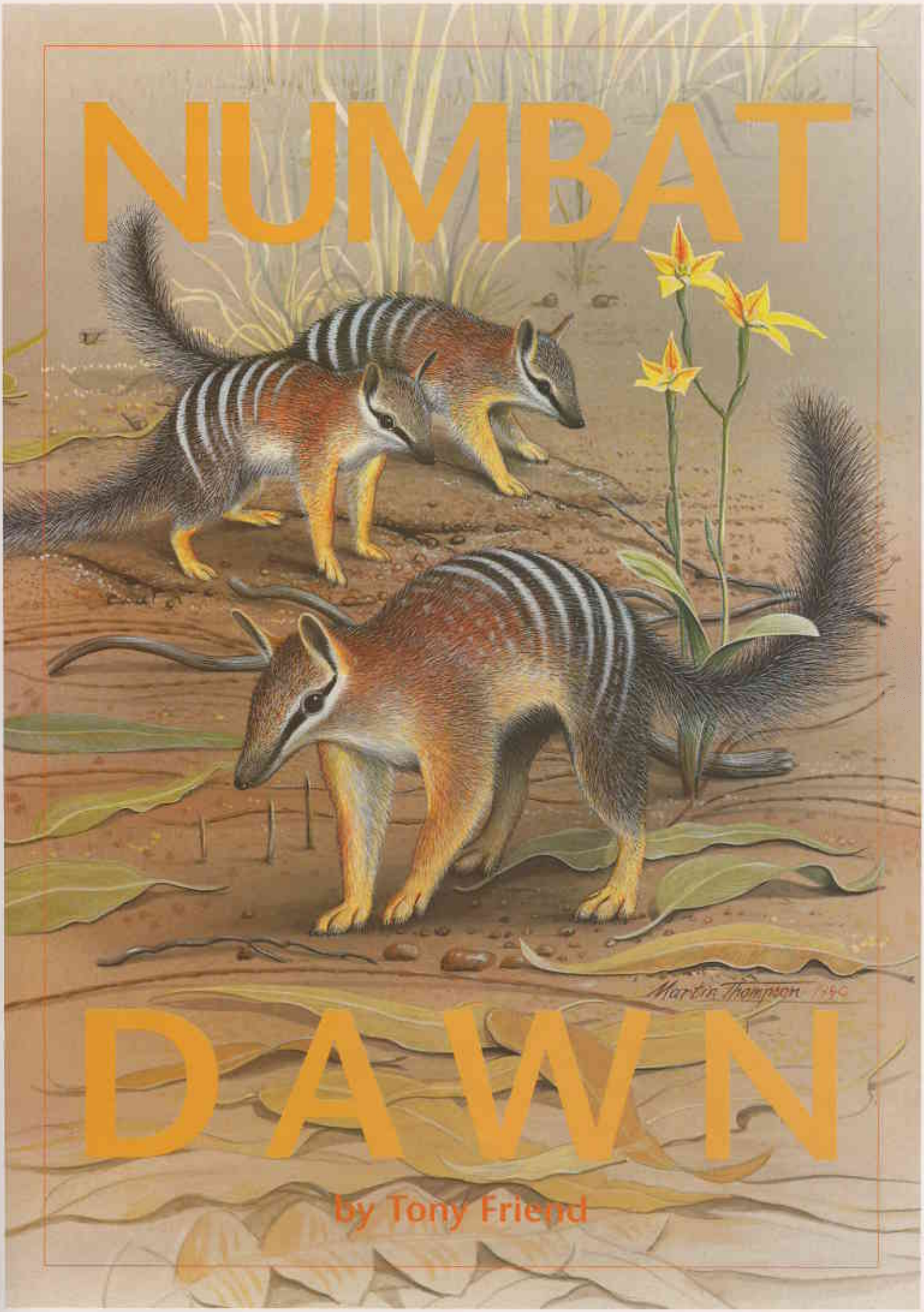

NUMBAT
DAWN
by Tony Friend

Numbats, once common in many parts of the South-West, were on the brink of extinction by the late 1970s. Intervention by scientists, using a range of techniques that include captive breeding, translocation and fox control, has brought new hope for these "banded ant-eaters". Does the numbat now have extinction licked?

IN the early 1970s, it was fashionable for Australian States to proclaim a plant, a mammal and a bird as their emblems. Western Australia had long had the black swan as its emblem, but the other two positions were vacant. The person who recommended the numbat as the State's mammal emblem may not have realised the importance of this move for the survival of the species.

Before European settlement, the numbat was found through much of southern Australia. It ranged from semi-arid western New South Wales, through central Australia, to the west coast. By the late 1960s numbats survived only in State forest, nature reserves and uncleared farmland in the South-West of Western Australia. This pattern of widespread and rapid population decline has been shared by many Australian mammals, especially in arid and semi-arid areas.

In 1973, when the numbat was declared WA's mammal emblem, these small attractive marsupials were still quite common in parts of the South-West. Observant day-trippers to Dryandra State Forest, near Narrogin, had a good chance of seeing a numbat feeding beside the track. The animals were often seen by foresters working in parts of the wandoo and jarrah forests.

Between 1954 and 1956, John Calaby of the CSIRO studied numbats at Dryandra. He showed that they are essentially termite-eaters, procuring their food not from termite-mounds but by digging up the insects' galleries in the soil of the forest floor and licking up the occupants with their long, thin tongues. However, the limited research techniques then available made it impossible to gather much information on other aspects of numbat ecology, such as their use of habitat, home range size, predators, breeding and care of their young. Calaby concluded, however, that numbats were

Numbats consume 15 000 to 20 000 termites each day - the equivalent of 10 per cent of their body weight.
Photo - Jiri Lochman▼

quite common and were threatened only by agricultural clearing of the woodland in which they lived.

Numbats have never been popular subjects for intensive study - they refuse to go into the cages or box traps beloved of zoologists, and show disdain for the paltry offerings of peanut butter and rolled oats which so many of their marsupial relatives find irresistible. Even today, the sight-and-chase technique, which requires a certain amount of sharpness (not to mention fitness) on the part of researchers, is the main method of capture.

DISAPPEARANCE

So, by the late 1970s, very little was known of the numbat's lifestyle. When sightings of the striped marsupials suddenly stopped at about that time, even in the most reliable numbat strongholds, there was widespread concern among people interested in conserving our fauna. A number of other marsupial species had become scarce in the South-West at the same time, but unlike the numbat, had secure populations elsewhere in the wild or in captivity. The fact that the numbat was the State's emblem made its preservation a matter of pride, and this helped to direct attention to its plight.

A research and management program began in 1981. It was to shed new light on the private life of the numbat, establish a breeding colony in captivity, and reintroduce numbats to areas where they had become extinct.

There had been previous attempts to keep and breed numbats in captivity - without success. Providing 15 000 to 20 000 termites a day for each numbat had always been a problem. But new knowledge had been gained through field studies, and an artificial diet was developed by Dick Whitford, a skilled marsupial breeder employed on the project. As a result, and with financial support from World Wildlife Fund Australia, numbats were successfully bred in 1985 at the Department of Conservation and Land Management's (CALM) Woodvale Research Centre. Since 1986, the breeding program has been run jointly by CALM and the Perth Zoo, and there are plans to establish breeding colonies at other Australian zoos, to increase security and spread the workload. When these colonies grow large enough, surplus young numbats will be released into the wild.

In summer, before the breeding season, male numbats roam a long way from their home range in search of females.
Photo - Jiri Lochman▲

Early field research was carried out in the Perup State Forest by Per Christensen, and at Dryandra State Forest by Tony Friend. The study of these trap-shy animals living in low densities was made feasible by radio-tracking. Researchers fitted transmitter collars to individual numbats and studied their movements closely, a technique that ensures that the capture of a few animals yields a large amount of valuable information.

At Perup, near Manjimup, it was proved that numbats lived in the jarrah forest, dispelling the popular idea that the species depended solely on wandoo woodland. Here, at the southern extreme of their range, it was found that numbats had adapted well to forest that had regenerated after being harvested for timber, nesting in and finding much of their termite food in the logging debris.

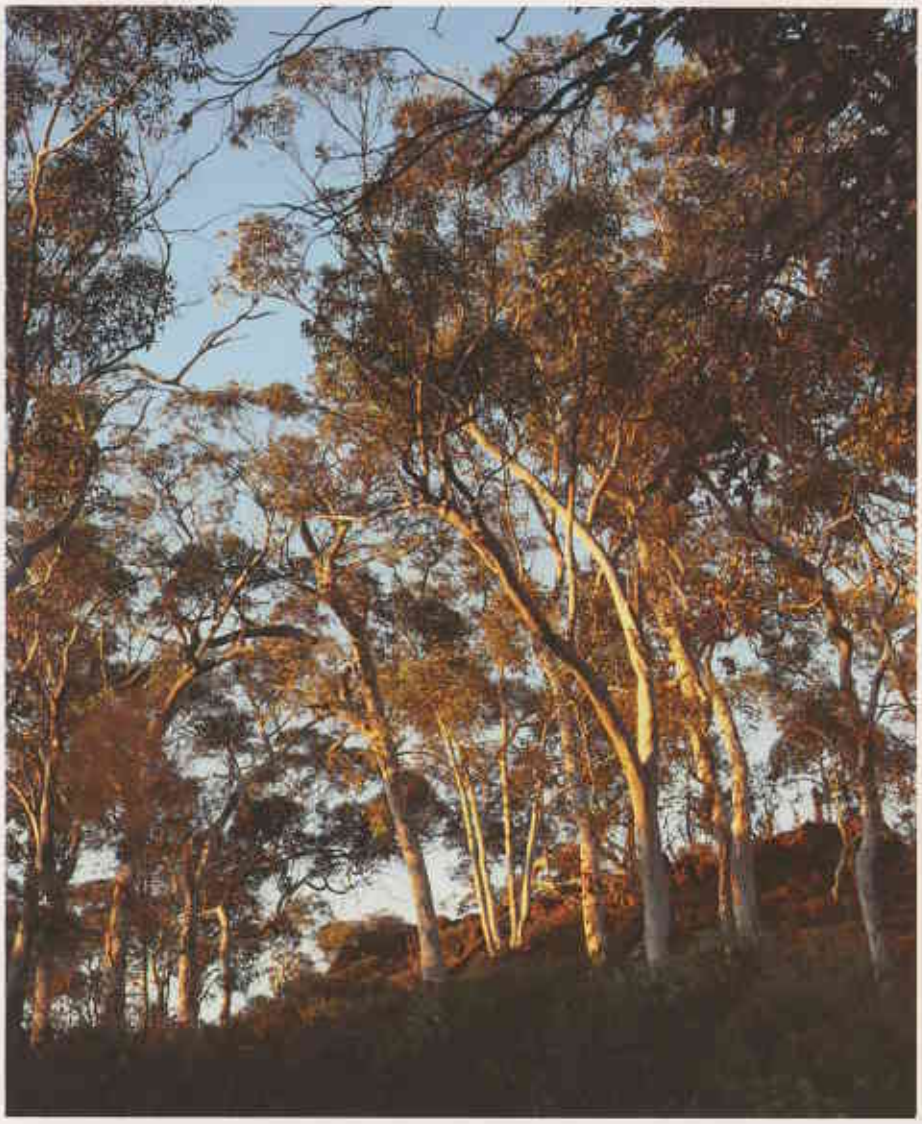
The Dryandra numbats were found on the slopes of the broad valleys that supported the densest stands of wandoo. Curiously enough, they were also living in the plantations of brown mallet, established between 1920 and 1960 to supply the now-defunct tannin-bark industry and now occupying a quarter of the area of Dryandra Forest.

A survey at Dryandra in 1979 showed that numbats were hanging on there in very low numbers. In the 1950s, John Calaby had seen about three numbats in each 100 kilometres of driving slowly around the tracks. The 1979 rate was 0.2 per 100 kilometres. What had caused this drop in numbers? If numbat populations were to be effectively managed, it was necessary to identify the factors that had influenced their numbers so dramatically.

DROUGHT, FIRE OR FOX?

A simultaneous drop in the numbers of other marsupial species pointed to a common cause, not one specific to numbats. The most likely factors were drought, increased fire frequency and increased predation, all of which could affect a range of species living in the same habitat. The Wheatbelt had received low rainfall during the late 1970s, and this may have caused food shortages for a number of mammal species. Increasingly frequent fires might have depleted food supplies, particularly those of insectivorous animals such as the numbat. As for increased predation, fox numbers had built up after rabbit control using 1080 was phased out during the 1970s.

The Dryandra study set out to examine these theories. While the number of numbats there was now much lower than in the 1950s, all animals caught



Young numbats in the wild. The young play near the nest while their mother searches for food. Some are taken by birds of prey and foxes.
Photo - Jiri Lochman▲

Wandoo woodland is prime numbat habitat. It has the highest concentrations of termites in the South-West and the trees drop many hollow branches, used by numbats as nest-sites and refuges. They are also found in the nearby powderbark woodland, shown here.
Photo - Marie Lochman◀

were in very good condition. Nearly all females had young attached to their teats after the breeding season in January, and almost 100 per cent of young survived until the time they first emerged from the nursery burrow in September. There was no evidence that individual numbats were undernourished. While there was average rainfall at Dryandra during 1980-82, the next three seasons were as dry as the time of the population crash in the late 1970s. However, the numbats maintained their good condition. Population numbers, which had started to recover, showed no setback.

The fire theory also began to look shaky. Fire records from Dryandra revealed that, throughout the 1970s, only 21 per cent of the forest had been burnt through prescribed burning or wildfire, and the frequency of fire had not increased before the population crash. Three of the animals tracked intensively for several months were living in areas burnt in the previous year or so. Two were females that successfully raised their young. Over 90 per cent of radio-collared numbats survived an experimental fire.

Foxes were often seen in the forest during the day (when numbats are active) as well as at night. Their faeces, deposited on the forest tracks, were found to contain the bones and hair of numbats and other native mammals, along with the more frequent rabbit, sheep and invertebrate remains. An experiment was carried out between 1982 and 1985 to determine what effect this predation was having on the numbat population. Two areas in the forest, of about 20 square kilometres, were surveyed for numbats. A fox-baiting program in one of the areas effectively removed all foxes and prevented them from re-establishing. Further surveys were carried out in both areas two and then three years after fox-baiting began. Numbat numbers in the unbaited area showed little increase, but rose dramatically in the baited area. This implied that fox predation had a significant effect on numbat numbers and, given the increase of foxes recorded in parts of the South-West during the late 1970s, supported the theory that this had caused the population crash.

Scientist Jack Kinnear's work (*LANDSCOPE*, Autumn 1990) has shown that rock-wallabies, woylies, tammars, and brushtail possums also increase in number when foxes are removed by baiting. CALM now undertakes regular fox-baiting on a number of reserves where endangered mammals are found, including Dryandra Forest.

During the study, a survey of all known numbat populations showed that several had become extinct since 1970. In the Wheatbelt, isolated remnants of bushland are separated by wide expanses of farmland that are inhospitable to most native mammals except kangaroos. In such a landscape the loss of populations through natural fluctuations is an ongoing process. Before the land had been cleared to its present extent, local extinctions

would have been followed by natural recolonisation from adjacent areas. So management of mammal populations in these areas today may require the artificial recolonisation of these remnants.

DELIVERANCE

With the success of the fox-baiting program at Dryandra, the way was clear for CALM to attempt to re-establish a population, under a regime of fox exclusion, in an area where numbats had recently become extinct. World Wildlife Fund Australia supported the project. Boyagin Nature Reserve, near Brookton, was chosen because its vegetation was similar to that of Dryandra Forest. The 5 000 hectare reserve, which contains the well-known Boyagin Rock, is split in two by a strip of farmland. The last recorded sighting of a numbat on the reserve was in 1970.

Seventeen numbats were released into the eastern part of the reserve in November and December 1985, the time of year when the young disperse from their mothers' home ranges. Two males were taken from the captive breeding colony, and the rest from Dryandra. All were fitted with radio collars to monitor their progress. Six weeks after their release, all the numbats had established new home ranges. By the end of January, after the breeding season, five of the six females checked had produced young.

Over the next two years, 18 more numbats were released at Boyagin. Since then, researchers have made regular searches for the animals' distinctive diggings to monitor the population spread over the reserve. In 1986, they were found in more than 20 per cent of the suitable habitat in the eastern part of the reserve. By 1987 this had increased to 50 per cent, and by November 1989 it was 80 per cent. Numbats are now seen regularly in the reserve. Scientists will continue their monitoring, but the population now seems to be viable.

Another attempt by CALM to re-establish numbats, supported by World Wildlife Fund Australia and *Australian Geographic*, is now under way at Karroun Hill Nature Reserve, 400 kilometres north-east of Perth, using a much less intense fox-baiting program. This reserve is at the eastern boundary of the Wheatbelt, and the woodland is dominated by York gum and salmon gum. Numbats probably became extinct here in the 1930s or 1940s. The condition and breeding rate of the translocated numbats is extremely good, but predation rates are higher than at Boyagin. The key to their successful re-establishment will be finding a baiting intensity which is both effective and practical.

We now have the knowledge to manage remaining populations and minimise the chance of another crash. A management program for the species is being prepared. This will help to ensure that numbats never again stare extinction in the face.

Scientist Tony Friend with a numbat from the captive breeding colony. Nineteen numbats have been bred since 1985. When these colonies grow large enough surplus young will be released into the wild.◄

Numbats nest in logs that are too narrow for most of their predators to enter. If an enemy invades, numbats can use their rumps, which have extremely thick skin, to plug the hollow. Photos - Jiri Lochman▼

Dr Tony Friend is a Senior Research Scientist working on the conservation biology of endangered species. He has been involved in numbat research and conservation for nine years and can be contacted at CALM's Wildlife Research Centre on 405 5100.

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FEATURES

REGULARS

COVER

*Back in the early 1970s, Western Australia proclaimed the numbat (*Myrmecobius fasciatus*) as its State emblem which may have saved its life. With the help of scientists and new techniques, these delightful creatures are now fighting back against extinction. See page 15.*

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