



DEPARTMENT OF  
**Conservation**  
AND LAND MANAGEMENT  
*Conserving the nature of WA*

# Western Wildlife



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NEWSLETTER OF THE LAND FOR WILDLIFE SCHEME

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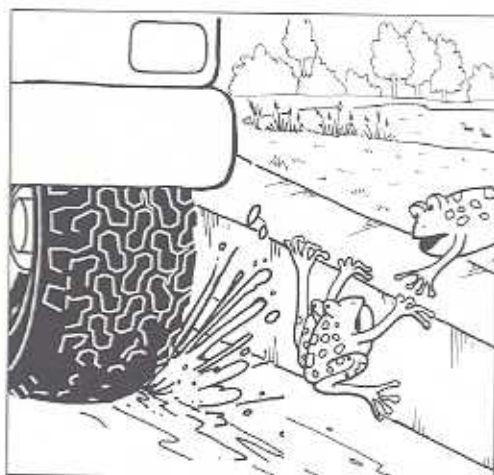
## A KERB TOO HIGH

Steve Reynolds

THERE are currently 23 recognised species of frogs in the south-west of Western Australia, with additional species in the wheatbelt and semi-arid zone. The great majority of these are endemic (i.e. restricted) to the south-west and are therefore unique from a world viewpoint or indeed from an Australian perspective. Around the Perth area there are about nine species that regularly occur, with a few more that exist in the hills to the east and others in the sandplain country to the north, making a total of 16 in the Perth region.

In the lakes and swamps of the Swan Coastal Plain there are six species of frogs that occur and breed regularly; the calls of these species are likely to be familiar to anyone who lives in close proximity to a wetland around Perth. These species are the Moaning Frog *Heleioporus eyrei*, the Pobblebonk or Western Banjo Frog *Limnodynastes dorsalis*, the Motorbike Frog or Western Green and Golden Bell Frog *Litoria moorei*, the Slender Tree Frog *Litoria adelaidensis*, and two species of 'froglet', the Pea-rattler or Glauert's Froglet *Crinia* (sometimes *Ranidella*) *glauerti* and the Squelching Froglet *Crinia insignifera*. Personally I prefer common names that give some idea about the call of the frog because each species has a unique call thus making identification possible on this basis, and also because a frog's call is about all you are likely to observe unless a thorough search is made. Frogs are very cryptic and often hide amongst vegetation or in burrows - however, on very wet nights, particularly after the first rains of autumn, frogs do move about and they are most likely to be seen at this time.

Hence the reason for this article, in which I want to talk about a few of the problems that frogs face in their



(newly established) urban environment. One of the big problems is that when frogs move around and end up on roads they tend to get run over. Although this is clearly detrimental to the individual the effect may be strong enough to influence entire populations of frogs at individual wetlands. Loss of frogs is particularly evident along busy roads in close proximity to wetlands, for example along Perry Lakes Drive, but also near Bibra Lake, Manning Lake and

Herdsmen.

This loss of frogs on roads occurs because of movement and dispersal. Based on the information we have available it seems that frogs tend to move into wetlands in the breeding season, i.e. autumn and winter, and then move out into surrounding areas in the non-breeding season, where they shelter under leaf litter and bark, or in the soil. It is not just farmers then that wait expectantly for the first rains after summer - the frogs are also waiting for sufficient rain to allow them to head back to the swamps to breed. Based on studies elsewhere the usual scenario is that males move in first, establish territories (or burrows) and start calling, and then the females, laden with unfertilised eggs, follow. Frogs seem to move a long way from wetlands, and at sites near Perth have been recorded from several hundred metres to over a kilometre from the nearest wetland. Judging from studies by Ric How (WA Museum) at Bold Park, in summer the frogs only emerge and move around immediately following rain, so they are generally fairly inactive at this time of year.

So what can people do about all these frogs dying on our roads? Well, the obvious thing to do is to slow down and keep an eye out on rainy nights, but they are not always easy to avoid. It may be that Councils should

continued on page 3

## EDITORIAL

*Greetings everyone!*

Great news! Rosemary Jasper has taken up the position of *Land for Wildlife Officer* at Ravensthorpe. Rosey knows the South Coast well, and she will be working in Esperance and Ravensthorpe Shires. A great addition to the team! Why not call up and say Hi?

Recently I attended a *LFW Coordinator's Workshop* in Canberra, which was very stimulating, listening to all the good ideas from other States. Apart from Victoria, where *LFW* started in 1981, Qld, Tas and NT have operating schemes, and NSW starts soon. Remember, if you are going interstate, and would like to meet some *LFWers*, ask me for some contacts. *LFW* Victoria organised an "Open Property" scheme last year, and their State Coordinator has written about it in this issue. Do you think the idea would work here?

There are a wide variety of fascinating articles in this issue, from the legality of trapping feral animals to how to get fungi back into your revegetation. Remember, if there is a particular topic you would like to be covered in the magazine, please let us know.

Penny Hussey

**Oops! Sorry!**

On p 11 of last issue, the excellent owl photo was taken by Clare Mark. Apologies, Clare, for forgetting to note the credit.

## INDEX

A kerb too high	1
Biodiversity of the Camarvon Basin	14
Bush Detective	3
Canker disease in marri	16
Camaby's Black-Cockatoo	4
Coming Events	24
Discovering our flora's hidden diversity	6
Editorial	2
Greening Challenge	22
Legal aspects of trapping feral animals	12
<i>LFW</i> news	19
Members' page	17
New books	24
Paterson's curse	10
Putting the fungi back - kick start your revegl	18
The value of old photographs	6
Would groups of tourists like your block?	11

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## BALINGUP SMALL FARM FIELD DAY



Part of the award-winning *LFW* display at the Balingup Small Farm Field day - have you seen a Brush-tailed Phascogale? Photo: J.Dewing

**Please note:**

The Department of Conservation and Land Management no longer wishes the acronym CALM to be used. Pending a name change, everyone is asked to please use DCLM.

Thank you.

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## FAUNA

*continued from page 1*

erect signage to indicate that frogs are moving about in certain seasons, much as there are signs warning of tortoises crossing. If people are really keen then walking along roads near wetlands and moving frogs off roads and into the swamps or lakes will at least save a number of frogs. Unfortunately though, weather conducive to frogs is not likely to be suitable for humans, although it may be necessary to go out for only a few nights each year. (I have been told that, in Germany, Naturalists' Clubs put up drift fences of low flywire on the edge of a road, to hold frogs moving from surrounding country down into wetlands, and then each morning carry all the frogs that collect behind the fence, across the road to the nearest lake. Later on in the year, as the frogs move away from the water, the fence is moved to the other side of the road.)

Something that has come to my attention only recently is that some frogs seem unable, or at least find it difficult, to get over kerbs, even though the kerbs may only be 15cm high. This seems to be for several reasons, firstly because many Australian frogs don't seem to be all that agile - Moaning Frogs are fairly 'slow-witted' and only hop 20 - 30 cm in the horizontal, and don't appear to hop very high. The other reason is that many of the frogs moving around are juveniles, so they're not very big in any case. What this means is that many of the frogs are not able to reach the wetlands where they are headed. The simplest solution to this problem seems to be to ensure that sloping kerbs are used around wetlands so that the frogs can more easily move around. The frogs will still have the problem of crossing roads but at least they won't get stuck there, and so the chances of being run over should be reduced.

Just in passing, there are also a bunch of problems that affect the places that frogs live, i.e. wetlands. The first of these involves the increase in runoff when residential developments are established around the periphery of wetlands. The increased runoff occurs because roads, driveways and roofs are impenetrable to water, hence a lot more water ends up in drains and then eventually in wetlands. The effect that this change in water regime has on frogs is not well documented, but it is clear that many wetlands around Perth that were previously dry in summer are now permanent due to increased runoff. Obviously, the water that floods in from roads and drains is not always of the best quality either - it is filled with oily deposits, grime and rubbish.

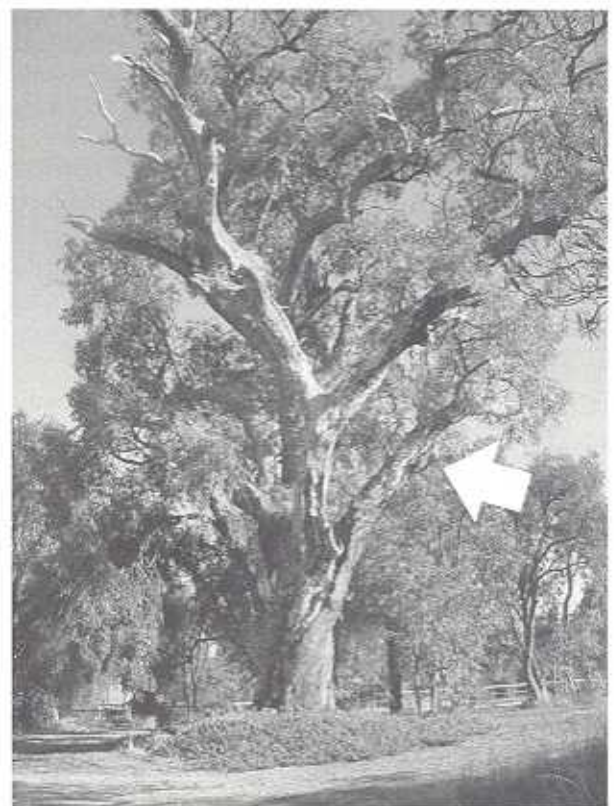
The loss of vegetation fringing wetlands is also a problem - these areas provide a buffer into which frogs can disperse in safety. A concern in many areas is what I call the 'ornamentation' of many of our wetlands, with the wetland fringes converted into parklands. These areas are great for people, but leave little room for the natural inhabitants of our wetlands, which prefer native plants like Melaleucas and sedges. Clearing and drainage of swamps, or conversion into other land uses, e.g. water

ski parks or residential, has also affected numerous wetlands around Perth. Most of these changes are related to urbanisation and it seems that there is little we can do, but leaving adequate areas surrounding wetlands would be a first good step. The problem is that when wetlands become surrounded by housing, populations of frogs (and other organisms) become completely isolated from other areas. Where frogs would have moved between swamps in the past, they are now blocked by houses or are forced to cross roads. This means that there is no exchange between populations, and one component of biodiversity, genetic diversity, is consequently curtailed. Corridors of vegetation, particularly in low lying areas, are the best way to facilitate movement between wetlands.

(For more information about the frogs around Perth refer to: Dell & Turpin, 1992, 'Frogs of the Perth Area' WA Museum; or Bush et al., 1995, 'Reptiles and Frogs of the Perth Region'.)

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## BUSH DETECTIVE



What are the white plates hanging out of this magnificent jarrah habitat tree on Eddie Williams property at Baldviss? Are they fungi, or what?

Ans on page 23

If you lived in the Northern or Eastern Wheatbelt half a century ago, you probably didn't need a barometer to forecast a good downpour. A sky darkened not by clouds but by Carnaby's Black-Cockatoos was believed to be a good indicator that rain was on the way. If few black cockies fly in to herald the rain now, it's less to do with drought and more to do with the changing fortunes of a species once so plentiful in number that a government bounty was placed on its head to control its numbers.

Over the years since then, widespread clearing, poaching, shooting, and increasing competition from other species have all taken their toll on the world's only population of Carnaby's Black-Cockatoo, *Calyptorhynchus latirostris* (Carnaby's). In the past 45 years the cockatoo's population is estimated to have more than halved and the species is now listed as endangered and likely to become extinct. It is already locally extinct in some areas.

In 1999, in an effort to prevent the cockatoo's extinction, the Carnaby's Black-Cockatoo Recovery Team wrote a recovery plan for the years 2000-2009. The recovery team consists of members from several professional organizations, including Birds Australia, DCLM, CSIRO and WA Museum, and a landholder who is successfully conserving and developing Carnaby's habitats.

### Carnaby's and Baudin's

Carnaby's is closely related to Baudin's Black-Cockatoo, *Calyptorhynchus baudinii* (Baudin's). Both species are endemic to the southwest of WA, both are now threatened with extinction, and both look virtually identical. In fact, they were initially considered to be the same species. The main physiological difference between them is that Baudin's has a longer, narrower upper mandible than Carnaby's.

A good knowledge of the differences in their feeding habits and calls is useful in telling the two species apart, as is an awareness of

## FAUNA

### CARNABY'S BLACK-COCKATOO: A COCKY IN CRISIS

Leonic McMahon



A



B

Heads of Carnaby's Cockatoo (A) and Baudin's Cockatoo (B) (J. Darnell) from WA Birds Vol 1, Johnstone and Storr.

their preferred ranges. The range of Carnaby's stretches from the Lower Murchison River, down along the west coast, across to Esperance and inland to such places as Coorow, Kellerberrin, Lake Grace and Lake Cronin. Carnaby's congregate in large feeding flocks in coastal regions over summer and autumn, sometimes sharing the range of Baudin's, especially in pine plantations.

Baudin's has a smaller range than Carnaby's, being found just to the north-east of Perth and then south through to Albany. It resides throughout the year in areas that receive an average annual rainfall of 750 mm and above. Carnaby's, on the other hand, disperses out into the wheatbelt at the onset of winter to breed, typically in regions that receive an average annual rainfall of between 300-750 mm.

### Breeding against the odds

Carnaby's tend to mate for life and the same pairs return year after year to the same breeding grounds and often the same hollows. Over the months that follow, the battle to successfully fledge a chick is fought. It's a battle the species as a whole is losing. The odds are stacking up against it on several fronts.

Carnaby's rely on several very different habitats during the breeding season. They nest in the large hollows of mature eucalypt species, in particular, salmon gum, *Eucalyptus salmonophloia*, and wandoo, *E. wandoo*, but breeding has also been reported in other species including red morrell, *E. longicornis*, York gum, *E. loxophleba*, and marri, *Corymbia calophylla*. Carnaby's feed in shrubland or kwongan heath on insect larvae and seeds from native species such as banksia, grevillea, hakea, dryandra and marri. It has also adapted to feeding on introduced species including pines, wild geranium (also called erodium or corkscrew) and wild radish. In some places, these have become important food sources in the absence of its native food.

Research by CSIRO has shown feeding habitats must be in close proximity to the breeding site (ie within 20 km) for breeding success. The female lays up to two eggs though it is rare for two chicks to fledge unless there is a good and constant source of food nearby. In many areas the second egg will not even get a chance to hatch, or if it does, the second chick dies in the first couple of days.

The male feeds the female while she broods the eggs and during the first weeks of the chicks' lives. The further the male has to fly for food, the more energy it requires of him and the less he has to take back to the female and the rapidly growing chick. In this instance the female must leave the nest sooner in order to maintain her own health, leaving the chick vulnerable and less likely to survive to fledging.

continued on page 5

continued from page 4

That nesting can take place at all presumes that the preferred nursery of the pair is there for the taking when they return from their summer feeding grounds. Increasingly, Carnaby's are losing their hollows to the more aggressive Galahs, *Cacatua roseicapilla*, and Long-billed Corellas, *Cacatua pastinator*. While the opening up of farmland has proved detrimental to Carnaby's, it has enabled galahs and corellas to successfully colonise new areas. Other bird species, including several species of wild duck, also nest in hollows favoured by Carnaby's and in some areas feral bees are also taking over traditional hollows.

Additionally, hollows may have degenerated or been damaged, or the trees containing them may have fallen, or been burned or cleared. Trees are usually more than a hundred years old before they are large enough to support a hollow of the size required by a large cockatoo. For every tree that reaches this age many more die. The degeneration of a suitable stand of eucalypts through clearing, grazing, weed invasion, salinity and fire happens far more quickly than natural regeneration can replace them. The bottom line is that hollows are becoming scarcer. In the future they will be even fewer and the competition will be even fiercer unless existing stands are protected now.

Poaching of wild chicks and eggs to be reared and sold as cage birds on the black market, both locally and internationally, is another danger the species faces. DCLM has conducted a captive breeding program since 1996 aimed at flooding the market to bring down black market prices. The advent of DNA testing has also aided in regulating the market.

### Shortening the odds

Other moves are afoot to prevent this large, sometimes loud, sometimes larrikin, 'Rainbird', so loved by many a farming family, from disappearing (some might say un-naturally quietly) from our skies forever.

A project supported by the Recovery Program is currently being

## FAUNA

run by Birds Australia WA Inc with funding from the NHT. The project has several aims. These include:

- ▶ Alerting people to the fact that Carnaby's Black-Cockatoos are endangered, and why.
- ▶ Ascertaining where they are still breeding and where their corresponding feeding sites are.
- ▶ Informing private landholders of how to assist the birds if they so choose.
- ▶ Establishing conservation measures to ensure long-term survival.
- ▶ Establishing community action groups and liaising with existing conservation groups to assist in conservation measures.

Many significant breeding sites are in remnant vegetation on private land. Should you wish to assist Carnaby's breeding on your property there are several things you can do. These include:

- ▶ Leaving standing dead trees that have hollows.
- ▶ Keeping Galahs and Long-billed Corellas under control in areas where Carnaby's breed. This has

proved to be an effective way of increasing breeding success.

- ▶ Fencing off stands of eucalypts used for breeding to slow down degeneration and allow natural revegetation to occur.
- ▶ Fencing off remnant bush and/or revegetating areas with suitable feed species.
- ▶ Covenanting habitats of breeding and feeding significance to be protected in perpetuity.
- ▶ Observing and recording the behaviour of Carnaby's, eg the time of the year they arrive at your place, when they leave, regular flight patterns, breeding activity such as chewing or entering and leaving hollows, or male birds feeding females.

It is important to note that these conservation measures will not only assist Carnaby's, but will flow on to other species and the environment as a whole.

*Observation sheets and further information about the project and conservation of Carnaby's Black-Cockatoo habitats can be obtained from the project officer, Leonie McMahon. Phone: 9287 2448, Mobile: 0438 678492 (after hours calls are okay), email [ljmcmahon@bigpond.com](mailto:ljmcmahon@bigpond.com)*



Hollows don't have to be high up!

*Meg and Simon Travers of Mt Helena watched Tawny Frogmouths use this hollow in a fallen log as a nesting site last season!  
Photo: Sarah McEvoy*

## RESEARCH

THE diversity of Western Australia's wildflowers has been recognised internationally as one of the great wonders of the natural world, a biodiversity "hotspot". The measure of diversity used to come to this conclusion was based on what the plants look like (their morphology). But these plants also have a high degree of hidden diversity in their genetic makeup, which is not seen because it doesn't cause any specific change in what the plants look like. This array of genetic variation is just as diverse and complex as the morphological diversity we can see. Although the genetic diversity of plants can not be seen by the human eye it can be made visible with new genetic techniques. Not only has this genetic information confirmed the high diversity of our flora but it has also revealed some interesting surprises that will influence conservation efforts. Just as morphology can tell us a lot about plants and how they function, the patterns of genetic diversity can also teach us much about the evolutionary history of our flora.

In Western Australia there are many species that are quite restricted and occur in localised areas which may be large distances apart. These plants may show few morphological differences but that does not necessarily mean that they have no genetic differences. For example, most populations of the round leaf honeysuckle (*Lambertia orbifolia*) occur near Augusta but there are also small populations approximately 200km away near Narrikup north of Albany. There are no obvious morphological differences between the plants from the two areas but genetic analysis has shown that the isolated populations near Narrikup, are quite distinct from the populations near Augusta. This means that they have been separated for long periods of time and have not been isolated by recent events such as agricultural clearing. The long period of separation for these

### DISCOVERING OUR FLORA'S HIDDEN DIVERSITY.

Margaret Byrne



*A. verruculata*

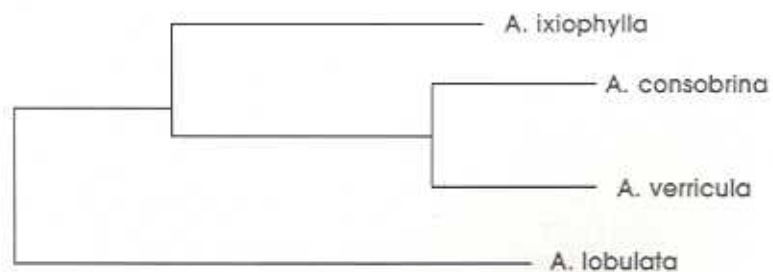
populations means that they have accumulated lots of differences and have changed over time into different genetic forms which are known as evolutionary lineages.

This pattern of restricted distribution is quite common for plant species in Western Australia and is a result of the biogeographical history of the region. The south-west is an ancient flat landscape with no mountain ranges which has been very stable with no major

glaciation events. However there has been some instability resulting in changes in climatic conditions in the semi arid region between the relatively high rainfall zone in the extreme south west and the arid zone in the north and east. This climatic instability has occurred over the last 2 million years during the Pleistocene time era, and has led to a complex mosaic of different soil types and a flora that has a high degree of natural fragmentation. So perhaps it is not so unexpected to find that populations that are isolated from each other are genetically different. But these differences have also been found in studies of widespread species and is not what we would have expected.

Genetic studies on York Gum (*Eucalyptus loxophleba*), Sandalwood (*Santalum spicatum*) and Jam (*Acacia acuminata*) have identified two different genetic lineages in each of these species. The level of genetic differences between these lineages suggest that they became isolated from each other around 800,000 to 1,000,000 years ago. This is during the middle of the Pleistocene time period when the significant changes in climatic conditions would have caused isolation and fragmentation of the flora in the region. These studies show that even species that have widespread, more-or-less continuous distributions now, have been affected by isolation and fragmentation in the past.

The ancient landscape of Western Australia means that the

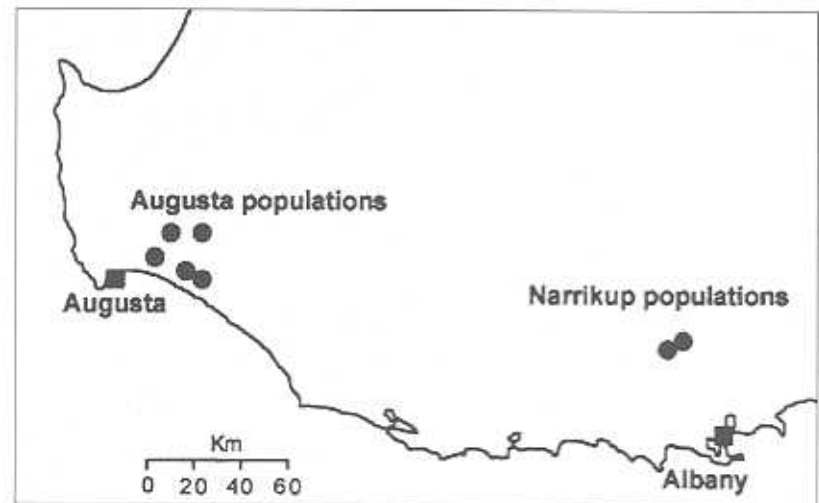


A genetic tree showing *Acacia lobulata* on a different branch to *A. verruculata*. Note that two other acacia species are more closely related to *A. verruculata* than *A. lobulata* is.

## RESEARCH

flora is a combination of ancient relict species that have persisted for a long period of time, along with newly derived species that have recently diverged from their common ancestors. But morphological similarity between species is not always a reliable way of knowing which species are closely related. In the same way that family trees can show the pattern of relationships through many generations in human families, genetic trees can show whether plant species are close or distantly related. Several studies using genetic trees have identified species that are quite genetically different from what has been presumed to be their closest relatives based on similarities in morphological characters.

For example, the wattle *Acacia verruculata* and Chiddarcooping Wattle (*A. lobulata*) were thought to be related since they both have a network pattern in the veins on the 'leaves' (technically known as phyllodes in acacias). But a genetic study has shown that they are very distinct and have probably been separated for over 3 million years. Also Oldfield's Wattle (*A. oldfieldii*), which was thought to be closely related to Jam (*A. acuminata*), is quite distinct and has also probably been isolated from Jam for nearly 3 million years. Chiddarcooping Wattle and Oldfield's Wattle have very restricted distributions and are most likely ancient relict species that have persisted in suitable habitat (such as south side of granite rocks or mild coastal areas) through the climatic changes that occurred during the Pleistocene era. In contrast other restricted species are not ancient. For example, Wundowling Wattle (*A. sciophanes*) is a rare species that shares a similar wispy growth habit with *A. anfractuosa*. These species have few genetic differences and can be considered sister species that have arisen through recent separation. In this case similarity in physical characters does indicate a close relationship between the species.



Distribution of *Lambertia orbifolia* in two areas near Augusta and near Narrikup.

This knowledge of genetic relationships is interesting and provides background on the evolutionary history of the region but how does it help us with conservation? These studies enable us to identify genetic lineages that represent distinct conservation units. For example the Narrikup populations of the round leaf honeysuckle have now been recognised as distinct and are being targeted for conservation activity through translocation to a secure, disease-free site. In a region like Western Australia where there are a large number of species identified as rare and threatened, we don't have enough resources to do all the things we would like, and some assessment of priority has to be made. Most often priorities are assigned based on the degree of threat that the species is under. But some would argue that ancient species have greater priority for conservation than more recently derived species. This is because ancient species carry a lot more different genetic history than more recent species therefore if we conserve the ancient species we will be conserving more genetic variation than if we conserve recently derived species. Hence genetic studies can identify the relationships between species and this can be taken into account when

making decisions about priorities for conservation efforts. Knowledge of genetic relationships between species also allows appropriate comparisons between rare species and their common relatives, rather than between rare species and other unrelated species that have no common history. This means that we are more likely to identify the particular aspects of a species biology that is contributing to its rarity. We can then target our conservation action much more precisely and achieve better results.

So you can see that the study of genetic relationships between populations and species (phylogenetics) is particularly valuable in areas such as south-west Western Australia where the historical influences on an ancient landscape has led to complex genetic patterns in a highly diverse flora. Next time you wander through the bush think of the hidden diversity that's present as well as the wonderful morphological diversity on display.

*Dr Margaret Byrne is a Principal Research Scientist in the Department of Conservation and Land Management. She specialises in genetics for conservation and utilization of native flora. She can be contacted on 9334 0503.*

## RESEARCH

## THE VALUE OF OLD PHOTOGRAPHS

A.N. (Tony) Start  
and Tricia Handasyde

IN a recent *Wildlife Notes*, Penny Hussey provided a very useful guide to photography as a method for recording changes in vegetation. To illustrate how effective the technique can be, she reproduced some 'then and now' photographs showing changes over time. Understandably, her article focussed on how to set up photo-points that will give you useful base lines from which you (or others after you) can monitor the results of your land management. However, the photos illustrated another point. Your old snap shots could be vital clues to better environmental management. Even those old pictures of somewhere far away that you took on holiday when the kids were still kids. Here's an example.

In 1960, when work started on the Ord River diversion dam near present day Kununurra, environmental impact assessments were unknown. Even in 1970/71 when the 'top' dam was built to create Lake Argyle, Australia's largest artificial water body, there was no requirement for an environmental impact assessment. To be sure, the devastated condition of pastoral land in the upper Ord catchment was recorded because erosion from that landscape threatened to silt up the dams that were being planned. Similarly, the soils of the lower Ord flood plain were mapped and assessed for their irrigated agricultural potential. Eventually, the upper Ord's eroded lands were resumed and rehabilitated while much of the lower Ord's flood plain was cleared and irrigated. However, nobody documented the hundreds of kilometres of

riverine vegetation that was affected by these developments. That task only began in the 1990s, long after the dams had changed it.

In a nutshell, the dams created four hydrological zones, which are summarised in the following table.

'River' section	Pre dams hydrology	Hydrological effect of dams	Effect on Vegetation
Upper Ord	Seasonal river, huge floods	Unchanged	Unchanged
Lake Argyle	Seasonal river, huge floods	Replaced by lake with fluctuating water levels	Drowned
Diversion Dam	Seasonal river, huge floods	Replaced by lake with stable water levels	Drowned
Lower Ord	Seasonal river, huge floods	Permanent flow, small floods	high banks deprived of floods, channel margin always damp

The hydrology of the lower three zones has changed radically since the dams were built. Inevitably, that must have caused huge changes to the riverine environments. But what are they? Although we can see what's there today we have no written record from which to measure the difference. If only someone had set up photo-points! The issue is not just academic. Today, we are more aware of our dependence on a healthy environment and we take more care to evaluate the consequences of



*Ivanhoe Crossing, June 1953.* Prior to construction of the dams upstream, the river was subject to huge floods in the wet season and dried back to pools during the dry season. Note the large sand bar which was deposited across the approach to 'the crossing' in the 1952/53 wet season. Photographer: W.A.C. Wright.



*Ivanhoe Crossing, August 1963.* Vegetation similar to 1953 photo. The large sand bar deposited in the 1952/53 wet season has been moved on. Photographer: A. Harris.



## RESEARCH

altering it. With the prospect of trebling the irrigated area, the State is developing a Water Allocation Plan for the lower Ord. The plan will have to take into account Environmental Water Requirements (EWRs). So, how much water does the environment need? Clearly it would be easier to determine that if we knew how the environment had been affected by the changes that followed the building of dams 30 to 40 years ago.

I said nobody set up photo points and it is true that nobody did that with the intention of being able to measure change. However, lots of people took photos of the river. Some of them were pioneer tourists, some were engineers working on the dams or other projects and some were researchers investigating potential crops, farming techniques and insect pests. Their photographic subjects ranged from big crocs, big floods and big barramundi to family picnics, construction sites and beautiful scenery. Perhaps the most exciting were of the river in flood, 18 metres deep and hundreds of metres wide, lapping the top of the bank at the research station, but the most artistic ones are undoubtedly those of drovers on horseback taking mobs of cattle across the river on their way to Wyndham.

Unwittingly, those photographers also captured and stored away a mass of information about the riverine environment and so we have been borrowing historical photographs from anybody who lived or passed by the area. We now have a bulging collection of photos that tell many stories. As an example, we'll concentrate this story on the 20 kilometres down stream from the diversion dam. We have more than 200 colour photos of that section, taken between 1952 and 1990 (as well as a few older ones and many modern ones). Thus our collection starts ten years before the first dam was built and includes the ten years between that and building the second dam.



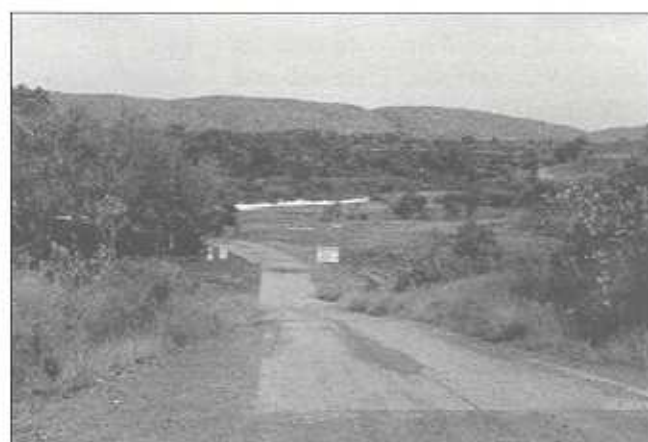
*Ivanhoe Crossing, 1972. Vegetation similar to 1953 and 1963 photos however erosion of the far bank appears to have increased. The 'top' dam has been completed and the flow of the river will from now on be controlled. Photographer: M.Folkard*

Not only do we have a rich supply of photos, but there were three spots which appealed to many of the photographers, in effect giving us series of photos taken over the last fifty years from three *de facto* photo-points. They are Bandicoot Bar, the rock bar on which the diversion dam was built (completed) in 1963, the Frank Wise Institute of Tropical Agriculture (better known to the older photographers as the Kimberley Research Station or, simply, KRS) and Ivanhoe Crossing.

And what changes have occurred? The building of the diversion dam had little effect because its storage capacity was very modest and its huge steel gates had to be lifted to let the river run freely whenever there was a big flood. Floods were the main drivers that shaped the river's sediment beds and its vegetation and they continued to play that role below the dam. The photos show us that from 1953 to 1973, below the dam, sand bars, annual plants and sapling paperbarks came and went but besides them, and a few trees that could anchor themselves in rocky places, there was very little vegetation in the riverbed. Most of the riparian vegetation was near the tops of the banks, and along gullies flowing into the river.

However all that changed after 1973 when the Lake Argyle filled. Waterlilies, cumbungi and several other aquatic plants rapidly colonised the shallows and forests grew along the channel margins. At Ivanhoe crossing, visitors picnic under a forest of figs and Leichardt trees that are ten metres tall. Understandably, they look at us disbelievingly when we tell them that this spot was a bare sandbank in 1973. But the photos prove it. You'll know what we mean when you look at these pictures.

So why did Lake Argyle have so much effect? Lake Argyle has the capacity to absorb flows from over 90% of the catchment. Water is released at a rate that keeps



*Ivanhoe Crossing, April 2001. For almost 30 years, downstream of Lake Argyle the river has flowed all year and floods have been controlled. The increase in vegetation along the river is enormous. The group of paperbarks growing to the left of the sweeping curve in 'the crossing' visible in the previous 3 photos are now obscured by a forest of figs and Leichardt trees. Photographer: A.N.Starr*

## WEED ALERT

# PATERSON'S CURSE

**T**HE beautiful blue of Paterson's Curse (*Echium plantagineum*) is spreading inexorably across the State and looks set to eventually eliminate everlastings from much of the mulga belt - it has already done a good job of taking over the ground flora in Coalseam National Park, for example. Its broad rosettes and fast growth rate simply outcompete plants such as everlastings, orchids and native grasses. It is a major environmental weed.

It is also a major agricultural weed, which can lead to up to 80% loss of pasture production and cause severe liver damage in stock. The Department of Agriculture has released six biological control agents which are starting to have an effect in some areas, but control on individual properties remains essential. Several herbicides can be used, but, if you have not personally had training in the use of herbicides, for the treatment of small areas by spot-spraying or a weeding wand, *LFW* suggests using glyphosate

(Roundup ® or Zero ®) as this remains (relatively) benign.

Late winter is a great time to get stuck into it, on your block, or, with permission, on roadsides, or your local reserve. It is vital to prevent it seeding, remember the old saw:

**"One year's seeding - seven years' weeding!"**

AgWA has produced several notes in which you will find detailed control and management advice, including exact herbicide prescriptions:

"How to Control Paterson's Curse" Farmnote 131/2000

"Paterson's Curse" Farmnote 43/00 and, best of all, the detailed and superbly illustrated:

"Paterson's Curse Management Handbook" Bulletin 4452, August 2001.

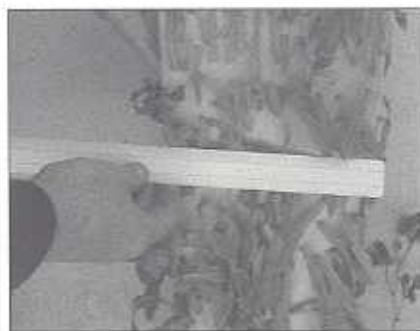
Copies can be obtained from AgWA offices, or phone (08) 9368 3333, or visit web site: [www.agric.wa.gov.au](http://www.agric.wa.gov.au)

*Penny Hussey*

## THE TRIFFIDS ARE COMING!

John Lambie of Chittering sent in these pics of a strange form of Paterson's Curse, asking what caused this form of growth, which is called 'fasciation'. It is the result of damage to the growing point of a young plant, probably by insects, perhaps carrying a viral disease. Instead of growing from one point as normal, the stem of a fasciated plant grows from many points, producing the spectacular growth form shown here.

Sandy Lloyd of Weed Science in AgWA says that Flatweed and Skeleton Weed also commonly show fasciation, though not usually as spectacularly. It is also known in some native plants.



## IN BRIEF

### Managing Bridal Creeper

The papers from this very successful workshop, organised by Blackwood Valley Landcare and *LFW*, have been put on a CD.

If you are trying to manage this weed, you'll find these papers very helpful.

Cost: \$12.50 (includes p&h)

Contact: Clark Ward

Blackwood Valley Landcare Zone

PO Box 672

BRIDGETOWN, WA 6255

ph: 9761 4277

email: [clarkw@wn.com.au](mailto:clarkw@wn.com.au)

## ECONOMIC VALUE OF BIODIVERSITY

### WOULD GROUPS OF TOURISTS LIKE YOUR BLOCK?

Kevin Coate

**S**O! You have a block of land that you love and want to preserve. You most likely have friends who visit your block and perhaps you belong to clubs that have an affinity with your aims and whose members occasionally visit.

Perhaps your bush block does not bring in an income and can be costly to maintain (eg fencing, fire breaks and the control of feral animals). You think you would like to make it available to tourists, from whom you would expect to collect a fee in order to help offset some of the costs incurred and possibly give you an income. Probably more importantly, it would give you a sense of place, a chance to expound on it's attractions and help make people more aware of the environment we all live in. Your thoughts turn to eco-tourism and you wonder what would be necessary to induce operators to your block.

At this point I don't want to kill enthusiasm, but realistically, most owners of small bush blocks would find the commitment involving tourism too daunting - and tour operators would not be interested unless you have an unique attraction. However, while saying this, if you do have something special - persevere.

Firstly, approach your regional tourism centre, as they would have some idea of the viability of your project. If you have a positive response, you would then contact tour operators working in the area. Be aware that a tourist business is highly competitive and itineraries and brochures are planned up to a year in advance. Whatever the attraction on your block (eg wildflowers, breakaways, hills, lakes, birds etc), tour operators will need to assess it's potential at least 12 months before bringing tourists.

Points a tour operator will look for:

- 1 Location: Ideally, entrance should be on a tourist route or close to a regional centre from which a day or half-day trip could be conducted.
- 2 Vehicle access: The drives should be over firm ground without low overhanging branches. There needs to be adequate parking space and turning circle for a large coach and trailer.
- 3 Walking trails: Safe tracks made to points of interest.
- 4 Toilets: Toilets are necessary and must be kept in good order and regularly checked. Unhygienic toilets reflect badly on both you and the operator. Hand washing facilities are important.
- 5 Shelter: A shady picnic area for lunch, morning and afternoon teas. Some kind of cover is advisable in times of adverse weather conditions.
- 6 Camping ground: In more remote areas a camping ground in pleasant surrounds with even campsites and a fire-ring, would be an asset. It would need to be in a sheltered place with space to spread out.



Kevin Coate and an Abbotts Booby inspecting each other, Christmas Island. Photo, P. Hussey.

- 7 Publicity: Assist in publicising your block, either in a brochure or press releases.
- 8 Insurance: Public liability insurance is essential and expensive. It is a big consideration for those contemplating opening their block to the public. Check with your insurance company as to your liability, should someone be injured.

It could be more appealing to a wider range of tourist, if your block is part of a farm and you are able to 'value add' with other activities such as sheep shearing or a sheep dog working. A list of birds and plants on the block would be useful. Other inducements would be to provide lunch or country style morning tea, with special scones or home-made cake. A camp-fire situation, where a damper is taken from the camp oven and served with billy tea, is always a winner. There are quite a number of tourism ventures in the south-west and wheatbelt where Home Stay and Bed & Breakfast (in more remote areas Station Stay) are becoming increasingly popular as a way of bringing in additional income.

There is more useful information for those venturing into eco-tourism in an article I wrote for the WA Naturalists' Club (see ref below). Good luck with your endeavours!

*Ref: Coate, K. 2001. "The Development of Nature-based Tourism in Western Australia" The Western Australian Naturalist, 23: pp (for info about copies, email: wanats@inet.net.au)*

*Kevin Coate is a naturalist who started Coates Wildlife Tours some 30 years ago, leading groups of people on trips throughout Australia and overseas.*

*Web site: coates.inet.net.au*

## LEGAL ASPECTS

### LEGAL ASPECTS OF TRAPPING FERAL ANIMALS

Johnson Kitto

*Cats and foxes are decimating our native wildlife and their removal is often recommended in our Land for Wildlife reports. Whilst foxes will take 1080 meat baits, cats are more wary of the dried bait and we often have to resort to trapping before disposing of them. Trapping, however, carries certain legal responsibilities. LFW member and lawyer Johnson Kitto has suggested the following guidelines from his reading of the Prevention of Cruelty to Animals Act.*

**L**AND FOR WILDLIFE'S understanding of the law regarding the trapping of feral animals (as stated briefly in WW 6/2 on p 15) is, I think, correct.

Specifically, section 24 of the *Prevention of Cruelty to Animals Act* provides:

"Any person who sets, or causes or procures to be set, any spring trap, snare, or other device, for the purpose of catching any marsupial, dingo or wild dog, foxes or vermin, or which is so placed as to be likely to catch any such animal, shall inspect, or cause some competent person to inspect, the trap, snare or other device at reasonable intervals of time, and, if any person shall fail to comply with the provisions of this section, he shall be guilty of an offence under this Act."

This provision by implication suggests that trapping itself is not illegal provided the trap is regularly inspected, and I think that an inspection of no less than 24 hours would comply with the statute in this regard. Small mammal traps, folding tin box (elliott) traps or pit traps may have to be inspected more frequently, especially if the weather (eg hot, or heavy rain) will present a risk to any animal caught. Ideally, most traps should be set in the late afternoon and inspected early the following morning to avoid heat stress/hypothermia on any animal caught.

The *Animal Welfare Bill 1999* is not yet law but if and when it becomes so, it defines at section 19 (and following) those acts and the penalties relating to cruelty (including trapping).

At the present time however, the only relevant act is the *Prevention of Cruelty to Animals Act 1920*. This act has statewide application, however specific local government regions such as shires and towns may have their own by-laws which affect trapping. It will therefore be necessary for Western Wildlife readers to check with their local authority in this regard.

To further complicate matters, certain species may be protected within some areas, but may be regarded as disposable in others. A good example of this is the galah and the 28 parrot, which, as I understand it, may be lawfully culled in certain regions due to their over population, but may be protected in other regions.

Without looking at the matter in detail I can only advise each reader to consult their Local Government Authority before conducting trapping operations. I bear in mind that LFW is a statewide scheme and the law will obviously be different in urban and semi-urban areas (eg Mundaring, Wanneroo etc which border rural shires) and in the rural areas themselves.

Under the existing *Prevention of Cruelty to Animals Act* it is an offence for a person to ill-treat, fail to supply with sufficient food or water and protection against weather, cause unnecessary pain or suffering, needlessly slaughter or to generally knowingly commit cruelty to any animal (section 4(1)). In fact, section 4 (1) of the *Prevention of Cruelty to Animals Act* proscribes all sorts of conduct in relation to animals which is illegal but I have limited my summary of this section to only those parts I think relevant to this issue, namely the trapping and disposal of feral animals. Section 4 also provides, however, that if a person is charged with administering poison or leaving out poisoned grain etc., the person can defend the charge if he or she establishes that it was done for the purpose of destroying rats, mice or other vermin and that every reasonable precaution was taken to prevent access to the poison by dogs, cats, chickens or other domestic animals.

Of most interest however to LFW participants is the exemption provided at section 6 of the *Prevention of Cruelty to Animals Act* which relevantly provides:

"Accept as hereinafter provided nothing in this Act shall render unlawful: ... the extermination of rabbits, marsupials, wild or stray dogs or cats, foxes or vermin or ... the hunting, snaring, trapping, shooting or capturing of any animal not in a domestic state, etc."

#### Disposal of trapped animals

An issue related to trapping is the release or disposal of any animals caught in a trap. Again, this is not a clear-cut legal area. Take the example of a LFW member living in a semi-urban area who catches, on his or her own property, what appear to be feral cats.

Technically, if the person destroys or retains possession of the cat, he or she may be unlawfully stealing the animal, if the cat could be described as:

## LEGAL ASPECTS

"A tame animal, whether tame by nature or wild by nature and tamed, which is the property of any person;" or if the cat could be described as:

"Wild by nature, of a kind which is not ordinarily found in a condition of natural liberty in Western Australia which is the property of any person, and which is usually kept in a state of confinement;" (section 370, *Criminal Code of Western Australia*)

Section 370 however, also provides that "wild animals in the enjoyment of their natural liberty are not capable of being stolen". So presumably this relates to a feral cat which could not be described as someone's pet.

From a purely legal perspective, the fact that a household pet wanders onto the land of a person who traps it and disposes of it, does not provide any defence to the person because the criminal act attaches to the trapping and disposal of the animal, not the reason as to how the animal came into the trapper's possession.

To further complicate matters however, the trapper would have a defence against any prosecution brought by the owner of the beloved but destroyed cat, if the trapper could establish that the cat appeared to be feral (eg by its characteristics, lack of identification, size and condition etc). The trapper in this circumstance would be able to rely on the general criminal code defence of "mistake of fact" which provides that a person is not criminally liable for an act done under an honest and reasonable but mistaken belief of fact, to any greater extent than if the belief was true. Applying this general defence to our hypothetical example, if a person trapped and humanely shot a pet cat, but honestly and reasonably believing that the cat was either feral, or tame but not the property of any person (ie a stray), then the person would have a defence to the charge of stealing.

The position with any other form of pet caught in a trap would be the same, and the test would be whether the caught animal could be described as "feral" or "non-feral but not the property of anybody". In these cases the animal could be lawfully destroyed, provided it was done so humanely. If no-one owns the animal (whether it be tame, wild, feral or otherwise), the trapper would not be guilty of stealing the animal and could dispose or retain the animal as he or she saw fit.

Confused yet?

### Dogs

Dogs fall into a special category by virtue of the *Dog Act 1976*.

Section 35 of the *Dog Act* provides:

"Where a person, reasonably and in good faith, lawfully takes measures for the purpose of destroying vermin or dogs wandering at large, whether by means of traps, poison or otherwise, in conformity with the provisions of any Act or the regulations made thereunder, and as a consequence of a dog wandering at large those measures result in that dog suffering death, injury or

harm, that person shall not be liable therefore in any proceedings, whether civil or penal."

However, a person who wilfully and without lawful excuse kills, poisons, injures or causes unnecessary pain or suffering to any dog commits an offence and is liable to a \$10,000.00 fine or 12 months imprisonment or both (section 47 *Dog Act*).

### Summary

As you can see, the legal aspects of trapping and disposing of feral animals are not clear, however, I suggest the following guidelines:

- 1 Any traps used should be humane and operate by capturing the animal without injuring it. Traps which mutilate or strangle or otherwise injure the animal (eg old style rabbit traps, wire snares etc) must not be used.
- 2 The trap must be regularly inspected and any captive animal released, humanely destroyed, or removed to a sustainable environment.
- 3 Dogs, cats or any type of animal kept as a pet, must not be destroyed and should be returned to its owner if the owner can be identified.
- 4 Feral animals, or non-feral animals which do not have owners, may be released or destroyed at the trapper's discretion.
- 5 The destruction of any animal, if lawfully permitted, must be humanely performed, and I suggest done so with minimum distress to the animal and the environment.
- 6 If a trapper is in any doubt as to whether an animal is the pet or property of anyone else, then the trapper must use all reasonable endeavours to find out and make enquiries, before destroying the trapped animal.
- 7 Generally, a land owner is entitled to destroy vermin or "dogs wandering at large" whether by means of traps, poison or otherwise (eg firearms lawfully used etc) provided the land owner has reasonable belief that the animal destroyed was either vermin or a dog wandering at large, and does so in good faith.
- 8 Any person considering trapping or destroying animals must check with their local authority as to which species may be protected, and also check whether there are any local government by-laws prohibiting the trapping of cats, dogs or pets, etc.

*This article is contributed by Johnson Kitto, a partner of Kitto & Kitto Barristers & Solicitors, 19 Howard Street, Perth. Johnson is also a Land for Wildlife participant, and with his brother Grantham (also a lawyer), manages "Euretta" at Kojonup. This article is not a substitute for legal advice and readers are cautioned to obtain their own legal advice on their particular circumstances before trapping or destroying animals.*

## RESEARCH

### BIODIVERSITY OF THE CARNARVON BASIN

**I**NLAND rivers, red dune systems, 'sunburnt' plains and inland ranges, but also sweeping beaches and spectacular coastal cliffs – all these features contribute to the geographic and resultant biological diversity of the Carnarvon Basin. It is part of the vast 'outback' that many people believe has been significant in development of the Australian character.

The boundary between the vast arid centre of Australia and the wetter areas of southwestern Australia runs south-east from Shark Bay, and was straddled by our study area. This area is rich in plant and animal species that are a significant part of Australia's biodiversity. We aimed to find out more about how these plants and animals are distributed across the landscape, so that we could make recommendations for sustainable management and suggest improvements to the conservation reserve system.

*Allan Burbidge*

Over 40 people took part in the survey of the biodiversity of the Carnarvon Basin, including scientists from the Department of Conservation and Land Management, the Western Australian Museum, University of Western Australia and elsewhere, as well as volunteers. Significant funding support was provided by Environment Australia.

People think that most of a biological survey is spent in the field, observing and catching things but, in fact, far more time is spent back at base, writing it all up. Most field work was done during several expeditions totalling about 12 weeks in 1994 and 1995. It took another five years (along with work on other major projects) to compile, analyse and interpret the data and write it up.

Mostly, field work went without a hitch, but various incidents and

memories come to mind - like a trailer wheel rolling past the vehicle when an axle broke, millions of flies at a few sites (at one site, it was hard to see your sandwich at lunch time!), and the scorching conditions when we were digging holes for pit traps on a samphire flat with no shade for miles. But it was all worth it – we saw some fantastic places, met some interesting characters on the stations and in the towns, learnt an enormous amount and found numerous plants and animals that were new to science, and many others beyond their known range.

We surveyed 63 sites on land and 56 wetland sites. Numerous additional sites were surveyed for specific purposes, particularly for botanical sampling. We determined environmental factors related to plant and animal distribution patterns and developed models to predict the occurrence of the ecological communities identified.

#### Plants

If your only experience of this region is from a speeding car on the highway, you might think that the vegetation is all pretty similar and possibly unexciting. In fact, the botanists, led by Greg Keighery and Neil Gibson, recorded 2133 different kinds of plants (species and subspecies) in the study area. Much of this richness comes from the area south of Shark Bay, which includes many species and plant communities more typical of southern parts of the State.

We recorded a total of 88 weedy plant species that are naturalised in the study area. Most of these are annuals. Many weeds displace native plants and reduce the food resources for our native animals. Among plant pests in the region, Buffel Grass, *Cenchrus ciliaris*, is known to be a serious environmental weed although it does have value as a pastoral species.

#### Aquatics

Although, or perhaps because, the area is so arid, where water is found it has an enormous importance for flora and fauna. Not only does it provide moisture for wide-ranging animals, it also is critical habitat for specialised aquatic animals such as water boatmen, whirligig beetles, backswimmers, water fleas, fairy shrimps and shield shrimps. The aquatic team, led by Stuart Halse, collected at least 492 species of aquatic invertebrates, many of which were not recorded in the



## RESEARCH

conservation reserve system. There were more aquatic invertebrates than we expected. The team distinguished five different classes of wetland habitat, each with a different biological community: river pools, rock pools and larger flowing streams; seeps, springs and smaller creeks; freshwater claypans; birridas; and Lake MacLeod.

More than 29,000 waterbirds – 25 species – were recorded on Lake MacLeod during our survey in October 1994. The lake sometimes supports more than 100,000 waterbirds, making it a site of international importance.

### Ground-dwelling animals

We got another surprise in this part of the survey – there were many more spider species than we expected, and about 90% of them did not even have a scientific name. Mark Harvey of the WA Museum led the terrestrial invertebrate survey and his team recorded 10 scorpion species, 60 species of mygalomorph spiders (trapdoor spiders and relatives) from seven families, 33 families of araneomorph spiders (and more than 285 species), 15

species of centipedes and 11 species of millipedes.

The Carnarvon Basin is particularly rich in reptiles and includes geckos, legless lizards, dragons, skinks, goannas and snakes. An unusual feature of the lizard fauna is the high number of species with restricted distributions, mostly centred on Shark Bay.

Of the 279 bird species known to occur in the southern Carnarvon Basin, 162 breed there, with the remainder being migrants, nomads or occasional visitors. Ron Johnstone, Allan Burbidge and Phil Stone assessed all historical bird records and found that no bird species has become extinct here in the last century, but about 13 per cent have increased in abundance and 10 to 15 per cent have decreased. Reasons for this are unknown, but probably are related to pastoral activities such as the provision of artificial water supplies.

As elsewhere in Australia, numbers of native mammals have declined and numbers of feral species increased. Norm McKenzie and Alex Baynes found that nearly half the ground-dwelling native

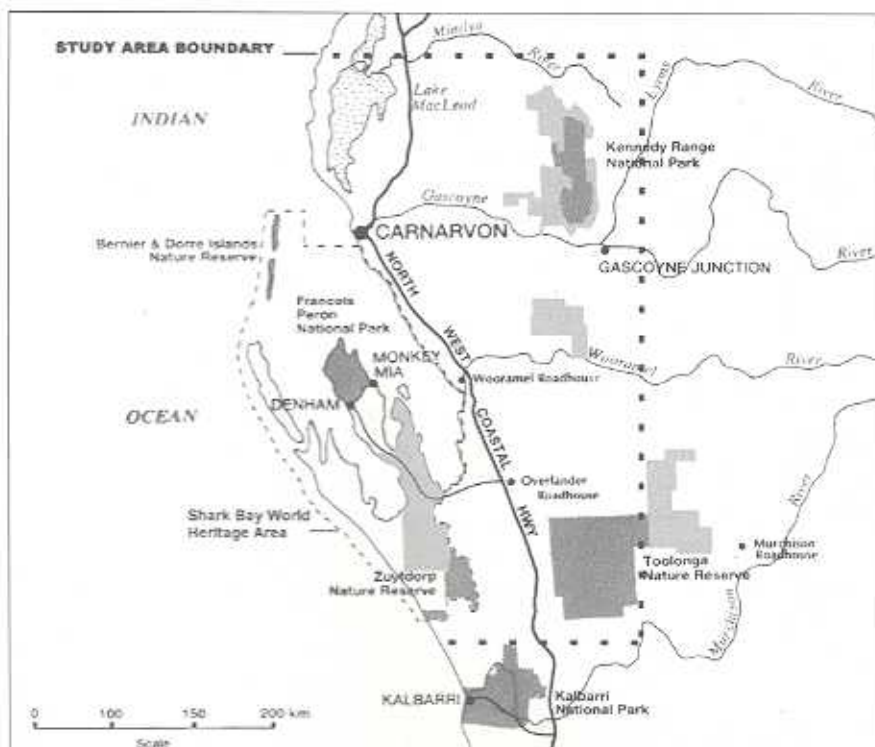
mammal species in the Carnarvon Basin (22 of 48 original inhabitants) are extinct because of introduced predators, soil erosion and vegetation changes.

### Summary

Now, for the first time, the biodiversity of the southern Carnarvon Basin has been recorded in detail. We have documented the natural communities, discovered and named new species, and identified gaps in the conservation reserve system. This has led, through the State government's Gascoyne-Murchison Strategy and the Commonwealth's National Reserve System Program of the Natural Heritage Trust to the purchase of 470 000 ha of pastoral leases. This will help fill a number of gaps in the conservation reserve system and includes wetlands, sandplains, alluvial plains, river frontages, coastal flats, salt lakes and limestone uplands. We also recommended a number of management techniques that landholders can undertake to integrate biodiversity conservation with sustainable land use.

The detailed results have been published ('Biodiversity of the Southern Carnarvon Basin', edited by A.H. Burbidge, M.S. Harvey and N.L. McKenzie, Records of the Western Australian Museum Supplement No. 61 (595 pages)) but a 20 page companion guide has also been published and is available from Allan Burbidge.

*About the author: Dr Allan Burbidge was the Project Leader for the southern Carnarvon Basin study. He is a Senior Research Scientist at the Department of Conservation and Land Management's Wildlife Research Centre at Woodvale. Specific interests include bird biogeography and the conservation and management of threatened birds. He can be contacted on 9405 5100, e-mail allanb@calm.wa.gov.au or by post at PO Box 51, Wanneroo 6946.*



## FLORA

### CANKER DISEASE IN *CORYMBIA CALOPHYLLA* (MARRI)

Trudy Paap

A decline in the health of marri trees throughout the south west has been observed over recent years. This is largely associated with a canker disease which leads to branch death, and in severe cases, tree death. Cankers are a symptom caused by the death of areas of bark and the cortex tissue below that, and are usually caused by ascomycete fungi invading through wounds or areas of stress. If the fungus is not excessively aggressive and the tree vigorously growing, it is able to produce a defence response that enables it to 'wall off' the diseased region. This prevents the damage from spreading around a branch or trunk, which otherwise effectively ring-barks the limb. However, if the tree is stressed, or the fungus causing the disease is highly pathogenic or aggressive, the tree may not be able to wall off the affected regions. In other instances, the diseased area is walled off, but with time, the fungus manages to penetrate this barrier, and reinvade. This situation leads to large target-like lesions being formed, as shown in the photo. Cankers such as these take years to develop, but ultimately result in tree death.

Work to date has not identified a disease-causing agent (pathogen) that would be capable of causing the severe damage we are witnessing. It is possible a recently introduced aggressive fungus that has not yet been identified is the cause. Alternatively, the marri



decline may be driven by environmental stress. The decline currently occurring in a number of other eucalypt species, including *E. rudis* (flooded gum), *E. gomphocephala* (tuart) and *E. wandoo* (wandoo) supports this.

Remnant stands of trees on property and along roadsides, especially isolated trees, are under a range of stresses that are more severe than, or not experienced by, trees in their natural forest or woodland ecosystem.

Examples of these stresses include

- ▶ Exposure to extremes of weather (eg drought, flooding or wind)

- ▶ Changing water tables
- ▶ Salinity
- ▶ Soil compaction (stock trampling)
- ▶ Altered soil nutrient levels
- ▶ Old age
- ▶ Stock attack
- ▶ Mechanical injury to roots or trunk
- ▶ Herbicide injury
- ▶ Repeated defoliations - insect damage
- ▶ Repeated burning off

The disease is not limited to remnant stands of trees, as cankers are also causing tree death in State Forest. This raises worrying questions about the general health of our forested areas.

If you have remnant marri trees on your property or in your area, take the time to have a good look at them and assess their current health. Bark splitting open, large amounts of gum oozing out, and dying back of branches are often clear

indicators of canker disease. Currently there are no direct treatments or control measures for the disease. It is important that we gain an understanding of the extent of the disease, and the factors that are contributing. In the meantime, the best hope is to encourage recruitment (the growth of new seedlings), and to try and minimise environmental stresses on existing trees where possible.

*Trudy Paap has just started a PhD on Marri Canker at Murdoch University, after doing her Honours thesis on this topic.*

*To contact her, email [t.paap@student.murdoch.edu.au](mailto:t.paap@student.murdoch.edu.au)*



**W**E live in Busselton Shire, on 140 acres of jarrah forest on the edge of the State Forest, which we purchased in 1994. A strip along the road which was cleared for grazing about 30 or 40 years ago has some regrowth and is, unfortunately, an excellent breeding ground for rabbits. The rest of the land, apart from having some of the large trees cut for fence posts (we can see the evidence on the forest floor) is still in its natural state. We have cleared about 3 acres for a garden and orchard, which we have had to rabbit-proof fence in order to grow anything!

The bird life is wonderful and we have identified over 70 different birds, many in the garden which is planted to encourage them. Apart from lots of kangaroos passing through each night to the farm across the road and back in the morning, there was little sign of other wildlife so I thought I would find out about how to get rid of feral animals. I knew that there were foxes around as I could see their footprints on the firebreaks, as well as occasional cat prints. These had to be feral as we are too far from other houses. With much help from Phil Williams at AgWA, I started on a fox eradication programme. I used 1080 eggs, burying them in the ground and marking where they were so I could check if or when they were taken. I started in 1996 and kept baiting whenever I saw fox footprints on my walks. If I found part of an empty egg shell it was a pretty good indication a fox had taken it.

In 1999 we joined LFW and were shown two quenda diggings, down by a winter stream on the property. These were the only ones we could find, but 1999 was my best year for the number of eggs taken by foxes. In 2000 we started to see quenda diggings on our walks, and they have been increasing ever since.

This year I found that something was digging under the side gate in the garden and thought it was rabbits getting in, so I set a trap which fortunately caught nothing. I then spread damp sand and, lo and behold, quenda footprints were seen! By the time all this was worked out the

## MEMBER'S PAGE

### AN EXCITING INVASION

Sue Seaman

parsley, pinks and carnations were eaten down to the ground. The access was blocked off, but they dug in again a bit further along. This was blocked off and that seemed to cure it - or so I thought! However, as I started to find more and more quenda diggings in the garden, I came to realise that many of them had not returned to the forest each night, but had taken up residence in the garden!

Over the next three months I moved 11 adult and three half-grown quendas to the bush outside the garden. We then had a few weeks free of any fresh diggings but then I found a mother and her three babies who were the size of mice and out of the pouch. I did not dare release her as I was sure she would run off and leave her babies, so I left them under a bush until it was dark. By this time her babies were back in the pouch and, being a softie, I let her stay in the garden until her babies were bigger.

As everyone knows, time passes quicker than you realise, and I thought it was time to return the mother and her grown babies to the bush. I caught one and returned it, but the second one I caught again had babies only mouse size and again they had come out of the pouch, so will be staying a little longer!

I have come to the conclusion that we will have quendas in the garden for ever, as we forget from time to time to shut the main gate and I think that is when one of the ex-residents finds it's way back. Actually it is rather nice having them around, so long as we keep the numbers down. We sometimes see them in the early evening dashing from cover to cover and it is a great incentive to be rigorous with the fox baiting.

*Editor's Note: Isn't it great that Sue has so many quendas on her property! Under the Wildlife Conservation Act 1950, a licence is required for any capture or removal of wild fauna. It is best to exclude animals by fencing or barriers, wherever possible. If they must be relocated, keep them on your property as Sue has done. If any readers have similar 'problems' with quenda, please contact your nearest LFW or DCLM officer for advice and assistance.*

### LEGLESS LIZARD

Robyn Soulier and son Phillip, of Yandanooka, spotted this creature last September in 'Banksia Corner', their dense sandplain bushland. It was about 30cm long and very slender, overall sandy beige, with a longitudinal pattern of blocks of black interspersed with reddish-brown. Once disturbed, it soon whipped off into dense cover.

DCLM Senior Zoologist Peter Mawson says that it is a Common Scaly-foot, *Pygopus lepidopodus*. This legless lizard is quite widespread in the south-west (except for high-rainfall forest) and easy to recognise by the blocks of colour in its three longitudinal stripes. "Dense sandplain with a heavy leaf litter, such as this, would be ideal for them" Peter said. "They forage through the top layer of sand and the leaf litter, searching for insects and spiders." Although legless lizards are not poisonous, they often mimic snake-like behaviour to try to deter predators. Unless you are an experienced zoologist, it's best not to handle any such animals. Admire, and photograph, from afar!  
photo R. Soulier



**F**UNGI are vital to the long-term health of woodlands, as we explained in *Western Wildlife* in July 1999 (WW 3/3 pp 6-7). Unfortunately, in ex-paddocks where revegetation is taking place, there are very few fungi left. We have been trying to find out how to put the native fungi back, along with the planted seedlings. We think we have found a pretty easy way that everyone can do! If you are growing your own seedlings, just follow these easy steps:

- 1 get some fungal spores
- ▶ collect some soil from your proposed reveg site. Spread it out on a clean tray (such as a baking tray) about 2cm deep and leave to dry
- ▶ visit your remnant woodland, or your neighbour's woodland with their permission (as close as possible to your reveg site) and collect fungi. Take mushrooms, toadstools, corals, jellies and puffballs from the woodland floor. Don't collect brackets

## REVEGETATION

### PUTTING THE FUNGI BACK - KICK START YOUR REVEG!

*Neale Bougher and Inez Tommerup*



from living trees or logs, as wood-rotting fungi are not needed at this stage.

- ▶ moisten prepared soil and then place the fungi on the moist soil, so that the spores can fall out. Cut the stem off toadstools, and put the cap gill-side down on top of the soil.
- ▶ remove the fungi after 24 hours.
- ▶ keep the soil + spores in a cool, dry place.

- 2 put the fungi in with the seedlings
- ▶ mix the soil + spores with your potting mixture
- ▶ plant seeds and raise seedlings as usual
- ▶ plant out as usual

There, you've put the fungi back into your reveg!

Easy, isn't it!

Hopefully there will soon be a book where you can read all the detail!

*Neale Bougher and Inez Tommerup work with CSIRO Forestry and Forest Products at Floreat. This technique is the result of field work with Laurie Pitman of "Valema Farms" at Corrigin with support from NHT Bushcare. They can be contacted on 9333 6674 or 9333 6673.*

*Note for more recent LFW members - if you would like a copy of earlier Western Wildlife articles, such as the one quoted here, ask the Editor to send you one.*

## PRACTICALITIES

**W**ORKING in areas of bush where kangaroos live can mean days or even weeks of itchy spots for some unlucky people. What can be done about kangaroo ticks?

Spraying personal insect repellent over yourself and your clothes is one option - trousers tucked into socks, then a heavy dose of 'Aeroguard' or similar on boots, socks and trousers will stop the big Mommas climbing up from ground level, attracted by your body heat. But personally I don't like using insecticide, so I suggest disrobing in the shower and washing them away as soon as you get home. Wash your hair too, as they seem to like hiding there. Also, put all your clothes in a very hot bucket of water. I didn't do either of these recently and ended up with 44 bites in various places.

Adult ticks are easy to find, though it can be alarming to find a

### AVOIDING KANGAROO TICKS

*Kirsten Tullis*

big fat grey thing stuck in your skin! Don't try and pull it out or it's head may stay behind to fester. Simply smear the tick with some Vaseline or tea tree oil and wait 20 minutes or so for it to suffocate. It will relax it's jaws on dying and can be wiped off.

The larval stage of kangaroo ticks, commonly called pepperticks, can occur in large numbers and are very, very small. They crawl up vegetation and wait for a meal to brush past. Don't sit in the middle of a kangaroo track! On a recent Bennett Brook CG flora survey trip I did just that and turned my arm over to find two or three hundred ticks rapidly spreading out from an area on my shirt sleeve. Ticks are a regular topic of conversation among

bush regenerators - colleagues have variously suggested we use sheep dip, a flame thrower and even a flea bomb in the car on the way home!

Pepper ticks seem to come out of nowhere, appearing in odd bodily places on waking in the morning as a tiny dark dot in the middle of a pink itchy spot. Invariably, each one just spent the wee hours leaving a trail of test bites. Worse still, the actual tick may not appear for days. Any that are found can be pulled off. For treating the bites I have tried tea tree oil and 1% hydrocortisone cream, but it would be good to hear if there is something better.

Has anyone any suggestions?

*This article is adapted from one first published in the AABR Newsletter, May 2002, which Kirsten edits. She can be contacted on 9271 3549 or by email: kt500@inet.net.au*

## LFW NEWS

### FROM INTERIM TO FULL MEMBERSHIP – SHIRLEY AND JIM WELLS

*Avril Baxter*



WHEN Shirley and Jim Wells “retired” from working in Canberra, they bought a small property in Morumbine townsite (east of Pingelly) with the idea of creating a seed production area and enjoying the country lifestyle.

On joining the *Land for Wildlife* scheme, they were given interim membership as there were no patches of “bush” on the property. However, their vision of creating a viable seed production area and a natural refuge for “roaming wildlife” via an established system of corridors and reserves, fitted in well with our aims. They decided to plant local hard-to-collect species in their seed production area, encourage natural regeneration where possible, revegetate dedicated wildlife areas and create more habitat around their dam.

During negotiations to buy the 6 ha property in 1997, the Pingelly/Brookton wildfires swept through the area. Concerned about wind erosion and on advice from local farmers, the winter following the fires the whole area was sown to wheat.

The following year they decided to direct seed areas that were dedicated wildlife sites and tackled two areas either side of a minor waterway. Soil types varied in each area, sandy soils predominated around granite rocks on one side of the waterway and red loams around dolerite rocks on the other. The sandy site was fairly level and the red loams slightly sloping.

After the break of the season they sprayed any weeds that had germinated in the wheat stubble and on rainy days in July, hand scattered seed that had been treated with smoke and mixed with vermiculite and sand, onto the surface of the soil. The species sown were selected



*Successful direct seeding in sandy soils.*



*Results were not so good in heavier red loams even though the same process was used.*

for the differing soil types and included eucalypt, acacia, allocasuarina, calothamnus, beaufortia, kunzea and leptospermum.

Plants in the sandy area grew well. However, apart from a few clumps, results were poor in the red loams even though the same process was used in both areas. They will now replant the red loams with seedlings.

Shirley and Jim are keen bird watchers and have noted that numbers of yellow rumped thornbills have increased in the area. Other birds more frequently seen include pardalotes and the singing, brown and brown-headed honey eaters. Whilst they can enjoy watching the birds utilising areas that they have created, Jim and Shirley feel they will have succeeded and can truly “retire” when splendid fairy-wrens start visiting the area!

In the meantime we can see the results of their efforts and are happy to award them full membership of the *Land for Wildlife* scheme.

## MEMBERS' PAGE

### HONEY POSSUM HEAVEN!

**R**OSS and Kit Backhouse are farmers at Narrikup in the south coast region. They have installed about 5 ha of native plant species to pick for the commercial flower market.

Ross delights in some of the special experiences he has with wildlife that now live within the flower plantation. One of his favourite times is when he comes across honey possums still feeding on the flowers (even when the sun is quite high in the sky). Ross noticed that if the wind is blowing downwind from his approach they don't smell him coming and he can watch them for quite some time feeding on the flower heads. The possums show no fear and hop quite happily onto Ross's hands allowing him to have a good look at each one of them.



The pic shows Ross standing next to one of the scarlet banksias they have planted. Unusually these banksias were still flowering in mid March on their property.

So here is an instance where a commercial plantation of native flora has a very definite benefit to native fauna!

*Sylvia Leighton*

*Old Photos continued from page 9*

the level of the diversion dam constant so that water can be diverted into distributary channels for irrigation while also allowing some water to be released all the time into the lower Ord. Thus, the wild river that boasted roaring floods in the wet season and retreated to a series of big pools during the dry, now flows perpetually and no longer sees those huge floods that stripped vegetation from all but the higher banks. To be sure, there are still floods but they are modest by old standards, even when the spillway overflows and all the excess has to be released. This newfound stability has allowed prolific riverine vegetation to develop. In turn, it has provided habitat for many animals that were rare or absent before the dams.

The moral of this story? Please treasure your old photographs, particularly ones that depict some feature that can be identified, so

that you or others can re-visit the spot and take another photo of the same view. Better still, have a copy made that can be archived by a historical society or a DCLM office in the area where you took the photo in the first place. Maybe, even the Batty Library. We found some very valuable photos there.

#### Acknowledgements

Thanks to Marg Folkard, Wayne Freer (A.Harris) and Bill Wright for the use of their photos.

#### Further Reading

Hussey, BMJ, 2001. Photographic monitoring of vegetation. *Wildlife Notes No. 9*

Start A.N. and Handasyde, T. (in press). Using photographs to document environmental change: The effects of dams on the riparian environment of the lower Ord River. *Australian Journal of Botany*.

*Tony Start is Principal Research Scientist and Tricia Handasyde is Technical Officer in DCLM Science Division, Kunumurra.*

*Did you know?*

..... why cormorants perch with their wings outspread?

They are drying their feathers. Cormorants are strong swimmers and hunt their prey underwater.

Their plumage is not water-repellent, so without air trapped between the feathers they are less buoyant and so can swim underwater more easily. But the feathers need to be dried off between swims. It's also possible that the sun's heat helps to control skin parasites.

## LFW NEWS

### VICTORIAN LAND FOR WILDLIFE PROPERTIES OPEN THEIR GATES TO THE PUBLIC

*Felicity Nicholls*

I often wonder how many people stop and wonder what the *Land for Wildlife* sign means. Why have they joined the "club"? What benefits are there, apart from getting a sign? Do other members wish they could pop in to see what is happening on someone else's *LFW* property? What better way to answer these questions than to open the gates and let them in!

To celebrate Biodiversity Month in September 2001, *LFW* opened 10 properties throughout Victoria to the public. This aimed to:

- ▶ promote *LFW* to the community in general;
- ▶ allow non-members to learn about the program;
- ▶ provide a chance for members to meet the local *LFW* Extension Officers;
- ▶ allow local members to meet up and network; and
- ▶ to provide information on nature conservation on private land.

200 visitors enjoyed a variety of properties, ranging from unusual perched bogs in the North East, a water authority property in the North West, Red Gum plains in Gippsland, stringybark woodlands in the South West and an example of a small property in Port Phillip.

Activities ranged from guided nature tours, planting shrubs for Grey-crowned Babblers, displays, expert talks on threatened species and landholder tours and talks.

When visitors were asked what did they enjoy most about their visit, answers included:

- ▶ knowledge sharing
- ▶ relaxed but informative process



*John Robinson's urban LFW property includes a beautiful wetland area and even an old fallen dead tree that was relocated to his property and cemented upright into the ground using a large crane. John then made spouts that are now being utilised by Sugar Gliders, bats, kingfishers and lorikeets.*

- ▶ seeing changes made from scratch
- ▶ confirmation of people's commitment
- ▶ meeting like-minded people.

In all, the inaugural *Land for Wildlife* Open Property Scheme was a great success and I would encourage *LFW* in all States and Territories across Australia to give it a go. This year we hope the event

will be bigger and better. In 2002, *LFW* Vic. celebrates its 21<sup>st</sup> Birthday and celebrations will occur at each open property. That's a lot of cakes to bake!

*Felicity Nicholls is Statewide Coordinator, LFW Victoria. She can be contacted on (03) 5430 4363 or by email: Felicity.Nicholls@nre.vic.gov.au*

## REVEGETATION

### GREENING CHALLENGE – HELPING ENVIRONMENT, HELPING COMMUNITY

**T**HE Hotham-Williams catchment, located 100km south-east of Perth, has a wide range of environmental problems including salinity, waterlogging, erosion, loss of biodiversity and decline of remnant bush.

Farmers in the catchment have been working together to overcome these land degradation problems by developing and implementing catchment plans to achieve more sustainable agricultural systems. One of the major components of these plans is revegetation. However, the implementation of the necessary broadscale revegetation in the catchment has been limited by cost, of seedlings and the amount of labour required to plant the large number of seedlings, and access to specialist information.

The Western Power Greening Challenge was initiated in 1996 to overcome these limitations and to provide a link between corporate sponsorship and nature conservation on farms. The farmer groups benefited from having their catchment revegetation plans implemented sooner and at less personal cost as Western Power contributed seedlings, a volunteer labour force and some of the cost of fencing. The Challenge was coordinated by the Community Landcare Coordinators and the Department of Agriculture (AgWA). By 1999, one million seedlings were planted.

Western Power Greening Challenge attracted the support of the Commonwealth Natural Heritage Trust, which provided a \$1.68 million grant in 1998 to expand on the existing project. The new Challenge, known as the Hotham-Williams Western Power Greening Challenge, aimed to plant an additional three million seedlings by the end of 2002. The 4 millionth

*Cliff Morris*



seedling is expected to be planted on 4<sup>th</sup> August this year.

The Hotham-Williams Western Power Greening Challenge is now a partnership between the communities of the Hotham-Williams Catchment, Western Power, AgWA, and the Department of Conservation and Land Management.

The key aims of the Greening Challenge is to improve nature conservation and biodiversity values in the Hotham-Williams Catchment through large scale revegetation using local species. This is achieved by using over 80 native species for revegetation. Careful planning is undertaken to ensure that correct species are used according to the landscape position, soil type and salinity. This has ensured seedling survival rates of around 75%, which is considered very good for a project of this size and the wide range of species used.

Apart from increasing plant biodiversity, projects such as the Greening Challenge also help maintain and improve the diversity

of native fauna on farm properties by improving habitat. Bird surveys undertaken by the AgWA, Narrogin, have shown that sites revegetated through the Greening Challenge provide habitat for a wide range of bird species.

Bird species richness per site ranged from 3 species to 17 species and the presence of key species (remnant vegetation dependent) at each site ranged from 40 to 100 percent.

Apart from environmental benefits, the Greening Challenge has also had a major impact on the local and Perth community. This project has raised awareness of landcare and built capacity in the community to undertake revegetation projects following best practice management standards. Local nurseries have benefited by a surge in business and learning to grow a wide range of local native trees and shrubs. The nearly 2500 volunteers over the life of the project, mostly from Perth, have benefited from a greater understanding of rural issues and friendships with local farmers with whom they planted trees.

The Greening Challenge exists because individuals had a vision, and success is due to the unique partnership between a corporation, community and agencies; the involvement of the volunteers; and the commitment to the project by Western Power and the community itself. With 4 million trees in the ground, there will be an enduring landscape record of the efforts of thousands of people involved.

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*Cliff Morris is Principal Environmental Officer at Western Power. He can be contacted on 9326 4961 or email [cliff.morris@westernpower.com.au](mailto:cliff.morris@westernpower.com.au)*

## LFW NEWS

### BE A NATURE CONSERVATION OFFICER FOR A NIGHT

**I**N April, 36 people (mostly *LFW* members and teachers) assembled at Camp Quaranup, Albany, to learn more about local fauna. Peter Collins and Tony Friend talked about Western Shield and demonstrated observation and trapping techniques but sadly, neither the spotlight walk nor the traps found anything (except for one banjo frog), which was disappointing but probably due to the timing at the end of a long dry summer. Eunice Daubert's talk about the wildlife carers' group, with her assistant - an extremely cute baby ringtail possum - helped to make up for this lack.

The event was organised by *LFW* and DCLM's EcoEducation programme, and the mix of teachers and landholders worked well, as the



*The group. Photo: Liz Moore*

participants enjoyed the chance to mix with others who are also involved in promoting nature conservation.

Many thanks to all who helped with the organisation, especially Liz Moore, DCLM Senior Eco-Education Officer, the speakers and of course the participants.

(Nb: I am thinking of organising a spotlighting stopover night at Perup, where the fauna recovery after fox control has been spectacular. Are there any people interested?)

*Sylvia Leighton*

## BUSH DETECTIVE

**T**hey are the honeycombs of a feral bee hive. There are four such hives in this tree.

Feral bees are occupying a lot of hollows once used by native fauna, and they cause other problems in the environment too. The Naturalists' Club and Kings Park hope to soon be running a research project to investigate the effect of feral bees on aspects of local ecology. If it gets under way, we'll give you more detail.

*Thanks to Emma Bramwell for these photos.*



From a young *Land for Wildlifer* - Q: Where did Noah keep his bees? A: In an archive.



## NEW BOOKS

### Tree Hollows and Wildlife Conservation in Australia

Phillip Gibbons and David Lindenmayer

CSIRO Publishing, 2002

\$59.95

Available in selected bookstores, or contact CSIRO Publishing 1800 654 051 (Freecall); fax (03) 9662 7555 or email: [publishing.sales@csiro.au](mailto:publishing.sales@csiro.au)

Everything you ever wanted to know about tree hollows and fauna - and then some!

The authors, both of whom have worked and published in this field for many years, have done an extensive literature search, both within Australia and overseas, to bring together information about the use of tree hollows by fauna. They talk about how hollows are formed and how they are used - what influences a particular animal's choice of site? Why is it that so many Australian animals use hollows? What has been the changes in hollow availability since European settlement? When it takes 150 years for a salmon gum to get big enough to start to form a useable hollow, what should we be doing to ensure that hollow trees and their fauna are a sustainable resource?

There has not been a great deal of research on this topic done in WA, so most of the Australian information in this book is from the eastern States, nevertheless, its easy enough to extrapolate to our situation. *Land for Wildlife* members will find the sections on management of hollow trees and the woodlands and forests in which they occur to be very interesting, and almost certainly end feeling reassured that they are already doing the right thing - but perhaps there is a little more that could be attempted? There is a very interesting section on nest boxes, for example, and also warnings about pest species (see Bush Detective in this issue!).

This is not a book you would sit down and read like a novel, it is a scientific text book. It contains numerous tables, graphs and statistics, and the reference list is 20 pages long. Nevertheless, the book is easy to read and packed full of information. And if, like me, you don't speak mathematics, you can ignore those bits without really interrupting the flow of the text!

If you have trees with hollows on your property, and would like to know more about the ecological relationships involved in this important niche, you will find this book well worth reading.

Penny Hussey

## COMING EVENTS

### Gardner's Botanical World

The Life and Artwork of Charles Austin Gardner 1896-1970

21<sup>st</sup> July to 21<sup>st</sup> October 2002

New Norcia Art Gallery

9.30 am - 5.00 pm daily

Further info: call Sally Osborn on (08) 9654 8167 or email: [nnfriends@yahoo.com](mailto:nnfriends@yahoo.com)

For 40 years, from when he was appointed Government Botanist and Curator of the WA Herbarium in 1929 until his death in 1970, Charles Austin Gardner was a major figure in WA botany. He travelled widely, collecting over 20,000 specimens, many of which, being new to science, he then named. He also wrote several botanical books, often illustrating the plants himself.

Gardner had a long-standing friendship with members of the Benedictine Community at New Norcia, and left his botanical estate to the monks, including some artworks which will form the core of this exhibition.

"Gardner's Botanical World" will celebrate Gardner the man, his connexion with New Norcia and his contribution as a botanist, conservationist and author. There will also be contemporary artwork relevant to the theme.

This exhibition is a great excuse to visit New Norcia, one of the most unusual cultural places in WA. Take yourself, take the family, take your overseas visitors - just don't forget to go!

### "Weeds - Threats Now and Forever?" 13<sup>th</sup> Australian Weeds Conference

8-13<sup>th</sup> September 2002

Sheraton Perth Hotel

Contact: Dianne McLeod email: [convlink@inet.net.au](mailto:convlink@inet.net.au)

### September is Biodiversity Month

To find out what activities are being held nationally to celebrate Biodiversity Month, browse Environment Australia's web site on [www.ea.gov.au](http://www.ea.gov.au)

### "Prospects for Biodiversity and Rivers in Salinising Landscapes"

21-25<sup>th</sup> October 2002

Albany

Contact: Marcus Blacklow ph: 9386 4897 or email: [mblacklo@agric.uwa.edu.au](mailto:mblacklo@agric.uwa.edu.au)

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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