



EASTERN BILLABONG W I L D L I F E

The Current State of Affairs



INTRODUCTION

A large scale wildlife survey was conducted throughout the Eastern Billabong Creek catchment from October 2001 – September 2002 as part of the *Heartlands* 'Benchmarking Biodiversity in the Billabong' project¹. This project also included over 20 wildlife presentations to the local community. *Heartlands* in its entirety is a collaboration (see logos on back cover) of research and on-ground works for many fields associated with sustainable land use, such as social issues, farm forestry, perennial pastures, salinity and biodiversity.

In addition to engaging the local community, this project aimed to determine the distribution, abundance and local status of wildlife species, particularly those that are considered threatened in NSW. This booklet aims to provide a summary of the results of the surveys and present a comprehensive inventory of local wildlife to the Eastern Billabong community, highlighting the current state of affairs for

selected species and the most important conservation issues for all wildlife.

The four wildlife groups studied were mammals, birds, reptiles and frogs, which together comprise all vertebrate groups present except fish. The focus was on private land and the most significant areas of woodland and forest remaining in the catchment. A total of 78 study sites were surveyed (see map below), including 27 sites on ridges, slopes and hills, 25 sites along the Billabong Creek and its tributaries, 20 sites in other lowland areas on the plains and 6 revegetation sites.

This booklet draws on other research conducted in the area and across Australia. The species considered threatened in this booklet refer to species listed as *Vulnerable* or *Endangered* in NSW under the *Threatened Species Conservation Act*. Several of them are also considered threatened species nationally.

Insert MAP here



COVER PHOTOS (top) The Billabong Creek ; from "Wycombe" looking east towards Holbrook and Morgan's Ridge.

(middle) The Brolga has been reduced to critically low numbers in the Eastern Billabong with only two or possibly three breeding pairs remaining.

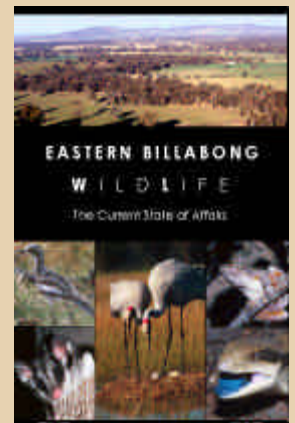
(middle left) The Bush Stone-Curlew has declined to about six breeding pairs.

(bottom left) The threatened Squirrel Glider persists along much of the eastern part of the Billabong Creek.

(middle right) The Peron's Tree Frog is one of very few frog species to remain relatively common.

(bottom right) The Eastern Blue-tongued Lizard appears to be very restricted in distribution.

(left) Interested people gather around to inspect a Yellow-footed Ateuchinus found at "Wyabaleena" on Morgan's Ridge.



M A M M A L S

Eastern Billabong Mammal Species List

Monotremes

Echidna **LT ?**

Platypus **LT/P**

Marsupials

Spot-tailed Quoll **T**

Brush-tailed Phascogale **T P**

Yellow-footed Antechinus

Agile Antechinus

Common Dunnart **P**

Fat-tailed Dunnart

Long-nosed Bandicoot **P**

Koala **T**

Common Wombat

Common Brushtail Possum

Eastern Pygmy Possum **T Po**

Feather-tailed Glider

Sugar Glider

Squirrel Glider **T**

Greater Glider

Common Ringtail Possum

Eastern Grey Kangaroo

Common Wallaroo (Euro)

Black Wallaby

Bats

Little Red Flying Fox **P**

Yellow-bellied Sheathtail Bat **P T**

White-striped Freetail Bat

Eastern Freetail Bat

Inland Freetail Bat

Southern Freetail Bat

Gould's Wattled Bat

Chocolate Wattled Bat

Large Forest Bat

Southern Forest Bat

Little Forest Bat

Common Bentwing Bat **T**

Large-footed Myotis **T**

Eastern False Pipistrelle

Inland Broad-nosed Bat

Lesser Long-eared Bat

Gould's Long-eared Bat

Greater Long-eared Bat **P T**

Rodents

Water Rat

House Mouse *

Black Rat *

Other mammals

Red Fox *

Dingo

House Cat *

European Rabbit *

European Hare *

Goat *

Pig *

Sambar *

Fallow Deer *



Unfortunately, Australia has the worst extinction record for mammals on the planet and the Eastern Billabong has already lost many species like the Northern Hairy-nosed Wombat, White-footed Rabbit Rat, Eastern Hare Wallaby and Eastern Quoll. Unfortunately there are several species on the list presented here that are probably already extinct in the catchment or whose fate is already sealed.

A total of 12 bat species were recorded during the surveys, including nine that were found to use the Billabong Creek as a highway. Future surveys may detect additional species. All the bats listed, except the Little Red Flying Fox that may occur in the catchment, are insectivorous and play an important role in controlling insects. By far the most common bat in the Eastern Billabong (several hundred were caught during the surveys) is the Little Forest Bat, which weighs only 4 grams. The discovery of the Large-footed Myotis, a threatened 'fishing' bat, at the Walla Walla Swamp was a major highlight of the surveys. This large wetland provides optimal habitat for bats, including numerous ancient trees with hollows and crevices for roosting. The Common Bent-wing Bat, also a threatened species, was recorded on Morgan's Ridge and is known to favour caves for roosting and maternity sites.

The Black Wallaby, also known as the Swamp Wallaby, was only recorded once on the Billabong Creek. All other sites were on ridges, hills and slopes.

Key

T = Threatened in NSW.

P = Predicted but no recent records.

* = introduced species



SQUIRREL GLIDER

A major highlight of the project was the discovery of Squirrel Gliders, which are listed as a threatened species in NSW, at eight of the study sites, five of which were along the Billabong Creek. The three other sites were also on fertile soils in lowland areas where there were numerous large old trees like River Red Gum, Apple Box, White Box, Grey Box and Yellow Box. Because Squirrel Gliders (and other gliders) glide between trees, they rely on trees that are highly connected to each other, so it is no real surprise that the Billabong Creek supports significant numbers. Squirrel Gliders feed on insects, gum from wattles, sap from eucalypts, as well as nectar and pollen. They are known to be associated with habitats that have a diversity of feeding opportunities from many plant and tree species.

The highest densities of Squirrel Gliders were found on the Billabong, near Culcairn and Walla Walla (up to nine on a 250 metre section). Here there were a large number of big old trees, including dead stags, together with thickets of Silver Wattle. Squirrel Gliders can glide up to 90 m, but generally require large tree canopies with at least some overlap. The one pictured on this page was photographed gliding across the Billabong Creek after being captured and released, west of Culcairn.

The Squirrel Glider is one of four glider species found in the Eastern Billabong. They are known to have disappeared from up to 50% of their former range and are closely associated with box woodlands that have been heavily cleared. The Sugar Glider is by no means common in the catchment but unlike the Squirrel Glider, it is well represented in the foothill forests of the eastern end (e.g. Woomargama NP and down the Four Mile Lane). The Greater Glider, which is much larger than the Squirrel or Sugar Glider, is only known from Woomargama NP and probably provides an important food source for the Powerful Owls that are known to reside here[?]. The tiny (12 gram) Feathertail Glider was not recorded during the surveys but is known to occur in the catchment. The Common Brushtail and Common Ringtail Possums remain relatively common, whilst two other arboreal marsupials, the Brush-tailed Phascogale (Tuan) and Eastern Pygmy Possum, may also occur. If they do persist in the catchment they must be extremely rare to have gone undetected for this long. Across the border in north-east Victoria the Eastern Pygmy Possum is known from the Mt. Lawson region and the Brush-tailed Phascogale still occurs in the Baranduda, Chiltern and Mt. Pilot areas.

The Billabong Creek, together with other naturally vegetated creek-lines and roadsides, facilitates the mixing of Squirrel Glider colonies throughout the catchment, preventing inbreeding and local extinction. Small isolated colonies, of which very few remain, may not survive for much longer unless we improve habitat connectivity across the landscape. We should strategically plant large wildlife corridors that incorporate numerous properties. The Eastern Billabong probably provides a nationally significant stronghold for the Squirrel Glider, likely supporting at least several hundred individuals, and it is our responsibility to look



One of the squirrel gliders found at Kings TSR, north of Walla Walla. Note the bushy tail which distinguishes it from the sugar glider.



The word Antechinus, pronounced 'anti-kine-us', refers to a group of small carnivorous marsupials, including two that are found in the Eastern Billabong. It is possible that one or two other small, ground-dwelling marsupials, the Fat-tailed and Common Dunnarts, survive in the catchment. Antechinus and dunnarts have pouches like possums, wombats and kangaroos and are very different to rodents (e.g. they lack the two big front teeth). Antechinus mainly feed on insects but will also eat the introduced House Mouse. Every year all of the males die after the breeding season, leaving the females to raise the next generation.

The Agile Antechinus is found throughout the foothill forests of the far eastern and south-eastern end of the catchment (e.g. Woomargama National Park) where much of the native vegetation remains intact. Woomargama National Park alone probably supports at least several thousand individuals. In contrast, the Yellow-footed Antechinus is more closely associated with woodlands and is mainly found west of the Hume Highway where there is much less native vegetation cover.

Despite a considerable amount of trapping effort, no Yellow-foots were found in lowland areas, such as the Billabong Creek, Walla Walla Swamp or Comer TSR, near Henty. Unfortunately it appears the surveys were a few decades too late for many of the smaller or more isolated remnants, despite suitable habitat. This was particularly the case for those in the western end of the catchment where it is likely that local extinction has already occurred. Populations of the Yellow-footed Antechinus are now highly fragmented (see distribution map below) and many may be too small to be viable in the long-term. This species now appears to be restricted to large remnants in the timbered hilly country between 350 m and 600 m (e.g. Red Stringybark, Red Box and Scribbly Gum).

Yellow-footed Antechinus were only found on timbered slopes and ridges that contained large amounts of fallen timber and a healthy layer of leaf litter. Densities of up to 12 per hectare were recorded and appear dependent on the amount of fallen logs. Indeed, fallen timber, especially those large logs, appears to provide critical habitat for this once plentiful species that is now locally threatened. Hollows in standing trees also provide important habitat, particularly older trees that contain numerous small crevices and cavities.

The Yellow-footed Antechinus may be as seriously threatened in the Eastern Billabong as the Squirrel Glider. By enhancing the quality of habitat over time (e.g. number of old trees and fallen logs) and increasing the size of remnant patches with adjacent revegetation, we can increase the number of individuals in each population, thus giving them a better chance of long-term survival. To help conserve populations of both Antechinus species, avoid removing firewood from remnants and plant woodlots for future supply.





The **Swift Parrot** (above, feeding in Golden Wattle), is a nationally threatened migratory species that breeds only in Tasmania. Each year they cross the Bass Strait and spend the winter months on the mainland. Swift Parrots have been recorded at a minimum of nine locations across the Eastern Billabong in the last three years, including about 30 birds at six sites during 2002. This nectar-loving and lerp-eating species favours older remnant trees in fertile lowland areas. It is estimated that only about 2000 Swift Parrots remain in the world².



The **Dusky Woodswallow** (left), like the other five woodswallow species found in the catchment, is highly mobile and selects the better quality habitats available in the landscape.



The **Turquoise Parrot** (left, nesting in a tree stump) is a resident species that makes local movements. It was only recorded at "Wyabaleena" on Morgan's Ridge and "Jillamatong" adjacent to Benambra National Park. This species has only ever been recorded from a handful of other very large remnants in the Eastern Billabong and is clearly in big trouble.



The **Diamond Firetail** (below), although listed as a threatened species in NSW, is not yet rare in the catchment. However, they appear to be mostly restricted to large remnants on ridges and hills. Several of their nests were found in clumps of mistletoe in healthy remnants. The Painted Honeyeater (not pictured), also a threatened species, is almost entirely dependent on mistletoe as a food supply. The presence of mistletoes in a patch of bush increases habitat diversity. The resources provided by mistletoes are widely used by many wildlife species. In degraded farmland, the abundance of mistletoe is simply an indication of how things out of balance².

Much of the Eastern Billabong landscape, especially on the flats, is now almost devoid of the smaller insect-eating birds. These are typified by the uniquely Australian thornbills, honeyeaters and robins, and apart from a few common species like the Yellow-rumped Thornbill, White-plumed Honeyeater and Flame Robin, they are now largely restricted to high quality remnants on hills. However, there are some exceptions to this, such as the better sections of the Billabong and other creeks (101 bird species were recorded at creek sites). These small birds play an

important role in insect control and help prevent eucalypt dieback. Most farms that lack good habitat have very few small insectivorous birds. In contrast, many of the larger birds remain common in degraded farmland (e.g. Galah, Red-rumped Parrot, Noisy Miner and Australian Magpie) and a whole suite of them have benefited from European settlement. Many of our birds are migrants and are only present in the catchment at certain times of year (e.g. Sacred Kingfisher in summer, Swift Parrot in winter). Other species like the Budgerigar rely on areas like the Eastern Billabong catchment as a drought refuge.

The **Brown Treecreeper**, one of three treecreeper species found in the catchment, is now considered threatened in NSW and is known to be declining at frightening rates. Like many of the declining woodland birds it does not survive in farmland with only scattered trees. In contrast to studies in nearby landscapes (e.g. CSIRO research in the Savernake-Native Dog area), the Brown Treecreeper was found to still be relatively common in the Eastern Billabong (recorded at 62.8% of sites). This is principally because of the extent of vegetated creek lines, as well as larger patches elsewhere in the catchment. The Brown Treecreeper is a co-operative breeder, whereby offspring from previous breeding seasons help out their parents to raise the young. This bark and ground-foraging persists bird persists along most of the eastern section of the Billabong Creek but aggregations occur where the riparian vegetation strip is widest and habitat diversity is highest, notably the number of old trees, and amount of fallen timber. A recent study in north-east NSW² found female Brown Treecreepers typically disperse from breeding groups. In highly fragmented landscapes the females were found to have difficulty in successfully reaching other patches of bush and are consequently not replaced in isolated breeding groups. In other words, small patches increasingly end up with mostly males and eventually local extinction occurs.



The **Bush Stone-Curlew**, well known for its eerie, wailing call at night, is a ground-feeding and ground-nesting species that is highly susceptible to introduced predators like the Fox. Bush Stone Curlews are dependent on fallen logs and branches for camouflage. They remain common in parts of northern Australia and on large predator-free islands that still have suitable habitat. Many Eastern Billabong farmers that are alive today remember this species when it was still common but most haven't heard or seen one for decades. Bush Stone Curlews were recorded from four of the study sites and known to occur at a handful of others. The core area is in the Walla Walla region where curlews reside in stands of River Red Gum, Grey Box or Yellow Box that have numerous fallen logs and branches. It is estimated that only about six breeding pairs remain in the Eastern Billabong, together with a few unpartnered young birds floating around. Such critically low numbers, consistent with other parts of south-eastern Australia, mean that urgent, intensive actions may now be required. For example, predator-proof fences might be necessary to adequately increase breeding success or captive breeding programs might be the only option to prevent local extinctions. The recovery of this single species could now come at a very high cost. Bush Stone-Curlews illustrate the negative economic implications of letting a species become so seriously threatened. A recent increase in local fox control efforts and a greater awareness of the value of fallen timber to wildlife is hopefully already going a long way to saving curlews from local extinction in the Eastern Billabong and adjacent regions. This highly



EASTERN BILLABONG BIRD LIST

Emu P
 Stubble Quail M
 Brown Quail R
 King Quail P
 Plumed Whistling Duck R
 Australian Wood Duck A
 Freckled Duck P (t)
 Blue-billed Duck R (t)
 Musk Duck R
 Black swan M
 Cape Barren Goose P
 Australian Shelduck C
 Hardhead M
 *Mallard R
 Pacific Black Duck A
 Australasian Shoveler U
 Pink-eared Duck R
 Grey Teal A
 Chestnut Teal R
 Great Crested Grebe R
 Hoary-headed Grebe M
 Australasian Grebe C
 Darter R
 Great Cormorant U
 Little Black Cormorant U
 Pied Cormorant R
 Little Pied Cormorant M
 Australian Pelican M
 White-necked Heron M
 White-faced Heron C
 Great Egret U
 Intermediate Egret R
 Little Egret P
 Cattle Egret U
 Nankeen Night Heron R
 Little Bittern P
 Australasian Bittern P (t)
 Glossy Ibis R
 Straw-necked Ibis M
 Australian White Ibis C
 Royal Spoonbill R
 Yellow-billed Spoonbill M
 Black-shouldered Kite M
 Letter-winged Kite P
 Black Kite P
 Whistling Kite U
 Square-tailed Kite E (t)
 Collared Sparrowhawk U
 Brown Goshawk U
 Grey Goshawk P
 White-bellied Sea-Eagle R
 Little Eagle U
 Wedge-tailed Eagle M
 Spotted Harrier R
 Swamp Harrier R
 Black Falcon R
 Brown Falcon C
 Nankeen Kestrel C
 Australian Hobby U
 Peregrine Falcon U
 Grey Falcon P (t)
 Brolga R (t)
 Buff-banded Rail R
 Lewin's Rail P
 Spotless Crake R
 Australian Spotted Crake R
 Baillon's Crake R
 Dusky Moorhen U
 Purple Swampphen M
 Eurasian Coot M
 Black-tailed Native Hen P
 Bush Stone Curlew R (t)
 Painted Button Quail R
 Little Button-Quail P
 Red-chested Button-Quail P
 Plains Wanderer P (t)
 Latham's Snipe R
 Black-tailed Godwit P (t)
 Bar-tailed Godwit P
 Common Greenshank P
 Marsh Sandpiper P
 Wood Sandpiper P
 Common Sandpiper P
 Red-necked Stint P
 Long-toed Stint P

Sharp-tailed Sandpiper P
 Curlew Sandpiper P
 Ruff P
 Red-necked Phalarope P
 Pectoral Sandpiper P
 Australian Painted Snipe P (t)
 Red-necked Avocet P
 Black-winged Stilt U
 Banded Stilt P
 Pacific Golden Plover P
 Red-capped Plover P
 Double-banded Plover P
 Red-kneed Dotteral R
 Black-fronted Plover M
 Masked Lapwing M
 Banded Lapwing R
 Australian Pratincole P
 Silver Gull R
 Whiskered Tern R
 Caspian Tern P
 White-winged Black Tern P
 Gull-billed Tern P
 *Spotted Turtle Dove U
 *Feral Pigeon U
 Diamond Dove R
 Peaceful Dove M
 Common Bronzewing M
 Wonga Pigeon E
 Crested Pigeon C
 Yellow-tailed Black Cockatoo P
 Gang Gang Cockatoo R
 Galah A
 Long-billed Corella R
 Little Corella U
 Sulphur-crested Cockatoo C
 Rainbow Lorikeet P
 Little Lorikeet R
 Purple-crowned Lorikeet P (t)
 Musk Lorikeet R
 Swift Parrot R (t)
 King Parrot U
 Superb Parrot R (t)
 Cockatiel R
 Crimson Rosella M
 Eastern Rosella A
 Australian Ringneck R
 Blue Bonnet R
 Red-rumped Parrot A
 Blue-winged Parrot P
 Turquoise Parrot R (t)
 Budgerigar R
 Pallid Cuckoo U
 Fan-tailed Cuckoo U
 Brush Cuckoo P
 Horsfields Bronze-Cuckoo U
 Shining Bronze-Cuckoo U
 Black-eared Cuckoo R
 Common Koel P
 Powerful Owl R (t)
 Barking Owl R (t)
 Southern Boobook U
 Barn Owl U
 Masked Owl P (t)
 Tawny Frogmouth U
 Australian Owlet Nightjar R
 White-throated Nightjar R
 Spotted Nightjar P
 Fork-tailed Swift P
 White-throated Needletail R
 Azure Kingfisher P
 Laughing Kookaburra A
 Sacred Kingfisher M
 Red-backed Kingfisher P
 Rainbow Bee-eater M
 Dollarbird U
 Superb Lyrebird P
 White-throated Treecreeper M
 Red-browed Treecreeper R
 Brown Treecreeper C (t)
 Superb Fairy-Wren M
 Spotted Pardalote M
 Striated Pardalote A
 White-browed Scrubwren M
 Chestnut-rumped Heathwren P
 Speckled Warbler U (t)

Western Gerygone U
 White-throated Gerygone U
 Brown Thornbill U
 Inland Thornbill R
 Buff-rumped Thornbill U
 Chestnut-rumped Thornbill R
 Yellow-rumped Thornbill M
 Striated Thornbill U
 Yellow Thornbill U
 Weebill U
 Southern Whiteface U
 Red Wattlebird U
 Little Friarbird M
 Noisy Friarbird U
 Spiny-cheeked Honeyeater R
 Striped Honeyeater R
 Regent Honeyeater R (t)
 Blue-faced Honeyeater R
 Noisy Miner A
 Lewin's Honeyeater P
 Yellow-faced Honeyeater U
 Singing Honeyeater R
 White-eared Honeyeater R
 Yellow-tufted Honeyeater R
 Yellow-plumed Honeyeater R
 Fuscous Honeyeater U
 White-plumed Honeyeater A
 Black-chinned Honeyeater U (t)
 Brown-headed Honeyeater U
 White-naped Honeyeater M
 New Holland Honeyeater R
 White-fronted Honeyeater P
 Crescent Honeyeater R
 Eastern Spinebill R > U
 Black Honeyeater R
 Painted Honeyeater R (t)
 Scarlet Honeyeater R
 White-fronted Chat R
 Jacky Winter U
 Flame Robin C
 Scarlet Robin M
 Red-capped Robin R
 Rose Robin R
 Pink Robin P (t)
 Eastern Yellow Robin U
 Hooded Robin R (t)
 Grey-crowned Babbler U (t)
 White-browed Babbler R
 Eastern Whipbird P
 Spotted Quail Thrush R
 Varied Sitella U
 Crested Shrike-Tit M
 Olive Whistler P (t)
 Gilberts Whistler P (t)
 Golden Whistler U
 Rufous Whistler M
 Grey Shrike-Thrush C
 Grey Fantail M
 Rufous Fantail P
 Leaden Flycatcher R
 Satin Flycatcher P
 Willie Wagtail A
 Restless Flycatcher C
 White-bellied Cuckoo-Shrike R
 Black-faced Cuckoo-Shrike C
 Ground Cuckoo-Shrike P
 Cicadabird P
 White-winged Triller U
 Olive-backed Oriole U
 White-breasted Woodswallow R
 Black-faced Woodswallow R
 White-browed Woodswallow R
 Masked Woodswallow R
 Dusky Woodswallow M
 Grey Butcherbird U
 Pied Butcherbird R
 Magpie-Lark A
 Australian Magpie A
 Pied Currawong M
 Grey Currawong R
 Australian Raven A
 Little Raven U
 Apostlebird R
 White-winged Chough C
 Satin Bowerbird R

Richard's Pipit U
 Singing Bushlark R
 *Common Skylark P
 Double-barred Finch R
 Red-browed Finch M
 Zebra Finch P
 Diamond Firetail U (t)
 *European Goldfinch R
 *European Greenfinch P
 *House Sparrow C
 *Eurasian Tree Sparrow U
 Mistletoebird M
 Welcome Swallow C
 White-backed Swallow R
 Tree Martin M
 Fairy Martin U
 Clamorous Reed-Warbler R
 Brown Songlark U
 Rufous Songlark M
 Little Grassbird R
 Golden-headed Cisticola R
 Silveryeye M
 *Common Blackbird M
 Bassian Thrush P
 *Common Starling A
 *Common Myna P



The threatened Speckled Warbler, a ground-nesting and ground-feeding species, is now largely restricted to hills in the eastern end of the catchment.

Eastern Billabong Birds List Key

- * = Introduced
- (t) = Listed as threatened in NSW
- P = Predicted to occur or possible only – no records
- R = Rare (1 – 10% of sites)
- U = Uncommon (11 – 25% of sites)
- M = Moderately Common (26 – 50% of sites)
- C = Common (51 – 75% of sites)
- A = Abundant (76 – 100% of sites)

Some adjustments were made due to a lack of surveys in grasslands/paddocks, wetlands, the far east of the catchment, urban areas and highly degraded remnants.



Above: **Eastern Yellow Robin** nesting in a thick understorey of Bracken. Left: Female (incubating) and male **Red-capped Robin** nesting in a tree close to the ground. Right: Male **Scarlet Robin**.



Below Right: Male **Flame Robin**. Below: **Hooded Robin** (male) photographed during the surveys at "Jillamatong", Mountain Creek Road, north-west of Woomargama.



Robins are an ideal group to monitor because they are conspicuous, relatively easy to identify and are good indicators of the overall health of wildlife populations in forests and woodlands. Virtually all of the robins are known to be declining across their ranges in south-eastern Australia⁹. Several of them are now well recognised amongst wildlife researchers for their use as focal species, being highly sensitive and generally only found in the largest, most connected remnants that have high habitat diversity. Seven different species of robin regularly occur in the Eastern Billabong. Future surveys may detect an eighth species, the Pink Robin. The Flame Robin is by far the most common species. Prior to winter they leave the high country and during the colder months of the year can be found in paddocks on most farms across the catchment. The Scarlet Robin, which is also an altitudinal migrant, is only moderately common in the Eastern Billabong and much more dependent on remnants of bush with good quality habitat. The Jacky Winter (not pictured), now uncommon in the Eastern Billabong, is a grey species of robin and like the other robins is often seen pouncing on insects from fence-lines or other low perches in or adjacent to remnant bush. Eastern

Yellow Robins were not found west of Culcairn and this study supports previous local research² that identified them as a highly sensitive species. The Rose Robin (not pictured) was only recorded at two sites, both on Morgan's Ridge, near Holbrook. This species, like the Pink Robin, is more typically found in taller, wetter eucalypt forests and rainforests closer to the coast.

Red-capped Robins are now rare in the catchment but thankfully the Walbundrie Hills still support numerous breeding pairs at high densities, thus acting as a source supply for other remnants and restored areas. Of all the robins though, the survival of the Hooded is of most concern. A total of only 23 individuals, including 6 juveniles, were recorded from seven sites. Based on the coverage of the survey it is estimated that as few as only 25 breeding pairs could remain in the entire Eastern Billabong. Indeed, they are one of the most threatened species in the catchment, occurring at very low densities and probably resident in less than 15 different patches. Fortunately though, this species, together with others like the Red-capped, Scarlet and Eastern Yellow Robin, were found to colonise large, structurally diverse revegetation patches within a decade.

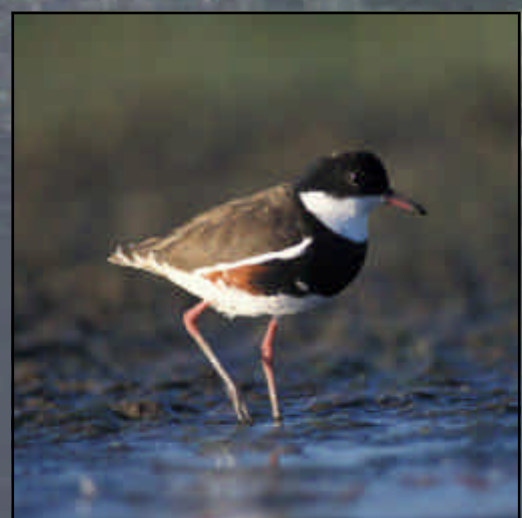
WATERBIRDS



A large proportion of the birds found in the Eastern Billabong are entirely dependent on wetlands and countless others make use of these habitats to varying degrees. Very few natural, relatively intact wetlands remain in the catchment. Most waterbirds favour wetlands with shallows, such as the Yellow-billed Spoonbill (above left) that is still relatively common.

In southern New South Wales, Brolgas (left middle, adult with chick) rely on large (~100 ha), relatively healthy swamps for breeding habitat. Only three of these remain in the Eastern Billabong, so it is no real surprise that there are only two or three Brolga breeding pairs left. The Red-kneed Dotteral (below right), which is known to be in decline, is like a whole suite of birds from the plover and sandpiper families that rely on shallow mudflats for foraging. Such habitats are lacking in most farm dams. The Purple Swamphen (below left) is a large, conspicuous waterbird that is a good indicator for waterbirds that are dependent on wetland vegetation cover, such as the secretive Spotted Crake (below middle). The Painted Snipe and Australasian Bittern, which are two of Australia's most threatened waterbirds, are also dependent on the cover provided by waterplants like rushes, reeds and canegrass for breeding and feeding. Other species, like the spoonbills, herons and ibises, rely on trees in flooded areas for nesting, whilst many duck species breed in hollows. The Australian Wood Duck is an example of a waterbird that has benefited from the proliferation of farm dams.

Waterbirds are typically highly mobile (some species migrate from Siberia to the Eastern Billabong) and respond rapidly to wetland restoration. Simple changes to farm dams can dramatically increase their value to waterbirds. Increasing the extent of shallow areas (less than 30 cm deep) and the amount of cover provided by native water plants will result in a greater diversity of habitats, which will lead to greater diversity of waterbirds. Earthworks to create shallow areas that are intermittently flooded, together with better grazing management, are among the techniques that can achieve this.



FROGS

Although not heavily targeted during the surveys, only seven species of frog were recorded. Several others are known to occur in the catchment, whilst future surveys may detect some additional species. In total, up to 18 different frog species could occur in the catchment. Many of Australia's frog species are known to have declined dramatically in settled areas. Future surveys are necessary to better ascertain the local status of frogs.

The Spotted Marsh Frog (below right) remains relatively common in the Eastern Billabong. The tiny Eastern Sign-bearing Frog is also one of very few species to remain relatively common and was frequently recorded along the Billabong and other creeks. When the Walla Walla Swamp was flooded in the year 2000, Peron's Tree Frogs were counted on parts of one of the River Red Gums. At least 60 individuals were found in the loose bark of the lower trunk, indicating the importance of this wetland for this species. Only one threatened species, the Southern Bell Frog, could possibly be found in the catchment. It is known to colonise artificial wetlands. Like waterbirds, frogs will benefit from changes to the habitat and management of farm dams.

The Giant Bullfrog (above right) and the Wrinkled Toadlet were found at sites near Walbundrie and are near the southern edges of their geographic ranges. Many of the species presented in the list that could possibly occur are at the western edge of their range (e.g. Lesuer's Frog), so if they do occur they are likely to be restricted to areas like Woomargama NP. The Plains Brown Tree Frog (below left) is almost restricted to Victoria but may be found in the catchment with future surveys.



Eastern Billabong Frog Species List

Southern Brown Tree Frog	<i>Litoria ewingii</i> P
Lesuer's Frog	<i>Litoria lesueuri</i> P
Plains Brown Tree Frog	<i>Litoria parewingii</i>
Peron's Tree Frog	<i>Litoria peronii</i>
Southern Bell Frog	<i>Litoria raniformis</i> P/T
Eastern Sign-bearing Frog	<i>Crinia parinsignifera</i>
Common Eastern Froglet	<i>Crinia signifera</i>
Sloane's Froglet	<i>Crinia sloanei</i> P
Banjo (Pobblebonk) Frog	<i>Limnodynastes dumerilii</i>
Barking Marsh Frog	<i>Limnodynastes fletcheri</i> P
Giant Bullfrog	<i>Limnodynastes interioris</i>
Ornate Burrowing Frog	<i>Limnodynastes ornatus</i> P
Striped Marsh Frog	<i>Limnodynastes peronii</i> P
Spotted Marsh Frog	<i>Limnodynastes tasmaniensis</i>
Common Spadefoot	<i>Neobatrachus sudelli</i>
Bibron's Toadlet	<i>Pseudophryne bibroni</i>
Smooth Toadlet	<i>Uperoleia laevigata</i>
Wrinkled Toadlet	<i>Uperoleia rugosa</i>

Key

P = Predicted to occur or possibility it may occur.

T = Threatened species in NSW



Eastern Billabong Reptile Species List

R E P T

Yellow-faced Whip Snake	<i>Demansia psammophis</i>
Red-naped Snake	<i>Furina diadema</i> P
Eastern Brown Snake	<i>Pseudonaja textilis</i>
Red-bellied Black Snake	<i>Pseudechis porphyriacus</i>
Eastern Tiger Snake	<i>Notechis scutatus</i> P
Small-eyed Snake	<i>Rhincoplocephalus nigrescens</i>
Dwyer's Black-headed Snake	<i>Suta dwyeri</i> P
Little Whip Snake	<i>Suta flagellum</i> P T
Bandy Bandy	<i>Vermicella annulata</i> P
Carpet Python (Murray-Darling form)	<i>Morelia spilota</i>
Blackish (Grey's) Blind Snake	<i>Ramphotyphlops nigrescens</i>
Woodland Blind Snake	<i>Ramphotyphlops proximus</i>
Three-lobed (Peter's) Blind Snake	<i>Ramphotyphlops bituberculatus</i>
Pink-tailed Worm Lizard	<i>Aprasia parapulchella</i> P T
Striped Legless Lizard	<i>Delma impar</i> P
Olive Legless Lizard	<i>Delma inornata</i>
Burton's Legless Lizard	<i>Lialis burtonis</i> P
Common Scaly-foot	<i>Pygopus lepidopodus</i> P
Hooded Scaly-Foot	<i>Pygopus schraderi</i> P
Earless Three-lined Skink	<i>Bassiana dupperreyi</i>
Red-throated Skink	<i>Bassiana platynota</i>
Southern Rainbow Skink	<i>Carlia tetradactyla</i>
Carnaby's Wall Skink	<i>Cryptoblepharus carnabyi</i>
Copper-tailed Skink	<i>Ctenotus taeniolatus</i>
Large-striped Skink	<i>Ctenotus robustus</i>
Cunningham's Skink	<i>Egernia cunninghami</i>
Black Rock Skink	<i>Egernia saxatilis</i>
Tree-crevice Skink	<i>Egernia striolata</i>
White's Skink	<i>Egernia whitii</i>
Southern Water Skink	<i>Eulamprus heatwolei</i>
Three-toed Skink	<i>Hemiergis decresiensis</i>
Grass Skink	<i>Lampropholis delicata</i> P
Garden Skink	<i>Lampropholis guichenoti</i>
South-eastern Slider	<i>Lerista bougainvillii</i>
Wood Mulch Slider	<i>Lerista muelleri</i> P
Grey's Skink	<i>Menetia greyii</i>
Boulenger's Skink	<i>Morethia boulengeri</i>
Highlands Forest Skink	<i>Nannoscincus maccoyi</i> P
Coventry's Skink	<i>Niveoscincus coventryi</i> P
Eastern Blue-tongued Lizard	<i>Tiliqua scincoids</i>
Eastern Bearded Dragon	<i>Pogona barbata</i>
Jacky Lizard	<i>Amphibolurus muricatus</i>
Nobbi	<i>Amphibolurus nobbi</i>
Southern Marbled Gecko	<i>Christinus marmoratus</i>
Wood Gecko	<i>Diplodactylus vittatus</i>
Eastern Spiny-tailed Gecko	<i>Diplodactylus intermedius</i> P
Lace Monitor (Tree Goanna)	<i>Varanus varius</i>
Broad-shelled Tortoise	<i>Chelodina expansa</i> P
Eastern Long-necked Tortoise	<i>Chelodina longicollis</i>
Murray River Tortoise	<i>Emydura macquarii</i>

Key

T = Species listed as threatened in NSW
Po = Possibility only.



ILES



The intriguing Pink-tailed Worm Lizard (left) lives under rocks and feeds on small black ants. This threatened species favours open woodlands and grasslands that have a thick cover of Kangaroo Grass (*Themeda triandra*). In Victoria they are only known from the Bendigo region and most NSW records are from around Tarcutta². Pictured here are individuals from a population discovered in August 2002 on the Nail Can Hill range, near Albury². This rare legless lizard was also found on Goombargana Hill, west of Walbundrie in September 2000 during a community biodiversity survey organised by the NSW National Parks Association. These records highlight the real possibilities for the future discovery of the species in the Eastern Billabong, as well as other parts of the NSW south-west slopes and northern Victoria.



The Copper-tailed Skink (left) appears



Conservation Priorities

Biodiversity Hotspots

Biodiversity hotspots are important reservoirs of life and their conservation should be a priority. The list of biodiversity hotspots in the Eastern Billabong presented below is based on the number of species recorded during the surveys (or otherwise known to occur), the size of the remnant, habitat quality, position in the landscape and the presence of significant wildlife (e.g. threatened and locally threatened species). Examples of significant species are given in brackets.

- ❑ **Billabong Creek and its tributaries**, notably the Yarra Yarra, Jerra Jerra, Back Creek, Ten Mile Creek (numerous Squirrel Glider and Brown Treecreeper populations).
- ❑ **Morgan's Ridge**, east of Holbrook. (Common Bent-wing Bat, Sugar Glider, Yellow-footed Antechinus, seven robins, Turquoise Parrot).

- ❑ **Walla Walla Swamp**, including adjacent box woodland, Petries Creek and nearby River Red Gum remnants. (Large-footed Myotis, Squirrel Glider, Brown Treecreeper, Bush Stone-Curlew, Brolga, waterbird breeding)
- ❑ **Woomargama National Park and adjacent remnants** (Powerful Owl, Koala, Greater Glider, several reptile and frog species not found elsewhere in the catchment)
- ❑ **Benambra National Park and adjacent remnants**, south of Culcairn. (Turquoise Parrot, Carpet Python, Yellow-footed Antechinus)
- ❑ **Gerogery Range (Stringybark Hill)** (Carpet Python, Speckled Warbler)
- ❑ **Walbundrie Hills** (Chestnut-rumped Thornbill, Red-capped and Hooded Robin, Swift Parrot)
- ❑ **Other noteworthy remnants**, such as No Mans Land, "Rossmor", "Goolabah", Kings TSR, Brittas TSR, Blue Metal TSR, "Mullemblah", Comer TSR, "Stonehaven",



The Billabong Creek—a wildlife super-highway—supports many species and facilitates the movement of countless others throughout the catchment. This photo shows a healthy section of the creek with old River Red Gums, River Bottlebrush and reeds (*Phragmites*). Patches of bush adjacent to the creek (e.g. Kings TSR, north of Walla Walla) act as hotels, whereby animals moving along the creek can stop off for a feed and a rest or perhaps even to stay and breed.

The Walbundrie Hills (below, Sugarloaf Hill) are a significant hotspot for threatened and declining woodland birds, acting as a source supply for restored areas in the surrounding landscape.

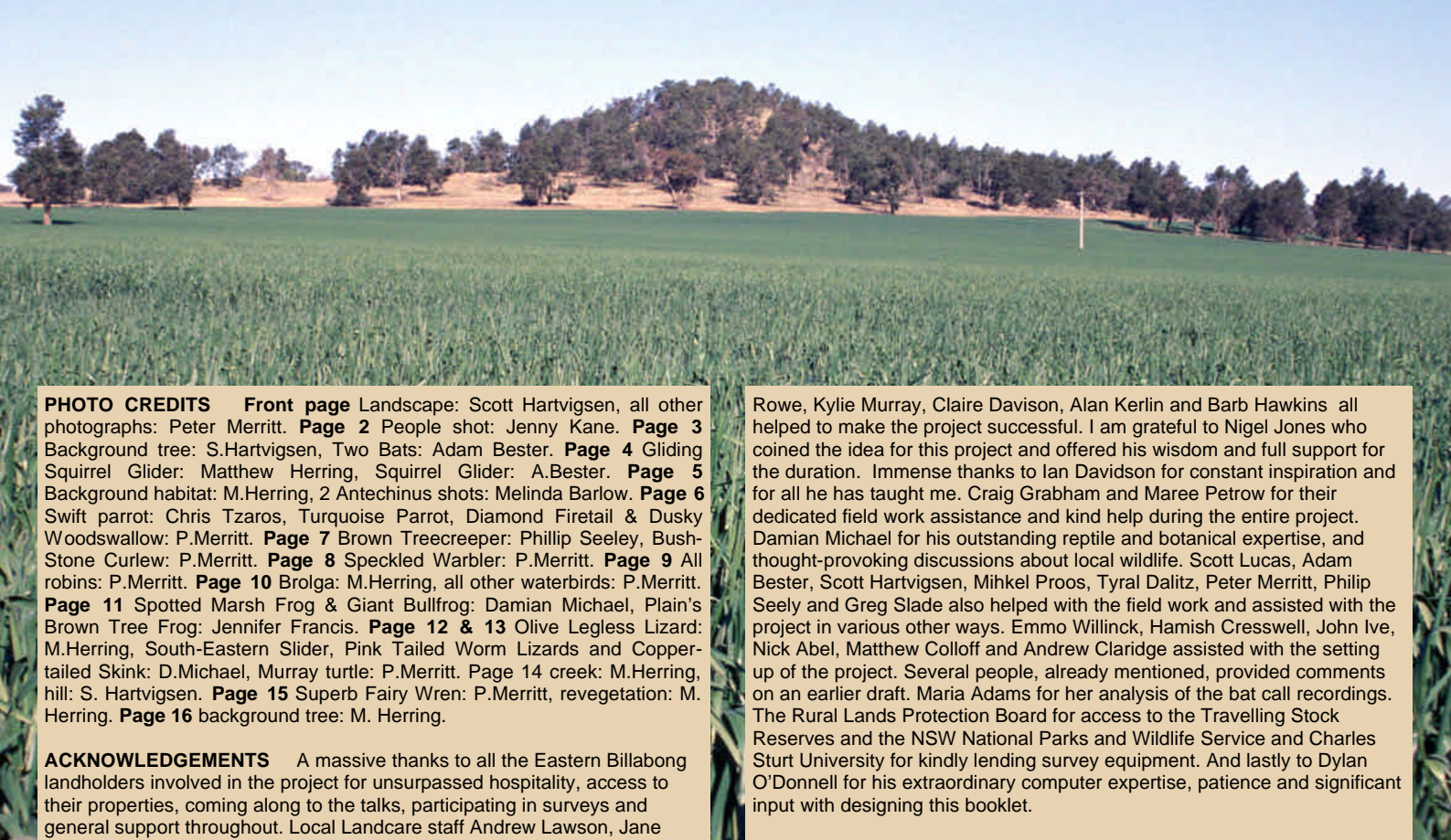


PHOTO CREDITS Front page Landscape: Scott Hartvigsen, all other photographs: Peter Merritt. **Page 2** People shot: Jenny Kane. **Page 3** Background tree: S.Hartvigsen, Two Bats: Adam Bester. **Page 4** Gliding Squirrel Glider: Matthew Herring, Squirrel Glider: A.Bester. **Page 5** Background habitat: M.Herring, 2 Antechinus shots: Melinda Barlow. **Page 6** Swift parrot: Chris Tzaros, Turquoise Parrot, Diamond Firetail & Dusky Woodswallow: P.Merritt. **Page 7** Brown Treecreeper: Phillip Seeley, Bush Stone Curlew: P.Merritt. **Page 8** Speckled Warbler: P.Merritt. **Page 9** All robins: P.Merritt. **Page 10** Brolga: M.Herring, all other waterbirds: P.Merritt. **Page 11** Spotted Marsh Frog & Giant Bullfrog: Damian Michael, Plain's Brown Tree Frog: Jennifer Francis. **Page 12 & 13** Olive Legless Lizard: M.Herring, South-Eastern Slider, Pink Tailed Worm Lizards and Copper-tailed Skink: D.Michael, Murray turtle: P.Merritt. Page 14 creek: M.Herring, hill: S. Hartvigsen. **Page 15** Superb Fairy Wren: P.Merritt, revegetation: M. Herring. **Page 16** background tree: M. Herring.

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Bringing Back The Wildlife

Habitat Restoration Across the Landscape

There is no doubt about it - without massive habitat restoration across the landscape local extinctions will continue to take place and we will continue to lose important parts of our natural heritage. The particular mix of natural heritage in the Eastern Billabong is what characterises the catchment and makes it unique. This area is among a handful of regions in Australia that are leading the way with wildlife conservation in agricultural landscapes. It is now clear that the work already undertaken for biodiversity conservation by landholders in the area is working well, but we still have a long way to go. We need to be more strategic about what we plant, where we plant it, how we plant it and what other options there are. For example, allowing for natural regeneration to occur, through appropriate grazing management, may be a better option for enlarging existing patches of bush or improving the health and long-term viability of a patch of remnant trees.

A study of birds on farms across Australia recommended that corridors should be at least 50 metres wide, native vegetation patches should be at least 10 hectares and at least 10% of every farm should be managed for wildlife conservation¹. There are several factors that strongly influence the response of wildlife to revegetated areas. The most important ones are the size of the area planted, the diversity of species planted and the distance to the nearest remnant patch of bush. The value of remnant trees within a revegetated area should not be underestimated. Old paddock trees, sometimes referred to as 'the living dead', act as stepping stones for mobile wildlife species moving through the catchment and through restoration we can ensure that they don't simply fall out of the system. Many

people can't bear the thought of every paddock being devoid of any trees in the future.

Some species are undoubtedly at crisis point and unfortunately their fate may

already be sealed. This is due to the debt that we still have to pay. However, the majority of threatened species in the Eastern Billabong are not doomed and restoration efforts across the landscape will go a long way to halting the loss of biodiversity – the diversity of life. People, particularly farmers, play the most crucial role for wildlife conservation in this Eastern Billabong. Indeed, the future survival of many species literally lies in the hands of the local community. The actions taken by people in days and years to come will ultimately decide the presence or absence of countless species in our area. It is apparent that the more we learn about the landscape and understand it, the more willing we'll be to provide a long-term future for all biodiversity, including ourselves. Lets make the future state of affairs a brighter one for all the other species that we share the catchment



The Superb Fairy-Wren is one of the first



Large-scale revegetation at "Old Carabobala", near Holbrook – A Success Story. These two sites have already attracted back well over 30 bird species since being planted just over a decade ago. Interestingly, the smaller patch supports more bird species, including the Speckled Warbler, Eastern Yellow Robin and Red-capped Robin, presumably because of the greater habitat diversity provided by the shrubs, which are largely absent from the bigger patch.

HEARTLANDS



**Towards Sustainable
Land Use in the
Murray-Darling Basin**

PHOTO



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