a matter of time," Tom said.

"Red imported fire ants compete with native species of insects, reptiles, birds and mammals for food, displacing them from their natural habitat. Taking into consideration our already threatened animal species, there's no time to lose."

AGWEST entomologist Peter Davis said there was always a risk that the red imported fire ant could have 'hitched a lift' on a transport vehicle or among cargo, especially earth-moving equipment, travelling from Queensland to WA.

"However, WA has an extensive database of ants that have been reported as part of the surveillance for Argentine ants, so we have a high degree of confidence that red imported fire ants haven't established themselves here. But we need to undertake this public survey to increase our certainty," he said.

The red imported fire ant looks very similar to many other common ants, is 2–6 millimetres long and red to brown in colour. It is distinguished by large ant mounds, which are commonly 30–40 centimetres high, but can be up to 60 centimetres high and one metre wide. Another unique feature of the ant is its stings, which form painful pustules (pimples) in people within 24 hours.

Peter said that red imported fire ants needed water to survive. Perth and the south-west of WA could provide suitable habitats in summer, especially in reticulated gardens and parks, along waterways, wetlands, freshwater lakes, ponds and streams.

"They can also deter livestock from feeding grounds, while their mounds can interfere with machinery in crop paddocks and orchards," he said.

"Early detection is the key to preventing this pest from becoming established and requiring an expensive baiting campaign, such as that now under way in Queensland."

The public can assist greatly in the survey by submitting unfamiliar specimens for identification. As there are more than 2,000 native species of ants in Australia, it is only by examination of specimens that the existence of red imported fire ants can be detected.

Specimens can be easily submitted by sticking about a dozen suspect ants to clear sticky tape and sticking that to a piece of paper with the collector's contact details. All can be posted to: Red Imported Fire Ant Surveillance, Agriculture Western Australia, Locked Bag No. 4, Bentley Delivery Centre, WA, 6983.

DRAFT PLAN FOR INTERNATIONALLY RECOGNISED PARK

Beeliar Regional Park, in Perth's southern suburbs, contains 18 internationally significant lakes and wetlands. It is on the Interim List of the Register of the National Estate, and one of its lakes, Thomsons Lake, is listed as a wetland of international importance under the Ramsar Convention. These make the park's recently launched draft management plan of vital importance in terms of its conservation for present and future generations.

It outlines recommended management practices that ensure recreational and tourism needs do not have an adverse effect on ecosystems.

The plan was jointly drafted by the Regional Parks Unit of the Department of Conservation and Land Management, a team of environmental consultants and three local government authorities—the City of Melville, the City of Cockburn and the Town of Kwinana.

The department's Regional Parks Manager, Tim Bowra, said a major priority was community involvement.

"It's vital," he said, "to make sure that the community has access to recreational facilities, but at the same time understands the need for conservation."

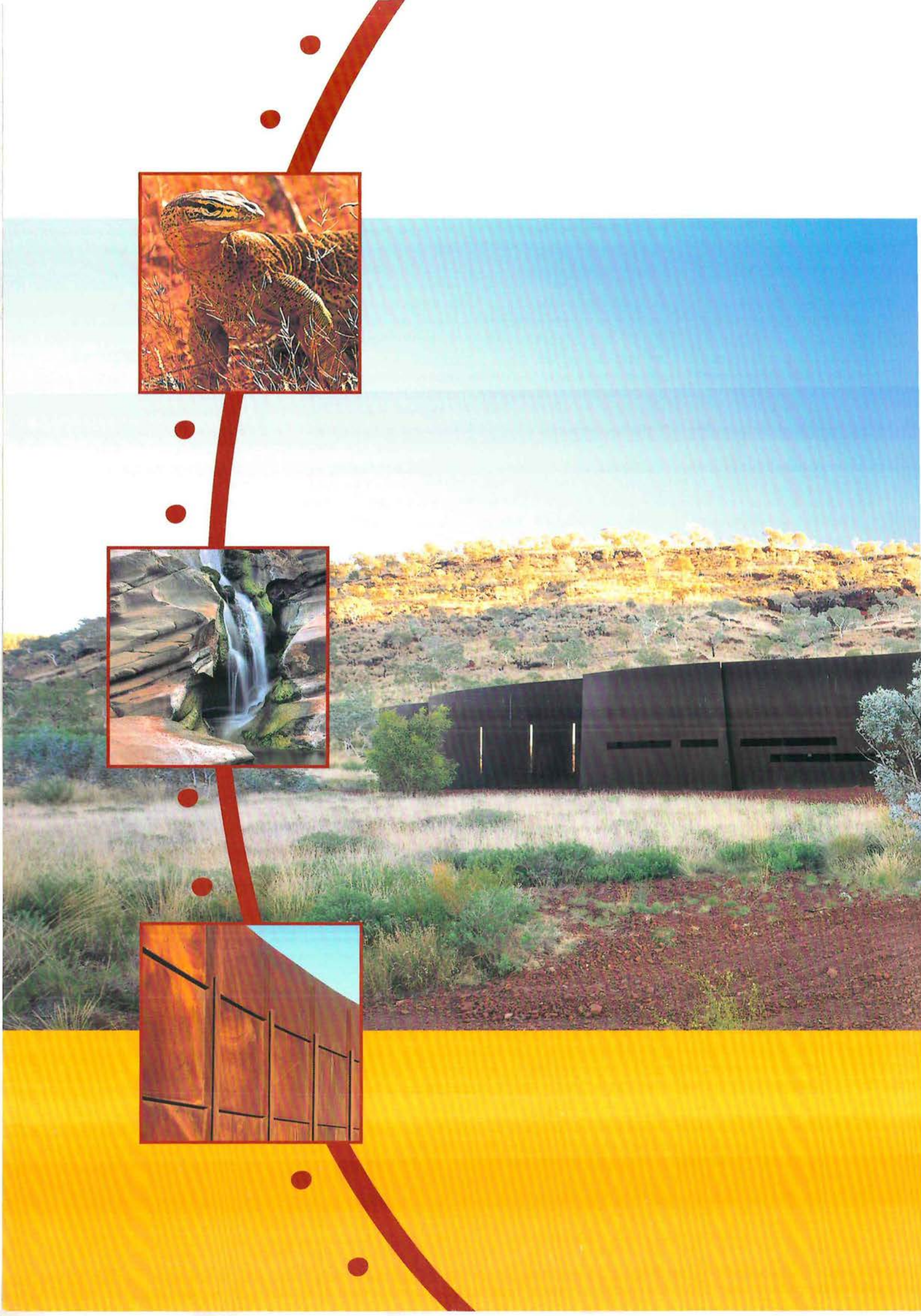
Beeliar Regional Park is a significant historical site to Aboriginal people as it was a key food gathering site, water source and camp site. So it was fitting that an Aboriginal Heritage Walk Trail at the Spectacles wetland in the park was also opened at the launch of the draft management plan.

The new five-kilometre trail—partly funded by Alcoa of Australia—starts at the Spectacles Lakes on Anketell Road, Kwinana, taking walkers on a tour of the park's Aboriginal sites.

The opening of the trail and release of the Beeliar Regional Park draft management plan coincided with the launch of a new sign system for regional parks.

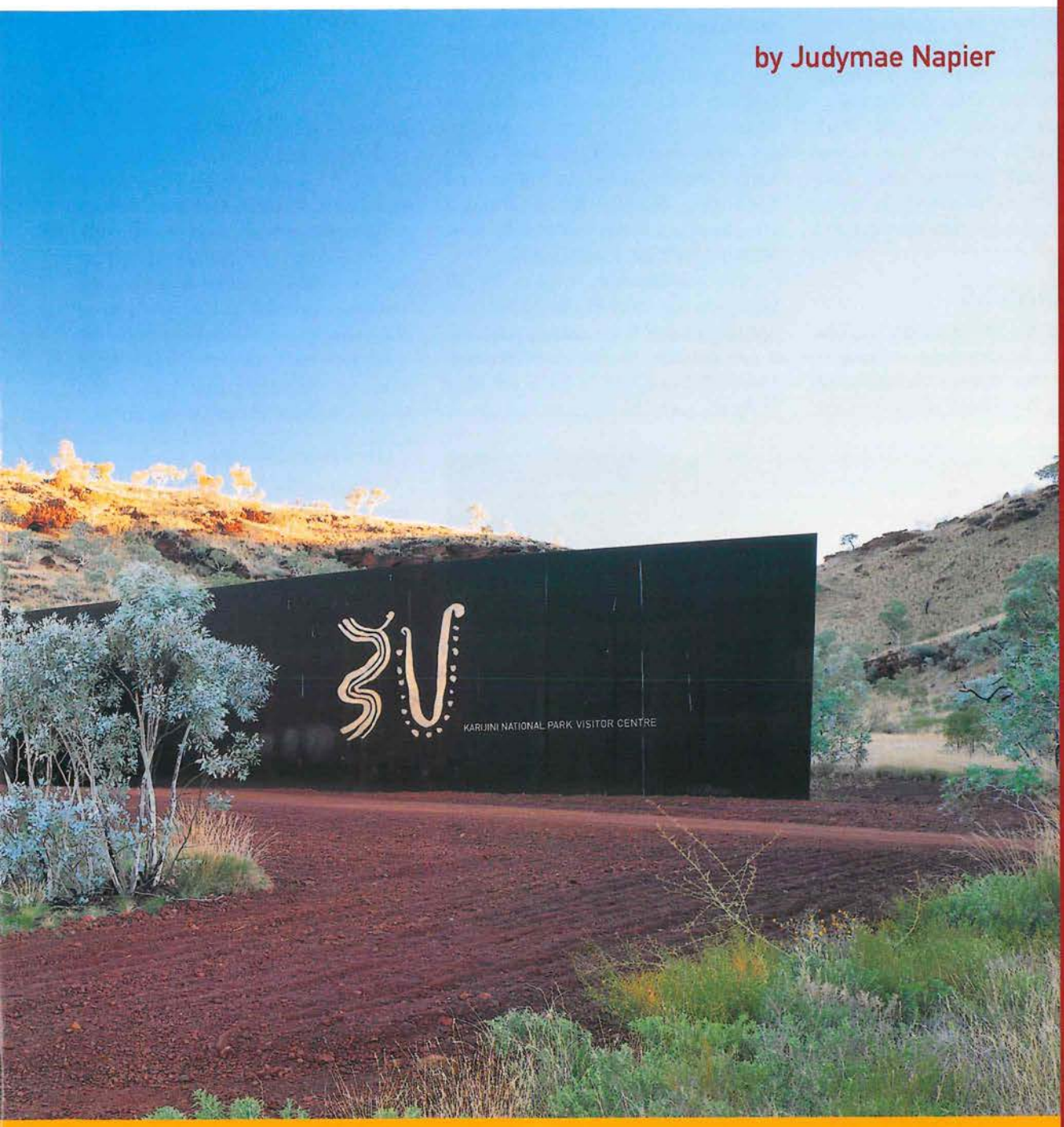
The artwork and sign designs for the Aboriginal Heritage Trail were developed by Artice, an Aboriginal art company, and the project was jointly managed and funded by the department and Alcoa of Australia.

Senior traditional custodian, Joe Walley, provided the stories that are portrayed on the signs marking the trail, and told of the spiritual meaning of the Spectacles' natural features, the traditional ways of life of Aboriginal people, and the bush foods of the area and how they were used.



Karijini calling

by Judymae Napier



A new, inspiring visitor centre at Karijini National Park is helping to meet visitor demands in one of the State's most remote and spectacular national parks.

Karijini National Park, in the heart of the Pilbara region, is a significant international nature-based and cultural tourism destination. In a landscape as old as time, it offers dramatic scenery, natural beauty and adventures galore. Walk trails and lookouts provide fantastic opportunities to see and be part of this unique area.

The new Karijini National Park Visitor Centre is another jewel in the crown of a truly majestic place. Like the gorges, it too has secrets to reveal for those prepared to take the time and the journey.

THE BEGINNING

Through the efforts of the Karijini Economic Development Group—comprising the Pilbara Development Commission, Department of Conservation and Land Management, Karijini Aboriginal Corporation, Aboriginal Economic Development Office and the Shire of Ashburton—a temporary visitor centre (housed in a large marquee) was established in the park in 1994. The initial proposal from the Karijini Aboriginal Corporation was to sell artefacts from a caravan. The marquee was an idea that arose from a concept by the Department of Conservation and Land Management's Recreation and Landscape branch for a 'canvas' structure for a visitor centre at Kalbarri National Park some years before.

The marquee was in place for six years and was open to the public from April to October. It was destroyed once in a cyclone, but, overall, came through remarkably well, with a bit of patching along the way. The marquee was in two sections. It included a public area consisting of displays, a one-bookcase library, a two-chair video viewing area and a shop. A smaller section at the back of the marquee was a combined kitchen, meeting room and storage area. Staff used the public pit toilets adjacent to the carpark and lived in caravans behind the marquee, hidden from view by vegetation and shade cloth screens. More than 40 Aboriginal staff trained and worked in the temporary visitor centre.

THE TRANSITION

Planning for the establishment of a permanent centre began in 1995. The first application for Commonwealth funds was rejected. The second included the production of a homemade video featuring Karijini Aboriginal Corporation Chairperson Slim Parker and wildlife identity Harry Butler (then Chair of the PDC). The Karijini Economic Development Group took the video to Canberra for its screen debut and funding was approved. The proposal was supported by the Western Australian Government as one of the highest priorities for tourism development in the Pilbara region.

The permanent visitor centre was a joint initiative of the Pilbara Development Commission, the Department of Conservation and Land

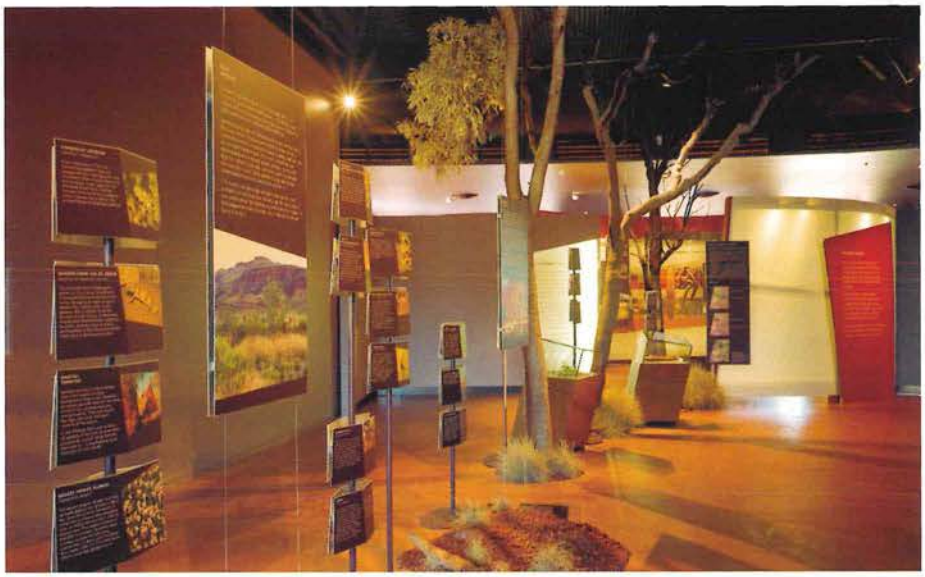
Previous page
Main: Karijini Visitor Centre.
Photo – John Gollings
Insets from top: The goanna, *Varanus panoptes rubidu.*
Photo – Jiri Lochman
Hamersley Gorge.
Photo – Chris Garnett
Part of the exterior wall of the visitor centre.
Photo – John Gollings

Above left: Termite mound in Karijini National Park.
Photo – Chris Garnett

Left: The interior of the marquee that served as a temporary visitor centre.
Photo – Judy Daily

Above: The goanna, *Varanus panoptes rubidus*, for which the Banyjima name is kurrumanthu, inspired the shape of the visitor centre.
Photo – Jiri Lochman

Right: Aerial view of the Karijini Visitor Centre.



Bottom right: Labels and panels interpret the wildflowers and wildlife of the park.
Photo – John Gollings

Management and the Karijini Aboriginal Corporation. The ongoing project was a major focus of the Karijini Park Council, which consists of representatives from the three Aboriginal language groups whose homelands include the park: the Banyjima, Yinhawanga and Kurrama people. The council provides a valuable forum for discussing park issues and developing policies in relation to Aboriginal interests in the park. Over the next five years, every aspect of the visitor centre, from its design down to the wording of text on labels, would be discussed and sometimes debated, until a consensus was reached.

Woodhead International BDH were the architects and project managers. WA Company, Wylie and Skene Pty Ltd constructed the centre, and the interpretive displays were designed and developed by David Lancashire Design, a Melbourne-based company.

The design of the building represents a goanna moving through the country and is described in a statement from the Martitidja Banyjima people, thus:

> "The concept behind the design is to represent the movement of the people from the past and into the future. The tail symbolises a history that needs to be understood, acknowledged and left behind as we move forward. The head symbolises the future direction of the traditional owners in the management of environmental, conservational and commercial developments in Karijini National Park. Aboriginal law and culture is represented in the guts (or stomach), which symbolises the spiritual life given by the creator. This is expressed through the importance of the relationship between the people and the land."

The objectives of the visitor centre are to interpret the natural and cultural history of the area to enhance visitors' experiences, and to provide up-to-date information and cautionary advice so they can make informed choices about exploring the park. It provides an opportunity for visitors to meet and speak with local Aboriginal people and learn about their association with the land. The centre provides employment opportunities for Aboriginal people and is a venue from which other Aboriginal tourism ideas can be explored and developed.

The high, weathered steel walls of the visitor centre mimic the sheer-sided gorges that are a feature of the park. Like the gorge walls, they feel the force of the Pilbara's summer sun, which proved to be quite an issue when initial discussions on building materials took place. However, forethought and originality won the day, and the use of steel as the material has resulted in the centre blending so well with its surrounds that it is not obvious until you actually arrive in the carpark.

But the building also had to be designed for the fire-prone environment in which it stands. It is remote from the park headquarters and ranger's residence, and had to be able to withstand the fires that are a regular feature of the area—often associated with lightning strikes, particularly during the summer months. The construction materials, the lack of openings and minimal places to trap debris all help to reduce the threat of fire entering or damaging the building. Hose reels permit hoses to cover all external parts of the building and there is also the

provision for foam to be used with the hose reels. The forethought given to the fire environment is rare, if not unique, in the design of these types of facilities.

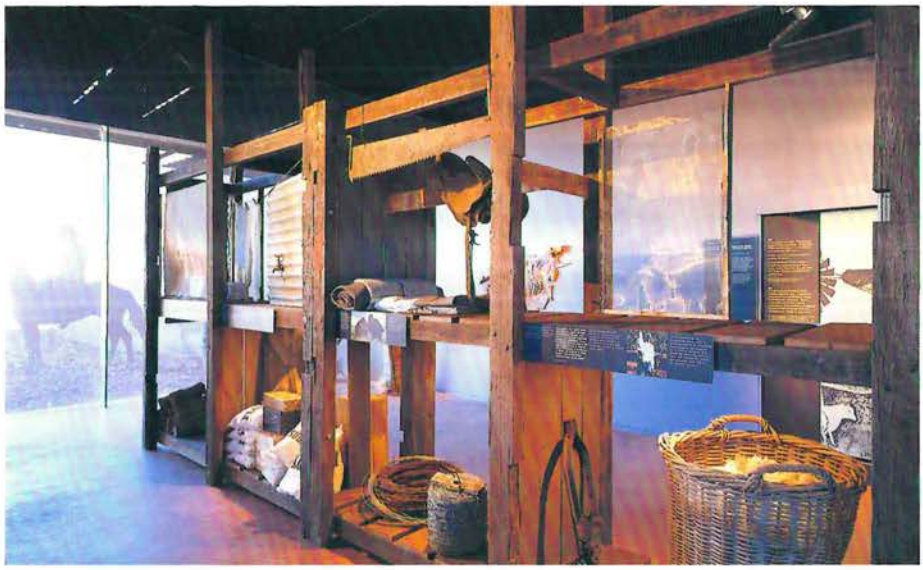
THE THEME

The theme interpreted throughout the centre is 'Country'. A range of static and interactive displays take you on a journey of places and people, past and present, through stories of geology, plants, animals and Aboriginal people and their culture. In order to achieve this flow of information, the design team spent a great deal of time becoming familiar with the park attractions and consulting extensively with key Aboriginal people. This would often mean travelling hundreds of kilometres on each trip, as Karijini people are now spread throughout the Pilbara. It was often difficult to gather together a representative group of Aboriginal stakeholders, not only because of their scattered locations, but also because of the advanced age and health of several key elders. One of the most effective ways of explaining new ideas and concepts was to use a scale model of the visitor centre. The model made the trip from Melbourne to Karijini at least three times as part of this process, each time gathering a little more Pilbara red dirt for authenticity.

Inside the centre, a wall of running water enhances the gorge experience, made all the more real by the chirping of the desert tree frog, the trailing roots of a clinging fig tree and tiny bats nestled in crevices. Glass display cases protect Aboriginal artefacts, on temporary loan, that have been handed down by generations of Aboriginal people for whom Karijini was home. Audio and video displays are used to capture the essence of Aboriginal songs and stories. These are at the core of Aboriginal culture and are used to teach young people about the land. They are a means of 'talking' with the country, looking after it and keeping it healthy.

Visitors to the park will also be able to view models of some of the park's more elusive wildlife. Hot summer temperatures send many animals into hiding, only emerging at sundown to search for food. In the centre, you can get up close and personal with a replica of a Pilbara olive python that has already sent a few hearts racing. You'll also discover the secret to the stone mounds, reminiscent of tiny volcanoes, often found along the slopes of the Hamersley Range.

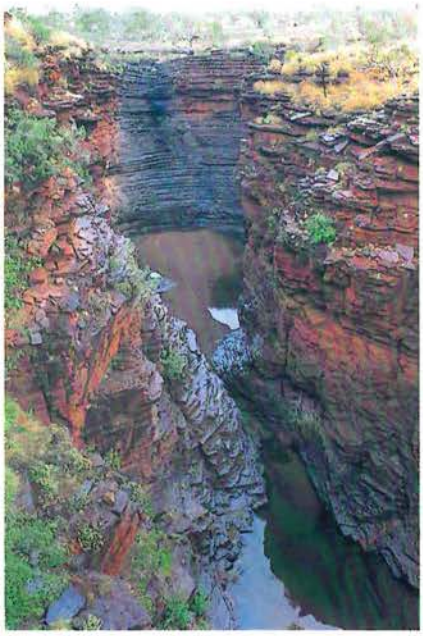
Pilbara summers no longer frighten visitors away, and those that choose to visit the park at this time of year can still come in and enjoy the displays. It may be warm, but 10 degrees cooler than outside will always be a welcome relief. A shaded outdoor seating area provides a great



Left: A diorama depicting the early pastoral days of the area.

Below left: The story of the formation of the park's unique geology.
Photos – John Gollings

Below: Joffre Falls.
Photo – Dennis Sarson/Lochman Transparencies



opportunity to relax and absorb the Karijini landscape. From here, the only choices you need to make are what campground to use, which gorge to explore first, and when to climb Bunnurhuna (Mt Bruce). A bitumen road links the visitor centre with the Great Northern Highway to the west and the town of Tom Price to the east. The visitor centre is now accessible all year round, with the exception of the downpours associated with tropical cyclones, when even the highways can be closed.

THE FOYER

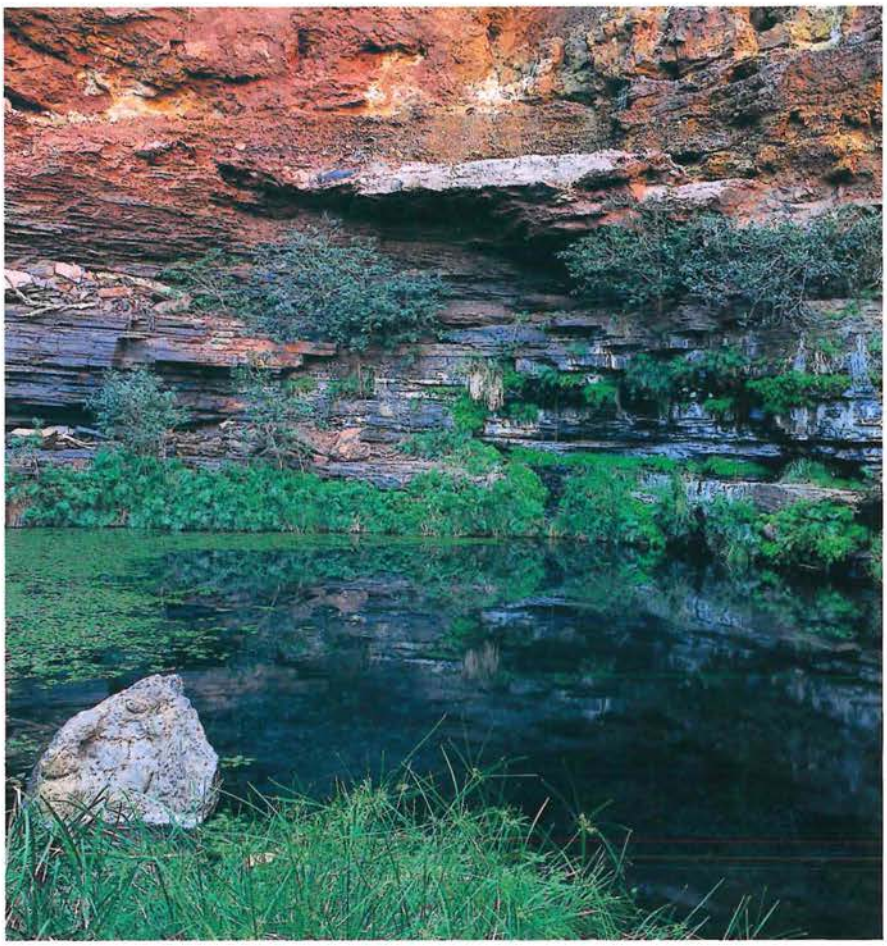
A park visitor centre is like the foyer of a theatre—it provides a sense of anticipation of what is to come.

The Karijini Visitor Centre was officially opened on 22 June 2001 by the Premier, Dr Geoff Gallop, and Banyjima Aboriginal elder Mr Wobby Parker. More than 350 guests attended the opening, travelling from around the Pilbara and from Perth. Maitland Parker, a local Banyjima man and Ranger-in-Charge of Karijini National Park, hosted the ceremony. It included a welcome to the country by Banyjima Aboriginal people, a display of traditional dancing and speeches from Aboriginal elders.

The centre has been the recipient of three Australian Institute of Architecture awards to date. It won the BHP Colorbond Steel Award for most innovative use of steel products in Western Australia and then won the national award for the same at a presentation night in Adelaide in early November 2001. It also received a commendation in the Sir Zelman Cowan Award for Public Buildings, the winner being the Victorian Museum.

While the visitor centre has been the focus of efforts for some time, behind the scenes, other park facilities have been added or improved. Shade sails are in place at popular picnic areas, while weathered steel lookouts complement the environment and provide safe opportunities to view the world-famous gorges. A new day-use facility has been established at Dales Gorge, 14 kilometres west of the visitor centre. It caters for both large coach groups and small family outings.

When reflecting on the establishment of the visitor centre, determination is a word that springs to mind. The determination to not just meet visitor demands, but to challenge their expectations of what can be achieved in the State's second largest national park, remote from any major service centre; and the determination of a group of Aboriginal people wanting to keep their culture alive and share it with other Australians and visitors from around the world.



Circular Pool, Dales Gorge.
Photo – Bill Bachman

THE MAIN ATTRACTION

After passing through the visitor centre and experiencing views of Karijini, framed by the glass-walled galleries of the building, you are reminded that the park is the main attraction here. From the glass galleries you see views of the park out to the sides, both east and west. Mt Windell is viewed from the verandah at the front of the building, looking south through slots cut in the steel wall.

Karijini National Park is a place to explore and absorb; a place where thousands of visitors have the opportunity to sample the magnificent natural surrounds whether physically able or not, without destroying those surrounds or the experience of others. It is a place that is not over-developed; where not all areas are made 'safe for all', a place where there is room to get away from people and enjoy the natural peace and quiet. There is room for people to challenge themselves, but the challenge is to conquer themselves, not to conquer or destroy the environment. It is a place where effort is rewarded with the experience, a place that is protected for our grandchildren's grandchildren to appreciate the same wonders of rocks and landscape, plants and animals, peace and solitude.

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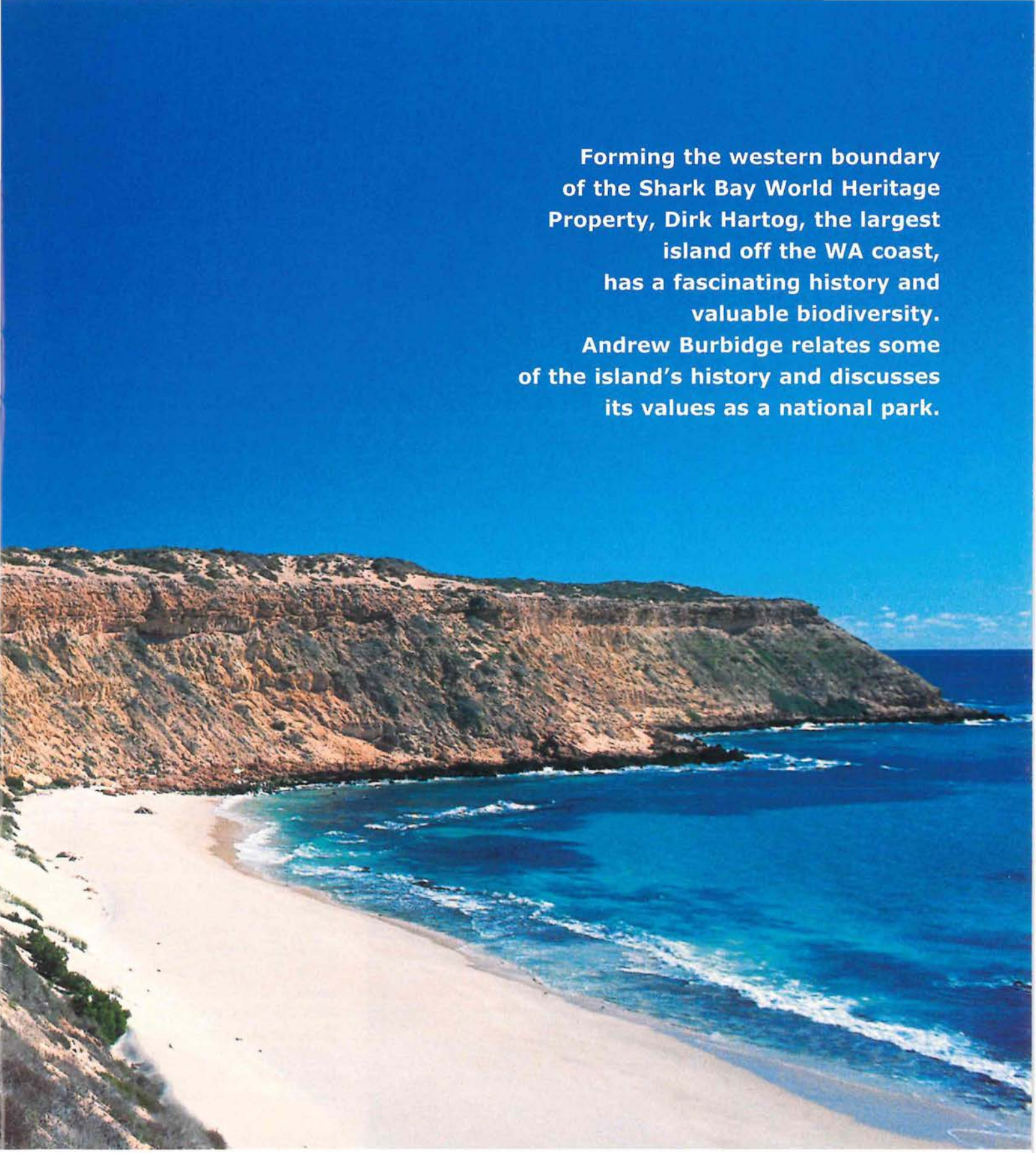
The author wishes to thank Chris Muller, the Department of Conservation and Land Management's Pilbara Regional Manager, for his valuable contributions to this article.

Forming the western boundary of the Shark Bay World Heritage Property, Dirk Hartog, the largest island off the WA coast, has a fascinating history and valuable biodiversity. Andrew Burbidge relates some of the island's history and discusses its values as a national park.



by Andrew Burbidge

Our largest island

Occupying about 60,000 hectares, Dirk Hartog Island is the largest island in Western Australia as well as the westernmost point of Australia. Forming the western boundary of Shark Bay, it is situated in an arid but remarkably biodiverse area. Dirk Hartog has a long European history dating back to the earliest days of the exploration of Australia, and is part of the Shark Bay World Heritage Property. Although there has been a sheep station on the island for nearly 150 years, the intention is to convert the pastoral lease into a national park in the near future.

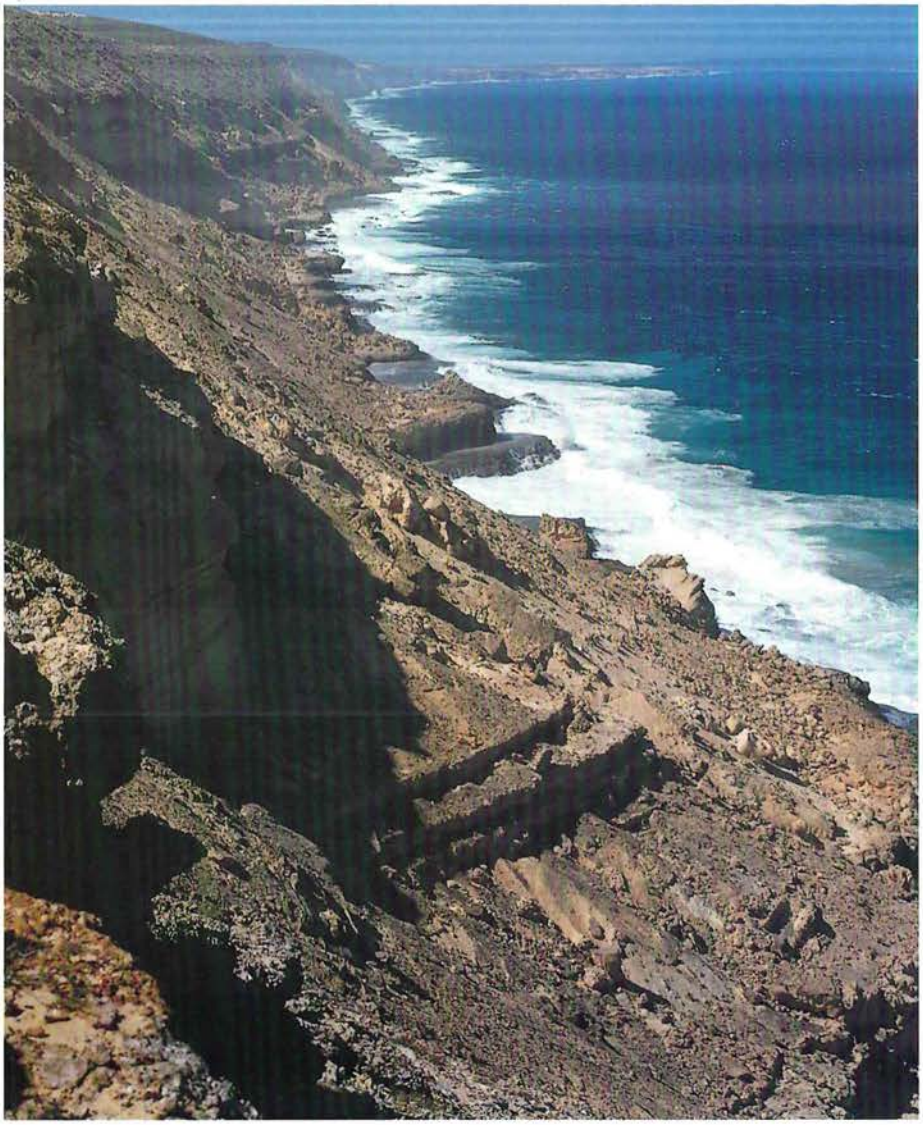
Prior to about 6,000–7,000 years ago, when sea levels were lower, Dirk Hartog Island would have been part of the mainland and would, undoubtedly, have been visited by Aboriginal Australians. However, by the time that European explorers arrived, it was uninhabited—the lack of fresh water was probably the main reason.

EUROPEAN EXPLORATION

The island is probably best known as the site of the first proven European landing in Australia—by Dirck Hatichs (Dirk Hartog), the master of the Dutch ship *Eendrach*, on 25 October 1616. The landing was at the northern tip of the island—later named Cape Inscription, because the crew left a pewter plate, bearing a record of their visit, nailed to a post. Eighty-one years later, in 1697, Cape Inscription was again visited by a Dutch East India Company ship, this time the *Geelvinck* commanded by Willem de Vlamingh. He discovered Dirk Hartog's plate, and took it back to Holland, replacing it with one of his own on a new post.

Englishman William Dampier, in the *Roebuck*, was the next visitor to Dirk Hartog Island, staying between 16 and 21 August 1699. In his *Voyage to New Holland*, Dampier wrote of the island's vegetation: 'The grass grows in great Tufts, as big as a bushel, here and there a Tuft: being intermix'd with much Heath, much of the kind we have growing on our Commons in England'. He collected the earliest known plant specimens from anywhere in Australia; these are now in the Fielding-Druce Herbarium at Oxford University in England. Most of the 24 specimens collected by Dampier that remain from this voyage were from Dirk Hartog Island. Dampier did not see Hartog's and Vlamingh's posts, as he landed about five kilometres south-east of Cape Inscription, at a place now known as Dampier's Landing.

On 30 March 1772, the Frenchman Louis-François-Marie Aleno de Saint-Aloüarn, in the ship *Gros Ventre*, anchored in Turtle Bay. On 30 March, Ensign Mingault landed and took possession of the land in the name of the King of France, burying a bottle containing a parchment recording the event, and burying two French coins nearby. In January 1998, an expedition led by Philippe Godard of Noumea, assisted by Max Cramer, Kim Cramer, John Eckersley, Tom Brady and Chris Shine from Geraldton, discovered a French *écu* bearing the head of King Louis XV and dated 1766 at a site on the cliff top overlooking Turtle Bay.



Previous page
Main: Turtle Bay.
Photo – Clay Bryce/Lochman Transparencies
Insets from left: Sandhill frog.
Photo – Jiri Lochman
Lantern flower (*Abutilon oxycarpum*).
Photo – Babs & Bert Wells
Mingkiri (sandy inland mouse).
Photo – Jiri Lochman

Left: On the west coast, cliffs form a striking barrier to the seas of the Indian Ocean.
Photo – Andrew Burbidge

Right: The historic posts at Cape Inscription have been replaced with modern replicas.
Photo – Andrew Burbidge

Below right: Vlamingh's plate can be viewed at the WA Maritime Museum in Fremantle.
Photo – Patrick Baker © Western Australian Maritime Museum

Below far right: The Tamala rose (*Diplolaena grandiflora*) occurs from near Geraldton to North West Cape.
Photo – Alex George

The silver coin, which was encased in a lead capsule, is believed to be associated with the Saint-Aloüarn expedition. A further search by the WA Maritime Museum located a bottle similar to that buried by Mingault, but if it had ever contained a parchment, insects had consumed it long ago!

The next European visitors were members of the French Baudin expedition, in the *Naturaliste* and *Géographe*, in 1801 and 1803. Many features in Shark Bay bear French names emanating from this expedition. A party from the *Naturaliste* found Vlamingh's plate lying on the ground and took it on board ship, where Commander Emmanuel Hamelin had it cleaned and nailed to a new post. Hamelin also had a plate erected to commemorate their own visit (said to have been to the north-east corner of the island). Cape Inscription was named at this time. In 1818, Louis de Freycinet, a member of Baudin's expedition, returned in *L'Uranie* and took Vlamingh's plate to France. It was later presented by the Government of France to the Western Australian Government in 1947 and can be seen in the Western Australian Maritime Museum in Fremantle. Hartog's plate is in the Rijksmuseum in Amsterdam.

Phillip Parker King, in HM Brig *Bathurst*, anchored under Cape Inscription on 20 January 1822 and, seeing the two posts on its summit, landed, but was disappointed to discover the plates were missing. Botanist Alan Cunningham, who accompanied King on his voyages, collected plants from the island. George Grey made a brief visit in March 1839, landing near Quoin Bluff and noting that the vegetation 'looks exactly like a Scottish heath'. In 1842, the French whaler *Perseverant* slipped its cable and ran ashore on the island near Cape Levillain. Five men died of scurvy and the remaining crew sailed away in four boats after camping on the island for ten weeks.

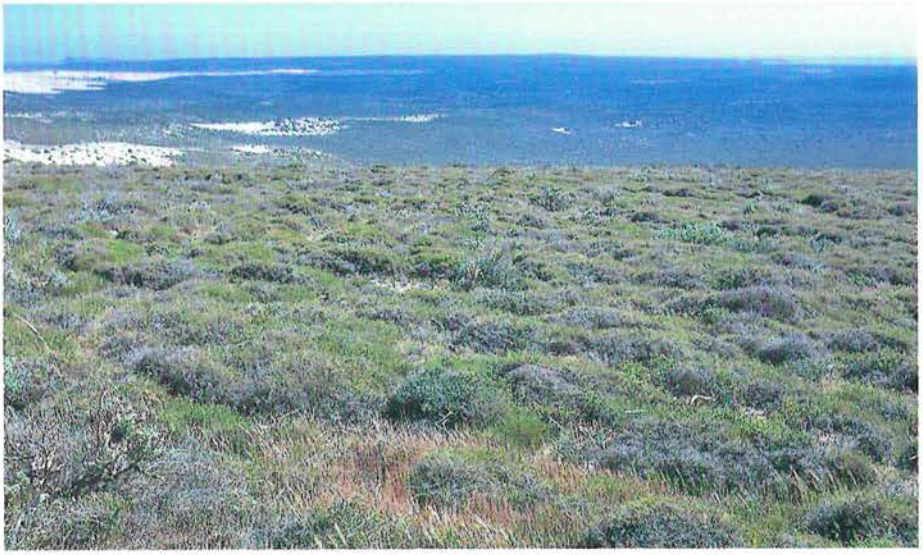
In March 1858, Captain H M Denham visited Shark Bay in HMS *Herald* and landed at Dirk Hartog Island. Among his crew was the botanist William Milne, of the Royal Botanical Garden Edinburgh, who collected several plants, including cone-spike angianthus (*Angianthus milnei*), a small yellow-flowered member of the Asteraceae family (the daisies). Denham named Turtle Bay after the loggerhead turtles (*Caretta caretta*) that nested there—the bay remains a very important nesting site for this threatened species. Denham, like many of his contemporaries, thought that the country would benefit from the addition of European animals and he liberated rabbits and pigeons on Dirk Hartog Island. Fortunately, neither survived.

Near Quoin Bluff, the *Herald*'s crew found dry pits, an iron tank, some bottles and old shoes; relics of an earlier visit, either a base camp set up by the Austin exploring expedition in 1854 or the remains of an 1850 military camp (see page 22).

By the early 1860s, the first 'squatter' had arrived on Dirk Hartog. F L von Bibra set up a camp in that year, but as he was a major player in the guano trade, he may have been more interested in the guano deposits rather than running sheep. Sheep were introduced by the late 1860s or early 1870s, and the island has been a sheep station ever since. It was known for some time as 'Brown's Station' after one of the early station owners. A pastoral lease was granted in 1899.

PLANTS

Several vegetation types are present. The most widespread is tall open heath, usually dominated by umbrella bush (*Acacia ligulata*), but four species of mallees also occur. Low open heath with hummock grass is also widespread; the hummock grasses or spinifexes (*Triodia plurinervata* and *T. danthonioides*) are both common.



Low heath with spinifex is the vegetation that reminded Dampier and Grey of English or Scottish heath. The grass that 'grows in great Tufts', described by Dampier, was doubtless spinifex.

A 1972 survey and other work has revealed 237 species of indigenous plants growing on the island. Shark Bay lies at the boundary of the South-West and Eremaean Botanical Provinces and Dirk Hartog has slightly more plant species from the former. However, the flora is clearly transitional. Some 34 species of weeds have been recorded; several, such as buffel grass (*Cenchrus ciliaris*), were doubtless introduced in an attempt to improve feed for the sheep.

MAMMALS

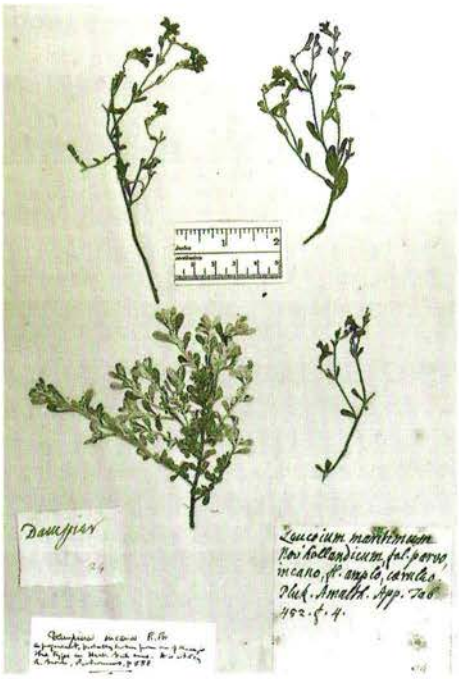
The island once had a rich and abundant mammal fauna. Today, in spite of its large size, only five species of small native mammals remain: two species of bats and three ground-dwelling mammals—the little long-tailed dunnart (*Sminthopsis dolichura*), the noodji or ash-grey mouse (*Pseudomys albocinereus*) and the mingkiri or sandy inland mouse (*P. hermannsburgensis*). The worst effect of the sheep station was the introduction of cats, which probably became feral soon after it was established. Because of the lack of detailed survey, we do not know precisely how many species of mammals became extinct as a result. We do know that boodies (*Bettongia lesueur*) occurred there, as Freycinet's expedition and the *Herald* expedition collected skulls. It has been assumed that the banded hare-wallaby (*Lagostrophus fasciatus*) occurred on the island, as it was reported by the Baudin Expedition. However, no specimen has ever been collected and some doubt remains.

Some idea of the island's former diversity of mammal species can be gained from research into mammal distribution, based on subfossil deposits, by Dr Alex Baynes of the Western Australian Museum. His work suggests that 13 non-flying species once occurred on the island. Species that are no longer present are the chuditch (*Dasyurus geoffroii*), mulgara (*Dasycercus cristicauda*), dibbler (*Parantechinus apicalis*), western barred bandicoot (*Perameles bougainville*), woylie (*Bettongia penicillata*), boodie, wopilkara or greater stick-nest rat (*Leporillus conditor*), dayang or heath rat (*Pseudomys shortridgei*), wildjin or desert mouse (*Pseudomys desertor*) and djoongari or Shark Bay mouse (*Pseudomys fieldi*). The two remaining native rodents have to compete with the introduced house mouse. As well as sheep, goats are fairly common and are damaging the native vegetation.

Local people recall that the wallabies had disappeared by the 1920s. As far as mammal conservation is concerned, Dirk Hartog is a microcosm of mainland Australia—introduced predators have eradicated many species.

BIRDS, REPTILES AND FROGS

Dirk Hartog's birds have been well studied and more than 80 species have been recorded. Three subspecies occur



Above left: Low open heath in northern parts of the island reminded explorers of English and Scottish heaths.
Photo – Andrew Burbidge

Above: Umbrella bush (*Acacia ligulata*) is a common shrub on the island.
Photo – Jiri Lochman

Left and far left: The specimen of *Dampiera incana* from William Dampier's collection alongside a picture of a living plant.
Photos – Alex George

Right: The little long-tailed dunnart is one of the few survivors from what was once a rich mammal fauna.

Centre right: Subfossil remains of the chuditch suggest that it occurred on Dirk Hartog Island before cats established there in the 1800s.

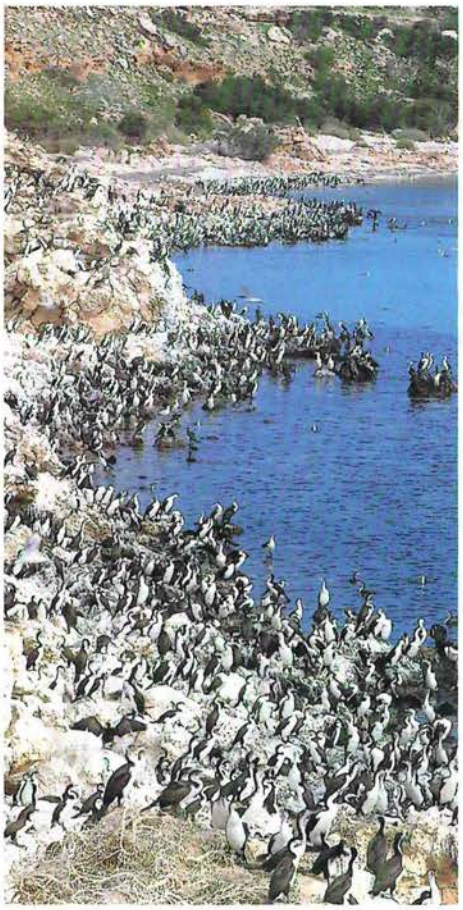
Below centre right: The wopilkara (or greater stick-nest rat) also occurred on the island before cats were introduced.
Photos – Jiri Lochman

Far centre right: The southern emu-wren is common on Dirk Hartog Island.

Bottom: The Dirk Hartog Island black-and-white subspecies of the white-winged fairy-wren is unique to the island.
Photos – Babs & Bert Wells

nowhere else and have been listed as vulnerable. They are the Dirk Hartog Island white-winged fairy-wren (*Malurus leucopterus leucopterus*), the Dirk Hartog Island southern emu-wren (*Stipiturus malachurus hartogi*), and the Dirk Hartog Island rufous fieldwren (*Calamanthus campestris hartogi*). One species—the thick-billed grasswren (*Amytornis textilis*)—has become locally extinct, probably because of the effects of grazing on critical nesting habitat, perhaps combined with cat predation, although it is difficult to understand why one small bird has disappeared while others have not. Fairy-wrens, emu-wrens, scrub-wrens and field-wrens are common, which led ornithologist Thomas Carter, after a visit in 1917, to suggest that 'Dirk Hartog Island might be called an island of wrens, as at least ninety of every hundred land-birds seen are wrens'.

Shark Bay supports enormous numbers of pied cormorants, and Dirk Hartog Island has the largest breeding colony in the State. The colony, at Quoin Bluff South, usually comprises more than 2,000 breeding pairs. Noted ornithologist F Lawson Whitlock estimated that there were more than 2,500 pairs in August 1920, the same number that I estimated in September 1972. Numbers do vary—in September 1997, Phil Fuller and I counted about 600 nests. Another large colony occurs on Freycinet Island, a tiny island east of the Cararang Peninsula, south-south-east of Useless Loop. This colony had more than 1,500 nests in May 1997,



Far left: Pied cormorant colony at Quoin Bluff South.
Photo – Babs & Bert Wells

Left: The king brown (or mulga) snake is the only large poisonous snake on Dirk Hartog Island.

Above: Loggerhead turtles are an endangered species. The nesting colony on Dirk Hartog is the largest in Western Australia.
Photos – Jiri Lochman

so the cormorants may move between the two islands.

The guano produced by the pied cormorants in Shark Bay was a valuable early resource to Western Australian agriculture. Captain Daniel Scott and T F Gilman discovered guano on Egg Island in 1850. On the expiry of Scott's one-year lease, the Government stationed a protective military force of 15 men from the 99th Regiment on Dirk Hartog Island to protect the guano, pearl shell and timber resources from illegal removal, and to assist in the examination of the Shark Bay and Exmouth Gulf regions. However, the party was withdrawn after a year. F L von Bibra, who held the concession from the government to mine guano in Shark Bay between 1880 and 1888, estimated that the cormorants renewed the guano at the rate of 80 tons (72.5 tonnes) per annum!

Several species of lizards have been recorded, including one species of skink (*Ctenotus youngsoni*), which is restricted to Dirk Hartog Island and some nearby areas. One large poisonous snake, the king brown or mulga snake (*Pseudechis australis*), is found on the island, and one frog species, the sandhill frog (*Arenophryne rotunda*), also occurs there. It survives in this arid place because it does not require open water to breed.

Loggerhead turtles breed at Turtle Bay, at the northern end of the island. They are listed internationally as critically endangered, and in Australia as endangered, and this island breeding rookery is the largest in WA. The lack of foxes on the island means that the eggs and hatchlings are safe from this voracious introduced species. However, other threats, such as drowning in fishing nets, are of concern and are being addressed.

A FUTURE NATIONAL PARK

Dirk Hartog Island has many attributes that suggest it should be a national park. It is one of the State's most important historic sites, it is situated within the Shark Bay World Heritage Property, it is the westernmost point of Australia and it has a wealth of nature conservation values. It is also becoming increasingly important as a recreation destination.

The island's conversion to national park was first recommended in 1972 in the Conservation Through Reserves Committee report to the Environmental Protection Authority, and negotiations are under way with the current leaseholders to bring that about by purchasing the pastoral lease.

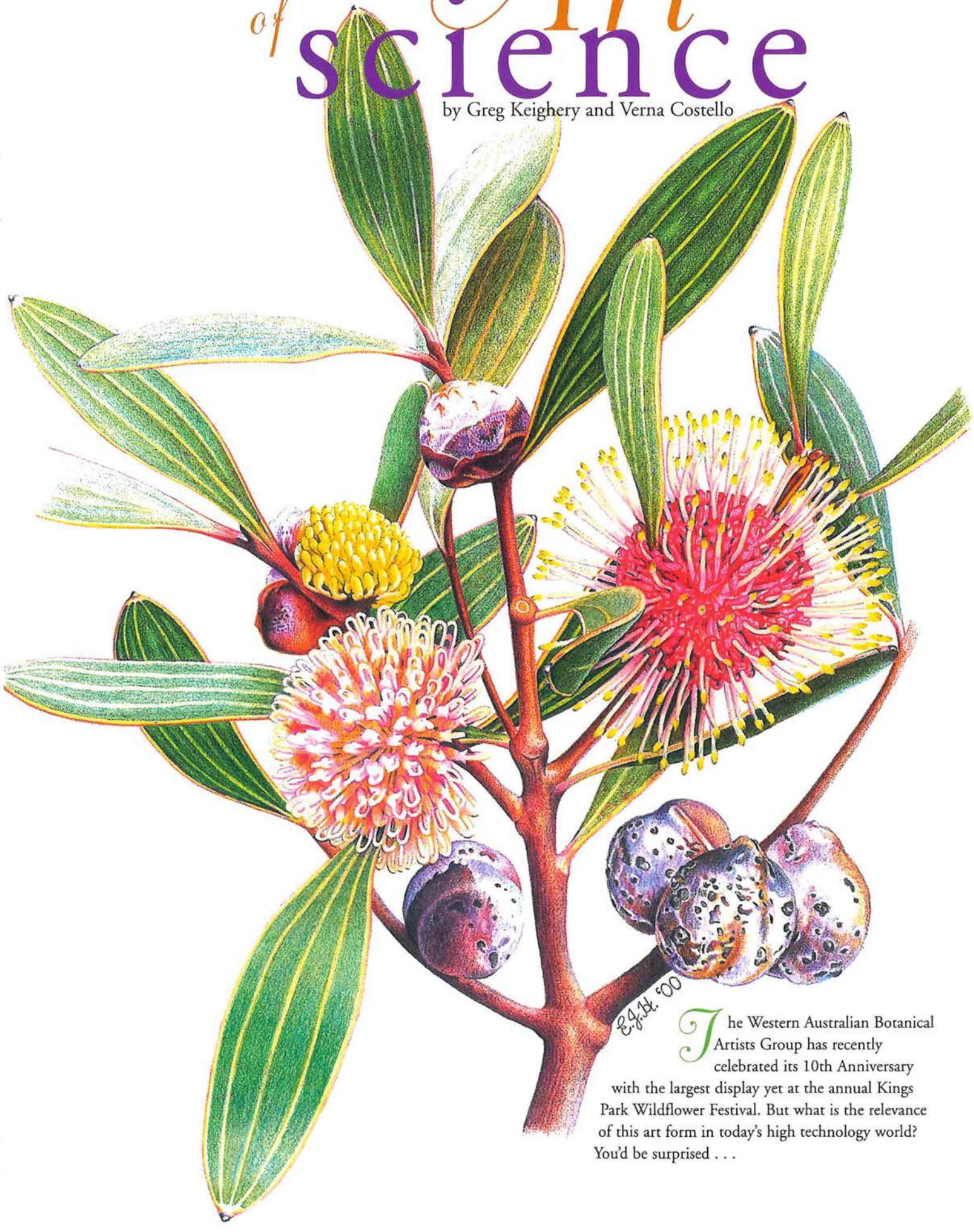
Once Dirk Hartog Island becomes a national park, a major challenge will be to remove the feral cats and to reintroduce the mammals that once occurred there. If that challenge is overcome, it will be a fantastic place to see how Australian mammals lived before the arrival of cats, foxes and other pests.

Dr Andrew Burbidge is Deputy Director, Biodiversity Conservation in the Department of Conservation and Land Management. He first visited Dirk Hartog Island with Alex George in 1972 at the invitation of Sir Thomas Wardle, who then owned the pastoral lease. Andrew can be contacted on (08) 9405 5128 or by email (Andrew.Burbidge@calm.wa.gov.au).

The author thanks Dr Alex Baynes of the Western Australian Museum, Professor Sandra Bowdler of The University of Western Australia, Alex George of Murdoch University and Dr Myra Stanbury of the WA Maritime Museum for help in writing this article.

The Art of science

by Greg Keighery and Verna Costello



The Western Australian Botanical Artists Group has recently celebrated its 10th Anniversary with the largest display yet at the annual Kings Park Wildflower Festival. But what is the relevance of this art form in today's high technology world? You'd be surprised . . .

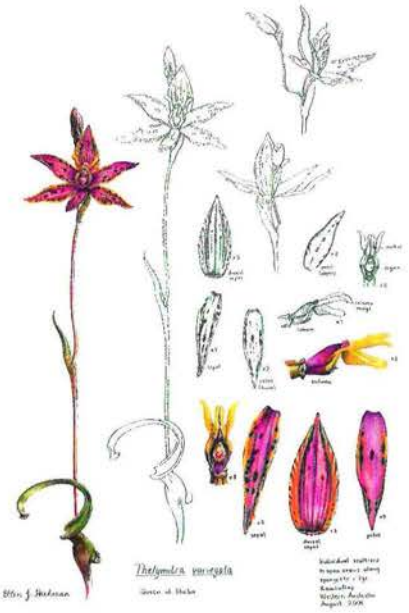
Photography, both still and moving, is currently the major means by which we gain an appreciation of the natural wonders of our State in books, magazines, film, video and slide collections. It has immediacy, and is able to portray the colour, wonder and harshness of our land in an instant. However, in scientific study, especially classification of living organisms (taxonomy), and field guides, the artist and illustrator still reign. Why is this so?

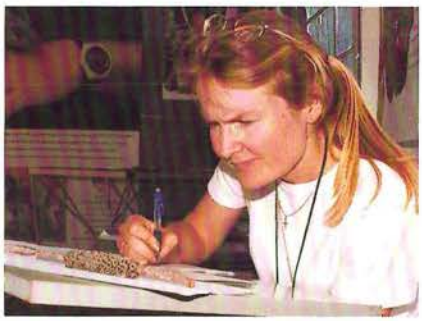
Western Australia has a long history of botanic artists and scientific illustrators who have successfully combined art and scientific accuracy. This combination is the key to the endurance of this art in science. The camera may not lie, but it cannot replace a trained eye.

Botanic artists and illustrators can portray the salient features of a plant that make it instantly recognisable to a lay person, together with the key features that are used by taxonomists to separate plant species. These features are used in scientific descriptions or in field guides or botanical keys such as Blackall and Grieve's five-volume *How to Know Western Australian Wildflowers*, which contain more than 4,000 illustrated species and 20,000 line drawings. These books' use of accurate drawings of the key features of our native and naturalised flowering plants have revealed the marvellous flora of south-western Australia to generations of budding and established botanists and wildflower enthusiasts in a way that words never could.

The importance of accuracy in these line drawings and illustrations cannot be overemphasised. For example, an artist may decide to reduce or increase the number of a plant's petals for aesthetic reasons. But such artistic licence is not appropriate in scientific illustrations, as the number of petals could be crucial in identifying the plant or species and in distinguishing one from another.

The first WA plants to be scientifically illustrated were those collected by William Dampier in 1699 (see 'Our Largest Island' on page 16). The illustrations (by an unknown artist) were published in 1703. But perhaps the most significant historical illustrations of WA plants were made by the renowned Ferdinand Bauer, who worked closely with botanist Robert





Previous page
Pincusion hakea.

Left: Queen of Sheba orchid (*Thelymitra variegata*) with detailed key features.
Illustrations by Ellen Hickman

Above: Ellen Hickman at work in the 'BAGs' tent at the Kings Park Wildflower Festival.
Photo – Verna Costello

Below: Sea urchin hakea by Edgar Dell, as it appeared in *Wildflowers of Western Australia*.

Below right: A 1933 watercolour of a scented sun orchid, with associated pencil sketches.
Illustration by Rica Erickson

Below far right: The frontispiece to the publication *Plants of Prey*, featuring a pitcher plant and rainbow plant.
Illustration by Rica Erickson

Brown on Matthew Flinders' visit to WA in 1801. Bauer's representations of our flora are some of the most accurate and beautiful. The originals are now held in the British Natural History Museum.

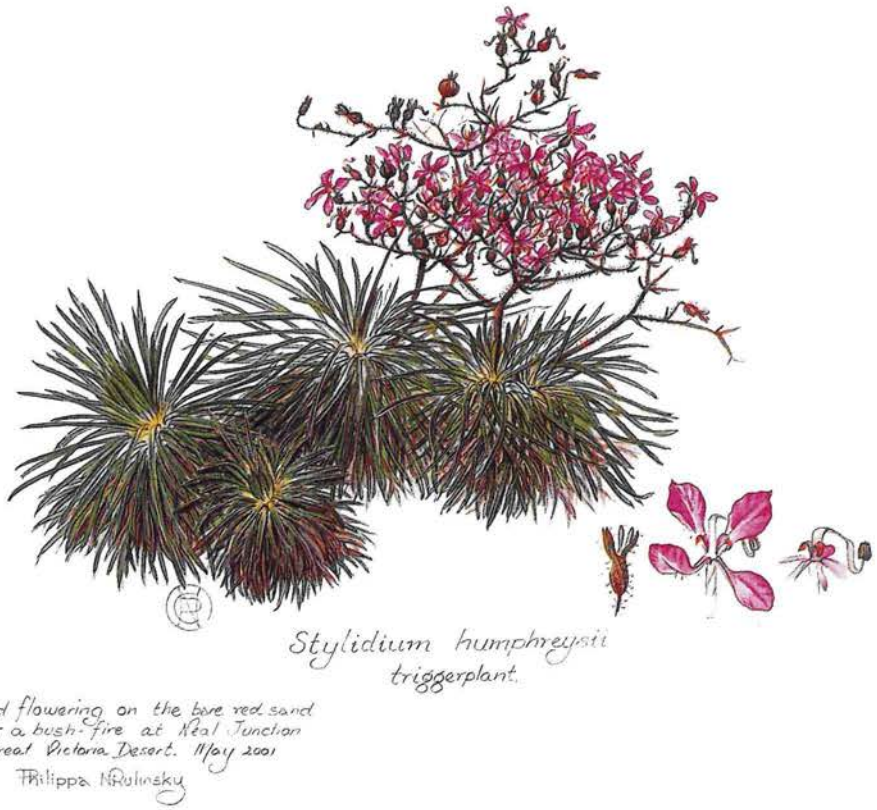
The earliest botanic artists were colonial women painters such as Margaret Forrest. In the 1920s, artists such as Emily Pelloe, who painted arrangements of native flowers, produced popular accounts of the flora. She was followed by Edgar Dell, whose paintings appeared first in the *Western Mail* and were then used extensively in the series of books entitled *Western Australian Wildflowers* from 1935. Edgar's paintings of individual flowers are both scientifically accurate and a work of art in themselves.

After World War II, the first major figure to appear was Rica Erickson. A self-taught artist and member of the WA Botanical Artists Group, Rica produced several books on native plant groups, including *Orchids* (1951), *Triggerplants* (1958) and *Plants of Prey* (1968). These books are more botanical than those of the earlier-mentioned artists. Another notable artist to emerge post-war was botanist Charles Gardner. His fine pen and ink drawings can be seen in his books on grasses and poison plants, published between 1950 and 1960.

'BAG' LADIES

With the abundance and variety of Western Australian wildflowers, it is not surprising that a wealth of talented botanic artists have honed their skills on the State's unique and diverse flora. Such is the passion for their art, and for Western Australia's wildflowers, that members of the Botanical Artists Group—or 'BAG ladies', as its six artists like to refer to themselves—work alongside botanists to learn more about the morphology (the form and structure) of plants and its significance in different species.

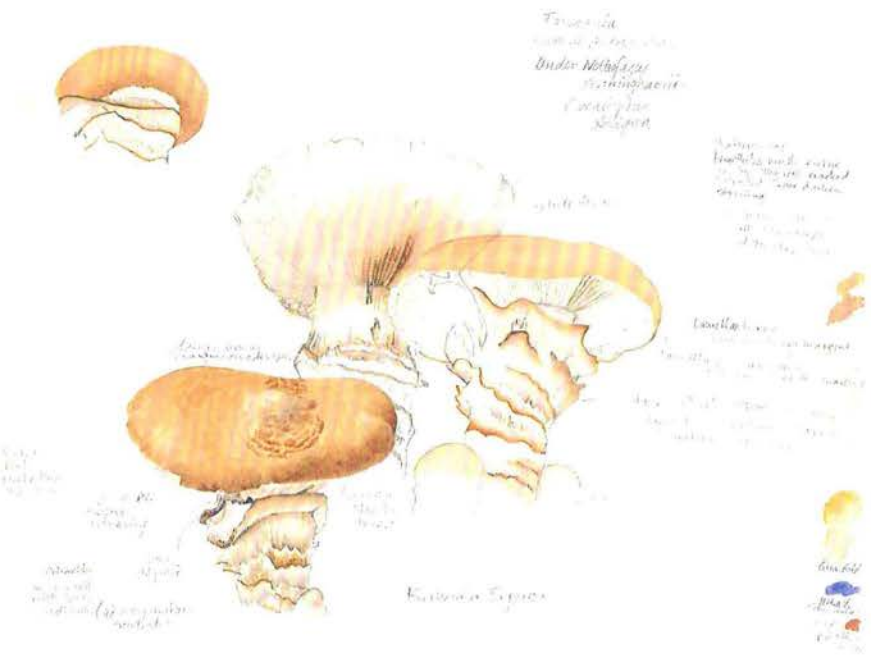
According to botanist Alex Chapman, of the Department of Conservation and Land Management's Western Australian Herbarium, this kind of collaboration has worked particularly well. Herbarium scientists get accurate, detailed illustrations for use in their taxonomic publications and the artist enjoys the challenge of creating something that's both meticulously detailed and a



Above: Dryandra tenuifolia var. *reptans* with fruit and floral parts.

Above right: Pelargonium havlasae with floral parts.
Illustrations by Margaret Pieroni

Right: The triggerplant *Stylidium humphreysii* with floral parts.
Illustration by Philippa Nikulinsky



beautiful work of art. Neither science, nor art, is compromised.

The artists met in September 1991, when the Art Gallery of Western Australia held the exhibition 'Wildflowers in Art' to complement three major wildflower conferences. This provided an introductory forum for exhibitors, six of whom later formed themselves into the Botanical Artists Group.

Most group members work in isolation and in a range of styles, while several specialise in particular areas or species and have staged exhibitions throughout Australia and overseas. They are:

PATRICIA DUNDAS: Orchid specialist, currently completing a revision of artwork for *WA Orchids*;

RICA ERICKSON: Historian. She was a pioneer in orchid, *Stylidium*, and *Drosera* studies;

ELLEN HICKMAN: Botanist, specialising in threatened flora. A book she illustrated with Professor John Pate of The University of WA recently won an award (in the USA) for the best scientific publication;

PHILIPPA NIKULINSKY: No particular speciality. Interested in anything nature based, but with a preference for desert plants and rock survivors;

MARGARET PIERONI: *Dryandra* specialist. Currently, she has a book on *Verticordia* with The University of WA Press;

KATRINA SYME: Fungi. She also uses dyes made from fungi on a range of textiles.

The group's role model is Ferdinand Bauer.

"He travelled as a natural history artist with Flinders on *HMS Investigator* in 1801, painting Australian plants and animals," says lively nonagenarian Rica Erickson.

"His work is exquisite in its detail and in its artistry, which is why we regard him as our hero."

In the beginning, the group met in a social setting, with their common interest in art being the 'glue' that bound them. The group has recently celebrated its 10th anniversary with another major exhibition at the Kings Park Wildflower Festival, and its members continue to meet regularly to admire, encourage and stimulate each other's work.

Botanic Garden and Parks Authority Chief Executive Officer Steve Hopper is no stranger to botanic art and firmly believes that: "These talented women are world class, and take pride of place

Above left: Cortuiarius fungus from a collection at the Royal Botanic Gardens in Melbourne, with accompanying field notes.

Above: Amanita sp. from the floor of karri forest in WA's south-west. Illustrations by Katrina Syme

COURSES IN BOTANIC ART

The University of Newcastle, in New South Wales, offers courses that involve a scientific illustration component, and it is the only tertiary institution in Australia that does so. The courses are designed to enable participants to use a wide variety of mediums, techniques and styles to produce clear and accurate scientific illustrations suitable for publication.

The following courses are available:

- The Bachelor of Design (Visual Communication) degree offers a major in Plant and Wildlife Illustration) in which scientific illustration is one of the areas studied.
- The Bachelor of Design (Visual Communications) —Honours—the former Graduate Diploma in Art (Plant and Wildlife Illustration) program, involves a large component of scientific illustration and is available to science graduates.
- A Master of Design by Research degree is offered by the Faculty of Architecture, Building and Design, which may be studied through the Wildlife Illustration discipline.

The University's web address is:
http://www.newcastle.edu.au/department/fad/ds/illus/illusthp.htm

and further course details can be acquired by email from Chris Sanders (csanders@mail.newcastle.edu.au).

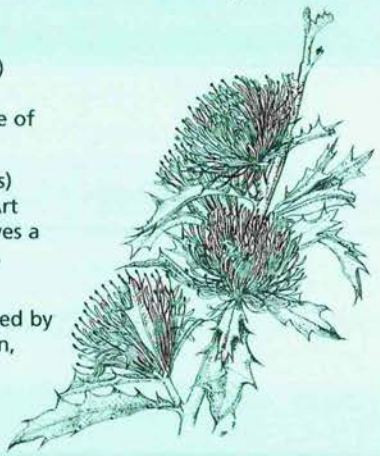


Illustration by Margaret Pieroni from *Leaf and Branch* by Robert Powell.

Above: The five subgenera of *Caladenia* from the cover of *Nuytsia* Vol 14, No. 1/2 (2001).
Illustration by Pat Dundas

among the best of botanic artists both past and present".

Steve has witnessed the group's popularity with the general public increase significantly with their presence at the Kings Park Wildflower Festival each spring. This is of particular satisfaction to the Department of Conservation and Land Management, which sponsors the group's presence at this event and regularly calls upon the talents of its members.

The artwork of BAG members has featured in a number of the department's publications, as well as those of other organisations. Some members contribute regularly to *NUYTSIA*—WA's taxonomic botanic journal—while others contribute to a variety of other departmental publications, particularly the covers of *LANDSCOPE* magazine, which is also widely recognised for the quality of its photographic images from some of Australia's finest wildlife photographers.

With advances in digital cameras making them affordable and more accurate in their representation, professional photographers are moving closer to accepting digital imaging as a valid medium for their work. The once mind-blowing special effects of 3D image modelling, which allows us to examine the intricate details of an object by turning it around on a computer screen, have become commonplace. The magic has begun to fade.

But even in this fast-advancing, technological age, we can still watch the botanical artist take up 'a wand', which is no more than a wooden stick with sable hair attached to one end, and with deft strokes of paint, create magic on a sheet of paper. The image that materialises both impresses the scientist with its accuracy and charms us all with its beauty. This art is truly the art of science.

FLORAL EMBLEMS OF AUSTRALIA

Six of Australia's most respected botanical artists have contributed superb original drawings of each State and Territory floral emblem and the national floral emblem. Complementing Dr Stuart Devlin's design of the Centenary of Federation bi-metal coin, all nine original artworks are reproduced in the one Floral Emblems of Australia Art Piece. The piece also incorporates some of the earliest botanical illustrations of our flora (sourced from as far afield as Kew Gardens, London and the Florence Museum), as well as interesting information on their history and their status as official emblems.

The artists commissioned for the unique, limited edition art piece are Pat Dundas, Rica Erickson, Ellen Hickman, Philippa Nikulinsky (whose work regularly features on the covers of *LANDSCOPE*), Margaret Pieroni and Katrina Syme, all from the Botanical Artists Group.

The floral emblems depicted are the royal bluebell (ACT), waratah (NSW), Sturt's desert rose (NT), Cooktown orchid (QLD), Sturt's desert pea (SA), Tasmanian blue gum (TAS), common heath (VIC), red and green kangaroo paw (WA) and the golden wattle (Commonwealth).

This is the first time that the works of the Botanical Artists Group have been brought together in a single art piece. Only 100 of these special art pieces were commissioned, each in a magnificent and imposing frame incorporating the Centenary of Federation bi-metal, legal tender Australian coin. The six botanical artists have individually signed each piece, which are all hand numbered.

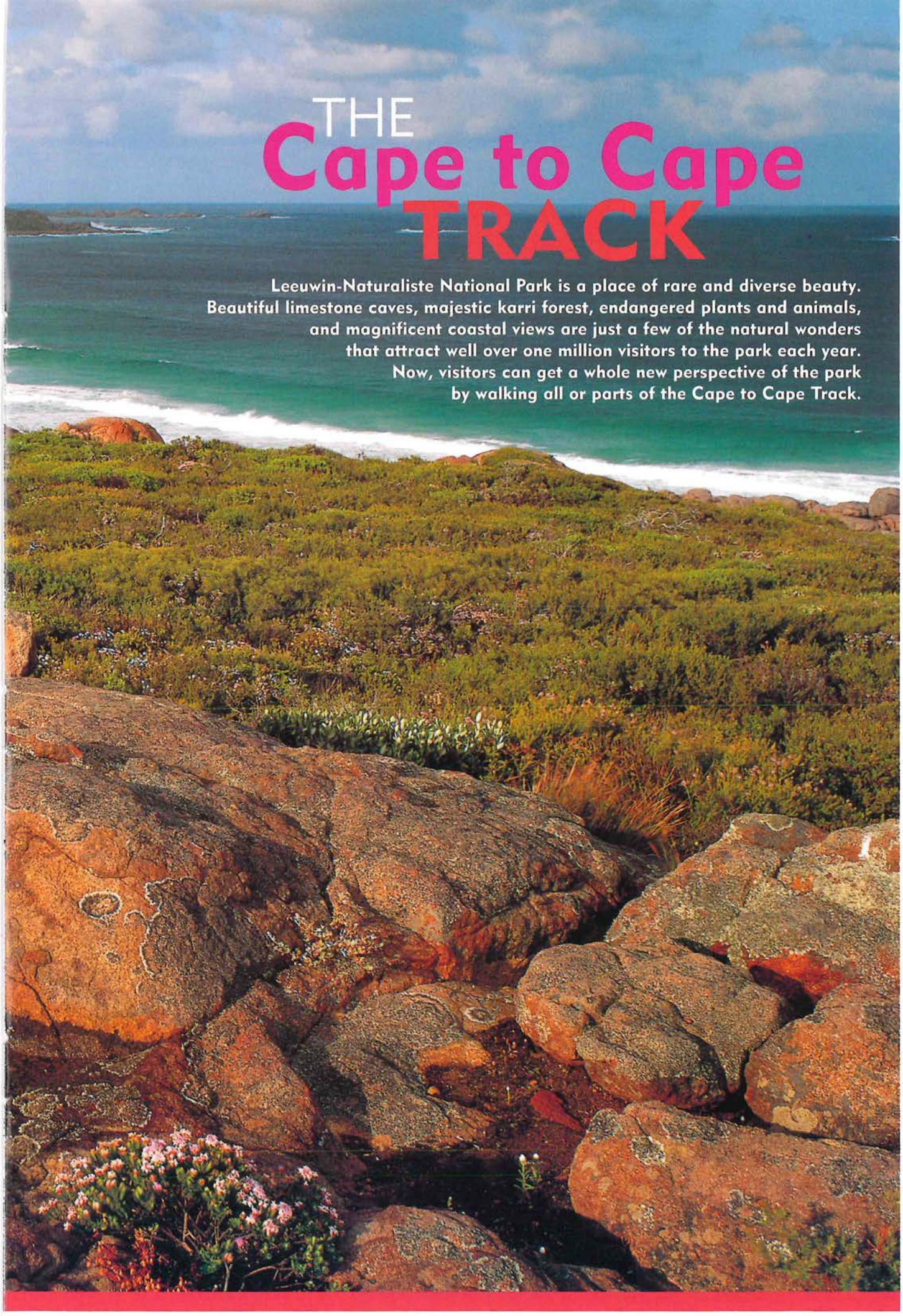
The work is a stunning display of Australian flora, featuring the skills of some of Australia's most lauded botanical artists, and the world's foremost coin designer.

Five of the members of the Botanical Artists Group, from left, Pat Dundas, Ellen Hickman, Katrina Syme, Philippa Nikulinsky and Rica Erickson, in front of the Floral Emblems of Australia Art Piece, on show at the recent Kings Park Wildflower Festival.
Photo – Verna Costello

Greg Keighery is a Principal Research Scientist with the Department of Conservation and Land Management, based at Woodvale. Greg can be contacted on (08) 9405 5100 or by email (gregk@calm.wa.gov.au).

Verna Costello is a volunteer photo-journalist and editor with the department's Strategic Development and Corporate Affairs Division.

The authors wish to thank Alex Chapman of the WA Herbarium and the members of the WA Botanical Artists Group for their assistance with this article. They also acknowledge The Perth Mint for background information on the Floral Emblems of Australia Art Piece.



THE Cape to Cape TRACK

Leeuwin-Naturaliste National Park is a place of rare and diverse beauty. Beautiful limestone caves, majestic karri forest, endangered plants and animals, and magnificent coastal views are just a few of the natural wonders that attract well over one million visitors to the park each year. Now, visitors can get a whole new perspective of the park by walking all or parts of the Cape to Cape Track.

The recently opened Cape to Cape Track offers visitors to the Leeuwin-Naturaliste National Park the opportunity to experience nature on intimate terms. The track runs from Cape Naturaliste to Cape Leeuwin, hugging the coast and often diverting for long tracts along the beach. Other parts of the track drift inland, leading walkers through woodlands and forest.

The 133-kilometre track has been constructed opportunistically; making use of established four-wheel-drive tracks in many places. The objective was to create an alignment that brings people in close contact with the environment while creating as little disturbance as possible, on a minimal budget. This was finally realised when the track was opened officially in April 2001.

Above: Cape Leeuwin lighthouse was built in 1895. It is 53 metres high and marks the southern end of the track.
Photo – Alex Bond

HISTORY

The 1988 Australian Bicentennial celebrations saw the first real progress on the idea of a walk from Cape Naturaliste to Cape Leeuwin. Staff from the Department of Conservation and Land Management saw an opportunity to plan and build the track in the form of a $50,000 Bicentennial grant, which they applied for and won. Community consultation during the planning generated a great deal of enthusiasm for the proposal.

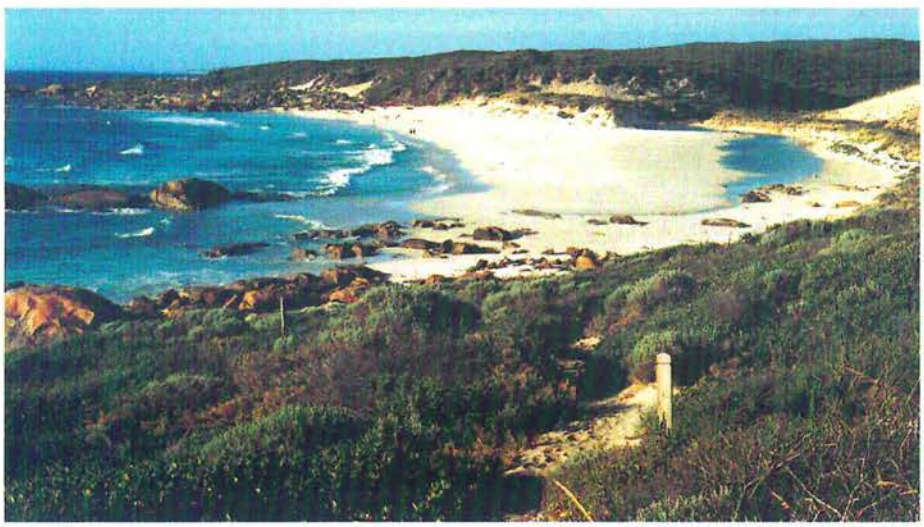
During the planning process, it was decided to call the trail the Cape Naturaliste to Cape Leeuwin Heritage Trail. A track logo was proposed as well as features for the track itself, such as campsites and small loop trails. Volunteer help from the community and a cash commitment from the department were important in obtaining the initial grant.

Unfortunately, because the management plan for the Leeuwin-Naturaliste National Park was delayed, the Bicentennial grant could not be utilised before the expenditure deadline of 30 September 1988, and was returned.

This was a major disappointment, but local interest remained high and it was only a matter of time before department staff and local volunteer groups resurrected the idea. Due to their relative ease of construction and public demand, Sections One (Cape Naturaliste to Wyadup) and Five (Hamelin Bay to Cape Leeuwin) were tackled first.

Section Five was opened officially on Sunday, 18 October 1996. A Regional Employment Action Program, based in Augusta, achieved the major hand tool work, and the department contributed some machine time in order to complete the section.

Section One was completed and opened a short time later, thanks to help



Previous page
Coastal heath and granite at Smiths Beach, Yallingup.
Photo – Bill Bachman

Above left: This seat provides a rest point overlooking the beach at Wyadup. Wyadup carpark is in the background.

Left: Redgate Beach in summer with the sandbar across Calgardup Brook.
Photos – Jane Scott

Above: Busselton Senior High School students working on the track near Gracetown.
Photo – Neil Taylor

Above right: Boodjidup Bridge and steps built by a Green Corp program.

Right: The Cape to Cape Track's northernmost trailhead sign at the intersection with Lighthouse Walk.
Photos – Jane Scott

from participants of a Local Employment Action Program, school students, volunteers from the Australian Trust for Conservation Volunteers, and other interested individuals who contributed time and labour. Once these two sections were completed and usage grew, community expectations began to mount.

Special mention needs to be made of the contribution by the Margaret River and Busselton Senior High Schools. Through the efforts of their in-house chaplains, both schools adopted sections of the trail to build with small groups of students. Hand tools were used to construct paths and lookouts on large tracts of Sections Two and Four. The work was carried out over several years and with various students.

Gradually, more and more people began to walk the track and the pressure was on to complete the project.

The Friends of the Cape to Cape Track Incorporated group was formed on 9 December 1998. Without the assistance and predominant force of the 'Friends', it is unlikely that the track would have been finished so quickly.

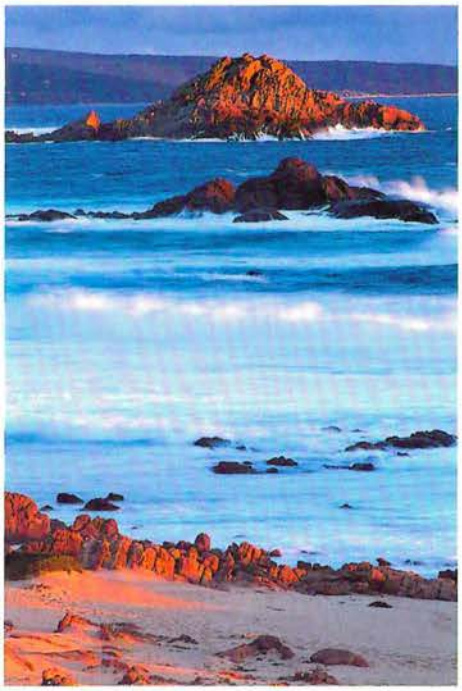
The group has obtained and contributed around $200,000 in grants, including substantial grants from Trailswest, Coastcare, Healthways and the Lotteries Commission. It has also set up an adoptees program, developed on lines borrowed from that of the Bibbulmun Track, whereby interested groups, families and individuals can 'adopt' a short length of the Cape to Cape Track, by becoming responsible for maintenance for that section. The Friends group has also begun compiling a register of local accommodation houses that offer a drop off and pick up service to walkers along the track.

WHY WALK THE TRACK?

The Cape to Cape Track is a 'four seasons' walk that can be tackled by hikers in its entirety or by more casual walkers using a wide variety of short-walk options. Many people are walking the track in short bursts and hope to get their 'End to End' certificate over several years! The department and the Friends group see the track more as a series of short walks, because it is easy to access via the numerous roads and tracks that lead to the coast. This provides opportunities for short-stay holidaymakers as well as locals and long distance hikers.

The track is marked with pine posts

Right: Volunteers laying 'brushing' on the Cape to Cape Track near Moses Rock.
Photo – Neil Taylor



displaying the track logo. Maps and books that highlight the main attractions of each section are available to assist individuals in choosing the most suitable walk option.

PLANTS AND ANIMALS

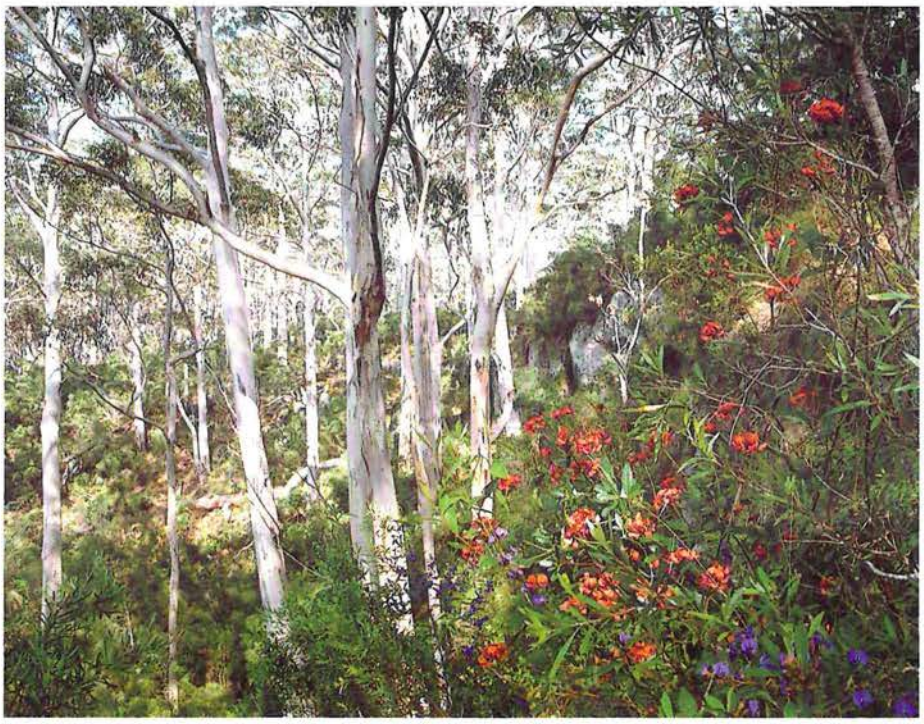
Walkers are frequently delighted by the myriad bird life to be seen along the entire length of the track. Close to the coast, the heathland supports a variety of small birds. Quiet and patient observers may be rewarded by a glimpse of a white-browed scrub-wren, evasive southern emu-wren or red-eared firetail.

Red-tailed and long-billed black-cockatoos inhabit the bush and forest, while small groups of rock parrots may be seen along the beach.

The success of the department's Western Shield baiting program has enabled many small mammals to make a comeback in the area. Quendas, or southern brown bandicoots, are increasingly being spotted during the day, while at night, you may catch a glimpse of a brush-tailed phascogale, or wambenger. If camping overnight, you are advised to secure provisions from the very sociable brushtail possums, which often visit campsites.

In warmer weather, reptiles may be seen basking in the sun, though they usually slither away long before being approached. Dugites and tiger snakes are prevalent in Leeuwin-Naturaliste National Park and should be avoided. Fortunate walkers may come across the distinctively marked but rarely seen carpet python. Bobtails are frequently found sunbaking on the path, while less commonly encountered lizards include the southern heath monitor and the western bearded dragon.

The vegetation along the Cape to Cape Track is just as varied as the wildlife. The most obvious are the coastal heath plant communities. Although the vegetation may seem similar, there are major changes from north to south, and an ever-changing array of plants to enjoy. Wildflowers are most

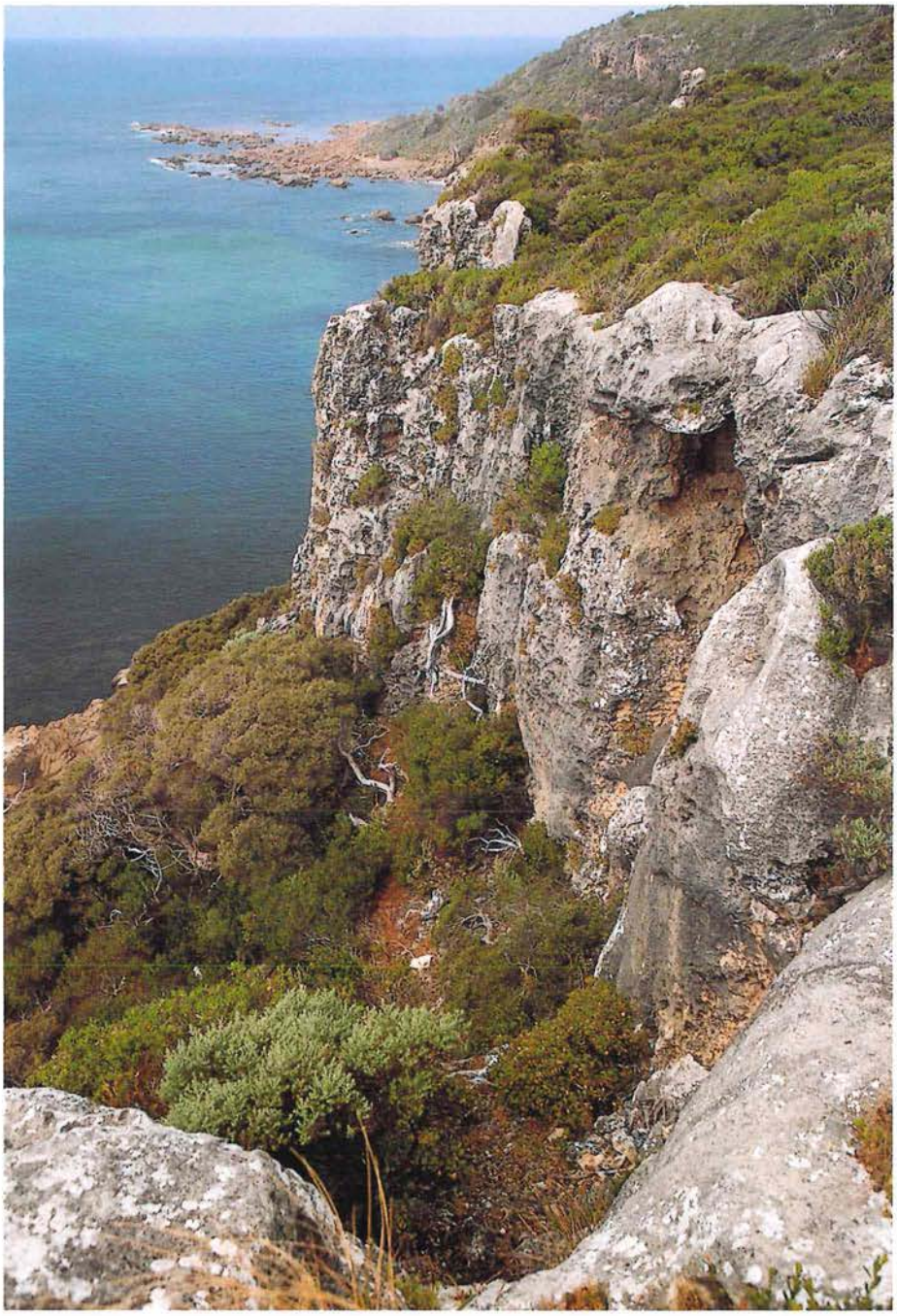


Above: Quendas have become more abundant since fox numbers were reduced under Western Shield.
Photo – Marie Lochman

Top left: A rainbow leads walkers along Willyabrup Cliffs.
Photo – Ray Forma

Centre left: Sunset at Sugarloaf Rock near Cape Naturaliste.
Photo – Alex Bond

Left: Coral vine and tree hovea at Boranup in the Leeuwin-Naturaliste National Park.
Photo – Alex Bond



spectacular in spring, but there is something interesting to see all year round—and to smell, as many of the heathland plants have aromatic leaves or scented blossoms. And for a change of scenery, the quiet cool of the karri forest offers a complete contrast and welcome shade during the summer months.

FROM NORTH TO SOUTH

The Cape to Cape Track can be walked from north to south or vice versa. It can be completed in five days, five months or over several years. But either way, there is something for everyone to enjoy.

The northernmost portion of the track follows a fairly level cliff top path with magnificent ocean views. Beach access is limited for the most part, with the exception of Yallingup and Smiths Beach. The track begins near the Cape Naturaliste Lighthouse and passes by Willanup Spring, Sugarloaf Rock, Three Bears (a popular surfing spot) and Canal Rocks. Humpback whales may be spotted on their annual migration south from late September to mid-December.

The stretch of track between Wyadup and Gracetown offers some of the most spectacular coastal views. This section of Leeuwin-Naturaliste National Park is very narrow, but the scenery is breathtaking, with the track winding along rugged cliffs and among granite boulders. Cape Clairault is a prominent dune-topped landmark, visible for several kilometres up and down the beach. Quinninup Falls, a 17-metre winter waterfall flowing down a natural granite wall, can be seen from a distance when in full rush, but declines to a water-hole in summer.

Willyabrup Cliffs, formed from granitic gneiss, rise 40 metres above sea level and are popular with abseilers and climbers. Although the path is aligned well back from the cliff face for safety reasons (to prevent people from knocking rocks over the edge or treading on equipment), you are guaranteed a spectacular view as you approach.

Gentle slopes, low ridges and easy bush trails have made the length of track from Cowaramup Bay to Redgate Beach extremely popular. Starting out along the coast, this part of the track diverts slightly inland near the historic Ellensbrook Homestead, passing the photogenic Meekadarabee Falls and Cave.

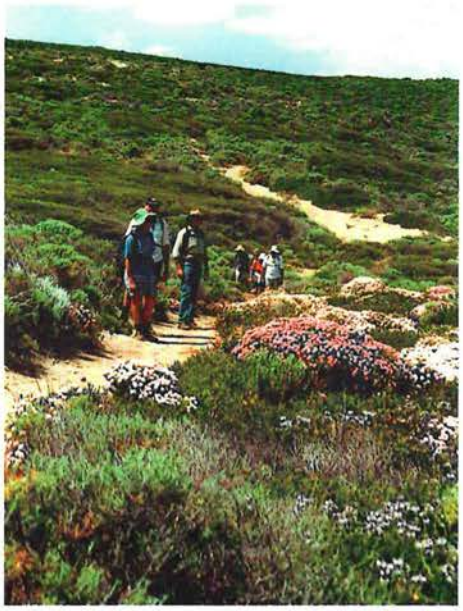
Cape Mentelle is an unusual feature composed entirely of limestone rather than granite. Consisting of a number of high headlands carved up by deeply indented bays, the area is a haven for birds, particularly ospreys.

From the steep ridge overlooking the Boodjidup Brook valley, you will be captivated by the contrast of ocean views on one side of the track and green farmlands and vineyards on the other.

Many remote beaches, and some of the more heavily visited beaches such as Redgate, are frequently inhabited by

Above left: Hooded plover.
Photo – Hans & Judy Beste/Lochman Transparencies

Above: Limestone cliffs along the edge of Geographe Bay near Cape Naturaliste.
Photo – Bill Bachman



the endangered hooded plover, which is endemic to the south coast of WA. Hooded plovers are small black and white birds that nest on open beaches. Tread carefully during the breeding season, which extends from September to January, and report any sightings or evidence of nesting to the Department of Conservation and Land Management.

Beaches, cliff tops and cool shady forested areas of the Redgate to Hamelin Bay section offer a memorable experience of the Leeuwin-Naturaliste Ridge. The cliff top walk between Bob's Hollow and Contos is considered by some to be the most scenic segment of the entire Cape to Cape Track. However, the trail runs close to the cliff top and is quite rocky in places, so extra care is required.

From Contos Campground, the track moves inland, to take advantage of the park's width. The eight-kilometre easy trek through the karri trees of the Boranup Forest may leave you feeling overawed and with a sense of isolation, despite the proximity of civilisation.

From Hamelin Bay to Cape Leeuwin, the track stays mainly alongside the coastline. With many long stretches of soft beach sand and a wild yet breathtaking hike from Cosy Corner to Skippy Rock, this is probably the most challenging section of the whole walk. Cosy Corner is particularly beautiful, with its white sandy beach, red granite headlands and offshore limestone islands that are home to thousands of seabirds.

FUTURE

The future wellbeing of the Cape to Cape Track is in the hands of both the Friends of the Cape to Cape Track Incorporated and the Department of Conservation and Land Management. Cooperation between local volunteers and the department has enabled the track to be where it is today, and its continued strong support will be vital if the Friends group is to continue and grow in number.

Although the 'adoptee' program is only in its early stages, it is expected to provide a strong local support network that will sustain the life of the track. Almost the entire track has been adopted, but more adoptees are required to cover some areas and to assist in others. Adoptees are required to walk their section a minimum of four times per year, reporting and repairing minor problems and referring bigger problems to the department.

The exact number of people walking the Cape to Cape Track is presently unknown, but it is clear that the number of walkers is growing rapidly.

Above left: A machine-cut section of the track north of Left-Handers.
Photo – Jane Scott

Above: Walkers enjoying the view from the top of Willyabrup Cliffs.
Photo – Rob Olver

Registration stations were built at both ends of the track in July 2001 and foot counters have now been installed. The Friends group has entered into a Memorandum of Understanding with the department to ensure the roles and responsibilities of both parties are clear. A philosophy for the use and future development of the track is being finalised so that the track offers a unique experience for visitors and a major tourism attraction for the Capes area. But whatever the future may hold, the Cape to Cape Track will remain a great example of how a local community and a government agency can work together to fulfil a common vision.

Deborah Micallef is a student at Edith Cowan University Bunbury, studying towards a BA (in Writing) with Honours. She has completed an enjoyable and successful four-month Workplace Practice with the Department of Conservation and Land Management at Busselton and this is her first *LANDSCOPE* article. Deborah can be contacted by email (aphina@iinet.net.au) or on 0438 907 833.

Jane Scott is the President of the Friends of the Cape to Cape Track Inc., and devotes a lot of her spare time to the track. She has written several books including *The Cape to Cape Track Guidebook*, which is an excellent read for anyone intending to walk the track. Jane can be contacted on (08) 9757 6327.

Neil Taylor was one of the initiators of the track. He has worked for the Department of Conservation and Land Management in Busselton as a Recreation Officer for seven years. Neil still oversees the progress of work on the Cape to Cape Track within the department and can be contacted on (08) 9752 1677.

Track information can be obtained by contacting the Busselton office of the Department of Conservation and Land Management on (08) 9752 1677, or by writing to Ms Jane Scott President of the Friends of the Cape to Cape Track Inc., c/o Witchcliffe Post Office, Witchcliffe, WA 6286.

Ancient animals, ancient names

The Aboriginal names of native animals trip off the tongue, often in an almost perfect rendition of the animals' sounds—quokka, chuditch, woylie, numbat and quenda, to name a few. Aboriginal animal names have always been part of Australia's history, with kangaroo, koala, dingo and wombat having been in common use in the English language for more than two centuries.

by Sue McKenna

Ian Abbott, a Senior Principal Research Scientist at the Department of Conservation and Land Management, has, for many years, combed historic diaries, archives, dictionaries and library collections to create a list of Aboriginal animal names we can use every day.

For centuries, the Nyoongar people in the south-west corner of Western Australia eked their existence from nature. They dined on fish, insects, seeds, corms, tubers, bulbs, fruits and nectar, birds, eggs, small mammals, frogs and freshwater crayfish. Unlike their northern cousins, they did not use rafts or boats so subsequently didn't eat seals or whales unless these became stranded.

They stalked yonka, or western grey kangaroos, by running the animals into soft, swampy bog and spearing them, usually in winter. Another method was to smoke them out and chase them down a hill by shrieking and frightening them. At the base of the hill more men would be stationed with heavy hunting ketj (spears) ready to kill the floundering animals. Kings Park was a favourite spot for this battue, or running down, with the slopes facing Crawley and Subiaco being good hunting spots.

But yonka weren't the only animals to be hunted. There were koora (western brush wallabies), maning (banded hare-wallabies) and moororong or bokal (black-flanked rock-wallabies) to add to the menu.

Women and children collected small species of rodents, such as the now-extinct koolawa (long-tailed hopping-mouse) or bolong (large-eared hopping-mouse), that had been overcome and killed by fire passing through the bush. They collected kjirdon or matakitj (Mitchell's hopping-mice), mookji (ash-grey mice) or konding (Shark Bay mice) in the same fashion. The widespread burning of vegetation ensured an ongoing supply of green pick or fresh new growth for browsing and grazing species, and increased the availability of meat for the Nyoongar people.

WHAT'S IN A NAME?

The sounds of Nyoongar animal names trip easily from the tongue because they're often an imitation of the sound made by the animal. Early European explorers were amazed at the splendid parade of small creatures in the bush, desert and sandplains. Eager to learn more, they quizzed the Nyoongars who gave them words such as chuditch, numbat, quenda, woylie and quokka—names still in common use today.

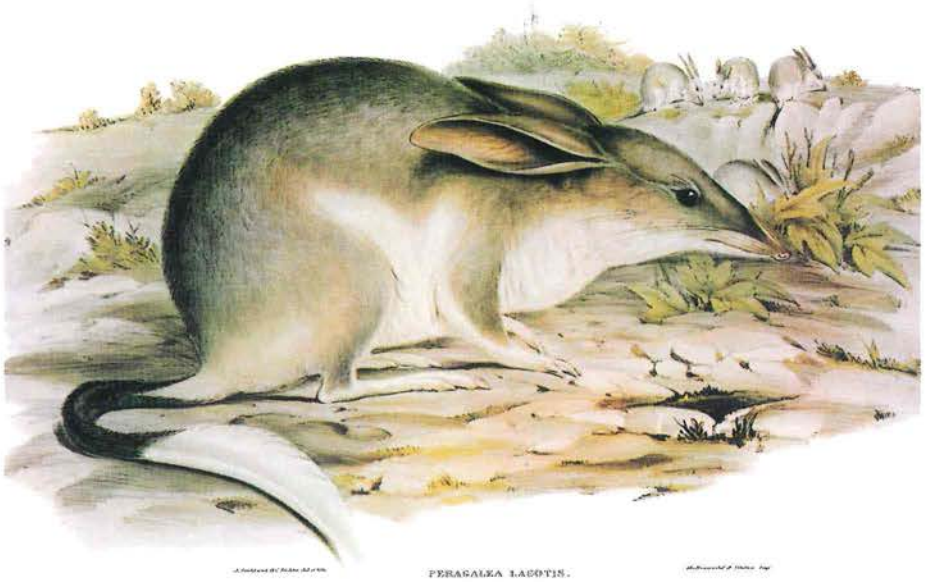
Several early pioneers attempted to live in harmony with the Aboriginal people and developed friendships that enabled them to learn elements of each other's languages. The intertwined relationship resulted in intertwined words, so that names used by Nyoongar people quickly found their way into the English language—at least locally. Unfortunately, Nyoongar is not a written language, so there are no references or dictionaries to record the vocabulary. Today we must rely on the spoken word passed from generation to generation through the Nyoongar culture or through pioneers' diaries and notes kept about Nyoongar words.

A few years ago, the language was in danger of dying out, and was largely a vocabulary used by elders whose children had abandoned the tribal language for English. During the last decade, it has revived to the point that three years ago

Previous page
Numbats depicted in English zoologist John Gould's publication *Australian Marsupials and Monotremes*, first published more than 150 years ago. Like many native animals, they are referred to by their Aboriginal name.

Above: The name 'emu' is an anomaly, as the word is Portuguese. Marayong is the Aboriginal word for the animal from New South Wales (Sydney) where it was first observed by Europeans.
Photo – Jiri Lochman

Left: 'Kangaroo' is another anomaly. Research suggests that this word (from north-east Queensland) means 'go away'. The correct Aboriginal name for that region is mania, or man-ya.
Photo – Jay Sarson/Lochman Transparencies



Above left and above: English zoologist John Gould compiled detailed and beautiful publications featuring drawings of Australia's birds and mammals more than 150 years ago. Notes accompanying the drawings were supplied by naturalist John Gilbert, who referred to animals and birds by their Aboriginal names. The dalgyte, or bilby (above), is an example.

Right: James Drummond, the botanist, and his grandson, James Mackintosh. Photo – Courtesy of Mrs Veasey via Rica Erickson, the author of the book *The Drummonds of Hawthornden*, from which it was taken.

the first Nyoongar language class started in Bunbury, with more beginning in Perth. Classes are now being taught at 30 schools in the south-west.

Ian Abbott has been trawling historical archives for information on Aboriginal names of mammal species. So far he has found about 1,100 records of Aboriginal names for native mammals in the south-west, including reliable names for 40 of the 51 species that occurred within the Nyoongar region.

His findings were recently published in the Department of Conservation and Land Management's scientific journal *CALMScience*, and he is encouraging his academic peers and others in the department to use Aboriginal words when describing native mammals. The tide has already started turning, with senior zoologists using Aboriginal names in their scientific and research papers, as they began doing for native rodents shortly after the publication of *Australian Names for Australian Rodents* by the Australian Nature Conservation Agency in 1995.

Discovering the correct Aboriginal words was a long, hard haul that took Ian five years of work. He located and extracted records from books written by early visitors and settlers, from dictionaries and from reports by explorers, historians and anthropologists. He also searched later documents and papers by contemporaries in WA and the eastern states.

Ian's historical searches uncovered some gems. George Grey, the Government Resident at Albany, who was later the Governor of South Australia and the New Zealand and Cape Colony, and subsequently Prime Minister of New Zealand, published lists of Nyoongar words used by people living from Cervantes to Busselton across to Albany and Esperance.

GOULD AND GILBERT

English zoologist John Gould and his wife, artist Elizabeth Gould, visited Australia from England between 1838 and 1840. Elizabeth painted the continent's birds for a published portfolio to be sold in Europe. They travelled to Tasmania, the Bass Strait Islands, South Australia and New South Wales, but John Gould was so impressed by the animals, which came into their tent as they camped beside billabongs, that he created a portfolio for them too, describing many new species from his notes.

Gould's notes referred to animals with Aboriginal names—the koala, wombat, kangaroo and dingo. The anomaly is that the word 'emu' is Portuguese, not Aboriginal, so we're left to ponder why the Aboriginal word 'marayong', from Sydney where the emu was first observed by Europeans, went unrecognised. The word 'kangaroo' might be another anomaly, because instead of being the name of the animal, research shows it's likely to mean something such as 'go away'. The correct eastern name is mania, or man-ya.

Because he never travelled to Western Australia, Gould's notes for all WA species were supplied by John Gilbert, a naturalist who collected mammals in the early 1840s. John Gilbert trekked across south-west WA

HOW DO YOU SAY THAT?

One of the challenges in using the Nyoongar language is pronunciation and Ian's paper includes a guide to pronunciation including emphasis on the first syllable.
Below is a list of animal names on the left, with the Nyoongar word or words on the right. Several Nyoongar words mean there were different descriptions from different districts. Deciding on the most appropriate one will be a task for the Ngoongar people and others.

COMMON USE	NYOONGAR WORD
echidna	nyingarn or donongerde
chuditch	djooditj, ngooldjangit or badjada
dibbler	dibla or madoon
mardo	mado or domat
red-tailed phascogale	kingo
brush-tailed phascogale	wambenga, balat, balawa or koming
fat-tailed dunnart	ngooda
white-tailed dunnart	djoordong
grey-bellied dunnart	donat or djamin
numbat	noombat or wioo
pig-footed bandicoot (extinct)	boda, woda or boodal
quenda	kwenda
western barred bandicoot	mal or nymal
bilby or dalgyte	djalkat
western pygmy possum	mandada or nyeranit
western ringtail possum	ngwayir, womp, woder, ngoor or ngoolangit
honey possum	ngoolboongoor, djebin or dat
brushtail possum	koomal
boodie	boodi
woylie	woli or wol
broad-faced potoroo (extinct)	moda
Gilbert's potoroo	ngilkat
rufous hare-wallaby or mala	woorap
tammar wallaby	dama or bonin
western grey kangaroo	yonka (male), wok or wor (female)
western brush wallaby	kwara or koora
euro	bikada
red kangaroo	marlo
crescent nailtail wallaby (extinct)	worong
black-flanked rock-wallaby	moororong or bokal
quokka	kwoka or bangop
long-tailed hopping-mouse (extinct)	koolawa or kodong
large-eared hopping-mouse (extinct)	bolong
Mitchell's hopping-mouse	djirdon or matakitj
ash-grey mouse	noodji
Shark Bay mouse	konding
western chestnut mouse	djilbitj
water rat	ngoodjo, wamp wamp or ngangaritj
southern bush rat	modit
dingo	doot
bats (not distinguished to species)	bam-bi, ba-bill, babilgun or babitj
Australian sea lion	manyinni
whale (not distinguished to species)	mammang
dolphin	waraneen, kwillen-ah, kear-la or kwilena or waraneen

catching specimens and sending extensive accompanying notes to Gould. Gould then arranged for the artist, Hans Richter, to draw entrancing colour sketches of the animals—detailed paintings that captured forever some species that are now extinct—using Gilbert's notes. And since Gilbert's notes often included Aboriginal animal names, they turned out to be one of Ian's most important sources. Gilbert had wandered across the Western Australian colony as it was being settled, and he recorded many species from Moore River and Toodyay. He was often accompanied by Nyoongar aides and by botanist Johnston Drummond, who was fluent in Aboriginal languages.

Gould's magnificent colour plates are still in demand more than 150 years later and their value steadily increases. Gould lived into old age, but Gilbert, one of our

During his roving missionary work, the founder of the Benedictine Community of New Norcia, Bishop Rosendo Salvado, was one of the early pioneers who compiled lists of Aboriginal words.
Photo – Courtesy of the Benedictine Community of New Norcia

first and best scholars of Aboriginal words and a brilliant preserver of animals, met an ugly death. At the age of 35, in a weird juxtaposition of events and roles, he was speared to death by Aboriginal people as he lay in his tent on the ill-fated Leichhardt expedition to Port Essington in Queensland in 1845.

OTHER SOURCES

From the first instances of European interaction with Aboriginal people, Aboriginal names for animals were commonly used. Ian's Nyoongar word list was inspired by many other sources. The writings of Dr Isaac Nind, who worked at the King George Sound convict colony during the 1820s, was one of the earliest sources. Equally useful were the diaries of Henry William St Pierre Bunbury, a military officer stationed at York, Pinjarra, Busselton and Williams during the 1830s, and the notes of Charles Symmons, Western Australia's first 'Protector of Aborigines' in the 1840s. Other information was uncovered in lists from John Stokes, who carried out British naval surveys of Australian waters in the 1840s, followed by the

writings of Roman Catholic Bishop John Brady in the 1840s and the diaries of British collector Guy Shortridge in the early 1900s.

A book published by George Fletcher Moore in the 1840s contained one of the most significant Nyoongar word lists.

Most of the information, however, came from the early thoughts and observations of pioneers and makes an interesting litany of reading. They included pioneer botanists James Drummond and Augustus Oldfield; the founder of the Benedictine Monastery at New Norcia, Bishop Rosendo Salvado; one of the Avon Valley's first settlers, Robert Austin; Janet Millett, the York-based wife of a missionary; early surveyor Henry Ranford; Western Australia's first Premier John Forrest, who, accompanied by Nyoongar trackers, explored parts of the south-west during his surveying duties in the 1870s; Ethel Hassell, who compiled a word list of the Wheelman tribe at Jerramungup in the 1880s; Alfred Bussell, a pioneer settler who spoke the Aboriginal language fluently; squatter Edward Curr, who sent lists of English words to settlers requesting them to supply the equivalent local Aboriginal words; Sam Isaacs, who had an Aboriginal mother and who lived near Margaret River; Surveyor Frederick Brockman who obtained much of his information from Sam Isaacs; Farmer Job Haddleton who lived near Katanning and wrote a book of notes in 1952; naturalist Richard Helms, who wrote a paper containing word lists of Aboriginal people living south-west of Mt Magnet and along the south-west coast; surveyor Lawrence Wells; Toodyay farmer Thomas Markey; pioneer settler Ednie Hassell, who compiled a list from the south-west capes region and Jerramungup; and pastoralist Bruce Leake, who listed Aboriginal words from Kellerberrin.

A series of jumbled word lists was compiled by the somewhat eccentric Daisy Bates (1859-1951). She originally came to Western Australia from Ireland in 1883 aged just 23. She worked as a governess, married and had a child, returned to England in 1894 without her husband and child to work on magazines, and then came back to Western Australia in 1901 to live with Aboriginal people. In 1904, she was appointed by the State Government to gather information about Aboriginal people. To carry out this task, she distributed 500 blank vocabulary booklets of chosen words to postmasters, police, station owners and other settlers, so they could note the local dialect equivalents. She collated the results and presented them to the State Government in 1911. Daisy Bates later lived with Aboriginal people on the Nullarbor Plain, buying food for herself and the tribe from her income as a freelance writer for the *Western Mail* and other newspapers.

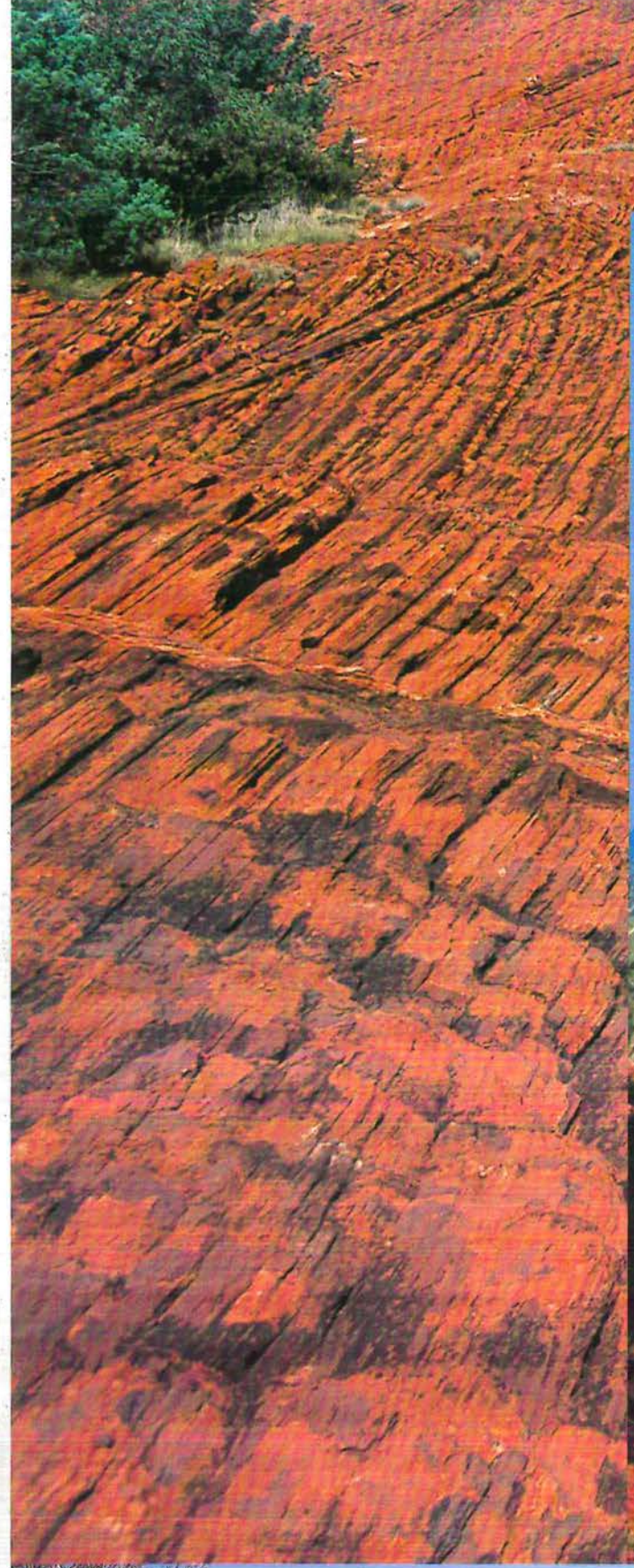
Although there have been a number of word lists published more recently, notably *A Nyoongar Wordlist from the South-West of Western Australia* compiled and edited by Peter Bindon and Ross Chadwick and published by the Western Australian Museum, this latest word list is the first to concentrate solely on the native mammals of south-western Australia.

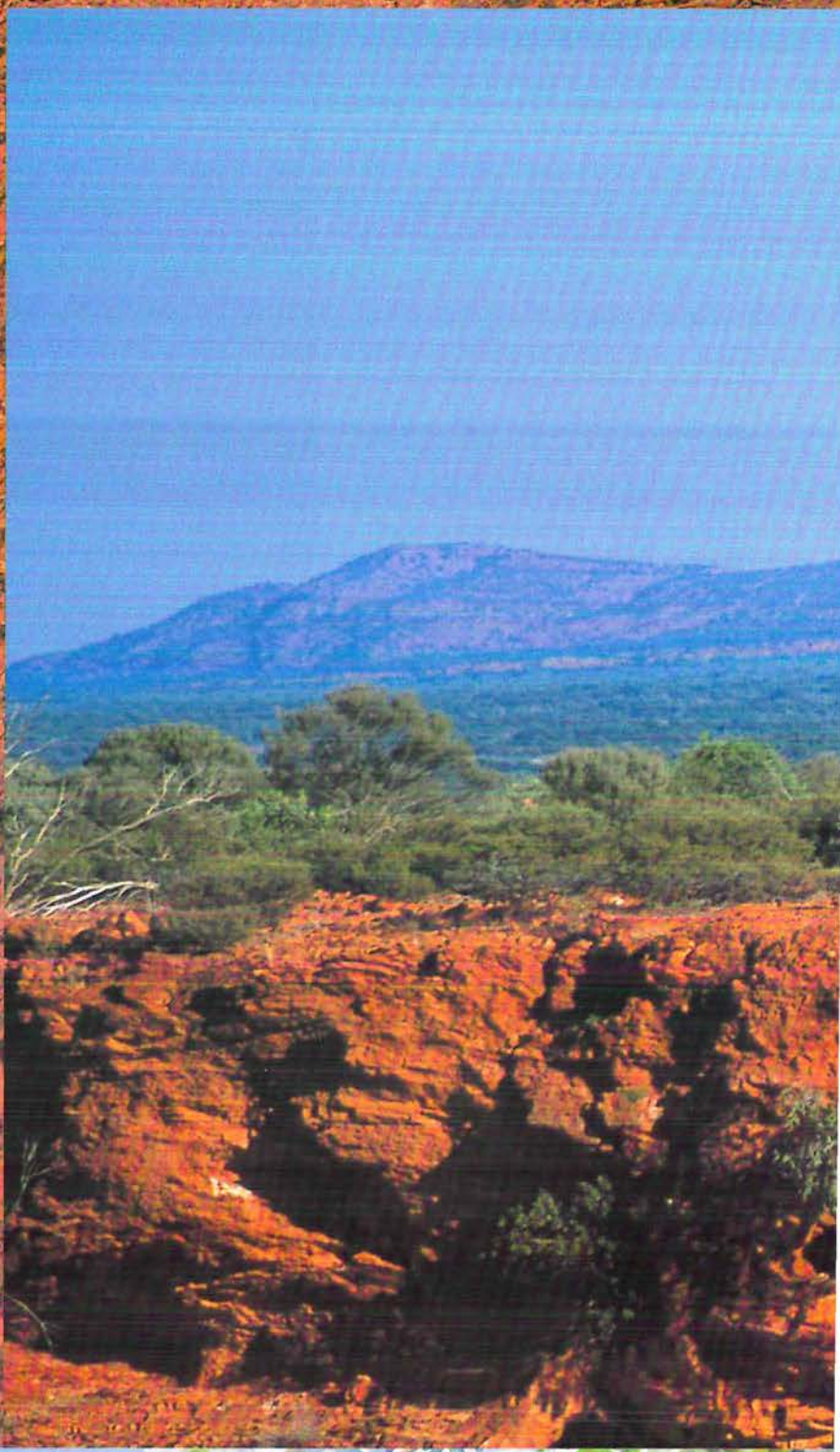
Above: Daisy Bates, pictured with Aboriginal tribesman Joobaitch early this century, lived with Aboriginal people to learn local dialects. In 1904 the State Government appointed her to gather information about Aboriginal words.
Photo – Courtesy of the Western Australian Museum

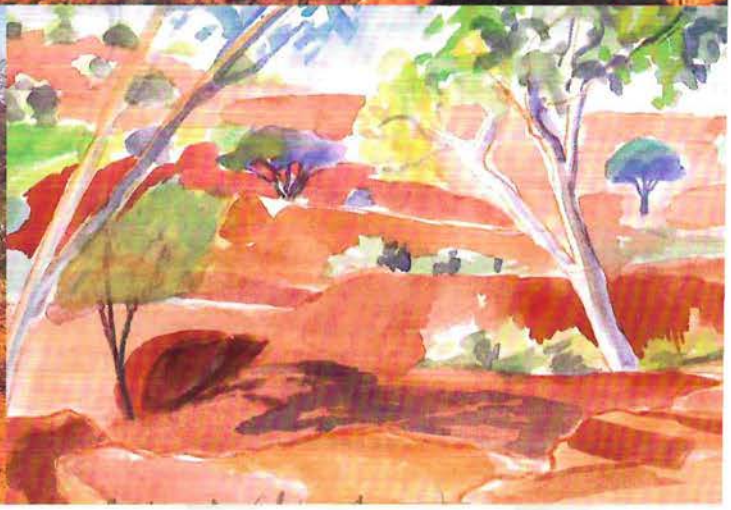
Right: Echidna is a Greek word. The Nyoongar words are nyingarn or donongerde.
Photo – Jiri Lochman

As well as providing a comprehensive Nyoongar word list of WA's native mammals, Ian's work was personally rewarding and fulfilling. It has provided the impetus for replacing common names of animals, formed artificially by an English translation of the Latin name, or by using English common names such as Gilbert's potoroo, with a more suitable 'local' name. If this aim is achieved, the official and popular use of Nyoongar names by Western Australians will be a tribute to the original inhabitants.

Sue McKenna is Acting Publications Manager at the Department of Conservation and Land Management and has edited a number of *LANDSCOPE* articles during the past few years. She can be contacted on (08) 9389 8644 or by email (suem@calm.wa.gov.au).





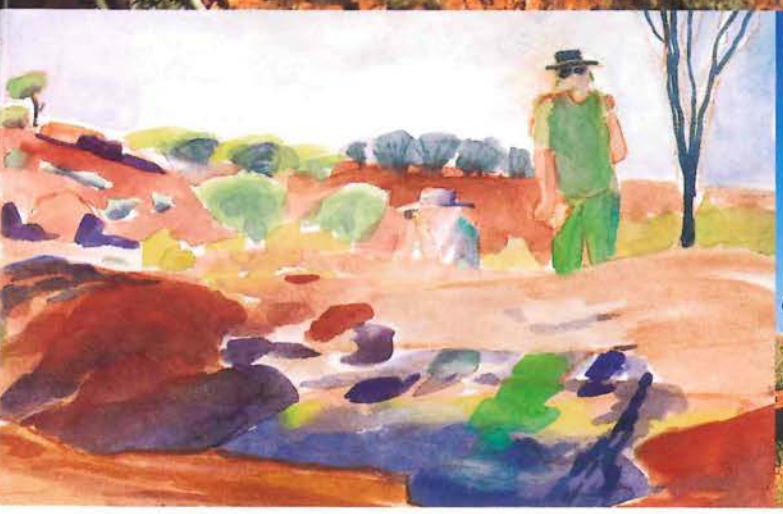


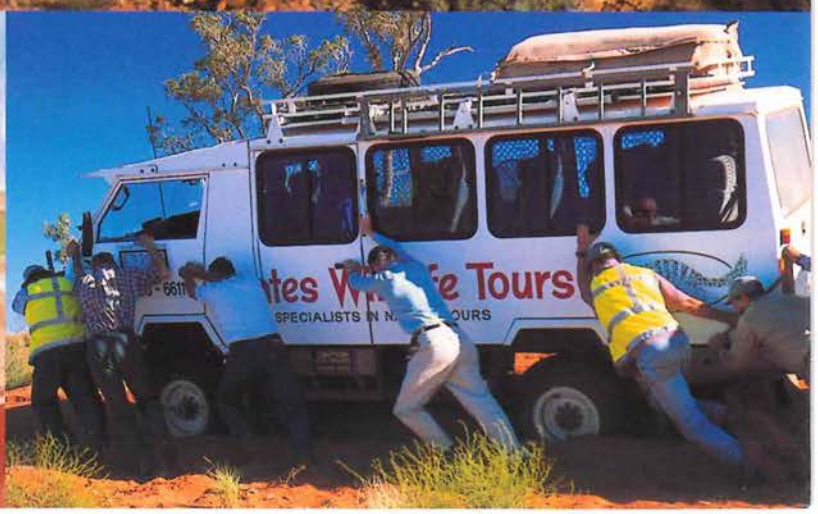
Landscape of the heart

A journey to the Carnarvon Range

by Kevin Kenneally and Jean Paton

In Western Australia's arid interior, at the edge of the Little Sandy Desert, lies the Carnarvon Range. A group of *LANDSCOPE* Expedition members immersed themselves in the wildness and vastness of this ancient world and found, in its remoteness, fulfilment, renewal and the unexpected.





In the pre-dawn glow of a late winter's day, we assembled at the Causeway car park, on the bank of the Swan River in Perth, and loaded the vehicles for our first *LANDSCOPE* Expedition to the Carnarvon Range in the Little Sandy Desert. The late Alex Harris, an environmental journalist, described the ranges as 'looming blue out of the sandplain, changing to brilliant red—a huge mass of crazily-tilted sandstone'. One of our leaders, Kevin Coate, inspired by Alex's descriptions, had heard whispers from people who had visited the area, but they were just that—whispers. "Nobody shouted loudly, in case too many heard," he said. In 1988, Kevin made his first visit to study the area's natural history. The 2001 expedition aimed to build on his initial work, and add to botanical collections commenced by Daphne Edinger in the proposed Carnarvon Range Conservation Park, located north of Wiluna between the Great Northern Highway and the Canning Stock Route.

JOURNEY TO BASE

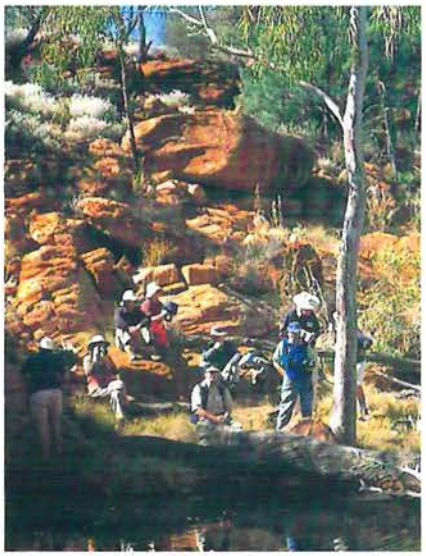
It would take us two days to reach base camp in the Carnarvon Range. We followed the Swan Valley north and stopped at Gingers Roadhouse to rendezvous with the first of the tag-along vehicles. This was the first *LANDSCOPE* Expedition to involve tag-alongs, volunteers driving their own vehicles who would be self-sufficient for the entire trip. Following the edge of the Darling Scarp, the convoy slowed to admire the monastic town of New Norcia. Jarrah and wandoo gave way to cleared farmland as we passed fields of wheat, canola and lupins. We enjoyed lunch near Wubin in a patch of York gums (*Eucalyptus loxophleba*), where there was time to observe patches of blue fairy orchids and numerous wattles just coming into flower.

The landscape was now flatter and we left the farmland behind for pastoral country dominated by mulga (*Acacia aneura*). At 3.00 pm we reached Paynes Find to meet more tag-alongs, before heading north again. The highway was littered with road-killed red kangaroos and euros, providing food for scavenging foxes, wedge-tailed eagles and whistling kites. Flocks of little crows also competed for the scraps.

Just south of Mount Magnet, we turned into Wogarno Station and met the rest of our tag-alongs. A champagne sunset at Lizard Rock was a great way to renew old friendships with veteran expedition members and meet newcomers to our program. We were a varied group of farmers, medical professionals, artists and academics—keen naturalists all.

Day dawned clear and still, following a relatively warm night in the shearers' quarters. After bacon and eggs at the homestead we bade farewell to Wogarno—but not before being entertained by the awesome speed and agility of a peregrine falcon attempting to flush an immature pied butcherbird from a mulga tree near the quarters. Before our departure, a 'tail-end Charlie' was appointed and call-signs were allocated. Once under way, CB radios sprang to life as Kevin Coate, in the lead vehicle, relayed directions and points of interest to the group. After a brief refuelling stop at Mount Magnet we continued to Lake Austin.

Here, we explored the old stone dwellings of a past generation of gold prospectors and saw the strange dunna dunna (*Lawrencia helmsii*) plant that is restricted to the gypsum surface of the surrounding lakes. After passing Cue, we stopped for morning tea at the old Nallan railway dam, which had an abundance of waterfowl and waders. Musk ducks observed here were later confirmed by the Western Australian Museum to be about 300 kilometres north-east of their known range. Our lunch stop was Lake Annean where, from the vantage of a gypsum rise, we were again impressed by the quantity of waterfowl. Then it was on through Meekatharra to an overnight bush camp on the southern branch of the Gascoyne River.



Previous page
Main: Carnarvon Range from the breakaways.
Photo – Kevin Coate
Bottom left: Volunteers checking pit traps.
Photo – Kevin Kenneally
Bottom centre: Watercolour painting of Muirs Pool, Carnarvon Range.
Painting – Fling Boyer
Bottom right: Cresting a sand dune.
Photo – Daphne Edinger

Left: Talbot Rockhole.
Photo – Kevin Kenneally

Below: Convoy at Lake Austin.
Photo – Kevin Kenneally

REACHING THE DESERT

By 7.30 am the next morning, we were heading for the range via Neds Creek Station. The dust from the convoy drifted through the mulga, and colourful yellow sennas and purple solanums lined the track. At Neds Creek, owner Ken Hill was there to greet us. We topped up our drinking water before heading into the desert. Mark Cowan, the Department of Conservation and Land Management's Goldfields Regional Ecologist, joined us here.

We were soon under way again, apart from a brief stop to climb Johnsons Cairn, a rock outcrop surrounded by masses of pink-flowering mulla-mulla (*Ptilotus obovatus*). Brightly coloured budgerigars flashed across the sky.

We startled many red kangaroos and euros from their resting places under bushes and, at times, reduced our speed to avoid those sunning themselves on these seldom-used station tracks. Emus were also common. We crossed numerous creek beds dotted with the white trunks of river red gums (*Eucalyptus camaldulensis*), before another short diversion to view Unabubba water hole.

We lunched in a patch of gidgee wattle (*Acacia pruinocarpa*), then continued east. A bustard was seen standing stock-still behind a bush, its beak pointing skyward in an attempt to blend with the surrounding vegetation. We noticed numerous camel prints and droppings along the track, so it was no surprise to overtake five camels. A little farther on we came upon another group of eight, including two youngsters.

As we neared our destination, the landscape changed to red sand and spinifex. Extensive areas had been burnt, but follow-up rains had coloured the landscape. Clumps of new-growth spinifex stood out against the red sand, alongside purple-flowered solanums and a large spreading pea (*Kennedia prorepens*) with its profusion of purplish-red flowers. Scattered through the red sandplain was the soft blue native cornflower (*Brunonia australis*).

Top: Kennedia prorepens—a common creeping pea on the red sandplains.
Photo – Kevin Kenneally

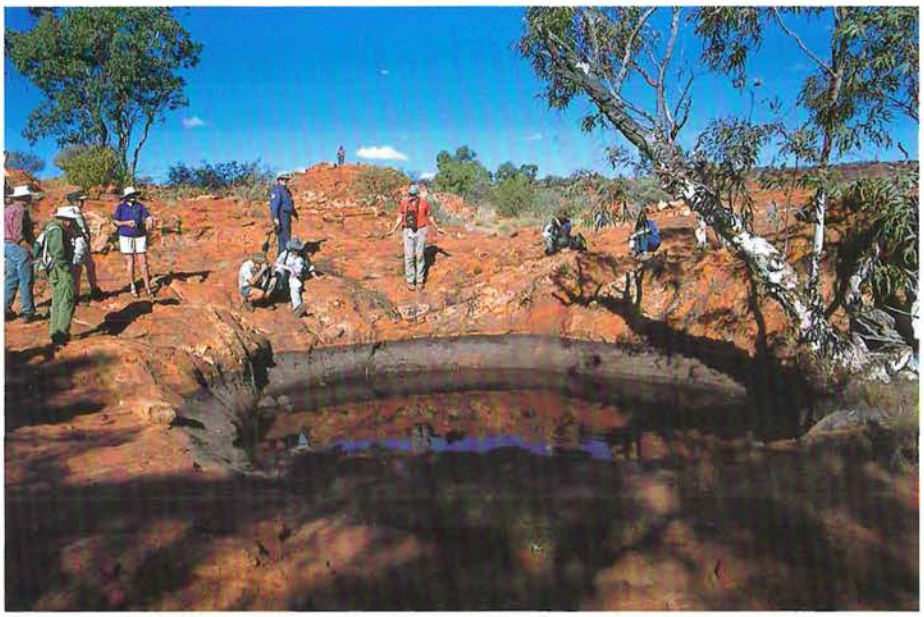
Above: The rare, rock-loving Chapman's tetratheca at Serpents Glen.
Photo – Daphne Edinger

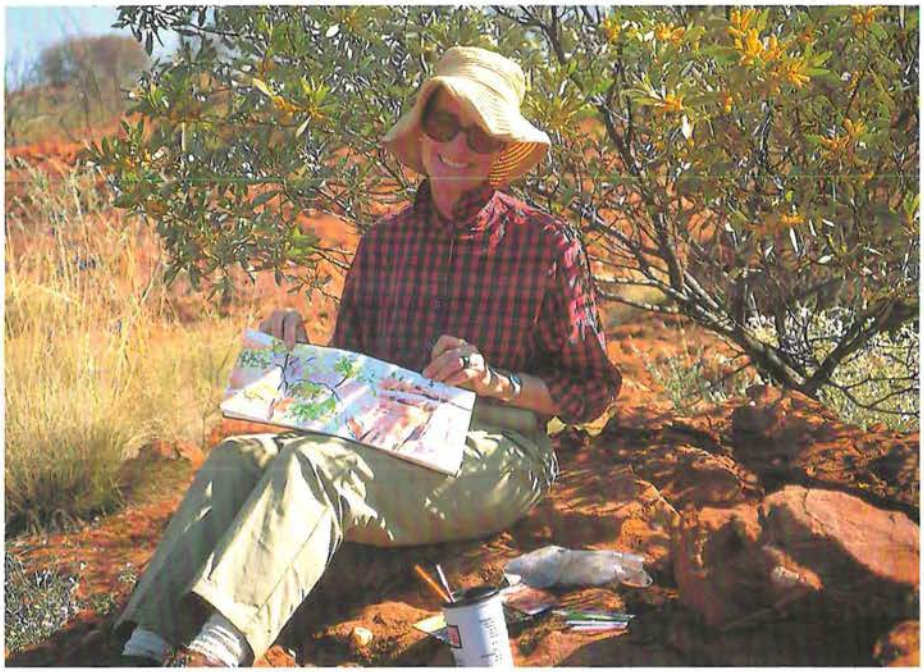
SERPENTS GLEN

The Carnarvon Range was at last within sight, but a steep sand dune provided a challenge for the fully-loaded Oka and trailer. Sandboards were laid and much pushing ensured the Oka crested the dune. We camped at Serpents Glen, a horseshoe-shaped area sculpted into the southern end of the Carnarvon Range. Its name is derived from Aboriginal rock art galleries in the sandstone overhangs.

Carnarvon Range was first explored in 1874 by John Forrest, who named it after Lord Carnarvon, the Secretary of State for the Colonies. Between 1907 and 1909, H W B Talbot surveyed part of the proposed park as an adjunct to surveying the Canning Stock Route. Until the 1960s, few Europeans visited the range. The former Western Australian Fisheries and Wildlife Department undertook brief biological surveys in November 1975 and March 1976.

The range consists of cross-bedded red sandstone that forms low, gently undulating hills, with occasional steep





Left: Good Camp Rockhole.
Photo – Kevin Coate

Centre left: Artist Fling Boyer at work.
Photo – Kevin Kenneally

Below left: A perentie basking on a breakaway at Yeelirrie Station.
Photo – Kevin Coate

cliffs and gullies containing a few semi-permanent pools named by doggers and explorers—Virgin Springs, Talbot Rockhole and Good Camp Rockhole. Red sand ridges and plains occur at their base and there is one salt lake, Lake Kerrylyn, in the area. In the late afternoon, we photographed the last of the sun's rays lighting up the towering cliff faces with fiery reds. The colourful landscapes were a favourite subject of volunteer Fling Boyer, who captured her experiences with watercolours and pencils. An accomplished artist, Fling's interpretations of the landscapes and animals were a source of delight for fellow travellers.

FIELDWORK

Once camp was set up at Serpents Glen, the fieldwork could begin. Our 25 volunteers assisted with a variety of scientific tasks. Dr Rick How, a zoologist with the Western Australian Museum, and Mark Cowan coordinated the terrestrial vertebrate survey; Kevin Coate focused on birds, adding to his observations from earlier trips; and botanists Kevin Kenneally and Daphne Edinger, assisted by Pat Angel (a volunteer with the Department of Conservation and Land Management's WA Herbarium), collected plants. And while we studied the wildlife, Dr David Webb from The University of Western Australia studied us! His research focused on people's interactions with the natural environment.

Working in small teams, volunteers were kept busy each day on a variety of survey activities in and around the Carnarvon Range. Each evening, we gathered around the campfire and shared the day's discoveries. These sessions were an opportunity for volunteers to discover the processes and difficulties involved in managing remote conservation areas—and to ask questions they had been saving up all day.

PLANTS

Fire has been a major modifying process in desert regions. This expedition enabled us to gauge the impact of widespread wildfires on the vegetation of the surrounding sandplains by comparing unburnt, burnt and regenerating sites. Of more than 200 plant collections made during our visit, 46 were new records for the proposed Carnarvon Range Conservation Park.

Some plants are unique to the area. Cascading from fissures in the rocks were nature's hanging baskets, the rock-loving *Tetratheca chapmanii*, with its clumps of bright pink flowers. This plant is common throughout the Carnarvon Range, but is not found outside this area. Also of interest was the northerly range extension of the pale pink starflower (*Calytrix praecipua*), again restricted to the sandstone outcrops. A broombush, *Melaleuca hamata*, was another significant northerly range extension, as it had previously been collected only from between Leinster and Leonora. It is related to the common broombush (*Melaleuca uncinata*) of the Wheatbelt.

At Good Camp Rockhole, a discovery was made while plumbing the depth of water in the pool. The stick came up covered in a slimy raft of dark green freshwater algae. Noticing that it was a species of *Spirogyra*, Kevin Kenneally rescued it before it was thrown back. Samples were preserved in 70 per cent alcohol. On our return to Perth, the material was sent to Dr Stephen Skinner at the Royal Botanic Gardens in Sydney. He identified it as containing *Spirogyra neglecta*, a desmid (*Pleurotaenium* sp.), and two species of *Oedogonium*. One of these, *Oedogonium silvaticum*, proved to be a new species record for Australia and the other is an undescribed species. These unexpected discoveries highlight the importance of doing survey work in remote areas.

MAMMALS AND REPTILES

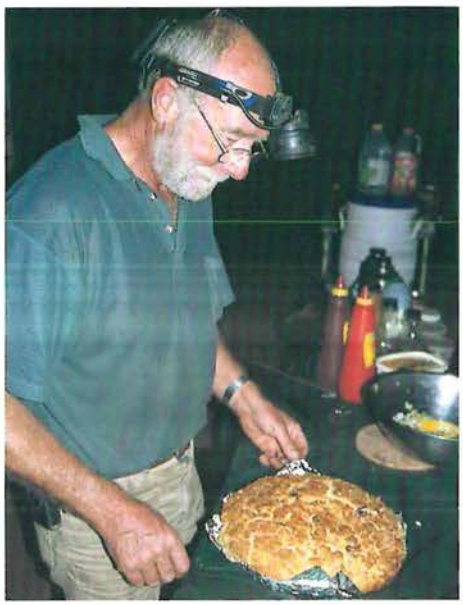
Under the direction of the zoologists, the volunteers set up traps in a variety of habitats within three kilometres of the campsite. These were checked each morning at first light. The intensive pitfall and Elliott trapping resulted in the identification of two small marsupials—the wongai ningaui (*Ningaui ridei*) and the lesser hairy-footed dunnart *(Sminthopsis youngsoni)*. Four rodents—the sandy inland mouse (*Pseudomys hermannsburgensis*), desert mouse (*Pseudomys desertor*), spinifex hopping-mouse (*Notomys alexis*) and the introduced house mouse (*Mus domesticus*)—were also recorded. The sandy inland mouse was found in all the pitfall and Elliott trap lines and showed marked changes in colouration, suggesting a genetic variation in this wide-ranging arid zone species. Only one house mouse was recorded, indicating that there was no residual high population level in this species following the good desert seasons of 1998–99.

Very old, dried droppings of rock-wallabies and stick-nest rats were found under overhangs above Virgin Springs, to the west of our campsite. The rock-wallaby droppings were probably of the central Australian race of *Petrogale lateralis*, but there was no evidence of recent activity. Droppings of stick-nest rats (*Leporillus* sp.) were found under the same overhang. No existing mainland populations are known for either of the two species of stick-nest rats.

The number of reptiles captured or seen was disappointing, as the cool nights and mild days of early August were not conducive to their activity. Although a diverse reptile assemblage had already been recorded from the area, our attempts to sample below-ground

Top: Native cornflower.
Photo – Kevin Kenneally

Above: Margo Webb admiring the snow plant *(Macgregoria racemigera)*.
Photo – Kevin Coate



Above: The wongai ningaui is one of Australia's smallest marsupials.
Photo – Kevin Kenneally

Left: Rick Curtis with his memorable damper.
Photo – Ric How

reptiles using pitfall traps proved unsuccessful. In fact, more than half of the species recorded were either caught by hand or observed during the day.

BIRDS

Although there was plenty of water in rock holes and seepage areas, bird life was generally scarce. Kevin Coate attributed this lack, even of common birds like the zebra finch, to the dryness of the surrounding countryside and the vast areas burnt by bushfires some eight months earlier. Abundant rainfall and a good season further north could also have contributed to the paucity of bird numbers, especially of nomadic species.

Nevertheless, the expedition added several new species to previous lists, the most notable being the rufous-crowned emu-wren, inland dotterel and banded whiteface. The rufous-crowned emu-wren, first spotted by Val Talbot and Sue Clarkson, were reasonably common in unburnt areas of spinifex and *Aluta maisonneuvei* between Serpents Glen and Talbot Rockhole. Dr Mary Bremner spotted a number of banded whiteface; Peter Wilshaw observed the inland dotterel on the stony plain country; and John Tucker disturbed two tawny frogmouths when he was returning from the summit of M6, a trig point at the eastern end of the range.

During most nights at Serpents Glen and at our camp in the breakaways, we heard the distinctive 'tukka-tukka-tukka' calls of spotted nightjars and 'chirring' sounds from owlet nightjars. While walking upstream from Talbot Rockhole, two owlet nightjars were flushed from their roosting hollows. Seventy-one bird species were recorded in the proposed park and the adjacent Blue Hills Pastoral Lease during our visit. These recordings, together with plant records, are included in a paper being prepared by Kevin Coate and Daphne Edinger for publication in the journal of the Western Australian Naturalists' Club.

HOMEWARD BOUND

After five days at base camp it was time to begin the journey home. Our route took us past the abandoned Blue Hill homestead. We spent a night camped in the breakaways, our last evening within sight of the Carnarvon Range. Next day, we headed to Wiluna and Sandstone via Granite Peak Station, with a memorable morning tea stop at Spriggs Pool, sheltered by arching white-gums. We spent our last night at Paynes Find Tavern.

Volunteer Eric Carlin summed up his impressions of the trip in the expedition diary:

> ". . . we must say a fond farewell to Serpents Glen, jewel of the Carnarvon Range. It was just the Glen we were saying farewell to, but in years to come, 'hived in us like old honey', would be our memories of it. Memories of the sand hill barrier on the first day and the adrenalin rush as succeeding drivers charged and slewed and wobbled triumphantly over the top . . . Memories of Mark Cowan sacrificing yet another finger, his lips tightly drawn as we pumped him with questions regarding the mammal in his fist. Memories of the morning the hopping-mouse escaped and was pursued enthusiastically around the campsite until tackled and trapped by John Tucker. Memories of Kevin Coate leading his lemming-like bird enthusiasts in pursuit of the . . . as-yet-unsighted wren, honeyeater, swallow, babbler, bellbird, falcon . . . Memories of rockholes surrounded by exquisitely beautiful river gums—Good Camp Rockhole, Talbot Springs, Virgin Springs. Memories of the climb to M6 and the views of the country spread out below and, in the distance, the breakaways. Memories of improbable tucker and a most memorable damper created by Rick Curtis."

And so ended another *LANDSCOPE* Expedition.

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Jean Paton is the Administrator of *LANDSCOPE* Expeditions. She can be reached on (08) 9334 0401 or by email (jeanp@calm.wa.gov.au).

Kevin and Jean acknowledge the volunteers, leaders and support crew for their companionship and commitment to the 2001 Carnarvon Range *LANDSCOPE* Expedition.

ENDANGERED!

Greenough alluvial flats

Who would have thought that a half-hectare site (previously cleared and with buildings erected on it) smack bang in the middle of at least 130,000 hectares of agricultural land, could still contain plants not thought to exist in the area since the end of the 19th century?

When Senior Research Scientist Terry Macfarlane saw the site in 1983, he couldn't believe his eyes! Not only did it contain the declared rare long-flowered nancy (*Wurmbea tubulosa*), but also a number of native shrubs, perennial herbs and grasses. The long-flowered nancy population was subsequently fenced, but Terry was keen to see the whole site protected, as he was convinced that it was the last fragment of the original vegetation that used to cover the 130,000 hectares of the Greenough alluvial flats. The question was: how does one convince anyone that this degraded site is biologically important, especially when weeds outnumber native plants by a thousand to one?

The WA Threatened Species and Communities Unit (WATSCU) was convinced. In 1998, with funds from the Natural Heritage Trust and the Department of Conservation and Land Management, staff from the unit researched the available literature and archives from the Royal Botanic Gardens of Melbourne. This enabled them to describe the original vegetation: a low forest of summer-scented wattle with scattered river red gum over grassland and herbland. The remnant plant assemblage at the site became classified as a Critically Endangered Threatened Ecological Community.

When the third round of Threatened Species Network Community Grants opened in 2000, it took little effort to convince the National Trust—one of three owners of the site—to support a funding application for an experimental restoration program. The application was successful; partly because of the status of the Threatened Ecological Community, but also because the National Trust were so committed that they had even enlisted the involvement of the Walkaway Primary School.

Article and main photo by Sheila Hamilton-Brown
Insert photo by Terry Macfarlane

The school children collected seeds of native species from the site in the spring, propagated some of them in a local nursery and planted the seedlings out in the winter. At the same time, a number of trial plots were set up on the site, which were subjected to various chemical weed control and regeneration (smoke treatment and control burning) treatments to stimulate germination of soil stored seed.

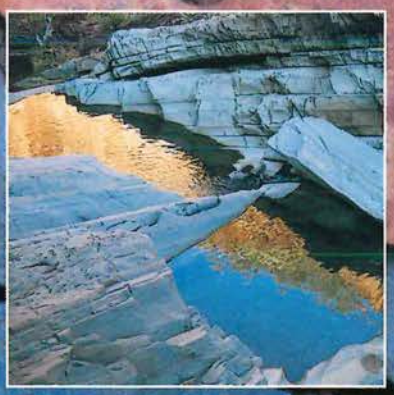
All plots are still being monitored and the information collated to determine the best method to control weeds and restore the entire site—this will take a few more years yet.

Looking at this degraded site now, it is easy to dismiss the efforts at restoration as wasted time and money. But the work will restore a glimpse of the original native vegetation of the Greenough flats, as much a part of the natural heritage of the State as the numbat or malleefowl.

In a different light

A photo essay by Cliff Winfield

Way back in 1985, the very first issue of *LANDSCOPE* featured 'The Ever-Changing Light', a photo essay by Cliff Winfield. The theme of the essay was that the landscape of the Pilbara was so stunning, yet so difficult to capture on film.



In the introduction to the 1985 essay, Cliff said of his photography: "Capturing the massive landscape and its variety of textures and hues presents problems of perspective, contrast and light".

Having just returned from a recent holiday in Karijini National Park—the first time back there since 1984—Cliff called *LANDSCOPE* to say that the Pilbara landscape still stirred emotions of awe and wonder, but this time his journey took on new dimensions.

Late afternoon—cruising at speed and heading north-east on a silky grey sealed road with barely a ripple on its surface. It snakes elegantly along the mulga and spinifex floor of the valley towards a horizon outlined with the familiar shapes of the hills of the Hamersley Range. Contrast this to my last visit to the Pilbara when it was a solid drive from anywhere on very rough, tyre bruising, rocky, dusty roads. In those days, the arrival itself had a sense of achievement, the scenery was an amazing bonus.

ANTICIPATION

Because the scenery is so easy to get to now, would my sense of arrival be less this time? Would there be thousands of tourists everywhere? I had been in these hills many times, and felt moved by their grandeur and raw beauty. I'd even say they were some of my favourite places on this earth. But as we drew closer, I felt a bit like I was about to meet an old friend after many years, and I found myself wondering whether they would be as special as I remembered them. Wondering whether our relationship had survived.

This time my travelling companions were my family, including two small boys. I knew the gorges had claimed several lives—including a young boy. I wondered whether safety would still be an issue.

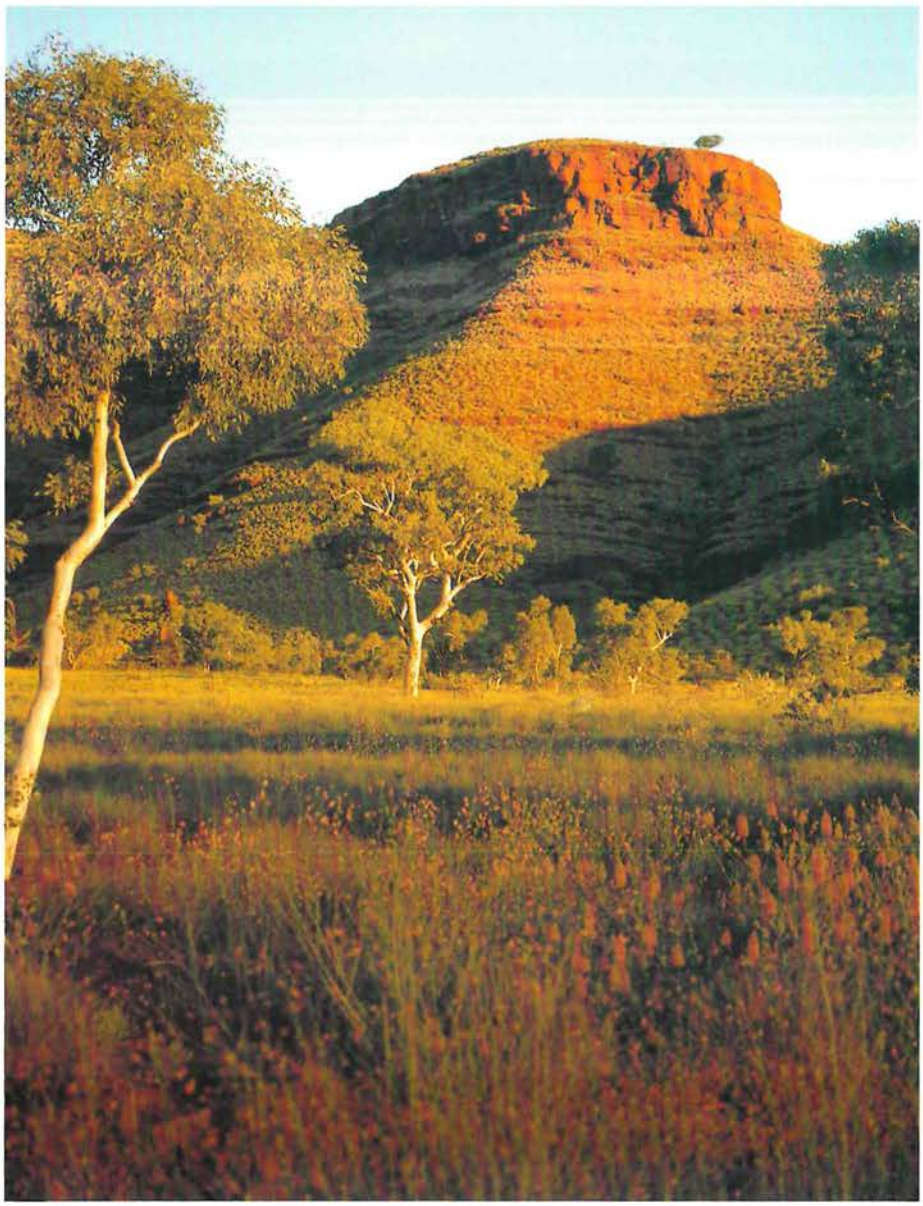
Obviously, the red rock hills and the ever-changing light would still be there. Much else had changed, though. The new highways, iron ore mines adjacent to the national park, joint management with Aboriginal people, a flash new visitor centre (see 'Karijini Dreaming' on page 10), and of course probably ten-fold more visitors. Even the name of the national park was new—Karijini.

Then the setting sun began turning bright burnt orange. In a matter of minutes, the west-facing slopes of the hills started to glow as if they were red hot. They have probably done this for three billion years, but if you've just arrived from a city, or flat farmland, or a green forest, these glowing hills are awesome to behold and once again my passion for the Pilbara flowed back.

MORNING, DAY TWO

Looks like rain on the horizon! Previous visits to Karijini were characterised by a crystal clear blue sky and stark shadows and light. In the thickening cloud, the colours were becoming soft and pastel. I could see that in many ways, on this visit, I would view Karijini in a different light.

The Pilbara is not really my country; I grew up alongside a very different national park. I used to watch the runway lights of Perth airport from the edge of the scarp in John Forrest National Park. I'd watch the coming and going planes and wonder about their destinations—mostly 'up north'. Compared with today, air travel was very expensive, and both the journey and the destinations were exotic experiences for me. So, during my previous visits to the Pilbara, I'd been a consumer of the scenery and the experience—a visitor in a foreign land—intrigued by the new and the spectacular, and influenced by the 'last



Previous page
Main: Snappy gums, red dirt and spinifex—true Pilbara country.
Inset: Liquid gold light on the floor of a gorge.

Left: The hills begin to glow in the late afternoon sun.

frontier' culture that pervaded. I had perhaps been naive to the issues confronting the park managers.

I now work in park and visitor services management in the tall forests of the south-west. I have come to realise that one of the most important issues in park management is preserving the visitor experience. As a consumer, I used to pursue the 'magic spots' in the bush that required effort to get to, but rewarded that effort with great beauty, solitude—or good fishing.

Access to wild places is easier now. Air travel is affordable, four-wheel-drive vehicles have proliferated, the highway network has extended and the road surfaces have improved, and of course the information revolution has occurred. I learnt a lesson about communication. I once published in a magazine a few spectacular pictures of one of my magic spots. When I went there next, half-a-dozen four-wheel-drive vehicles were snuggled in to *my* place by the river.

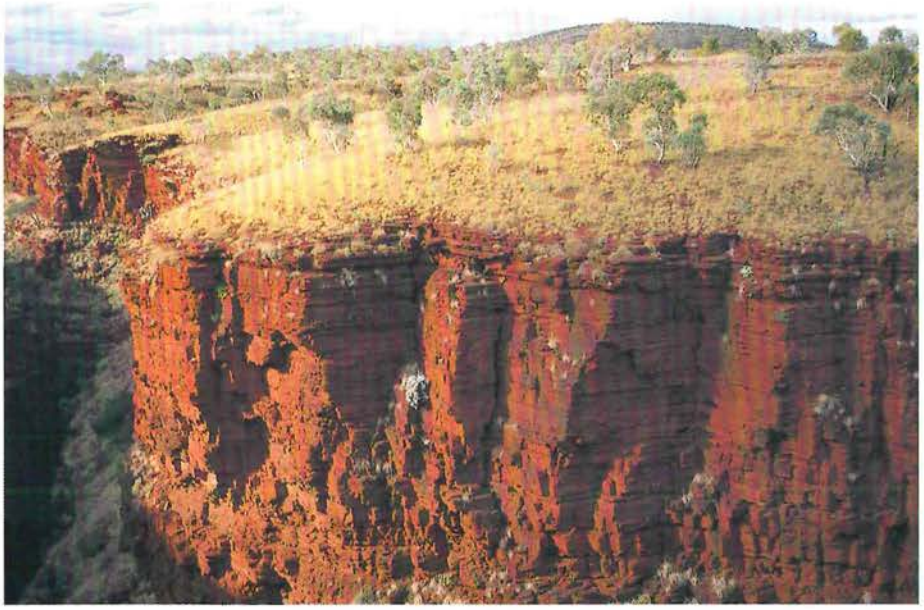
We have a very mobile population, and now there are many more visitors to my 'magic spots'. In response to visitor pressure, many of those places have been 'hardened' to preserve the environment. Tracks become roads, beaches get car parks, toilets, showers and change-rooms, and riverside campfires become gas barbecues.

We camp at Dales Campground. Middle of the night, pouring rain on the tent, everyone else seems to be fast asleep. I'm there with images of the family being swept into Dales Gorge in a flash flood. You know how things seem a lot worse in the pitch black. Wide-awake, I set forth to solve the problem of magic spot thieves. They had short-circuited my system. I'd given them the image and the location of the magic spot, so they got to it without having to put in the hard work.

I'd been reading earlier in the night. Now, at three in the morning, it was

Above: Textured plants atop *Jarndunmunha* (Mount Nameless) looking into Karijini National Park.

Right: Tiny specks—risk-takers at the base of one of Joffre George's red rocky walls.



Left: View from Knox Gorge Lookout across the pastel, spinifex-clad hills.

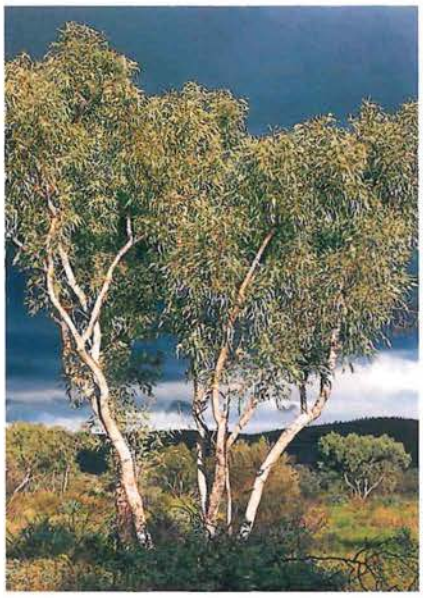
Below: Mt Bruce displays the classic Pilbara palette in rich light-yellow grass, red-brown rocks and deep blue sky.

clear to me that you can look at our national parks as if they were libraries. There is a range of libraries, from the State Reference Library to the corner video library. Most libraries are multi-purpose (apologies to librarians who I'm sure have different words for 'multi-purpose'). *Thomas the Tank Engine* and other kids' books on the left, light-weight magazines and papers on the right, fiction straight ahead, over there the non-fiction—how to raise chooks, play cricket or grow camellias—and then the reference section.

So, should our parks be like libraries? Some have light-weight 'been there, done that, tick it off' experiences, some hold Pullitzer Prize novels—the more pages you turn, the more intriguing and rewarding they get. Some have really good guided discoveries for kids. Some are kept purely for scientific reference. But then again, a lot of people read comics. Eventually I fell asleep again.

There must be a better way than hardening sites to protect them. If you apply yourself to discovering the intricacies of the park, you should be rewarded. Managers must not seek to homogenise the experiences, so that each park site looks the same but in a different landscape. Let's have a range of some places with no interpretation, to some places with visitor centres; places you can only get to after a hike on foot, to places where 40-seat coaches can deliver people in wheelchairs; places with backpack tenting, to others with serviced cabins. We need to plan and provide a spectrum of places to visit, and to protect that ethereal notion of reward for effort.

Probably the most important change since the 1980s is the advent of park management plans. They give communities an opportunity to have their say on what happens to their favourite places, and park managers



an opportunity to air their strategies to preserve biodiversity. The real challenge is for park planners to provide for this spectrum of experiences.

At Karijini, what appears to be a veneer of commerciality—the visitor centre, the smooth sealed roads and the regimented camping grounds—are probably the newspapers and magazines of my national park library. These 'modern necessities' make the values of the park more accessible to a wider population and, in the scheme of things, that can only be of benefit both in the understanding of the values of this park and in the acceptance of the great challenges confronting park managers generally. But what has it done to the experience?

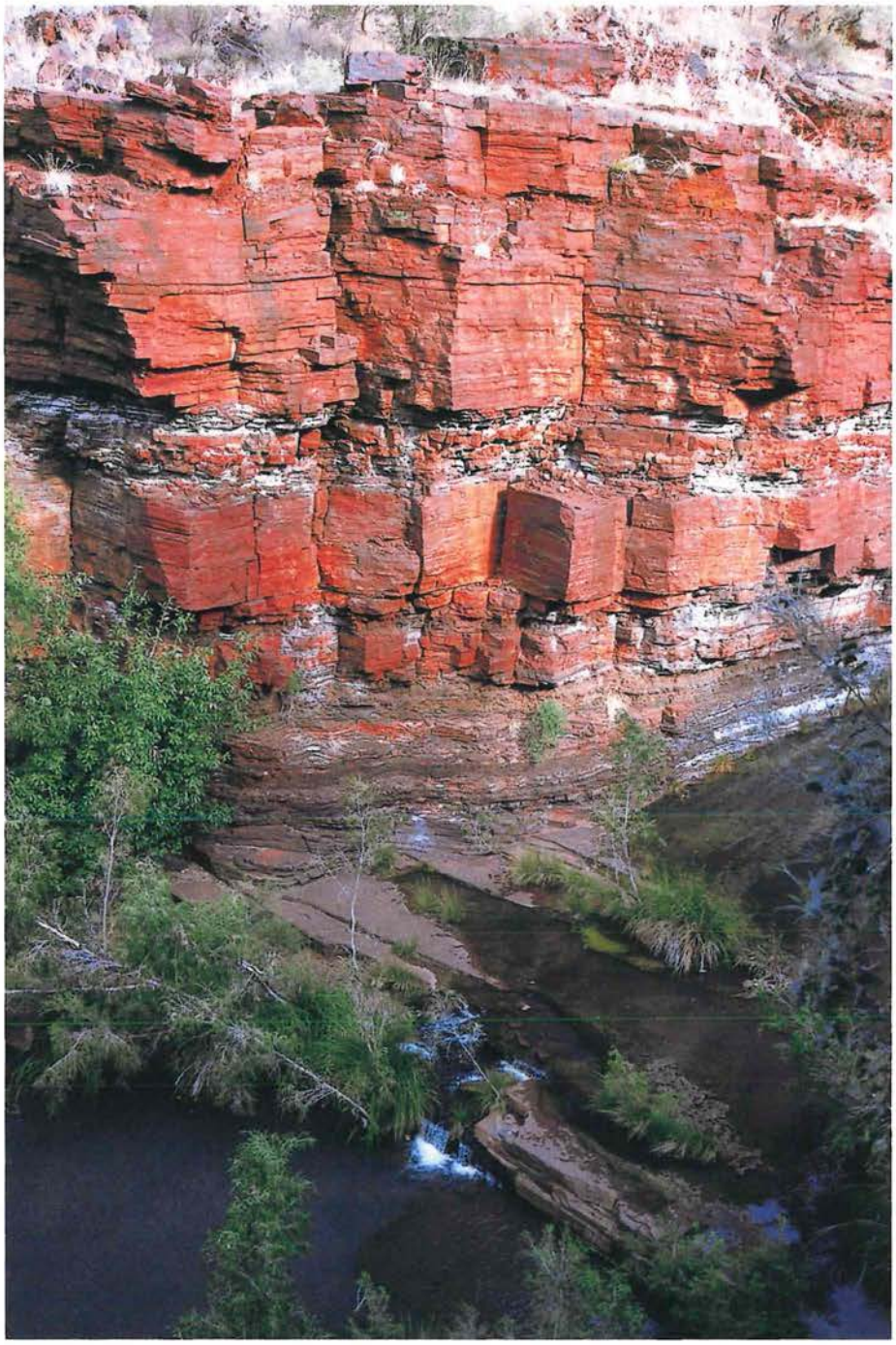
I guess, for me, Karijini does provide challenges for the risk takers, protection from natural hazards for the vulnerable, comfort for those addicted to it and security of ecological values, while it evokes respect for the traditional owners. The boys complained that there was nowhere in the campground to play cricket!

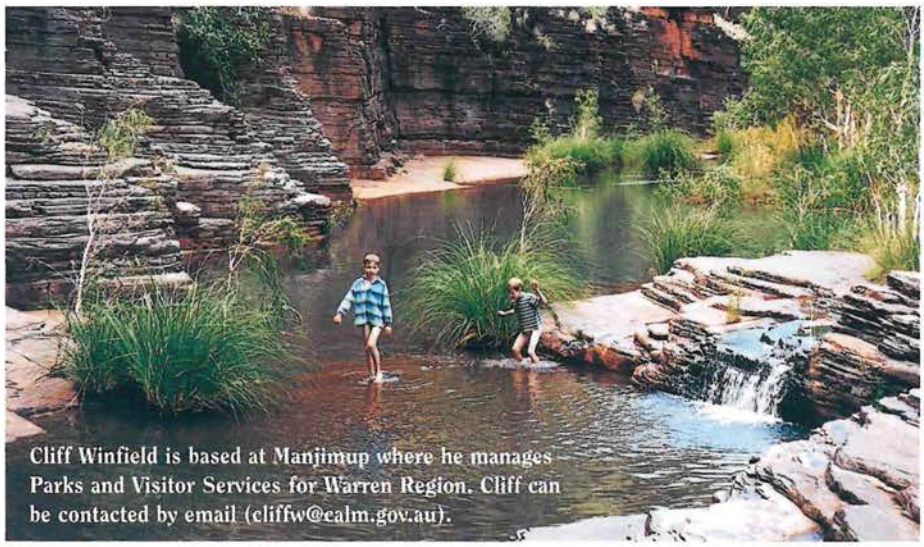
So my return visit turned out to be a journey through time and space, trying to come to terms with preserving the experiences of the past—in a brave new world. Once again, apologies to librarians!

Above: Dramatic, black, rain-laden sky over our sunlit campground.

Above right: Looking down into Dales Gorge from the safety of the lookout.

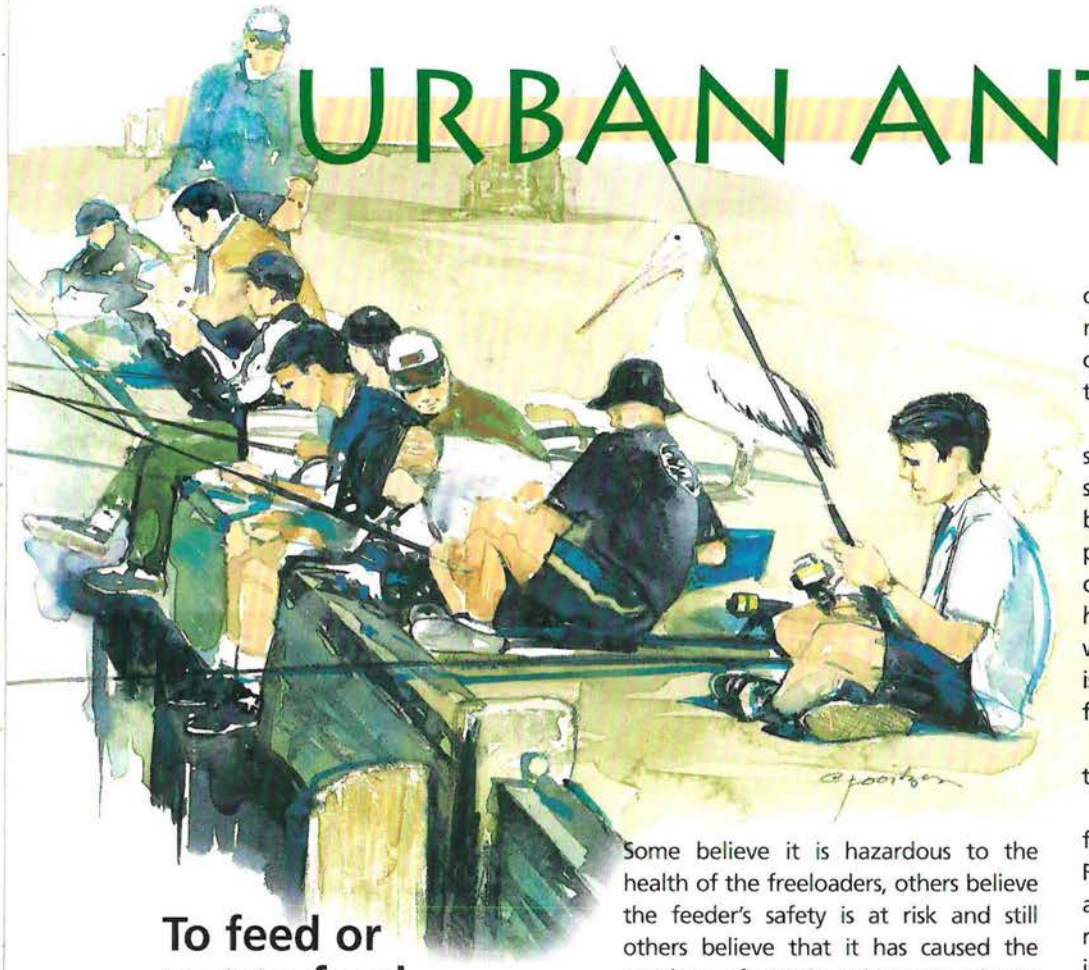
Right: The boys cooling their heels in the chilly waters of Dales Gorge.





Cliff Winfield is based at Manjimup where he manages Parks and Visitor Services for Warren Region. Cliff can be contacted by email (cliffw@calm.gov.au).

URBAN ANTICS



To feed or not to feed..

People are inquisitive by nature and it is not surprising that they have always been interested in collecting objects of various kinds, especially those relating to nature. It might also be said that the need for possession and entertainment resulted in the age old habit of attracting wild creatures to perform in our presence. Or is it simply a survival trait handed down from our ancestors to keep a ready food source close at hand?

One of my first treasured recollections about wildlife was feeding the garden birds on my grandfather's verandah in Subiaco. From this I learned a deep appreciation of nature and wild creatures. Across the road, old Mrs Cheese also used to do the same with her grandchildren and, if the truth were known (according to a recent survey in Brisbane), so did four out of every ten households in the street.

The old debate about whether or not to feed local urban wildlife is still simmering. According to a recent article in *Wildlife Australia*, we need to get scientists to study the effects of wildlife feeding. While there has been no serious scientific research conducted in the suburban environment to provide a valid conclusion, there are those who believe the ecological implications are not good. Some believe it is hazardous to the health of the freeloaders, others believe the feeder's safety is at risk and still others believe that it has caused the numbers of certain nuisance species to explode.

For example, hand-feeding flocks of parrots in parks is thought to be exacerbating a situation where the numbers of several species are starting to cause property and vegetation destruction and, possibly, the displacement of other birds in Perth suburbs. Silver gulls and ravens have become frighteningly bold, noisy and messy at picnic sites and shopping centres, where scraps of rubbish are left about. And on it goes, with undesirable animals such as rats and mice also getting in on the act.

When the seasonal fruits of Moreton Bay fig trees fall at Matilda Bay on the Swan River, black ducks and other birds innately equipped with excellent food foraging skills, leave the picnic sites to concentrate on the banquet. The birds do not wait until the figs are exhausted, however, they simply move back and forth to other sites as opportunities arise. It is unlikely that occasional 'handouts' would provide a large proportion of an individual's diet, as wild seasonal food seems to be readily available and eagerly sought. On the other hand, it is a matter of concern at Lake Monger where a constant stream of tourists and locals are overfeeding wildlife. Here, the frequent distribution of large amounts of bread can pollute the environment or cause nutrition loss by swelling and filling birds crops and stomachs to such an extent that they do not eat their natural foods.

In parks and waterways, where swans, geese and pelicans congregate in summer, food-offering visitors need to be wary of being nipped and careful to protect small children from being knocked over by exuberant beggars. Another hazard unwittingly created for urban wildlife and a sure way to spread disease, is when dropping-polluted residue seed from aviaries is fed to wild birds.

So are we doing harm when we feed the wild animals?

Non-native species should never be fed, either in public or private areas. Feeding of corellas, rainbow lorikeets and doves is likely to increase their high reproductive rate, causing negative impacts on native species and major problems for agriculture and for biodiversity conservation.

It is probably a good idea to curtail our habit of feeding wildlife in public places. However, minimal backyard feeding (not overfeeding) with appropriate kinds of food could provide owners with a better understanding of the natural world. It is imperative, though, to consider the needs of wildlife before our own.

BY JOHN HUNTER

DID YOU KNOW?

- *Providing water dishes and planting your garden in such a way as to encourage native wildlife is a real buzz. See* LANDSCOPE *Vol 10 No 2: 10-16 (1994).*
- *If you have to feed native wildlife, do so sparingly so that they are not put at risk or become dependent on handouts from people.*
- *If you find sick, injured or orphaned native wildlife, the Department of Conservation and Land Management has a WildCare helpline. Call (08) 9474 9055.*

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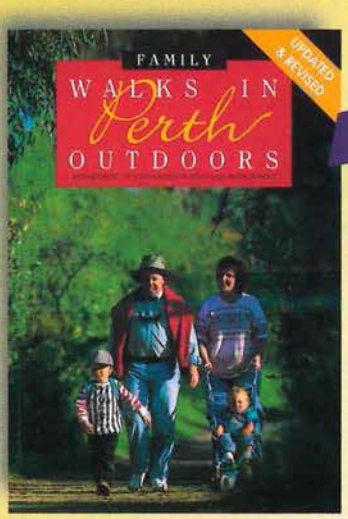

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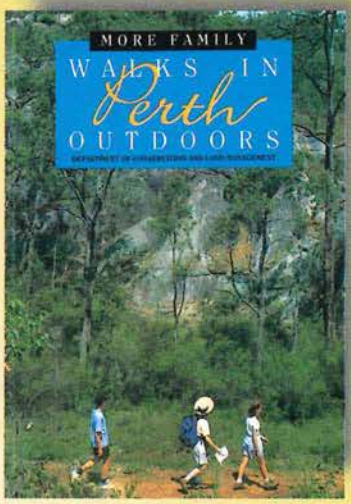

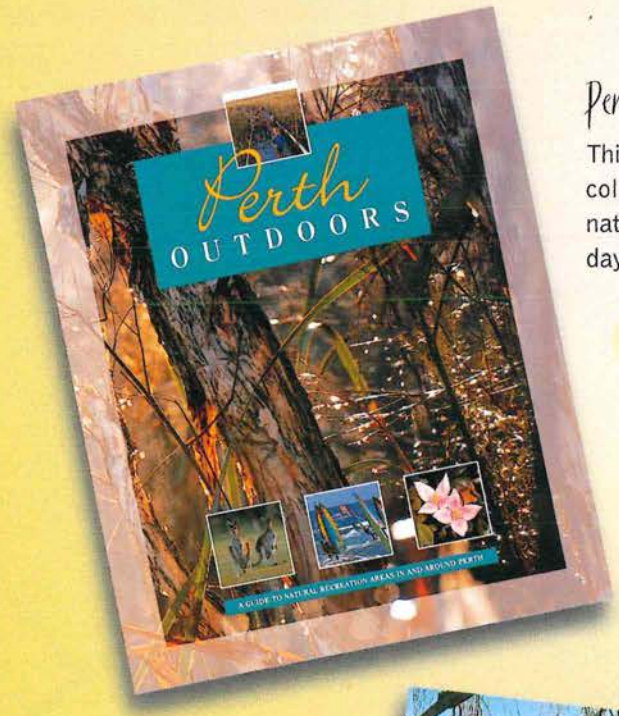

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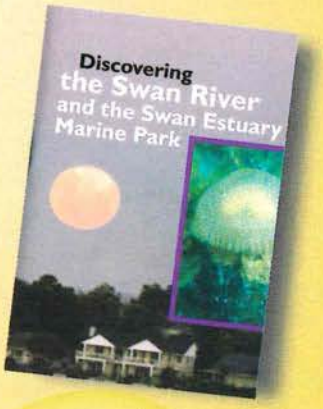

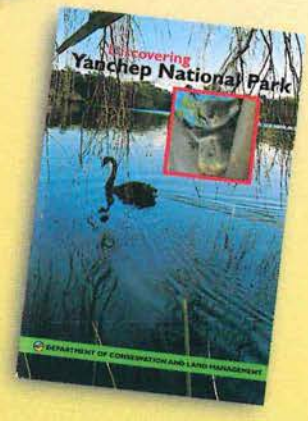

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