






# Central Riverina Wildlife

*Matthew Herring*
*Hugh McGregor*
*Jessica Herring*
*David Webb*
*Alexandra Knight*

Murray CMA CATCHMENT MANAGEMENT AUTHORITY

Murray CMA CATCHMENT MANAGEMENT AUTHORITY

**Publication Details**

Published by the Murray Catchment Management Authority and Murray Wildlife Pty. Ltd. © 2008. This booklet is copyright.

ISBN: 978-0-9775829-5-2

Matthew Herring
Hugh McGregor
Jessica Herring
David Webb
Alexandra Knight

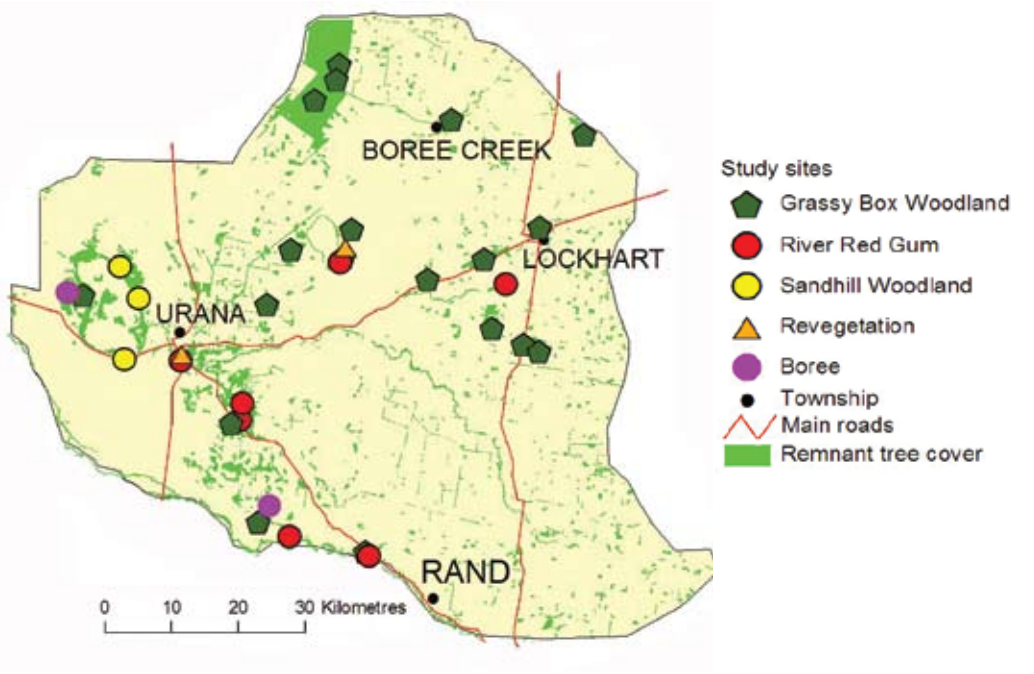
# Central Riverina Wildlife

For any further information contact mherring@murraywildlife.com.au or to obtain additional copies contact the Murray CMA.

**Acknowledgements**

The West Corurgan/Central Riverina Wildlife Survey was funded and supported by the NSW Murray Catchment Management Authority. Special thanks to all the farmers for supporting the project so enthusiastically, with access to your properties, help during trapping sessions, strong attendance at the field days and seminars, and amazing hospitality. Rosie Smith, Shanna Rogers, Natasha Lappin and Sue Logie from the Murray CMA made a significant contribution to the project – their efforts are greatly appreciated. The work by Gary Herring, Jamie Jackson and Scott Lucas during the field work was first class. Thanks also to David Leslie, Dean Metcalfe, Jack Chubb, Katrina Grundy, Anthony Couroupis (Murray CMA) and Ian Davidson for reviewing an earlier draft and for general support throughout the project. We are indebted to the graphic design, IT and publishing expertise of Dylan O'Donnell who enabled our visions to materialise into this booklet. Thanks also to the Rural Lands Protection Boards and NSW Forests for access to TSR's and State Forests, and to Charles Sturt University and the Department of Environment & Climate Change for scientific permits and equipment hire.

# INTRODUCTION




## Why we did a wildlife survey?

One of the best things about living in the Murray region is all the wildlife that we share our landscape with. Unfortunately we have lost several animal species since European settlement, such as the White-footed Rabbit-Rat and Eastern Hare-wallaby, and many others are in serious danger of becoming extinct as well. Fortunately though, there is a growing commitment in the country to wildlife conservation on the farm. As we improve our knowledge of the local landscape and the animals and plants that live in it we will be in a much better position to ensure our natural heritage is maintained for future generations.

This wildlife survey was an initiative of the Murray Catchment Management Authority (CMA) and is the largest and most extensive ever undertaken in the local area. It builds on three previous studies in the catchment: the Murray LWMP Wildlife Survey conducted in the Berriquin, Cadell, Wakool, and Denimein areas from 2005-2006; the Murrakool Wildlife Survey conducted around Barham, Swan Hill and Tooleybuc in 2003-2004 and; the Heartlands Eastern Billabong Wildlife Survey conducted around Holbrook, Culcairn and Walbundrie in 2001-2002. These projects have two broad aims:

1) To determine the distribution, habitat and local status of birds, reptiles, mammals and frogs

2) To raise awareness about wildlife ecology and promote conservation of the remaining species

## What methods did we use?

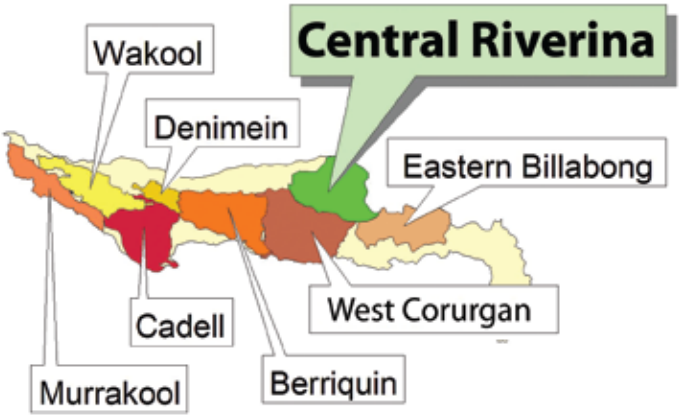
A total of 70 sites were established across the Central Riverina and West Corurgan areas. Formal surveys were conducted over the 14-month period at the sites, with an additional 20 sites surveyed incidentally. The sites were spread across 28 farms and were surveyed between September 2006 and October 2007. The sites incorporated the range of broad vegetation types in the region, together with revegetation on previously cleared land.

*Red Kangaroo*

Methods used to survey wildlife included:

- 420 x 20 minute Bird Surveys (Two surveys in each of three seasons at all 70 sites)
- 30 x 1 hour Active Searches for reptiles and frogs (e.g. log rolling)
- 30 x 1 hour Spotlighting surveys for mammals, reptiles and nocturnal birds
- 6000 x Elliot trap-nights for small mammals and reptiles
- 120 x Harp trap-nights for bats.
- Opportunistic Anabat bat call recording, Pitfall trap-nights for reptiles and frogs and call broadcasting to attract birds.

Surveying over the entire West Corurgan and Central Riverina areas involved over 60 days of field work, usually with at least two people.



# CENTRAL RIVERINA / WEST CORURGAN - SPECIES LIST

*Ground Cuckoo-shrike*

## Birds

Emu R
Stubble Quail R
Brown Quail R
Pacific Black Duck R
Wood Duck R
Black Swan R
Magpie Goose R **(t)**
Australian Shelduck R
Grey Teal R
Chesnut Teal R
Hardhead R
Australasian Grebe R
Hoary-headed Grebe R
Darter R
Great Cormorant R
Little Black Cormorant R
Little Pied Cormorant R
Australian Pelican R
White-faced Heron R
White-necked Heron R
Royal Spoonbill R
Yellow-billed Spoonbill R
Great Egret R
White Ibis R
Straw-necked Ibis R
Black-shouldered Kite R
Black Kite R
Swamp Harrier R
Spotted Harrier R
Whistling Kite R
Brown Goshawk R
Wedge-tailed Eagle R
White-breasted Sea Eagle R
Little Eagle R
Brown Falcon R
Australian Hobby R
Black Falcon R
Peregrine Falcon R
Australian Kestrel R
Brolga R **(t)**
Dusky Moorhen R
Purple Swamphen R
Eurasian Coot R
Black-tailed Native Hen R
Bush Stone-curlew R
Painted Button-quail R
Marsh Sandpiper R
Common Greenshank R
Sharp-tailed Sandpiper R
Black-winged Stilt R
Red-necked Avocet R
Red-kneed Dotterel R
Black-fronted Dotterel R
Masked Lapwing R
Banded Lapwing R
Australian Pratincole R
Peaceful Dove R
Common Bronzewing U
Crested Pigeon C
Feral Pigeon R #
Galah C
Little Corella R
Sulphur-crested Cockatoo C
Cockatiel R
Superb Parrot R **(t)**
Eastern Rosella C
Yellow Rosella R
Mallee Ringneck R
Blue Bonnet R
Red-rumped Parrot C
Pallid Cuckoo R
Horsfields Bronze-cuckoo R
Southern Boobook R
Barn Owl R
Powerful Owl R (t)
Tawny Frogmouth R
Australian Owlet-nightjar R
Fork-tailed Swift R
White-throated Needletail R
Laughing Kookaburra C
Azure Kingfisher R
Sacred Kingfisher R
Rainbow Bee-eater R
Dollarbird R
White-throated Treecreeper R
Brown Treecreeper U
Striated Pardalote C
Spotted Pardalote R
White-browed Scrubwren R
Speckled Warbler R **(t)**
Weebill C
Western Gerygone U
Brown Thornbill R
Inland Thornbill R
Chestnut-rumped Thornbill R
Yellow-rumped Thornbill C
Yellow Thornbill C
Buff-rumped Thornbill R
Southern Whiteface R
Red Wattlebird R
Painted Honeyeater R **(t)**
Spiny-cheeked Honeyeater R
Striped Honeyeater R
Noisy Friarbird R
Little Friarbird R
Noisy Miner C
Blue-faced Honeyeater R
White-plumed Honeyeater C
Black-chinned Honeyeater R **(t)**
Brown-headed Honeyeater R
White-fronted Chat R
Jacky Winter R
Flame Robin R
Red-capped Robin R
Hooded Robin R **(t)**
Grey-crowned Babbler C **(t)**
White-browed Babbler R
Varied Sittella R
Crested Shrike-tit R
Golden Whistler R
Rufous Whistler U
Grey Shrike-thrush C
Restless Flycatcher U
Leaden Flycatcher R
Australian Magpie-lark C
Grey Fantail U
Willie Wagtail C
Black-faced Cuckoo-shrike C
Ground Cuckoo-shrike R
White-winged Triller R
Olive-backed Oriole R
Masked Woodswallow R
White-breasted Woodswallow R
White-browed Woodswallow R
Black-faced Woodswallow R
Dusky Woodswallow R
Grey Butcherbird C
Pied Butcherbird C
Australian Magpie C
Pied Currawong R
Little Raven C
White-winged Chough C
Apostlebird R
House Sparrow R #
Red-browed Finch R
Zebra Finch R
Diamond Firetail R **(t)**
Mistletoebird R
Welcome Swallow C
Tree Martin U
White-backed Swallow R
Clamerous Reed-warbler R
Little Grassbird R
Rufous Songlark U
Australian Pipit R
Singing Bushlark R
Brown Songlark R
Silvereye R
Common Blackbird R #
Common Starling R #

*Inland Forest Bat*

## Mammals

Short-beaked Echidna R
Squirrel Glider R **(t)**
Sugar Glider R
Black Wallaby R
Eastern Grey Kangaroo C
Red Kangaroo R
Ring-tailed Possum R
Common Brushtail Possum C
Gould's Long-eared Bat R
Lesser Long-eared Bat U
White-striped Freetail Bat R
Southern Freetail Bat R
Inland Freetail Bat R
Goulds Wattled Bat U
Chocolate Wattled Bat R
Inland Broad-nosed Bat R
Inland Forest Bat R **(t)**
Little Forest Bat C
Large Forest Bat R
Southern Forest Bat R
Feral Cat R #
House Mouse U #
Black Rat R #
Rabbit C #
Brown Hare U #
Fox U #

*Wrinkled Toadlet*

## Frogs

Peron's Tree Frog R
Plains Froglet C
Common Froglet C
Spotted Marsh Frog C
Barking Marsh Frog R
Wrinkled Toadlet R

## Reptiles

Eastern Long-necked Turtle R
Southern Marbled Gecko R
Wood Gecko R
Tree Dtella R
Southern Spiny-tailed Gecko R
Lace Monitor R
Sand Goanna R
Carnaby's wall skink C
Wood Mulch Slider R
Boulengers Skink C
Dwarf Skink R
Southern Rainbow Skink R
Spotted-backed Ctenotus R
Bronze-blazed Wedgesnout R
Tree Crevice Skink R
Robust Ctenotus R
Yellow-bellied Water Skink R
Dwyer's Snake R
Curl Snake R
Eastern Brown Snake U
Red-bellied Black Snake R
Bearded Dragon R
Prong-snouted Blind Snake R
Nobbi Dragon R

## Key

**R - Rare (1-10% of sites)**
**U - Uncommon (11-25% of sites)**
**C - Common (26% sites or more)**
**# Introduced**
**(t) Threatened**

*Dwyer's Snake*

# GRASSY BOX WOODLAND

Grassy Box Woodland includes any stands of White Cypress-Pine, Yellow Box, Grey Box or Buloke, that aren't on sandhills. Prior to European settlement this was the most widespread vegetation type across the NSW Murray Catchment with large expanses in the Central Riverina.

From a conservation perspective, the few remaining stands of high quality Grassy Box Woodland are like gold. When in good condition, these beautiful woodlands contain a great variety of understorey shrubs such as wattles, saltbushes and hopbushes, together with a wide range of native grasses and wildflowers.

**It is vital that we rest areas from grazing to allow young trees and shrubs to regenerate.**

The soils found in Grassy Box Woodland have been favoured for agriculture and more than 95% of the original area has disappeared from the NSW Murray Catchment. Today, the wildlife found in these woodlands usually consists of common species like the Australian Magpie, Noisy Miner, Red-rumped Parrot, Galah, Eastern Brown Snake and Eastern Grey Kangaroo, all of which are associated with relatively open areas and can persist in landscapes that are mostly cleared.

At times it was very disheartening for us to survey these sites and record the same dozen or so species again and again. The good news is that many special species like the Red-capped Robin and Speckled Warbler are capable of returning to Grassy Box Woodland sites that have been restored and now support plenty of young trees, shrubs, native grasses, fallen timber and other habitat.

Thankfully there are at least some high quality patches of Grassy Box Woodland remaining in the Central Riverina, such as those around Lake Uranagong, the western side of Lake Urana and Galore Hill, together with the Buckingbong, Cullival and Brookong State Forests. Restored areas of Grassy Box Woodland are able to attract the surplus of wildlife produced at these hotspots as the animals disperse through the landscape looking for places to live.

*The Southern Spiny-tailed Gecko is real jewel of the bush. It is mostly nocturnal but can be found during the day hiding under logs, rocks or bark on trees.*

*The orange throat of this Boulenger's Skink identifies it as a breeding male. When there is good habitat this species can be abundant and is probably the region's most common reptile.*

*The Allan Carroll Flora & Fauna Reserve at Boree Creek is a highly significant patch of bush. It supports many species like the Inland Thornbill that are now restricted to large, high quality remnants.*

## A Real Winner: The Noisy Miner

One native species that has done especially well since European settlement is the Noisy Miner. It was one of the most abundant bird species recorded during the surveys, and is often indicative of small, degraded and fragmented woodland patches that have widely spaced Eucalypts. It is quite aggressive to other native birds, and the only small woodland bird that seems to tolerate them in large densities is the Striated Pardalote.

*The Buckingbong State Forest is a biodiversity hotspot of immense regional significance. It is the largest remaining patch of Grassy Box Woodland in the entire NSW Murray Catchment.*

Grassy Box Woodland sites that have a good cover of native shrubs supported a number of important species like the Black Wallaby, White-browed Babbler and Speckled Warbler. One of the simplest ways to reinstate a patchy understorey of shrubs and young trees is to avoid continuous grazing regimes and ensure the area is rested for long enough to allow regeneration. Sites can be strategically grazed once shrubs and young trees have become established.

Direct-seeding or planting local shrubs that have disappeared from an area is another easy way to reinstate the understorey. A good cover of native perennial grasses is also an important habitat feature to aim toward and these can also be reintroduced by spreading seed and managing weeds.

Native grasses not only reduce erosion and improve the overall ecological health of a site, but also provide seeds for species like the beautiful Diamond Firetail (see front cover), which is only rarely recorded in the region and considered a threatened species in NSW. Native grass tussocks also provide cover from predators for several reptiles.

The appropriately named Superb Parrot was closely associated with Grassy Box and Sandhill Woodlands, and although they breed in the red gum forests along the Murray and other major waterways, they rely on other vegetation types to feed in. The retention of remnant vegetation along roadsides helps facilitate the movement of this species between its breeding and feeding sites throughout the landscape.

The discovery of the Bronze-blazed Ctenotus (***Ctenotus allotropis***), a small skink not thought to occur as far south as the NSW Murray Catchment, in the Allan Carroll Flora & Fauna Reserve at Boree Creek, was a major highlight of the study. Other high quality Grassy Box Woodland sites like Galore Hill and Buckingbong State Forest supported additional uncommon to rare reptiles species, such as the Nobbi Dragon, Tree Dtella, Wood Gecko, Southern Spiny-tailed Gecko, Curl Snake and Dwyer's Snake.

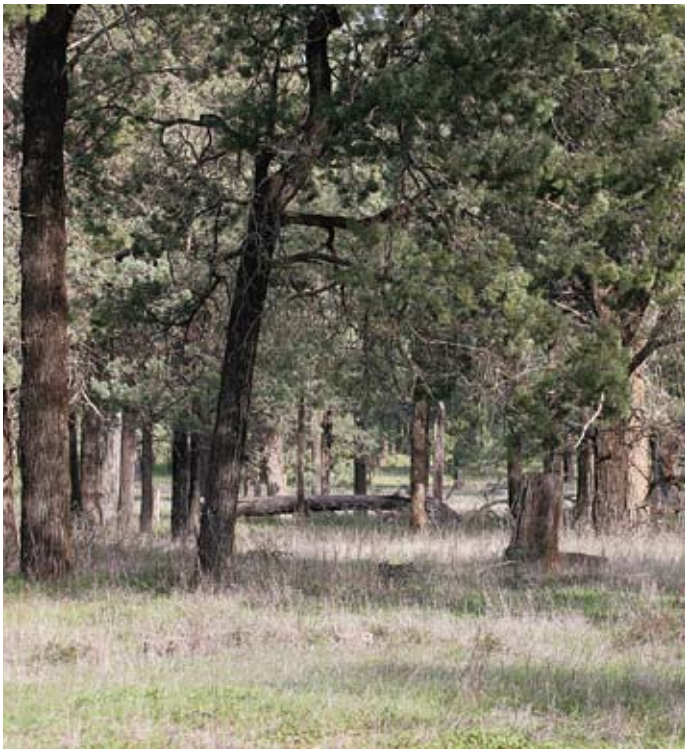
**Retaining fallen timber benefits many wildlife species. Piling it up and burning it wastes a valuable resource.**

At isolated revegetation sites and restored remnants it may be necessary and desirable to reintroduce some of these species to areas that are once again capable of supporting viable populations.

*The tiny Speckled Warbler was only found at two sites, both large (300+ hectares) Grassy Box Woodland patches, but can readily colonise revegetation.*

*The Superb Parrot (below) and Grey-crowned Babbler (bottom left) are among the last woodland birds to hang on in heavily cleared areas, long after most of the smaller species like robins and thornbills have become locally extinct.*

# SANDHILL WOODLAND



*Sandhill Woodland supports a particularly unique suite of wildlife and high quality sites are hotspots for reptile diversity.*

**Maintaining healthy remnant vegetation on sandhills is great news for wildlife and helps stabilise the fragile soils from wind and rain.**

*The loose soil of Sandhill Woodland enables the Sand Goanna (also called a Gould's Monitor) to easily dig its burrows. It differs from the Lace Monitor by being much smaller and having distinctive cream stripes behind the eye.*

High quality Sandhill Woodland is outstanding for native wildlife and supports a plethora of native plants, however these days it is hard to find good quality patches. It includes vegetation capable of growing in sandy soils and often merges with Grassy Box Woodland. Large trees include White Cypress-Pine, Buloke, Yellow Box, Grey Box and Needlewood.

Parts of the Central Riverina have extensive sandhills but when the area was first settled in the 1800s they were heavily cleared for grazing and then later for cropping. Fortunately, there are still a handful of significant Sandhill Woodland remnants like those around the eastern and southern edges of Lake Urana.

Sandhills originally had a very diverse shrub layer with species such as Emu Bush, Quandong and various Acacias and saltbushes. Reinstating this understorey into stands of trees on sandhills will help to bring this beautiful vegetation back from the brink of local extinction.

Good quality sandhill woodland is a haven for reptiles and woodland birds. The sandy soils allow movement of underground animals like blind snakes, and provide ideal nesting sites for Rainbow Bee-eaters and Sand Goannas.

Remaining stands of native pine are examples of remnant sandhill woodland that are excellent starting blocks for future restoration. This can be done by fencing out stock, controlling common weeds (e.g. Patterson's Curse, Cape Weed and Barley Grass) and replanting with shrubs. Controlling rabbits, hares, foxes and cats will also make a site more attractive to native wildlife.

**Sandhill Woodland sites dominated by native pines are unattractive to Noisy Miners because of the lack of Eucalypts and higher tree density.**

Nocturnal birds of prey like the Barn Owl, Boobook Owl, and Tawny Frogmouth were frequently detected at Sandhill Woodland sites. and many other parts of the landscape. Along with Brush-tailed and Ring-tailed Possums, these species rely on old trees with hollows.

*The Prong-snouted Blind Snake is easily recognised by it's distinctive tri-lobed snout. It spends much of its time underground. Blind Snakes feed on termites and ants, their eggs and larvae.*

# BOREE WOODLAND

Boree Woodland is dominated by Boree (***Acacia pendula***) and originally covered large areas of the Central Riverina. It was the dominant vegetation throughout the central and western parts of the region. Today, there are just a few scattered stands remaining, representing a small fraction of the original area.

**One of the single most important things that can be done for wildlife in the Central Riverina is protecting the remaining stands of Boree.**

A well-managed Boree remnant with good habitat can support dozens of bird species and around 10 reptile species, even if the site is only a hectare or two in area. It doesn't take long to enhance a stand of Boree trees into an oasis for wildlife.

All sites, irrespective of their vegetation type, that have old grass, fallen logs, branches, shrubs, sheets of corrugated iron, old fence posts or other habitat contained healthy reptile and bird assemblages. Such "messy" areas are good habitat for the Dwyer's Snake and Curl Snake, as well as many of the small, insectivorous woodland birds that are declining.

Conservation of the remaining stands of Boree is crucially important for the Central Riverina and the NSW Murray Catchment as a whole. Fortunately, Boree can usually regenerate easily if stock grazing is controlled to allow regrowth of young Boree trees.

These new trees not only provide a future for the site but also act as an understorey while they are young. Shrubs will also have a much better chance of reestablishing if the area is rested from grazing.

Retaining fallen timber and encouraging native grasses can make a huge difference as well so if you're lucky enough to have a stand of Boree consider giving it a future by taking up the incentives offered by the Murray CMA to improve habitat for native wildlife.

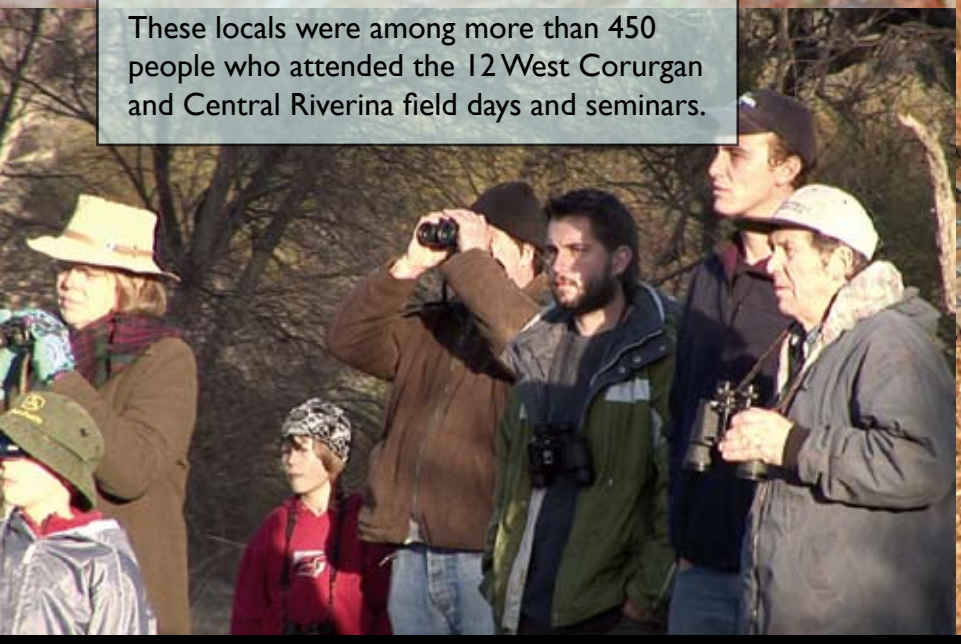
*Young Boree trees have regenerated at this site because it has been rested from grazing for long enough to allow young trees to become established. As a result of this the trees here are no longer the "living dead". Well managed Boree also supports a range of native shrubs, ground covers and wildflowers, such as saltbushes and rare Swainsona Peas. When Grey Mistletoe (inset) is present in a Boree site it can attract the threatened Painted Honeyeater (see front cover), which is dependent on mistletoe, and was found near Lake Urana.*

*Like so many of our wildlife species, this Blue Bonnet depends on old trees with hollows.*

*Boree often supports Grey Mistletoe so it is a great place to see the Mistletoebird. This male has been munching on ripe mistletoe fruits. Within half an hour or so these will pass through the bird and potentially germinate if they attach to a suitable branch.*

Locals brave a cold winters morning at a field day on the western edge of Lake Urana.

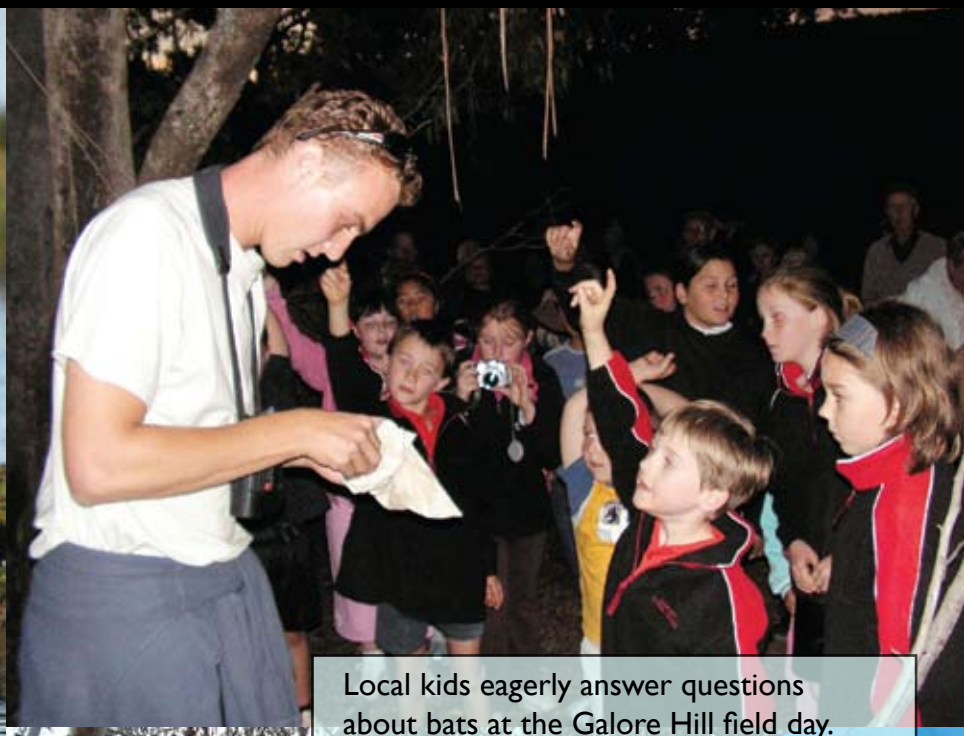
Black Wallaby.



These locals were among more than 450 people who attended the 12 West Corurgan and Central Riverina field days and seminars.

This Curl Snake and the Dwyer's Snake (see p3) differ from a juvenile Eastern Brown Snake (inset) mainly by the absence of a neck band.

Brolga pair with two freshly hatched chicks in tow.



Local kids eagerly answer questions about bats at the Galore Hill field day.

The Billabong Creek at "Bogandillan" was another well attended Central Riverina field day.

# RIVER RED GUM

River Red Gum (***Eucalyptus camaldulensis***) is one of the most intact vegetation types in the NSW Murray Catchment. The red gum forests of the Murray region are one of Australia's greatest ecological assets. The value of major waterways and wetlands in the Central Riverina such as the Billabong Creek and Lake Urana-gong cannot be overemphasised. Good quality red gum habitat booms with wildlife, particularly birds and mammals.

Large, old River Red Gums, some of which were around long before European settlement, are the

**River Red Gum waterways like the Billabong Creek facilitate wildlife movement through the landscape, enabling populations to intermix.**

equivalent of Hollywood mansions for wildlife because they are filled with a range of hollows and crevices. Bats, possums, gliders, parrots, pardalotes, owls, various reptiles and numerous others all shelter and nest in red gums.

Shedding bark is important for treecreepers, the Crested Shrike-tit, the Southern Marbled Gecko and Peron's Tree Frog. Fallen logs provide homes for the Yellow-footed Antechinus, Bush Stone-Curlews and various species of reptile. River Red Gums attract a myriad of insects, as well as honeyeaters, lorikeets and numerous other birds. The abundant leaf litter produced by River Red Gums is another valuable resource for wildlife.

Some species strongly associated with red gums and creeklines include the Pacific Black Duck, Nankeen Night Heron, Yellow Rosella, Sacred Kingfisher, White-throated Treecreeper, Little Friarbird, Restless Flycatcher, Sugar Glider, Tree-crevice Skink and a range of bats and frogs. Some birds like the colorful Dollarbird migrate all the way from Northern Australia and beyond during summer to use these River Red Gum forests.

The Billabong Creek and other major waterways in the Central Riverina act as wildlife 'highways' through the landscape, enabling wildlife populations to intermix. Intermittent flooding of red gum directly benefits waterbirds, frogs and bats but also maintains the overall health of the system. Restoring flows to waterways and wetlands that are dying of thirst is clearly a priority.

A total of twelve bat species were recorded for the West Corurgan and Central Riverina surveys, many of which were most abundant in River Red Gum. All these bat species are insectivorous and play an important role in controlling insects, consuming up to half their body weight in insects every night!

During the day these bats roost in tree hollows, crevices and under bark. The greatest number and diversity of bats were recorded in wetlands and along rivers, where invertebrates like mosquitoes are most abundant. Some of the more special bats trapped included the Inland Broad-nosed Bat, Inland Forest Bat, Gould's Long-eared Bat and Southern Forest Bat.

Squirrel Gilders, which are listed as a threatened species in NSW, were found along the Billabong Creek in between Rand and Urana, a long way westward of their previously confirmed sightings on this waterway. Waterways like the Billabong Creek, as well as continuous stands of roadside

*Large, old River Red Gums like this one are home to Sugar Gliders and Squirrel Gliders, and numerous species of birds and bats shelter and breed in the hollows and crevices.*

*The White-plumed Honeyeater is characteristic of River Red Gum but does not survive in open areas with poor habitat that are dominated by Noisy Miners and other large, aggressive species.*

*The nocturnal Southern Marbled Gecko is commonly found under the bark of River Red Gums. Peron's Tree Frogs also favour red gum bark to shelter under.*

*An Australian Owlet Nightjar at the entrance of it's nest. This nocturnal bird has a distinctive call, somewhat similar to that of a Brown Falcon.*

trees, act as corridors and enable populations to intermix, preventing inbreeding and local extinction. Squirrel Gliders feed on insects, gum from wattles, sap from eucalypts, as well as nectar and pollen. They benefit from having a range of tree and wattle species that offer different resources at different times of year.

Despite 6000 Elliot Trap-nights (30 sites x 50 traps x 4 nights) not a single Yellow-footed Antechinus was found, a very disheartening result. The Yellow-footed Antechinus is a small, carnivorous marsupial that is well known for its bizarre breeding habits where all males die of exhaustion after the winter breeding season.

We're quite confident that the complete lack of Yellow-footed Antechinus detection was at least partly due to successive years of drought. With previous surveys across the NSW Murray Catchment we have found "Yellow-foots" along major floodplain waterways that have extensive areas of remnant vegetation like the Murray, Edward and Wakool Rivers, as well as high quality remnants on hills in the South-west Slopes such as those around Holbrook and Albury.

In areas where there are numerous old, hollow logs on the ground we frequently record them in densities between 4 and 24 per hectare. Retaining fallen logs in your patch of bush and planting woodlots for future firewood supply will help ensure these amazing critters don't become another addition to the list of mammals that have disappeared from the Murray region since European settlement.

Early settlers in the Central Riverina had the pleasure of finding native animals like the Eastern Quoll, Eastern Hare-Wallaby, Greater Bilby and White-footed Rabbit-Rat, now all extinct in the Murray region. Today, the only common native mammal species in the region, apart from bats, are the Eastern Grey Kangaroo and Common Brushtail Possum, which are both regularly found in high densities in River Red Gum areas.

*The amazing Squirrel Glider, capable of gliding for up to 100 metres, is larger and normally much rarer than the Sugar Glider. Squirrel Gliders would have once occurred across most of the Central Riverina.*

*The "Bell's Form" (below left) of the Lace Monitor (also called Tree Goanna) is very distinctive from the usual form that people normally see (below centre). Lace Monitors are thought to exclusively lay their eggs in termite nests, either on the ground or in trees. The termites seal the excavation left by the female so the termite nest acts as an incubator. Once hatched the young goannas dig themselves out and fend for themselves.*

Much to our disappointment, the beautiful Canegrass wetlands (and other open wetlands) of the Central Riverina region didn't fill during our survey period, and so we didn't have any sites that incorporated them. Undoubtedly, if we'd had the appropriate rainfall and these sites did fill, then we would have recorded many more waterbird and frog species.

A number Brolgas were found in the Central Riverina and West Corurgan areas during the study. There are fewer than 1000 Brolgas remaining in south-eastern Australia, with their survival ultimately depending on how wetlands are managed on farms.

**Many waterbird species prefer treeless wetlands to feed and breed in.**

Brolgas breed almost exclusively in large, ephemeral, open wetlands (usually between 10 and 200 hectares) that are only flooded for about 2-6 months at a time, then allowed to completely dry out.

There are a number of these types of wetlands in the Central Riverina so it is not surprising that the area is one of the most important Brolga breeding regions remaining in the state. These sites also support the Australasian Bittern and other significant species when they are full.

The Marsh Sandpiper and Sharp-tailed Sandpiper are migratory shorebird species that visit the Central Riverina every Spring and Summer. They essentially live their lives in an endless summer, migrating between the northern and southern hemispheres. These species breed in Europe, Siberia and China, and in Australia favor shallow, muddy wetland areas for foraging.

The most common frogs recorded during the study were Plains Froglet, Common Froglet and Spotted Marsh Frog. They were frequently recorded in large numbers near water, along rivers, creeks, and farm dams. The adults and tadpoles of these common frogs provide a great food source for waterbirds like Great Egret and reptiles like the Tiger Snake.

**Most farm dams have insufficient habitat to support a good variety of waterbirds, frogs and bats. The Australian Wood Duck is a rare example of a species that has actually benefited from the proliferation of farm dams. Simple changes to farm dams can substantially increase their wildlife carrying capacity.**

**Earthworks that create seasonally flooded shallows that support waterplants and mudflats attract a wide range of new species like egrets, herons, crakes, sandpipers, spoonbills and stilts. Avoiding constant grazing pressure from stock will also enable mudflats and waterplants to flourish resulting in a greater range of wildlife utilising your farm dam.**

*Treeless wetlands that support a range of waterplant communities with mudflats and shallows, like this one in the Urana-Jerilderie area, are often home to 50 diffferent waterbird species, as well as numerous frogs, bats and other wildlife.*

*Royal Spoonbill (left). The Australian Painted Snipe (below) breeds in the Riverina region and is not closely related to the Latham's Snipe (inset), which only breeds in Japan and migrates to spend the summer (northern hemisphere winter) here in Australia. Both species rely on shallow wetland areas with mudflats and cover from waterplants.*

*Revegetation helps bring back structural habitat diversity to the landscape. The Spiny-cheeked Honeyeater (inset) is one of dozens of bird species that benefit from revegetation in the Central Riverina.*

For years we've had faith that revegetation would benefit wildlife and now it is clear that many species, particularly birds, are readily able to colonise suitable revegetation patches that landholders have planted.

Whistlers, thornbills, fantails, warblers, robins, honeyeaters and numerous other birds take advantage of the dense young trees and shrubs. Here, they have cover from predators and aggressive Noisy Miners, opportunities to nest, and places to feed.

These small birds are even able to colonise isolated patches of revegetation, many kilometres from the nearest remnant but revegetated sites attract the most species when they are 5 or more hectares in area, incorporate a range of tree and shrub species and are situated adjacent to remnant vegetation. The popular 'wind-break' plantings in isolated paddocks that involve thin strips generally only benefit species already doing well like Crested Pigeon, Willie Wagtail, Red-rumped Parrot and Black-faced Cuckoo-shrike.

Some plantings in the Central Riverina and West Corurgan areas that are only 5-10 years old actually had higher bird diversity than many of the degraded remnants that are dominated by large bird species like the Pied Butcherbird, Australian Magpies and Eastern Rosella.

Other less mobile species, like many reptiles and small mammals will only benefit from revegetation that is situated adjacent to existing remnants. Isolated sites of adequate size and with appropriate habitat that are thought to once again be able to support viable populations of these immobile species may make suitable reintroduction trial sites in the future.

Old sheets of corrugated iron, fence posts and roofing tiles can provide homes for a range of skinks, geckos and legless lizards that would otherwise have to wait many decades for fallen logs and branches to accumulate. Similarly, nest boxes designed for bats, possums, gliders, parrots, owls or other hollow-nesting wildlife can provide shelter and nest sites well before hollows form in trees, which takes place decades down the track.

Farm forestry plantations of Eucalypts and Old Man Saltbush plantings for grazing value and salinity mitigation are a much better 'crop' for most wildlife than conventional agriculture. Old Man Saltbush plantings attract the most birds when they are situated around remnant trees. Several species like the White-fronted Chat avoid trees and respond well to these sites but most shrub-loving birds in the region also require tree cover.

**The response of small, insectivorous woodland birds to revegetation is phenomenal.**

Most revegetation sites are ungrazed, at least for the first few years while trees and shrubs become established. As a result, wildlife species that favour thick grass benefit. Reptiles like the Olive Legless Lizard are attracted by the cover provided by grass tussocks. The Rufous Songlark nests in long grass and is often closely associated with ungrazed or lightly grazed parts of the landscape.

Variation in tree and shrub density within a large planting will benefit species that prefer dense areas, as well as species that prefer more open areas. The key to attracting a maximum number of species is habitat diversity.

*The Weebill is generally considered Australia's smallest bird. It does not persist in highly fragmented landscapes with only small, degraded remnants that have widely-spaced trees. Despite their small size, Weebills readily colonise revegetation.*

*The Rufous Whistler (pictured here is a male at the nest) responds well to revegetation. Young trees and shrubs provide cover from predators, a place to nest and they support a range of invertebrate food.*

# LOCAL HOTSPOTS

Biodiversity hotspots are a priority for conservation. They are reservoirs of life and are the last remaining 'jewels in the crown'. There is an urgent need for us to target our on-ground conservation efforts towards local biodiversity hotspots in the Central Riverina. By getting the biggest bang for our buck we can ensure as many individuals and species as possible benefit from our efforts. We can increase the wildlife carrying capacity of these sites and expand the area of the sites by improving and creating habitat adjacent to them.

The local biodiversity hotspots identified here are characterised by at least one of the following attributes: relatively large patch, high habitat diversity, high number of species, high number of threatened or locally endemic species, high productivity/fertility or a severely depleted vegetation type. Different vegetation types support different suites of wildlife. Conservation of all vegetation types across the Central Riverina region is therefore very important.

*HOTSPOTS: Sandhill Woodland around Lake Urana and any high quality stands of Boree Woodland.*

*HOTSPOTS: Grassy Box Woodland patches including Buckingbong, Cullival and Brookong State Forests, the Allan Carroll Reserve at Boree Creek, Galore Hill, adjacent to the western edge of Lake Urana, and around Lake Uranagong.*

*HOTSPOTS: River Red Gum along the Billabong and Urangeline Creeks, and other major waterways, as well as major wetlands like Lake Uranagong and Lake Urana.*

*HOTSPOTS: Canegrass Wetlands such as Lake Cullival, parts of the Boree Creek floodplain and those west of Urana.*


**Photo Credits**

Peter Merritt: PM, David Webb: DW, Matthew Herring: MH, Sue Logie: SL, Shanna Rogers: SR, Natasha Lappin: NL, Nathan Smith: NS, Gary Herring: GH, Hugh McGregor: HM, Craig Grabham: CG, Paul Scannell: PS.

FRONT COVER: Southern Spiny-tailed Gecko: DW, Field Day: SR, Painted Honeyeater: DW, Local girl looking for geckos: SL, Diamond Firetail: PM, Fenced Boree: MH, Australian Owlet Nightjar: GH, Ring-tailed Possum: NL Page 2: PM. Page 3: Bird: PM, Bat: HM, Frog: MH, Snake: DW. Page 4: All DW except Allan Carroll Reserve: MH. Page 5: Buckingbong: MH, Speckled Warbler and Grey-crowned Babbler: PM, Superb Parrot: DW. Page 6: All DW. Page 7: All PM except Boree: DW, Grey Mistletoe flower: MH. Pages 8 & 9: Locals at field day near Lake Urana: NS, Black Wallaby: PM, Locals with binoculars: NS, Brolgas: PM, Curl Snake and Eastern Brown Snake: DW, Locals at Galore Hill: SR, "Bogandillan" field day: SL. Page 10: All DW except red gum: MH. Page 11: All PM except Bell's Form Lace Monitor: PS. Page 12: All PM except Painted Snipe:DW. Page 13: All PM except revegetation: MH. Page 14: All MH except top photo: DW. PAGE 15: All MH except Fox and constructed wetland: PM. BACK COVER: All PM except Bronze-blazed Wedge-snout (skink): DW, locals in mist: NS, Grassy Box Woodland with shrubs: MH, and Gould's Wattled Bat: CG

## KNOW YOUR HABITAT

**The most important thing that landholders in the Central Riverina can do for wildlife conservation is to identify the significant remnant vegetation sites on their properties and manage them in a way that will maintain or improve the quality of habitat.**

## RETAIN FALLEN TIMBER

Tidying up the farm by piling up logs and branches and burning them is bad news for wildlife. Retaining fallen timber will benefit many species like the Yellow-footed Antechinus, Bush Stone-curlew and a whole range of reptiles such as geckoes and skinks. Even junk such as old fence posts and sheets of corrugated iron can be valuable habitat.

## REVEGETATE

The response of wildlife to plantings on cleared land is phenomenal, especially for birds. Revegetated sites attract the most species when they are 5 or more hectares in area (but not in thin strips), incorporate a range of tree and shrub species, and are situated adjacent to remnant vegetation.

## REST AREAS FROM GRAZING

Avoiding continuous grazing pressure and resting areas from stock dramatically improve wildlife habitat, allowing young trees, shrubs and grasses to regenerate. Fencing incentives available through the Murray CMA are enabling landholders to make major improvements to wildlife habitat on their farms.

## MODIFY YOUR DAM

Simple changes to farm dams can also increase wildlife diversity on your property. Earthworks that create ephemeral shallows (50 cm and less) and exclusion of stock promotes waterplant growth and productive mudflats. This results in a wetland oasis for frogs, waterbirds and bats. Stock water can be pumped to a nearby trough if needed.

## REINSTATE UNDERSTOREY

Reinstating an understorey of shrubs into remnants is another easy way to make a big difference to wildlife habitat on your farm. Direct-seeding or planting of a range of appropriate shrub species, depending on the vegetation type, is great news for wildlife.

## RESTORE FLOWS

Flooding River Red Gum, Black Box, Canegrass and other wetland sites from time to time will help maintain the health of these ecosystems and greatly improve wildlife habitat. Intermittent flooding promotes waterplant growth, stimulates regeneration and maintains the health of old trees and waterplant communities, all benefiting wildlife.

## CONTROL FERALS

On top of improving habitat on your farm, controlling introduced predators like Foxes and Feral Cats will also benefit wildlife. Broad-scale baiting programs, like those coordinated by the Rural Lands Protection Board, that incorporate numerous neighbouring properties are the most effective for fox control. Control of other introduced animals like Rabbits, as well as weeds, is generally also good news for wildlife.









Murray CMA CATCHMENT MANAGEMENT AUTHORITY

**Berrigan**
79-81 Chanter Street
BERRIGAN NSW 2712
P: 03 5885 2804

**Deniliquin**
315 Victoria Street
DENILIQUIN NSW 2710
P: 03 5880 1400

**Corowa**
157 Sanger Street
COROWA NSW 2646
P: 02 6033 0947

**Albury**
421 Swift Street
ALBURY NSW 2640
P: 02 6051 2200

**Murray Catchment Management Authority**

murray@cma.nsw.gov.au
www.murray.cma.nsw.gov.au