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ANIMAL RESPONSES TO FIRE IN BANKSIA WOODLANDS IN WESTERN AUSTRALIA

Barbara A. Wilson and Leonie E. Valentine

Prescribed fire is a significant management tool for both hazard reduction and maintenance of biodiversity. However, inappropriate fire regimes may have undesirable consequences including declines or local extinctions of flora and fauna and decreased structural complexity of habitat. Determining appropriate ecological fire regimes can be difficult as what may be an inappropriate fire regime for one species or community may be beneficial to another species or community. A major challenge for land managers is the development of fire regimes that reduce the potential for damaging bushfires and are optimal for biodiversity.

Development of ecological fire



*Above: honey possum on woollybush, a common and very flammable shrub in Gngangara banksia woodlands.
Below: experimental burn.
Photos: Barbara Wilson*



regimes has focused generally on plants and vegetation as they are the first level in the food web for terrestrial ecosystems and also provide habitat and successional phases for fauna. Attributes such as the post-fire regeneration strategies, juvenile periods and the longevity of longer-lived woody species that mostly reproduce after fire are useful criteria to determine minimum and maximum intervals between lethal fires for a particular ecosystem. However ecological fire regimes appropriate for fauna are also of significance. These can be based on the life histories, post-fire succession patterns and habitat requirements of fauna species. The time since last fire and its impact on fauna is also an important factor to understand, as land managers often aim for prescribed burning regimes with specific fire-free intervals. There is however often little information on these attributes. In addition, because animals are mobile there is a need to understand the sizes, shapes, age structure or configurations of suitable habitat for fauna in relationship to fire dynamics and fire mosaics.

Recent field studies have advanced our understanding of the impacts of fire on the vertebrates in banksia woodlands on the Gngangara Groundwater System and provided

EDITORIAL

Greetings all!

During March and April, we were reminded that *Land for Wildlife* WA does not operate in isolation. *LFW* Victoria hosted a national *LFW* conference that celebrated 30 years since the scheme's first property was registered. Claire Hall and Sylvia Leighton attended this event, which was great networking, as well as being interesting and informative. You can read their report on page 3.

We also had a visitor from New Zealand, who was in Australia on a Churchill Fellowship to see if *LFW* might be a good programme to start up over there. We believe he went back pretty positive about the idea!

Recently, *LFW*, along with other 'off-reserve programmes'

in DEC, has been audited by the Department's Internal Audit Branch. On the whole, they were complimentary about the operation of *LFW*, but did say that we were not undertaking stewardship visits often enough. This is when we visit a property five or so years after our first visit, to see how your management efforts are coming along and find out if we can provide further help. Such visits are invariably uplifting experiences, as in almost every instance there is good response to fencing, replanting, etc. Not only can we get some superb sequential photographs from these visits, but landowners can often tell us of successes attributable to particular management actions, so that their practical advice can be passed on to others.

would like a visit, please contact your local *LFW* officer. There is a constraint, however. The *LFW*Os only work part-time and visiting newly registered properties would take precedence, so there may be a delay before anyone can make it. Please be patient with us!

Best wishes for a good growing season.

Penny Hussey



Claire Hall and Sylvia Leighton with the stone curlew glove puppets that they were given at the conference in Victoria.

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Please do remember to take those 'before and after' photos. They are very important for long-term records. In this issue, read about the Jilakin jarrahs, to see how important it is to keep good records.

Getting back to that stewardship visit, if we haven't been out to see your property for a while, but you

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NEWS

LFW VICTORIA: 30 YEAR CELEBRATION FORUM

Claire Hall and Sylvia Leighton

In March 2012 *LFW* officers Claire Hall and Sylvia Leighton were given the opportunity to attend Victoria's *Land for Wildlife* 30th anniversary celebration forum. Participants included staff from the Department of Sustainability and Environment who deliver the *LFW* program in Victoria, interstate *LFW* coordinators, stakeholders sharing objectives aligned with *LFW*, and landholders.

The aims of the forum were:

- to hear about similar programs and delivery models;
- to identify ways for improving or supporting more efficient delivery of *LFW*; and
- to identify innovative delivery and engagement tools.

We gave a presentation titled 'Working With the Willing' and spoke about how *LFW* operates in WA and the challenges facing landholders here.

From presentations given by other states it became clear that *LFW* operates quite differently in each state and territory. Some operate out of state or local government offices and others through contract consultants. Some of the programs employ on-ground officers and others rely on volunteer inspection officers. Some programs have operated continuously and others have reestablished themselves after a break in funding. Despite a 'bumpy road' as far as continuity and funding is concerned, *LFW* in all states except South Australia has managed to survive and help thousands of landowners over the past 30 years. *LFW* Victoria now has 5,890 registered properties totalling 500,000ha, or 4% of private land in Victoria.

It was interesting to hear Rob Youl OAM, *LFW* member and

Landcare Champion talk about his experiences. His suggestions: to know your neighbours, join local groups, invite experts or groups to your land to conduct fauna surveys, have your own backyard nursery, covenant your block, and have a succession plan.

Some of the challenges *LFW* must face in coming years include the pace of change, demographics, population dynamics, new technology, skills training, and integration with other programmes. The common theme was that communication in all its forms is essential to keep both *LFW* officers and landholders informed and motivated to conserve and create habitats for biodiversity.

Landowners too will be facing challenges in the future, but they can help themselves by investigating more funding opportunities. For example, in January 2011 in Victoria, 85% of landholders did not access funding.

The finale to the forum was a field visit to well-known author and *LFW* member John Marsden's property 'Tye Estate' at Romsey in the eastern foothills of Mt Macedon. The property has been registered with *LFW* since 1999 and supports stringybark-peppermint forest. John started his own school, Candlebark, on the property in 2006. He describes the school as an experiential school, "somewhere between Steiner and The Simpsons". It is so successful that there is a four-year waiting list to get in. John has carried out weed control and revegetation on the property and the forest is used for educational purposes. He recently installed a new fire proof underground building which operates as the school's library but also can be used as a safety bunker for the school children if a bushfire was to come through the tall forests on the property. The design of the building

provoked thought about landholders taking responsibility for the designs of our dwellings to cope with the bushfires that are a natural part of Australia's ecology.

At the end of the forum we both agreed that we are very fortunate to be working for such a wonderful programme as *LFW* and in particular, *LFW* WA.

From *LFW* VIC

Land For Wildlife has been around for 30+ years and is one of the longest running landholder engagement programmes known. A celebration event was held at Lancemore Hill in central Victoria. The event included a workshop/forum, a celebration dinner with guest speakers and a visit to the *LFW* property of noted children's author, John Marsden.

Apart from celebrating 30 years of *LFW*, the objective of the event was to explore ways for improving or supporting more effective delivery of *LFW*, and identifying effective delivery and engagement tools.

Many thanks go to those who travelled from interstate to make the event a success. We also had a small representation from New Zealand where the Forests and Bird Association is exploring the possibility of starting *LFW* – is this the first step to going international with the programme – let's hope so!

From Peter Johnson, Victorian *Land For Wildlife* Coordinator and National Liaison Officer.

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FAUNA

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Animals and fire

strong evidence for post-fire responses over time for reptiles and mammals related to variations in food productivity. The studies were undertaken between 2007 and 2010 as a part of the Gngangara Sustainability Strategy (GSS) (the reports of these studies are available on: www.water.wa.gov.au/sites/gss/reports.html).

The responses of reptiles to time since last fire in banksia woodlands, and the interspersed melaleuca damplands among them, were investigated. Reptile species richness was higher in banksia sites and some species were more abundant there, e.g. the litter dwelling skink (*Lerista elegans*) and the small western heath dragon (*Ctenophorus adelaidensis*). The response of reptiles to fire was found to be dependent on microhabitat variables associated with time since last fire. A number of species including the common dwarf skink (*Menetia greyii*) preferred older melaleuca sites (more than 16 years since last fire) compared to younger sites (less than 11 years since last fire). Several of the small snakes (e.g. the WA priority listed species the black-striped burrowing snake (*Neelaps calonotus*)) were only detected in older-aged banksia sites. The terrestrial heath dragon was more abundant in the young and very old banksia sites, both of which have high amounts of bare ground. In contrast the abundance of the skink *Cryptoblepharus buchanni* was correlated with canopy cover. The studies revealed that different habitats created by a range of time since last fire are required to support the reptiles, and that older aged habitat is important for a number of species.

In the banksia woodland, the honey possum (*Tarsipes rostratus*) was a key fire response mammal species and had low abundance in recently burnt sites (less than seven years since last fire) with a peak in relative abundance at sites 20-26 years since fire. However, we also noticed lower abundances in sites that have remained unburnt for a very long time (greater than 36 years post-fire age). There is evidence elsewhere that although honey possums can return to burnt areas within two to four years after fire, higher densities are typically recorded in older vegetation, with peaks in abundance in vegetation 20-30 years since last burnt. Honey possums are dependent on nectar and pollen, particularly from plants of the Proteaceae, Myrtaceae and Ericaceae (was Epacridaceae) families. Their capture rates are closely linked to food sources and have been correlated with the densities of flowers and the flowering periods of banksias. Hence, the impact of fire on honey possums is likely to be related to the post-fire responses of target food species. Based on this information, burning regimes need to ensure retention of long unburnt vegetation to provide resources for this species.



Some reptiles from the study area:

Top: common dwarf skink, *Menetia greyii*

Centre: western heath dragon, *Ctenophorus adelaidensis*

Lower: *Morethia obscura*.

Photos: Barbara Wilson

Other key fire response fauna identified include the quenda (*Isoodon obesulus fusciventer*), water rat (*Hydromys chrysogaster*) and western swamp tortoise (*Pseudemydura umbrina*). This critically endangered tortoise is unique to the GGS study area, with populations reliant on permanent or persisting wetlands and dense riparian vegetation, and they are now restricted to small fenced reserves on the east of the study area. The

NEWS

A VISITOR FROM NEW ZEALAND

A pilot *LFW* programme will soon be starting in New Zealand! The Royal Forest and Bird Protection Society of New Zealand (Forest and Bird)* was looking for a way to provide biodiversity extension advice to private landholders to link them into whole-of-landscape conservation planning. Forest and Bird is a non-government organisation similar to BirdLife Australia, but with a wider remit. It has some 90,000 members and numerous staff, and campaigns actively on conservation and environment matters throughout the nation, operating at all levels from international lobbying to planting individual trees. Alan Fleming, the Central North Island Field Officer for Forest and Bird, obtained a Churchill Fellowship to come to Australia and study the organisation of *LFW*, to see if this sort of scheme would fit the bill.

He first attended the national *LFW* conference then went on to Brisbane and Alice Springs before coming to Perth. While here he went on a

property visit and talked to managers and staff in DEC. He was also keen to learn about roadside conservation, so he spent a day with the Roadside Conservation Committee learning about the methodology for roadside surveys and subsequent mapping. In addition, he talked to DEC's Nature Conservation Covenant staff, and spent time with BirdLife Australia WA and WWF-Australia WA.

Alan seemed very impressed with the way *LFW* delivers a consistent message across the national scene, although it is organised very differently in each State. He was also very impressed with the enthusiasm of all concerned and with the results being achieved by landholders through voluntary conservation. Warm thanks to everyone who welcomed Alan and helped to give him a positive view of *LFW* and

the future of conservation on private lands. He headed home with lots of ideas about how the programme might be implemented in his region.

We hope to hear more from you, Alan! Perhaps any reader visiting NZ might be interested to contact him and learn more?

*To find out more about Forest and Bird, go to: www.forestandbird.org.nz.

Below: Penny Hussey, Alan Fleming and Claire Hall.



continued from page 4 **Animals and fire**

survival of water rats is also vitally linked to the persistence of wetland ecosystems. The loss or reduction in size and quality of wetland areas from fire impacts may affect the availability of terrestrial habitat and food resources needed by these species, including large aquatic insects, fishes, crustaceans, mussels, frogs and lizards. While data on the preferred fire age for the quenda in the GGS has not been obtained, there is information on its preference for moist low-lying areas with dense mid-storey vegetation which may be linked to the potential protection that this habitat type provides from introduced predators. Thus loss of such habitats from intense or too frequent fires is likely to be a threat.

A number of recommendations have been made based on these studies. Burning regimes need to ensure retention of long-unburnt habitats that are significant habitats for key fauna species including the honey possum, the quenda, the water rat, the black-striped burrowing snake and the common dwarf skink. Further, it is recommended that sites be identified as fire 'refugia' to protect highly susceptible biota from frequent fire, including wetlands and wetland-associated species, such as the quenda and water rat.

Several threats have been implicated in the extinctions and declines of fauna on the GGS. These include habitat clearance and fragmentation as a result of agriculture

and urbanisation, and predation by introduced foxes and cats. The impact of any inappropriate fire regimes are likely to be increased due to habitat clearance and fragmentation, with intense or too-frequent fire potentially causing local extinction from an isolated remnant with no capacity for recolonisation. In addition, any fragmentation provides increased access by predators, particularly following fires.

Dr Barbara Wilson is DEC Swan Region Leader Nature Conservation, and Dr Leonie Valentine is Post-doctoral Research Fellow, Centre of Excellence for Climate Change, Woodland and Forest Health, School of Veterinary Biology & Biomedical Sciences, Murdoch University.

MEMBER'S PAGE

THE FIRST MOORA COCKY COUNT

Marie Carter

Every year for the last 21 years it has been my joy to see Carnaby's cockatoos coming back to Moora to nest around July/August. To see them flying over the town, even perching on the roofs of the old hotels and hear their distinctive cry is very special. My husband and I have a two hectare block on the edge of Moora with two artificial nests, put up by Wally Kerkhoff, the bird guru of Moora. He has a special love of the Carnaby's and has been observing and supporting for the last 27 years. A Carnaby's pair did choose one of our nests this year and reared a very healthy chick.

Some months ago Clair Bertrand from BirdLife Australia sent me a copy of the 2012 Great Cocky Count and I wondered if we could have one in the Moora area. I contacted Moora Catchment Council NRM Officer Ingrid Krockenberger and Rachael Warmsley, who said they had been considering it but it seemed there was no known roost site that could be pinpointed. I then recalled that Wally Kerkhoff had said he might know of a likely area. The Wednesday before the count (13th April) Wally, my husband Harry and I headed west along the Moora/Dandaragan road, checking where they had been seen recently, but no luck. Then, stopping intermittently, we began to hear the odd one in the distance. We drove on further - it was almost dusk by then, 6.15 pm, and there they were in front of us in large numbers flying across the road, some circling at times. Stopping, we were amazed to observe and hear about 200 Carnaby's perching on low eucalypt trees very close to the road on both sides. After a while they flew off to the north.

I then contacted BirdLife Australia again, and was encouraged by Tamara Kabat, the conservation officer



Flying home to roost. Photo: Ingrid Krockenberger

organizing the Great Cocky Count, to give it a try, and also sought the help of the Moora Catchment officers. The question for us all was would they be around that spot for the count on Sunday.

On Friday about 5.00pm Ingrid and I drove to the same site and then on to a farm about 22km west, north-west of Moora on the Muthawandery Rd, where about 200 of the birds sometimes roost, to the delight of the owners. We thought this is where we could come on the Sunday. Coming back about 6.15 pm we observed them flying across the road in the distance around the same area where Wally, Harry and I had seen them on the Wednesday.

On Saturday evening Harry and I decided we would go to the same site and see if we could spot them again, 13km from Moora we stopped and heard one. Then, at 6.30 pm, 14km from Moora, we observed 30 of them feeding in a paddock on the right of the Koburn Farm driveway.

At 6.00 pm we headed west along the road 17km and observed 60 flying south across the road. Turning round we returned to the site we had seen them on Wednesday and yes, as we got closer a large number of birds, perhaps 200, crossed the road from the north, roosting in the trees very close to the road. Again we marvelled, what a wonderful thing to see! Having put a red marker at the site we set the odometer and headed back to Moora, 14.09km to the first bridge with birds sighted in the trees for 1.3km from the marker.

Sunday arrived and a group, made up of Ingrid, Wally, Harry and I and Nathaniel Chapman with 4 children Caitlin and Bella Chapman, Rhianne Watts and Cameron Flynn met at Wally's place and at 5.20 pm set off from Moora hoping we would be lucky enough to see them that evening. Arriving at the site at 5.40, no birds were sighted but they had been heard on the way out, so that was promising. Leaving the other cars,

MEMBER'S PAGE

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Moora cocky count

at Wally's suggestion, Harry and I drove another 2km west and we could see and hear them across a paddock flying in a north-eastern direction to a site where we had seen them on the Wednesday. We returned to the cars and Wally asked Harry and I to drive east to the entrance of Koburn Farm about 1km away. At 6.20 pm, at that place, in a short time, we counted 262 birds heading in a south-westerly direction, towards where the red marker on the side of the road was placed. When we got back there, we were all very excited and estimated that based on the average of three independent counts and the difficulty of being accurate because on the road some groups flew over and circled back, we had sighted 313 birds. As we watched and marvelled and thought how fortunate we were, listening to the juveniles calling out to be fed and the sound of the mothers feeding them, a cacophony of bird sound that gradually eased as night drew in. Then, suddenly, they all took off and roosted in trees further back from the road, on the north side! We then decided we must take a photo of us all on this remarkable occasion – unfortunately Ingrid is not in the one that came out best.

Why did they choose this particular place to spend the



Mission accomplished, a very happy group! Photo: I Krockenberger

night? Perhaps good water supply, wild geraniums growing around the area and a good wooded site but certainly from our observation they do not come into roost until just before nightfall. I wonder where they will be roosting this time next year near Moora, when we do our second Great Cocky Count - these iconic Carnaby's cockatoos!

Marie Carter can be contacted on mcartermrs@yahoo.com.au

A BEAUTIFUL BIRD - FOR A PARROT!

Lawry Pitman was surprised to see this multicoloured bird in a flock of ringneck parrots near his shed at Corrigin. The bird did not mind posing, although Lawry did not feel that it was tame enough to have escaped from an aviary. According to Lawry it had the head, voice and size of a ringneck parrot and appeared to be a juvenile, but the colours were very different from normal ringnecks.



Is it a crossbreed? Is it a freak of nature?

The most likely guess at a cross would be with the western rosella, but Lawry has not seen a rosella in this area for many years. Lawry also noted that the bird was the same size as the ringnecks that it was hanging around with, but some of the markings looked similar to the female western rosella.

Lawry has only seen it once, but expects to see it again and would like to know how far ringnecks travel outside their territories. We asked DEC's Principal Research Scientist Dr Allan Burbidge for his opinion.

He replied: "I thought at first that it may be a hybrid between a ringneck and a rosella, because some of the colours are similar to those of

the western rosella, as Lawry had noted. However, the bird was similar in size to ringnecks, while western rosellas are somewhat smaller. We would therefore expect that a hybrid would also be smaller than a ringneck, but this bird is not, so another explanation needs to be sought. Given the brownish tinge to the head, it is probably a young bird, but that doesn't solve the riddle of its identity.

However, in discussing this bird with Ron Johnstone at the Western Australian Museum, he told me that sometimes ringnecks do occur with really unusual colours, although these colours don't get established in a population. It's not known why they occur. So, perhaps the 'freak' explanation is the correct one."

FLORA RESEARCH

45 MILLION YEARS OF FIRE-STIMULATED FLOWERING!

Byron Lamont



Nuytsia flowering after fire near Esperance – no wonder it is named 'floribunda'! Prof. Lamont says "I suspect that the stand shown is the one clone perhaps thousands of years old". Photo: Mike Archer

The WA Christmas Tree (*Nuytsia floribunda*) is a true relic of Australia's ancient past: it is estimated to have remained essentially unchanged since its origin 45 million years ago. It is by far the oldest living species so far recorded in south-western Australia. (The oldest living banksia species, *Banksia attenuata* for example, is 'only' 19 million years old.) There are many amazing features of this bizarre species that make it one of the wonders of the plant kingdom.

It is usually a soft-stemmed tree (it lacks true wood) to 12m tall but can be a creeping shrub in exposed coastal habitats. Individual plants are connected by rhizomes that may extend up to 110m in the soil. Thus, a stand of plants can cover up to several hectares and really represents the gradual extension of one original plant that established perhaps several thousand years ago, though this has never been studied properly. *Nuytsia* is a root parasite and will latch onto the roots of any species in its vicinity. The suckers are unique as they wrap

around the host root to form a ring that sends out two plates of hard tissue that cut the host root in two and redirect the host sap into the *Nuytsia* root.

It is regarded as one of the world's most spectacular flowering trees, especially after fire when it forms huge bunches of flowers that arise directly from the blackened stems, while the leaves are produced later. Sometimes the blossoms are so heavy that they make the stem bend permanently and even break off on occasion. After a fire, termites eat the outer bark killed by the fire but they cannot penetrate the new living tissue underneath so that *Nuytsia* in effect produces new bark including a new vascular system. The remarkable ability of *Nuytsia* not only to survive fire but to have fire-stimulated flowering has been used as evidence that fire must have been a selective force in south-western Australia at least 45 million years ago.

The flowers are in threes, two of them produce pollen only while the third can produce a fruit. While *Nuytsia* is placed in the mistletoe

family, Loranthaceae (there have been attempts to put it in its own family!), it is the only mistletoe that produces dry winged fruits and is dispersed by wind, whereas the others have succulent 'berries' usually dispersed by the mistletoe bird (*Dicaeum hirundinaceum*) - at least in WA. The three wings have a cardboard texture and serve to absorb winter rain and keep the germinating seed moist during periods without rain. Seeds must germinate that winter or they die. Coupled with the tough leathery leaves that hang downwards, and the ability to avoid drought by tapping the moisture in host plants, these make this bizarre species perfectly adapted to a Mediterranean-type climate, even though it originated at least 25 million years before south-western Australia is believed to have experienced such a climate.

Distinguished Professor (Emeritus) Byron Lamont can be contacted via the Department of Environment and Agriculture, Curtin University.

MEMBERS' PAGE

I SPY ... !

Whispie Bayly

Located between the granite rock nature reserves 'Yanneymooning' and 'Elachbutting' at the northern boundary of the Westonia Shire, is our *Land for Wildlife* block, registration number 224. It is well connected with excellent vegetation along roadways and fence lines to both reserves, and adjoins unallocated Crown land to the east. This 600ha block is in near-pristine condition with many and varied habitats for animals and a great mixture of soil types and vegetation including large breakaway ridges, granite rocks with sheet granite slopes and some large granite boulders strewn within the woodlands. It is fenced and has not been grazed by stock for more than 30 years. However, unfortunately there are foxes, rabbits and feral cats.

We have two sensor cameras placed on a series of four very small tear-shaped pit gnammas with good water catchment off the sheet granite slopes – even 5ml of rain will fill them. There isn't any access to the public here and so it is a great animal sanctuary evident by the photos and videos of animals and birds that visit the gnammas. The perentie and wedge-tailed eagle are just two of the images we have collected. Not all the images are as clear as these two, alas! There has been an echidna or two visiting often, many kangaroos call for a drink as do many birds – including pigeons, crows, willie wagtails, zebra finches and mulga parrots.

At another very large gnamma with almost permanent water we have captured banded lapwings, emus, white-faced herons, ducks, parrots, galahs, magpies, mudlarks and small lizards. We are still hoping for a chuditch, dunnart, phascogale, or maybe a hopping mouse!

Last year the cameras were placed near an active malleefowl mound and we captured some marvellous videos of the birds at work. Then there seemed to be a fight of some sort between three birds and they all disappeared and have abandoned the mound, sadly.



These cameras are very nonintrusive and it is fantastic to observe the natural animal behavior. Placement of the camera is very important and it should be secured well – I have video evidence of a fox shaking the camera and removing the strap!

Whispie Bayly farms in the northern part of Mukinbudin Shire. Email contact: yandegin@wn.com.au



Camouflage

Insect camouflage can be astonishing - unless it moves it is very hard to spot this fellow on a buffalo grass lawn! Its bright green colour and linear shape is exactly like the grass leaves. Note the pointed, almost conical head, very different from most grasshoppers. It is the giant green slantface (*Acrida conica*) from the family Acrididae. This genus is common across Australia, and sometimes occurs with brown colouration. Not unsurprisingly, it eats grass. (Thanks to Terry Houston, of the WA Museum, for the identification.)

Photo: G. Rundle

FAUNA RESEARCH

DEAD TREES HAVE A ROLE IN YOUR REMNANT

Jonathan Majer

Dead standing trees, commonly referred to as ‘stags’ in Australia and as ‘snags’ in North America, are a regular feature of forests and woodlands. Although previously regarded as useless, often meriting removal, stags are now recognised as important for wildlife and for biodiversity in general.

A series of wildfires in Kings Park in the latter part of the last century resulted in widespread tree mortality. Although trees that were considered a hazard were removed, many have remained until the present day. This provided the opportunity for West Timorese student Siprianus (Sipri) Radho Toly to quantify the abundance of insects and other invertebrates that visited or used the trunks of stags in Kings Park. Stags ranging from about four to 11 years since death were compared with paired live trees of the same species, namely jarrah (*Eucalyptus marginata*), tuart (*E. gomphocephala*) and Fraser’s sheoak (*Allocasuarina fraseriana*). Sipri sampled the animals moving on the trunk by using semi-circular plastic bowls strapped to the side of the tree. Animals moving up the trunk passed through a tunnel in the centre of the bowl and fell into the preservative. Insects attempting to land on the trunk were thwarted by a transparent perspex panel, and slid down into a plastic tray of preservative clipped beneath.



The sampling methods used to assess invertebrates on the trunks of stags and live trees. To the left is the perspex intercept trap for catching flying insects, to the right is the bark trap for catching invertebrates that are crawling up the trunk. Photo: J. Majer

Invertebrates were removed from the traps and identified at the order level, meaning to beetles, crickets, ants, etc. At this ordinal level, stags were visited or used by almost as many groups of arthropods as were live trees. The beetles were separated to the species level (227 species in total!) and were found to be only slightly less diverse on *Eucalyptus* stags than on live trees and were actually



The aftermath of a fire in Kings Park. Although many of these trees will resprout, others will die but remain standing for many years. Photo: J. Majer

more diverse on sheoak stags than on live sheoaks. Of particular interest was that a large proportion of the beetle species was specific to either live trees or to stags, suggesting that the existence of stags actually enriches the diversity of invertebrates in forests and woodlands.

In addition to contributing to arthropod diversity and conservation, these invertebrates are a food source for insectivorous vertebrates, including frogs, geckos, skinks, some birds, and certain small mammals. In addition, they contribute to core ecosystem functions, such as nutrient cycling, releasing much-needed nutrients into the soil as they decompose the wood. This decomposition, which is mediated by invertebrates such as termites and also by fungi, creates cavities which provide nesting sites for birds.

So, if you are concerned about that dead tree in your remnant, if you are considering removing it because it takes up space, remember this: retention of stags has important conservation benefits and, other than when there is a risk to public safety, they should be protected and allowed to fall naturally in the course of time. They may not look as beautiful as the live specimen, but they play an essential role in our ecosystems.

Jonathan Majer is Professor of Invertebrate Conservation at Curtin University’s Institute for Biodiversity and Climate. Siprianus is now a lecturer at Universitas Nusa Cendana, Kupang, West Timor.

A PDF of the paper from which this summary is taken can be obtained from the author by email at J.Majer@curtin.edu.au

MEMBERS' PAGE

A BLAZED TREE ON 'ARDGOWAN FARM'

Bill Butler, a long-term resident of the Wickepin/Yealering area, was shown a blazed tree on his property in 1942. He was told that it was blazed by John Forrest in either 1872 or 1874. Neighbours have also noted pegs, cairns or blazes approximately 10 miles apart.

A large limb was blown off the tree during storms two years ago and, as part of the clean-up process, Bill was reminded of the marking and became aware that a piece of history could be lost.



The wandoo tree has the number 32 and a broad arrow cut into the trunk on the eastern side about 1.3m from the ground. The tree is approximately 18m tall, has a circumference of 323cm and in Bill's estimate has grown 18cm in diameter since it was blazed.

Since the storm Bill has been reading many books on John Forrest's journeys but can not find any reference to this particular trip and would love more information.

Could Land for Wildlife help?

We were intrigued by this query, and asked geographer Marion Hercock if she could help (she wrote the article Heritage trees and land management in WW 6/2, April 2002). She, in turn, passed the query on to other people who, as you can read below, created lots of questions but, as yet, no definite answers.

When Bill Butler of Ardgowan Farm, Wickepin, asked *LFW* to help him find the story behind a blazed tree on his property, he created a flurry of interest.

Bill's request and the responses it received show that there is a strong argument for a central register of heritage trees. Questions raised by the respondents included: could Landgate help? Did the Shire of Wickepin know anything? Would a history book on the Shire provide information? How does one age a blaze? Was this an old blaze that had been re-cut?

The general view was that the blaze was relatively recent; and it was not made by John Forrest, although Alexander Forrest had been in the area in 1871. The condition of the blaze was too clear and modern looking, and it included the government arrow which John Forrest did not use on his explorations. The blaze

QUESTIONS ABOUT A BLAZED TREE LEAD TO MORE QUESTIONS

Marion Hercock

was definitely a government survey mark made by a surveyor or survey hand. For a fee, Landgate could search surveyors' field books and old plans. Alternatively, the website of State Records Office (SRO) is free to access, so this presents a better option. Some online records for the Wickepin agricultural area are available but, unfortunately, researcher Lesley Brooker has found that they do not cover the location of Ardgowan Farm. Lesley found that there is, indeed, a 'white gum tree' with the broad arrow and the number 32 in Wickepin Shire, but it is not this one. With more time and detailed searching, the year of the survey and the surveyor's name could be found, as well as confirming if the survey was the first sub-division of the farming district, or delineation of a road reserve.

The idea that all blazed trees were marked by John Forrest owes more to his stature as a politician than to his surveying career. A tree blazed by Forrest might be of heritage significance, but what is the value of a tree bearing the initials

of some unknown surveyor subdividing a property? Or the mark of a station hand, who, in a moment of boredom, chipped away at the nearest tree in 1905? Perhaps the value of preserving a marked tree lies in landscapes where there are no obvious human marks from the past, so the tree provides a relic of people. In cleared landscapes, the surveyor's description of the trees he marked is a record of the original vegetation; and those trees are plotted on the map accompanying that survey.

In Western Australia, heritage objects and places are divided into different types of heritage, which are registered and protected by different State Government departments and local governments. The different types of heritage include indigenous, natural, local, national, world and maritime heritage. Blazed trees appear to be considered 'local' heritage, and can be registered with the local government. Such trees could also be considered 'natural', or 'indigenous' or 'national' heritage. There is no strict rule to register a

FLORA

JILAKIN JARRAH

Kim Whitford

Just east of Kulin on the edge of Lake Jilakin, a large granite boss rises 50m above the surrounding plains. Here at the base of Jilakin Rock, grows the easternmost occurrence of jarrah (*Eucalyptus marginata*) more than 100km from its usual forest habitat. The jarrahs here have survived with only 335mm of annual rainfall; well below the 635 to 1,300mm suited to the species. These aren't stunted examples of their western cousins; many are tall, large diameter trees like those of the high rainfall jarrah forest. The largest of these, still living but a burnt out shell, is more than 135cm in diameter. The trees, growing along two ephemeral creeks, are believed to be a remnant from an earlier and wetter climatic period when jarrah occurred more widely across the south-west of Western Australia. Like many other granite outcrops, Jilakin Rock is a refugium – in this case a refuge where jarrah sheltered after a prehistoric rainfall decline.

The outlying location, together with the large size and growth habit of these trees, has generated interest since the early 1900s when the uniqueness of the stand was first reported in the *Western Mail*. The population has been included in studies of the historic and current distribution of jarrah, its genetics and provenance variation for mine rehabilitation. Jarrahs at Jilakin Rock are genetically similar to those of the main forest belt,

and in provenance trials have grown at similar rates to jarrah from Dwellingup, and notably faster than other outlying provenances that grow under similar conditions.

A decline of the Jilakin jarrahs was reported to have occurred about 1958 and deaths were observed in 1966. In 1981 nearly half the trees were dead and the deaths attributed to a fire in 1967; the only fire known at the site since 1921. As jarrah is well adapted to fire, and dead trees were observed a year before the 1967 fire, the deaths reported in 1981 may have been the same trees observed dead in 1966. The cause of these tree deaths and the frequency of decline events is unclear.

In the autumn of 2008, the Jilakin jarrahs again began to decline. Since then my colleagues and I have assessed, measured and photographed the trees. The historical records and our observations of their form and age indicate that the Jilakin jarrahs

have progressively declined over the last 50 years; possibly longer. There are many dead trees and dead coppice stems in the stand. Many of the smaller trees have multiple live stems about a dead central trunk. The condition of the remaining bark and the bare trunks indicates the trees' deaths have occurred at varying times. Although harvesting of some jarrah occurred at this site before 1918 and again in 1924, the cut trees coppiced from the stumps, and harvesting did not cause tree deaths. From the number of dead trees and dead coppice stems, the apparently varied ages of these tree deaths, and the progressive decline in the number of live trees, it seems likely that the type of decline we have observed since 2008 has occurred before at Jilakin. The photographs taken in 2008 and 2012 show the response - a dramatic loss of foliage and downward contraction of the



Left: a sick Jarrah in 2008
Above: dead jarrahs in 2012

Photos: Kim Whitford

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Jilakin jarrah

crown, some tree deaths and some trees shooting from the base.

Measurements of leaf and soil salt content indicate that salt from the adjacent lake is not affecting these trees. Other potential causes of decline that we examined – pathogens, fire, frost, insect damage, herbicide or fertiliser dumping or drift, stand age, soil disturbance, compaction, and weeds – can be excluded. Effects of low or high soil moisture – waterlogging, but particularly drought, stand density and competition – seem most likely to be potential causes of this decline. Rainfall in this region has decreased since records began in 1912, and the average maximum temperature has increased in recent years. With these climate shifts the extremely variable moisture environment that the trees would experience at the base of the rock puts them at risk. In such a low rainfall area the trees depend on a regular input of replenishing rainfall, appropriately timed to cater for demand and maintain relatively stable levels of soil moisture. Timing

of the rainfall is probably as important as the amount.

Today few jarrahs survive at Jilakin. Of those that persist, most have lost their original crowns and shot from the base. If the reduced rainfall and elevated temperatures continue it is likely that jarrah will be lost from the site. The survival of these unique trees probably requires removal of some of the rock sheoak (*Allocasuarina huegeliana*), York gum (*Eucalyptus loxophleba*) and jam (*Acacia acuminata*) which successfully compete with the few remaining jarrah. Such a reduction in stand density would reduce the demand on the available soil water and greatly increase the chances of the jarrahs surviving.

Kim Whitford is a research scientist in DEC's Science Division and can be contacted by email at: Kim.Whitford@dec.wa.gov.au. Peter White, Lachie McCaw, Estelle Whitford and Greg Durell contributed to this work.

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Blazed trees

marked tree, so it is up to the individual landowner/land manager to identify any potential heritage trees on their property.

The best protection for a heritage tree is that provided by the individual land manager, but there is a case for wider protection. There is certainly a need for an easy-to-complete register, with links to accessible sources of information, such as the State Records Office. It would be worth interested people - members of local museum committees for example - following up this idea.

Suggestions for what to do if you have a blazed tree:

Note the species and size of tree. Photograph it, plot its position with a GPS, and mark this site on a map of the property. Protect it from stock.

In your assessment of the tree's heritage value, apply the WA State Heritage Office's criteria for places. These criteria, including aesthetic value, historic value, scientific value, social value, rarity and representativeness, will help you decide if the tree is worth preserving, and enable you to present a case to your local shire for registering, preserving and protecting the tree.

HOW TO TURN A SHEOAK TREE INTO A SHEOAK BUSH!

Emily Elsasser

Just thought you might like to see my glorious sheoak 'tree'. I took the photo after it rained, so it is a bit droopy.



The history of the tree's unusual shape is that for years - possibly four or more - it was growing in the lawn, quite literally. It was regularly mowed flat, always part of the lawn and not recognisable as anything else. One day about two years ago, I noticed the different 'grass' form and thought I might give it its own space to grow up and see what it actually was. The 'grass' looked like sheoak, but I wasn't sure. Some of the 'branches' were radiating out about a metre long when pulled up and separated from the lawn. I did not plant the tree, and I have also noticed that Peppy trees can integrate quite easily into the lawn too.

I gave it its own garden bed and it grew quickly and lushly. I have pruned the branches back quite severely twice to keep it low and more compact. All my visitors admire the wonderful bush that I have, and do not quite believe me when I tell them it is a sheoak tree! It is constantly flowering and provides a beautiful contrast in foliage within the garden.

Emily Elsasser lives in Albany and she can be contacted by email at: freds@hotmail.com.au

WEEDS

AFRICAN BOXTHORN CAN BE A NASTY PROBLEM

Mathew Kennewell

African boxthorn (*Lycium ferocissimum*) is one of 12 recent additions to the Australian Government's Weeds of National Significance (WoNS) list, while the South Coast NRM region covers 6 million ha and includes some of the most diverse and precious ecosystems in Australia.

So what's the connection? African boxthorn is invading the south coast's unique natural landscape and it has to go!

African boxthorn is a spiny, woody perennial shrub present across inland and coastal areas of southern Australia. In WA it is found from Carnarvon to the South Australian border with infestations in the Wheatbelt, northern and southern coastal heaths, as well as offshore islands from the Houtman Albrohlos to the Recherche Archipelago.

Its most prominent features are hard spiky thorns which grow up to 10cm and can easily puncture 4WD, tractor and bobcat tyres and severely injure people and animals. This thorny devil was introduced from its native South Africa as a hedging plant in the mid-19th century. It has no natural predators and is considered a major pest species.

In late 2011, South Coast NRM received funding through the Australian Government's Caring for Our Country program to deal with the issue of boxthorn on the south coast of WA. Precious assets under immediate threat from this thorny invader include Lake Warden, Lake Gore, Stokes Inlet and the Fitzgerald Biosphere. As boxthorn invades the natural bushland of these areas of international importance, it displaces native fauna and flora by forming dense impenetrable thickets. This undergrowth also provides excellent cover for invasive predators such as foxes, cats and rabbits and has even been known to adversely affect beach access for colonies of seals, sealions and seabirds on offshore islands.

African boxthorn is a multi-branched shrub which grows up to 6m tall with downward curving hairless branches, which all terminate with a long spine at right angles to the stem. Its fleshy, oval leaves are sometimes dark green - although a bright green variety is more common - and measure 10-40mm long and 4-10mm wide. They occur in whorls of 5-12 at nodes along the stems and at the base of spines. Flowering occurs all year round, with flushes in autumn and spring. The flowers can be white or lilac-purple, are funnel-shaped and hang from a long stalk. The plant also produces round berries which ripen from green to bright red and contain 35-70 seeds.

African boxthorn should not be confused with the native Australian species (*Lycium australe*) which grows in the Wheatbelt, Goldfields and on the south coast of



Top: bushes can become large and dense.

Lower: showing thorny stems, leaves and ripe fruits, brightly coloured to attract birds.

Photos: Charlotte Powis

WA. It is smaller than the African species with broader leaves and berries which contain five to 20 seeds.

African boxthorn re-grows readily and broken stems or root pieces can remain dormant for several months before re-sprouting. Its seeds are highly viable and are thought to live up to six years. A mass germination of seedlings (which take more than two years to produce fruit) occurs after foxes and birds consume the red berries and excrete their seeds. When temperatures exceed 28°C, African boxthorn shuts down and sheds its leaves, but remains active during the cooler months of autumn, winter and spring.

Methods of control must be undertaken from autumn until temperatures rise above 28°C or extended periods of drought are experienced. An easy way of testing for

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African boxthorn

dormancy is by giving the plant a shake. If its leaves stay attached, the plant is actively growing and can be treated. However, before you attempt this, ensure you are wearing protective clothing to prevent injuries from its spines. Hand pull, or dig out very small seedlings and remove all the roots.

For mature plants, cut at the base and paint with 50% glyphosate or spray a basal bark treatment of 250ml Access® in 15L diesel to the bottom 15cm of the stem of uncut plants. Do not leave cut stems in contact with the soil. The plant can also be effectively foliar sprayed with glyphosate (450gm/L) 100ml to 10L of water and 25ml of Pulse. Make sure the entire plant is covered and follow up with more treatment on any re-sprouting stems or regeneration for up to six years.

Another tool in the anti-African boxthorn armoury is the cut and swab machine, devised in WA by Australian Allwood Coppicing and Pruning Services. This is essentially a chainsaw attached to a small excavator which cuts the plant before chemically treating its stump to prevent regrowth. The job is then completed by the 'plucker' which rips the plant from the ground and stacks it ready for incineration. Monitor boxthorn-free areas every two years to detect and remove seedlings before they fruit.

To date, South Coast NRM has employed two Indigenous works teams and two separate contractors to implement control activities in Ravensthorpe, Stokes Inlet and Esperance, where more than 5,000 plants have been treated. Control at Stokes Inlet has seen Young River Station completed, while work at Ravensthorpe has just started. Known African boxthorn locations



*Mechanical removal.
Photo: Charlotte Powis*

have been recorded and mapped for treatment.

Local communities have supported these projects with great enthusiasm, by undertaking their own control and supplying additional resources such as herbicide, diesel, property access and information about new infestations. People can become involved in the project by informing South Coast NRM of infestations which have been privately controlled or infestations where assistance is required. Contact Charlotte Powis by phone on 9845 8527 or by email at: charlottep@southcoastnrm.com.au.

Mathew Kennewell is Invasive Species Coordinator at South Coast NRM, Albany.

PLEASE BE CAREFUL WHEN ORDERING GARDEN BULBS OVER THE INTERNET!

At this time of year people often order spring flowering bulbs from catalogues or the internet. Please take care to ensure that what you order doesn't pose a threat to the ecosystem in Western Australia!



A case in point is Chinchinchee (*Ornithogalum thyrsoides*), shown on the photo taken at Tambellup. It has been introduced from South Africa, as it is very beautiful, but it can be deadly to stock, causing blindness in cattle and foetid haemorrhagic diarrhoea in sheep. It has been found in the Kojonup area, in the Perth Hills and on a granite outcrop near Wongan Hills. At all locations so far it seems to have spread from old homestead sites, or from garden rubbish dumped in the bush.

There are many other pretty bulby things that could become weedy in WA and most local nurseries do not stock them (though national chains whose buyers are in Melbourne or Sydney may well do so). Please take care when buying and if you are not sure, ask your LFWO or DAFWA weed person for advice.

ADDITIONAL WEEDS OF NATIONAL SIGNIFICANCE

Twelve additional species have been added to the Weeds of National Significance (WoNS) list. They are:

- African boxthorn
- asparagus weeds
- bellyache bush
- brooms
- cat's claw creeper
- fireweed
- gamba grass
- madeira vine
- opuntoid cacti
- sagittaria
- silverleaf nightshade
- water hyacinth.

We hope to have an article in the next issue of *Western Wildlife* to give detail of how these species were selected and what it will mean for Western Australians, especially regarding funding.

FLORA

THE PRIMROSE FAMILY IN WA

Penny Hussey

Primulaceae, a worldwide family, has about 30 genera and about 1,000 species, chiefly in the cold temperate regions of the northern hemisphere. They are mostly annual or perennial herbs and a few, both weeds and native, do occur here in WA.

The primrose (*Primula vulgaris*) which gives its name to the family, is loved throughout northern Europe as a sign that spring is on its way. It was thought to have medicinal properties. When Nicholas Culpepper published *The English Physician, or Herball* in 1653 he wrote: "Of the leaves of primroses is made as fine a salve to heal wounds as any I know; do not see your poor neighbours go with wounded limbs when a halfpenny cost will heal them". One thing I can say with surety is that primrose flowers make a superb light, delicate wine, as do the flowers of its relative, the cowslip! There are about 500 species of primroses throughout the world and many are cultivated. However, some of these species, especially those from the Himalayan region and western China, contain toxic principles that can cause dermatitis in susceptible people. This group includes the mauve flowered species often grown as pot plants.

Perhaps it is the connexion between primroses and spring, with its connotation of rising sap and fertility, that gives rise to the idea of the 'primrose path' which denotes the easy way, the path of pleasure and self-indulgence. Shakespeare, in *Hamlet* (1 iii, 47) has a sly dig at priestly hypocrisy when he says:

"Do not, as some ungracious pastors do,
Show me the steep and thorny way to heaven,
Whiles, like a puff'd and reckless libertine,
Himself the primrose path of dalliance treads,
And recks not his own rede."

There are three genera from this family in WA; *Asterolinon* is introduced, *Anagallis* has three weeds and a native species in the Kimberley while *Samolus* has several native species.

Asterolinon linum-stellatum is a tiny branching annual with flowers no more than 2mm across. I well remember an excursion to Garden Island when Greg Keighery leant precariously down an old well to pull out a fistful of stuff, saying "What's this?". If you look in *Western Weeds*, you'll see the photo I took of that fistful he was holding up. It has since also been found near Toodyay, but it is so inconspicuous that it could well be elsewhere.

Anagallis are known collectively as the Pimpernels.

A. arvensis is a widespread weed of disturbed areas including cropland throughout the southwest. It has two varieties with different flower colours; var. *caerulea*, the blue pimpernel, has blue flowers while var. *arvensis*, the scarlet pimpernel, has red ones. In England, another name for the scarlet pimpernel is poor man's weather glass, because the flower closes up when clouds cover the sun. Perhaps it was this ability to become invisible that inspired Baroness Orczy's name for her title character in *The Scarlet Pimpernel*?



The pimpernel has long been used in the Mediterranean region to cure many disorders, and both Dioscorides (a Greek who lived in Asia Minor, practiced as a physician to the Roman army and who compiled all his herbal knowledge into the book *De Materia Medica*, published in AD 60 as an instruction manual for other military physicians) and Pliny (a roman aristocrat and amateur natural historian who, at much the same time, wrote

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Primrose family

Natural History, an encyclopaedia of the natural world) used the name *Anagallis* for this plant. Dioscorides thought the red was the male plant and the blue the female. As a medicinal plant, its use continued well into the Middle Ages although some of the treatments sound a little odd to modern ears. Culpepper, for example, recommends that the juice be mixed with honey to cure the toothache by “being dropped into the ear on the contrary side of the pain”. When Linnaeus introduced his new system of nomenclature in the 1760s, he merely followed existing custom with this name, as it was well known in herbal circles.

Chaffweed (*A. minima*) is a plant with tiny pink flowers in leaf axils, growing on granite rocks and claypans around Perth. It too is introduced, but in the Kimberley there is a native species, *A. pumila*, a low sprawling annual with tiny white flowers that grows on damp sandy loam. This plant is found worldwide in tropical areas.

The genus *Samolus* was also named by Linnaeus. He gave it a name used by the ancient Roman writer Pliny for a marsh plant, which may have been what we now refer to as *S. valerandi*, brookweed, but equally might have referred to something quite different! The genus has 10 species in the southern hemisphere with five in WA.

Brookweed (*S. valerandi*) is a wetland plant growing at Gingin and from Yallingup to Augusta (see *Western Weeds* for a photo). Reedy brookweed (*S. junceus*) is a tufted plant of creek banks and swamp edges, often on clay soil, that could be mistaken for a rush or sedge until it produces groups of small pinkish-white flowers in early summer. It is quite widespread across the south-



Above and right: Reedy brookweed growing on a recently-burnt, degraded saline creek bank near York. It is in full flower, though the small pink flowers are not spectacular. The clumps grow from rhizomes, and probably could be lifted, divided and transplanted to increase diversity on saline revegetation sites. On page 12: Blue pimpernel and scarlet pimpernel.

Photos: P. Hussey

west but is often overlooked. It can tolerate a degree of salt. Creeping Brookweed (*S. repens*), is similar but smaller, and has leafy stems. A variant occurs in the Pilbara and up to the Kimberley. It occurs near water, in the north on flood plains, often on saline soils. Also found around claypan edges are the tufted perennials, *S. caespitosus* and *S. eremaeus*.



Did you know that ...?

... people are eating more marine mammal species than ever before? A recent paper* reports that since 1990, people in at least 114 countries have consumed one or more of at least 87 marine mammal species. Eating marine mammals is considered a significant aspect of food security and cultural well-being in many regions – including in the Shark Bay/Cape Range region of WA, where stranded dugongs represented a week-long feast for the local Aboriginal tribe.

With increasing global population and food scarcity, as well as having limited international legal protection, it would seem likely that consumption of the smaller cetaceans (dolphins and porpoises) and pinnipeds (seals and sea lions) will increase. The authors conclude that it will be important to study the motivations that underlie consumption of marine mammals before more effective conservation measures can be designed and implemented.

[*for ref. contact Ed.]

NEWS

LFW GOES TO THE SMALL PROPERTY EXPO

Green Skills recently held a Small Property and Harvest Festival Expo in Denmark. There was an extensive program of activities with a whole week of films, workshops and field days on everything to do with small property management from animal husbandry to growing vegetables and managing bushland. The event attracted hundreds of people during the seven days and culminated in an expo on the last day. LFW had a stall, along with many small property owners selling their produce.

Sylvia Leighton assembled the display, specifically designed to attract children - she managed to fill a large 4WD vehicle and huge trailer with banners, vegetation, equipment and a gazebo. As well as the LFW stall, there was a tour of Daisybrook Farm, a LFW-registered property in Denmark.



The LFW stall concentrated on activities for kids, with a colouring-in competition, play dough and touchy-feely. But the parents found lots to interest them too!
Photo: Sylvia Leighton

On the tour, owner Murray Brooker was keen to point out the benefits of the bush to his farming operation. 45% of the farm is natural bush, either jarrah forest or regenerating tea tree. Murray explained that the bush provides homes for predators of pests and helps to bring nutrients up from deep in the soil.

Murray and Catherine's 100-acre property will soon be able to support them both, this is remarkable for a small property and even more so for one which was almost ruined by potato

production and only 50 or so acres are actually farmed. In the eight years that they have owned the property the Dieldrin levels have gone from almost too high to farm, to nil.

The remarkable improvement in soil health is due to stopping all chemical use on the farm, along with other biodynamic practices. The fences are just 90cm high which allows wildlife free access without damage to fences. The sheep are so happy on their side of the fence that they don't stray. The back boundary, between the reserve and the forest on the block, is unfenced.

Murray's biodynamic lamb is highly sought after and he believes that farming for the local market is the way of the future. He recommends that small landholders start growing a high-quality product for local consumption.

Murray said that the LFW report and support has enabled him and Catherine to better understand and manage their property as well as giving them a head start in identifying the plants and animals and increasing their observation skills.

Dorothy Redreau

BALIJUP SURVEY

Green Skills, in partnership with LFW, organised a weekend biological survey camp and Biodiversity Restoration Field Day on Balijup farm near Tenterden in March. The farm has more than 700 hectares of forests and wetlands and is remarkably diverse. The property is owned by the Hordacre family and Alan and Richard Hordacre were on hand during the weekend to provide their knowledge of the

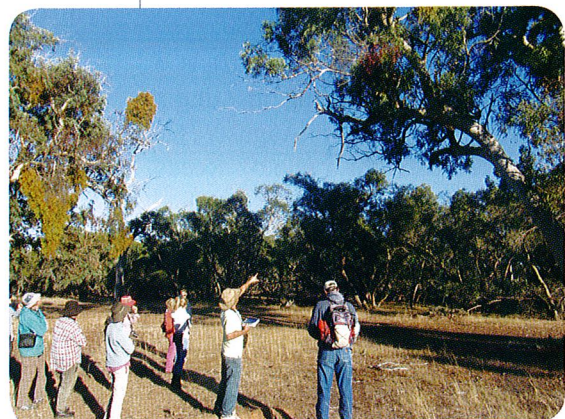
history and environment, based on many years' observation. During the weekend, a number of experts and amateur natural historians carried out surveys of the flora, fauna and wetlands to expand local knowledge of this unique LFW property.

Melaleucas in the wetlands were surveyed, and proteaceous rich vegetation associations were mapped. Bird-watching excursions added to the number of bird species noted for the property. Sylvia Leighton spoke of fauna surveying she was undertaking on the property with support from the Gillamii Centre (Cranbrook) and landcare trainees and volunteers. Threats, including salinity and *Phytophthora* dieback were also discussed.

Gondwana Link planner, Barry Heydenrych, outlined how Balijup was important for at least five of the eight conservation targets set out in the conservation plan for this section of Gondwana Link. The events, attended by more than 40 people, yielded valuable information to assist with future restoration efforts of this important ecological asset.

For further info contact Basil Schur at the Green Skills Denmark office on 98483301 or by email: bschur@greenskills.org.au

Phil Worts points to something on a bird walk. Photo: Basil Schur



IN BRIEF

CHECKLIST OF THE FLORA OF DRYANDRA WOODLAND

If you visit Dryandra Woodland, you may be interested in obtaining a copy of the flora list recently published in the *WA Naturalist* (Vol 28, Jan 2012). Authored by Greg and Bronwyn Keighery, the article *Vascular Flora of Dryandra Woodland (Lol Gray and Montague State Forests)* provides a checklist of 928 taxa, 813 are natives and 115 are weeds.

To find how you can obtain a copy of this publication, contact the Western Australian Naturalists' Club by email: wanats@iinet.net.au

RAINBOW LORIKEETS AT KATANNING



Two rainbow lorikeets have been discovered at Katanning. It is believed that they were escaped pets, and they have now been removed.

These birds are beautiful but also very destructive and are serious pests affecting horticulture, infrastructure and the environment. They cause severe damage to fruit crops and compete with native species for food and nest sites.

DAFWA is asking residents in the Great Southern to keep an eye out for these birds, and report sightings to the Pest and Disease Information Service on 1800 084 881.

Photo: DAFWA

Congratulations...

to Ana Nail, whose LFW-registered property at Dunsborough has recently won the Sustainable Garden prize in the *Australian House and Garden* magazine.

Ana said that while reading the magazine, she noted that the first prize in a garden competition was a trip to Chelsea Gardens Show in Britain. And so she thought, can't hurt to give it a go! Later, Ana received a phone call from a journalist from the magazine asking if she could be interviewed. The official arrived from the eastern states, conducted the interview and the next thing Ana heard was that she was the overall winner of the Sustainable Gardens prize for the whole of Australia!



Ana has been managing her property with concern for issues such as dieback management and treatment, weed control and fire management and, with the help of the whole family, has established a wonderful native garden around their house. This gives its own rewards, but it is nice to have a prize as acknowledgement, and the financial reward that goes with it!

Congratulations to Ana Nail and her family!

Cherie Kemp

Photo: Ana Nail

PLEASE NOTE: If you change your postal address, phone number or email, please let LFW know.

Congratulations...

to Deb 'Spoons' Perry of Bridgetown, who doesn't just spot leucistic cockies (see WW 13/3), she's a talented percussionist who reached the finals of *Australia's Got Talent* in 2008, playing the spoons.



Recently she made a video clip, filmed in a collaboration between Deb and fellow LFW member, Carol Lander of Boyup Brook. Carol filmed Deb feeding 'in care' kangaroos on Carol's place and then performing her unique spooning style on Deb's Bridgetown farm. Released on *You Tube*, it became a viral internet sensation with more than half a million worldwide visits in its first week and probably will have had over a million hits by the time this article goes to print.

As a result of this, Deb has featured on Australian TV and will be travelling to the USA and the UK for TV appearances. A nice bit of fun and excitement for the 60-year-old sheep farmer! So the spoons are not likely to be put back into the kitchen drawer just yet!

You can see the clip on: <http://www.youtube.com/watch?v=ZNY3i6MybpU>

Sheila Howat

Photo: Carol Lander

[Congratulations from the LFW team, but we have a request, Deb and Carol - the next time you make a world-enthraling video clip, could you somehow contrive to have a LFW sign in the background somewhere?! It would be great publicity! - Ed.]

NEW BOOKS

Travellers guide to the parks and reserves of Western Australia Fourth Edition

Simon Nevill

Simon Nevill Publications. 2011

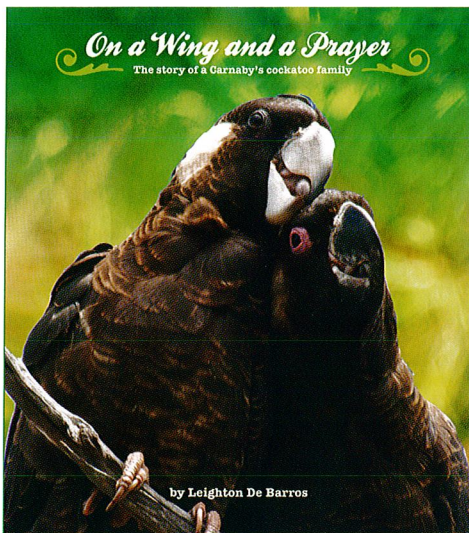
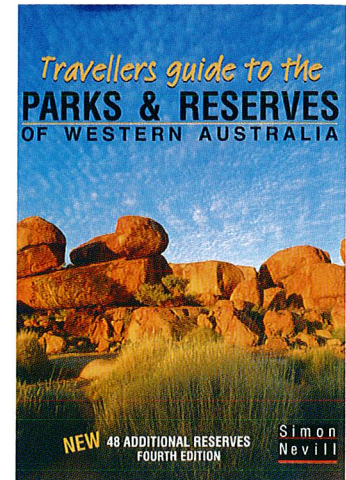
\$35.99 from selected booksellers or by contacting snpub@bigpond.net.au

There are so many beautiful, unspoilt natural areas to visit in Western Australia – not just the few, high-profile places, but lots of lovely sites where you won't be crowded out by other travellers.

Whether you are looking for a lunch spot near Perth, a weekend in the Wheatbelt, or two months touring the state, this book will give you lots of ideas. It is packed full of information, not only about places and the facilities available there, but snippets about flora and fauna, including some less obvious creatures like jumping spiders. As with all of Simon Nevill's books, the photos are superb, and the hand-drawn site maps easy to interpret.

First published in 2000, this fourth edition has been fully updated and 48 additional reserves added. I particularly like the fact that it lists a whole suite of Wheatbelt granite rocks, just waiting for you to explore them. Many would be an easy weekend camp-out from Perth. Have a look through the book, then choose your destination!

Penny Hussey



On a wing and a prayer – the story of a Carnaby's cockatoo family

Leighton de Barros

Department of Environment & Conservation. 2012

\$24.95 – Available from DEC offices, ABC shops and other good bookstores.

Perhaps you watched the documentary *On a Wing and a Prayer* shown on ABC TV? This book is based on the documentary and introduces us to the world of the Carnaby's cockatoo; one of five species of black cockatoo whose populations have declined dramatically. Every milestone in their struggle to survive is documented through the engaging story of one cockatoo family. This is a story of love, loss and sheer endurance.

Read about the parent's unique nest-selection behaviour, their elaborate courtship, and revel in the miracle of new life as the first chick breaks through its shell. Much depends on the chick's survival but life at the hollow is tough and threats are many – hypothermia, starvation, predators and poachers are but a few. While the female tries to protect her precious offspring, the male risks predation, exhaustion and road traffic accidents to find food for his family in a depleted natural habitat.

With easy-to-read text and superb photographs, this book will really bring home to you the pressures that threaten the survival of this iconic bird.

Cathy Birch

DO WINDFARMS AFFECT WILDLIFE?

Louise Higham of Williams has done a lot of research into this question, studying research papers from Australia and overseas. If you are interested in this, you might like to contact Louise directly to discuss her findings and where you can access supporting documents. She can be contacted by email : rlhigham@bigpond.com



LFW staff at the annual workshop, May 2012.

Back row, L-R: Fiona Falconer, Wayne Gill, Penny Hussey, Sheila Howat, Mal Harper, Phil Worts, Sylvia Leighton. Front row, L-R: Heather Adamson, Dorothy Redreau, Zara Kivell, Avril Baxter, Cherie Kemp, Claire Hall.

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 Environment and Conservation.

Published by the Department of Environment and Conservation, Perth.

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