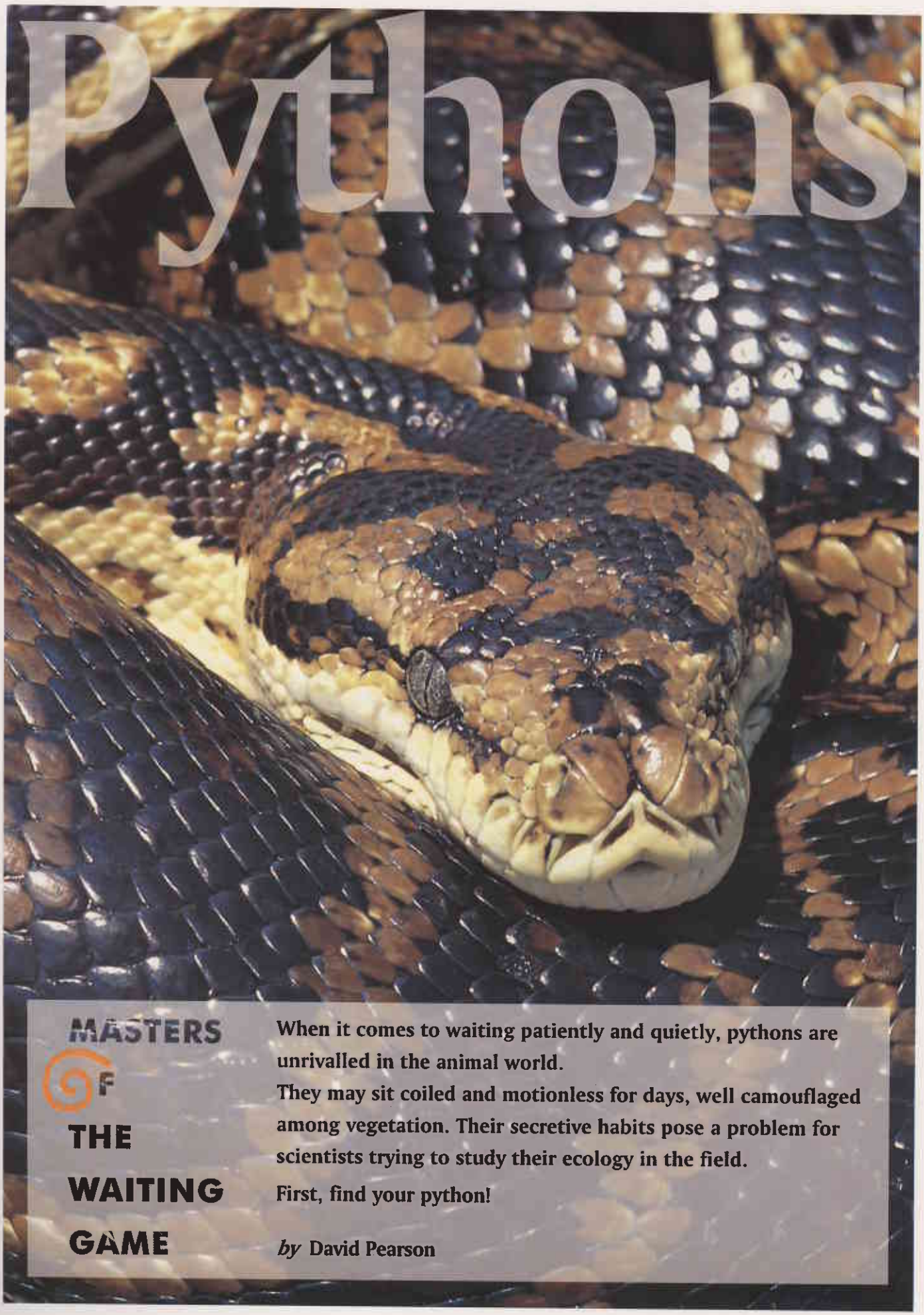
Pythons



MASTERS OF THE WAITING GAME

When it comes to waiting patiently and quietly, pythons are unrivalled in the animal world.

They may sit coiled and motionless for days, well camouflaged among vegetation. Their secretive habits pose a problem for scientists trying to study their ecology in the field.

First, find your python!

by **David Pearson**

Most pythons are sit-and-wait or ambush predators. The next meal for a python might pass by in five minutes, or in five months, so it needs to be ready to grab the opportunity, not with both hands, but by the throat! When hunting they sit coiled, often concealed in vegetation, waiting for an unsuspecting bird, mammal or reptile to pass within range. When that occurs, the python will strike out like a tightly coiled spring to seize its prey. Such a lifestyle is reflected in some remarkable physical adaptations and behavioural traits, some of which are shared with other types of snake.

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A carpet python lies in wait to ambush passing prey. Note the heat-sensitive pits along the lower lip, characteristic of most Australian pythons.
Photo – Jiri Lochman

Below: Body coils are wrapped around a prey to hold and constrict it. Here, a Stimson's python begins to swallow a mouse it has captured.
Photo – Jiri Lochman

Western Australia is fortunate to have many species of python, but our knowledge of their ecology is still rudimentary. In recent years, it has become apparent that some species have declined in abundance or even disappeared from entire regions, prompting concern for their survival. Until we have a better understanding of their basic ecology, it will be difficult to determine how factors such as habitat alteration, fire and feral animals affect pythons.

SLENDER COMPROMISES

Pythons, and the closely related boas, belong to an ancient group that evolved from lizards with well-developed limbs during the Upper Cretaceous period (65–100 million years ago). Fossil ancestors reached lengths in excess of 20 metres, although the largest modern species of the Family Boidae (pythons and boas) is the South American anaconda, which grows up to 11 metres.

The body plan of pythons has not changed dramatically in the past 70 million years and retains reminders of the limbs of their ancestors. The pelvic girdle, which supports hind limbs in other vertebrates, is still present in pythons, and vestiges of the hind limbs can be seen as small claw-like projections near the cloaca, called pelvic spurs.

The shape of a snake is such that body organs need to be elongate to fit into the body cavity. This has resulted in some remarkable anatomical features in pythons. For instance, some smaller pythons have only one effective lung, usually on the right, which extends along about one third of the body length. The oesophagus and stomach are thin, but can expand enormously to accommodate large food items.

Pythons are non-venomous. Prey is seized with the jaws and several body coils are thrown around it to constrict and suffocate. The jaws can be disarticulated to permit the swallowing of large prey such as wallabies. As the python's teeth are not suitable for tearing meat or chewing, prey are eaten whole and digested by strong stomach acids. After swallowing large food items, a python will yawn several times. This is to ease the jaws back into their usual position. The bones of the head are also loosely hinged to allow the passage of large food items.

AWESOME HUNTERS

As ambush predators, pythons need mechanisms to detect approaching prey, and must be able to catch and subdue it while avoiding serious injury. Snakes do not have external ear openings, but are able to 'hear' to some extent by detecting vibrations through the bones of the cranium and jaw. All Australian pythons have well-developed eyes, which are situated towards the front of the head to give excellent forward vision.

The odour of prey is detected by tongue flicking. Scent particles from the air are collected on the tongue and are then transferred to a pair of pits on the roof of the mouth, known as the Jacobson organ. This organ then sends signals to the brain, which in turn interprets the odours.

The most unusual feature in the armoury of most pythons are heat-sensitive pits positioned along the lower lips. These are extremely sensitive to infra-red radiation, allowing the detection of minute changes in temperature. The pits are oriented at a variety of angles so that a python is able to pinpoint accurately a source of heat. This feature allows pythons to capture warm-blooded prey, even in total darkness!

The diet of pythons is broad and is dependent on their size, mode of hunting and the availability of prey. Adult carpet pythons (*Morelia spilota imbricata*) lie in wait on the forest floor and capture birds, or more usually mammals, and have been known to eat animals as large as a tammar wallaby (*Macropus eugenii*) or a woylie (*Bettongia penicillata*). Juveniles prefer smaller prey and concentrate on lizards and mice. The Pilbara olive python (*Morelia olivacea barroni*) lies submerged in waterholes and ambushes birds as they drink. Alternatively, it may climb trees to catch possums or bats. A three-metre-long olive python observed recently at Millstream-Chichester National Park was so intent on keeping hold of a bat that it fell several metres from a palm tree. Unperturbed, it slithered away after swallowing its meal.

Above: An X-ray image of this carpet python reveals the presence of a radio-transmitter in the stomach (the solid box near the tail). The transmitter was around the neck of a woylie which had been swallowed by the python. It was removed during surgery by Murdoch University veterinarians.
Photo – Murdoch University Veterinary School

Above right: Little is known about the ecology of the rough-scaled python, found in remote parts of the northern Kimberley.
Photo – John Weigel

Right: The black-headed python has a narrower head and lacks the heat-sensitive pits of most other Australian pythons.
Photo – Babs and Bert Wells/CALM

The black-headed python (*Aspidites melanocephalus*) and the woma python (*Aspidites ramsayi*) eat some mammals, but consume a greater proportion of reptiles than other pythons. Neither has the heat-sensitive pits of other Australian pythons, a fact that is consistent with their reduced emphasis on warm-blooded prey.

SHIVERING MOTHERS

Being such cryptic creatures, it is remarkable that pythons can find each other when the time comes to breed. Typically, female pythons become receptive at a certain time of the year and lay down a scent trail to attract males. This may result in the aggregation of several males and, in some species, ritual battles between males may occur. During mating, the male uses his pelvic spurs to excite the female by stroking her flanks.

Egg-laying occurs about two to three months after a successful mating and depending on the species, between two to 20, sometimes more, leathery-shelled eggs are deposited, often in a nest of grass or leaves. The female coils tightly around the eggs to protect them and to maintain the levels of humidity and temperature needed to hasten their development. She may not eat throughout the incubation period, resulting in a great loss of weight and body condition. Should the temperature of the eggs fall too low, the female may start shivering to generate heat from her muscle movements. Once the young hatch, the female has completed her duty and the hatchlings are left to disperse and fend for themselves.

WA PYTHONS

No boas occur in Australia. Nine of Australia's 14 species of python occur in Western Australia, the majority of these in the tropics. Of these nine, two species and four subspecies are endemic to Western Australia. Pythons are distributed throughout Western Australia, from islands along the north Kimberley coast to the islands of the Recherche Archipelago off the southern coastline. They occupy many different habitats, making them a highly successful reptilian group.

Despite the large size that many pythons attain, one species escaped discovery until recently. The first specimen of the rough-scaled python (*Morelia carinata*) was not collected until 1973, and was not formally named until 1981. It remains one of the State's rarest reptiles, with only four individuals found to date.

The Pilbara region has one of the world's smallest pythons, the pygmy python (*Morelia perthensis*), which grows to a maximum length of 60 centimetres and provides a striking contrast to the Pilbara olive python, which has been recorded at lengths of up to four and a half metres. Some Australian pythons are entirely terrestrial, whereas others spend much of their lives in trees, in swamps, or among rock piles.

Pythons feature prominently in the spiritual life of many Aboriginal groups. They were also important sources of food. The woma python is referred to as *kuniya* by the people of the western desert, and had an important role during the Dreaming, when it travelled the land in human form. The kuniya people were important in the creation of Uluru (Ayers Rock), as well as the formation of rocky ranges in central Western Australia.

The black-headed python occurs in northern desert and tropical regions. Aboriginal people along the Western Australian–Northern Territory border call it *warrurungkalpa*. This name translated literally means 'a grinder or crusher of rock wallabies', giving a clear indication of one of its favourite foods and its mode of subduing prey! Aboriginal people note the prowess of this species as a hunter. It is capable of great lunges off rock ledges to seize prey and may tumble down a slope, grimly hanging onto its prey, until constriction is complete.

Other species of python found in northern Australia, which also extend into the Kimberley region, include the water python (*Morelia mackloti*), the olive python (*Morelia olivacea olivacea*) and the children's python (*Morelia childreni*). Two subspecies of carpet pythons occur in Western Australia. In the north Kimberley, there is *Morelia variegata variegata*, while the other, *Morelia variegata imbricata*, is confined to the south-west, occuring as far north as Geraldton and east to near Kalgoorlie. Finally, the Stimson's python (*Morelia stimsoni*) has an extensive distribution across most of the State to the north and east of Perth.

Aboriginal women at Tjirrkarli community in the Gibson Desert explain aspects of the ecology of local pythons to a CALM researcher.
Photo – Stuart Pearson

CONSERVATION PROBLEMS

Despite being efficient predators, pythons are not without enemies. Some species have declined in abundance, or even disappeared from large areas of their range. Four species that occur in Western Australia are now listed as threatened or in need of special protection.

The factors causing the decline of these pythons are not clear. The destruction of habitat has been suggested as the reason for the decline of the carpet and woma pythons in the Wheatbelt region. Frequent or large fires may pose problems for pythons because they are too slow to flee the flames, or they may die when logs and hollow trees used for shelter are burnt. It is not known whether predation by exotic animals (foxes and feral cats) has contributed to these declines. Cats have been linked to the reduction of boa populations in the West Indies, and they would have little trouble killing juvenile pythons, or adults of some of the smaller python species.

As pythons are so difficult to observe, because of their camouflage and cryptic habits, studying their ecology in the field is complicated. Recent developments in radio-tracking technology now make it possible to implant small transmitters inside the body cavity of snakes. Under anaesthesia, a small incision is made in the body wall and a transmitter with whip aerial slipped inside. After a few stitches and time to recuperate, the python can be released at its point of capture. A transmitter's battery may last up to two years, and by following a signal, valuable information on the python's use of habitat, movements and social

HOW CAN YOU HELP?

If you see pythons occasionally and would like to assist python conservation by recording your sightings, please write to the address below for a Python Observation Kit. The information you supply will be entered on to the database and will provide valuable assistance to scientists studying these cryptic creatures.

Another great way to assist python conservation is to encourage better understanding of snakes by the people around you and, wherever possible, prevent the unnecessary killing of pythons, or indeed any snakes. The idea that 'the only good snake is a dead one' is still widespread in Australian society and unfortunately even non-venomous species such as pythons are frequently beaten to death.

Pythons often lie across roads to soak up the sun or the heat radiating from the road surface. As a consequence, many are killed by vehicles every year. You can help prevent road deaths by carefully shepherding pythons off busy roads. But be aware, they can bite. However, if you gently touch the flanks at the rear of the body with a stick, the snake usually moves forward and off the road. Do not forget to look out for traffic! With your assistance, we can better conserve these magnificent patient hunters and ensure that in the future, other people can appreciate the diversity of Western Australian pythons.

If you'd like a Python Observation Kit, please write to:

David Pearson,
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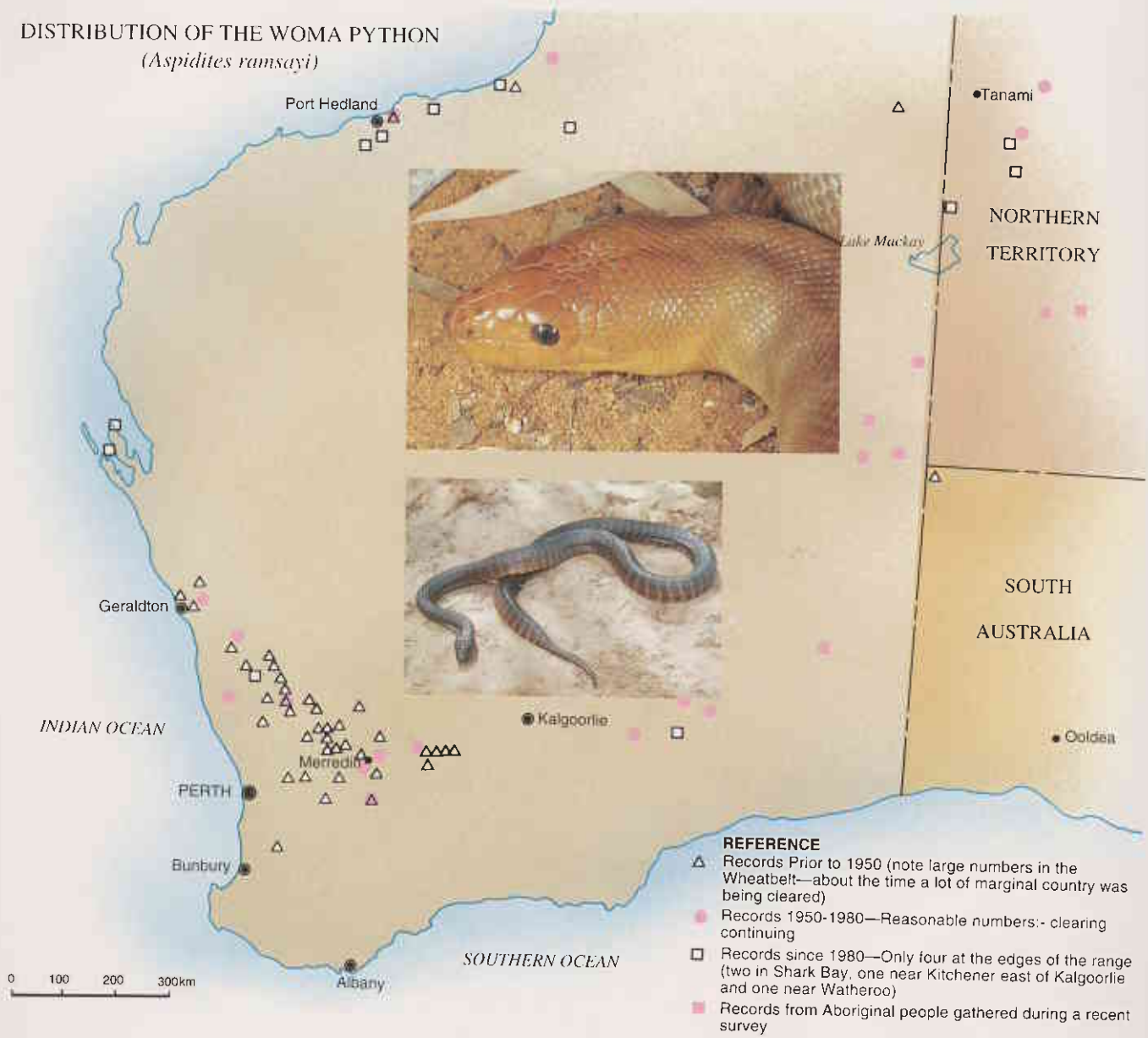
PO Box 51,
Wanneroo, WA 6065

David Pearson

Morelia spilota vaiegata



interactions can be obtained. The pulse rate of some transmitters varies with the body temperature of the snake, so it is possible to calculate body temperature by timing the pulses.

A study by the Department of Conservation and Land Management (CALM) on the ecology of carpet pythons in the South West began recently and will employ radio-tracking technology to understand how pythons use their habitat and what effects fire and exotic predators are likely to have on their future conservation. With a better understanding of such factors, it will be possible to improve the planning of prescribed burning and feral animal control operations for the benefit of pythons.

The cryptic habits of pythons and their low numbers make it impossible to survey populations using conventional techniques such as live-trapping or spotlight searches. An effective way to monitor python populations is to rely on the eyes of many people. To this end a python survey has commenced, to provide baseline information on the distribution of the various python species and their status. A pilot survey among some CALM staff, desert Aboriginal people and herpetologists proved very successful, with many interesting sightings reported.

Information on each sighting is sent to CALM's Wildlife Research Centre in Woodvale, where it is transferred to a database and used to plot distribution maps. With this information, it should be possible to detect changes in the status of python species before declines advance too far. In addition, new populations of threatened species such as the woma python may be located.

Top: The head of a woma python from the Broome area showing the typical rich golden and brown-banded colouration of desert populations.
Photo – Brad Maryan

Above: Woma pythons in south-western Western Australia are often dark on their upper surfaces and have sometimes been confused with the black-headed pythons (see photo on page 19).
Photo – Brad Maryan

David Pearson is a senior research scientist in CALM's Science and Information Division. He can be contacted at CALM's Wildlife Research Centre at Woodvale on (09) 405 5100.

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LANDSCOPE

VOLUME TEN NO. 2 SUMMER ISSUE 1994–95

The golden whistler is a common forest bird. 'Forest Focus' (on page 10) discusses a five-year study into the effects of timber harvesting on forest birds, insects and mammals.

The 10th Light Horse Memorial Trail is one of two walktrails in Neerabup National Park. The story on page 22 takes you inside this little-known park in Perth's northern suburbs.

In the closing days of 1991, heavy downpours of rain flooded Rowles Lagoon in WA's Goldfields; and so began an unusual year of floods, frogs, flowers and fires (see page 42).

Aboriginal people of the northern deserts call the black-headed python 'warrurungkalpa', which roughly translates as 'grinder or crusher of rock wallabies'. See the story on page 17.

Radio collars are fitted to feral cats to help scientists track their movements. 'Hunting the Hunter', on page 36, focuses on research into the habits of these supreme desert hunters.

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The majestic and graceful whale shark visits the north-west of Western Australia each year and is fast becoming a major tourist attraction. What does the future hold for the world's largest fish? See page 28.

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