



# Western Wildlife



NEWSLETTER OF THE LAND FOR WILDLIFE SCHEME

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## MEMORIES OF ROADSIDES

by Rica Erickson

**R**oadsides have been my lifelong interest. I was born at Boulder in 1908 where as a small child I marvelled at the sudden appearance after rains of plants growing wild outside our front gate. Within days the strip of red earth that flanked the narrow asphalt footpath would be covered with capeweed, jackjack grass and doublegees. In springtime in later years, when my sisters and I were trusted to explore the road southwards towards Mt Robinson, we found ferns growing on its southern flanks, while the flats beside the road were covered with everlastings, bluebells, buttercups, wattles and silky pears. One crisp autumn morning on the dry red earth we found our first 'early nancy', a tiny plant with a flower as bright as a star. Accustomed to nurturing our garden with a daily watering we were puzzled by the magnificence of the bush plants that flourished without care.

During World War 1 our family lived awhile at Albany and Cuballing. The road from Albany to Middleton Beach was a sandy track bordered by a showy spread of different wildflowers. At Cuballing where the road out of town was



bordered by prickly poison plants we hastened on to a grove of whispering sheoaks where we found gentler wildflowers called blue lilies. After the War, Dad came back with a 'gammy leg', but despite this handicap he settled on a small block of orchard land at Kendenup. There we found new and exciting roads, plotted for an embryo townsite, through virgin bush where orchids, triggerplants and sundews were abundant.

By then, Emily Pelloe's books on orchids and wildflowers were published. Pictures of wildflowers appeared weekly in the 'Western Mail', while Leach's book on Australian Nature Studies was opening a new field of knowledge. Because of my love of the bush I chose to be a country school teacher and during the next ten years kept a Nature Study Diary in which I sketched everything that came my

way: ferns, fungi, beetles, bees and butterflies as well as wildflowers. This became a treasured record of a variety of roads beside which I walked to school, from those that flanked the ditches lining the swamps at Young's Siding to those that criss-crossed wide areas of farmland as far north as Bolgart. It was there that I met the farmer who

was to become my husband.

By then I had a collection of botanical paintings worthy of publication. But there were gaps to be filled, so for many years we planned our holidays and business trips to cover as many different routes as possible. Whenever I saw an unusual patch of bush I would yell 'Stop!' - and was never disappointed. My husband declared that the plants whistled to me. He and our children joined happily in the hunt for plants and would wait patiently as I sat by the roadside to make the important preliminary sketches.

After World War 2, roadsides began to change. Road making on a grand scale was undertaken, both nationally and locally. Winding tracks were straightened and widened, with the loss of verges. In some areas the verges were burnt

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annually in the mistaken belief that bushfires would be prevented. In other areas where new roads were being made through bushland, the road reserves were three chains wide instead of the customary one. These plans for keeping wider nature strips were frustrated by farmers who encroached upon the reserves by ploughing firebreaks outside their fences. Botanists who are concerned about rare and endangered species ask for the exact locations of plants I have collected. I can only answer 'At a certain mile post on a certain road, but as the road has since been widened it may no longer be there.'

The network of national highways constructed by the Main Roads Department was also a source of concern to many. Their road graders relentlessly demolished nature strips for hundreds of miles, at the same time carrying noxious weeds for farming areas to previously unaffected bushland. Onion weed was spread within a year or two from Northampton to the Far North, while in the south there was a growing realisation of the devastating effect of bridal creeper in our forests. This noxious weed is still sold to city dwellers as a desirable garden plant. A more

insidious invasion by an alien plant is that of pine seedlings from plantations. They flourish on verges where some native plants are fighting for survival. Are these isolated escapees the vanguard of a steadily advancing army of pines capable of replacing eucalypts and banksias?

Discerning travellers noted these gradual changes with dismay. Some decades ago Shirley de la Hunty chaired a committee devoted to the preservation of flora on roadsides. The Main Roads Department now has a policy of spray-seeding and revegetation by native species. Also many Shires are now replanting their roadsides with native trees and shrubs. This will be a continuing exercise for future generations unless an effective method of weed control is used. Is it possible to eliminate the rank grasses now flourishing where giant drosera used to grow, or along the wet sheoak flats of Gingin where the green kangaroo paw is no longer seen?

There is need to guard the remnants of bushland that still survive, to eradicate invading pines and check the growth of weeds on recently affected verges. Already roadsides are covered with grass that has to be mowed annually. The

fragile understorey of small shrubs and native animals are slowly being choked by weeds. Within a few decades to come when the trees die also, of old age, there will be no bushland left to gladden travellers' (and tourists') eyes. So it is encouraging to find so many people in various societies who are engaged in investigating methods of weed control along our roadside verges.

*Rica Erickson is a naturalist, historian and artist whose influence on nature conservation in WA has been profound. As well as publishing, she was instrumental in having several areas in Victoria Plains Shire made into Nature Reserves and, through the Country Women's Association in 1961, she helped to persuade the then Premier, Sir David Brand, to increase the width of road reserves in new land releases to be places where, in Sir David's own words: 'Wildflowers can grow and flourish in perpetuity'.*

*Some of Rica's publications include: 'Orchids of the West' 1951 (second edition 1965); 'Triggerplants' 1958; 'Plants of Prey' 1968, 'Flowers and Plants of Western Australia' 1973 Erickson, George, Marchant & Morcombe pub. Reed (now into its third edition); and various historical books such as 'The Drummonds of Hawthornden' 1969; etc.*

## EDITORIAL

*Hi everyone!*

There are some people whose work is so important that it influences the vision of everyone who comes into contact with it. Rica Erickson is one such. A farmer's wife who was also a botanist and conservationist long before these disciplines became fashionable, Rica's love of the Western Australian bushland shines through in her lively prose and delicate watercolour drawings. Rural Australia needs more such people if we are to truly achieve Ecologically Sustainable Development.

This issue also covers some stories which relate to plants and animals that are active or more noticeable during the summer. It is an especially good time to observe reptiles. Although many people (including me!) are a little bit afraid of snakes, they are an important part of the ecosystem - what about a python in every hay-shed instead of a cat?

Many plants grow and flower in summer, in fact the northern sandplains are exceptionally colourful at this time. Of course, the reason why the plants can grow during this dry time is that many have deep roots which they use to tap the water table. This difference in water usage between native vegetation and

the annual crops and pastures which have largely replaced it is, of course, well understood by anyone who is involved with the management of soil and water salinity.

Also, please note the information on the back page about this year's round of grants. In the January issue we will be detailing some things that should help with writing submissions for funds. For example, there seems to be a lot of confusion about where 'biodiversity' fits into the usual NLP project. If you would like us to cover a particular point, please write or ring, so that we can try to help.

*Penny Hussey*

## FAUNA

# SCALY FRIENDS - CARPET PYTHONS

*by David Pearson*

**S**NAKES tend to have a poor public image. This may be due to the ability of some species to inflict venomous bites, or perhaps the evil role cast for serpents in biblical tales. Certainly to be described as 'a snake in the grass' is not a compliment!

**P**YTHONS, however, are one group of snakes the public views with some empathy. They are non-venomous and are typically large and slow-moving.

Pythons often reside close to people; sheltering in haysheds, outhouses and occasionally in house ceilings. Some farmers have encouraged their presence in sheds to keep mice and rats in check.

The Carpet Python (*Morelia spilota imbricata*) is found throughout southwestern WA, extending from Northampton, south to Albany and eastwards to Kalgoorlie. It is the best known of the pythons and the one most often encountered by people. It may grow up to 3 m in length and weigh over 5 kg. A pronounced triangular head and a pattern of irregular blotches and bars along the body (resembling an old carpet pattern, hence its common name) make it readily identifiable from other species of snakes.

Carpet Pythons are usually observed when crossing roads or sheltering in buildings. Unfortunately, their love of lying on warm roads in the late afternoon and evening results in many being killed



*(Photo: D. Pearson)*

by cars each year. Despite being one of the best known Australian snakes, little is known about their life history or ecology. Secretive habits and superb camouflage make them difficult to observe and study.

A downward trend in Carpet Python populations in WA has prompted a study by CALM into their ecology at two sites; Garden Island near Rockingham, and at Dryandra State Forest near Narrogin. Radio transmitters are implanted inside pythons while they are under a general anaesthetic. They are then released and located regularly to collect data on their preferred habitats, activity patterns, diet and social interactions.

The study has been running for two years and already some astounding findings have emerged. Female Carpet Pythons in SW WA grow to much larger sizes than males, up to four times larger at maturity. This occurs because females need to store vast amounts of fat to reproduce. In a reproductive

year, females may not eat for up to eight months. During that time they will also lay a clutch of eggs (up to 35) weighing around 25% of their body weight and then coil around the eggs to incubate them for about 60 days. Should the temperature of the clutch drop too low, the female python will begin shivering to generate heat to elevate its temperature.

Young pythons are independent as soon as they hatch and wander away from the nest in search of food and a home range of their own. This is probably a dangerous period for them, as they are only 40 cm long and weigh around 25 g. Birds of prey, foxes and feral cats are some of the potential predators of these small pythons.

Radio tracking has shown that Carpet Pythons have a preferred home range. At Dryandra, they return to the same logs on a regular basis, often at the same time each year. Since the winters are cold at

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Dryandra, they retreat up trees and shelter in hollows as much as 10 m above the ground. Here they may spend up to 5 months, only emerging to bask on a branch on warm days.

With the arrival of spring, the males begin travelling widely in search of females. In populations of Carpet Pythons in eastern Australia, males may fight to determine who mates with a particular female. As a consequence, evolutionary forces have influenced males to grow to a large size. In contrast, the small males of the SW Carpet Pythons do not fight so there has been no reason to attain a large size. They tolerate the presence of other males and either wait their turn to mate, or move on to locate other females.

Pythons are renowned for their ability to consume large prey items. Since they do not have dentition suitable for cutting up their food, it is swallowed whole. This has led to

some remarkable adaptations in the structure of the head, with the ability to temporarily dislocate parts of the jaw to increase the size of the gape. Juvenile pythons eat mice, other small mammals, lizards and occasional birds; while adult pythons are able to eat larger birds, reptiles and mammals including Numbats, possums and small wallabies. Prey is captured by lying in ambush inside a log or on an animal trail.

Carpet Pythons at Dryandra show a strong preference for sheltering in hollow logs during the warmer months. Favoured logs are usually greater than 150 mm in diameter with a hollow section that extends at least a metre. In the absence of suitable logs they appear to require thick vegetation for cover. Females often lay their eggs inside logs, usually large ones with concealed

entrances and occupying a sunny position.

In addition to radio tracking, a CALM survey collecting python sightings from the public has been running for three years. This has led to a much improved understanding of the current distribution and abundance of pythons throughout WA. This survey relies on the eyes and interest of many people and data collected will establish a benchmark against which any future changes in python populations can be assessed. If you have seen pythons in the past, or are likely to in the future, your observations would be of great assistance to the survey. Python sighting kits are available to interested people. Please contact me on (08) 9405 5100.

*David Pearson is a Senior Research Scientist at CALM's Wildlife Research Centre, Woodvale.*

## ECONOMIC VALUE OF BIODIVERSITY

### HAY SHEDS AND HEART ATTACKS

*by Murray Davies*

**P**YTHONS are the best form of mice control for stored hay, but I never got over the shock of finding them in my hay shed!

My family have a small property at Northampton and each year we conserve about 500 bales of cereal hay for supplementary feeding. Even though we kept a cat in the shed, we generally threw out the last 40 bales due to mice damage.

Then the snake moved in! In the course of feeding out the bales we would find him everywhere. Once I got over the ritual heart attack, I could pick him up and move him to a spot in the shed where we weren't working. That year we were able to feed out all the hay, there was no mouse damage.

The snake must have hibernated nearby, for next spring he was back again. The snake's life cycle fits in



*(Photo: D. Pearson)*

well with hay storage. Hay is moved into the shed in September when the snake wakes up and by the time we have finished feeding it out he is ready to hibernate again. Also, I can conscientiously leave junk heaps around the shed 'for the snake to hibernate in over winter'!

It is a good symbiotic relationship. The snake feeds on our mice and we save \$200 to \$300 a year on unspoiled hay. In bigger farming operations, the dollar value would be more.

*Murray Davies grew up at Northampton and currently manages a farm at Cuballing.*

*This snake was originally identified for Murray as a Children's Python, but it was more likely a Stimson's Python. Has anyone else got interesting 'snake tales'? - Ed.*

## FLORA

# VERTICORDIAS: WHAT ARE THEY, WHERE CAN THEY BE FOUND AND WHY DO THEY NEED PROTECTION?

by Elizabeth George

SOME of the most brilliantly coloured plants lighting up the country landscape from early spring onwards are *Verticordia* species - or Featherflowers, Morrison and Bush Cauliflower which are but some of the names by which these often spectacularly beautiful shrubs are commonly known. I prefer the botanical name *Verticordia* (literally meaning 'turner of hearts') because it is applied to all this genus (group) of plants which belong to the family Myrtaceae, they have flowers with 5 'feathery', 'hairy' or 'woolly' sepals, 5 petals, usually 10 stamens and 10 staminodes or sterile stamens (although *V. picta* and *V. rennieana* have 5 stamens and 15 staminodes) and a single style; all attached to a hypanthium or calyx tube. Sometimes the outer floral whorl which are called sepals appear to be more like long hairs than feathers and in some species the hairs are so fine and intricately interwoven that they look almost woolly. Currently known are 100 species and within them 13 subspecies and 30 varieties.



*Verticordia picta*

Morrison-flower was the common name first attributed by early settlers to the summer-flowering, almost iridescent orange-coloured plant (growing in Banksia



*Verticordia ovalifolia*

woodlands between Harvey and north of the Moore River) which later became *V. nitens*. Over the years the name changed to Orange Morrison, Christmas Morrison or simply Morrison, a name which was also applied to other species such as the brilliant yellow flowered *V. chrysantha* which is widespread from Kalbarri National Park through to the south coast, the beautiful pale to very deep pink flowered *V. monadelpha* (Eurardy Station through Mullewa and Eneabba to Amery) and the striking red flowered *V. etheliana* which grows on sand ridges between Billabong and the Yuna area. The name Bush Cauliflower covers most of the cream and white cauliflower-like species such as *V. polytricha* and *V. capillaris* which occur on the sandplains north and east of Geraldton, *V. eriocephala* (previously known as *V. brownii*) occurring between Mt Adams, north of Eneabba, and Israelite Bay, and *V. roei* which can be found through the south-eastern agricultural regions between Merredin, Peak Charles and Ongerup.

*Verticordias* vary from tiny, almost bizarre, prostrate shrubs through a broad range of shapes, sizes and flower colours to large

shrubs or small trees up to 7m tall. They are found growing naturally only in Western Australia and the Northern Territory where 3 species, *V. cunninghamii*, *V. verticillata* and *V. decussata* occur. The greatest number of species occur in the south-western corner of WA between Shark Bay and Israelite Bay, although a few can be found in the pastoral station country and the first two of the tropical species reach into the Kimberley area. They grow in differing soil types from various kinds of sand and gravel to heavier loams and clay soils and in a wide range of habitats such as sand ridges, open sandplains, heaths, shrublands and open woodlands. These can be located near the ocean or inland, beside rivers, adjacent to salt lakes, on and around small to large rock outcrops, or hills and even mountains.

A few species such as the unusual Wongan Featherflower, *V. staminosa*, and some forms of the Painted Featherflower, *V. picta*, which is also known as China Cups, flower early in the season through winter and spring. Many species flower during the spring months, although some of these and others bloom well into summer. Several near the south coast such as the pine-like *V. pityrhops*, Autumn Featherflower *V. harveyi*, and *V. seiberi* begin to bloom late in summer then continue through autumn until early winter. A few species - like the spectacular Scarlet Featherflower, *V. grandis*, which can be seen from Geraldton to Badgingarra - as well as having a couple of main flushes of flowering, bloom sporadically throughout the year. The rare southern Coast Featherflower, *V. helichrysantha*,

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## FLORA

bears its quaint lemon-yellow 'papery' blossoms in both spring and autumn when sufficient rains fall. In fact quite a number of them flower longer, or again after unseasonal rainfall and if one knows where to look, at least one species, and often many more, can be found in flower every month of the year!



*Verticordia grandis*

Besides producing beautiful or unusual flowers providing magnificent colour displays and vistas for local Western Australians as well as tourists, *Verticordias* primarily attract and produce nectar

and pollen for a wide range of insects including various ants, beetles and bugs, flies, bees and wasps, butterflies and moths. These as well as marsupials and nectar feeding birds. Some species are quite common occurring over relatively large areas, but others are rare, with far too many being vulnerable on roadsides. All of them form an important part of the natural food-chain in remnant vegetation, especially because it is becoming increasingly evident through the work of Terry Houston, that some of them provide sustenance for a number of host-specific (confined to a particular plant) specialised native bee species. More detailed analysis of their values is given in the article on *V. eriocephala* by Sarah McEvoy and Denise True... and we are only discussing one genus of the many which occur in our State! It is therefore vital to preserve and protect

as many as possible of the remaining small reserves as well as large and small pieces of natural bushland, particularly those in areas which have already been cleared.

*Elizabeth George is an amateur botanist who developed a fascination for Verticordia after moving to Western Australia in 1970. From 1978-88, with the help of many volunteer collectors and observers throughout this State, she compiled the Verticordia Reference Collection which can be consulted in the public section of the WA Herbarium. At present her comprehensive book, featuring life-sized watercolour paintings by Margaret Pieroni of all the described Verticordias, is in the final stages of preparation for publishing.*

*Illustrations by Margaret Pieroni for the Roadside Conservation Committee. Used with permission.*

## BUSH DETECTIVE

### WHO ATE THESE MARRI NUTS?



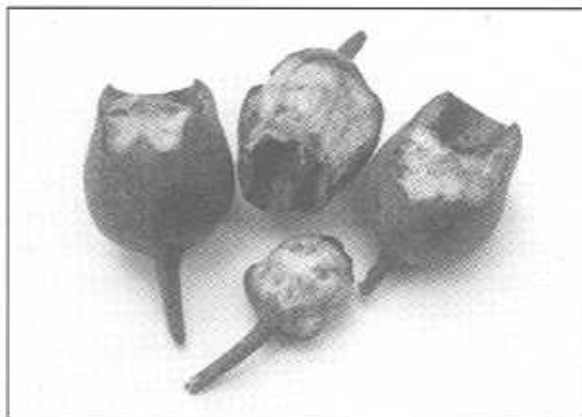
Back in February, Bush Detective showed drawings of the marks made by three different parrots when feeding on Marri fruit and seeds. Here are two more birds for whom Marri is a very important seed source.

A. Note that it is the flesh of the immature fruit that is being eaten.

B. Hard, dry fruits have been ripped open to get at the seeds.

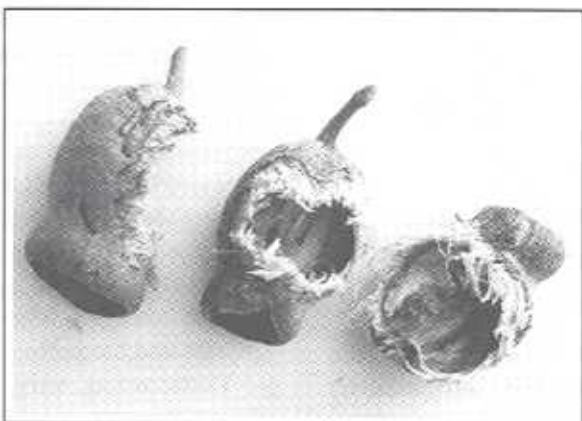
Remembering that we have already covered Twenty-eights, Red-caps and Baudin's Black Cockies, can you suggest what might have eaten these two?

A.



(photo: Robyn Knox)

B.



(photo: Peter Mawson)

Answer: A = Long-billed Corella B = Red-tailed Black Cockatoo

## PRACTICALITIES

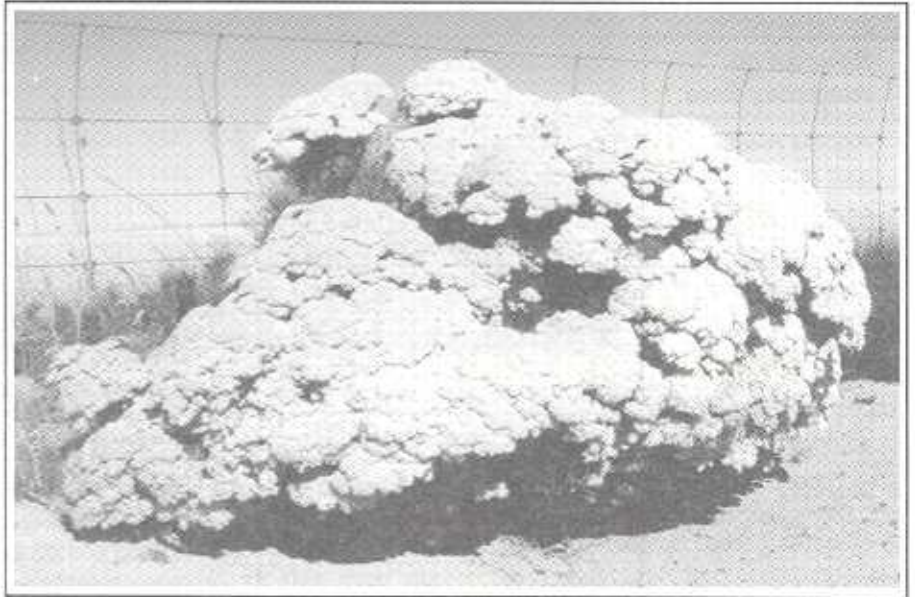
# BIODIVERSITY CONSERVATION AND WILDFLOWER PRODUCTION OF BUSH CAULIFLOWER (*VERTICORDIA ERIOCEPHALA*) - CONFLICT OR COMPATIBILITY?

by Sarah McEvoy and Denise True

**B**USH Cauliflower (*Verticordia eriocephala*) is one of the most distinctive Wheatbelt wildflowers with its characteristic white 'cauliflower' blooms. It occurs from Coorow to near Esperance and usually grows on sand over gravel or sand over clay in a scrub heath community. While the range of the species is wide, the area of habitat remaining in which Bush Cauliflower occurs is limited. Field surveys have shown that much of the potential habitat has been cleared, mainly for agriculture but also to a lesser extent for sand and gravel mining. Illegal harvesting on conservation reserves in the western Wheatbelt is common, with nearly all nature reserves and national parks having been exploited.

Bush Cauliflower has been commercially harvested for about the last 15 years from wild populations for use in the wildflower trade. The value per bunch (approximately 10 stems per bunch) to the private property picker is 60c - 80c when selling to a local landholder/wholesaler (depending on distance to the stands and ease of picking), or about 40c more when sold directly to an exporter. The majority of Bush Cauliflower is exported overseas, some is exported to eastern Australia and a very small percentage is sold locally.

Little cultivation of Bush Cauliflower has occurred to date. Research being conducted by Agriculture Western Australia is investigating the best method of establishing a commercial plantation, including an



investigation of nutritional requirements and mycorrhizal (fungal) associations which may influence growth and yield. Previous work has highlighted difficulties in establishing the crop. Similar difficulties have been experienced by growers with trial plantings. High transplanting losses occur and after planting out, plants often stagnate in the field for some time before either flourishing or dying.

With a gradual decline in the species' availability from Crown land, coupled with a downturn in the rural economy, there has been an increase in the number of blooms being taken from semi-managed 'wild' populations on private land. As a result of concerns about the sustainability of commercial harvesting, picking of this species has been prohibited on Crown land since November 1994.

### Effects of picking

One of the problems with picking or harvesting Bush Cauliflower is that many of the plants are killed as a result of the practice. Research we have carried out indicates that harvesting results on average in the death of half of all plants, including plants not picked. For heavily harvested plants where more than 80% of the flowers are removed, mortality is nearly 100%. Where plants survive, regeneration is slow with stems growing only 3-5 cm per growing season and plants taking between 3-5 years to produce another commercial flowering head.

The other damaging aspect of picking is the actual reduction of future plants by diminishing the seed bank through removal of the fruits that contain seed. This species depends almost entirely on seed stored in the soil for germination of seedlings following the death of parent plants during fire.

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## THE EFFECT OF DIFFERENT MANAGEMENT REGIMES ON BUSH CAULIFLOWER

Technique	Benefit	Disadvantage
<i>Rolling and/or chaining</i>	encourages regeneration of some species	<ul style="list-style-type: none"> <li>severely disrupts the community, often killing resprouter species</li> </ul>
<i>Fertilising</i>	may increase growth rate	<ul style="list-style-type: none"> <li>value to <i>Verticordias</i> not yet proven</li> <li>can be deleterious to other species in the remnant</li> </ul>
<i>Controlling pests and diseases</i>	improve growth and health of Bush Cauliflower	<ul style="list-style-type: none"> <li>the pollinator of Bush Cauliflower has not yet been identified and insecticide spraying may adversely affect future seed production</li> <li>may affect other insects which have ecological and agricultural benefits</li> </ul>
<i>Removal of competing flora</i>	less competition	<ul style="list-style-type: none"> <li>may not lead to increased growth</li> <li>reduction in conservation values of the remnant</li> </ul>
<i>Access roads and tracks</i>	confine vehicle access for picking to one area	<ul style="list-style-type: none"> <li>may create a passage for the spread of weeds and disease such as <i>Phytophthora</i></li> <li>may increase wind turbulence in remnant, resulting in deaths of Bush Cauliflower plants</li> </ul>
<i>Irrigating</i>	increase growth rates in a row crop	<ul style="list-style-type: none"> <li>unlikely to improve growth in a remnant population, especially without deleterious effect on other species</li> <li>may not be a wise use of a scarce resource</li> </ul>
<i>Pruning</i>	improve shape and yield	<ul style="list-style-type: none"> <li>likely to result in death of plants or reduce yield</li> </ul>
<i>Burning</i>	regenerate target species	<ul style="list-style-type: none"> <li>frequency and timing are critical - would not recommend less than 15 year intervals</li> <li>if seed source is depleted, may result in extinction of target species from remnant</li> <li>can increase weed invasion if buffer areas not provided.</li> </ul>

### Why conserve Bush Cauliflower?

With proper management, retaining viable stands in remnants can not only contribute to the ecology of a remnant and overall conservation of the species, but may also provide additional farm income.

The location of Bush Cauliflower in the landscape, on mid to upper slopes and crests, means its retention can be important for land conservation purposes. The vegetation type in which it occurs provides a rich habitat for fauna and Bush Cauliflower itself is an important structural and visual element in the ecosystem. In addition, conservation of viable populations of this species cannot be achieved on Crown land alone, and the role of private property in

maintaining this species throughout the Wheatbelt is vital.

### Managing a harvested population

The following management techniques can help to protect the vegetation and specifically Bush Cauliflower, for landcare, nature conservation and commercial harvesting:

- fence to exclude grazing
- control weeds
- exclude frequent fires
- avoid allowing fertiliser and insecticide to drift into the remnant
- disease hygiene management.

Specific techniques have been used by growers in semi-natural stands to 'improve' the yield of

Bush Cauliflower for commercial production. However they can have both beneficial and deleterious effects on the species and its habitat. The table above provides a guide for understanding the potential effects of your actions.

It should be noted that any flora which is exported (as nearly all Bush Cauliflower is) must, under Commonwealth legislation, be sustainable for both the species and its ecosystem. So, if any potentially destructive techniques are proposed, the impacts on other values of the remnant should be carefully considered. It is suggested that before any management techniques to improve production are imposed, the following should be undertaken:

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## IN BRIEF

### Pollination of Christmas Morrison



*Christmas Morrison under banksia woodland in Moore River National Park (P. Hussey)*

THE waist-high stems of brilliant orange-flowered Christmas Morrison, *Verticordia nitens*, are familiar to anyone who has seen the banksia woodland on the Coastal Plain north of Perth in early summer. Moore River National Park, just south of Regan's Ford, is ablaze with it in December. If you live in the Perth area, a trip to this Park make a great day's outing. I suggest you go up Brand Highway, stop at the Roadside Flora Area (shown by a sign of a kangaroo paw) and go for a walk along the firebreaks. A 'wildflower buff' will spot at least 150 species, while a 'twitcher' should get at least 30 birds!

Christmas Morrison also has the distinction of being one of the few plants yet determined in WA that are known to be pollinated by one specific animal, in this case the native bee *Euryglossa morrisoni*. Terry Houston (from the WA Museum) and Byron Lamont (from Curtin Uni) worked out the story ...

Christmas Morrison has curiously shaped anthers, with a strange helmet over the top. Pollen is secreted in an oily fluid into this helmet, which terminates in a spout. The bee squeezes the helmet and laps up the pollen mixture from the spout, and also takes nectar from the nectaries at the base of the petals - in the process moving pollen from one

flower to another. Little seed is set if this particular bee is not present, although other insects visit the flowers, and, in fact, a number of invertebrate herbivores and carnivores appear to depend on it.

Little is known about the life history of the morrison bee, apart from only ever being found on Christmas Morrison flowers. Since the plant germinates from seed after a fire, if there is no morrison bee there will be no seed, so no regeneration, so no Christmas Morrison.

Another example of the complexity of the bushland ecosystem.

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- defining what are the major ecosystems which will be affected by commercial harvesting from remnant vegetation;

- assessing the conservation status of the species and communities affected (either directly or indirectly) by your actions;

- evaluating the effects of management techniques used for flora harvesting on remnant

vegetation. Potential sources of help in assessing these effects are CALM, AgWA, LCDCs - or your local *Land for Wildlife Officer*.

Inappropriate use can result in degradation of the remnant with consequent effects on water, soil and nature conservation values - the very reasons for which the remnant has been retained. In addition, if you cannot prove your actions are sustainable, an export licence is unlikely to be granted.

So, pick conservatively, and plan your management to reflect nature as much as possible to ensure the compatibility of economic values with long-term viability of the Bush Cauliflower remnant.

*Sarah McEvoy is a consultant ecologist, who formerly worked for CALM as Flora Industry Botanist. Denise True is WA Coordinator of the Threatened Species Network at World Wide Fund for Nature Australia, and can be contacted on 08 9228 3227.*

## IN BRIEF

### Good news on the Bridal Creeper front!

Louise Marin, of CSIRO Canberra, reports that a rust disease, caused by *Puccinea myrsiphyllii*, has been found on Bridal Creeper in South Africa. It is so effective a control agent that it is hard to find any of the host plants at all! Once all the formalities are concluded, the rust will be imported and trialled in Australia. The tests will involve seeing if it affects only the target plants - commercial asparagus is a worry, but, in this family, there are fortunately few native plants to be concerned about.

Great news, if it works!

### Phytophthora at Moorine Rock

To Western Australians, the term 'dieback' is usually used to refer to the devastating disease caused by a soil-borne fungus, *Phytophthora cinnamomi*. This has been introduced to WA and has caused/is causing havoc in our plant communities, both native and cultivated. There are, however, other *Phytophthora* species - at least 24 in WA - most of which are probably native. One is *P. citricola*. Deaths caused by this fungus are usually isolated instances.

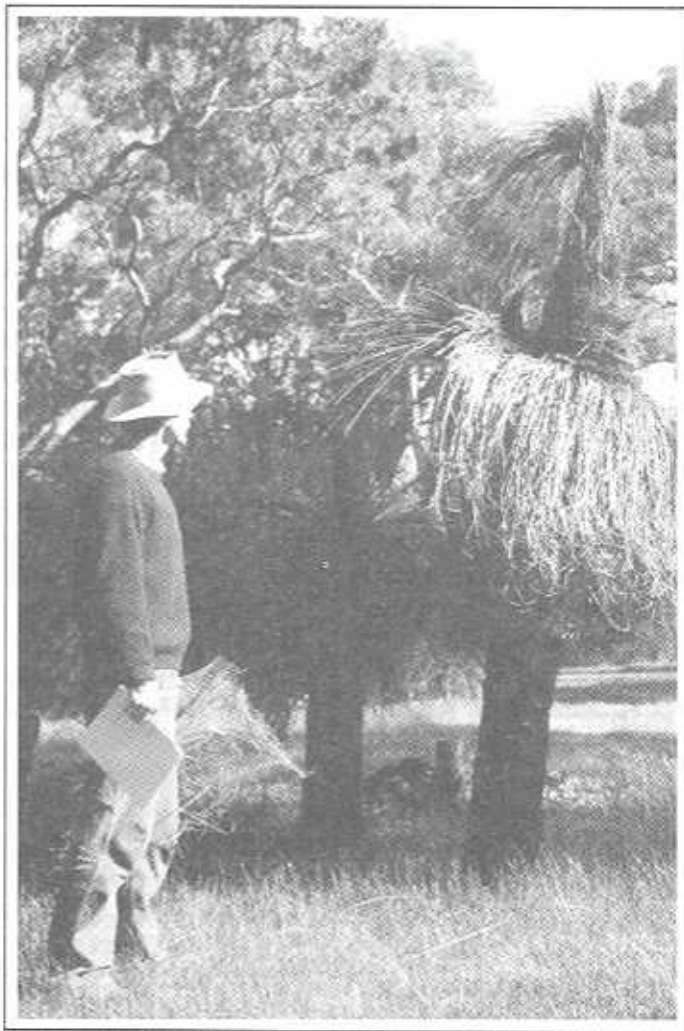
A worrying development is that Elaine Davison, a consultant mycologist, reports that *P. citricola* has recently been isolated from soil at Moorine Rock. This is way east of previously known populations and into the drier regions where *Phytophthoras* were not supposed to be able to survive. (But note, it is possible that the site received increased run-off, and therefore greater effective rainfall.) Nevertheless, this discovery raises the spectre of *Phytophthora* in the eastern wheatbelt, and reminds us that **Dieback hygiene should be undertaken wherever you are.**

### Biological control of Paterson's Curse

Paterson's Curse is a major weed of both agriculture and bushland in WA. It is a winter-growing annual whose broad leaves smother surrounding plants. A big effort is being made to find an effective 'biological control' which would destroy the weed but not anything else. Apart from various weevils and leaf-eating insects, another possible agent is the blight fungus

*Cercospora echii*, but this was ruled out due to quarantine restrictions into Australia.

But - surprise! Some Paterson's Curse plants with *Cercospora* infections were discovered growing on the Greenough Flats. Louise Marin of CSIRO in Canberra is testing to see if spores can be developed as a 'mycoherbicide' which could be put out over the target plants and so control them. Work still proceeds.



### Parrot-proofing!

Steve and Hedy Krasevac of York have protected their Balgas from parrot attack by wrapping the delicate central core of leaves in a cylinder of chicken wire. Steve says it looks odd - but it works!

## RESEARCH

# LUPIS : A DECISION-SUPPORT TOOL FOR INTEGRATED LAND-USE PLANNING

*by Robert Lambeck*

**A**RE you doing farm or catchment planning? CSIRO has been working on a computer model that could help.

Things are obviously changing down on the farm: increasingly we're hearing about product diversification, alley farming, plantation forestry, oil mallees, land conservation, nature conservation, integrated catchment management, etc. Farmers are having to make decisions about a much wider range of land uses and, with the expansion of catchment management, they are often having to make decisions in consultation and cooperation with their neighbours, shire councils, government agencies and their advisers, and private consultants.

Suddenly, the decision-making process has become more complex, and maybe not everybody share the same objectives. Even if they do have common objectives, they may not agree about the relative importance of those objectives. So, how do we decide which parts of the landscape are best suited for the different land uses that we identify? How do we assess the impact of actions for nature conservation and land conservation on productivity and profits? How do we take into account the fact that different participants have different objectives? These and many other questions have to be dealt with when we consider multiple goal planning at a catchment scale.

This is where decision support tools such as LUPIS (Land Use Planning and Information System) can be of assistance. Decision support tools are designed to help you to make decisions in an orderly manner. They ensure that it is obvious to everyone exactly what

decisions are being made, and why they are being made. LUPIS also allows you to play 'what if' games with your farm plans so that you can explore the consequences of making different land-use decisions.

If you are going to get involved in group planning, there are some essential elements that have to be included in the planning process. These include:

- stake holder participation
- identification of the main land management issues and objectives
- identification of the full range of potential land uses that can help you to meet those objectives
- assessment of land suitability/capability for those different uses
- development of guidelines for land allocation - these are the 'rules' that you use to decide what should go where
- creation and comparison of alternative land-use plans.

LUPIS is a computer-based support system which helps with the last point in this list. It's a sophisticated version of those plastic overlays that you've all used in farm planning in the past, with the benefit that it allows you to try different patterns of land use and see what the implications are for

your different objectives. The important features of LUPIS include:

- an ability to reflect the interests of each of the different stakeholder groups,
- transparency in the decision-making process, so that all participants can see how outcomes are arrived at, and how their interests are performing,
- an ability to quantify the extent to which different objectives are being met,
- and ability to determine the impact on all other land uses of allocating land to a particular use,
- an ability to run 'what if' scenarios to assess the likely consequences of alternative decisions.

It's important to remember that any decision support tool is designed to assist you in the planning process - they don't make the decisions for you. More importantly, the quality of the results that such a process produces will depend on the quality of the information that you use for making decisions. There is no substitute for a good understanding of the issues that you are dealing with! The real strength of using these types of tools is that they help you to manage the information that you need for good planning and they provide a logical and transparent procedure for helping you to make decisions about increasingly complex planning issues.



*LUPIS was developed by John Ive of CSIRO's Division of Wildlife and Ecology. For more information about its use, contact Dr. Robert Lambeck at CSIRO Division of Wildlife and Ecology, LB4, PO Midland WA 6056.*

# SHEOAKS AND HEOAKS - WHAT MAKES AN (ALLO-) CASUARINA?

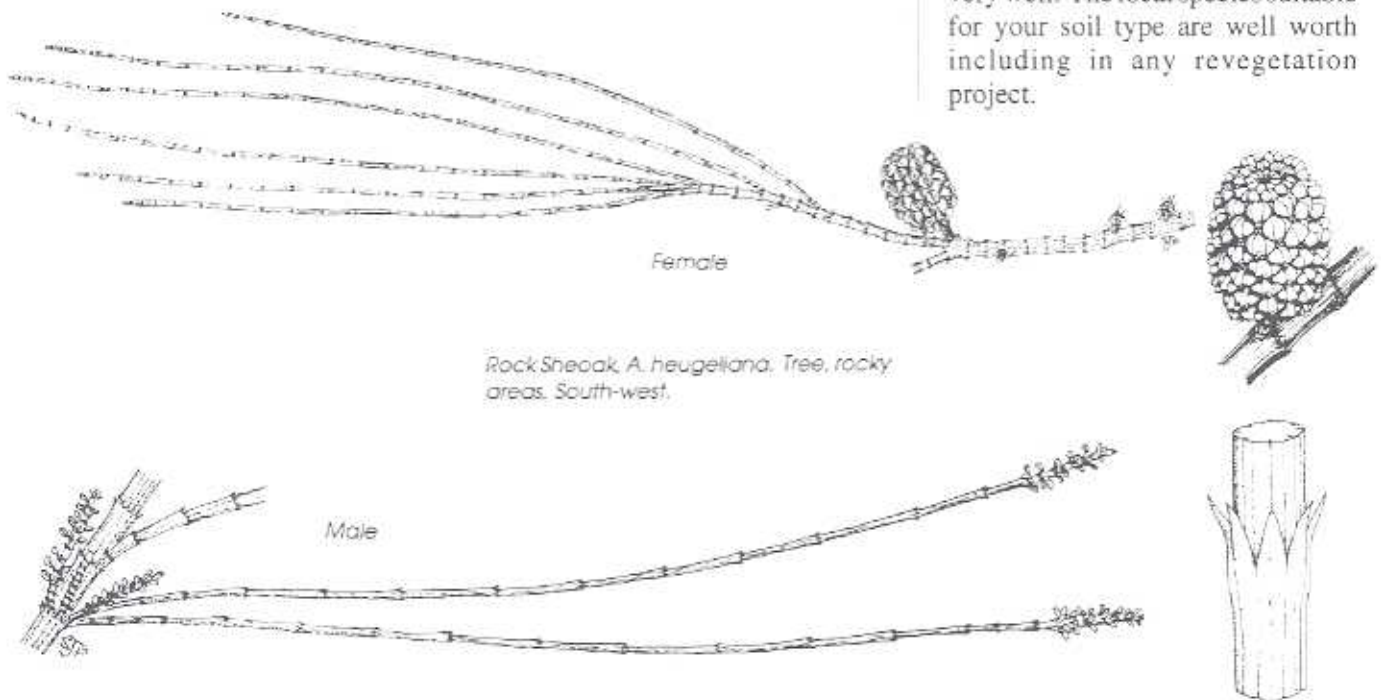
As sheoaks in wetlands, forests and rock outcrops, or tamma in scrub country, casuarinas are an important part of WA's vegetation.

All sheoaks have separate male and female flowers, and some, such as Rock Sheoak (*Allocasuarina heugelliana*) have separate male and female trees. The male trees turn a beautiful rusty brown when in flower. Female trees can be recognised by their cones.

Sheoak needles are really thin, flexible branches. The leaves have been reduced to tiny scales which circle the stems like paper crowns, while the branches themselves do the photosynthesis. After some time, the needles are shed and form a thick layer of leaf litter beneath the tree which effectively prevents most other plants from growing. A few orchids, however, specialise in this site, and the rare Smooth-lipped Spider Orchid, *Caladenia integra*, is almost confined to dense Rock Sheoak stands.

Sheoak roots contain nitrogen fixing bacteria, helping to put nitrogen back into the soil, and so the foliage is often highly nutritious. Grey Kangaroos, especially, are very partial to the young plants. Parrots often ringbark small shoots to get at the sweet sap beneath, especially during autumn, when alternative sources of food are restricted.

There are about 22 native species of Sheoaks in WA. Collect both needles and mature female cones to enable identification. Sheoak seed is easy to collect and direct seeds very well. The local species suitable for your soil type are well worth including in any revegetation project.

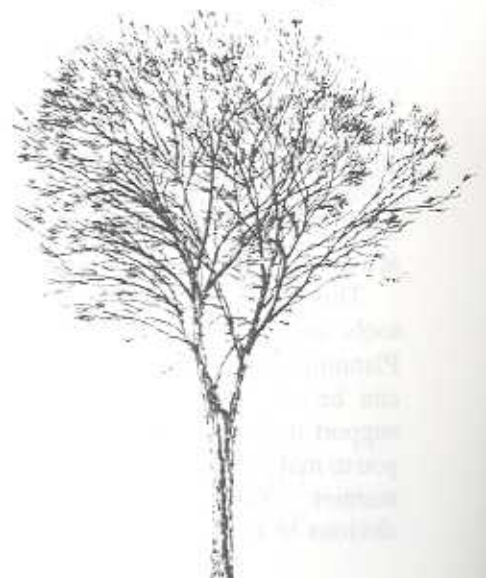


## How did Sheoak get its name?

The generic name comes from the Malay word "casuari" or cassowary, because the foliage was thought to look like that bird's drooping tail feathers. The early settlers thought the wood resembled oak, but, being not as strong, it became "sheoak". And why the "Allo-"? The genus has been divided

into two, depending on features of the seed. "Allo" means "like", so most of our sheoaks are now *Allocasuarina* "like casuarina". The only true *Casuarina* native to WA is Salt Sheoak, *C. obesa*.

Would you like to know more about what plant names mean? It helps one to remember the latin name, sometimes! The book "Western Australian plant names and their meanings" by F.A. Sharr. Uni WA Press, 1978, is a mine of information!



# PRACTICALITIES

## Sheoaks for revegetation

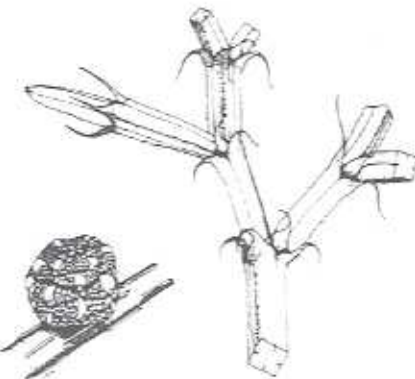
The following drawings will help you identify sheoaks for revegetation seed collection. The drawings of cones and needles are taken from 'Flora of Australia' Vol 3, the rest are by Margaret Peironi from 'Leaf and Branch' CALM.



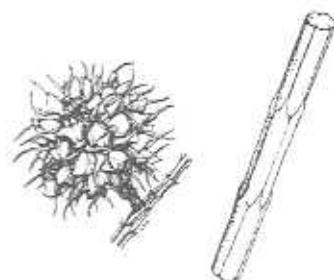
Common Sheoak, *A. fraseriana*. Tree on laterite or sand in higher rainfall areas.



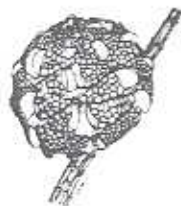
Tamma, *A. campestris*. Large shrub, widespread in the wheatbelt.



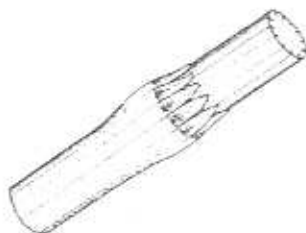
Tiny Sheoak, *A. microstachya*. Very small, dense low shrub on gravel in the wheatbelt.



Horned Sheoak, *A. thuyoides*. Medium shrub on laterite and gravelly sand in the wheatbelt.



Karri Sheoak, *A. decussata*. Large tree in very high rainfall areas.



Salt Sheoak, *C. obesa*. Tree, saline or waterlogged sites throughout the South-west.



## COMING EVENTS

### ◆ COASTAL REHABILITATION TECHNIQUES - BUSSELTON

Sun Nov 2nd - Fri Nov 7th 1997

This course is a unit in the TAFE certificate IV Land Management (Coastal Stream)

Live in: Catholic Youth Camp, 161 Caves Rd, Busselton

Cost: \$325 per participant

If you are interested in attending, please phone South Metropolitan College of TAFE, Fremantle, on: (08) 9239 8111 for further information.

### ◆ RETAINING OUR BUSHLAND - UWA PERTH

Sat Nov 15th 1997 1.00 - 5.30

Organised by the Wildflower Society of Western Australia.

Topics to be covered include landowners' experience of retaining bushland, covenanting mechanisms, future policy directions.

Registration fee: \$20 or \$10.

For further details, phone James Duggie on (08) 9383 7979.

## ABOUT GROUPS

### WASAH

**W**ASAH is a group of people who have an interest in reptiles and amphibians. This group is the Western Australian Society of Amateur Herpetologists. So, as you may gather, herpetology is the study of these animals. If you are interested in any aspect of snakes, lizards, tortoises or frogs, this club is for you. Some of our members have a broad interest in herpetology while others have more specific interests like captive breeding, wildlife rescue, reptile photography or getting out in the bush to observe animals in the wild.

WASAH has been a formal society since 1994, so we're very new. Our objectives are not only to promote the conservation of these animals, but also to encourage the study of reptiles and frogs both in the wild and in captivity. We also feel there is a great need for increased public awareness of herpetology.

We have four general meetings every year for members but we welcome visitors. A guest speaker is invited to each meeting to talk about some aspect of herpetology such as, pythons, reptile and frog conservation, or reptiles in captivity.

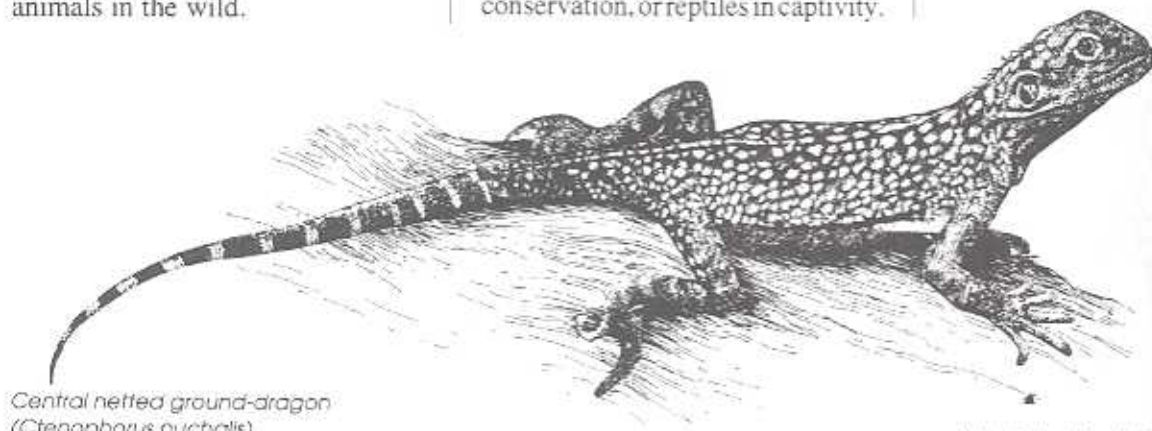
To find out more about WASAH you can contact any of the following people.

Brian Bush  
(08) 9295 3007 (President)

Brad Maryan  
(08) 9444 6412 (Vice President)

Robert Browne-Cooper  
(08) 9445 2409 (Secretary)

Write to: The Secretary WASAH  
169 Egina Street  
Mount Hawthorn WA 6016



Central netted ground-dragon  
(*Ctenophorus nuchalis*)

Artist: Kellee Merritt/The Illustration Library



## NEW BOOKS

### HOW TO CREATE A LOCAL HERBARIUM

by Sue Patrick  
Land for Wildlife, 1997

Our new booklet sets out the steps for collecting plant specimens, prior to having them identified. It is meant as a text for volunteers involved in community herbaria, but could be used by anyone who wishes to build up a collection of plants in their own bushland.

*Our new booklet, the first of the 'How to ...' series, will not be automatically sent to all LFW members, since not all members will be interested. If you are already involved with a local herbarium group, you will already have a copy. If not, please ring Emma on 08 9334 0427, to obtain one. Emma can also tell you how to contact your nearest community herbarium.*



Couch honeypot (*Dryandra nivea*) Artist: Kellee Merritt/ The Illustration Library

### WESTERN WEEDS: A GUIDE TO THE WEEDS OF WESTERN AUSTRALIA

by Penny Hussey, Greg Keighery, Roger Cousens, John Dodd and Sandy Lloyd.  
Plant Protection Society of Western Australia, 1997.

This book will help you to identify agricultural, environmental and garden weeds found throughout WA. About 1000 plants are described and 600 are illustrated in colour. A must for anyone dealing with growing plants!

Cost: \$25.00 + \$5.00 postage. From Agwest Seed Quality.

See leaflet enclosed.

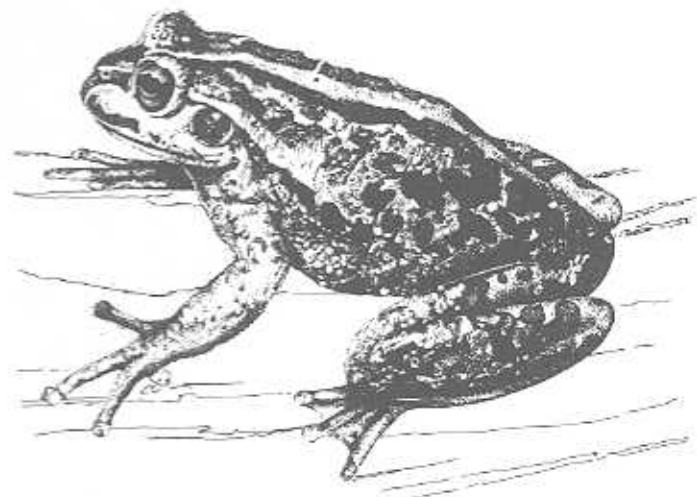
### A GUIDE TO REPTILES AND FROGS OF THE PERTH REGION

by B. Bush, B. Maryan, R. Browne-Cooper and D. Robinson.  
University of Western Australia, 1995.

Want to be sure of the type of lizard you just saw run across the road? Like to know which species of frog seranades outside the bedroom window each night? If you live anywhere on or west of the Darling Range between Yanchep and Mandurah, this is the guide for you!

This comprehensive book with colour photographs provides detailed information on 96 species of frogs, lizards, snakes, sea turtles and freshwater turtles that are found in the Perth region. For quick reference the book has been divided into sections based on the scientific classes and families that the animals fall into, and contains identification keys, descriptions and distribution maps for each species. The book also includes several commonly asked questions about reptiles, and refers to snake bites and their treatment.

Cost: \$12.95. Available from bookstores.



Green & gold bell frog (*Litoria moorei*) Artist: Kellee Merritt/ The Illustration Library

# FUNDING

## NATURAL HERITAGE TRUST FUNDING FOR 1998/99

**G**UIDELINES and application forms for the 1998/99 NHT funding are expected to be available from mid November 1997. Groups thinking of applying are encouraged to start formulating new projects for the next funding round now, which will have a closing date in late February 1998.

Applicants should aim to integrate their projects with other local, catchment and regional activities - particularly where regional strategies and catchment plans exist - and consist of a range of activities.

**BUSHCARE: National Vegetation Initiative** is one of the key programs under the NHT. The program aims to support projects that protect, manage and restore bushland, mainly outside the reserve system. The principle objectives are to conserve biological diversity and restore the productive capacity of degraded land and water.



*"...start formulating new projects for the next funding round now"*

Bushcare encourages activities that will:

- Protect and manage native vegetation, (particularly threatened ecological communities, habitat for rare and threatened species (i.e. endangered or vulnerable) and other areas of high nature conservation value);
- rehabilitation of degraded native vegetation;
- strategically revegetate degraded land to restore productivity; and
- enhance the knowledge and skills of land managers to better manage native bushland.

*"...conserve biological diversity and restore the productive capacity of degraded land and water".*

### ELIGIBILITY

Applicants must be an incorporated community group, or equivalent legal status, local government authorities, Non-Government Organisations, State agency or an education institute.

### FUNDING

To be considered for funding under Bushcare, applicants should submit a generic Natural Heritage Trust application.

*"Applicants should aim to integrate their projects with other local, catchment and regional activities..."*

Projects can be approved for up to 36 months, although funding is provided for 1 financial year at a time. Projects longer than 1 financial year will be subject to an annual review.



### FURTHER INFORMATION

Contact:  
Keith Claymore  
Bushcare Co-ordinator WA  
CALM  
LOCKED BAG 104  
BENTLEY DELIVERY CENTRE  
6983

Phone (08) 9334 0438  
Fax: (08) 9334 0278

Website address: [www.nht.gov.au](http://www.nht.gov.au)



For information relating to the National Landcare Program and the National Rivercare Initiative contact:

NLP - Natalie Moore  
ph (08) 9368 3960  
NRI - Luke Pen  
ph (08) 9278 0374

This Newsletter is a compendium of articles written by many different people. The views expressed are those of the authors, not necessarily those of the Department of Conservation and Land Management.

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