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Conserving the nature of WA

Western Wildlife

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WOODLANDS THROUGH A TREECREEPER'S EYES

Gary Luck

Woodland homes

IF you see a reddish-brown bird hopping vertically up the trunk of a wandoo tree you can be pretty sure it is the Rufous Treecreeper. Australia has six species of treecreepers, but only the Rufous Treecreeper occurs in the south-west corner. In fact, the wheatbelt is probably the heart of its distribution. During the early to mid 1900's it was recorded as one of the most common bird species in the region. However, sadly, with the clearance of large tracts of woodland habitat its abundance has declined dramatically.

In the wheatbelt, wandoo (*Eucalyptus wandoo*) and salmon gum (*E. salmonophloia)* woodlands appear to be its favoured habitats. However, not just any woodland will do. The treecreeper can be very picky when it comes to selecting a home. First, it can't do without tree hollows. Hollows are used as night-time roosting sites, to hide from predators and, most importantly, as the perfect place to build a nest. Second, it likes large, old trees. In addition to containing lots of hollows, these trees have a large, textually rich surface area with many nooks and crannies that form suitable hiding places for a variety of invertebrates. This is the perfect smorgasbord for an invertebrate-eating, tree-creeping bird that can cling to the trunks of trees with its sharp claws and dig into the bark with its bill.

Third, the treecreeper favours areas with lots of deadwood and hollow logs on the ground. Hollow logs! Why would a bird need hollow logs? (Maybe it's Numbat envy??). Well, there is a logical explanation for this. Nestling treecreepers spend the first 28 days (or so) of their life in the tree hollow where the parents built the nest. When they eventually leave the hollow they are still quite weak and for the first few days are not very adept at flying or climbing trees. Not surprisingly, these young treecreepers spend most of their time on the ground. This is a dangerous place for an inexperienced bird. To escape trouble, the safest place to go is the nearest hollow log. Also, since much of their life so far has been spent in hollows, this is what is most familiar to them.

Food and finding it

These are just some of the important characteristics that make a woodland a home for treecreepers. Of course, one of the most important things of all is food. The Rufous Treecreeper eats a wide range on invertebrates including ants, spiders, butterflies and moths (and their larvae), termites, grasshoppers, and various beetles and bugs (to name a few). We don't know if it favours any particular group. On two occasions I have also seen it eating (or attempting to eat) small skinks. I guess it just views these as large invertebrates! Other researchers have observed it

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EDITORIAL

Hello everyone!

I have stepped in as Editor of this issue while Penny Hussey takes a well-deserved holiday.

Welcome to our newest Land for Wildlife Officer, Steve Newbey, who commenced in July. Steve is based at the DCLM office in Katanning and will be working in the Broomehill, Cranbrook, Dumbleyung, Katanning, Kent, Kojonup, Tambellup and Woodanilling shires. He farms at Ongerup, has just bought a property in Collie and for the last few years was Community Landcare Coordinator for the Gnowangerup LCD. See below for Steve's contact details.

In this issue we have some very interesting articles on our fascinating native fauna - treecreepers, turtles and dalgytes, and our native flora - Eremophilas, native grasses, and rare flora. No less fascinating is the history and vegetation of the Greenough Flats and yes, there are positive aspects of salinity, as described by Alison Doley who farms at Coorow.

Last year Western Wildlife was the winner of the State section of the Sigma Media Landcare Awards. In August, Penny travelled to Canberra to represent WA and although we did not win, it was good publicity to be in at that level and Penny reports that it was a very flash function!

In September *LFW* hopes to celebrate its 1000th registration with a presentation by the Minister for Environment & Heritage, Dr Judy Edwards, at Coogee Primary School. A full report will appear in the next issue.

Best wishes for a successful harvest and end of the year.

Claire Hall

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Did you know?

..... that some bats can eat half their body weight in insects *each night*? Flying needs large amounts of energy and so they have to consume lots of energy-rich food. They are very important controllers of night-flying insect numbers.

DO YOU WANT A SECOND BINDER?

If you have been with *LFW* for several years, and are filling all your Western Wildlifes, your binder will be getting quite full. If you would like a second one, they are available for sale:

Binder + GST = $5.50
(if you collect it personally from a *LFW* Officer)

Binder + GST + postage in WA = $7.70
(please make cheques payable to Land for Wildlife)

Contact details for *Land for Wildlife* Officers

	Location	phone & email
Heather Adamson	Merredin	(08) 9041 2488 heathera@calm.wa.gov.au
Avril Baxter	Narrogin	(08) 9881 9218 avrilb@calm.wa.gov.au
Jenny Dewing	Bridgetown	(08) 9761 2318 mdewing@iinet.net.au
Fiona Falconer	Coorow	(08) 9952 1074 fonafalc@hotmail.com
Claire Hall	Perth	(08) 9334 0427 claireh@calm.wa.gov.au
Penny Hussey	Perth	(08) 9334 0530 pennyh@calm.wa.gov.au
Bob Huston	Mundaring	(08) 9295 1955 roberthu@calm.wa.gov.au
Rosemary Jasper	Ravensthorpe	(08) 9838 1890 rosemaryj@calm.wa.gov.au
Cherie Kemp	Busselton	(08) 9752 1677 cheriek@calm.wa.gov.au
Sylvia Leighton	Albany	(08) 9842 4500 sylvial@calm.wa.gov.au
Stephen Newbey	Katanning	(08) 9821 1296 steven@calm.wa.gov.au

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taking nectar from banksia flowers, but this is probably a rare event.

The treecreeper got its name because of its characteristic trait of hopping along the trunks and branches of trees looking for food. However, if you spend time watching these birds feed you might agree that this name can be a bit misleading. The Rufous "Treecreeper" spends a lot of its time foraging on the ground. This is especially true in winter and spring when about 70% of its foraging time is spent pecking invertebrates off the soil surface, turning over leaf litter and even digging into soft soil with its bill in search of a tasty grub. Foraging on the ground is best done in open areas because it is easier to find food and treecreepers can keep an eye out for potential predators. This is probably one reason why the birds are very common in our open woodlands.

Typical woodland with dead wood and hollow logs favoured by treecreepers. Photo: Gary Luck.

Social life

One of the most fascinating things about the Rufous Treecreeper is its social life. The treecreeper is a cooperative breeder. This means that, unlike most other birds in the world, more than just the breeding pair help to raise the young. A number of other animal species breed cooperatively, including humans. Treecreeper groups usually occupy a relatively small (about 2.5 ha), all-purpose territory that must provide the group with everything they need (e.g. food and nest sites). These territories are generally occupied year-round and some can be occupied by the same individuals for a number of years.

For the treecreeper, a cooperatively breeding group usually consists of Mum and Dad and their offspring from the previous breeding season (this is not always the case - sometimes birds from outside the immediate family help to form groups). Offspring will often stay with their parents on the home territory for a year (sometimes more) and help raise the following year's nestlings. It is usually males that do this, with most young females leaving the home territory within the first 12 months.

The offspring that stay are referred to as "helpers" because they help with a number of tasks. These include defending the territory from predators, helping to build the nest, and feeding the nestlings and fledglings. This help may be very important because breeding groups with more helpers at the nest raise more young than smaller groups. In this way, helpers improve the likelihood that at least some of their genes are passed on to the next generation because they share genes with the nestlings they help. This is very important if breeding positions are hard to come by and genes can't be passed on directly by reproducing yourself.

What is even more amazing about the treecreeper is that birds from neighbouring territories sometimes help to feed the nestlings in adjacent territories. We are not sure why this happens. It could be that birds in neighbouring territories are related (e.g. aunts or uncles of the nestlings they feed). It could also be a way for neighbours to get access to the resources of adjacent territories. For example, "let me have some of the food in your territory and I will help you feed your nestlings." The motive for this type of help will be a fascinating area for future research.

Conservation of treecreepers

If you've got a nice patch of wandoo or salmon gum woodland on your property with lots of large, old trees with hollows, piles of deadwood and an open ground layer you might just have treecreepers as well. I have found them in patches as small as 5-10 ha, but it is likely they only occur here if there are much larger patches nearby (e.g. 100-500 ha) or lots of patches close together (so birds can move from one patch to the other). To help keep our woodlands suitable homes for treecreepers and a number of other woodland birds there are a few practical things you can do.

1. Keep sheep and cattle out. Excess grazing can limit the recruitment of saplings and compact the soil.
2. Control weeds to keep at least some areas open.
3. Leave piles of deadwood and hollows logs on the ground. These are so important to our native animals for protection and as potential places to find food. As deadwood breaks down, it also returns nutrients to the soil.

If you are worried that your woodland patches don't have enough hollow-bearing trees you could try experimenting with nest boxes. I am not sure how the treecreepers would take to this, but I would love to find out and I have some ideas about what might be a suitable nest-box design. If anybody is interested in this my contact details are below.

Gary Luck, Centre for Conservation Biology
Stanford University, 371 Serra Mall
Stanford, CA, 94305-5020, USA
email: garyluck@stanford.edu

My work on treecreepers was completed during my PhD at Edith Cowan University, Department of Environmental Management.

FLORA

EREMOPHILAS - EMU BUSHES, POVERTY BUSHES

Bob Chinnock

EMU bushes are common throughout the drier parts of Australia. They are also known as poverty bushes in Western Australia because in some areas a number of unpalatable species increase rapidly in numbers as pasture becomes degraded. These plants all belong to *Eremophila*, the largest and most diverse genus in the Myoporaceae family. This family is largely Australian and the other well-known genus, *Myoporum*, has 30 species worldwide with 18 occurring in Australia.

Eremophila occurs only in Australia and the great majority of species are found in WA. Of the 214 species recognised today, 180 occur in WA and of these 146 are only found there. They are particularly common throughout mulga country and in eucalypt woodlands throughout the wheatbelt. The richest Eremophila area in Australia occurs around Meekatharra where over 30 species can be found in a 1° square (latitude x longitude).

PLANT FEATURES

Most *Eremophila* are shrubs commonly ranging from 0.2 - 3 metres tall but a few species like *E. longifolia*, *E. fraseri* and *E. mitchellii* can develop into small trees and a new species found in south west Queensland grows to 11 metres tall. In the southern parts of WA, a number of species form flat mats up to 2 metres or more in diameter.

Leaves are scattered or spirally arranged along the branches but in a few small groups the leaves are in opposite pairs or in whorls of threes to fives. They are undivided, frequently long and narrow and have entire or toothed margins. They may lack hairs or have a sparse to dense covering of them. In many cases the white, or more rarely yellow hairs, completely cover the surface.

The branches, leaves and sometimes parts of the flowers secrete resin and many species are very sticky. In extremely resinous species like *E. ramiflora*, the hairs become immersed in the resin and are not visible.

Eremophila flowers are pollinated by either birds or insects, and the flower types for these pollinator groups are quite different in form and colour.

INSECT-POLLINATED SPECIES like *E. nivea* (Fig.1.) are characterised by having white, cream, lilac, pinkish-lilac to purple corollas with the anthers enclosed in the tube or just sitting at the throat. In the tube there are usually spots (rarely solid broad lines) forming lines on the lateral walls, and often on, and below, the lower lobe. They help guide insects, usually native bees, but also honeybees, moths and butterflies, to the flower and down the tube to where the nectar is secreted. On entering the flower, pollen is rubbed onto the insect's head and back. Some flowers have tufts of white hairs at the entrance of the tube below the upper lobes and often on the lower lobe. Insects also "see" beyond the visible light spectrum into the UV range and both the hairs and spots in these flowers fluoresce and act as spotlights to the insects. Another feature of insect flowers is that the lower corolla lobe is projected forward and acts as a platform for the insect to land on.

BIRD-POLLINATED SPECIES like *E. subfloccosa* (Fig.2.) have red, orange, yellow and sometimes cream, green or brownish corollas. The anthers are normally exserted well beyond the tip of the corolla,

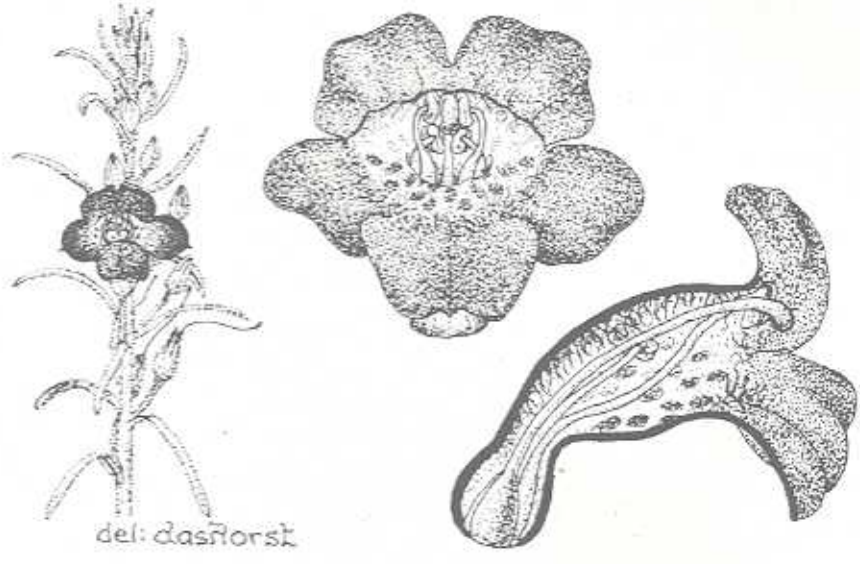

Fig. 1. Eremophila nivea showing the lower corolla lobe projected forward, enclosed stamens and the prominent spotting in the tube

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FLORA

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as is the style. Many species like *E. glabra*, *E. oppositifolia* and *E. subfloccosa* have no spotting at all but when it does occur e.g. *E. abietina*, *E. alternifolia*, the spots are randomly scattered over the surface, often only on the outside. Neither hairs nor spots are visible in the UV range. Birds only see in the visible light range.

Unlike insect flowers, the lower lobe in bird-flowers is reflexed out of the way to enable the bird to insert its beak easily.

The majority of bird-flowers like *E. subfloccosa* and *E. glabra* have glandular hairs in the tube. This is unique to bird flowers and is thought to assist cross-pollination by smearing sticky exudate on the bird's beak, which would in turn enable pollen to adhere and be transported to other flowers.

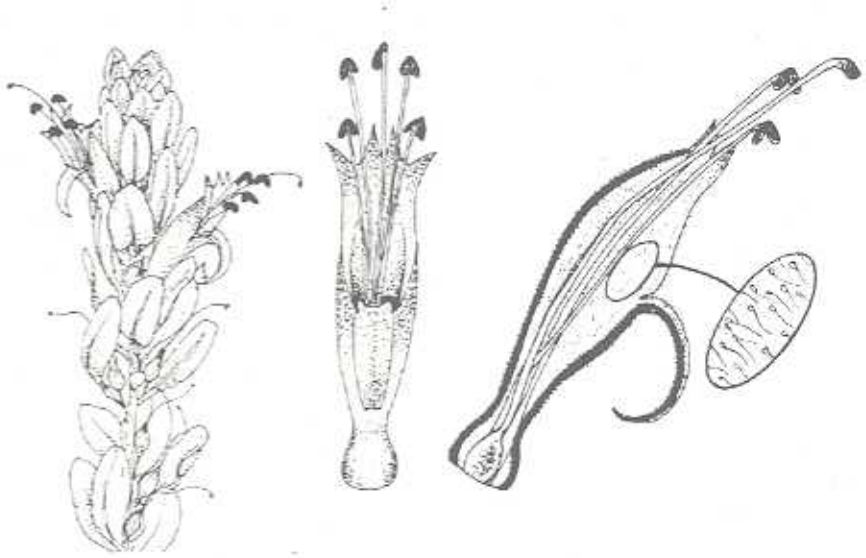

Fig.2. Eremophila subfloccosa *showing the reflexed lower lobe, stamens extending well beyond the corolla and the glandular hairs (enlargement) on the inside of the tube*

RARE EREMOPHILA

Many species of Eremophila found within the wheatbelt of Western Australia are very rare and gazetted as Rare Flora. There are a number of reasons for their rarity including: the contraction of habitats over the last century and a half, as agricultural practices expanded; the fact that many of these species were probably always restricted to small areas; and the decline of populations with changing composition of the vegetation. Today some species are known only from one or a few sites and many of the populations consist of small numbers of individuals.

A number of factors influence the size and extent of *Eremophila* populations. The genus has a relatively high light requirement and few species will tolerate deep shade. Thus plants favour very open areas in sparse woodland, on open plains or they grow on rocky hillsides.

Eremophilas prefer clayey loams or stoney soils and relatively few species occur on sand flats or on sand dunes. That is why the sand areas to the north and south of Perth are virtually devoid of them. Many Eremophilas are known to increase significantly in numbers following soil disturbance or after a fire event. It would appear that in many cases natural fires have probably been a significant factor in the rejuvenation of populations. Certainly old senescent plants of *E. purpurascens* and *E. denticulata* are known to re-sprout vigorously from the base after fire and many species are known to reproduce from seed following a fire event.

Over a period of more than 20 years I have studied a number of rare species in areas east of Hyden. Known populations of *Eremophila racemosa* were monitored during this period. They were restricted to disturbed road verges and usually consisted of relatively few plants, rarely more than 10. The largest population discovered was 38 plants. Although extensive searches were made in the undisturbed eucalypt woodlands adjacent to the populations, no plants were ever found beyond the road verge.

During February 1994, extensive fires ravaged areas to the east of Hyden destroying all the populations known to me. In early 1996, however, Dr Guy Richmond found an extensive population south of Lake Cronin in a burnt-over area which he estimated at one million plants, and later that year, Guy and I located another population of between 5,000 and 10,000 plants (Fig.3). We counted up to 18 seedlings per square metre in some places.

Species like *E. racemosa* are therefore well adapted to fire and populations will proliferate following one when conditions of good light, reduced competition and good rains prevail. Over a period of time, populations will gradually decline once taller species such as *Eucalyptus* and *Melaleuca* start overtopping them and reducing light levels. So, I would expect that in another 20 years we will be back to small relic populations of *E. racemosa* restricted to road verges again. Certainly for the moment this

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ECONOMIC VALUE OF BIODIVERSITY

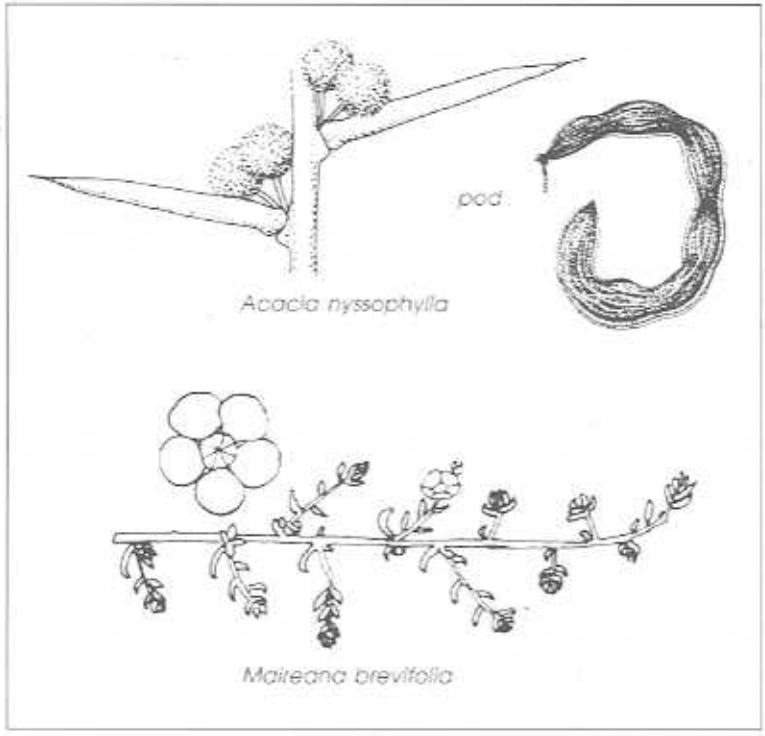
SALINITY - SOME PLUSES

Alison Doley

SALINE areas are often only spoken about in a negative light, but they do have some good points!

Natural salinity - conservation areas

Our property, "Koobabbie", is in the Waddy Forest LCDC 260km north of Perth, which is centred on a palaeo-drainage system. This is an area of natural salt land which contains a number of Priority Plants and forms a valuable wildlife corridor.



In 1987, John and I purchased an additional 2208 ha which included 1706 ha of this drainage system. Where the main flow of water occurs, the original melaleucas and *Acacia eremaea* have died, and saline flats covered with the samphire *Halosarcia pergranulata* dominate the landscape. However, much of the vegetation is diverse and in good condition, the only problem weed is Paterson's curse.

There are three Declared Rare Flora growing on this lake system. *Halosarcia koobabbiensis* is an attractive samphire with blueish "leaves" that is only found growing around the edge of one lake. We were very excited when we found out from Paul Wilson at the Herbarium that it was a completely new species! This is the only known population. *Ptilotus fasciculatus* was thought to be extinct until I forwarded a specimen to the Herbarium in 1987. It is a prostrate mat that doesn't look like a mulla-mulla until it actually flowers. *Caladenia drakeoides* grows close to the edge of the lake where the *Halosarcia koobabbiensis* is found. I first noticed a small population in 1996, and when Andrew Brown visited in 2001, he located two more populations 2 km away.

Thus, the area of primary salinity has a high conservation value but low grazing productivity. It might sustain 300 dry sheep in the long term.

Secondary salinity - productive areas

By comparison, the areas of secondary salinity adjoining the salt lakes are productive grazing land. The shelterbelts that have been preserved show that a fine stand of morrells, *Eucalyptus longicornis* and *E. myriadena*, grew on what was once the best soil on the farm. My father, Arnold Ruddock, recorded that the first signs of salinity appeared 13 years after the land was cleared.

In the late 1950s, Arnold fenced off an area that was developing saline patches and broadcast seed of old man saltbush, *Atriplex nummularia*, and bluebush, *Maireana brevifolia*, mixed with superphosphate. The bluebush grows naturally but as, at the time, only one small area was fenced from stock, there were few plants for natural regeneration. We removed the fence as the bluebush spread over the whole paddock. The paddock was last cropped in 1973, and since 1982, only cattle have been run there. They prune both species into dense low shrubs which can be grazed all year round. When sheep graze bluebush they strip all the leaves off, leaving long bare stems which produce no seed.

The old man saltbush has spread into the nearby salt lake system - will it become an environmental weed?

What has been a surprise is the ability of the thorny *Acacia nyssophylla* to establish and grow into large, 1.5m high, shrubs despite grazing by cattle or sheep. White-winged wrens and, to a lesser extent white-fronted chats, live in these "Brer Rabbit" bushes, which also shelter fat-tailed dunnarts and reptiles. Their dense, prickly habit means that foxes and cats would have difficulty penetrating them.

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Salinity continued from page 6

The cattle's need for roughage is provided by the barley grass which grows well on the alkaline soil. In autumn the calving cows are fed hay. In this 340mm average rainfall region, the 73 ha paddock provides the feed requirements for 40 cows and their calves for six months of the year. The paddock is rarely top-dressed and the pasture does not need re-sowing. In recent years a second paddock has been managed as a cattle-only pasture with a good stand of bluebush on part of the area. However, the pasture area in this paddock does need re-sowing after two very dry years.

Other saline areas

Away from the lake system, dolerite dykes are impeding drainage, bringing the saline watertable close to the surface. We fence these areas and plant trees at 10 metre spacings. There is now so much bluebush growing in fenced remnant vegetation that it quickly establishes on any newly-fenced areas once sheep are excluded. Acacias regenerate naturally. Once established, these areas are grazed by pregnant ewes in autumn, in years when feed is scarce.

Alison and John Doley are members of LFW and farm south of Coorow. They can be contacted on: 9952 3211.

Eremophilas continued from page 5

species cannot be considered "rare".

Within the wheatbelt many species are restricted to isolated pockets of vegetation or along road verges e.g. *E. adenotricha, E. nivea, E. resinosa, E scaberula, E. viscida, E. virens* and *E. sargentii*. *Eremophila nivea* (Fig.1.), for example, is known only from a small area near Three Springs and apart from one population on a farm, it is restricted to a narrow roadside verge.

E. adenotricha occurs in a small area south of Merredin and was presumed extinct as it had not been collected for over 60 years, but was fortunately re-discovered in 1987. Another species, yet to be described, *E. "vernicosa"*, was known only from a pressed collection in the Western Australian Herbarium made by Charles Gardner and William Blackall in 1934. The location given "between Wubin and Dalwallinu", covers a very large area and although searches were made by me and others on various occasions it was never located and presumed extinct. Then in 1998, during a vegetation survey, the species was re-discovered in a bush remnant on Kathie and Jack Stone's farm near Marchagee. Likewise in the same general area another species, not previously known, was discovered by Mrs Alison Doley on her property "Koobabbie" and less than 10 plants are known.

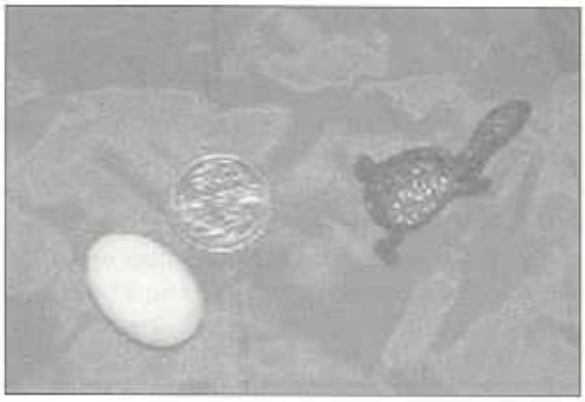
Fig.3. Population of Eremophila racemosa west of Lake Cronin

Fortunately, through the interest in flora and the co-operation of land owners like the Doleys and Stones and bodies like Kings Park & Botanic Gardens and the Eremophila Study Group who work with or through government departments like DCLM, most of these rare species are being located and populations studied and conserved. Species are being propagated by cuttings and as a result many of these rare species like *E. nivea, E. viscida, E. virens* and *E. scaberula* are established in cultivation.

Dr Bob Chinnock is a botanist at the State Herbarium of South Australia who has a special interest in Eremophilas.
He can be contacted on email Chinnock.Bob@saugov.sa.gov.au

Illustrations: Gilbert Dashorst
Photo: Bob Chinnock

FAUNA



Turtle egg and a newly emerged hatchling
Photo: Jacqueline Giles

THE OBLONG TURTLE

(Chelodina oblonga)

Jacqueline Giles

THE Oblong Turtle is our local long-necked freshwater turtle found only in the South-west of Western Australia, but is particularly seen in the wetlands throughout Perth. Toodyay is about the outer limit of its distribution inland. It is so named the Oblong Turtle, because its carapace or shell is an oblong shape, but it is also known as the Western Long-necked Tortoise.

You will often hear these freshwater turtles being called 'tortoises'. There are actually no strictly land-based tortoises in Australia. Probably it was their little legs that confused the early explorers, and tortoises they were called. While they do use their legs as 'walking legs' as they need to leave the water periodically for nesting and also to migrate between wetlands at various stages, it is due to their largely aquatic lifestyles, the international nomenclature classifies these animals as 'turtles'.

Like most reptiles, they lay eggs. This occurs during the spring and summer months. In fact, the first wave of females leave the water around 'Show week'. Unfortunately, in suburban wetlands, turtles are injured or killed when attempting to cross roads when they are seeking nesting sites or returning to the waterbody. The closer urban development creeps towards a wetland, less and less terrestrial buffer is available for the native wildlife utilising these areas and less is available for these turtles to nest in. Many females will nest within a short distance of the waters edge, but some have been known to walk a staggering 500m just for that 'perfect spot' to nest in. How can those little legs walk that far !! Like marine turtles, it is thought they may even return to the same site each year to nest in. So if you are lucky enough to have a turtle nesting in your garden, if she makes it, chances are she will be the same turtle returning next year to that very same spot. How do they do it ? No one knows for sure. This is just another one of those incredible things that occurs in nature that we have no answers to, just speculation.

The eggs take over 200 days to incubate !! That's a long time to remain in the ground. Further north, where its warmer, incubation time for other fresh-water turtle species is much shorter. Unfortunately, ground-nesting is recognised as being an extremely vulnerable life habit. As habitat patches become smaller and smaller, this makes it very easy for predators to forage throughout these patches which are essentially all 'edge' with no interior. In particular, because we now have some highly successful, voracious and unselective predators in this country - the European Fox and feral cats; much of our wildlife is severely threatened. I have found at my urban wetland study sites, foxes are preying on turtle nests which is severely reducing recruitment of young turtles into the urban populations. Adult turtles are also taken by foxes. Undoubtedly, the fox is a remarkable and beautiful animal, but there is no place for it in Australia.

Recently hatched turtles are known as 'Hatchlings' and are the size of a 20 cent piece. How do these incredible creatures make it back to the wetland? For those that have crossed roads to nest, very few probably make it back. Especially when vertical curbing is placed around wetlands. Ducklings cannot climb up vertical kerbing, or Bob-tailed lizards, and neither can Hatchling turtles. Some adult turtles can climb over this vertical kerbing, but for others, it presents as an absolute barrier.

These animals are then forced to remain on the roads for longer periods than necessary as they track along the kerbing hoping to find their way back. Some are deliberately run-over, others are preyed upon by the terrestrial birds such as Magpies or Ravens. Once in the wetlands, the gauntlet to adulthood is not over. Hatchlings provide a seasonal food source for many of the native aquatic birdlife eg Cormorants. Once they reach adulthood, they have few predators, but Pelicans have been known to take adult turtles. But each has its turn. Turtles are carnivorous and are the top of the food chain underwater. They eat the various water bugs, mosquito fish and crustaceans that inhabit these wetlands and they can take ducklings and will also consume carrion. So they are a natural and essential part of the balance within a wetland ecosystem.

These turtles do not hibernate completely like the northern hemisphere species do, but only partially hibernate. In summer, when their water body dries up they can burrow down into the mud and aestivate, which is summer hibernation. So farmers digging out the soft sediment in their dams may find aestivating turtles in the mud. Unless these turtles are decomposing and obviously dead, chances are they are still alive, so please put these turtles back into the river or another dam if possible. A neighbour may be happy to have turtles in their dams if you are not.

Thankyou for looking after our wildlife !

Jacqueline Giles is a consultant on the oblong turtle and is currently doing a PhD at Murdoch University looking at ambient sound in wetlands and the use of sound by these turtles. She can be contacted on 0408 95 70 53, email jacqgiles@netunltd.com.au

FAUNA

THE DEMISE OF THE DALGYTE

Ian Abbott

THE dalgyte or bilby *Macrotis lagotis* until recent times occurred over much of the Australian continent, including south-west WA. I collated distributional information from museum catalogues and specimen labels, scientific literature, regional histories, and interviews with 'oldtimers' (born before 1930). This last source provided most information. Because it is such a distinctive animal, it is unlikely that it could be confused with any other species present in the south-west.

The dalgyte (an approximation of the Noongar term for the bilby) was found to have occurred south-west to a line joining (approximately) Guilderton, Gingin, Upper Swan, Wooroloo, Chidlow, Bannister, Boddington, Bridgetown and Margaret River, and then south almost to the southern coast in places. I also used vegetation mapping produced during the Regional Forest Agreement to model the original (1929) geographical range of the dalgyte in south-west WA.

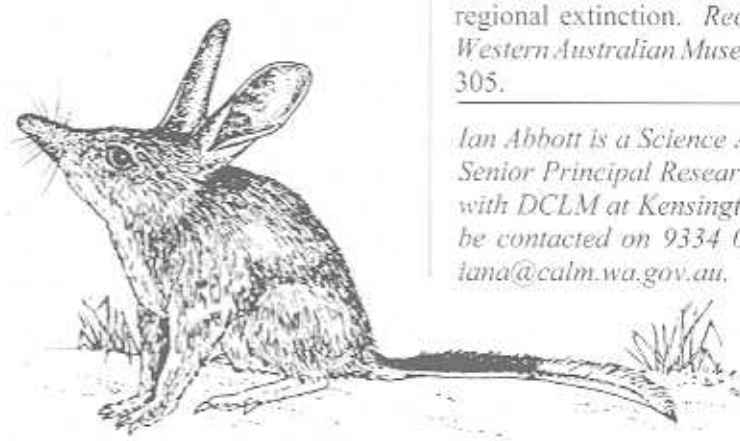
The last specimens were collected in the 1930s, but the species was last observed in the south-west as late as the 1980s. I assessed this chronology of (?apparent) extinction against the 15 factors usually invoked in explaining declines of native mammals in south-west WA.: drought, changed fire regimes, Noongar hunting, pastoralism, dingo predation, cat predation, trapping for fur trade, disease, clearing of vegetation for agriculture, competition from rabbits and introduced rodents, unintended mortality from rabbit trapping and poisoning, fox predation, logging and mining.

Careful consideration of the evidence available led me to determine that the fox is the single essential factor associated with regional decline of the dalgyte. I then formulated an additional hypothesis, that if the fox had not established in south-west WA, the dalgyte would have persisted in national parks, nature reserves, the eastern portion of State forest, and patches of remnant vegetation on farmland. This is a testable hypothesis, as DCLM is now re-introducing dalgytes to various national parks from which foxes have been removed by ongoing poisoning.

Generalizing from my analysis, extinction can be a drawn-out process to which many factors can contribute. The primary factor may also differ from species to species.

Reference: Abbott, I. (2001). The Bilby *Macrotis lagotis* (Marsupialia: Peramelidae) in south-western Australia: Original range limits, subsequent decline, and presumed regional extinction. *Records of the Western Australian Museum* **20**: 271-305.

Ian Abbott is a Science Adviser and Senior Principal Research Scientist with DCLM at Kensington and can be contacted on 9334 0526, email iana@calm.wa.gov.au.



THE WAY WE WERE

INTRODUCTION OF CATS TO THE BUSH

IN 1990, Thomas Dimer, then 87, recorded the things that had happened during his long life. Born in 1903 on a station in the Esperance hinterland, he was the archtypical bushman, drover, miner, dogger ... he has this to say about feral predators:

"You've got to be born and bred in the bush to see how the birds live, and I think the biggest pest in the world today, that's cats, dogs and foxes. They've killed all the little wallabies out, killed all the little lizards and that sort of things out, and the cats climb up the tree and get the eggs and all the ground years ago when there was plovers and any birds there, turkey and that sort of thing that lay eggs on the ground, the foxes destroyed them. That's the biggest pest that ever came to Australia. Cats too. In the turn of the centuary, the Government asked Dad would he take out 200 cats from Israelite Bay to distribute to get rid of the rabbits. So he distributed 200 cats around from Israelite Bay to Nanambinia Station, and them cats, the domestic cats came out from England you see, and they were paid for."

There are many fascinating snippets about living in the WA bush in this document "Interview with Thomas Dimer", by Helen Crompton, March 1990, ref no OH 2339, Battye Library Oral History Unit. A transcript is held in the Esperance Library.

FLORA

FLORAS PAST AND PRESENT

Judy Wheeler

WHY do we need Floras? Well we need a Flora to help us to identify the plants of any area. If we don't know what usually grows in an area, then we don't know what it is that we need to conserve. It is knowing the usual plants of an area which enables us to spot the unusual - this way we can decide which plants need closer examination and perhaps find that a plant we have seen is a new species (an exciting discovery new to science), or perhaps a known species but well outside its normal distributional range.

Australian Floras of very large areas, such as the whole of Australia can be very difficult and unwieldy to use (thousands and thousands of species). George Bentham (a British botanist) did write, single-handed just that - a Flora of Australia called "Flora Australiensis" in the mid nineteenth century, a work of seven volumes. Absolutely fabulous, an extremely talented and hard-working man. Today of course we know of many, many more species than was then known to science. A new "Flora of Australia" is being written by contributing botanists from all over Australia, but in more than fifty volumes and over a great number of years. Even a Flora of just Western Australia would be a huge work of many volumes to cover all the 12,500 or more plant species of our State.

The newly published "Flora of the South West", covers the much smaller area of Bunbury to Augusta to Denmark, and even so it has just over 2000 currently known species and took ten years to write! George Bentham worked from pressed plant specimens, which are in the Kew Herbarium, London. These were sent to London by the early explorers such as James Drummond and Ludwig Preiss and early settlers such as Georgiana Molloy. The actual specimens that he looked at can still be identified as he turned back the corner of the label and wrote the letter "B" to show that he had seen that particular specimen.

Judy Wheeler pictured with the two volumes of her new book. (See Book Review, page 19) Photo: Sylvia Leighton.

For the "Flora of the South West" we used similar pressed plant specimens housed in the Western Australian Herbarium in Perth which have been collected from throughout the south west of the State. We also have been able to tap into earlier work by various scientists who have worked in the area, such as Grant Wardell-Johnson who carefully collected plant specimens and drew up a species list for the Walpole-Nornalup National Park. Other scientists who did earlier survey work include Greg Keighery in the Busselton area and West Cape Howe, Neil Gibson in the Scott River and D'Entrecasteaux area, Brenda Hammersley in the Denmark area etc. Their work has been really important in compiling an accurate list of species for the area.

Unfortunately the people who have actually written the "Flora of the South West" have had to base their work on the collections of others. They have not been able to spend much time on field-based studies - it would just have taken even longer to write!

What format for a Flora? Many of the early Floras such as "Flora Australiensis" were devoid of all illustrations. However people have come to realise that very often a small picture can be worth a thousand words. It was on this basis that the plant identification books "Wildflowers of Western Australia" were produced and have been extremely successful. For the "Flora of the South West" we wanted to be able to give the user such pictures, but also sufficient text to be able to confirm their identification.

The keys in Floras are often quite difficult to use for people who have little specialist knowledge. One traditional start to a plant key in a Flora is based on the position of the ovary and how many ovules it contains. To the uninitiated – what or where is the "ovary" let alone how many "ovules" – it has can be quite daunting.

A format used successfully in South Australia was our starting point in which the key is based on flower colour and shape. We have followed this idea in the key of the Flora of the South West and have six broad colour groups within which we have used ten basic flower shapes. The result is a much more user-friendly illustrated Flora key.

The actual writing of a Flora is, unfortunately a very slow painstaking task. There are few or no field trips, no exciting moments like getting the vehicle bogged in previously untraversed terrain, no relaxing evening camp fires with colleagues, no encounters with wild animals.

Each plant group in turn must be thoroughly researched, literature pored over, previous descriptions of a plant species studied, often including the original

Floras continued on page 11

PRACTICALITIES

FIRE FREQUENCY CAN CHANGE VEGETATION COMMUNITIES

Malcolm Gath standing on the roadway which stopped the progress of the second fire. The sheoaks, which were regenerating on the right hand side of the road, were killed allowing a new crop of powderbark wandoo to survive.

DURING the 1960's when lighter soils in upland areas were cleared for farming, clearing fires often escaped into the remaining vegetation. In the case of a property now owned by the Gath's of Cuballing, this caused a complete change in vegetation communities.

Prior to the fires, the area had been a mixed woodland of wandoo and sheoak around a granite outcrop and adjacent to that, powderbark wandoo and sheoak around a laterite breakaway.

After the first clearing fire in 1960, the surrounding arable land was put into crop for several years and not grazed. Multiple cropping helped eliminate poison bush (*Gastrolobium* sp.), which readily regenerated within the crop and was toxic to stock. This lack of grazing allowed dense sheoak thickets to regenerate around the rocky areas outcompeting other species.

Four years later another clearing fire came from a different direction, this time Malcolm Gath helped the owners to stop it at the road. The fire killed the regenerating sheoaks which had not set seed. This left room for mature powderbark wandoos at the top of the ridge, which were not affected by fire, to recolonise the area.

Avril Baxter

Floras Past and Present continued from page 10

description in Latin. Then "pen to paper", or these days "keyboard to computer" writing until we come up with the words which we feel adequately and accurately create a word portrait of each species. Further research is then needed into the distribution and flowering time of the species, what sort of soils it prefers. Finally it is the picture to illustrate the species that is needed - if we could all draw than it would be easier, but I can't and so have to convey to an artist which features I want them to bring out in their illustration of each species.

Further work on the flora of the region will be ongoing with the discovery of new species or unusual variants. This is never-ending. People who think they have found an unusual plant can seek the help of DCLM officers in their area or volunteers involved with various Community Herbaria. There are many Community Herbaria groups who are very keen to help and are great sources of knowledge about the plants of their immediate area. These people in turn, if they also think that something new has been discovered, draw on assistance from the Western Australian Herbarium in Perth to direct the specimen to a botanist who is specialising in that particular plant group. If indeed it is a new species, then there is still a long way to go before the species can be formally described and given a new scientific name. That however is another story!

Judy Wheeler is a Senior Research Scientist with DCLM at Albany and can be contacted on 9842 4520, email: judyw@calm.wa.gov.au

BUSH DETECTIVE

This puzzle asks you to guess the reason for a management action.

Barrow Island, WA's biggest land-based oilfield, is also a Nature Reserve, which means that the petroleum company (Chevron Texaco) operates under strict guidelines concerning impacts on the indigenous flora and fauna. This is one of numerous 'donkeys' (beam pumps) on the island - the arm nods up and down as it pumps up the oil. But why is there a thick mat of hard, uncomfortable, upward-pointing plastic cones (arrowed), spread on the concrete alongside the machinery? Can you guess?

Ans: This mat is to discourage mammals such as euros, boodies or banded hare-wallabies from resting in the shade of the machinery, and then getting clobbered when the flywheel operating the donkey swings down to its lowest point. Miners can be pretty inventive people, can't they? *(Thanks to Graeme Rundle of the WA National Parks & Reserves Association for this puzzle.)*

FLORA

THE CHANGING GREENOUGH FLATS

Michael O'Connor and Bruce Gardiner

WHAT was the place like before farming? What is the story of human land use here? How and why did today's bush remnants survive? These are questions land managers often ask. The answers are typically used in planning future revegetation, but have also been applied to redesigning wheatbelt farming systems to function like the native vegetation they replaced.

We spent the period between 1996 and 2001 asking these very questions of the Greenough Flats (south of Geraldton). Although the Flats are often thought of as a pair of flood plains, they include the coastal Quindalup dunes on one side and Tamala limestone hills in between. The Flats are a fascinating subject given their long Aboriginal and European history. Aboriginal occupation of the Greenough region dates back more than 37 000 years. The first European pastoralists and herds appeared in 1850, followed by agriculture in 1857. The last pastoral leases were given up in the 1880s. When John Beard examined the area in 1974 there were few vegetation remnants on the flood plains. After consulting a local historian and similar landscapes at the Hutt Estuary he concluded that the flood plains were once covered in an *Acacia* low forest.

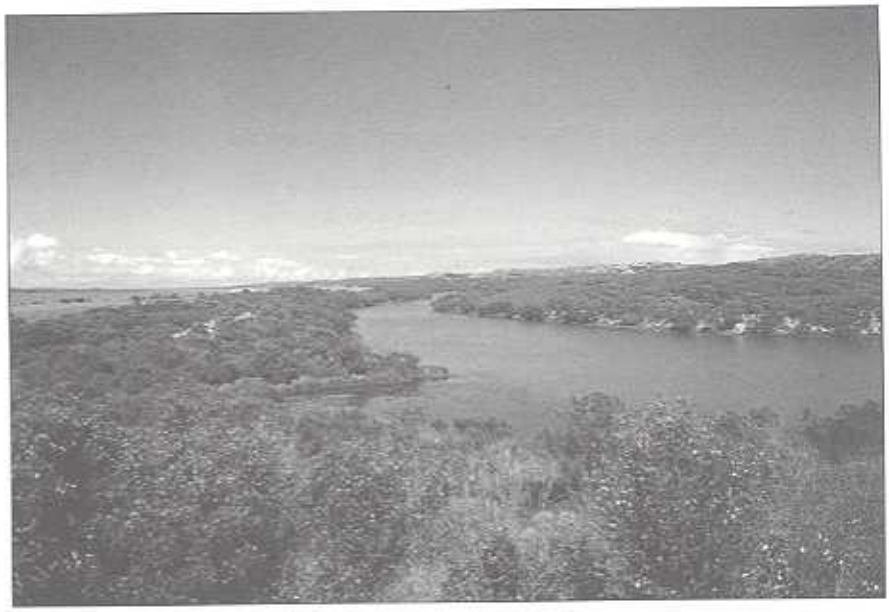
To look at the questions in more depth we turned to the archives – accounts left by European travellers such as George Grey, land surveyors' field books and maps, printed district plans and studies and specimen collections left by passing botanists. This material was re-mapped with GIS onto a recent land system map by Gary Rogers, from which it was possible to reconstruct the original landscape of Greenough, and then examine how it has changed since 1849.

The results were not particularly surprising for the non-alluvial parts of Greenough: scrub on the coastal dunes and various types of thickets on the Tamala limestone hills. The results for the flood plains were more detailed, probably because they were the subjects of much of the historical records, and also quite surprising. On both flood plains the records suggested savannah-like plant communities – extensive areas of grasses and herbaceous plants, dotted here and there with shrubs. Typical is the following diary entry by the early pastoralist Logue in which he described the Back Flats in 1850:

> ...we laid up on a fine flat lately burnt but with green Kangaroo grass [*Themeda triandra*] already springing from the tussocks clumps of a kind of wattle dotted here & there like a planted park, fine light alluvial soil...*31 October 1850*

These savannah woodlands were easy to travel across, and places where Europeans met large Aboriginal groups often engaged in digging for the yam *Dioscorea hastifolia*.

On the Front Flats, the alluvial plain nearest the ocean, the historical records suggest a pre-European vegetation of the northern two-thirds was a black wattle (*Acacia rostellifera*) savannah woodland. The southern third was probably



Estuary at mouth of Greenough River. Photo: M O'Connor.

Leaning river gum. Photo: M O'Connor.

continued on page 13

Greenough Flats continued from page 12

covered in grassland with sparse shrubs, clumps of *A. rostellifera* and *Muehlenbeckia florulenta*. This shrubby grassland also occurred on the southern part of the Back Flats. The mid-section of the Back Flats was covered in a York gum-wattle (*Eucalyptus loxophleba* - Acacia) savannah woodland. The northern part was similarly a savannah woodland, but one in which the woody component was a species of *Eucalyptus*. Although many of the early accounts refer simply to 'grass', a few detailed accounts from the Greenough Flats and nearby landscapes suggest that the grass species on both flats were mostly kangaroo grass (*Themeda triandra*) and spear grass species such as *Austrostipa elegantissima*. *Panicum decompositum* and species of *Danthonia* and Aristida species were present in places but perhaps not widespread. Herbs are also an important part of grasslands. At Greenough there were orchids such as *Microtis* and *Thelymitra*, the clover-like *Trigonella suavissima*, paper daisies (*Rhodanthe* and other species), and the vines *Dioscorea hastifolia* and *Clematicissus angustissima*. Wet depressions contained species such as the sedge *Schoenus*.

Interestingly the botanical symbol of the Greenough Flats – the 'bendy' river gum (*Eucalyptus camaldulensis*) – is not a focus of early traveller accounts. The field

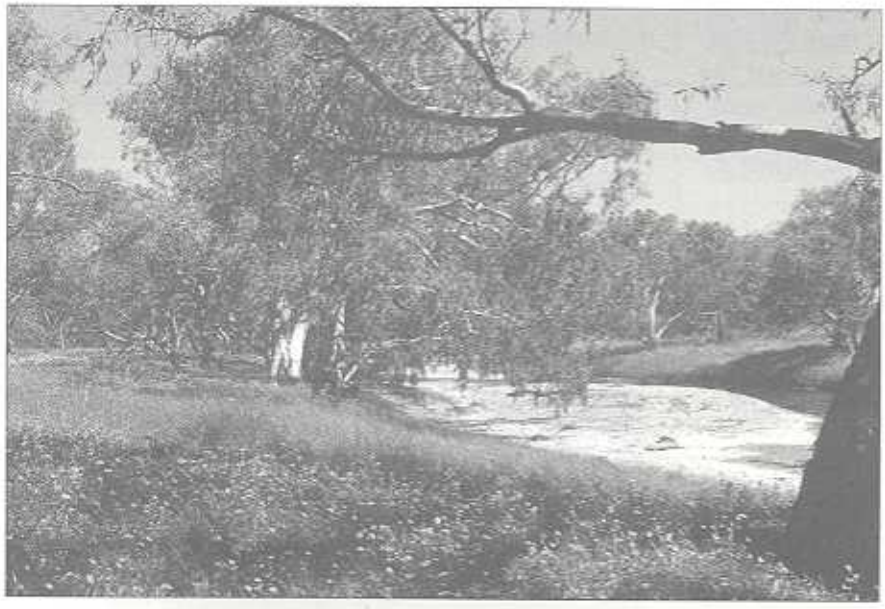
FLORA

books of Phelps, who surveyed parts of the Greenough Flats twice in the early 1860s, record 'wattles' at about 50% of survey points and 'flooded gums', 'white gums' or 'white gum saplings' at about 1% of sites. It is possible that river gums were neither as extensive or large as they are at present, being then restricted to the main channel and creek lines of the Greenough River (which runs across the Back Flats and turns northward up the Front Flats).

From historical records the study also reconstructed Aboriginal land use at Greenough, and the ecological patterns and processes of the relatively sudden transition to European land uses. This provided an understanding of how the original ecosystems responded to this change and how today's remnants were created. Europeans were intensely interested in utilising the Greenough Flats' natural resources; their subsequent pastoral success validated their landscape assessments. Early herds did well, although the suppression of regular firing by Aboriginal groups in the 1850s seems to have led to a proliferation of wattles on the flood plains. The first farmers on the Front Flats in 1857 had relatively little clearing to do, but those who took up land on the Front and Back Flats after 1861 had more work in front of them. Once the alluvial plains had been turned to agriculture, the other parts of the landscape came under pressure for agriculture even though the soil was not nearly so productive.

Today the flood plain ecosystems are probably extinct, although the good news is that many of the component species are still present on its margins. Plant species such as the once extensive grass *Themeda triandra* were collected for the first time from an area burnt in a very hot fire in January 1997, while others such as the mysterious wildflower 'dobies' remain to be found. Similarly, what became of the fauna of the flood plains is uncertain. For example, species such as the Australian bustard (*Otis australis*) were recorded at the Flats in the 1850s but their present status is unknown.

The results of the study may encourage flora and fauna researchers to look for species that until now haven't been thought likely to have occurred on the Flats. They are also useful to anyone thinking about revegetation or land management at Greenough. When compared to the landscape changes that have occurred in the central wheatbelt (e.g. Kellerberrin) the sequence at Greenough was found to be quite similar but much quicker. Thus in the wider context, the findings illustrate the contribution that history can make to planning sustainable futures for any wheatbelt landscape.



Slit in river side channel with River Gums over paddock plants. Photo: P Hussey.

Michael recently completed his PhD at Curtin University of Technology under the supervision of Bruce Gardiner. Michael's thesis was titled The historical ecology of the Greenough Flats, Western Australia. *and is now working on a book based on this research. If you have any historical information on Greenough Flat vegetation, including early photos or personal descriptions, Michael would be very interested to hear from you!*
Contact Michael on 9242 8847
Email oconnorm@iinet.net.au

REVEGETATION

MANAGING NATIVE GRASSES AS PASTURE: A KOJONUP EXAMPLE

Jenny Dewing and Avril Baxter

UNTIL five years ago set stocking was the usual grazing practice on *LFW* members Lyn & David Mathwin's sheep property "Barrule" in the Shire of Kojonup. When they became interested in Holistic Management, they set part of their goal "to have a diverse balanced ecosystem that includes an easily managed agricultural system within an essentially native landscape, retaining as many native organisms (animals, birds, insects, plants) as possible and covered, balanced, biologically active productive soils".

Some of their first activities were to establish perennial pastures and rotationally graze. They also continued to fence the flats around their creeklines, areas with eucalypts and little else apart from a few native grasses and wild oats, Guildford grass and some barley grass. Two heavy summer grazes have allowed native grasses to re-establish in these fenced creeklines. The Mathwins are now considering a grazing regime that favors the native grasses on these sites acknowledging that if any other regeneration event happened, for example melaleucas after a wet winter, then they would exclude stock from the area until the melaleucas became established. Thereby achieving their goal of a more diverse ecosystem. Indeed Jams, *Acacia acuminata*, are already regenerating well at this site.

They see many advantages in native grasses; they retain a high amount of dry leaf material over summer and make a valuable contribution to increasing soil biological activity and water holding ability through their fibrous root mass.

Recently the Mathwins were awarded the Carmen Saunders memorial scholarship. Funds from this scholarship will enable them to plant a one-hectare trial plot with Weeping Grass, *Microlaena stipoides* and Kangaroo Grass, *Themeda triandus*. This trial will be used to assess the ability of these plants to be grazed and in the long term they hope to produce seed from the plot. Unfortunately they were unable to source the seed for this plot in WA and they have used eastern States' seed.

They also appreciate their grazing value. Two commonly reported native grass myths are that they have poor nutritional value as production plants and that they do not require maintenance. Dry matter protein of 10 – 20% for young actively growing leaves and 8 - 11% for dry or stressed leaves are reported as typical for many native perennial grasses. Also, whilst native perennial grasses may require fewer fertiliser inputs, they do need to be managed for production and for persistence from season to season.

Grasses are divided into two broad categories C3 and C4 based on different biochemical pathways in the process of photosynthesis. Put simply, for C4 plants, the net rate of photosynthesis (and consequently the net production of biomass) is far larger at high temperatures than for the more common C3 plants.

Most of our south western perennial grasses such as Spear grasses, Wallaby grasses and Poas are C3 grasses. These species are winter and spring growing. The heavy summer grazing regime adopted by the Mathwins has encouraged these plants to persist in their broad creekline flats.

Terry Macfarlane, Senior Research Scientist from the Department of Conservation and Land Management suggests that the management of these C3 and C4 grasses would need to be different. It is unlikely that the same area can be managed for both types of grasses to persist under a grazing regime.

Terry suggests that C4 grasses such as Mat Grass, *Hemarthria uncinata*, Dropseed grasses, *Sporobolus*, especially *Sporobolus virginicus* (also known as Marine Couch), and Salt Water Couch, *Paspalum vaginatum*, might be encouraged in low lying saline flats where good cover would provide environmental benefits such as filtering, using nutrients and soil stabilisation. These native grasses prefer wet places and are salt tolerant.

There has been little work done on the establishment of native grasses from seed in WA. The seed is not available in affordable quantities. To be regarded as properly native, the plants should originate in WA and preferably from close to where they are to be used. The use of grazing as a regeneration tool could be a key factor in encouraging the already present native grasses to be more dominant in our agricultural landscapes.

By identifying our native grasses and understanding their biology we may be able to encourage their persistence through timely grazing. Key points from current literature and farmer experience show that for native grasses to persist it is best to:

- fence land management units
- manage areas where there are small patches of native grasses, to increase the sward over time
- carry out intermittent grazing, commonly referred to as 'rotational grazing' – to remove mature plants over the dormant period to utilise old dry matter and other competing pasture plants

Spear grasses in the old road reserve on Barrule. Photo: Jenny Dewing

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LFW NEWS

QUANTA-CUTTING RESERVE OPEN DAY

An open day was held on 29th July at Quanta-Cutting, a 72 ha reserve in the Shire of Mukinbudin. Thirty people attended, including many keen students from Mukinbudin Community Christian School.

Geoff Burrow demonstrated fauna trapping survey techniques and during the excursion, scats from echidnas, kangaroos and foxes were found, plus a regurgitated pellet from a raptor (bird of prey). A variegated dtella (Gecko) *Gehyra variegata* was found under a granite rock. Fourteen bird species were recorded and the nest of the yellow-rumped thornbill located. Several burrows of spiders, scorpions, reptiles and possibly frogs were investigated. Three fungi species were noticed and three orchid species were flowering - spider, snail and blue fairy or bluebeard orchids.

A rich supply of "Dunnart dinners": cockroaches, crickets, spiders, centipedes and beetles are present in the Reserve and the removal of predators such as feral cats and foxes would increase the likelihood of Dunnarts returning to the Reserve.

Mick Davis from WWF explained all about the lichens and algae common on the granite rocks and Jan Gathe conducted a workshop on "How to create your own Herbarium" and the procedures of the WA Herbarium.

Thanks go to everyone who participated and organised the day, including John and Mary Squires for the delicious sausage sizzle.

Heather Adamson

BUSSELTON SHIRE'S BIODIVERSITY STRATEGY AND LAND FOR WILDLIFE FIELD DAY

About 30 people attended a field day last July at Anne-Marie Harris's property in Carbanup. The aims of the field day were to explain the Shire of Busselton's Biodiversity Strategy and *Land for Wildlife's* role in the strategy. Demonstrations were held on how to regenerate bushland, use of smoked water, monitoring techniques, weed control, and seed collection.

As part of the Busselton Biodiversity strategy, property owners with bushland in excess of 5 hectares can obtain either a 35% rebate for being *LFW* members or a 50% rebate if the property has a Nature Conservation Covenant. The strategy will be detailed in a future issue of *Western Wildlife*.

Cherie Kemp

FAUNA SURVEY AT GOOMALLING

The trap set-up can be seen on the right below the tape in the tree

In July, a week of fauna surveying and trapping at a large permanent water soak and Banksia woodland on Lindsay White's property north of Goomalling proved to be very interesting despite the time of year. Four frog species were identified including the humming frog, Kunapalari's frog, bleating froglet and sandplain froglet. Also identified were the white-tailed dunnart, common dwarf skink and 29 bird species including a pair of Pacific Herons. Black rats, field mice, black crickets and shield beetles were caught and a trapdoor spider has yet to be identified. A big 'thank you' to Lindsay, Heather and their two boys for their assistance and we look forward to returning in spring when the Banksias are in full flower.

Heather Adamson

continued from page 14

- remove stock during the seed-setting season
- allow an adequate rest period for plant recovery after grazing. Manage for the longest recovery necessary for the type of plant you want to regenerate
- apply small amounts of fertiliser for seed production.

References and further information.

There is a lot to learn about establishing and managing native grasses. If you trial a particular management practice make sure that you record what you do and how it worked. Others would like to hear about your experience.

The good news is that there is already a wide range of information available in publications, websites and networks. Here are some:

A. Baxter, May 2000 *Revegetation on Farms Information Kit, Native Grasses, Ag WA*

C. Waters, W. Whalley & C. Huxtible. Dec 2000 *Grassed up – Guidelines for Revegetating with Australian Native Grasses*, NSW Agriculture ISBN 0 7347 1256 1

Jenny Dewing is the Land for Wildlife *Officer in Bridgetown Jenny can be contacted on 9761 2318.*

Avril Baxter is the Land for Wildlife *Officer in Narrogin. Avril can be contacted on 9881 9218*

Lyn and David Mathwin run a sheep and cropping farm in Kojonup. They are practitioners of holistic farming and are carrying out an ongoing perennial pasture establishment program.

FLORA

OH NO!! RARE FLORA!!

Ken Atkins

WOULD this be your reaction if you were notified that you have got rare flora on your property? It shouldn't be. This article discusses some of the issues surrounding rare flora and its protection, and explains why rare flora is not the impediment that some land managers perceive it to be.

Western Australia has some 12000 to 13000 species of flora, and the south west is one of the megadiverse flora hotspots of the world. Unfortunately, this area of great floral diversity is also the region of greatest development, and hence land clearing and loss of habitat. The end result is that Western Australia has a large number of rare flora species, either due to natural rarity because of the diversity of species, or because of the destruction of much of the habitat in which they once occurred.

One of the results of the correlation between the floral diversity of the south west, and the agricultural and urban development that has occurred in this area, is that a large number of rare flora populations occur on private land. In fact, 20% of them do. Private land owners thus have an important role to play in ensuring that our flora is conserved.

There are many reasons to protect these rare plant species, from economic to aesthetic, and maintenance of biological processes to philosophical. Suffice to say that our flora is a valuable asset that we should not let slip away so that future generations cannot have the benefits that our flora brings.

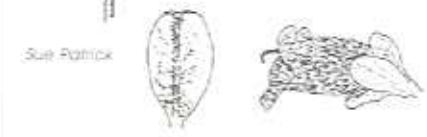
Our flora is protected through a number of different pieces of legislation that approach the issue from different perspectives:

- the Soil and Land Conservation Act (administered by the Department of Agriculture) recognises the role that vegetation plays in preventing soil and land degradation, and hence provides for vegetation protection for this purpose;
- the Country Areas Water Supply Act (administered by the Water and Rivers Commission) protects vegetation to protect our drinking water; and
- the Environmental Protection Act (administered by the Department of Environmental Protection) provides for overall vegetation protection and prevents significant environmental impacts.

Margaret Pieroni

The Mogumber Bell, Darwinia carnea, exists only on private property at Mogumber and Natrogin.

Resinous poverty bush, Eremophila vernicosa ms, was known only from a pressed specimen collected in 1934 by Charles Gardner and William Blackall and was presumed extinct until discovered in a bush remnant on Kathie & Jack Stone's farm near Marchagee in 1998



Sue Patrick

But it is the Wildlife Conservation Act that provides specific protection to rare flora. This Act is administered by the Department of Conservation and Land Management.

The Wildlife Conservation Act allows the Minister for the Environment to declare a species of native flora to be 'rare flora' if it is either likely to become extinct, is rare, or is otherwise in need of special protection. This term 'rare flora' is the equivalent to 'threatened flora' in international terminology. There are currently 364 species of flora declared as rare (16 of these being presumed to be extinct).

When a species is declared as rare, the Act provides special protection to the flora, in that it may only be 'taken' with the permission of the Minister. 'Taking' includes any act that may affect the plant, including destroying it, picking a piece, burning the plant, or allowing stock to graze them. This applies equally to Crown land and private land; to government employees and private landowners; and to land developers and research scientists.

So on the face of it, having rare flora on your property may appear to be an encumbrance – but is it really?

If you own rural land in the south west, it is probable that your property has now been cleared to the extent that it is going to be. This may be because that is the way you want it, or because you are aware that any further clearing will result in increased land degradation (and hence ultimately lost production) on your property, or because of the increased restrictions being imposed on land clearing due to regional land degradation problems. There are many reasons to preserve the vegetation remaining on your property, not only because it provides your land with shelter and protection from land degradation (salinity, waterlogging and erosion), but also because it enhances the aesthetic appeal of the land and provides a link to the natural environment in which you live.

As if there are not enough reasons to protect vegetation, the presence of rare flora enhances the special character or the area, and provides an added justification for having retained that 'bit of bush'. In many situations, it becomes a reason to keep an area of bushland that you were going to retain anyhow!

But what impositions are placed on a landowner with rare flora? Essentially the legislation states that you cannot take it without permission. This does not impose a great burden, as it does not require

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IN BRIEF

LESS RAIN IN THE SOUTH-WEST?

CSIRO climate scientists are investigating whether a climate shift has led to the long-term decline in rainfall that the south-west of WA is currently experiencing. They have identified a decline in rainfall since the 1950s, down to 20% lower than the norm for the first half of the 20th century. One consequence of this is a 40% reduction in inflow to Perth's dams.

It appears that a clearly discernable climate shift took place in the mid 1970s. The tropical Pacific warmed abruptly and stayed warm, and there was a sudden warming in sea surface temperatures in the Indian Ocean. This has led to more frequent, persistent and intense El Niños, and fewer La Niñas. For the south-west, this means more dry days, as high pressure air cells cause moisture-bearing air streams to miss the continent.

This new climate pattern appears to be linked to the behaviour of El Niño and the Antarctic Oscillation Index. During wetter cycles this index is negative, but since the mid-1970s it has swung to positive, giving zones of higher than usual air pressure over the southern Indian and Pacific oceans.

So, is this a natural cycle, or a greenhouse-induced one? Could be either - time will tell. What we do know is that, if it continues, it will lead to less effective rainfall, less runoff to dams, more extreme fire weather days and an extended high fire danger season.

From an article by Bryson Bates in CSIRO's "Land and Water Link" No 12, 2002.
For further information, contact: bryson.bates@csiro.au

TOOLIBIN LAKE WINS NATIONAL SALINITY PRIZE!

THE Toolibin Lake Salinity Management Strategy was awarded the National Salinity Prize, which comes with $30,000. This award is sponsored by the Institution of Engineers Australia, the Murray Darling Basin Commission and the National Action Plan for Salinity and Water Quality.

Congratulations to all those involved in the Toolibin Lake Recovery Team, to the local landholders and to everyone who have given dedicated service and commitment to conserving this valuable ecosystem in the Wheatbelt.

Rare Flora continued from page 16

the land manager to go out and undertake any particular management actions. The land remains the owner's, and the owner cannot be forced to do any action, other than protect the rare flora. This may require fencing the bush to stop the flora being grazed, but assistance can be provided to help with the fencing. The protection of the bush will also have the added advantage of keeping it healthy and functioning to provide the many benefits to the rest of the property.

Of course we know that bushland sometimes needs management, such as weed control, or regeneration burning to keep it healthy – but how can this be done if the rare flora cannot be 'taken'? In situations such as this, the land manager may apply to the Minister, through the Department of Conservation and Land Management, for a permit to take rare flora. The application is assessed and if the rare flora will not be damaged, or will regenerate, especially if this will benefit the conservation of the rare flora, then a permit may be issued. The objective of rare flora conservation is not to lock these populations up, but to have them managed in such a way that they remain healthy, and hopefully increase in size.

The Department will provide advice on the appropriate management of rare flora (and its bushland habitat), and if requested, may also assist landowners in this management through recovery teams that are established to coordinate the management of rare flora in the regions of the south west. Contact your *LFW* Officer or local Departmental office for further information.

In most situations, therefore, the presence of rare flora does not pose an encumbrance to a property owner, but may help the owner in obtaining advice or assistance in managing the bush. By knowing where these populations are, the Department can gain further information on the ecology and management needs of the species, and be able to better manage the species as a whole to ensure its conservation. Landowners are thus encouraged to report to the Department any suspected (or known) occurrences of rare flora on their property, so that the appropriate protection and management of the flora can be arranged, and our floral heritage preserved.

Ken Atkins is Principal Botanist at the Department of Conservation and Land Management, Kensington. Besides rare flora, he is also responsible for overseeing a wide variety of off-reserve conservation programmes, including Land for Wildlife. *He can be contacted on 9334 0425. Rare flora queries to Mike O'Donoghue, 9334 0422.*

MEMBERS' PAGE

WHAT BIRD WAS THIS?

I saw an odd coloured bird on a property about 15 km south west of Kojonup. The size, shape and mannerisms were very similar to that of a Willie Wagtail or a Grey Fantail. The colouration was what stumped me. Instead of having the standard white breast and black upper parts of a Willie Wagtail, the whole body was mottled black and white and resembled nothing that I had ever seen before. Any Ideas? *Kris Narducci* - Katanning

DCLM Senior Zoologist Dr Peter Mawson says it is a melanistic Rhipidura (the wagtail and fantail genus). Melanism is the replacement of white or colour pigment in feathers with black pigment.

ARE WE SEEING MORE ALBINO ANIMALS?

Following on from reports of albinism in recent issues of Western Wildlife, are we seeing more albino animals? In the Metro area, I have seen an albino Willie Wagtail at Lake Monger, a Richard's Pipit at Alfred Cove and a Marbled Gecko at Wembley - and there was the country report of an albino Scarlet Robin at Duranillin.

The chance of human albinism is one in 17,000 - it is a disorder of melanin pigmentation. Tyrosinase, a copper-containing enzyme, is important in melanin production. In humans, an altered tyrosine gene gives rise to oculo-cutaneous albinism (eye and skin). Animal/human abnormalities are a combination of the genes and the environment. Genetic conditions show a variable penetrance (from full to partial picture).

What part did the environment play with the Willy Wagtail and the Richards Pipit? The Willy Wagtail had its territory on the eastern side of Mongers Lake when this area was being dredged and replanted. The Richards Pipit was at the north end of Alfred Cove where there was extensive defoliation of grass and samphire, following spraying. Both of these birds established a territory with evidence of breeding that season but were not seen the following season.

Is there a research project here for someone?

Mary Bremner - Kalamunda

KANGAROO ACCESS GATE

A CSIRO-designed gate which allows kangaroos to pass back and forth, but not sheep or other stock, has been installed by Dr Colin Sanderson on his property near Gull Rock, east of Albany. The pic shows Colin next to the gate in a fenceline.

Sylvia Leighton

DISEASE ALERT!

RUST THREAT TO OUR NATIVE BUSH

AUSTRALIAN eucalypt forests and woodlands are at risk from an exotic disease – a rust fungus capable of attacking a broad range of our unique vegetation. Scientists at CSIRO have mounted a three year program to reduce the risk of the rust *Puccinia psidii*, (guava rust), which damages eucalypts and related trees and shrubs in South and Central America, from reaching our shores. This rust is a serious disease of young eucalypts, it attacks shoots of juvenile plants and can kill up to 90 per cent of seedlings. CSIRO's research in Brazil has shown that many of Australia's native tree species are susceptible to the rust. The rust has the potential to invade and damage ecosystems across the continent and, once established, there would be little we can do to prevent it. It could be very damaging.

The fungus originates in South America and has never been seen in Australia, attacking native plants of the *Myrtaceae* family, and introduced species for example guava. Unfortunately, guava rust has proved to have a very wide host range and once Australian trees and shrubs such as Eucalypts, Melaleucas and Callistemons were widely planted in Brazil, the rust somehow jumped host barriers, to attack these species. The rust is in eucalypt plantations and native vegetation in Brazil and also in Brazil's big cities such as Brasilia and Sao Paulo, carried on guavas and other fruit.

The big issue is: how do we keep the rust in South America? Its spores are so fine they can be carried on clothing, shoes, equipment, even on spectacles and camera bags. They remain viable for months, so a perfectly innocent traveler could easily bring it back with them without knowing it. If the fungus got loose in a major forest, or National Park the chances are it would pass unnoticed for months or even years, by which time it would be firmly established and spreading.

For further information contact: Dr Inez Tommerup on 9333 6674 Email: Inez.Tommerup@csiro.au

IN BRIEF

NAME CHANGES - BACK AGAIN!

Hinged dragon orchid

A few years ago the Dragon Orchids were taken out of *Caladenia* and put in their own genus, *Drakonorchis*. Well, now they're back in *Caladenia* again! Amend all your orchid books! (Well, I suppose it keeps Andrew Brown and Steve Hopper busy .....!)

GREENCORPS TEAMS

During the last few years, Green Corps work teams have been organised by the Australian Trust for Conservation Volunteers. From the start of the new financial year, Greening Australia has been awarded the contract, and thus all new Green Corps queries should be directed to them. It is expected that the new organisation should be in place by the end of September. For further information, contact: Greening Australia on 9335 8933.

NEW BOOKS

Reviews by Penny Hussey

Flora of the South West (Bunbury - Augusta - Denmark)

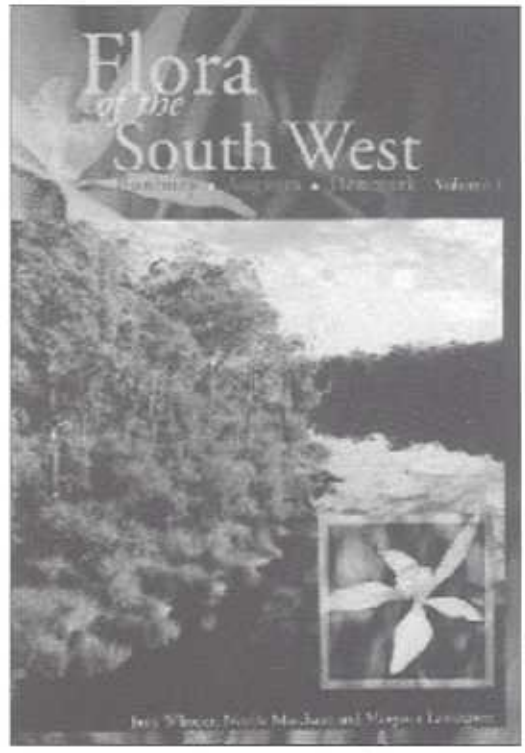
Judy Wheeler, Neville Marchant and Margaret Lewington

University of WA Press, DCLM and ABRS.

$165.00 (two volumes)

Contact: UWA Press, ph: 9380 3670 or email: uwap@cyllene.uwa.edu.au

It is important to be able to easily and accurately identify the plant species found in any area, and to do that, you need a Flora. What does the concept of "a Flora" conjure up for you? In the past I've always thought of it as a dry-as-dust tome, boringly printed, using obscure terms (sometimes in Latin, heavens help us!) to make even common plants difficult to recognise. Well, this is a "Flora" like you've never seen before - it is truly superb, and so easy to use!



The southern forest area covered by this book, with its very mild mediterranean climate, high rainfall and generally very nutrient-poor soils, is a somewhat special area. Its is home of the giant karri and tingle trees and also of several strange, relict Gondwanan fauna. Granitic monadnocks standing high above the surrounding vegetation often have a geographically relict flora and the vegetation of the sedgelands and wet heath may be one of the closest links to the flora of the early Tertiary period. There are at least 130 endemic species (found nowhere else) and many more which extend for only a short distance outside the area.

The books are packed full of ideas to make them easier to use, like having keys based on simple things like the colour of the petals, and at every point there is a clear line drawing to give a visual reference. A particularly useful feature is the diagrams and 'mini-glossary' often provided at the start of a family description. It defines and illustrates words particularly used in that family (like 'phyllode' in wattles, for example, or 'keel' in the peas) so that the reader does not have to refer to the extensive glossary at the rear of Volume 2.

Individual plant descriptions start with a diagnostic statement (in bold) which characterises that species and often highlights the difference between similar species. Distribution, ecological, conservation and flowering information is also given. But best of all, every species described has a little drawing accompanying it, sometimes of the whole plant, sometimes only of diagnostic bits. This is the same principle used in 'Blackall & Grieve', but the drawings are clearer. I tried it out on the notoriously difficult sedge family (Cyperaceae) and, lo and behold, got to the right answer - I think!!

If the book has a failing, it may be that it under-represents the introduced species present. As explained by the lead author, Judy Wheeler, in her article in this issue, Floras are written from herbarium specimens, not field surveys. Thus, if a voucher specimen is not lodged in a herbarium, officially, the plant doesn't exist at that site. When I was involved in compiling 'Western Weeds' I know that records were made - even photographs taken - at sites which are not recorded here. My fault, not the Flora's authors.

So, this is a great book, a milestone in making taxonomy accessible to the interested public. If you live locally, or are intending to visit, or are just simply interested in plants - it will become your standard reference for years to come.

NEW BOOKS

Tuart (*Eucalyptus gomphocephala*) and Tuart Communities

Keighery BJ and Longman VM (Editors)

Perth Branch, Wildflower Society of Western Australia, Nedlands

$22.00

Contact: WSWA, ph: 9383 7979; fax: 9383 9929
or email: wildflowers@ozemail.com.au

This book is based on a collection of papers presented at a workshop organised by the Wildflower Society in March 1998. However, in the time since then, the papers have been expanded and new topics included.

Tuart grows on the coastal plain from Jurien to the Sabina River near Busselton. It is a magnificent tree, which defines the character of much of that coastal zone, but in places it is in severe decline. This book brings together information on the tree itself, including biology and genetics, as well as on the other plants with which it associates - the tuart communities - and their fauna. It is detailed and highly scientific, not suitable for general reading, but that said, if you want to know more about tuart, there is nothing comparable. The final chapter 'Tuart Issues' is perhaps the most interesting, as it goes into the known detail of tuart decline, and discusses how landholders can manage their tuart communities. There is also an interesting segment (pp 251-2) on the accuracy of historical accounts of 'grassy woodlands' in WA.

In summary, if you are actively involved in the management of a natural community which contains tuart, you should get a copy of this book.

Seed Notes for Western Australia

Anne Cochrane

Perth Branch, Wildflower Society of WA

$10.00

Contact: WSWA, ph: 9383 7979; fax: 9383 9929
or email: wildflowers@ozemail.com.au

A series of very attractively produced leaflets covering general topics about native plant seed and its collection together with specific information on 15 important genera. If you are interested in growing your own seedlings, you will find this very useful.

How to Plan Wildlife Landscapes: a guide for community organisations

Stephen Platt

$16.00 + p&h

Dept Natural Resources & Environment, Victoria

Contact: DNRE on (03) 9627 8325

This is *LFW* Victoria's first contribution to the *LFW* "How to ..." series. It is very clear and simply written, and lavishly illustrated in colour. Despite the fact that all of the examples are, of course, from Victoria, anyone involved in property planning will find it helpful. Its use of examples based on aerial photography is particularly well done.

COMING EVENTS

"Prospects for Biodiversity and Rivers in Salinising Landscapes"

21-25th October 2002

Albany

Contact: Marcus Blacklow ph: 9386 4897
or email: mblacklo@agric.uwa.edu.au

Royal Show

27th September - 5th October

Visit the Conservation and Landcare Pavillion - an open air site on the southern edge of the show ring.

Kings Park Wildflower Festival 2002

26th to 30th September

The festival celebrates the magnificent beauty of Western Australia's wildflowers.

Open Gardens Scheme - "Pate's Patch", Mt Shadforth Road, Denmark

Sat 23rd and Sun 24th November 10.00am - 4.30pm

Entry Fee $4.50

Were you unable to get to the *LFW* "Rock On" workshop in Albany last year, and so missed seeing Prof. Pate's magnificent 150 acre karri and granite block on the slopes of Mt Shadforth? Well, now's your chance, this year the property is part of 'Australia's Open Gardens Scheme'. There is an acre of garden with named plants both exotic and local, with an emphasis on low maintenance and self-sufficiency from on-site water catchment. Conducted tours of the walk trails through the bushland will occur during the middle of each day (wear bush boots). And more - on Saturday there's even a brass band concert!

For more detail watch out for the 'Open Gardens' information in newspapers.

"Bushland for Cockatoos" seminar

Sunday 3rd November 2002, 1:00 pm to 3:30 pm

Bedfordale Hall, Admiral Road (UBD map 413, reference J1)

Our Black Cockatoos are in crisis. Hear about some of the research work being done by WA Museum and UWA Zoology Department to prevent their extinction, what measures can be undertaken by bush care groups, landowners and the general public to ensure their long-term survival and visit a trial nest box site in nearby bushland. Afternoon tea provided. Hosted by Bungendore Park Management Committee. No charge.

Registration essential

Contact: Kim Sarti 9473 0005.

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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