

NEW LIGHT ON THE NUMBAT

by Karan Maisey & Helen Bradbury

Who knows what a numbat is?
How big is it? Where does it live?
Why? How many are there in
Western Australia?

The numbat may be Western Australia's State faunal emblem, but until recently very little was known about the characteristics of this native mammal, let alone its ecology and occurrence throughout the State. Over the past eighteen months the Forests Department Manjimup Research Station has been radio-tracking, observing and studying these endearing creatures to find answers to the many

questions relating to *Myrmecobius fasciatus* and its survival in State forests. But before we can even start to find out how forestry practices affect this species, we have to document the details of its physical characteristics and day-to-day existence.

It is perhaps surprising that there is little scientific knowledge of this unique and interesting animal. However, intensive studies of West-

ern Australia's native fauna have generally only recently been undertaken. Rarer animals are more difficult to study and the numbat in particular is not easily trapped or kept in captivity. Forests Department researchers have kept records of numbat sightings in the Perup Fauna Priority Area since 1972. These observations, added to increased research activity in recent years, have combined to cast new light on the numbat.



Gentle Creatures

The numbat is the only member of the family Myrmecobiidae. Its closest relatives are the Dasyurids (including animals such as the western native cat, the dunnart and the mardo), which share certain characteristics of behaviour and physiology. It is not surprising that the numbat was chosen as Western Australia's faunal emblem, for it is an extremely attractive animal both in appearance and temperament. Adult animals weigh a little more than half a kilogram and are easily held in one hand, especially as they do not scratch or struggle very persistently. The numbat has a very alert appearance with its small head, long nose and pointed ears, and if alarmed the long coarse hairs covering the tail bristle up, making this gentle creature appear far more hostile than is actually the case. Coloured for camouflage, the numbat's coat features black and white bands on the back, and reddish-brown forequarters flecked with white.

The numbat seems to be quite a curious animal and has been observed to sit on its hind legs and gaze curiously at cars that have stopped, rather ironically, to enable the people to gaze curiously at the



Wandoo forest, once covering the wheatbelt is a known habitat of the numbat.



Dunnart (*Sminthopsis murina*). The numbat is possibly of similar evolutionary stock as the dunnart but has diverged due to its specialization of diet.





▲ Numbats inhabit the jarrah/marri forest in the Perup Fauna Priority Area. Here a researcher radio-tracks a numbat. Note the red tape used to mark the route.

The numbat is also known as the banded ant-eater because of its diet of "white ants" and the distinctive markings across its back. This numbat is about to be released after being fitted with collar and small antenna.



numbat! On one occasion a numbat stood behind a termite mound resting its paws on it, watching a person on foot.

Although the numbat is a marsupial the female does not have a pouch. The young, which are born between January and April are carried by the mother and are attached to the teats. When the young are too large to be carried they are sheltered in a burrow or log where the mother returns for feeding.

Declining Numbers

The numbat was once common in the open wandoo forests. Much current research relies on the only detailed biological study previously conducted on the numbat, by Dr. J. H. Calaby, who worked in Dryandra forest in 1960. The distribution map shown in figure 2 is taken from that study and shows the range of the numbat as estimated by Dr Calaby. As can be seen from this map, the open wandoo forests inhabited by the numbat are in the region known as the wheatbelt. Museum records also show that numbats were collected from various locations outside the wandoo forest region. Sightings from these areas were far less common than from the wheat-belt but indicate the original extent of the numbat's distribution.

In recent years the status of this species has dramatically changed. Most of the wheatbelt is now cleared for agriculture, leaving very little area as undisturbed bushland. The few remaining bush reserves, and uncleared private land are seldom of a size large enough to support a self-perpetuating population of numbats. Bushfires and other disturbances associated with settlement probably further reduce the value of these areas as numbat refuges.

Present day sightings are rare and restricted to areas of State forest such as Dryandra and Perup forests. It is not known how quickly the population declined, but it is certain that today there are fewer numbats in Dryandra forest than in 1960.

Records of numbat sightings in the Perup Fauna Priority Area show an encouraging increase in numbers in recent years. This follows an alarming decline between 1972 and 1976.

Tracking Programme

Early in 1981 while trapping for woylies and tammar wallabies (see *Forest Focus* Nos. 23-25) we had the great fortune to catch two numbats to commence the radio-tracking programme. Since then several other numbats have been caught and fitted with a collar and transmitter, so that we are gradually building up a picture of the daily lives of these animals. The great advantage that the numbat affords our research team is that it is a diurnal creature, that is, active during the day, whereas other animals being tracked, such as the brush-tailed possum (see *Forest Focus* 26) are nocturnal and more difficult to follow.

The transmitter emits a signal that is picked up on a hand-held directional antenna. When the numbat moves, the signal alters accordingly, so that we may follow the creatures as they are actually moving through the forest searching for food. Keeping a distance of 200 metres from the numbat affords enough room between the researcher and the subject to allow us to keep within range without disturbing or altering the numbat's behaviour.

Daily Routine

Each day the numbat is tracked to its home log where it sleeps overnight, and the tracking programme is resumed the next day from that log. During summer, these animals have an enviable routine. At about 7.15a.m. the numbat, perhaps curled up in its nest, wakes up in its log and starts to stir. The transmitted signal begins to fluctuate, indicating that it's on its way towards the entrance. Very sensitive to overhead predators, the numbat often will take two or three trips to the entrance of the log before satisfied that the coast is clear. Normally, it's well on its way before 8.00a.m., quickly at first as it heads eagerly to the first spot likely to provide a breakfast of termites. Foraging for termites under small logs or sticks

At the start of the day the numbat moves to the end of the log and has a good look about before leaving. ▶

takes up most of the morning's busy schedule. When the summer temperatures rise during the middle of the day the numbat, in classic Mediterranean style retires into a log for a three or four hour siesta, arising in the late afternoon to continue foraging often until 8.00p.m. The numbat is quite active towards the end of the day making its way as it forages, back to one of several preferred logs in its large home range, where it will spend the night.

The cold, wet conditions of winter see a change in routine for the numbat. During this period, particularly if it's raining, the tracker has waited for hours for the animal to wake in the morning. It likes very much to sleep in on cold days, the main period of activity at this time being in the middle and warmest part of the day.

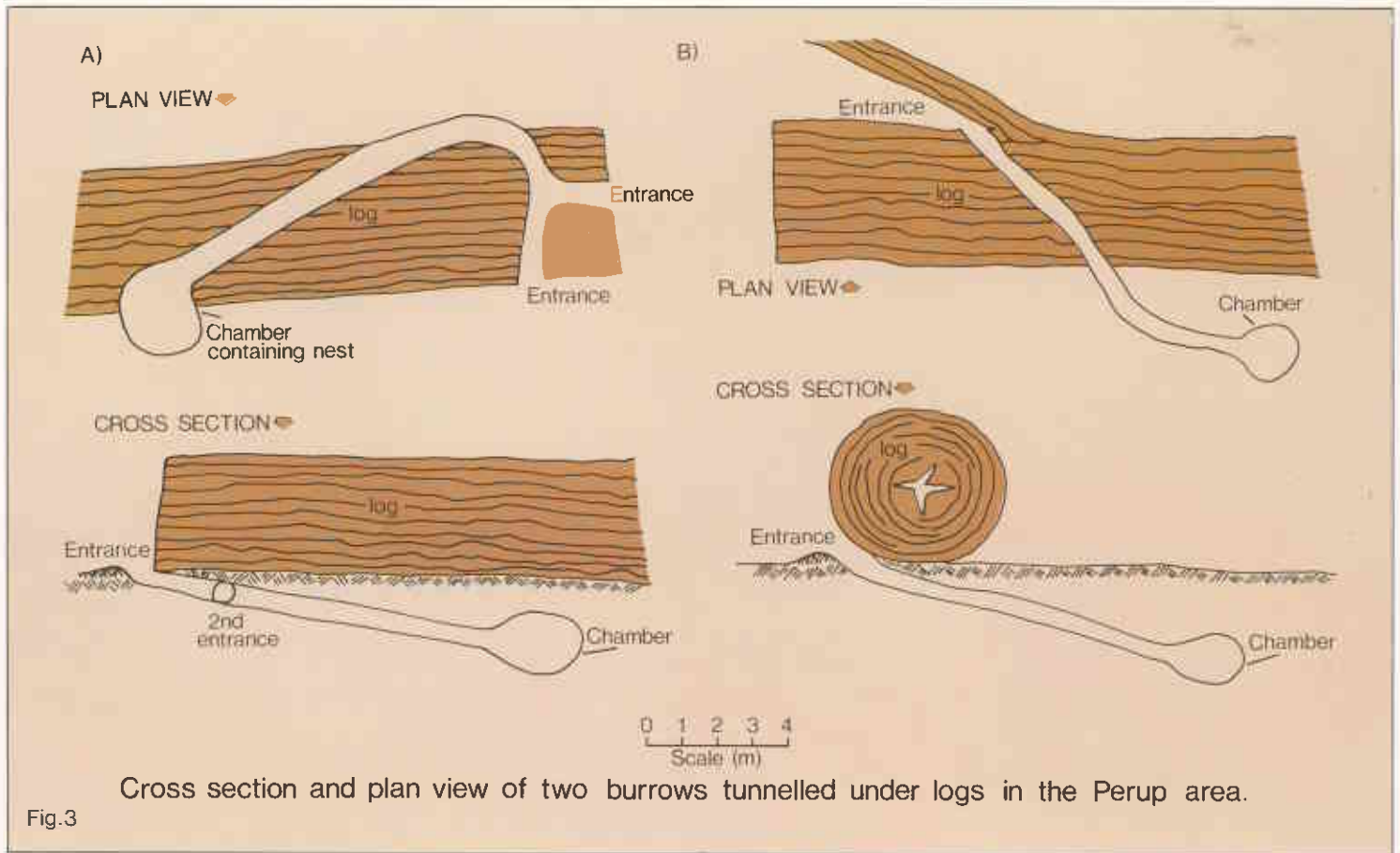
Termites

These changes in behaviour between summer and winter are most probably related to termite activity. The numbat is more likely to be out and about when the termites are



Female numbat with three young attached to the teats. Even though a marsupial, the numbat doesn't have a developed pouch.





Termites invade sticks and branchwood where they establish their working galleries. It is easier for the numbat to roll the sticks over than attempt to break into the mud walls of a termite mound.



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most abundant. In winter this is during the middle of the day when the termites are active in small sticks and branchwood laying on the forest floor. The numbat obtains the termites by turning over the sticks exposing the insects in the ground beneath and the termite galleries on the underside of the sticks. Large logs that are heavily infested with termites are broken into by scratching open the galleries just under the surface. Bark has been found scratched away from logs by the numbat searching for termites in the sapwood beneath.

During hot dry weather termites, being moisture-sensitive, tend to retreat from the small branchwood as it dries out. Activity then moves to the underside of larger logs or to pieces of wood partially buried in the ground. The numbat changes its method of searching and concentrates more on digging in the soil beside pieces of buried wood, at the base of trees, or at the base of termite mounds where the galleries are abundant just below the soil surface.

However, this small animal is not strong enough to actually break the hard surface of the mounds.

Logs and Burrows

Within its home range the numbat uses a number of logs created, in the case of the Perup forest, as logging debris from cutting operations conducted there in 1972. One animal used a total of 23 logs during the time that it was tracked. Some of these were simply refuge logs used when the animal was disturbed, others were regular "home" logs that the numbat returned to at night. The size of the hollow of the log seems to be very important. The numbat chooses those of approximately 7cm in diameter, although when startled will run into the nearest hollow for safety.

The numbat uses burrows in a similar way as the logs in its home range. The entrance to the burrows are always well concealed under logs or piles of branches and the tunnel invariably goes under the log for some distance making it very difficult for animals such as the introduced fox or the racehorse goanna to dig up. The tunnel section of the burrow is a consistent size for its entire length, and the entrance is of a characteristic shape, a shape that closely matches the hindquarters of the animal.

The tunnel opens out into a small nest area lined with shredded bark and dry leaves. This material is scratched from fallen logs and is similar to that used by other animals for lining their nests. It probably has a reasonable insulating effect and is used in both logs and burrows.

The burrows were once thought to be breeding burrows which the female excavated to house her litter. However, two of the numbats tracked were males and both had more than one burrow. It is more likely that these burrows are used in cold weather, as the ground may hold the heat generated by the numbat once inside its nest. Logs are less likely to remain warm once they are saturated. A numbat tracked in late autumn began using burrows when the temperature dropped and maximum temperatures of around 15°C were experienced. Another numbat tracked for a short period in winter used only burrows, whereas those tracked in summer used logs.



Termites are social insects, ordered into castes. The soldier caste defends the population with either ferocious looking mandibles on the head, or chemicals that are sprayed at intruders through a proboscis. Species are primarily identified by the shape of the mandibles or proboscis.

Top: *Heterotermes platycephalus*
Middle: *Nasutitermes exitiosus*
Bottom: *Termes occidentalis*

Results So Far

Once all the information about log-use, home range area, distance travelled and activity patterns was gathered, we could begin to piece together a story. The numbats' daily paths were plotted on maps, computer diagrams drawn up and vegetation grids of the whole study area composed. It appeared from these daily movement maps (see fig. 4) that a large proportion of a numbat's home range is not used while some particular locations are favoured. A pattern of rotational use began to emerge, suggesting that numbats spend certain amounts of time in one area in a home range then move to another allowing the first to recover its supply of termites. Once termite tunnels that connect a mound to pieces of wood are broken, it may take some time for repairs or new channels to be built.

Figure 5 presents the computer drawn maps of home range use. These show clearly the uneven pattern of utilization and the shift of the centres of activity.

The Future

What does the future hold for this unique species of fauna? Speculation is difficult at present as there is still much to learn about the numbat. Because of the extent of individual home ranges (in one case 128 hectares), we know that the numbat requires large areas of dry sclerophyll bushland to inhabit. The Perup forest is composed of wandoo and jarrah/marri forest, and the study area is significantly within the jarrah forest - an area not considered commonly inhabited by the numbat. But this area does

Fig 4 The activity pattern of a numbat tracked during one day within its total known home range

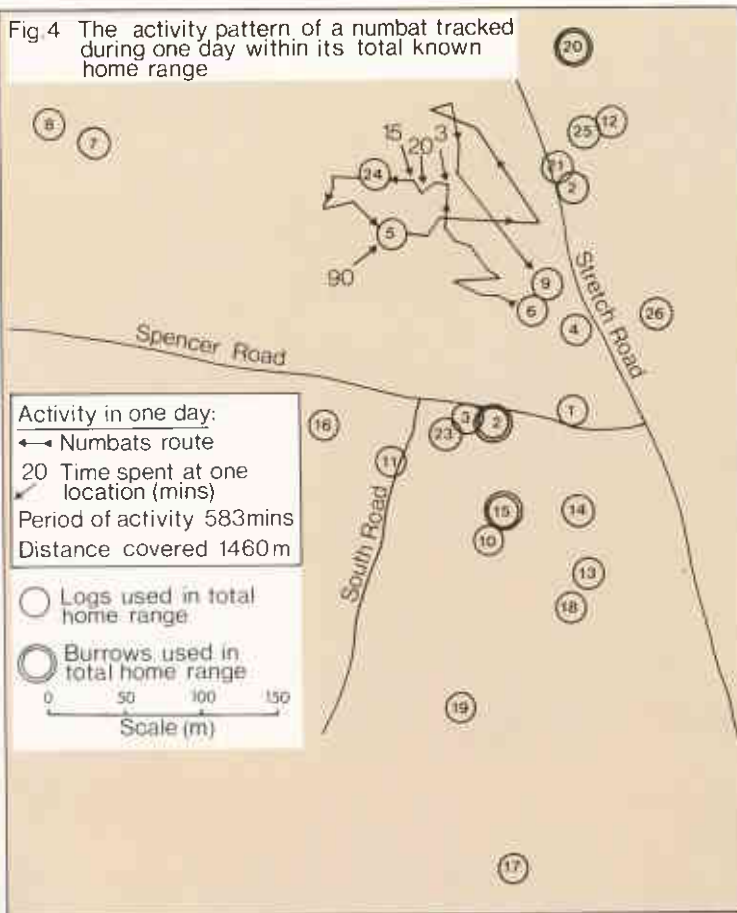
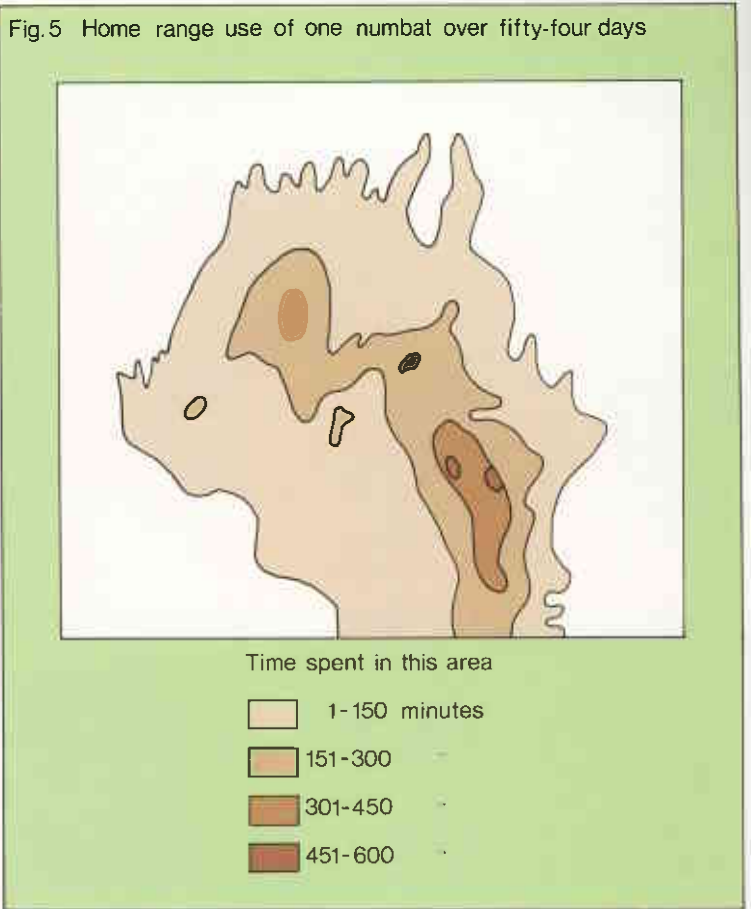


Fig.5 Home range use of one numbat over fifty-four days



provide an enticing habitat for these creatures. There is an abundance of logging debris at least 10 years old that is readily infested with termites which to our knowledge are the numbat's only food source. Also the debris is old enough to have commenced rotting, making available safe shelter for the numbat in the log hollows. It appears that the Perup Fauna Priority Area may be one of the few strongholds for the numbat. Dryandra is another and these two areas have been set aside by the Forests Department for the conservation of our native fauna. But what is the numbat's specific habitat requirements? How do we manage the forests to provide this habitat? These and many more questions are still to be answered.



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