

Life in the Bungle Bungle

In the north of Western Australia lies the rugged and inaccessible Kimberley Range, and outstanding among its attractions is Bungle Bungle National Park — more correctly, although less widely, known by its Aboriginal name of Purnululu.

Although the first European settlers reached the area about 100 years ago, its biology has remained relatively poorly known. In 1987, the Western Australian government created the park and adjacent conservation reserve in recognition of the region's outstanding scenery, its significance for Aboriginal culture, and the emerging realisation that it was probably of biological interest, as it lies between the tropical and arid zones and includes a complex mixture of the climate, plants, and animals of both.

To find out more about the region's ecology, the Western Australian Department of Conservation and Land Management (CALM) commissioned the CSIRO Centre for Tropical Ecosystems Research in Darwin to carry out a detailed biological survey there. Dr Dick Braithwaite, Dr John Woinarski, Mr Nick Gambold, and Ms Karina Menkhorst, all members of the Division of Wildlife and Ecology, undertook two extensive field trips to the Bungle Bungle area in 1989.

First the bad news...

Their survey confirmed that parts of it are severely degraded, because of the high densities of introduced mammals, now turned feral, that have roamed there for the last century. Obviously, low-lying parts and land bordering creeks were worse-affected than rocky outcrops.

Cattle have caused changes in the composition of native grasslands; their grazing and trampling have greatly reduced or completely exterminated plants that cannot tolerate this treatment, and compaction of the soil has changed its water-holding capacity and therefore patterns of water run-off during heavy rain. Trampling beasts have caused severe erosion in places, as well as destroying waterside vegetation, such as stands of pandanus palms. Waterholes have become silted up.

Since 1987, when the park was gazetted, the area has not been used for cattle-grazing, although the land nearby still is. But, unfortunately, cattle had previously become established as wild animals. So too had a large population of donkeys, which are hard to eliminate because of their high reproductive rates and ability to subsist on low-quality food.

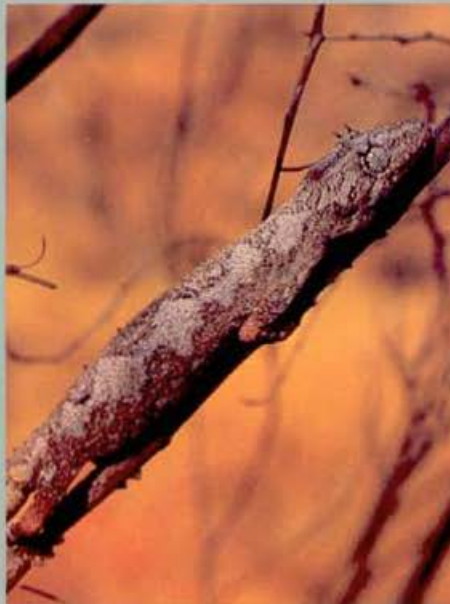
Despite this, CALM — with the help of the State Department of Agriculture and the Agricultural Protection Boards — has already had considerable success in removing cattle and donkeys from the park, and is continuing the work. CALM scientists estimate that the control program, using helicopters, has so far eliminated about



The skink *Egernia slateri* (top), largely confined to the arid centre, is also found within the region's rocky spinifex-topped ranges (lower).



The Ord River.



A selection of the region's reptiles: the olive python, a snake that reaches its inland limit in the Bungle Bungle; and two geckos.



Life-giving water on another hot, dry day in the National Park.

90% of these animals in the park, and in some places the vegetation is starting to recover.

Other 'ferals' complete the picture: cats, camels, and water buffalo may also occur, although not in large numbers. They are currently being monitored.

Changes in life-style and movement away from the land by the local Aborigines altered the traditional fire regimes that had been in place for so long. Elsewhere, especially in arid Australia, we know that this was associated with the human-induced loss of a number of mammal species (see 'The demise of the desert mammals' in *Ecos* 63). It could well have been a factor affecting the mammalian fauna of the Bungle Bungle region too.

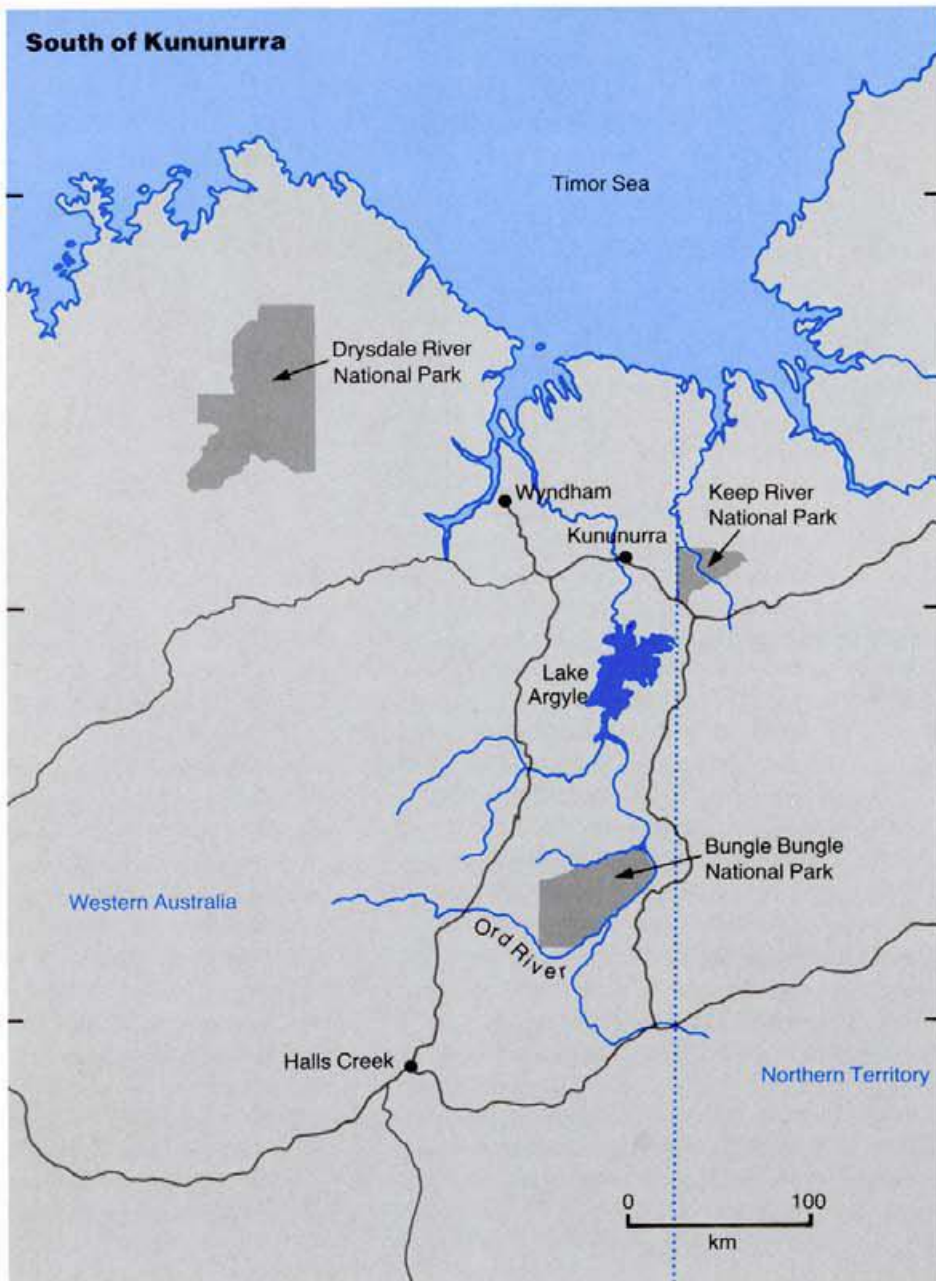
Working out what the region has lost is not easy because no fauna collections were made there before pastoralism took over. However, the observations of the local Aboriginal elders suggest that several medium-sized mammals — such as the

bilby, northern quoll, and golden and northern brown bandicoots — have either disappeared from the area entirely or have drastically declined in number.

The scientists thought it likely that these species would have been present originally, but weren't able to gather enough data during the survey to conclude whether they still are. (This in itself confirms that these mammals are rare.) Further work will be necessary to see whether any colonies remain.

Two bird species — the purple-crowned fairy wren and the white-browed robin, once common in the pandanus thickets fringing the creeks — have definitely disappeared. The degradation of the creekland vegetation by stock is probably the main cause of their decline. Grazing is currently affecting pandanus in a similar way in the Gulf of Carpentaria, so this finding, although too late to save these birds in the Bungle Bungle area, is relevant to land management elsewhere.

The biologists found 17 plant weed species growing in the park, mostly in the



lowlands and around rivers. Although not yet a severe problem, the spread of weeds is likely to increase with further land degradation or with increasing numbers of visitors. However, to put the matter in proportion, the weeds account for just under 3% of all the plant species recorded in the survey, so the natural flora in many parts of the park still remains relatively undisturbed.

... and then the good

This is mirrored in the results for its fauna. They show that, despite its poor treatment in the past, it retains a healthy biological diversity.

The survey found 147 bird, 81 reptile, 41 mammal, 15 fish, and 12 frog species in the national park, conservation reserve, and adjacent land. Of course, these were not universally abundant throughout the area — indeed, their distribution was very uneven.

The most widespread species were what the scientists term Torresian — broadly, those that occur in Australia's tropics — and their habitat was mostly in the tall, dense vegetation fringing waterways and in the more sheltered gorges. The region represented the southern inland limit for many of these creatures.

By contrast, the rocky ranges topped with spinifex contained species characteristic of the dry interior of the continent — Eyrean species. So the Bungle Bungle park is in the border zone, where two vastly different 'biogeographic cultures' overlap. For this reason, it is far richer than the arid land a few hundred kilometres further inland — the graveyard of so many unique animal species.

But the Bungle Bungle has its own identity. The survey found three undescribed species — a gecko, a skink, and a turtle — that are presumably new to science. Sub-

sequent research has shown that the turtle is relatively widespread throughout the Kimberley Range, as well as occurring in Kakadu, and the gecko has been found near Kununurra. A number of plant specimens may also represent new species.

The obvious environmental degradation in many places is perhaps not as severe in its effects as its appearance would have visitors believe. The scientists noticed a lack of any clear pattern between levels of degradation and the current distribution of many species. For example, in moderately affected areas birds continued to exist in great abundance, although small native mammals were noticeably fewer.

Partly this is because moderate degradation represents a transition state, where environmental changes have opened up new opportunities for some creatures while precluding a good life for others. The team was not asked to survey the most degraded sites, and it is likely that all classes of living things would have been less diverse in these badly affected places.

Fortunately, much of the region is suitable for rehabilitation. Research is needed to show how to halt the degradation in the severely degraded areas and allow reclamation of the land for conservation. It is a long way from stopping erosion and beginning soil formation anew to reinstating habitats and the mammals that once abounded therein. However, the lack of foxes and rabbits here should improve the odds. Insights gained from this work could be useful in the restoration of the extensive degradation that has occurred across the rest of the Kimberley region and north-western Northern Territory.

But Bungle Bungle National Park and its associated conservation reserve are more than just examples of moderately degraded land that could be rehabilitated. Aside from its significance to Aborigines and its unusual scenery, the area also has undoubted conservation value. Few species of its fauna are rare or endangered on a national scale, but it is home to nine species of vertebrates that have not so far been recorded in any other conserved area of north-western Australia. And several of its vertebrates have been recorded only in one other reserve.

Roger Beckmann

More about the topic

A survey of the wildlife and vegetation of Purnululu (Bungle Bungle) National Park and adjacent area. J.C.Z. Woinarski (ed.). *Final Report to the Western Australian Department of Conservation and Land Management* (in press).