

# *Wildlife and Native Plants*

## *Study Group Newsletter*

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Dear Members,

What a year so far! - we certainly are a land of extremes, of droughts, flooding rains, fires and strong winds. I do hope that all of you are keeping on top of things, and that some joys may come from such pain as we have experienced in our great nation to date. Life does go on, despite water restrictions, never-ending drought, and global warming. If anything, the situation reminds us of the value of our Australian flora and fauna species and how they have adapted to survive a country of extremes.

Our APS SA President reminds us that 'those plants surviving in our gardens are testament to good gardening practices (such as) applying a slow release fertiliser at planting and prudent watering with increasing intervals between watering.' He also recommends the use of mulch and the 'occasional side dressing of Rapid Raiser... applied in winter or spring.' Phil Robinson, APS Victoria's Editor, says that this is the first year his garden has been hit by drought. 'My general principle has been that plants can have water in their first twelve months, and after that they are on their own. Under this harsh regime, the Eremophilas, of which we have now about 70 or 80 different species, are flourishing. Correas and Croweas seem to have no trouble, but many others, including some Grevilleas, are either dying or showing such signs of stress that I'm having to bend the rules somewhat to keep them alive.'

APS Vic. President Paul Kennedy said in December, that he has never known

it to be so dry. 'The grass breaks under your feet' And yet, 'despite the drought, plants have flowered prolifically and the garden has looked exceptionally well. Perhaps the plants flower well in dry years as there is a need to set plenty of seed in case the plant does not survive the drought.'

This theory probably warrants further investigation. I have observed on our own property that some species will flower more than once a year, when conditions are right. A seasonal imbalance also upsets the timing of flowering, which has a spin off to other species in the natural world. Some fauna species do not reproduce in dry seasons, saving their energy for better times when there is adequate feed available.

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## Ringing the Bluebells

The Bluebell Family (*Campanulaceae*) rings out a series of interesting and intriguing tunes. Typically their versatility ranges from insignificant ground covers spreading like blues mats within rockery displays to feature plantings of blue spikes framing spectacular spring herbaceous borders.

Besides these much loved varieties, there are many less conspicuous family members. These include the dainty native woodland Bluebells (*Wahlenbergia* sp.), the distinctive, much-prized exotic Lobelias (eg Red Cardinal Flower, *Lobelia cardinalis*), the native Lobelias, (eg The Poison Lobelia *L. pratioides* 'Angled Lobelia' *L. alata*), as well as the unusual bulbous Balloon Flower (*Platycodon grandiflorus*). Interestingly the family name *Campanulaceae* is derived from the Latin word for bell as seen in the word for bell-ringing *campanologist*.

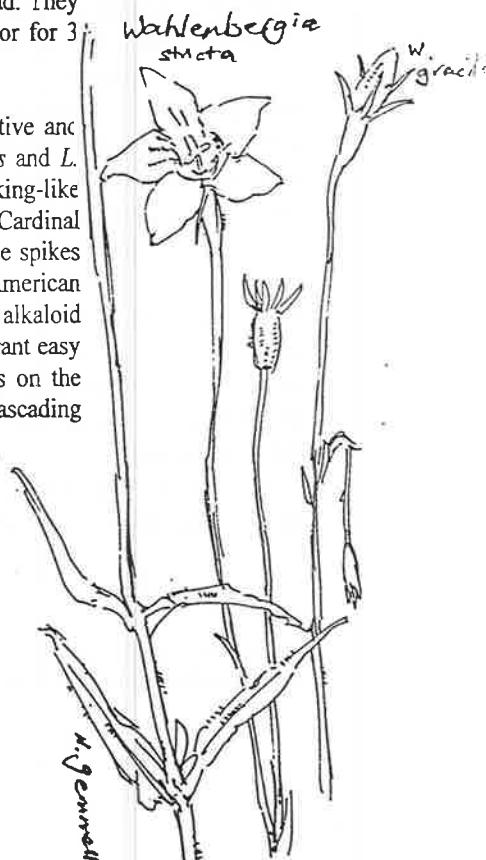
Of the *Campanula* species, the popular 'Canterbury Bells' (*C. media*) are prized for their showy spikes of cup and saucer shaped flowers. Their name 'Canterbury Bells' honours St. Thomas a Becket, since the flowers were similar to the horse bells used to cart the pilgrims on their long sojourns to worship at his shrine. Some *Campanula* species have swollen edible roots, while others such as *C. rapunculus* are grown for blanching as a celery substitute or boiling for their asparagus-like shoots.

The delicate bell-flowers of the native *Wahlenbergia* species are commonly seen in summer as bold blue splashes within our grassy woodland. They flourish in the inter-tussock spaces amongst the native grasses and sedges providing tiny nectar pools for a variety of moths, butterflies, bees and ground feeding birds. They include the graceful 'Annual Bluebell' *W. gracilenta*, the blue flowering 'Sprawling Bluebell' *W. gracilis* and the larger, funnel-shaped flowers from the 'Naked Bluebell' and 'Tall Bluebell', (*W. gymnoclada* and *W. stricta*).

All these species thrive in the protective care of a back yard native grass landscape, rewarding the grower with long periods of a rather rare range of blue hues. By late summer they die back to an undergrown rootstock, happily reappearing during winter. An unexpected bonus is that their tasty petals add interest to any garden salad. They are easy to grow. Simply collect the seeds and store them in the refrigerator for 3 months prior to sowing.

The *Lobelia* genus is a fascinating family member represented by both native and exotic favourites. The distinctive and much-prised exotic *Lobelia cardinalis* and *L. syphilitica* were named the 'Red and Blue Cardinal Flowers'. Their stocking-like flower shapes were seen as closely resembling the stockings worn by the Cardinal during the reign of Charles 1<sup>st</sup>. Their flowers typically form bold red or blue spikes ideal for herbaceous borders. Their roots have a cultural importance for the American Indians being sort after as a powerful tonic due to the presence of the narcotic alkaloid called Lobeline. Amongst the Lobelias, the spectrum of blue shades and tolerant easy care nature makes *L. erinus* still one of the biggest selling bedding plants on the market. Its ability to enhance hanging baskets by forming long blue beards cascading over the sides has continued to enhance its popularity.

Phil Watson "Campanulaceae Family"



Our native Lobelias also have a variety of attractive flowering forms, ideal for rockeries and moister parts of the native garden. Examples include the pale blue fan-shaped flowering Angled Lobelia, the deep blue tubular flowering Tall Lobelia, *L. gibbosa* and the tufted, white throated, dark blue to light purple-blue flowering Tufted Lobelia *L. rhombifolia*. These Lobelias also contain the active ingredient 'Lobeline' which was traditionally used by herbalists as a relaxant. Given that it may detrimentally interfere with the nervous system, care is recommended. Recently, scientifically controlled doses administered by surgeons, are providing a favoured means to dilate patient's air ways during operations.

Unknown to most gardeners are a few delicate creeping herbs that are worthy of introducing into moister sections of your native garden. The Tassie natives, Swamp Isotome (*Isotome fluvialis*), Matted and Poison Pratia (*P. pedunculata* and *P. irrigua*) thrive naturally in swampy conditions or on the fringes of your water ponds presenting trailing mats of soft blue star-like tubular flowers. Their quick to root, long spreading runners enable them to act as soil binding erosion controllers or grass alternatives in low traffic areas.

The dainty, native Rock Isotome or Wild Tobacco (*I. petraea*) is naturally found in amongst granitic rock crevices in the dry outback. However, its nicotine-like action (presence of Lobeline) on the Aborigines when the leaves were chewed adds another layer of interest to this attractive, hardy herb. The dried and powdered plant when mixed with mulga tree (*Acacia aneura*) ash was used as a pain killer and as an as, irin-like aid for colds

In conclusion, don't put off too long in applying practically, this newly discovered knowledge about the 2000 member Bluebell family. Select a gem or three from the range of species mentioned and ring a few new notes of interest into your home landscape.

#### EDITORIAL CONTINUED from page 1

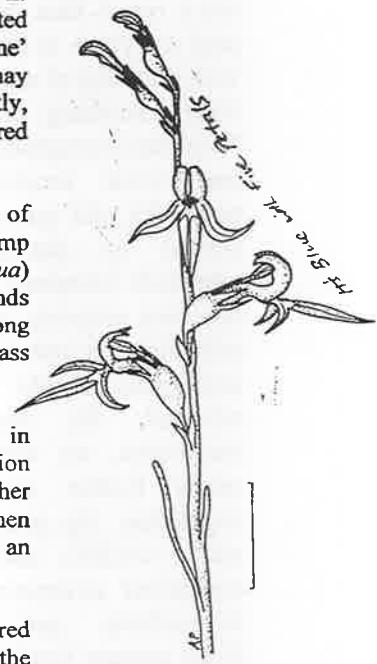
We experienced some very high winds prior to Christmas which ripped through our tall Eucalyptus trees. This reminded me that some species, like our lemon scented gum (*Eucalyptus citriodora*) are notorious for dropping limbs, wind or no wind! Others that are known to do this include *Eucalyptus camaldulensis*; *E. maculata*; *E. mannifera*; *E. regnans*, *E. rubida* and *E. viminalis*. I have seen mini cyclones rip out a large swathe of species in the mallee, such as *Eucalyptus incrassata* and *Callitris glauca*, turning and twisting everything in its path. Those Eucalypts left standing albeit bent in the ground, set large amounts of seed that year, almost as if knowing that the parent tree's days were numbered. The tree was dead the following season, replaced by many little seedlings. Perhaps this confirms Nature's way.

#### Butterflies

- Live over large areas of Australia - not all are found at the same time or place.
- Have two pairs of scale-covered wings held vertically above their body when at rest.
- Colourful adult butterflies are very different to drab caterpillars.
- Caterpillars eat leaves - butterflies suck nectar.

#### Native Turtles as pets

- Are easy and inexpensive to maintain
- Each has a personality of its own
- Ideal as pets which all ages can enjoy
- Turtles like meat and prepared turtle foods -give only what they can eat
- Like to swim underwater, but also like rocks and sand



Tall Lobelia, False Orchid  
(A Prescott)

## REVEGETATION - At What Cost?

By Chris Jones

Putting trees back into the ground is not a novel idea. My experiences over the past ten years in doing just that, leaves me with a feeling of achievement, and of having done something of value. The areas that have been revegetated had been barren, soil and wind eroded landscapes, weedy paddocks, old quarry and refuse sites. We started by planting several thousand tubestock (obtained through State Flora) on our own property, and seed collection was possible after several years. In this time the marsupials, birds, reptiles and insects returned. By proper seed collection techniques, we were able to replace and return further cleared areas to native vegetation. By encouraging the return of native wildlife, and a return to 'a nature controlled' environment we saw a reduction in salinity and environmental damage. Even pasture land was value-added by the practice of planting windbreaks and shelterbelts.

But today I look around and see the damage to the environment caused by indiscriminate seed collection and harvesting where people have been intent on gathering as much seed as they can from every living tree. I am not referring to the commercial seed companies which often carry a lot of the blame, but to the individuals and groups working for some cause or rather, without any understanding of the damage that they are causing. In some instances they have received a basic instruction on collection and identification, but let them loose in native vegetation and they do more harm than good. There is no regard to the genetic pool, or the damage caused by collecting every bit of seed available. All of which adds to the decline of species throughout the natural world.

Commercial seed collectors collect under permit with strict guidelines on where to source the seed and the quantity. Today many of the commercial enterprises have their own nurseries and seedbanks from species they have planted on private lands, and collect from that source only.

Individuals and groups however are different. Some groups are exceptionally well trained and understand the basics of collection guidelines, but the majority of people collecting seed (some under a blanket organisation permit) have no real understanding of the techniques, or the status of the species, and are tuned by competitive greed to collect as much as possible from any source. My personal belief is that any organisation should have its own seedbank and nursery and not have its members collecting seed from the wild.

As I look around today in certain areas I can see the damage that has been, and continues to be caused. We can all relate to Local Government contractors destroying rare species on roadsides by their heavy earth-moving equipment, and where road widening is their main aim, with no thought to the vegetation being destroyed. But the collective damage from indiscriminate seed collection techniques by groups and individuals is evident. Trees infected by pathogens from non-sterile techniques in pruning; shrubs butchered in an effort to get every available bit of seed - with damage to bird nesting and roosting sites; trees and shrubs suffering from natural predators that have gone 'out of control' in their numbers and quantities to the detriment of the plants (eg. mistletoe overkill, clawfoot disease, Mundulla yellows); a lack of seed germination or plant regeneration because there is no seed left on a plant; the destruction of rare or threatened plant species by those who don't know any better and believe such plants to be weeds; the loss of habitat and the subsequent decline in species of birds, reptiles, insects and invertebrates; the introduction of feral pest and weed species by soil disturbance from vehicles carrying collectors, or collectors not complying with disease management through boot protection and sterilisation (eg. in areas of phytophthora) ; and the list just goes on and on. Not everyone can or will undergo training in appropriate techniques. Even government agencies set upon a notion of fire to 'assist' regeneration, will destroy habitats and species and can cause local

extinction. Nature provides her own wildfires, and the belief that all Aboriginal nations and clans used fire as a tool is erroneous. Fire was used to flush game from an area, as a means to supply food for the people. It was not 'a burn the countryside' for control, or elimination of pest species, nor did it create the decimation of specific areas, and gene pools . This tends to be forgotten by enthusiasts who believe in the theory of fire propounded by today's government agencies.

So what is the answer? The industry has shown the way. Seed collections from previous private land plantings, harvesting in an ordered way, with regard to how much and from how many trees and shrubs. Perhaps more care will occur if this happens on private land. Possibly more could be achieved if landholders received further financial encouragement or incentives to return areas on their property to natural areas and establish seedbanks. More trees could be put back into the ground in a far more effective re-establishment of vegetation.

Regardless of how it can be achieved, pristine or wilderness areas of vegetation or areas of known threatened or vulnerable species should be 'no go' zones, and remain untouched by collectors. Furthermore, collection from nature reserves, national or conservation parks should only be allowed when the seed collected is going into authorised revegetation projects within those park areas. Collection remains possible from fallen roadside vegetation (from wind or storm damage) or where tree pruning aids road safety and is absolutely necessary. Today in a lot of areas, this is mulched and then sold back to the community. There should be consideration for the collection of seed materials which could be propagated by local government contractors with the outcome of returning these back to the community.

I can't stress highly enough the importance of seed collection and harvesting from established plots, whether they be from nursery seedbanks or revegetated areas on

private or Local government lands. By continuing the practices of indiscriminate seed collection that has been a snowballing activity of the past few years, we are working against nature, destroying more than we are trying to achieve. And the damage is not just to the vegetation but the habitat and biodiversity of an area. If we continue along the same path, the natural vegetation and habitat of Australia will be irreversibly damaged, seriously impaired and become further out of balance. All such factors which will impact on the landscape, on greenhouse warming, the reduced available water supply, and the loss and decline of species.

This article was written many years before the devastating fires which consumed much of Australia's 'high country' and which has damaged irreparably in some places the natural biodiversity of the area and the habitat of threatened species. It was also well before the current water crisis.

'The Book of the Sturt Pea' co-authored by David Symon and Manfred Jusaitis, of the SA Herbarium, will soon be released.

*From a talk given by David Symon to the Field Naturalist Society and printed in The South Australian Naturalist, Vol.80 No.3/4 July/Dec.2006*

'David Symon...spoke about the book...written on various aspects of the Sturt Pea.... The subjects covered range from records of the Sturt Pea by early explorers, and the names they used, references in European works, Australian research, popular uses and logos, to poetry and prose writings about the flower.

The first record of a European collecting Sturt Pea is that of William Dampier, at the end of the seventeenth century, who was then in the Roebuck Bay region. Other observations in Western Australia included those of Oxley, and also Cunningham and Parker King, while Eyre found specimens near the Gawler Ranges in South Australia. In 1844 Sturt recorded the plant in Central Australia, as did Lewis, and seeds were brought back to Adelaide. Well

before the end of the nineteenth century the flower was being used as a basis for designing embroidered items and many other representations appeared.

A number of common names have been used for the plant as well as several botanical names such as Kennedia and the early suggestion of Willdampia as a new genus; more recently there has been some difficulty in determining whether the genus is Clianthus or Swainsona. Aboriginal lore has some references to the flower, connecting it with blood, and also with kangaroo's eyes, presumably because of the dark centre.

Sturt Pea, now listed as *Swainsona formosa*, has a distribution mainly between the isohyets 125mm to 250mm and is found in western, southern and central Australia, reaching the southwest corner of Queensland. It flowers in 'good' seasons and should not be thought of as a typical desert plant. Sturt Peas grow in a form known as spiral phyllotaxy, where lateral branches develop from its short erect stem; this makes it less suitable for cut flowers. The normal colour is red with a black boss, but the petals can vary from white through pink to maroon, and the boss also shows considerable variation. There is a form having a keel that is white with a red edge. Crimson Chats, some wood-swallows and several species of honeyeater have been seen feeding on the nectar. The birds rupture a membrane over the style and this allows pollination to take place. Self-pollination can occur.

Propagation is best undertaken from seed, but the seed coat is hard and needs abrasion or piercing before germination can take place. AS the plants are susceptible to root rot, grafting is often used by growers, using Swainsona or Clianthus species as stock. Well drained soil is needed and fertilizer can be added. However the plant does not seem to have high potential as a commercial horticultural species.

There have been numerous uses of the Sturt pea in art and design work, it being a favourite with flower painters. Examples

are Fanny de Mole in her 1861 "Wildflowers of South Australia" and Margaret Preston in the early to mid-twentieth century. In 1961 Noel Lothian proposed that it should be adopted as the State floral emblem and this was accepted. Its use as a logo has since occurred frequently... However the Field Naturalists' Section of the Royal Society adopted their emblem long before this and used it on their badge from 1921. There have been postage stamps depicting the flower at intervals since 1913 and nowadays it is a popular motif on postcards, domestic items ...and souvenirs for tourists.

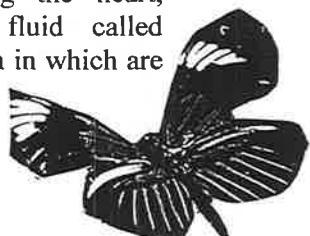
In literature there have been various references to the plant, and many poems have been written about it also. Some of these use the flower as a symbol of blood.'

**Attracting Butterflies to Your Garden**  
*from a talk given by Jan Forrest to the SA Field Naturalists' Society, and appearing in The South Australian Naturalist Vol.80, No.3/4 July/December 2006*

'Jan has been collecting and studying insects at the SA Museum for many years and over the last few years has set up various projects relating to butterflies.... She recently launched the project to encourage the growing of suitable plants for butterflies, which she described in this talk.

There are about 20,000 species of butterfly in the world, of which around 400 are found in Australia. South Australia has 79 native species grouped into five families. These families are Hesperiidae, the Skippers (20 spp.); Papilionidae, the Swallowtails (17 spp.); Pieridae, the Whites and Yellows (3 spp.); Lycaenidae, the Blues, Coppers and Hairstreaks (28 spp.), and Nymphalidae, the Nymphs and Browns (17 spp.) these figures include introduced species.

Jan mentioned the stages of a butterfly's life and showed photos of an adult emerging from its cocoon. The three body segments are the head with compound eyes, antennae, jaws and a proboscis to suck nectar, the thorax containing the heart, which pumps a greenish fluid called haemolymph, and the abdomen in which are



the stomach and reproductive organs as well as the spiracles through which oxygen enters the body. Ninety-five percent of Lepidoptera are moths. These have fringed or feathery antennae and are not as often seen feeding in daylight. Butterflies have clubbed antennae, fly by day, tend to fold their wings when at rest, and are usually colourful. Their pupae do not have a silken cocoon, unlike those of moths.

As well as food, moisture and warmth, butterflies need protection from predators and a "meeting place" where they can congregate. The larvae need specific host plants on which to feed safely, while the nectar needed by adults is best obtained from flowers with easily reached nectaries.

The observed reduction in numbers of butterflies has many causes such as clearance of native vegetation, including drainage of swamps, overgrazing and trampling of grass, use of pesticides and aerial sprays; fires and urbanization. An action plan for recovery of populations requires a survey of plants, observation of butterfly habits, comparison and recording of results, reintroduction plans and setting up of suitable planned areas by schools, the community and gardeners generally.

Jan then showed us a series of photographs of butterflies and some of their host plants, and mentioned other plants useful for attracting butterflies to gardens. These included Lantana, Buddleia, lavender, everlasting daisies, eucalypts, and a range of other native plants such as acacias, pea family flowers, Callistemon etc.'

#### Native plants useful for attracting butterflies:

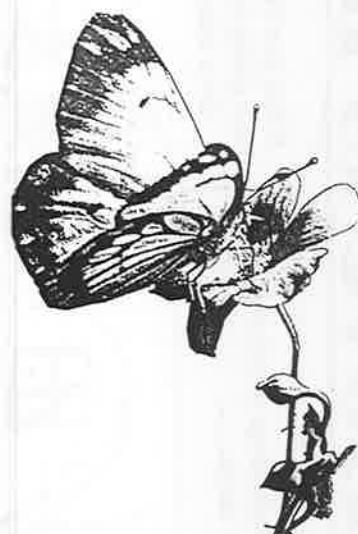
Pimelea, Bursaria, Cullen, Myoporum, Bracteantha, Chrysocephalum, Scaevola, Goodenia, Leptospermum, Callistemon, *Acacia pycnantha*, Daviesia, Hakea, Lotus, Westringia and *Eucalyptus* spp.

#### Exotic plants useful for attracting butterflies:

Buddleia, lantana, and lavender.

#### Butterflies and Host plants:

Southern Grass Dart	Grasses
White-tailed Grass Dart	Grasses
Painted Lady	Everlasting daisies
Australian Admiral	Nettle family
Meadow Argus	Goodenia, Scaevola
Long-tailed Pea Blue	Legumes, verbena
Common Grass Blue	Legumes
Varied Sedge Skipper	Gahnia
Chequered Swallowtail	Cullen(=Psoralea)
Small Grass Yellow	Sennas
Wood White	Mistletoes
Lesser Wanderer	Milkweed, Cynanchum
Saltbush Blue	Saltbushes
Caper White	Capparis (Native orange)
Double Split-line Blue	Acacias
Wattle Blue	Acacias
Ringed Xenica	Grasses and Sedges
Marbled Xenica	Grasses and Sedges
Heath Ochre	Lomandra
Golden Sedge Skipper	Gahnia
Flame Sedge Skipper	Gahnia
Fringed Heath Blue	Legumes
Large Brown Skipper	Lepidospermas
Southern Purple Azure	Mistletoes
Broad-margined Azure	Mistletoes
Varied Dusky Blue	Cassytha (Dodder- laurel)
Amethyst Hairstreak	<i>Acacia pycnantha</i> (Golden Wattle)
Bitterbush Blue	Bitterbush
Black and White Skipper	Gahnia
Mottled Grass Blue	Grasses
Dingy Swallowtail	Citrus
Cabbage White	Cabbage, Brassicas
Wanderer	Milkweed
Orange palm Dart	Palms
Tailed Emperor	Wattles, etc.





# Love is in the Air.....



*The male of the human species, particularly know to be female) who was busy pecking his previous timid behaviour was very much maligned (wrongly, in the opinion of many) when it comes to a judgement of their sub-species 'Australis', has often been maledicted (wrongly, in the opinion of many) when it comes to a judgement of their foreplay skills. A recent sighting in the mallee quite clearly puts the Australian male streets ahead of at least some other species. Well, *Leipoa ocellata* at the very least!*

Let me set the scene. It was a balmy, November Sunday evening at a bush camp in Wathe Flora and Fauna Reserve. Four of us, Ann and Peter Stokie and Wendy and I were sitting around enjoying a cold refresher or two before our evening meal. Our four other companions had left us earlier in the afternoon after the eight of us had spent the last two days monitoring the malleefowl mounds in the nearby grid.

We were camped on the edge of quite a large clearing in the scrub and were being entertained, as we had on the previous four evenings, by a malleefowl (which we now

know to be male) who was busy pecking morsels from the ground foliage not more than ten metres in front of us. Each evening when it comes to a judgement of their foreplay skills. A recent sighting in the mallee quite clearly puts the Australian male streets ahead of at least some other species. Well, *Leipoa ocellata* at the very least!

Each evening she hung around for about an hour before heading back whence she came at dusk to roost for the evening, an act verified by a member of our party who had patiently followed her on one occasion.

At the far end of the camping ground and at a much greater distance a malleefowl (which we now know to be male) also made his nightly appearance. He appeared to be more timid as he not only kept his distance but did not venture out into the clearing at all. That is, until the deed in question.

All four of us were busy watching the female who was pecking away about ten metres in front of us. Out of the corner of my eye, I noticed the male scurrying across the clearing. Initially, we thought that he was just endeavouring to get to the bush on the other side of the clearing and was not too keen about being in the open for any longer than necessary. However, it became very obvious to us that he was making a beeline for the female and that his reproductive urges were such that As he approached at a veritable gallop, she she emerged from the bush to our left and slowly wended her way towards our camp, pecking and feeding as she came. Whilst not prepared to allow us to get too close she did not appear intimidated by our presence. Each evening she hung around for about an hour before heading back whence she came at dusk to roost for the evening, an act verified by a member of our party who had patiently followed her on one occasion.

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By Ralph Patford

*cont. from p. 5*

To say we were 'gob-smacked' would be a fair description of our immediate reactions. In fact, it took some time for it all to sink in, (us, that is, not Mr Malleefowl). To rapidly move from casual observers to unwitting voyeurs of nature's most intimate act took a little while to appreciate. It was an entertaining, educational and memorable way to round off the monitoring of Wathe and added nicely to our report of eleven active mounds, one up on the previous year.

Having discussed the episode with a few other people, particularly those with greater expertise than we shared, we have formed the view that the birds in question may very well have been having a 'bit on the side' and that they both probably had more established partners for normal reproductive duties. On each evening the birds approached the campsite from opposite ends, did not appear to notice each other and did not otherwise get within 70 or 80 metres of each other. We found an active mound off in the bush from where the male appeared and we were pretty certain that there was another from where the female came.

'Adultery' in the animal world is not unknown. Any other views?

# Love is in the Air...

# Big Bad Natives - Noisy Miners

Amelia Hurren and Ann Prescott - Bush Management Advisors, Department for Environment and Heritage

From SmallTalk March-May 2007

Many people probably recognise Noisy Miners but fewer realise that they are native birds. Noisy Miners live in groups. They are common in urban parks and gardens where there are open lawns and lots of flowering shrubs to supply a constant source of nectar. Don't confuse Noisy Miners (native honeyeaters) with Indian Mynas found in the eastern states - which are introduced!

Noisy Miners have benefited from changes to the natural landscape that we have caused. These birds are not picky about the habitat they use. They can live in narrow strips of degraded vegetation such as roadsides and small patches of bush, whereas shy honeyeaters need big patches of native vegetation. Our gardens and parks encourage Noisy Miners by providing a fast-food outlet of nectar and pollen. Just like weeds, these naughty native birds are moving into new areas and taking over - when too many Noisy Miners move into new areas, they change the way the habitat works.

## What is the problem?

Noisy Miners are native, so why is it a problem if they are spreading? These extremely aggressive honeyeaters gang up on the local resident birds. They chase off small birds and even take on birds well above their weight class, including Kookaburras and Ravens. Once these bully birds move in, most other birds pack up and move out, leaving lots of Noisy Miners and little else.

- Noisy Miners may be one reason why shy species such as the Regent Honeyeater are nationally endangered.
- Attack by insects is one of the causes of tree dieback. With small insect eating birds being chased away by Noisy Miners, there are more insects and hence more dieback<sup>1</sup>.
- Noisy Miners chase away other birds that are moving through their territory, effectively putting up a migration 'road-block'<sup>2</sup>.

## What you can do

Restoring the natural balance is the challenge ahead. Simply removing the unwanted birds will not deal with the underlying reasons why they are so abundant. This will be a very short term solution. The key is to provide a diversity of habitats to encourage a diversity of birds. Although this is not an easy problem to solve, some things you can do are:

1. Protect and conserve remnant native bush of 10ha or more. Noisy Miners are more common in small or narrow degraded patches of bush. They tend to only invade the edges of large and healthy habitats 2. Shyer birds are better able to survive in large patches of healthy native bush.
2. Encourage the natural regeneration of trees and shrubs, a good groundcover of leaves, logs, and native grasses by removing grazing. This will help create a natural system that will be more attractive to shy birds.
3. Be careful what you plant and where - patchiness is the key! Plant groves of local native shrubs and groundcovers (including native grasses) in which shy birds can hide. Leave plenty of more open areas for ground-foraging birds.
4. Noisy Miners can 'road-block' narrow wildlife corridors. To be effective for shy species, corridors need to be as wide as possible and need to include a good mix of species. Try for at least 50m wide. A recent study suggests that at least one Drooping Sheoak or tall Wattle for every 5 gum trees in revegetation can discourage Noisy Miners<sup>2</sup>.
5. Limit your planting of showy flowering shrubs such as grevilleas which can attract Noisy Miners.



Photo courtesy of "Birds for Biodiversity"

1. Olsen P. Silcocks, A and Weston M (eds). 2006. The State of Australia's Birds: invasive species. Supplement to *Wingspan*. 16(4). Birds Australia.

2. Hastings R.A. and Beattie A.J. 2006. Stop the bullying in the corridors: can including shrubs make your revegetation more Noisy Miner free? *Ecological Management and Restoration*. 7(2). 105-112.

# Clever and crowing about it

HERE is one group of birds that outwits all the others when it comes to sheer intelligence. That is the crow tribe, known and detested for centuries by man for its persistent cunning in thievery.

This clan, way ahead of other birds for brains, consists of the predatory rook, the rapacious raven, the rascally magpie, the playfully mischievous Jackdaw, and the crow — common, carrion, black or hooded — the cleverest of them all.

From the days of early medieval scarecrows, through tales like that of the meddlesome Jackdaw of Rhelms which stole the bishop's ring and caused such a commotion, to the modern respect bird photographers have for ravens, knowing that they can count and are never fooled by the old trick of two people reaching a hide and one walking away again, this bird tribe has been known as a clever and cunning lot. Now, detailed observation on captive birds plus laboratory tests on the brain power of others has confirmed that, when it comes to avian intelligence, crows are the tops. For years, it has been known that carrion crows, magpies and rooks in the wild will habitually haul up bones or other tasty food morsels to a perch by pulling up the supporting string with the beak. The technique resembles nothing so much as a fisherman dragging in a net or a sailor hauling in a rope; using beak and feet together, the bird ingeniously loops, holds and pulls in the string until the food is in reach. Then there were the delightfully deceptious antics of Chicago, the devilish pet crow of naturalist Jean George. He had been at large in Mrs George's household since he was one month old — and quickly learnt many tricks and ruses.

One day, Mrs George was preparing a tea-party for eight little girls and on the table she placed small baskets filled with cashew nuts. Knowing her crow, she covered each basket with a heavy inverted mug, confident that he could not lift such weighty objects. She then returned to her

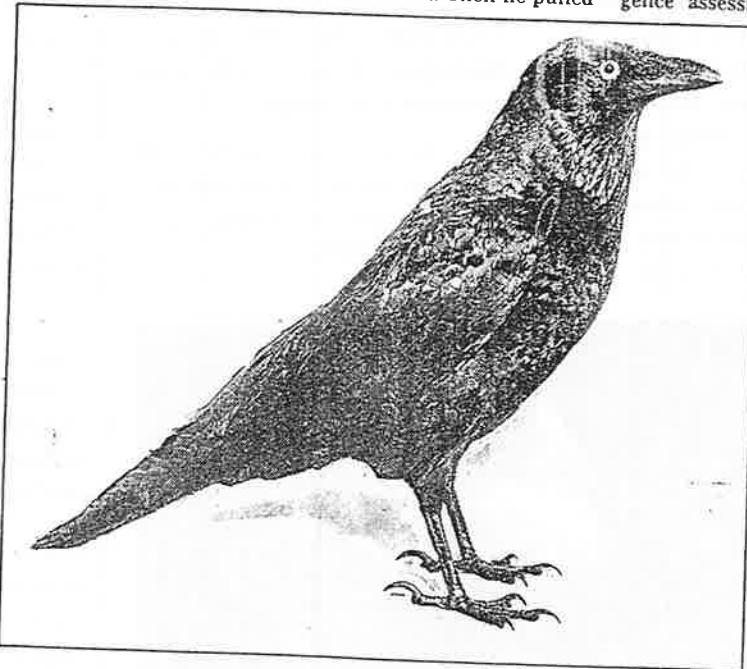
Crows are the smartest birds in the world. DAVID GUNSTON in London explains why.

We will come for you in October and you will teach us the habits of our enemy so that we can outwit them and survive".

Among other examples of highly intelligent crow behavior are: counting readily up to four (ravens can manage up to six); scouting main highways for the bodies of small birds and mammals killed by the traffic; cawing day after day in alarm outside the window of a sick child in the house where it was kept as a pet, then, when the child recovered, resting its beak on his knee and swaying ecstatically with delight; pickling pockets; solving the problems of how best to reach food placed on the other side of a screen in laboratory intelligence tests, surpassing the intelligence assessment of cats, rabbits and domestic fowls; scoring better than 90 per cent in many other similar tests under controlled conditions; learning to watch a clock face — waiting patiently until the hands pointed to 12 o'clock, then rousing its owner from sleep and leading him to the refrigerator for food; pressing a lever with its bill to obtain a reward of grain; slashing open opaque black plastic household refuse bags put on kerbsides for dustmen, the contents of which could not be seen; and baffling a tethered falcon by walking around and around its tethering stump until the bird of prey was wound up tightly by its leather leash, then abusing the hawk

vocally; three birds settling on three sides of a hanging plastic bird feeder to balance it while a fourth seized the food scraps. They also sometimes bury food rather like a dog, taking great pains to conceal the spot by dragging grass and leaves over the soil. They always retrieve hidden meals later, most likely by scent — these birds undoubtedly have a very keen sense of smell, rare in the avian world.

Compared with that of a chimpanzee or even a dolphin, the vital brain cortex of a bird is so obviously primitive that its overall intelligence, cunning and learning power must necessarily be limited. But crows, which stretch that cerebral endowment to the astonishing limit, are surely the cleverest creatures on wings.



the mug back to cover his crime! I pounced on him, gathered him up in his black taffeta wings and threw him out of the window. I distinctly heard him laugh as he flew off."

Chicago eventually succumbed to the persuasive cries of a flock of completely wild crows. They came to the house every day for a week and, with raucous cries, persuaded him to join them for their natural winter migration southwards.

Mrs George says she is convinced that when her pet was taken from his nest (for study purposes in connection with farm pest behavior), his mother's melancholy cry was crow language for "Go into their home, eat all you can, learn all you can.

*This item was collected many years ago  
Taken from an Adelaide newspaper. Date unknown*



An immature Laughing Kookaburra, an iconic Australian woodland bird.  
Photo by Jiri Lochman, Lochman Transparencies

## Why birds are good indicators of biodiversity

Birds are recognised internationally as useful indicators of biodiversity and the health of ecosystems. Because of the wealth of information, bird monitoring is making a major contribution to the global push to halt biodiversity loss, sitting alongside indicators of social and economic progress towards sustainable development.

- Birds are a major component of most ecosystems and are sensitive to many kinds of environmental disturbance.
- Birds' habitat requirements are likely to encompass the needs of a variety of other biota.
- Birds are the best-known group of animals in terms of knowledge of their ecology, abundance and distribution.
- Birds are attractive and birdwatching is rewarding, hence birds can help to engage the community in actively monitoring biodiversity.
- Birds have wide appeal—they can help to educate the public, and play a compelling role in advocacy.



Eucalypt plantings can help farmers and regional conservation planners improve biological diversity.

## Eucalypt plantings help restore wildlife

**A**USTRALIANS are planting large areas of trees and shrubs on previously cleared agricultural land. Environmental benefits are a major incentive for this change in land management but data on the response of biodiversity to new plantings has been scarce.

Recent research from the Joint Venture Agroforestry Program (JVAP) outlines a large-scale study to guide improved conservation from eucalypt planting.

The research, reported in the publication *'Biodiversity in Eucalypt Plantings Established to Reduce Salinity'*, looks at occurrences of

more than 180 species of birds, mammals, reptiles and amphibians sampled at 136 eucalypt planting sites.

These sites represent a wide range of landscapes, including two broad age classes, nearby remnants of native forest and woodland, and cleared or sparsely treed paddocks.

There has been surprisingly little research in Australia characterising the value for wildlife of eucalypt plantings and plantings of native trees and shrubs.

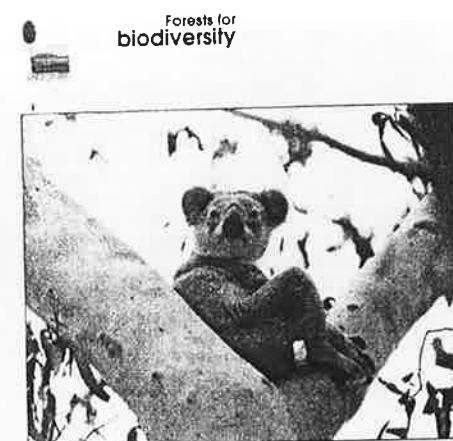
There are increased opportunities for planting eucalypts on private land, either as joint-venture wood production activities, or for land

restoration, such as salinity controlling on agricultural lands.

Extensive revegetation efforts have been occurring in the Albury-Wodonga region over the last three decades. These have been for environmental benefit, including land rehabilitation, salinity reduction and habitat restoration, as well as for improved landscape amenity and wood production.

These plantings of native trees and shrubs could greatly improve quality of the habitat matrix surrounding existing remnants of forest and woodland for a wide range of fauna, and increase the carrying capacity of habitat within remnants. ▶

AUSTRALIAN LANDCARE, June 2006



Existing remnants of native forest and woodland are important in regional conservation because many species rely on them for their habitat.

To guide future planting schemes for restoring biological diversity, 120 sites were sampled for birds, bats, arboreal marsupials, terrestrial mammals, reptiles and amphibians. They covered a range of available patch sizes, stand ages, habitat attributes and conditions for re-vegetated areas and remnant vegetation in the region.

These were compared to nearby paddocks. The study aimed to find out how eucalypt plantings can help farmers and regional conservation planners improve biological diversity in agricultural landscapes in south-eastern Australia.

Eucalypt plantings provide significant improvements in biodiversity compared to cleared or sparsely-treed paddocks, but different fauna show a range of responses. Mixed eucalypt and shrub plantings contained similar numbers of birds and bats to remnant native forest and woodland in the region.

Birds and bats made the most extensive use of plantings, particularly favouring the older (>10 years old) sites. Birds showed a strong response to patch size, with both larger eucalypt plantings and larger remnants having more species and more individuals than smaller patches of these vegetation types.

Even young (<10 years old) plantings were occupied by many

birds once patch sizes were larger than five hectares. Data were widespread throughout all vegetation types sampled (planted areas, remnants and paddocks), although they were more common in remnant vegetation.

Remnant forest and woodland were most important for arboreal mammals, nocturnal birds and reptiles, but the oldest (>20 years) plantings were also contributing to the abundance of these species.

Younger plantings and cleared or sparsely-treed areas provided little habitat for these species, and no reptiles were recorded in paddocks. Ground mammals were virtually absent from the region, presumably due to widespread and long-term impacts of grazing and the abundance of introduced predators.

This study recommends the importance of existing remnants of native forest and woodland in regional conservation. It is recognised in planning because many species were recorded in remnant areas, and some only in remnant vegetation.

Alley remnants usually contain old, hollow-bearing trees providing essential roosting and nesting sites for many species. The absence of roosting and nesting hollows, as well as the often low levels of shrub cover, grass cover and logs on the ground, were important factors limiting

sustainability of eucalypt plantings as habitat for many species.

Site preparation for eucalypt plantings could be improved by not removing old, paddock trees and logs on the ground. In plantings established primarily for nature conservation, management should exclude grazing by domestic stock to protect against loss of shrubs and grass cover.

Stock should also be excluded from some dams, or parts thereof, as these environments are important for frogs and many other species.

Research is needed to determine whether eucalypt plantings are capable of providing beneficial habitats for the wide range of species known to occur and forage in them. Opportunities for improving the value of eucalypt plantings for wildlife need to be explored.

The extent to which eucalypt plantings can augment the carrying capacity of remnants for wildlife should be determined, as well as their potential to aid recovery of threatened species.

Several biodiversity tool kits have been proposed to help change land use in agricultural areas using market-based and government-subsidised schemes. These depend on assumptions made about biodiversity responses to varying levels of these habitat surrogates.

Research is needed to give confidence in components of these tool kits being relevant and rankings for different restorative actions being properly calibrated.

*'Biodiversity in Eucalypt Plantings Established to Reduce Salinity'*, by Rob Herring, Brad Law, Frank Lemke, Matthew Stanley, Mark Thielke, Tracey Brink, Alison Tizard and Matthew Herring (2006, 90 pgs, RIRDC Publication No 05/165), is available from the Rural Industries Research and Development Corporation (RIRDC) for \$21.

Contact Phone (02) 6272 4818; email [publications.rirdc.gov.au](http://publications.rirdc.gov.au); website [www.rirdc.gov.au](http://www.rirdc.gov.au).

This project was funded by the Joint Venture Agroforestry Program (JVAP) and the Natural Heritage Trust. JVAP is supported by three R&D corporations, RIRDC, Land & Water Australia, and the Forest and Wood Products Research and Development Corporation.

AUSTRALIAN LANDCARE, June 2006



Barmah and Moira Lakes during low-level flooding. (Photo Keith Ward)

## Watering trials boost vegetation

**L**AST year, native vegetation and animal life benefited from environmental watering trials at the six "significant ecological assets" identified in the Murray-Darling Basin Commission's Living Murray initiative.

While positive results were achieved at all six sites, this article looks at two of them: the internationally recognised Barmah-Millewa Forest on the River Murray which responded strongly; and

Hattah Lakes near Ouyen in Victoria, which drew thousands of waterbirds.

The Murray-Darling Basin Commission (MDBC) Chief Executive, Dr Wendy Crail, said at the time that careful monitoring had shown the golden perch, silver perch and other native fish, as well as waterbirds such as ibis and egrets, bred as a result of higher water levels in the Barmah-Millewa Forest.

"It has provided information that reinforces our understanding of the

spawning requirements of golden perch, silver perch and other native fish species," she said. "More than half the Barmah-Millewa Forest wetlands have now validated as vegetation, including the regionally significant Moira Grass, responded."

From mid-October last year, more than 500 gigalitres had been released from Hume Reservoir from the Barmah-Millewa environmental account made available by the Victorian and NSW governments to complement Murray River flows that resulted from good rains at the time.

Dr Crail said the NSW and Victorian governments were working together to achieve environmental benefits across jurisdictional borders.

"The forest was monitored by the government agencies to ensure knowledge gained will enhance future efforts to provide environmental flows to this and other Living Murray icon sites and further contribute to meeting other Living Murray objectives," she said.

**Barmah-Millewa Forest – water levels were managed to maximise fauna and flora benefits. (Photo Tony Fuller)**

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Coorong – above-enitlement flows into South Australia have extended the duration of releases of water from the Barraages to benefit the Coorong, seen here. Photo John Baker.

### Managing forest water levels

Water levels in the forest were managed carefully to sustain bird and fish breeding and maximise environmental benefits. Dr Crail said the event added to what had already been a very seasonally environmental.

"As a result of surplus flows, environmental allocations and the Ministerial Council's River Red Gum Rescue Package, temporary rising of water pool levels in the Lower Murray and pumping of water into

high-value wetlands had been beneficial to river red gums and promoted bird breeding across the River Murray Channel, Chawilla Floodplain, Lindsay Walpole Islands and the Hattah Lake icon site," she said.

Above-enitlement flows into South Australia have extended the duration of releases of water from the Barraages to benefit the Coorong and Murray Mouth, with thousands of native fish observed migrating between the Lower Lakes and Coorong.

**Hattah Lakes – watering trials boosted native vegetation and animal life. (Photo Andrew Keogh)**



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Environmental  
watering

to achieving the Living Murray ecological objectives for the Barmah-Millewa Forest, one of the six significant ecological assets.

Victorian Minister for the Environment, The Hon John Thwaites MP, said this watering event added to other recent jointly managed releases to provide water to important environmental sites along the River Murray.

Mr Thwaites said the should and Thwaites agreed the impact of the flooding on the river and wetland health would be monitored closely. An adaptive management approach would be taken to enable government to learn from environmental flow release.

### Building on redgum program

At Hattah Lakes, according to the Mallee Catchment Management Authority, at least 3000 megalitres of water from the Murray River were pumped into Lakes Luckie, Little Hattah and Yerang.

The water was provided from the Victorian Department of Sustainability and Environment's Environmental Water Allocation to benefit flora and fauna and address river redgum health.

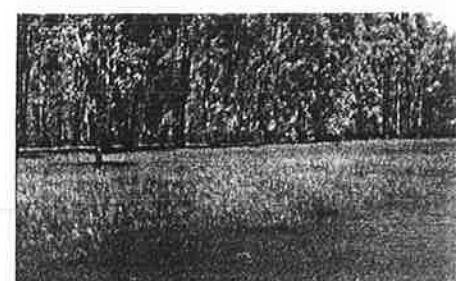
The trial builds on the current financial year's emergency redgum watering program, during which 1200ML of water, including 360ML of donated irrigation water, have been delivered to the southern arm of Chullora Creek, which feeds the Hattah Lakes system.

Funding for the trial was provided under the Victorian and Australian governments' National Action Plan for Biodiversity and Water Quality (NAP), the State Govt's Our Water Our Future initiative and Rural Water Reform package and the State and Federal governments' emergency redgum watering package.

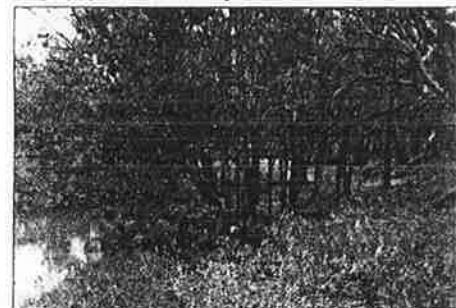
Most of the money will pay for pumping, with local contractors employed to deliver the water.

Mallee CMA area manager and water officer for Hattah, Andy Wise, said Hattah Kulkene National Park rangers had reported there were about 25 species of waterbirds present on Lake Luckie, including up to 5000 Grey Teal.

The large water-stressed River Redgums around Lake Luckie also had their feet wet for the first time in three years, providing a tremendous boost to their health.



The regionally significant Moira Grass, seen here at the base of the river redgums, responded well to the watering trials. Photo Keith Ward.



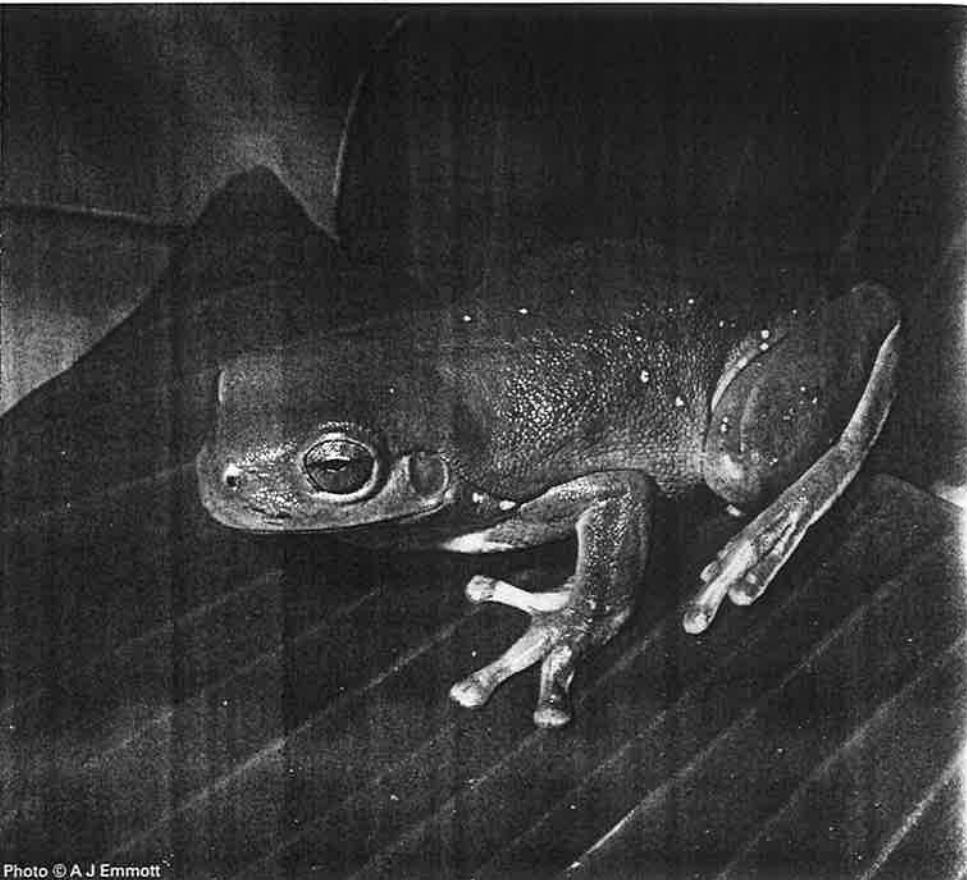
Lindsey Island – river redgums picked up and promoted bird-breeding. Photo John Baker.



AUSTRALIAN LANDCARE, June 2006

STORY AND PHOTOGRAPHY BY STEVE WILSON & ANGUS EMMOTT

Outback Australia is hardly friendly to an animal we associate with lily pads, ponds and streams, but heavy rains bring frogs bubbling out in droves. Where do they come from?



**Above:** With its relatively large size and upright stance, the New Holland frog is sometimes, and unfortunately, mistaken for a cane toad.

**Top:** Good rain stimulates a steady, moaning call in the male short-footed frog.

**Above right:** The well-known and widespread green tree frog enjoys a varied diet and has adapted well to human habitation, finding shelter anywhere from moist gardens to toilet cisterns.

**T**he ability to survive in harsh dry conditions is a feature of many Australian outback species. For example, we think of frogs as animals that live close to permanent water sources, but we have a suite of desert frog species superbly adapted to endure long droughts.

Frog skins are not waterproof, so how do they survive inevitable dry periods? Frogs regularly slough off their old, dead outer coat and eat it. In water-holding frogs, however, the outer layer of dead skin cells separates but is not shed. Instead it sits around the mucous-coated frog like plastic film wrap, virtually impervious to water. These frogs burrow to a considerable depth. Light rain showers have little effect; it takes a good soaking rainfall to percolate down to a cocooned frog and stimulate activity.

Rain induced activity is urgent and frantic. Outback frogs emerge in a desperate race for food, a mate and a place to spawn. Puddles, large or small, quickly fill with tadpoles. At high temperatures, these tadpoles develop rapidly. They need to. Evaporation rates are extreme and predators abound.

Rain events also clearly stimulate ant and termite activity – we have witnessed deep burrowing species using valuable energy to reach the surface, often in large numbers. However, their exact role in outback frog ecology is still poorly understood.

### Meet the frogs

The small (up to 35mm), short-legged desert tree frog (*Litoria rubella*), found in all states except Victoria and Tasmania, is the most widely distributed frog in Australia. This is the frog you are most likely to encounter on an outback visit. Highly adaptable, it survives in environments ranging from arid to wet tropics and can live around buildings and houses. Given the chance, this species, along with the green tree frog, will take up residence in your toilet cistern. Its colour varies from grey to



Photo © A J Emmott



Photo © A J Emmott

# ONLY WHEN IT RAINS: OUTBACK FROGS



Photo © Steve Wilson

red-brown to fawn, often with dark flecks. By day it shelters under stones or bark, in sheds, buildings or water pipes. At night it often sits near lights or hangs off a wall, opportunistically snatching insects. It breeds in summer, but, particularly in warmer areas, even unseasonal significant rainfall will trigger breeding.

Amongst the best known of Australian frogs, the green tree frog (*Litoria caerulea*) grows to 11cm, thrives in human habitations and delights in living in, on or under toilets. Like the desert tree frog, they occur in a range of habitats in all states except Victoria and Tasmania. Part of this species' success is the diversity of its diet: insects, other frogs, small birds, even small mammals such as bats and house mice. If caught, this species delights in urinating all over you. Also, there are irritants in its skin which you will notice especially if you rub your eyes after touching one without washing your hands first. Weather changes and even loud noises such as a car backfiring can stimulate their deep, barking calls. They breed in late spring or early summer, depositing 200–2000 eggs in still water. Tadpoles develop rapidly, particularly at high temperatures. The best time to see this animal is after dark on a warm evening, or better still, after a burst of rain. It's common, it has messy habits, but its brilliant green colour never fails to delight.

## Dig it

The trilling frog (*Neobatrachus centralis*) is a consummate burrower, growing to 55mm and found across the central and southern Lake Eyre Basin region. Ground temperatures in the arid zone can often exceed 50°C. This species burrows deep into the soil, stores water in its body and develops a water-retaining cocoon. Heavy rain sends it digging to the surface in search of food and a mate. Spawning females seek muddy, cloudy pools of water; tadpoles develop rapidly in the high temperatures. This is a highly variable species; we suspect more species may be derived from the current known animals.

**Above:** In arid zones, heavy rain and flooding trigger a tremendous flurry of activity amongst frogs that are otherwise rarely seen.

**Top left:** Living in areas where ground temperatures can exceed 50°C, the trilling frog develops rapidly as a tadpole and burrows deep as an adult.

**Top right:** Floods bring the striped burrowing frog out on the roads of Longreach at night; during the day, it often rests near temporary pools.

Growing to 65mm, the unusual desert spadefoot toad (*Notaden nicholisi*) – actually a frog – is a true desert dweller. Over several nights, while assisting a team of zoologists conducting a fauna survey on Moothandella Station near Windorah in central west Queensland, we captured many of these frogs which had surfaced after rain. When handled, they exude a pale cream, sticky secretion, often in copious quantities – presumably as a predator deterrent. They also have a distinctive mouse-like squeak and their movement, due to their fat bodies and short legs, can be quite comical. Their diet is predominantly insects, ants and termites. We noticed increased termite activity during the rain. This may be one of the reasons the frogs surfaced from their burrows, which can be up to 2m deep. They breed in shallow temporary pools, laying up to 1000 eggs in a clump which take around 40 days to develop. The genus *Notaden* occurs principally in northern Australia, with only subtle differences between species. Despite the extensive and almost continuous distribution of *Notaden*, rarely have two species been found together.

### Big fellas

Growing up to 100mm the New Holland frog (*Cyclorana novaehollandiae*) is often confused with the giant frog (*C. australis*), which has a similar appearance and overlapping range. Both species share a distinctive posture: erect, sitting high on the front legs. Powerful jumpers, they can cover considerable ground in a short time.

No two New Holland frogs are alike, with colour varying widely from almost yellow to dark mottled brown. In some eastern areas, the frog is confused with the cane toad because of its size and often ends up on the receiving end. Diet includes anything they can fit in their mouths: other frogs, insects and on occasion, small mammals such as house mice. Males have a short, barking call. The species is usually found near water. Despite its common status, little is known of its ecology.

One of the commonly encountered 'big' outback frogs, the giant frog grows over 10cm and has a healthy appetite and a diet similar to that of *C. novaehollandiae*. Unusually for a burrowing frog, it occasionally basks in full sun, often near water. Breeding occurs late spring and early summer, with females laying many thousands of eggs, usually in calm, still water. The tadpoles grow quite large, over 6cm, and have a lovely golden colour. At high temperatures, tadpoles often complete development in a month. This species is often sits on roads after rain, waiting for available prey.

Growing up to 75mm, the striped burrowing frog (*Litoria alboguttata*) is best observed after heavy rain. Floods in the Longreach region of western Queensland bring this species out on roads at night; however during wet periods, it will lurk near temporary pools during the day. A powerful jumper with a voracious appetite, it will eat anything it can overpower, including insects and other frogs.

There is continuing scientific debate as to whether this animal belongs to the genus *Litoria* or *Cyclorana*, as it carries characteristics of both. Excellent burrowers, these animals develop cocoons and store water in dry conditions. Its call is a distinctive rapid 'quacking' sound.

The water-holding frog (*Cyclorana platycephala*) is the one made famous by Aborigines, who use their skill to locate these frogs in their burrows and drink their stored water. Growing to 60mm, this species has a large range through

all states except Tasmania and Victoria. Although it survives arid conditions by burrowing, storing water and developing a cocoon, this species also thrives in water and has extensive webbing between the toes, particularly the hind feet. Most frogs hunt and feed out of the water; this species can also feed in water. Diet includes insects, other frogs and tadpoles. Usually seen only after heavy summer rains, water-holding frogs have a distinctive colour pattern of olive green with green or grey mottling. Males call from water with a steady 'mowing' sound not unlike a purring engine. Females spawn in temporary pools and the tadpoles develop a distinctive metallic sheen.

### In search of wet places

One of Australia's best-known frogs, the spotted grass frog (*Limnodynastes tasmaniensis*) grows to 45mm and is found in all states. One of the first frogs to inhabit new areas or disturbed ground, this species thrives in artificial wetlands, dams and ditches, hiding during the day in grass or under rocks and debris and feeding mainly on insects. Its colour, usually green or grey blotches, often with a pale stripe along the back, is distinctive. Males call with a rapid 'uk uk' during the late spring/early summer breeding season. Females create a foam nest holding up to 1100 eggs; the dark brown or black tadpoles grow quite large.

The *Crinia* group lives mainly in Australia's moister south; the areas of Australia. The desert froglet (*Crinia deserticola*) has the most northerly distribution, occurring across outback Australia. It survives arid climates by living in dense vegetation under trees where rain will collect and also at the edges of watercourses and dams. After good rain, males call with a very birdlike 'chirp chirp' from under rocks or debris. Females attach their eggs to submerged vegetation. Only small – about 18mm – and highly variable in colour, this species tends to have a brown, slightly blotchy, warty appearance.

One of the more commonly encountered outback frogs of northern and eastern Australia, the attractive ornate burrowing frog (*Limnodynastes ornatus*) grows to 45mm and varies from red to brown with an occasional blotchy pattern. Another classic burrower, it comes out after heavy rain. Males often call with a distinctive 'unk' sound while floating in shallow pools. Females build a foam nest and lay from 150 to 1500 eggs. At high temperatures the tadpoles have been known to metamorphose into frogs in 25 days.

### Sometimes seen but rarely studied

On a working trip to Boulia in outback Qld, I found some unusual buzzing tree frogs (*Litoria electrica*) in the company of *L. rubella* on the edge of town. Small (around 40mm), round and somewhat flattened, they appear to move the head independently from the body. Its behaviour is similar to that of *L. rubella* and both species use human habitation. Their call is not unlike the sound of static electricity. Current distribution maps show this species occurs in country adjacent to the base of the Gulf of Carpentaria. The Boulia discovery may be a considerable range extension. Breeding biology is poorly known; presumably it is similar to *L. rubella*.

Growing to around 40mm, the ground dwelling broad-palmed frog (*Litoria latopalmata*) is often found well away from water in all types of forest and open country across Queensland, NSW and parts of northern South Australia. Its appearance is highly variable; more species may be found amongst the various races. They breed in late spring/early summer in

all sorts of fresh water: still or flowing, natural or artificial. Males have a distinctive duck-like call, and tend to call from water edges or close by. Despite this being a common species, we know little of its ecology.

One of the classic burrowing frogs, the knife-footed frog (*Cyclorana cultripes*) has a distinctive, half-moon shaped, cutting spade on the edge of its hind foot, which it employs in digging. It is usually pale fawn with brown to green pale blotches and grows to 55mm. Found across the Northern Territory into Western Australia and western Queensland, it comes to the surface after heavy rains, occasionally in large numbers. A grasslands species, it breeds in temporary pools. As with many Australian frogs, we know little of its ecology.

Distinguished by unique body patterns and a narrow silver line down its back, the short-footed frog (*Cyclorana brevipes*) grows to 45mm and prefers open woodland and grass savannah country in Queensland and northern NSW. Despite being discovered in 1871, it is still poorly studied. Males can produce quite a large, bubble-like throat sac when generating their steady, moaning call. Good rain stimulates activity.

### Overstaying its welcome

Although cane toads (*Bufo marinus*) were originally introduced to coastal cane fields in north Queensland, these tough, adaptable creatures have travelled and colonised a range of habitats, including the Channel country landscapes around Longreach. They set up shop and have been living and thriving in the Longreach area for at least the past three years. I recently lifted a sheet of iron out near Bowen Downs Station at Aramac and found a large toad camped under it. The nearest water was over 10km away and the day was above 35°C – testament to the toughness of these animals.

Grey, olive or brown, they look rough and warty, and grow up to 150mm. During summer, males call near water with a distinctive 'purr'. Cane toads readily camp around human habitation, feeding on insects attracted to lights; they will use urban fish ponds for breeding. They are poisonous at all stages of their development, from the thread-like egg masses to tadpoles and young toads, which is why they impact so broadly on native predators. In Longreach, sightings of large goannas are now rare and I have personally found three dead goannas with the obvious remains of toads inside.

They favour damp hiding places: along creeks, channels and waterways as well as compost heaps, leaky pipes, drains and the cool, moist areas around homes. In wet weather, they will venture out into open country, usually moving by night and taking refuge underground or in debris until conditions are right to continue traveling. I don't believe toads will ever be found here in the huge numbers we see in north Queensland, however, around Longreach, they have proven capable of surviving and impacting on the local native food chains.

You should wash your hands after handling any frog or toad, but this is especially important after handling cane toads; the milky fluid from the neck glands is quite dangerous. Domestic dogs and cats can get sick and even die as a result of playing with toads. Best and most humane way to dispose of a toad is to catch it, pop it into a plastic bag, chill it in the refrigerator, then put it in the freezer for a couple of hours – although this isn't always possible. Steve Wilson's wife refuses to have frozen toads in the fridge, but since moving to Longreach three years ago, he and his kids have managed the creative dispatch of 173 toads.



**Above:** Two ornate burrowing frogs take advantage of a frantic, unpredictable and possibly very short breeding opportunity for Australia's arid zone frogs.

**Middle:** Round-bodied and short-legged, the desert spadefoot toad is actually a frog, and a true desert dweller burrowing to depths as great as 2m.

**Top:** The giant frog breeds in late spring to early summer and eats virtually anything it can overpower.

**STEVE WILSON** is the Regional Coordinator for Desert Channels Queensland ([www.dcq.org.au](http://www.dcq.org.au)) based in Longreach, Queensland. **ANGUS EMMOTT**, also based in Longreach, is a grazier involved with Desert Channels Qld and the Coopers Creek Catchment Committee. Both are keen naturalists and photographers with an interest in sustainable natural resource management in the region.

## THE MURRAY DARLING BASIN

*from The Border Mail (NSW) 6/11/06 pp. 1, 3*  
 The Murray Darling Basin is Australia's largest drainage system. Running from the Darling Downs in southern Queensland to eastern South Australia, the basin is a vitally important agricultural and geographical region.

- The Murray-Darling Basin is the drainage system for one-seventh of Australia
- About 30 rivers and hundreds of tributaries run across the basin including the Murray, Darling, Murrumbidgee, Snowy and Barwon rivers.
- Water within the basin is managed by the Murray Darling Basin Commission.
- Drought has now gripped much of the basin for as long as six years.
- Water from the basin provides about 70 per cent of Australia's irrigated farmlands.
- The Darling is the basin's longest river at just over 2700 kilometres.
- Water from the basin, if it makes it all the way, eventually flows into the Southern Ocean at the Coorong.

### Expert warns against red gum watering

*From Sunraysia Daily (Vic) 6/11/06 p.2*

'Prominent local redgum forester Vic Eddy yesterday warned again of the dangers of pumping water from the Murray River in time of drought to give parched redgum trees a drink.'

The warning comes as banks of diesel-powered pumps lift huge volumes of water from the Murray into Chalka Creek to fill Hattah Lakes.'

'Mr. Eddy said the watering of Hattah Lakes at this time could be counter-productive and said extreme care needed to be taken that the redgums given a watering were not given false hope the river drought had ended.'

"All new season growth, such as occurs with watering, draws on the tree's food reserves. One of the reasons for tree death can be that the demand for new growth has

exceeded the ability of the tree to replenish its exhausted reserves. River red gum is a tenacious survivor, hence a high proportion of trees survive to the bitter end. The more trees that survive to draw on the limited water the more trees we are likely to see dying at the one time....Unless there is sufficient water to saturate the soil and thus allow those trees to not only produce new foliage but restore their food reserves, we run the risk of further depleting their food reserves."

'He said the poorer the tree health at time of watering, the more vulnerable the tree was to reserve depletion.' He said work done about 20 years ago had found that some trees standing in flood for a month were still suffering drought stress because the water had not yet penetrated to the depth of the feeding roots (with water, the cracks in the soil 'take up' and moisture penetration slows.)

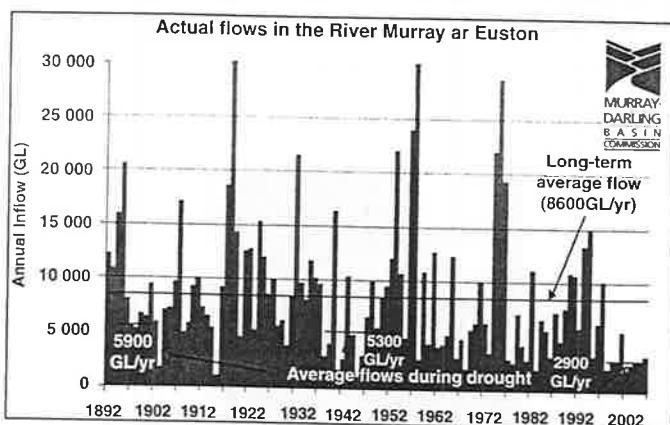
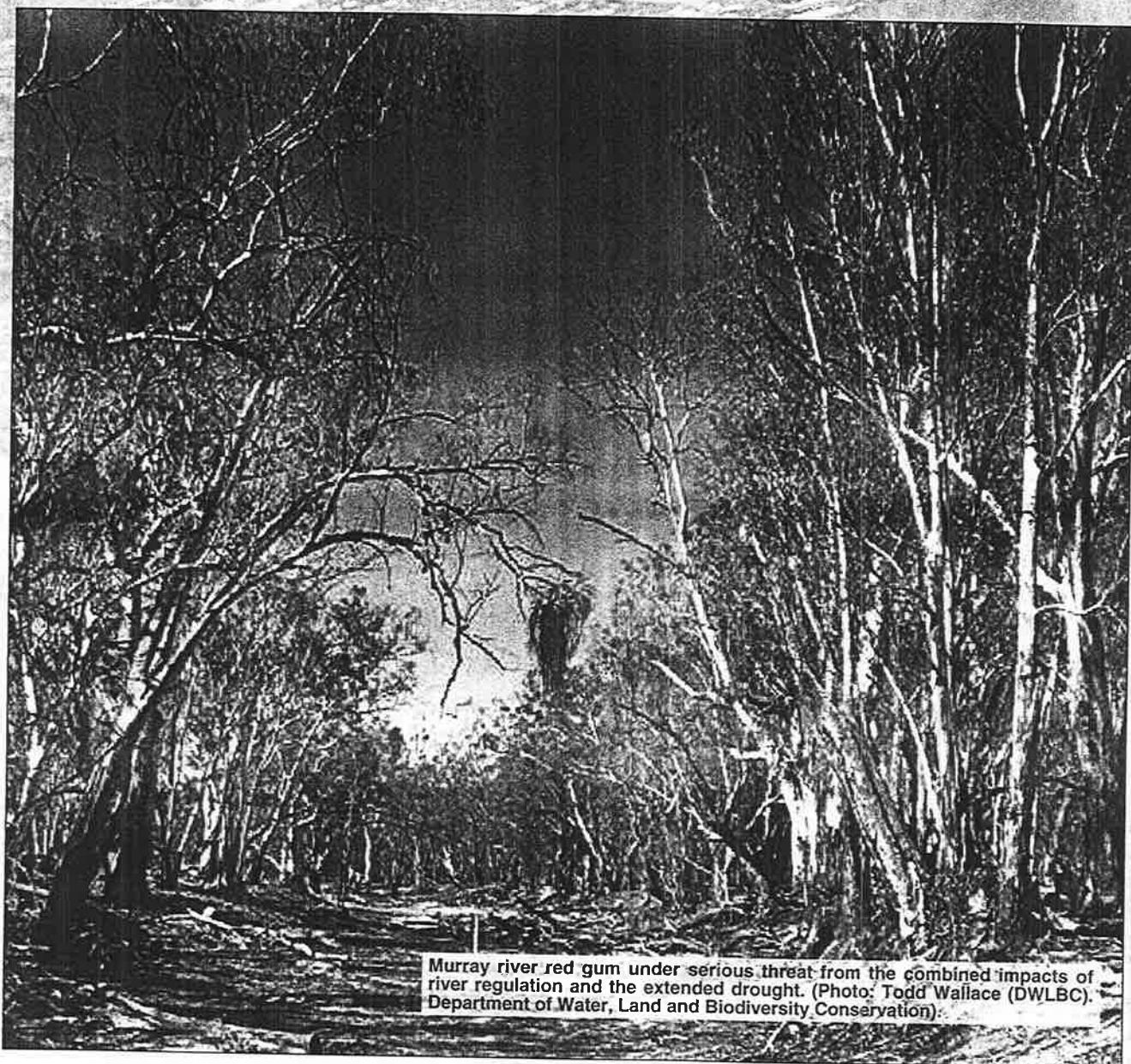
Because the river redgum forests had been severely affected by drought, the situation of the extent of tree death was obvious. When the trees get a good drink they produce fresh new growth and this foliage tends to be a rich yellowish green colour. As the dry season following a flood develops, so does the general bluish hue of the forest. However the tree is highly susceptible to sudden heat waves, and with reducing soil moisture the tree tends to shed its leaves and to eventually die back.

'The phenomenon known as "New England Dieback" is the repeated defoliation by two groups of beetles. They are the Christmas beetle (a large scarab) which hatch from grass root eating larvae, and chrysomelid beetles.. It is considered to take about three years to go from a healthy tree to a dead one.'

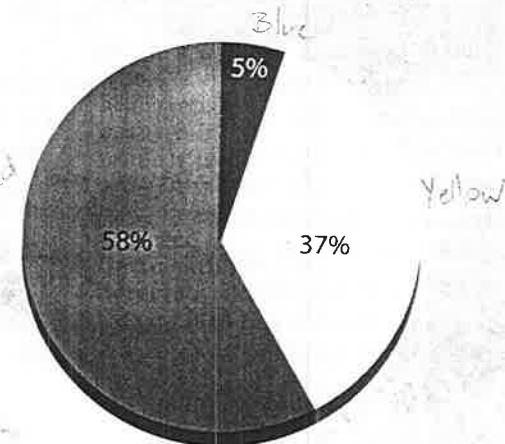


Adam Craven

Feather-tailed Gilder



Historical annual flows in the Lower River Murray at Euston (1892 – 2006) comparing major droughts.



Relative chance of 2006/07 season inflows being in the 'dry' (red), 'normal' (yellow), or 'wet' (blue) ranges.

### **Maywald faces toughest test as dry drags on.**

*From The Advertiser (SA) 18/11/06 p.29*

'River Murray Minister Karlene Maywald does not usually strike terror into the hearts of people. She certainly came close....when she held a media briefing on the future of the state's water because of the drought.'

' the scenario she painted for the Murray, lakes Alexandrina and Albert and for agriculture production along the river was, to use her own words, "a very scary picture." 'She foreshadowed further water restrictions in the metropolitan area, suspending some environmental rescue programs, operating the river virtually as a series of dams and reducing irrigators' allocations.

"The environment along the river is in big trouble." She said. "There is the prospect of significant tree death and deterioration of flood plain ecology. There is potential for long-term damage to wetlands including salinisation and acid sulphate soils."

### **Deterring Bird Pests**

*From Small Talk Dec 2006-07*

Both the Common Blackbird and Common Starling are introduced birds into Australia, and common in suburban areas. Starlings can nest in a wide range of places including roof cavities, tree hollows, and in the thick leafy centre of palms. Blackbirds make a medium-large fibre and mud nest which can be constructed in trees, but human-made places such as eaves, verandah posts, and other places can also be used.

You can discourage the birds by regularly removing nests, making roof cavities secure, and making the garden unsuitable for their foraging patterns. Observations of your garden and where the birds nest and feed will help with this.

For example, blackbirds search for insects and grubs on the ground by moving aside mulch or leaf litter with their feet and beaks. So thickly planted understorey may discourage them. Starlings like open lawn areas to work over with their beaks for grubs.

Anecdotal evidence also suggests that the use of rubber snakes can also be effective in deterring pest birds from garden beds and fruit trees.

(Ed. Just don't mistake the real thing!)

### **World Water Crisis on Way**

*From The Border Mail (NSW) 9/9/06 p.31*

#### **The Big Squeeze:**

How much Australia's available water is forecast to decline by

**2020**

- 3 to 11 per cent across Melbourne
- 2030**
- Up to 15 per cent in western NSW's Macquarie Basin
- Up to 25 per cent in southwest WA
- Up to 25 per cent in SA 's Gulf of St.Vincent
- 5 to 45 per cent across 29 Victorian catchments.

**2050**

- 10 to 25 per cent in the Murray Darling Basin
- 7 to 35 per cent across Melbourne

SOURCE: CSIRO and other research agencies.

### **Call for Regent Parrot sightings**

*From The Murray Pioneer (SA) 12/9/06 p.14*

'The Riverland has some new neighbours-brightly coloured regent parrots are returning to the region to breed.'

'Regent parrots are listed as vulnerable at both a state and national level. Their range has declined since the early 1900s and there are now believed to be fewer than 500 breeding pairs in South Australia.'

"We currently have a good idea of where the birds nest but we need to know more about where they go to feed and if they feed on the ground, shrubs, or trees." stated a Threatened Species Ecologist.

'Regent parrots breed between August and November. While in the Riverland they nest in the hollows of mature and dead river gums. They have been recorded foraging for food in Mallee woodlands up to 12 kilometres from their nests and in



agricultural areas such as fruit and almond orchards.'

'Primarily seed eaters, regent parrots will sometimes feed on insect larvae in addition to the seeds, buds and flowers of native and introduced plants.'

'All male feeding flocks can sometimes be seen heading to and from their nests near the River Murray. This is during the five week periods where female parrots incubate their eggs and sit with the newly hatched chicks.'

'Regent parrots are colourful, pretty birds. They are medium sized parrots weighing from 160 grams to 190 grams. Males may be slightly larger than the females. The male is brightly coloured with a gold-yellow head, neck and shoulders. Females and juveniles are similar but are greener, particularly around the head and neck.'

### Barmah Gums Bloom

From *The Land* 26/10/06 p.39

'The world's largest delivery of environmental water - equivalent to about one Sydney harbour- has revived the internationally acclaimed Barmah-Millewa redgum forest which straddles the Murray River upstream of Echuca on the NSW and Victorian border.'

A total of 513 gigalitres was released from Hume and Dartmouth storages to flood the area.

'The Barmah-Millewa Forest is a diverse wetland that includes the largest red gum forest in the world. The wetland has developed around the Barmah Choke ( a natural narrowing of the Murray River) which requires regular major floodings for its survival.'

As a consequence of the water releases many of the previously drought stressed plants including the River redgums and a host of aquatic species, such as Wavy Marshwort, burst back into life.

'Being a flood sensitive indicator species, Moira grass was monitored on the plains to establish at what depth it was being flooded and whether it was being inundated to depths critical for flowering and for sufficient duration for the species to consolidate. A number of fish monitoring

projects were already underway...including projects looking at spawning and recruitment of larval fish. This monitoring showed native and some introduced fish species were quick to respond to the extended flooding. Golden and Silver perch responded in numbers not previously recorded. Murray cod and...trout cod, were also observed to have successfully bred. Colonial nesting waterbirds were initially slow to react... but warmer weather and the duration of the flooding eventually triggered major breeding.'

### Bushfires a drain on Murray's faltering flow

From *The Australian* 20/11/06 p.6

'Bushfires past and future threaten to further reduce flows into the beleaguered Murray River, according to new research which presents a surprising relationship between fire and water flows.

For up to 50 years after a bushfire, forests can use half the runoff, because regenerating trees take up more water than mature trees. And with a long, hot summer predicted over much of the country, Murray Darling Basin Commission head Wendy Craik has warned that bushfires in the catchment would drastically reduce water quality with an influx of ash.'

'The amount of water used by the growing forest peaks between 20 and 30 years after the fire.'

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