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THE IMPACT OF FIRE ON THE ENDEMIC HONEY POSSUM

Annika Everaardt

AFTER completing my Honours degree in Victoria I decided that it was time for a change of scenery, a new adventure! So when I was given the opportunity to study the honey possum *Tarsipes rostratus* in the Fitzgerald River National Park on the south coast of Western Australia, it was just too good an offer to pass up. To be honest, I hadn't heard of the honey possum before but the more I found out about this unique and remarkable small mammal the more excited I got about the work that was ahead of me. Anyway, to cut a long story short, I commenced my PhD at Murdoch University under the supervision of Associate Professor Ron Wooller.

My first fieldtrip to the Fitzgerald was in March 2000; the vast relatively undisturbed heathlands were like nothing I had ever seen before. It was amazing, at first glance you don't really see anything but the closer you look the more flowers and colour you can see, quite often hidden in amongst the dense foliage of the plants. It was the same with the fauna; you don't tend to see many animals (apart from the kangaroos at dusk of course!), yet you know that there are honey possums and other small mammals all around. I couldn't wait to see my first honey possum and the next morning I did just that. I felt a real sense of honour to be able to work on honey possums, as they are an elusive species that not many people get to catch a glimpse of, let alone work with!

The honey possum is a tiny (7–12 g) flower-feeding marsupial found only in the southwestern corner of Western Australia. It has a real sweet tooth feeding



Photo: S. Hopper

solely upon nectar and pollen, the only non-flying mammal in the world to do so! My PhD research actually focussed on the impact of fire on the honey possum. Clearly, given their specialised diet and their need for cover from predators and unfavourable weather, fire has impacts on the availability of these important resources.

So what did I find out? Well, after analysing the three years of data I collected, along with the additional long-term data that was available to me (some 15 years worth!), I was able to determine that capture rates of honey possums were significantly related to the number of years since the vegetation was last burnt. Capture rates declined markedly after fire

and remained low for the next four to five years. Their numbers then increased slowly, but steadily, over the next 20 to 25 years. Maximal abundance was recorded about 30 years after fire. Although there appeared to be a slight decline in capture rates thereafter, honey possums were still being captured in vegetation unburnt for more than 50 years.

As one might expect, the pattern of increase in honey possum capture rates following fire paralleled the pattern of availability of cover in the vertical and, to a lesser extent, horizontal plane. Presumably the denser the vegetation cover, the greater protection from aerial and terrestrial predators, and from unfavourable weather.

The foodplants in the Fitzgerald most frequently visited by the honey possum were *Banksia nutans* in summer and *B. baueri* in winter. Both plants have

EDITORIAL

Greetings

Land for Wildlife was set up in 1997 with the aim: "to encourage and assist private landholders in Western Australia to provide habitats for wildlife on their property, even though the property may be managed primarily for other purposes". To try to achieve this, we embarked on a programme of property visits, field days and publications, always attempting to respond to ideas and suggestions from our members.

As *Land for Wildlife* enters its ninth year of operation (goodness, where has the time gone!) we would like you to help us determine what we should do in the next ten years. Enclosed with this issue is a Questionnaire that asks what you have liked about your association with us, and where you think we can improve. Please take the time to fill it out – you don't have to do much more than tick the boxes! Fold

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as shown, staple, then put into the post. It is reply paid, so there is no stamp required. Please return by 28th Feb 2005.

If you wish your comments to be anonymous, that is fine, but all responses with name and contact details will go into the draw for five prizes of CALM publications.

Please complete the Questionnaire! We really need your input!

We apologise for the very late delivery of the October issue, which you will not have received until the middle of November. Unfortunately a technical hitch delayed printing.

This issue contains three items concerning revegetation. One, the results of the 'Search Project', shortlists several native species for development as crops for paper or particle board, while another investigates the social aspects of why people undertake biodiversity landcare activities. This latter point is really important if we are truly to conserve biodiversity on a landscape scale. And most excitingly, after 13 years of work, WA scientists have finally isolated the chemical in smoke which is responsible for stimulating germination after a bushfire. Wonderful news! Maybe soon we will have a solution we can

just water on to grazed woodland to stimulate the soil seed bank. Congratulations to all involved!

In the July issue (WW 8/3) there was a short article on an American turtle called the Red-eared Slider which has been found feral in Queensland. I was rather surprised to see them for sale as food items in a village market near Lanzhou in Xinjiang Province in western China. No-one to whom I spoke was able to comment on the environmental impact of this invasive species – for that matter, there was astonishment that anyone should think it might have one. In many respects, Australia really is a lucky country!

I will be leaving *Land for Wildlife* for a while to organise a new funding scheme called "Bushland Benefits". Perhaps you need some money for a project you are thinking about? Anthea Jones, whom many of you will know from the CALM Covenant programme, will be acting as *Land for Wildlife* Coordinator and Editor of Western Wildlife. Please keep the stories coming in to her! Thank you all for your personal support over the years.

Best wishes for 2005.

Penny Hussey

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FAUNA

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flowers that are rich in nectar and pollen, vital to the honey possum's survival. These foodplants are slow growing and take many years to start flowering following fire, so it was no surprise that the trend in capture rates was similar to the maturation of these foodplants. Most of their favoured foodplants were from the *Banksia* and *Dryandra* genera. Other foodplants which they visited frequently, and which start flowering more quickly after fire, are some of the *Eucalyptus* and *Calothamnus* species; flower products from these foodplants were also eaten by honey possums in long unburnt areas.

Whilst honey possums appear to have a preference to remain sedentary within areas that meet their food and shelter requirements, they probably have the capacity to engage in longer distance movements when necessary (e.g. when faced with a lack of food). As such, bush corridors connecting areas of vegetation known to accommodate honey possums are likely to be a valuable resource. However, given the honey possums' need to eat nectar and pollen daily (they have a high metabolic rate), bush corridors would need to contain a number of different local foodplants that are rich in nectar and/or pollen. Some of the best foodplants would probably be the banksias and dryandras that grow in nearby areas of native vegetation. The shelter requirements of the honey possum could be met in bush corridors by the planting of rather dense multi-strata vegetation. Such habitat would provide cover from aerial and terrestrial predators and from unfavourable weather. The size of a bush corridor that would be used by honey possums is really dependent upon the quality of the food and shelter resources it provides.

In summary, the life of the honey possum consists of a continual search for food, cover and mates!

Management implications:

- In terms of honey possum conservation, this long-term study indicates that, if possible, management burns in these heathlands should be separated by intervals of at least 20 years between successive fires. If burns are required more frequently to meet other management priorities, it is highly preferable that these fires are small and patchy. Such practices may help ensure the long-term survival of this unique, highly specialised marsupial, found only in Western Australia.
- Honey possums need their preferred foodplants to survive. They feed on plants that are rich in nectar and/or pollen and this study indicates that they generally feed on flowers that are close to the ground (e.g. *Calothamnus gracilis*, *Dryandra falcata*, *Banksia baueri* and *B. nutans*) but will also feed on some flowers that are several metres off the ground (e.g. *Eucalyptus buprestium*).
- Following a fire, nearby patches of unburnt vegetation can be important refuges, feeding grounds and shelter for the few honey possums that visit recently burnt areas. These unburnt refuges also appear to be the source of honey possum colonists in the years following a fire.

Like many Australian mammals, the range of the honey possum has contracted markedly over the last 200 years and the coastal heathlands of the southwest are its last stronghold. With careful management and conservation these important heathlands might just protect these delightful and truly unique marsupials far into the future.

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BUSH DETECTIVE

What is this?



Hunting through the strand line on a sandy beach can be a fascinating pastime, with all sorts of strange marine organisms there for the finding, especially after winter storms. Occasionally there are non-marine things too - there is an entire beach on Christmas Island covered feet deep in plastic thongs!

This long object is most often seen on northern beaches, but can also sometimes be found around Carnarvon and Bunbury. It is bright green, solid and about the size of a cigar, though tapering rather than cylindrical. What is it?

Ans: It is the floating seedling of a mangrove tree. These very specialised plants grow in the sea, between high spring tide and mean sea level, forming dense forests called the 'mangal'. They all have a number of specialised adaptations to enable them to survive in their difficult environment, including 'pneumatophores', roots specialised to take in air during low tide. Another option is to have seeds or developing embryos that can float and so be carried away by the tide and distributed to new areas.

This is actually a developing embryo. The seed started to grow while still on the parent tree, then fell in the water. The shoot is the small thin tip to the left, while the longer part is the root which can grow quickly to anchor the new seedling. Note that it is so weighted that it should stick firmly in the mud, root end down.

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POSITIVE 'SEARCH PROJECT' RESULTS

John Bartle

The Natural Heritage Trust (NHT) Search Project conducted by CALM over the past four years has now delivered its final report. It concluded that there are many species in the flora of the south-west that have good potential to be developed as commercially viable large-scale crops.

The 1996 State Salinity Plan identified large-scale perennial crops as a necessary component of agricultural systems to bring salinity under control. It specified that long-term investment in developing new woody crops and processing industries be undertaken. This gave rise to the Search Project proposal that was submitted to NHT in 1997 but the project did not finally commence until 2000. It received an allocation of \$4.5 million, to investigate crop and industry development, and also to establish substantial demonstration plantings.

Confidence in the Search concept was high because commercial development of native mallee species appeared to be making good progress. CALM commenced mallee development in 1993 and by the time of submission of the Search Project proposal it was proceeding strongly. Confidence was reinforced in 2001 when a commercial feasibility investigation indicated the viability of integrated mallee processing to produce a combination of activated carbon, eucalyptus oil and electricity. A \$10 million demonstration processing plant has now been completed at Narrogin and is scheduled to commence operating early in 2005.

The Search Project adopted a method consisting of two parallel streams of progressively more intensive evaluation of species and

products options. Species selection was confined to the WA native flora. The products had to have markets that would be profitable enough to attract farmers and large enough to accommodate all production if the crop was adopted on a scale able to make a significant contribution to salinity control. Hence the products chosen were large-scale commodities both domestic (bioenergy) and export (timber, wood panels, paper, chemicals). Specialty products like fruits, flowers, nuts, pharmaceuticals and bush tucker were therefore not included in this study because their markets are too small.

Analysis showed that potential economic viability of sawn timber production declines steeply with the decrease in average rainfall across the wheatbelt. Where rainfall is below 500mm/year conventional sawlog crops, with a production cycle of more than 30 years, are unlikely to compete with short cycle crops (like mallee) that can be harvested every 2 to 4 years. These new short cycle crops can produce wood chips for processed wood products. Some, like mallee,

regenerate from the cut stump after harvest and do not need replanting. Others can be used as a 3 to 5 year de-watering phase in the annual crop rotation every 20 or 30 years. The Search Project focused in particular on species likely to be suitable short cycle coppice or phase crops.

It took some time to develop a method by which to combine the large hierarchy of objectives into a practical and systematic way to screen the entire 9977 species in the WA native flora. The first coarse level of screening had to rely on existing records. Fortunately the WA Herbarium has comprehensive and readily accessible records. Table 1 provides an overview of the steps taken.

The Herbarium lists 14,186 species names but nearly 3,000 of these are redundant. Of the current 11,038 species there are 9,977 natives. Rare and endangered species were excluded on the basis that they were less likely to be vigorous and diverse enough to warrant development. This reduced the field to 7,965. Excluding non-woody species further reduced the number to 6,339. To be consistent

Table 1: WA Herbarium list of species in various categories showing progressive selection.

Category	Region	No. Species
Total (including non-current names)	All WA	14 186
Current names	All WA	11 038
Native	All WA	9 977
Not "Priority" species	All WA	7 965
Woody (Dicotyledon Gymnosperm)	All WA	6 339
IBRA - AW - ESP - GS or MAL	Wheatbelt	3 664
Taller than 4 metres	Wheatbelt	484
Taller than 4 metres	"AW"	309
Taller than 4 metres	"ESP"	266
Taller than 4 metres	"GS"	219
Taller than 4 metres	"MAL"	293
Taller than 4 metres	All 4 areas	68

with the native plant development preference the selection range was constrained to species that occur in the Interim Biogeographic Regions of Australia (IBRA) boundaries that encompass the wheatbelt. Of the 6,339 woody species, 3,664 occur in one or more of the 4 IBRA regions of the wheatbelt (i.e. Geraldton sandplain (GS), Avon-wheatbelt (AW), Mallee (MAL) and Esperance plains (ESP)). Herbarium specimen data on plant height was used as a surrogate for productivity of short cycle crops. Only species with a maximum recorded height greater than 4 metres were considered. This reduced the total to 484 species, with between 219 and 309 of these present in each IBRA region. Many of these species were found in more than one region, with 68 occurring in all 4 regions. Those present in more than one region were favoured because they are likely to display greater adaptability as crop plants.

The selection criteria were applied under the scrutiny of a range of experts who helped sift out undesirable species, for example, those that are parasitic, toxic, spindly in form, or found in narrow niches. Further selections were made between similar species (especially eucalypts), to trim the number of selected species back to a manageable 250 before commencing field and laboratory testing.

Field assessment commenced with wood coring to estimate wood density, a critically important factor in many processed wood products. As far as possible tested plants were selected to be representative of farm-grown crops. Consideration of wood density and to a lesser extent colour enabled the 250 species to be reduced to about 50 'test species', defined here as those that warrant intensive laboratory testing leading up to sample product manufacture.

The two major products tested in the project, paper and wood panels, have well-established testing procedures and performance standards, and require specific wood properties. These tests

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were undertaken at the CSIRO Forestry and Forest Products Clayton laboratories in Victoria. For wood panels, the results of wood property tests were used to select the 20 most promising species for sample panel manufacture. In the case of paper, all 50 test species were chemically pulped, since laboratory-scale pulp manufacture is relatively cheap. After pulping, the 30 species with the highest pulp yield were carried forward for sample paper manufacture and testing.

Table 2 gives ratings for the top 20 species for paper and two types of panels (medium density fibreboard and particle board). Other aspects of the project included testing of combustion and sawn timber properties, and extensive demonstration planting of the early selections of Search species, involving planting more than 6 million seedlings by 600 farmers.

The results from all aspects of the Search Project, along with a closer examination of the biological

attributes and production potential of each test species, will be used to select a refined list of about 10 species for further, more intensive investigation. The most commercially promising of these will then become 'development species', and will enter full-scale development programs.

The Search Project generated considerable national interest. Its theme was adopted at the national scale by the Joint Venture Agroforestry Program (JVAP) in a project named FloraSearch, now jointly sponsored by the CRC for Plant-based Management of Dryland Salinity. In Western Australia, CALM is an active participant in FloraSearch and will commence intensive assessment of the best performing local species identified by the Search Project, with a view to selecting two or three 'development species' that warrant commercial development.

For further information or for the CD version of the Search Project Report telephone Cathlin Jakovcevic in the Natural Resources Branch of CALM on 9334 0209 or email cathlinj@calm.wa.gov.au

Table 2: Species ratings (1 good, 5 poor) for performance tests on sample paper and panel board results for the 20 best species.

Species	Paper	Panel board		Average ranking
		Fibre board	Particle board	
<i>Taxandria juniperina</i>	1	1	2	1.3
<i>Anthocercis littorea</i>	3	1	2	2.0
<i>Acacia saligna</i>	4	2	1	2.3
<i>Callitris glaucophylla</i>	5	1	2	2.7
<i>Codonocarpus cotinifolius</i>	4	2	1	2.3
<i>Eucalyptus rudis</i> subsp. <i>rudis</i>	4	1	2	2.3
<i>Gyrostemon ramulosus</i>	5	1	2	2.7
<i>Viminaria juncea</i>	4	2	1	2.3
<i>Senna pleurocarpa</i>	3	3	1	2.3
<i>Grevillea leucoptera</i>	2	2	2	2.0
<i>Alyogyne huegelii</i> var. <i>huegelii</i>	2	3	2	2.3
<i>Hakea oleifolia</i>	5	2	2	3.0
<i>Acacia lasiocalyx</i>	3	2	3	2.7
<i>Eucalyptus loxophleba</i> subsp. <i>lissophloia</i>	3	2	3	2.7
<i>Bursaria occidentalis</i>	5	2	3	3.3
<i>Casuarina obesa</i>	5	3	2	3.3
<i>Jacksonia stembergiana</i>	3	2	4	3.0
<i>Melaleuca preissiana</i>	5	3	2	3.3
<i>Eucalyptus occidentalis</i>	4		2	3.0
<i>Grevillea candelabroides</i>	2			2.0

FLORA

WHILE on a LFW visit inspecting the old Seabrook Battery site near Northam, Shire staff were surprised to find that an artificially dug hollow contained the odd little fern, nardoo. "It looks like a four-leafed clover!" someone said, and indeed it does.

Nardoo's scientific name is *Marsilea*, and there are probably six species in WA, two in the southwest and four more in the Kimberley. The most widespread species is *M. drummondii* (yes, named after our James Drummond, who would certainly have found it growing along Toodyay Brook, for example) and it is found right across mainland Australia. It is still common and widespread; look for it in still pools and clay-based wetlands, often on shady banks. It has little tolerance to salt, however, and will disappear as salinity increases.

Nardoo develops from a rhizome which runs over, or just below, the muddy surface of the wetland, from which its clover-like leaves arise. The leaflets appear silky because they are covered with dense, water-repellant hairs, and when the plant is totally submerged they float on the surface. As the water recedes, the plant continues to grow on the damp mud to form a green lawn. At this stage it forms spores – not on the backs of the fronds (leaves) as most ferns do, but in little packets called sporocarps at the junction of rhizome and leaf. As the wetland continues to dry, the leaves brown and shrivel and the sporocarps become detached. When the rains come again, the dried sporocarps can begin development within an hour.

It is these sporocarps that have propelled nardoo into Australian folklore. They are the things Burke and Wills starved to death on.

The sporocarps contain starch, and Aboriginal people from central

NARDOO - THE CLOVER- LEAVED FERN



The illustration (by Helen Aston) is *M. mutica*, a Kimberley species, but very similar to *M. drummondii*.

Australia ground them between two flat stones, using a little water to help the process, to make a form of porridge which could be eaten as it is, or baked in the ashes of a camp-fire. The husks contain a lot of tannin, and unless they were removed at some point in the process, would have contributed an astringent taste.

At Cooper's Creek in 1861, Wills wrote in his journal: "I cannot understand this nardoo at all; it certainly will not agree with me in any form. We are now reduced to it alone, and we manage to get between four and five pounds a day between us. It seems to give us no nutriment. Starvation on nardoo is by no means very unpleasant, but for the weakness one feels and the utter inability to move oneself, for, as far as appetite is concerned, it gives me the greatest satisfaction."

Nowadays we all have 'healthy eating' dinned into us, and would be well aware that anyone consuming nothing except starch and tannin would have problems. Indeed, the 'calming' effect of a regimen of bread and water has long been known to prison authorities; even the most recalcitrant prisoner could be reduced to a shambling waif of their former selves after a few weeks of such a diet. The Aboriginal people, of course, had a wide variety of food sources, which provided the carbohydrates, protein, vitamins and minerals they required.

If you have a clay-based freshwater wetland, even way out in the mulga zone, look for nardoo. If you are developing a wetland, part of a stock dam for wildlife habitat, for example, it would be a great plant to include, not only from its curiosity value, but because its leaves and sporocarps provide food for aquatic animals, and even stock will eat them. Spores probably move around in blown dust, or mud on birds' feet, but growing rhizomes can, with care, be transplanted, and specialist wetland nurseries may have plants for sale.

Penny Hussey

MEMBERS' PAGE

BUSH STONE-CURLEWS AND HOMESTEADS

Avril Baxter

BILL WARREN grew up with the eerie sound of bush stone-curlews calling at dusk from the sheds near his farmhouse. Fifty years later they are still there, usually just a pair although sometimes he might see four mature birds. However he has never seen stone-curlews in other bush remnants on the property.

Bill's property lies between the well-wooded and populated Highbury Townsite and an unbaited 928 ha Forestry Block. On clear nights he can hear the stone-curlews in both these areas.

Bush stone-curlews (sometimes known as stone plovers) are large ground nesting birds preferring open forests and woodlands with a low grassy or herbaceous understorey. They are active at night foraging for insects, seeds and small animals such as frogs. During the day they lie still as a stone (hence the name stone-curlew) camouflaged amongst fallen branches. They lay one to three eggs on the ground in open areas.

Our farming environment initially favoured the birds, but numbers crashed in the 1950s when rabbit populations were decimated by myxomatosis; this may have been due to foxes changing their food source.

Nationally, the bush stone-curlew is listed as "near-threatened", this is because whilst still relatively common in the tropical and sub-tropical north they have declined from the agricultural areas in the south. In Western Australia, bush stone-curlews are listed as a Priority 4 species, which means that they are not considered to be currently threatened, but could be if circumstances change. In NSW and Victoria they are considered threatened.

At Bill's place, the birds are quite tame. During the day they will sit

and watch the general farm activity and if it is raining shelter in the farm sheds. The farm dogs do not bother them. They nest near some of the old machinery and on one occasion when a bluegum was blown down, nested amongst the branches on the ground. When the female is sitting on the eggs, which is usually around harvest time, Bill says, "Nothing will shift her".

Bill regularly sees them nesting although he has never seen any chicks. Eggs will be there one day and gone (shell and all) the next. However, some of the offspring are managing to survive, as although the birds are long-lived they do not live for more than 10-30 years and Bill has learnt to distinguish particular birds over the years.

There have been other reports from *Land for Wildlife* members about stone-curlews living around their sheds. How have these birds managed to survive so close to human habitation? How have they managed to survive fox and cat predation?

One clue to this may come from a *Land for Wildlife* member from Victoria who has his male dog urinate around stone-curlew sites on his property stating that it will deter foxes from hunting nearby, although they still move through the area (pers. comm. Brett Beecham). Maybe the presence of farm and town dogs is protecting the birds. Could this be a useful management technique?

Bush stone-curlews have been known to return to areas where extensive fox baiting takes place and increase in numbers in areas where there is fox proof fencing. Bill fox-baits twice per year.

If you have any interesting anecdotal evidence or management tips for bush stone-curlews on your property we'd love to hear from you.

You can contact *LFWO* Avril Baxter at CALM, Narrogin on ph: 9881 9218, fax: 9881 3297 or email: avrilb@calm.wa.gov.au.



A resident bush stone-curlew near Bill's shearing shed. (Photo: Avril Baxter)

REVEGETATION

LANDHOLDERS AND RECOVERY PLANNING: TOOLIBIN LAKE CATCHMENT

Jennifer Munro and Susan A. Moore

Why is Toolibin Lake special?

Biodiversity in the wheatbelt has been steadily declining for a number of years, meaning that conservation management now focuses predominantly on remaining areas of biodiversity value. Toolibin Lake is one such area. Located in the Shire of Wickpin, Toolibin is an area of significant interest to government agencies, community groups and private landholders. People are interested in Toolibin Lake because it is the last remaining large freshwater lake in the wheatbelt; however its status as such is threatened by salinity. Efforts to recover Toolibin have been underway for several decades, most recently with CALM using the formal Toolibin Lake recovery plan to try and save the Lake.

The plan has recently been reviewed after a 10-year lifespan, with CALM looking towards recovery of the entire catchment, in addition to Toolibin Lake itself. In light of this CALM wanted up-to-date information from landholders within the catchment about their recovery activities and needs. Such information is critical because most of the catchment is privately owned agricultural land over which CALM has limited jurisdiction. As such, most of the recovery activities, such as fencing of remnants and revegetation, must be undertaken on these lands. The resultant project, funded by CALM and conducted by Murdoch University, set out to discover (i) how landholders valued Toolibin Lake as well as land management priorities and issues within the catchment, (ii) what landholders felt to be constraints and incentives



to adopting recovery management actions and (iii) how landholders felt about CALM's communication, promotion of the Toolibin Lake recovery plan and the strengths and weaknesses of the recovery plan.

What we found

Landholders were sent a mail-out questionnaire and later participated in face-to-face interviews to share their views with us. The results turned up many interesting findings. Landholders valued Toolibin Lake for a number of reasons, and especially for the wildlife habitat and the community value/identity it provides. Interestingly, two-thirds of landholders (68%) operate their property without a farm plan, meaning that only 32% of catchment landholders are using a plan. Earlier reports have estimated that 90% of landholders within this catchment had a farm plan. So what could explain the big difference in

actual versus expected use of farm plans? The answer to this possibly lies in what is known as 'Landcare Burnout', with landholders becoming jaded by ongoing demands regarding conservation works: "I think everyone got a bit sick of it, we all got sick to the teeth of doing plans...there's been a lot of criticism on that, farm plans."

In terms of recovery actions landholders are adopting, revegetation is the most common (90% adoption). Two-thirds of landholders (68%) were influenced by CALM subsidies in their decision to adopt recovery actions. A total of 86% of landholders increased the scale of adoption, such as revegetation, in response to subsidies. As a recovery catchment, landholders are being subsidised to undertake revegetation and fencing. A popular future management action, mentioned by 32% of landholders, was deep (sub-surface) drainage, as a means of dealing with salinity.

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REVEGETATION

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Landholders were asked about constraints to adopting recovery actions on their property. Financial constraints were identified by 77% of respondents, followed by logistical (lack of time) constraints (67%). A 'motivational' constraint (50%) was also apparent, perhaps linked to some degree of Landcare Burnout in the catchment, associated with the long history of conservation work in the area. In terms of incentives, money and information were identified.

When asked about the quality of CALM's communication, all landholders said they felt it was beneficial as it improved the information available and communication throughout the catchment, making landholders more aware of the importance of Toolibin and keeping them informed about developments. However, two-thirds of landholders commented that CALM still needed to improve their liaison within the catchment and that landholders needed to be regularly informed and updated of works and developments.

Similarly, when asked about promotion of the Toolibin Lake recovery plan, landholders said it had raised awareness of the significance of Toolibin, as well as demonstrated CALM efficiency and that they could work effectively to produce tangible results. When asked how they felt the recovery plan could be better promoted, landholders again identified the need for better dissemination of information throughout the catchment. Finally, landholders were asked to identify the strengths and weaknesses of the Toolibin Lake recovery plan. Strengths included the recovery plan increasing knowledge (of the situation and recovery efforts), demonstrating government efficiency (by showing that different government agencies could work together productively) and providing funding (in the form of subsidies). Stakeholder

interaction (landholders felt that the relationship between themselves and CALM was inadequate), bureaucracy (government reticence to accept deep drainage), fiscal (CALM not receiving enough funding) and lack of catchment involvement (patchy adoption of management actions) were identified as weaknesses.

Summary

These findings have some important implications for the future management of Toolibin catchment and other places with high biodiversity values and significant levels of private ownership. Strong, ongoing communication between government departments and private landholders is essential. Although CALM's communication efforts were complimented, room for improvement was also identified, particularly in keeping landholders up-to-date and consulting with them regarding catchment management. The strong positive influence of subsidies on recovery actions is also an important message. For areas of high biodiversity value, subsidies may be the best way to improve the level and extent of adoption of the desired recovery activities. To get better continuity of management actions for biodiversity across the catchment, multi-farm management agreements provide a novel solution to coordination needs. The last implication from this study is the need to foster and support further development of the Toolibin Catchment Group to progress an integrated approach among landholders to recovery activities.

Jennifer Munroe is an Honours student in Environmental Science, Murdoch University. Dr. Susan Moore is a Senior Lecturer in the School of Environmental Science, Murdoch. She can be contacted by phone on 93606076 or email: smoore@murdoch.edu.au

FERAL ALERT

Forensic fingerprinting of starlings

Starlings are one of the world's top 100 invasive alien species. Introduced by European settlers in the late 1850s, the bird has now colonised most of south-eastern Australia. It is omnivorous and lives in large noisy flocks (the quarrelling of a breeding colony in the roof above my bedroom in England was deafening! Ed.). It can cause extensive damage to cultivated grain and horticulture crops, as well as competing with native species for food resources and nesting hollows.

WA has been battling for 50 or more years to try to stop starlings getting here, patrolling the Nullarbor, shooting and poisoning any invaders seen. But recently, small populations have established near Esperance, at Munglinup and Condingup. A big effort is going into controlling them.

A new technique being tried is DNA fingerprinting. This will enable the flocks to be traced back to their original points of departure, and will give a better idea of how wide a buffer needs to be, to try to limit more incomers.

The newly formed State Starling Management Advisory Committee is developing a Strategic Plan for the long-term management of this pest. To find out more, go to www.agric.wa.gov.au and search for 'starling'.

The 'Landcare Burnout' mentioned is an important issue. Have any readers got ideas or suggestions concerning this that we could all consider? – Ed.

MEMBERS' PAGE

WEEDY SUCCESS STORY!

Julia Boniface



2001. before rust infection



2004. two years after infection. Note dead and dying stems.

WE are probably all familiar with the devastation caused by a rampant infestation of Bridal Creeper. Understorey species are rapidly smothered until the Bridal Creeper dominates. *LFW* members Shaun Cook and Denise Canna became only too aware of this after they bought their property on the Blackwood River about 30 km from Nannup. They had a huge Bridal Creeper problem on their river foreshore, which also extended to adjacent properties and State Forest. "We were devastated by the amount of Bridal Creeper and just didn't know what to do about it," remembers Denise. "We couldn't see the river because of the height of the infestation". Even grazing with sheep was considered seriously as an option.

So it was with cautious optimism that the rust fungus, the biocontrol agent for Bridal Creeper developed by the CSIRO, was welcomed. In the winters of 2002 and 2003 the rust was released on Sean and Denise's property. Rust fungus was also released in 2002 on the property on the other side of the river. It was with great excitement that Denise recently shared the news that the rust was winning a seemingly impossible battle. The columns of green swathing the trees and understorey were gone and replaced with a sick-looking yellowish-brown tangle. "We're really delighted" said Denise. "We never expected anything like this – we can even see the river!"

Some regrowth of the weed next autumn and winter is expected, but the rust, having spent the summer as spores on the dead Bridal Creeper stalks, will be there to resume the offensive.

The long term outcome for an infestation such as this is as yet unknown, as the rust has only been around for a

few years. Will the apparent eradication be permanent? Or will the rust do too good a job, deprive itself of its food source and therefore not be there to tackle any future outbreaks? Only time will tell.

One thing we have to be vigilant for is the creation of opportunity for other more difficult weeds, which can invade the empty space left by the Bridal Creeper before natural regeneration has the chance to occur. This has already been observed with several species including the Dolichos Pea. Careful observation of the regeneration site is important and replanting with local native plants may be necessary.

Despite this cautious note, Bridal Creeper rust is one of the big biocontrol success stories and hopefully Sean and Denise's experience will inspire other landowners to give it a go.

Julia Boniface is *LFWO* at Nannup. She can be contacted by phone: 9758 1465 or by email: juliab@calm.wa.gov.au

Did you know?

that weeds cost farmers 14% of their income? A new report confirms that weeds are causing a loss of \$1 in every \$7 of agricultural income.

'The Economic Impact of Weeds in Australia' Sinden et al. 2003. To obtain a copy, email request to: weeds@adelaide.edu.au

MEMBER'S PAGE

Eliminating Bridal Creeper - spreading the rust

Avril Baxter

BRIDAL CREEPER (*Asparagus asparagoides*), an import from South Africa, is a declared Weed of National Significance in Australia. It is spread around the countryside by birds who eat its bright red berries. The germinating plant quickly establishes an underground tuber that keeps it alive over our hot dry summers. It is difficult to control with herbicides or hand weeding.

During 2001-2004, CSIRO with the help of the community, released a rust fungus at over 1150 sites across Australia. The rust fungus (*Puccinia myrsiphylli*) only lives on bridal creeper and not on other closely related native or economic plants. In most release sites it is becoming established and killing pockets of bridal creeper and good populations are now established in many areas. However it was noted that around Narrogin, Williams and West Arthur it was slow to spread and more help was needed. So at the suggestion of CSIRO, the Department of Agriculture, Land for Wildlife and the Community Support Officers in the area held two "Spreading the Rust Days".

Here, keen locals with their eye on bridal creeper infestations came along to two of the original release sites, collected infected material and transferred it to their site on the same day. In a couple of years, when the rust has become established in these areas, it can again be transferred to other sites.

One site visited was *Land for Wildlife* member Jodie and Leanne White's property (See WW 2/4 Bridal Creeper - Everybody's Problem). Starting in 1998, a major chemical weed control program had been undertaken by Green Corps for two years in a row which was followed up annually by the landowners. Although a dent had been made in the population it required intervention every year to keep on top of it.

The Whites welcomed their local Community Landcare Co-ordinator's suggestion to release rust fungus



Land for Wildlife members harvesting rust-infected bridal creeper material to transfer to other sites. Photo: A. Baxter

to the site in 2002 and are pleased with the results so far. The rust is killing bridal creeper where it has been released and is slowly spreading, they feel that it is more of a longterm solution for them to spread the rust fungus within the site than to keep on spraying.

The locations of all release sites are held on a database by CSIRO. To find the site nearest you contact Kathryn Batchelor at CSIRO on 9333 6643 or visit their website on www.ento.csiro.au/bridalcreeper

WEED ALERT

Horehound

Horehound (*Marrubium vulgare*) is a really bad weed in the Goldfields region. Originally from the eastern Mediterranean, it is a spreading bushy plant covered with grey cottony hairs, has globular clusters of small white flowers in the leaf axils and a strong minty smell. The calyx is hooked and can contaminate wool. It likes to grow in disturbed open areas such as heavily-grazed pastoral paddocks, and is now so widespread on some Goldfields pastoral leases that it is almost uneconomical to undertake chemical control.

A biological control agent which is specific to horehound, the plume moth, is being tried. Its larvae feed on the growing tips of the plant, and work their way down the shoot while progressively defoliating the stem. The first time an introduction was tried, the plume moths were sourced from a high rainfall area of Victoria, and they did not survive in the arid Goldfields. This time moths from Murray Bridge in South Australia are being used, and hopefully they will cope better with the Goldfields climate.

Feral 'natives'

Last year Parks Victoria spent \$95,000 in Arthur's Seat State Park in trying to control an invader from Western Australia, Austral Bluebell, *Sollya heterophylla*, which had escaped from gardens.

Introductions from other States are not 'native' plants - beware of them! Noted author and weed campaigner Tim Low says: "One plant with time on its hands is Mat Rush, *Lomandra longifolia*, a domineering species in eastern Australia that is now sold in nurseries in Perth and sprouting prolifically in gardens there". Sold to satisfy the current fad for 'grass-like' plants in landscaping, I can personally verify its aggressiveness! And while we are considering garden plants that spread easily, watch out for *Dietes iridoides* sprouting in bushland close to ornamental roadside or parkland plantings.

Penny Hussey

FLORA

IN addition to a road's essential purpose as a transport route, roadsides possess a number of other values. They are remnants of the original native vegetation which provide habitat for native plants and animals and act as corridors for their movement. There are also landscape values associated with roadsides, with local native plants providing a 'sense of place', and providing the traveller with an example of the way the 'bush' once looked. Roadsides are a valuable and irreplaceable resource - the list of other values goes on and on!

Unfortunately, many of the roadsides in our beautiful state are losing their value, due to a range of threats. The most common ones are clearing, weeds, fire and salinity. Can you think of any roadsides in your area that may deserve special recognition and protection? Well, read on a bit further because there may be something you can do to help!

The Roadside Conservation Committee (RCC) initiated the Flora Roads program as a way of encouraging road managers to protect and conserve roadside vegetation of high conservation

When is a road a Flora Road?

Kate Jackson

value. Flora Roads, as defined by the RCC, are "those roads which have conservation value owing to the vegetation growing within the reserve". There are a number of criteria that the roadside must meet before it can be considered for Flora Road status:

- the roadside must be mostly native vegetation, and be in as near to its natural condition as possible;
- the roadside may be one of the only remaining examples of the original vegetation; and
- the Flora Road should be a decent length (e.g. more than 2km), and may link up with main roads, tourist routes or other significant features within an area.

Put simply, a Flora Road contains vegetation of special conservation, cultural or scenic value and also provides an attractive tourist drive route within a Shire or region.

The Flora Road signs (provided by the RCC) draw the attention

of both the tourist and anyone working in the road reserve to the roadside flora, indicating that it is special and worthy of protection. The program seeks to raise the profile of roadsides within both the community and among road management authorities.

To date, there are 21 Flora Roads in the state. They occur in the Shires of Plantagenet, West Arthur, Merredin, Dowerin, Serpentine-Jarrahdale, Cuballing, York, Chittering, Coorow and Mingenew. Do you know of one or more of these in your area?

There are 3 steps to follow before a road becomes a Flora Road:

- 1 identify the road;
- 2 nominate the road; and
- 3 declare the road as a Flora Road.

Anybody can identify potential Flora Roads; including local interest groups or individuals, the road manager, or the RCC. The RCC's survey of roadside conservation value identifies high conservation value roads that could potentially be suitable Flora Roads. Alternatively, local communities, groups and individuals usually know of some



Mundijong Road, a Flora Road in the Shire of Serpentine-Jarrahdale, is a tourist asset to the local community. Photo: D. Lamont



Attractive roadside landscapes make for a wonderful tourist drive and have the potential to be Flora Roads (North of Stirling Range National Park). Photo: P. Hussey.

FLORA

AFTER thirteen years of work, a team of Western Australian scientists has finally identified the molecule in smoke, which promotes seed germination. Out of the 4000 or so molecules formed when plant material burns, the team whittled the possibilities down to three and then, at last, to one! The findings of this world-first discovery were published in the prestigious international journal *Science* on the July 8th 2004. The team consists of botanists from Kings Park in collaboration with chemists from The University of Western Australia and Murdoch University.

For hundreds of years, African tribes have used smoke to improve germination of red rice and maize. 15 years ago South African botanists used bush smoke, derived from burning plant material, to promote the germination of wildflower seeds. On hearing about this, Kings Park started to study the effect of smoke in the WA environment. Although some of the top laboratories in the world have also researched the action of smoke in germination, the identity of the active agent(s) has, until now, remained elusive.

The team discovered a chemical, a unique butenolide, which induces germination in a broad range of wildflower, bushland and agricultural species from Australia and around the world, including celery, parsley and echinacea. Important agricultural weeds such as rye grass and wild oats also respond

Australian Scientists Make World First Discovery in Seed Germination

Kingsley Dixon

to the chemical, possibly heralding a new and effective method to control weeds in agriculture by stimulating germination of dormant seed banks prior to other treatments. The chemical induces earlier and more synchronized germination with likely benefits for agricultural industries particularly in marginal cropping regions.

We also found that the compound is active at extraordinarily low levels, parts per trillion concentrations. These concentrations are some of the lowest recorded in biology and agriculture and indicate that the chemical is likely to have wide acceptance as a naturally occurring substance that is safe to use.

For weed control and in land restoration industries in Australia and overseas, the potency of the chemical is so great that it equates to about 1 gram (quarter of a teaspoon!) per hectare. For restoration activities, particularly bushland, the discovery has potential

to be of great value in improving germination from dormant seed banks without resort to burning.

This discovery represents one of the most significant advances in seed science with benefits in the natural, agricultural, conservation and restoration sciences while providing a new and exciting method for scientists to understand the role of wildfires in the world's ecosystems and biodiversity.

Research is now focused on safety testing, as well as investigating the mode of action of the molecule in native and agricultural species worldwide. Key research linkages and partnerships are presently being formed and hopefully urgently needed funding will retain much of the scientific work here in Western Australia.

The discovery team comprised Dr Kingsley Dixon, Associate Professor Emilio Ghisalberti and PhD student Gavin Flematti of the University of Western Australia and Associate Professor Robert Trengove of Murdoch University. But in addition numerous other people have worked on the topic of smoke-induced germination, including at least eight local students who undertook Honours, Masters or PhD theses. Truly a cooperative effort.

Dr Kingsley Dixon is Director, Science at Kings Park and Botanic Garden. He can be contacted on kdixon@bgpa

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really good roadsides that we are not aware of, so please let us know about them!

Now that the roadside has been identified, you can nominate it as a Flora Road by submitting a written request to the RCC. If you are not the road manager, it is important to have the support of the road manager. Only the managing authority in whom the care, control

and management of the road is vested can officially declare it a Flora Road. Once the potential Flora Road is identified and nominated, and assuming it meets the criteria, the RCC works collaboratively with the road manager to achieve the declaration of a Flora Road.

In the past few years, there have not been very many Flora Road nominations, so we would love to

hear about special roadsides in your area, and expand the Flora Roads network. If you know of a potential Flora Road, or would like advice or information, please contact Kate Jackson, Technical Officer, RCC, by phone on 9334 0174, or email katej@calm.wa.gov.au or by mail to Locked Bag 104, Bentley Delivery Centre, WA 6983.

FAUNA

A RIDDLE IS NO JOKE

Brent Barrett

What use is an animal that's beautiful to behold but never seen?

How do you save a species you can never find and one that, when saved, will seldom be seen by others?

What's in a voice when no one is listening?

THE answer to these and many other questions must lie in our hearts rather than our heads. We are surrounded each day by reminders of nature but a few take this for granted. Birds invade our back yard and all we see is the damage they do, not the beauty and splendour of their presence. On these two counts the Western Ground Parrots will never be guilty. Rather the reverse is true. As described in a previous article in Western Wildlife this little unassuming parrot knows how to be good, keeps to itself, and sadly never asked for help when it needed it most. So while more and more people are becoming aware of this pearl-in-the-swamp, still very little is known about it.

This is a phantom bird which those in the know long to see and others, unaware of their rarity, believe they saw. A parrot so beautiful and striking in appearance, yet so reserved and cryptic, that few photos exist. But perhaps the most lasting feature of this lost tribe of avian friends is their haunting rhythmic voice. A voice that echoes through the heath as the sun is waking to embark on its harsh arc across the sky. A chant that emulates late into the night when the sun fades to a distant memory and all that remains is moonlight and stars. A voice which few humans are ever present to hear. Caught in translation, struggling to categorise what we find around us, humans describe these ghostly syllables as a mix between Morse code and a whistling kettle. To another ground parrot they are as different as the statements "what a beautiful day" and "do you want fries with that".

Like the retiring gardener you never had a conversation with, or the long-term neighbour you never met, these birds have been buzzing and calling in the background and we have never paused to listen. For eons these semi-flightless parrots have been walking in the wilderness far longer than written history exists. Despite our continued close presence we know almost nothing of them. So, like the gardener who invites you to speak at his retirement, we have no words to impart over the last remaining populations as they slide slowly towards extinction. Not one nest has been observed by humans since 1912. Despite 150 years of attention there is no known photograph of a Western Ground Parrot in the wild. No knowledge of breeding season, population size, food type or bird dispersal is recorded in satisfactory detail. It is as though this bird had never really existed. Until now!

Contrary to written history, the Western Ground Parrot has entered the hearts and minds of the most stoic of birders for generations. Shrouded in semi-silence it has waited in the wings for the day when we turned our attention to its plight and set a course to intervene with a slowly written history. One that would have the bird utter its last peep within 5 years should humans not intervene now. In our desire to categorise the globe around us we are now forced to label the Western Ground Parrot as Critically Endangered. Thus condemning it to eventual extinction based on all we know of dwindling populations.

How can humans answer such allegations? Here is one of the most unique parrots in Australia, a true gem of Western Australia. This, the largest and most diversely parroted continent of the world is now facing the loss of one of its less understood endemic birds. Finally we have an answer! Meek as the lone voice amongst the crowd, there is a steady rising of one unified voice. The Western Ground Parrot is becoming known by communities and professionals alike and as such appreciated and valued despite its attempts to remain incognito. For the past year a dedicated recovery project has been building a picture of occupancy and bird numbers, steadily filling the knowledge cup. This dedicated CALM team has been working alongside the recently resurrected Friends of the Western Ground Parrot group to raise awareness and understanding in the community. As a result interest is building, good reports of sightings are being lodged and people are promising to help.

Nest searching was recently undertaken with surprisingly positive results. While no nests were found, we now have the first ever photograph of a Western Ground Parrot in the wild, taken by the project leader Brent Barrett. A short film of a bird flying was also recorded. Timing of breeding is now better understood and with it the knowledge of when these birds need the greatest protection and where it needs to be focused. The entire 330,000 hectare Fitzgerald River National Park has been surveyed and mapped. Two new populations

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FAUNA

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of Western Ground Parrots have already been found there. We are changing the course of history now. When the tide of time next recedes on its wax and wane of life there will be no Western Ground Parrot cast up on the shore of extinction. There is no more room on that beach.

Through these efforts and the planned continuation of this successful project it is hoped that more populations can be found or established and once more our neighbour, the elusive cryptic ground parrot, will be heard calling a start and end to each day. With communities and conservation experts working together the future of this unique bird can be secured. With the technology and awareness we now enjoy in the 21st century we humans can make a positive change. Above all, it is no longer palatable to be offered a spoon marked extinction while holding a bowl of vulnerable species in the soup kitchen of life.

If you consider that only a few people have heard this parrot calling freely in the wild and you then realise that you could become one of those people, then please get involved as a volunteer on the project. Alternatively join the Friends of the Western Ground Parrot group and learn all about the progress of this dynamic team. The next area of focus is Cape Arid National Park and operations will be based in Esperance. We can assist volunteers with transport and during the trip with food and equipment. For more details contact Brent Barrett 0429 842 451 or brentb@calm.wa.gov.au

Brent Barrett has worked on Southern Right Whales and the rare New Zealand parrot the Kakapo. He is currently Ground Parrot Project Officer at CALM, Albany.

A Fish Ladder

Sylvia Leighton



Alan Danks (Regional Leader Nature Conservation, CALM) and Steve Janicke (Rivercare Officer, Department of Environment) standing on the fish ladder with the weir in the background

I was so glad to have read the article Freshwater Fishes of South Western Australia in the last Western Wildlife issue. By chance I attended a half day Department of Environment Wetlands Workshop in Two Peoples Bay Nature Reserve. One of the sites we visited was the new Vertical Slot Fish Ladder on the Goodga River mentioned in the article.

The Goodga River is the only known waterway in WA where the trout minnow (*Galaxias truttaceus*) is found. The trout minnow (10cm long) and other indigenous fish species normally migrate upstream each autumn to spawn but a gauging weir installed across the river in 1964 blocks their pathway. Surveys of the upstream waterway indicated that the trout minnow have been unable to get past the weir to reach valuable habitat and breeding areas.

After searching Australia-wide for engineering ideas that might possibly assist with this issue (most projects examined didn't seem to have a very high success rate) the



Schematic diagram of the fish ladder design

Department of Environment found a consultant in Queensland. The result has been the construction of a series of pools, separated by vertical slots allowing water flow for 'jumping' fish which gradually climbs the 1.5 metre weir wall.

Monitoring sessions recorded 1500 fish moving up through the ladder over a period of a few days and breeding adults have been found upstream. It is heartwarming to find a project that incorporates wildlife needs and has still allows the ongoing operation of the gauging weir.

IN BRIEF

Drummond Symposium



JAMES DRUMMOND, celebrated in Rica Ericson's book "The Drummonds of Hawthornden", was an extraordinary person and amazingly influential in Western Australian botany. The 'Drummond Symposium', held in Toodyay in August, celebrated his life and work. Over 170 people attended, and participants ranged from Kalbarri to Albany.

The event was organised by the Toodyay Naturalists' Club in association with Kings Park, the Western Australian Herbarium and Curtin University. It commemorated the life of James Drummond (1784 - 1863) and his outstanding contribution as a collecting botanist to the knowledge of plants of south-west WA.

The first day comprised an impressive array of speakers whose topics ranged from the life and times of the Drummonds; the difficulties of travel and the length of time it took letters to arrive from overseas; trips with other botanists and fauna collectors; where his specimens are now; problems with nomenclature; to genetics, orchids, wattles, fungi, plants that

Drummond saw that you can grow in your own bushland and, finally, plants he found that have never been seen again.

James Drummond certainly was an outstanding individual. He was Curator of the Cork Botanical Gardens in Ireland (1809 - 1828), and emigrated with his family to the Swan River Colony in 1829 to take up position as Government Botanist. Unfortunately, a falling out with Governor Stirling led to him losing that position and associated income. He then went on to earn part of his living by selling plant collections to overseas botanists, notably William Hooker and John Lindley. His collections are now to be found in about 25 herbaria throughout the world. A very large number of species from south-west WA are described from his collections, with 119 being named after him.

What was so interesting about this man was that due to the time period, all his travels were on horseback, and covered an area ranging from Geraldton to Cape Arid, with none of the roads and signposts that we take for granted these days. Some species that Drummond collected have not been found since, and he had had a relatively low rate of duplication, indicating that he had an incredible eye for detail.

The papers presented at the symposium are likely to be published in the New Year. Everybody interested in the combination of botany and early colonial settlement will find them fascinating. The cost will be \$10.00 (free to those who registered at the symposium). Any queries, please direct to Stephen Davies. He can be contacted at: S.Davies@exchange.curtin.edu.au

Zara Kivell

More on sea ice and climate change

As we reported in the last issue, there has been a big decrease in sea ice cover around the Antarctic. The links with WA's drying climate have been reinforced by scientists working with the Indian Ocean Climate Initiative. The fronts which bring winter rain originate over the sea ice, thus if the ice is further south, so will the cold fronts be. Therefore they will not cross land as intensely as before.

For an extensive website on climate change, see: <http://www.climateark.org/>.

Nursery Closes

CALM's Plant Nursery at Narrogin has closed. Since it opened in 1967, it has provided millions of seedlings for revegetation, most recently for oil mallee projects and the specialist "biodiversity trays". The decision to close the nursery was taken due to a significant decline in seedling sales over the past four years, resulting from a reduction in grant funding available to Landcare groups and a significant shift away from revegetation for salinity control in favour of engineering works.

Did you know?

that midges' wings beat about 1000 times a second?

MEMBERS' PAGE

What's affecting the Zamias?



I have noticed that very few of the *Macrozamia reidleyi* on our property have new growth in their centres. We have wandoo woodland on laterite gravel. We are 22km south east of New Norcia and are high in the catchment with quite large areas of remnant vegetation. Other plants in the same area are fine and looking very healthy, and we don't believe we have dieback in our catchment.

I have found the condition of the plants are similar across the farm in different patches of bush. The areas have not been burnt recently and I can't think of what may be causing the lack of growth. Several of the plants have deformed looking fronds, they curl and almost look as though they have been constrained when growing.

Has anyone else noticed a similar condition of their zamias? If so do you know what is causing the problem? I would love to hear from anyone and can be contacted by email at goodden@global.net.au

Sarah Mason

Congratulations!

Coogee Primary School is in the news again - it can boast it has the best primary school science teacher in the nation! Year 6 teacher Keith Brown has won the prestigious national BHP Billiton Science Teacher Award 2004 for his outstanding achievements in environmental education. Well done Keith!

Illegal trapping of long-necked turtles

Last August, Jenny Mackintosh of the Friends of Lion Mill Creek, Mount Helena, told us that one of the group members found a cage trap wedged under a low bridge and saw something moving in it. She hauled it out with great difficulty and found it was full of long-necked turtles! She managed to get them out and they were alive, all twenty of them! She contacted CALM who thought they were destined for export. If you find anything suspicious or any animal in trouble while you are out and about, please ring CALM's 24-hour Wildlife Helpline: 9474 9055



Congratulations!

To Suzanne and Peter Little of 'Random Valley Organic Wines', Karridale, who won the 'Small Business Leading by Example' category of the WA State Environment Awards. Very well done folks, and best wishes for the national Banksia Awards next year!

(You may remember that 'Riverside Sanctuary' won this Award last year. That's *LFWers* two years running! Next year ...?!)

PRACTICALITIES

Stopping birds flying into windows?

Crash! The whole house shook. "Quick, a bird's flown into the window!" Outside, the drama was reaching its conclusion..... a dove, frantically racing from a goshawk, had slammed into an upstairs window. Stunned, it tumbled to the ground and the hawk, in a superb piece of flying, dropped onto it. For a moment there was a pause, as the bird of prey worked its claws into the still feebly struggling victim. Then it lifted up and away.

Because my upstairs room has windows on all sides, birds are quite often fooled into thinking they can fly straight through. I have had to bury a number of casualties, including red-capped and 28 parrots, red-browed firetail finches, new holland honeyeaters and, once, a Horsfield's bronze-cuckoo. So what can one do to prevent this? It appears that it is important not to let the birds get the impression that there is a throughway. Below are some ideas that I have tried, or had suggested to me:

- keep the curtains closed
- let your windows get a bit dirty, so they are not as reflective (it's also a great excuse when a visitor looks down her nose at your housekeeping!)
- hang mobiles, wind chimes or solid shapes such as raptor silhouettes in front of the windows to break up their outline.

Has anyone got any other suggestions?

Penny Hussey

NEW BOOKS

Riparian Plants of the Avon Catchment: a field guide

Brendan Oversby

Pub: Department of Environment, Perth.

Cost: \$25.00 hardcopy; \$10.00 for CD.

Many revegetation projects only include a limited range of species, because people are not sure what to plant where. This new publication should help to fill that knowledge gap. It details species suitable for planting in the riparian zone of rivers and wet areas in the Avon Catchment, but most of the information would be applicable to all of the lower rainfall south-west of WA.

The plants are arranged alphabetically by families, and each is illustrated by photographs and written descriptions. There are also brief notes on its position in the riparian zone and use in revegetation. 59 species are described, but there are plans to include up to 200 species. So that this can be done easily, each species is on a separate card, held together in a ring binder. This arrangement means that, when looked at in the binder, a photograph is facing the description of the previous plant, a minor irritation for the user.

River banks often carry plants from some families that are rather difficult to identify, such as saltbushes, rushes and sedges, and here the book will be very helpful. The sedge section, especially, is excellent. However, as yet, not every possible plant is included, so don't despair if your plant doesn't fit the photos - perhaps it will be in the next edition!

Anyone who has a creek or wetland on their property, and is interested in the plants that grow there, will enjoy this publication. If you are planning a revegetation project for these areas, it will be invaluable.

Order through the Avon Catchment Council, PO Box 311, Northam, WA 6401. Phone: 9690 2250. Depending on your preference, you could obtain the field guide either as a hard copy, or as a CD. It is also available on the Department of Environment's website: www.environ.wa.gov.au

Pretty but Poisonous: plants poisonous to people: an illustrated guide for Australia

R.C.H. Shepherd

Pub: R.G. & F.J. Richardson, Melbourne

Cost: \$39.95 Obtainable from good bookstores or contact richardson@weedinfo.com.au

This book will help people to identify the plants commonly found in parks and gardens that may cause poisoning, allergies or skin reactions in people. Good, clear photographs and simple descriptions aid identification and there are hints on how to avoid poisoning and what to do if it does occur. Most of the plants illustrated are introduced - even the three fungi - though a few natives are described, including Caustic Bush, *Sarcostemma viminalis*, found on rocky areas through much of the dryer inland, which has an irritating sap.

Gardeners in general would probably find the book interesting and instructive, however anyone who is looking after young children would be well advised to read it, so that they can learn which plants children should not be allowed to handle, even daffodils, for example, contain toxic materials.

Native Plant Guide: Karlkurla Bushland Park & the Goldfields of Western Australia

Kylie Payne

Pub: Kalgoorlie-Boulder Urban Landcare Group

Cost: \$15.00 book; \$10.00 for CD

There is more to see in Kalgoorlie than just mines and pubs! The town is surrounded by eucalypt woodland that has regenerated after being cut for the mining industry in the 1900s. It is home to numerous species of native plants and animals, and can be very beautiful, especially in winter and spring when the sun shines through the tree canopy and illuminates the red soil, grey-leaved shrubby understorey and shiny cinnamon bark of the trees.

On the north side of the city is a small park, Karlkurla, that has recently been developed on the initiative of the Kalgoorlie-Boulder Urban Landcare Group. It has picnic sites, a lookout and a walk trail with information boards. The book illustrates 65 of the plants that occur in the park, including most of the common species that are easily noticed. As well as descriptions, there are interesting notes on use of the plant, whether by Aboriginal or European people.

My main concern with this otherwise delightful little book is that the binding is poorly done, so that a bit of use causes it to fall apart. With that proviso, if you are visiting the Goldfields and are interested in plants, you will find it very helpful for field identification.

Order through the Kalgoorlie-Boulder Urban Landcare Group. Phone: 9091 6233 or email: kbulg@emerge.net.au Depending on your preference, you could obtain the field guide either as a hard copy, or as a CD.

NEW BOOKS

Threatened Animals of Western Australia

Andrew A. Burbidge
Pub: CALM
Cost: \$32.95 + p&h

At least 185 species of animals are threatened in WA, from blue whales to numbats and cave crustaceans. A further 18 species are either extinct or extinct in the wild. This new book starts by discussing the 'threatening processes' that cause rarity and the steps which have been taken to try and conserve them. The main portion describes the animals and documents the current state of research and their management. A final chapter suggests what needs to be done in future to try to prevent further loss of species.

The book is a catalogue of what we have lost or are about to lose and it should help to raise the profile of these threatened fauna and draw attention to their plight. The illustrations are a visual delight, as well as a source of sorrow, as one contemplates John Gould's sensitive drawings of extinct animals. Who knows what ecological effect the broad-faced potoroo had on it's habitat around the edges of Wheatbelt salt lakes, for example? It was extinct before we could even begin to understand.

Perhaps because of the author's lifetime work on fauna conservation within the State Government system, and so a great familiarity with the research, regulatory and conservation reserve aspects of fauna management, the fauna recovery actions cited are mainly official ones, while the role of the general community, especially in awareness-raising, is seldom mentioned. For example, the work of the extremely high-profile Malleefowl Preservation Group is acknowledged, but the long-running Birds Australia Carnaby's Cockatoo

project is not. Nevertheless, the final comment in the book is the need for everyone to consult and work together if these threatened animals are to take their rightful place in mainstream natural communities. The success of fox baiting, spearheaded by CALM and its partners in Western Shield and supplemented by landholders, show that, given some effort, threatened fauna can recover. This book should be a great encouragement to further efforts.

Handbook of Western Australian Birds: Volume 11 Passerines

R.E. Johnstone and G.M. Storr
Pub: Western Australian Museum
Cost: \$130.00

A 'handbook' is defined by the Macquarie Dictionary as "a small book or treatise serving for guidance, as in an occupation or study", well, you will certainly get a lot of guidance out of this, but it is not small, this handbook is huge! It is a massive tome that if you dropped it on your foot would break bones! That is because of the enormous amount of information that it contains.

This and the previous Handbook, Vol. 1, are beautifully produced on quality paper with clear illustrations to enable identification. There is a detailed description of each bird, together with notes on its habitat, breeding and behaviour. Maps indicate the range. A feature of this volume is the superb line drawings of nests. As in the previous volume, it also includes life-sized colour photographs of the birds' eggs.

In Western Wildlife 3/1, Jan 1999, we drew reader's attention to Volume 1 of this series. It has been a long wait for Vol. 11! Anybody who is seriously interested in birds will want to have this superb reference on their bookshelves.

Australian Magpie: Biology and Behaviour of an Unusual Songbird

Gisela Kaplan
Pub: CSIRO, Collingwood.
Cost: \$39.95

Judging from reader responses, Ian Rowley's article on magpies in WW 5/2, April 2001, was one of the most popular we have ever produced. Thus I am sure that there are very many readers who will love this book!

Written in a very readable style, it presents an account of the biology and behaviour of this much-loved songbird.

There are detailed chapters on anatomy and physiology, including considerable detail about how and why magpies sing. Development and health are also discussed. Most interesting to me, however, were the chapters on behaviour. Youngsters playing and clowning around, adults warbling to themselves in their leisure time, the whole mob seeing off an eagle - all the way through I thought "Yes, I've seen that!"

So, if you have a magpie mob in your yard, this book will help you appreciate even more these fearless, friendly characters.

All reviews by Penny Hussey

From two young Land for Wildlifers:-

Q: What do you call an owl with a sore throat?

A: A bird that doesn't give a hoot.

("That's not right" said his elder sister, "you call it a little horse!")

COMING EVENTS

Banksia Environmental Awards 2005

Awards given in 12 categories of projects. Are you proud of your outstanding achievements? Why not enter for an award? (Remember that 'Riverside Sanctuary' won the 'Environmental Leadership in the Rural Sector' category last year.) To find out more, contact the Banksia Environmental Foundation on banksia@emailing.com.au

• Entries close on Monday 21st March 2005.

2005 National Native Grasses Conference

To be held in Burra, SA, on 11th – 13th October 2005. If you are interested in native grasses in agricultural and bushland systems – and especially if you would like to give a paper about your concerns – contact Christine McCrae for further information.

Email: cmcrae@hwy.com.au

WAGIN WOOLORAMA

is on the 11-12th April

see you at the *LFW* stall!

FUNDING

'Bushland Benefits' – coming soon!

A new funding scheme, based on a tender, will be commencing soon. Have you got a project ready to go which enhances the conservation value of your land? Do you need some financial help to get it started? As *Land for Wildlife* you will have one of the main requirements of this new scheme – a management plan – already prepared.

For more details, read the insert in this magazine and register for the full package. You could also contact your *Land for Wildlife* Officer or Penny Hussey at CALM on 9334 0570 or email: pennyh@calm.wa.gov.au

'Envirofund' - closes 18th February 2005

There is still time to submit a project to the Commonwealth Government Envirofund. This is one of the few funding schemes which will support projects on an individual property, not necessarily as part of a community group. Have you a biodiversity project you want to do? Contact your *LFWO* or local landcare officer for help.

For details see: www.nht.gov.au/envirofund/index.html

At last CALM's off-reserve conservation programmes (including *Land for Wildlife*) are on the web! It is not flash, but it is there. Check out www.calm.wa.gov.au/orc/index.html

Maintaining Australia's Biodiversity Hotspots programme

This new Commonwealth programme aims to improve the conservation of Australia's biodiversity hotspots on private and leasehold land by enhancing active conservation management and protection of existing terrestrial and freshwater ecosystems as habitat for native plants and animals. There are two components to the programme:

- a national biodiversity stewardship component, paying private landholders or lessees in hotspot regions to undertake 'above duty of care' conservation activities, and
- a voluntary land acquisition component, targeting outstanding high biodiversity value properties.

Details of how the programme will operate are still being determined, but it is known that it will have a budget of \$30 million over three years.

Further information is available at: www.deh.gov.au/biodiversity/hotspots/programme.html

