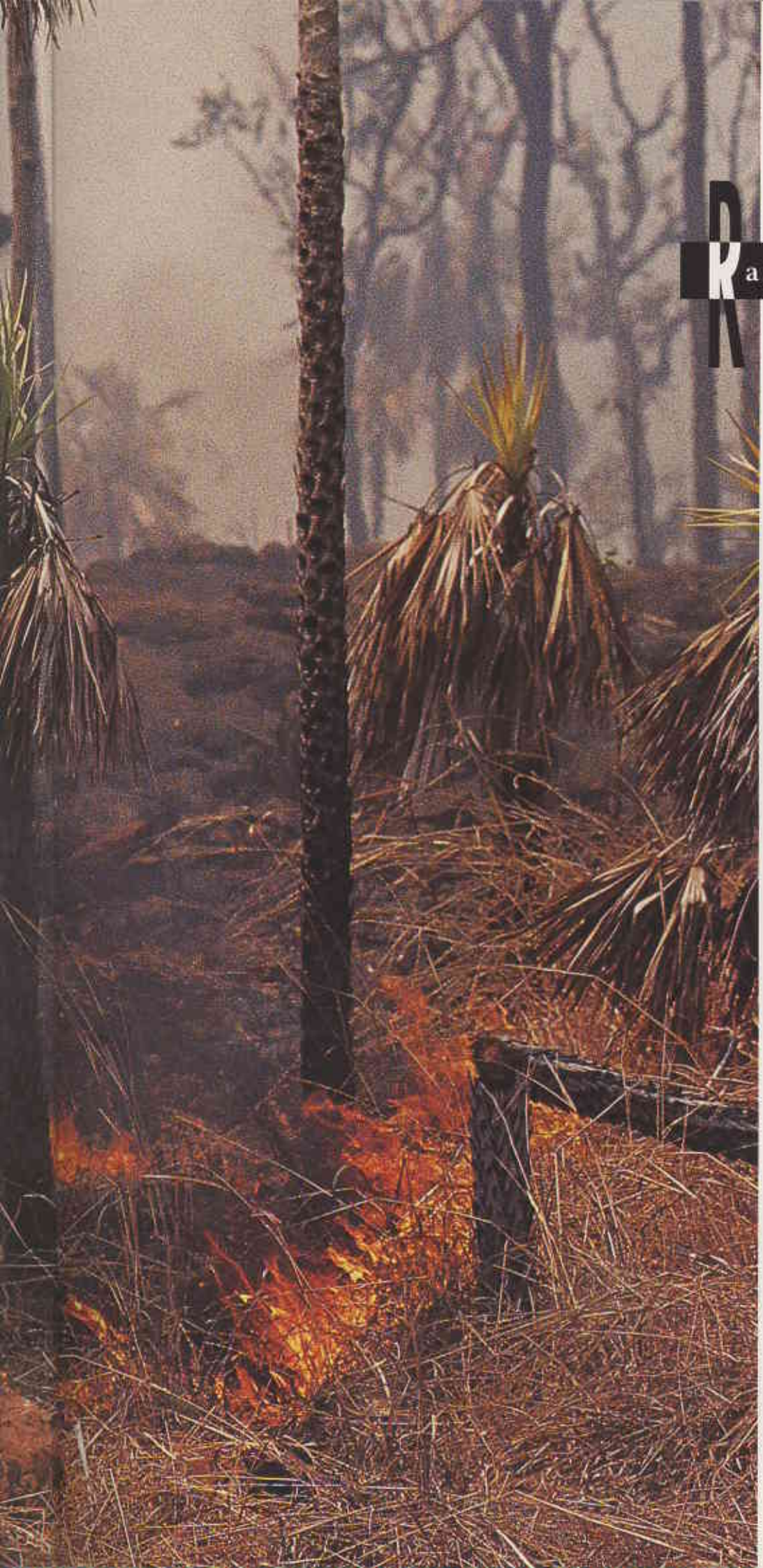


Rainforests and Bat

A LANDSCOPE Expedition to the Mitchell Plateau

by Kevin Kenneally, Daphne Edinger and Norm McKenzie

Visit a remote region of Western Australia . . . Find previously undiscovered species of animals and plants . . . Collect information vital for conservation. If that's your idea of fun, a LANDSCOPE Expedition could be just the adventure you've been waiting for.

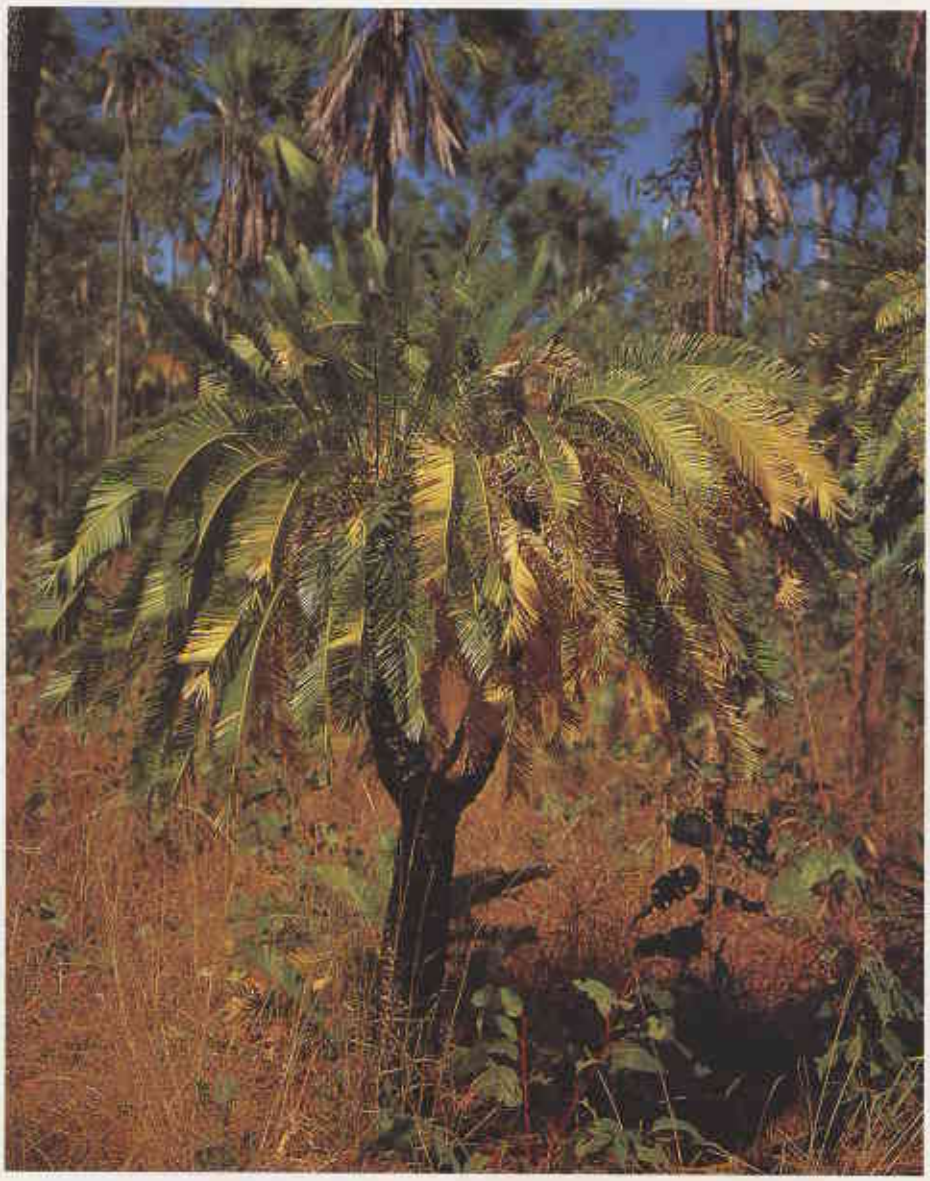
Spending 10 days studying plants and animals in the far north-west of Western Australia would be some people's idea of heaven. Recently, 24 volunteers grasped just such an opportunity by joining the June *LANDSCOPE* Expedition to Mitchell Plateau. They were able to visit a remote and exciting area of the Kimberley, and to work alongside scientists in learning more about its natural history. The scientists benefited by receiving funding for the project and assistance with the fieldwork from a team of enthusiastic paying volunteers. The volunteers were able to get first-hand experience of working in a remote area and being directly involved in Department of Conservation and Land Management (CALM) research projects. And everyone gained from the enormous team spirit and bonhomie that develops during 10 days of working in the field and camping under the stars.

LANDSCOPE Expeditions are offered through the University of Western Australia Extension program, and they are made possible by the contributions of the volunteers. Such expeditions allow CALM to continue to do valuable work, documenting the biodiversity and improving the conservation estate of the State.

The Mitchell Plateau region, in the north Kimberley of Western Australia, has high conservation value and contains patches of remnant rainforest, savanna woodlands and wetlands, making it a focal point for research into tropical ecosystems. But it is only within the past twenty years or so that it has been possible to gain access to much of this remote region.

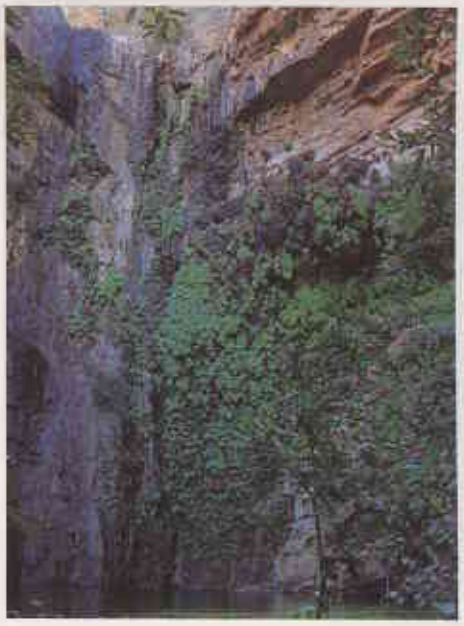
The major scenic and recreation attractions for tourists are the Mitchell Falls and the fan palm community. Although there are no national parks or nature reserves in the area, its conservation values have been recognised by the recommendation that the Mitchell River and the estuarine environments of the Lawley River be included in national parks, and that areas of the Plateau be set aside as conservation parks.

An important purpose of the expedition was to monitor rainforest patches on the Plateau. One of the many fascinating features of the Kimberley region is that it is sprinkled with patches of rainforest. These rainforests are not like lush tropical jungle, but they do include an abundance of plant and animal species that are only found in rainforests. The patches vary in size from groups of a few plants to communities covering some 20 hectares, and their small size has made them particularly vulnerable to disturbance. Fire and feral cattle are the two major damaging influences on rainforest in the Kimberley. Patches are being trampled, opened up, invaded by grasses and then burnt, leading to a contraction in their size. CALM is keen to conserve these unique communities, but there are more than 1 500 rainforest patches scattered across 170 000 square kilometres of the Kimberley. Because they are so dispersed it is not possible to represent their full biodiversity in any feasible network of conservation reserves. To ensure their survival there must be active management and



Previous page
Fire in the fan palm (*Livistona eastonii*) community, Mitchell Plateau.
Photo - Kevin Kenneally

Left: A Kimberley cycad (*Cycas lanepoolei*).
Photo- Kevin Kenneally



Waterlily (*Nymphaea gigantea*) pool on Mertens Creek.
Photo - Kevin Coate

Cliff face and plunge pool at the head of Emma Gorge in the Cockburn Ranges.
Photo - J. McGeough

On the track to Crystal Creek.
Photo - Kevin Kenneally

protection of patches, both inside and outside conservation reserves.

CALM has started a monitoring program on the Mitchell Plateau, to provide the data that are needed to set management priorities objectively. In 1990 two rainforest patches in a group of three were fenced, and these are being monitored. As well as working on the rainforest, the *LANDSCOPE* Expedition would collect insectivorous and trigger plants, capture and release bats, set traps to capture live mammals (especially brush-tailed phascogales), monitor scrubfowl mounds and collect soil samples for dieback research.

ANATOMY OF AN EXPEDITION

The expedition began in Kununurra with a briefing at the CALM office, where volunteers met Chris Done the Kimberley Regional Manager and Gordon Graham the regional ecologist. The expeditioners ranged in age from 15 to 74, and came from all walks of life. The attributes they shared were a love of nature, a desire to explore the Kimberley, and a preparedness to contribute towards the cost of the expedition.

Departing Kununurra, the expedition convoy comprised two four-wheel-drive buses and a utility. Gordon Graham joined the expedition a couple of days later, bringing an additional four-wheel-drive vehicle. We drove for most of the first day to get into the study region. Camp was made at dusk at Miner's Pool on the Drysdale river, and the first mist-nets were erected across the river to catch any unsuspecting bats.

On the second day we continued north, stopping for lunch at the King Edward River crossing. Here, on the damp sandy edges of the river, a myriad of small flowering herbs were growing, providing Allen Lowrie with a botanist's paradise. Plants were collected and flower buds preserved for chromosome studies back in the laboratory. Later that day we reached the study site, and made camp at Mertens Creek among spinifex and massive sandstone outcrops. As soon as we arrived, the bat team rushed out and set up their mist nets above the creek. Around the campfire, after dinner, each of the scientists presented an overview of the day's activities, followed by general discussion and a briefing for the next day. This became a regular evening event.

An excursion was planned for the next day to Mitchell Falls, via Mertens Falls. Along the way, patches of forest fringing the river were examined, and creeks and pools searched for aquatic plants. At a pool covered in flowering waterlilies (*Nymphaea gigantea*) behind Mertens Falls, we made our first exciting botanical discovery. Growing in the pool was flowering and fruiting material of the water-wheel plant (*Aldrovanda vesiculosa*). This plant, a member of the sundew family Droseraceae, had been recorded in the Kimberley in 1905, but

Frequent fires destroy signs on the Plateau.
Photo - Kevin Kenneally

Bundles of spear grass (*Heteropogon contortus*) seed heads await the unwary walker.
Photo - Kevin Kenneally

A rarely-collected aquatic flowering plant, *Tristicha trifaria*, growing above Mitchell Falls.
Photo - Kevin Kenneally

the specimen has never been located. At Mitchell Falls we made another discovery. Flowering and fruiting specimens of yet another poorly known aquatic plant, *Tristicha trifaria*, were collected. This plant, widespread in the tropics, forms a dense moss-like mat and attaches itself to rocks in fast-flowing creeks and rivers, flowering only when the water level drops and the plants are exposed.

From the fourth day onwards, the participants grouped into several teams to assist the scientists with various tasks, including monitoring rainforest plants and disturbance of the patches, recording birds of the rainforests, locating scrubfowl mounds, collecting carnivorous and trigger plants and helping to set mammal traps.

TO BOLDLY GO...

Despite having been briefed on the hazards likely to be encountered in rainforest surveys, even the most enthusiastic volunteers later agreed that it was an arduous task. The Mitchell Plateau was exceptionally dry for this time of the year, and large areas were covered in dense, above head height, stands of seeding spear grass (*Heteropogon contortus*). Walking through the spear grass to reach the rainforest patches, most people became uncomfortably aware of how the needle-sharp seeds of this species have no respect for any part of one's body!

There is an abrupt boundary between the rainforest and the surrounding grasslands, and it was a relief to enter the shade of the dense canopy. There is no grass understorey in the rainforest, just a dense leaf litter, but we were immediately confronted with the climbing caper (*Capparis sepiaria*) that has razor-sharp thorns guaranteed to scratch or effectively trap intruders. Other hazards included fire vines (*Mukuna diabolica*), which cause burn-like welts on contact with exposed skin, and numerous biting green ants, but none of these dampened the enthusiasm of the volunteers. Bird observations were noted, flowering and fruiting plants collected, and photographic records made of recent cattle damage. The pilot of a helicopter stationed at Mertens Falls told us that when heli-mustering, he had flushed about 60 head of cattle from one patch of Plateau rainforest!

Each evening, volunteers helped the scientists to erect and check mist-nets for bats. These forays would have been more productive if the nights had been warmer. Nevertheless, the expedition collected data on 12 bat species, including the large-footed myotis (*Myotis adversus*), two species of long-eared bat (*Nyctophilus bifax* and *N. walkeri*), the black flying fox (*Pteropus alecto*) and the rare golden horseshoe bat (*Rhinonicteris aurantius*). To study the flight capability of the different species, their wing-shapes were traced. This information will provide a basis for understanding their foraging strategies and dependence on different habitats. The bats were released with tiny bioluminescent markers glued to their rumps, so that they could be tracked in the dark. This allowed the team to record the echo-location calls made in free-flight by the small bats and know that the recordings were not of other bat species flying unseen in the dark. CALM is compiling a dictionary of these calls for use in future bat surveys. This is similar to a technique that is commonly used in bird surveys, where species are identified from their calls, and is invaluable when attempting to

monitor animals that you can not see easily.

On one day, a party went to Crystal Head (so named by the explorer Phillip Parker King because of the quartz crystals found there) to examine the coastal mangrove community at the mouth of Crystal Creek. On our return to camp we were informed that a fire had burnt through the rainforest monitoring patches. Unfortunate though this was, it gave us the opportunity to observe the impact of fire on the patches. Teams were organised to study these areas first thing the next morning.

On our arrival at the monitoring sites, we found that although the fire had been patchy, much of the spear grass surrounding the rainforests had succumbed to the flames, and in numerous places the fire was still smouldering. Fallen, burning trees had left fire trails into the patches, and numerous stumps were still burning around the edges.

Small saplings and seedlings growing on the patch perimeter had been killed by the fire, and the canopies of the larger trees were severely scorched. Numerous bird species that would normally be confined to the surrounding woodland had taken refuge in the rainforest. Among the casualties of the fire were some of the empty mammal traps of zoologist Susan Rhind.

The fire also exposed the abandoned scrubfowl nests that the expeditioners had so painfully located and mapped in the dense spear grass surrounding the patches only the day before. Orange-footed scrubfowl build their mounds only in rainforest patches, where they can scratch together a mound of soil and leaf litter. The decomposing litter provides the heat needed to incubate their eggs. There were several abandoned mounds outside each of the patches, providing direct evidence of the recent contraction of the rainforests. The only mounds found that were in use were inside the fenced rainforest patches.

Another day an excursion was arranged to Airfield Swamp to collect semi-aquatic plants and to examine the tiny flowering herbs growing in damp mud under a grove of cadjeputs (*Melaleuca viridiflora*). In an area of knee-deep water, a bladderwort (*Utricularia tubulata*) previously only known from near Kununurra, became the second record for Western Australia. Many volunteers enjoyed their first experience of 'belly botany', lying prone to examine minute plants, and experimenting with the pollination mechanisms of triggerplants under the guidance of Allen Lowrie. Several feral cattle were sighted amongst the long grass surrounding the permanent water, and evidence of their destructive presence was everywhere. The vegetation was trampled and the soil compacted, some areas had been completely cleared by constant dust bathing, and the trunks of the cadjeputs had been damaged by butting and rubbing. Also, grasses had been introduced, presumably in cattle dung.

RETURN FROM THE WILD

On the seventh day we left the Plateau to return to Kununurra. On our way south, we took a detour onto the track to the old Mitchell River Station to examine the boundaries of a proposed nature reserve. This area contains spectacular stands of the tall cycad (*Cycas lanepoolei*), which were found to be outside the proposed boundaries.

Susan Rhind with her burnt traps.
Photo - Kevin Kenneally

Norm McKenzie tracing bat wing outlines.
Photo - Kevin Coate

The burnt perimeter of a rain forest patch immediately after a fire.
Photo - Kevin Kenneally

Recommendations have been made to the Environmental Protection Authority to include these unusual plant communities within the proposed reserve. Soil samples were collected here and from other sites, to be screened for the presence of dieback fungus. They have since tested negative.

Our last campsite was on El Questro Station, about 90 km from Kununurra. Unlike those on the Mitchell Plateau, rainforest patches in the East Kimberley are confined to deep, moist gorges. There are several examples on the Station, and we investigated one in Emma Gorge in the Cockburn Ranges.

The last night was the perfect opportunity to review the success of the expedition while relaxing around the campfire. Much to the delight of the members, our Swedish botanists arranged an impromptu Midsommarstång ceremony, symbolised by a decorated pole and the drinking of mulled wine, which traditionally celebrates the northern summer solstice. This simple gesture brought people even closer together to reflect on what they had achieved during their week in the wilderness.

Although the expedition has ended, much of the scientific analysis remains to be done. The expedition members will be kept in touch with results as they are published. The group has since gathered at a reunion evening to share photographs and distribute summary reports.

Expeditioners can be satisfied in the knowledge that they have contributed towards a greater understanding of biodiversity in the Kimberley. Future generations will benefit from the scientific discoveries made possible by their involvement.

Revenge! A cave gecko bites his captor.
Photo - Kevin Coate

Often forming dense patches, *Lechenaultia filiformis* is the only member of this genus in the Kimberley.
Photo - Kevin Keneally

Kevin Kenneally is a principal research scientist at CALM's Western Australian Herbarium and can be contacted on (09) 334 0500. Daphne Edinger is a CALM honorary botanist and can be contacted on (09) 334 0500. Norm McKenzie is a principal research scientist at CALM's Western Australian Wildlife Research Centre at Woodvale and can be contacted on (09) 405 5100.

The Mitchell Plateau expedition was led by Kevin Kenneally and well-known naturalist Kevin Coate. They were assisted by CALM bat experts Dr Tony Start and Norm McKenzie, botanists Daphne Edinger and Allen Lowrie, and Murdoch University doctoral student Susan Rhind.

If you would like more information about future *LANDSCOPE* Expeditions, please contact Jean Collins at UWA Extension on (09) 380 2433 or FAX (09) 380 1066.

Wildfires are synonymous with Western Australian summers, but what can be done to lessen the threat to life and property? Lachlan McCaw discusses the problem on page 49.

Daisies belong to the Asteraceae family, one of the world's largest families of flowering plants. Suzanne Curry presents some of them in 'Delightful Daisies' on page 41.

LANDSCOPE

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Aborigines have eked out a living in the harsh Western Desert region for thousands of years. Their intimate knowledge of the desert is helping scientists learn more about its plants and animals. See 'Digging Sticks and Desert Dwellers' on page 10.

'Rainforests and Bats', on page 34, tells the story of the recent LANDSCOPE *Expedition to the Mitchell Plateau.*

Can images from space help locate desert mammals? See 'From Buckshot to Breakaways' on page 23.

FEATURES

REGULARS

SPECIALS

COVER

Cape Barren geese live on the islands and rocks of the Archipelago of Recherche. A few years ago their numbers appeared very low and their survival was in doubt. However, a recent survey of the islands has brought good news with a marked increase in the bird's population.

The illustration is by Philippa Nikulinsky.

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