

# Fauna

## on Case Study farms

### Introduction

During the Land, Water & Wool Northern Tablelands Project (NSW), three Case Study farms—‘The Hill’, ‘Lana’ and ‘Nant Lodge’—were selected to demonstrate three quite different examples of profitable, biodiverse wool production.

The owner-managers of all three properties recognised the value of biodiversity to their commercial success (see Box: Case Study booklets). However, the properties differed markedly in area, soil type, length of family ownership, intensity of development, grazing management and tree cover (Table 1).

In order to assess biodiversity values, vertebrate fauna surveys were conducted in the summer of 2002-03. The aim was to establish the range and diversity of species on each property.

### Birds

Bird species richness and abundance were greatest in grazed woodland and forest and least in open pasture (Fig. 1). Scattered trees supported intermediate numbers of birds.

On average, wooded riparian zones supported less bird species and individuals than woodland and forest. However, results varied with tree cover.

More bird species and individuals were found in riparian zones with high tree cover. Conversely, fewer birds were associated with sparse tree cover. Riparian sites with native woodland had marginally more species and individuals than open-forest and woodland away from streams.

Windbreaks and block plantings on two Case Study properties were compared with other habitats (Fig. 1). The native windbreaks at ‘Nant Lodge’ and the windbreaks of introduced trees (predominantly radiata pine) at ‘The Hill’ contained significantly more bird species and individuals than the pastures into which they were planted.

Similarly, block plantings of radiata pine or native trees and shrubs, and whole paddock contour plantings of

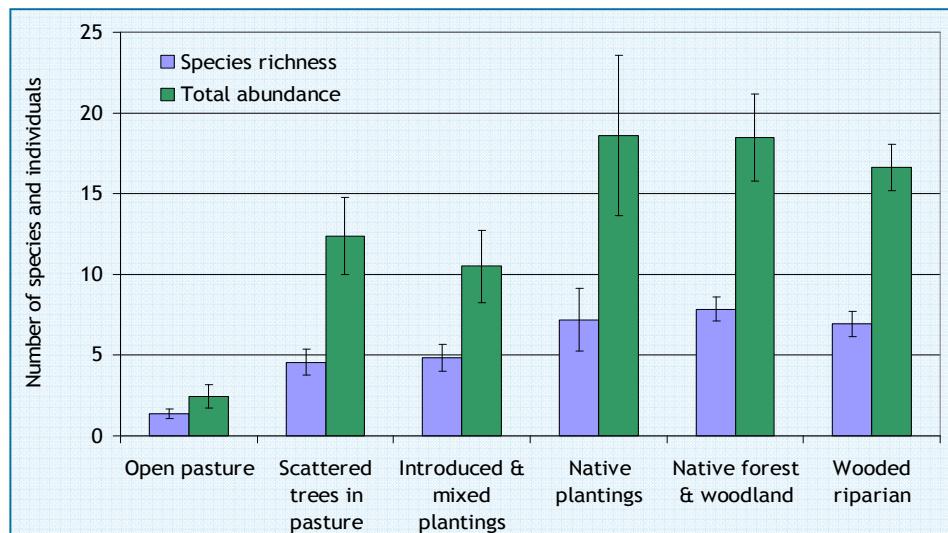
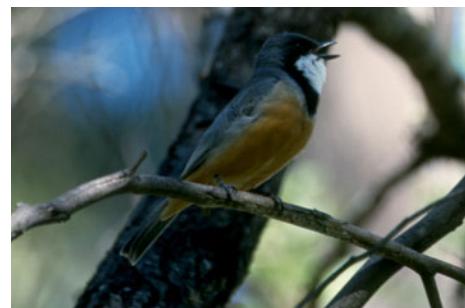
radiata pine and native trees and shrubs, supported more birds than pastures.

More than half of the bird species recorded on Case Study farms were uncommon, declining or vulnerable on the Northern Tablelands (Fig. 2). They are therefore of special conservation interest. At least 17 of these species occurred in planted habitats (windbreaks, block plantings, whole paddock contour plantings, garden) on ‘Nant Lodge’ and ‘The Hill/East Oaks,’ as well as in more natural vegetation on all three properties (Appendix).

Of particular conservation interest were nine woodland bird species that are declining and destined for extinction in the wheat-sheep belt of NSW due to habitat loss. Seven were recorded in censuses (Appendix) and the diamond firetail and eastern yellow robin were sighted opportunistically on Case Study farms. These species were mostly dependent on natural habitats. Retention of areas of natural timber on New England wool properties is important for the long-term survival of these species in NSW.



*The restless flycatcher (above) and rufous whistler (below) are declining towards extinction in the wheat-sheep belt of NSW. They were recorded on all three Case Study farms, either in census plots or opportunistically. Photos—Bob Shepherd.*

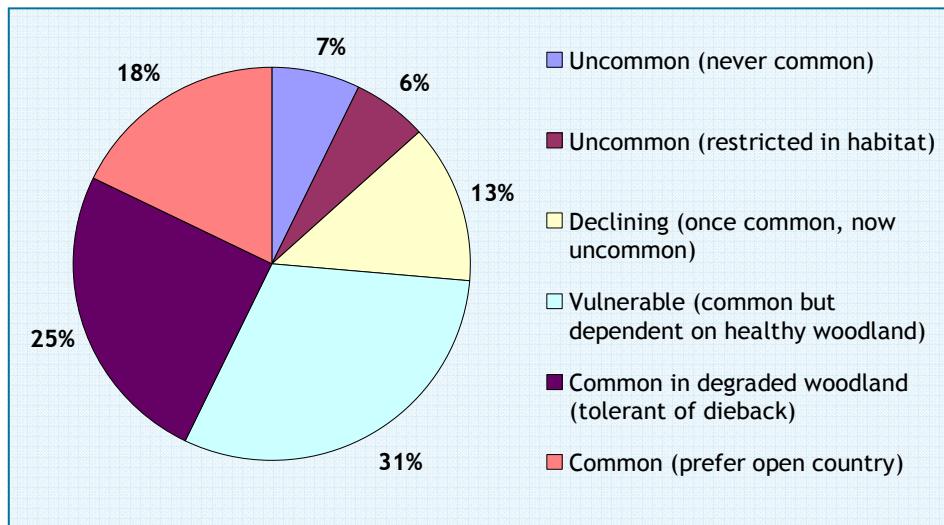


*Figure 1. The average number ( $\pm$  s.e.m.) of bird species and individuals in mostly grazed habitats on the three Case Study wool properties. Sample sizes: open pasture ( $n = 20$ ), scattered trees (14), introduced & mixed plantings (6), native plantings (5), native forest and woodland (14), and riparian timber (13). Plantings included windbreaks and block plantings; agroforestry consisted of paired rows of radiata pine and native trees and shrubs on the contour, spaced at 60 m intervals across the paddock, and was classified as mixed plantings.*

**Table 1. Characteristics of the three Case Study properties in the LWW Northern Tablelands Project.**

**Geology:** A = alluvial; B = basalt; G = granite; T = 'trap' or metamorphosed sediment. **Pasture base:** C = crops; N = native; Ns = naturalised; S = sown. **Habitat:** OP = open pasture; ST = scattered trees (projected foliage cover [PFC] of trees <10%); WL = woodland (PFC of trees 10-30%); OF = open forest (PFC of trees 31-50%); WR = wooded riparian; WB = windbreaks and block plantings (Nat = native, Int = introduced); AF = agroforestry; FD = farm dams; WW = waterways.

Property	Block	Owner-Managers	Area (ha)	Geology	Pasture Base	Paddock Nos	Habitat										
							OP	ST	WL	OF	WR	WB		AF	FD	WW	
												Nat	Int				
'The Hill'	Homestead	Jon & Vicki Taylor (5th generation)	650	T	N, Ns, S	35											
	'East Oaks'		400	B, T, G	N, Ns												
'Lana'	Homestead	Tim & Karen Wright (2nd generation)	3350	G	N, Ns	240											
'Nant Lodge'	Homestead	Rob & Annabel Dulhunty (2nd generation)	247	A, B	C, Ns, S	25											
	'Hillside'		630	B	N, Ns, S	21											



**Figure 2.** Status of 68 bird species recorded in surveys on three Case Study wool properties in the summer of 2002-03. Status after Barrett et al. (1994).



**Above—**The common brushtail possum was recorded on all three Case Study farms in mature native timber. Photo—Stuart Green.

## Vertebrate survey methods

Vertebrate surveys were undertaken by two wildlife experts on 'The Hill/East Oaks' (16-19/12/02), 'Lana' (17-20/1/03), and 'Nant Lodge/Hillside' 26/2-1/3/03 and 12-13/3/03).

In order to determine where vertebrate fauna occurred and in what abundance, each farm was stratified by habitat and two or more survey sites were surveyed in each. The habitat types depended on what was present on each property (Table 1).

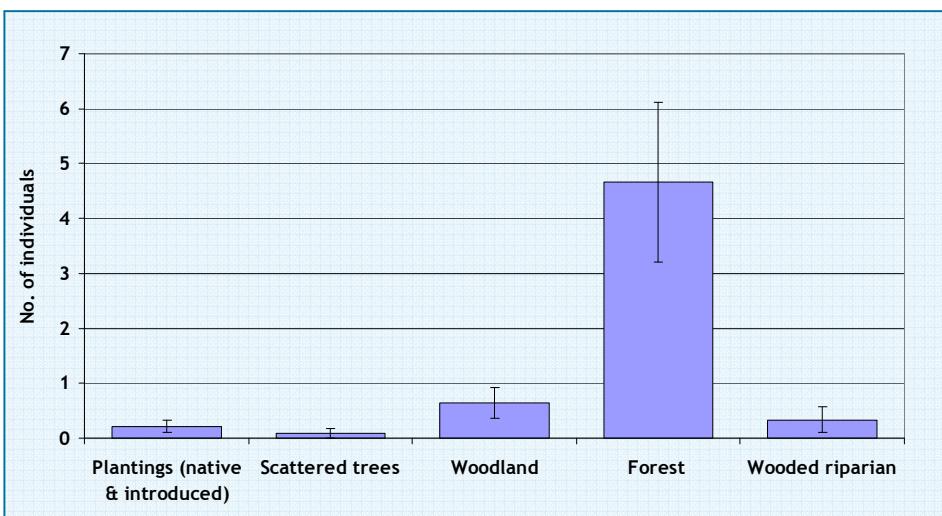
Birds were sampled for 20 minutes in 1.2 ha (200 x 60 m) census plots between sunrise and midday, and arboreal marsupials were sampled by spotlight in the early evening in the same plots. Microbat calls were recorded at each site for 10 minutes between 2100 and 2345 hours, using an analog recorder, and later identified by a bat expert. Frogs were surveyed by torchlight at night for 20 mins at 15 wetland (12 watercourse and three farm dam or constructed wetland) sites. Frog censuses were conducted over a 1.2 ha area (200 x 60 m along watercourses) or a circular area centred on dams.

## Arboreal marsupials

Four species of arboreal marsupial were recorded on Case Study farms: common brushtail possum, common ringtail possum, koala, and sugar glider.

Brushtail possums occurred in about a

quarter of all wooded sites surveyed. They were common in dense timber but infrequent elsewhere (Fig. 3). Where they occurred away from dense timber, they were generally associated with large hollow eucalypts, either as scattered trees or surrounded by native and introduced plantings.



**Figure 3.** The average number ( $\pm$  s.e.m.) of common brushtail possums in planted trees ( $n = 14$  sites), scattered trees ( $n = 11$ ), woodland ( $n = 11$ ), forest ( $n = 3$ ) and wooded riparian habitats ( $n = 9$ ) on Case Study farms. Most sites were grazed by domestic livestock.



*Above—Gould's wattled bat was the most widespread and abundant microbat on the three Case Study farms. Photo—Kim Downs.*



*Above—The lesser long-eared bat (Nyctophilus geoffroyi). Photo—Kim Downs.*



*Above—Little forest bat. Photo—Lindy Lumsden.*

# Bats

Nine different species of small, insect-eating bat ('microbat') were recorded on Case Study farms. About half the sites sampled registered ultrasonic recordings of microbats. The patterns of occurrence and abundance in the different habitats closely mirrored each other, and underscored the importance of mature native timber and surface water for microbats (Fig. 4).

Open pasture and planted habitats (windbreaks, agroforestry and block plantings of both native and introduced species) attracted fewest species and individuals, with microbats at only 20% and 33% of such sites, respectively.

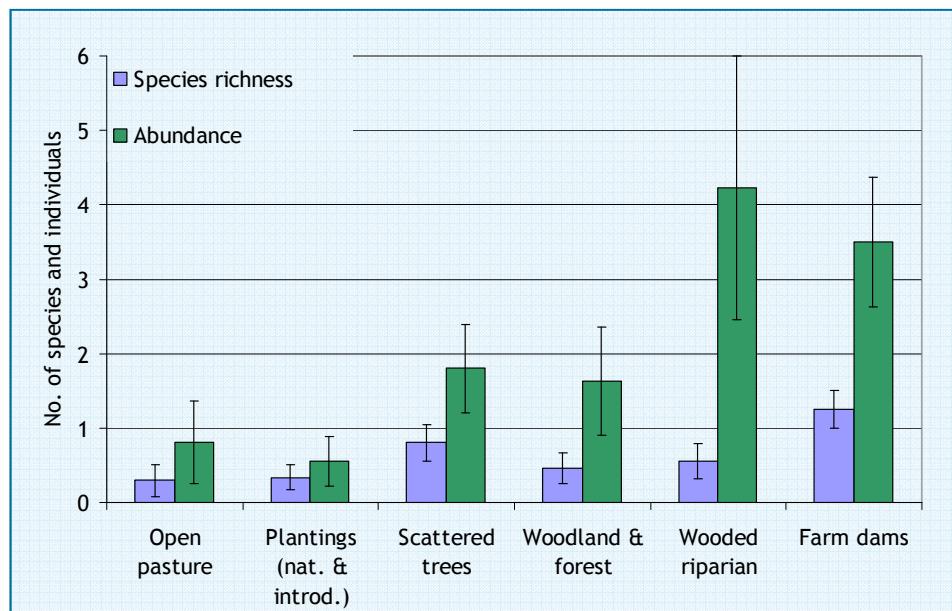
Mature eucalypts, either scattered or denser timber, attracted an intermediate diversity of microbats (60% and 45% of sites, respectively).

Most species and individuals were recorded near water at farm dams (100% of sites) and in wooded riparian zones (67% of sites).

Only 34% of the microbat ultrasonic recordings could be definitely identified due to the quality of the sound recordings and incomplete knowledge.

However, species-specific patterns in habitat preference detected on Case Study farms match the regional patterns encountered on the larger sample of wool properties in the summer of 2004-05 (Fact Sheet 2).

Gould's wattled bat occurred in most habitats, including open pasture, while the broad-nosed bat group was only recorded over surface water (Table 2).



**Figure 4.** The average number of species and individual ( $\pm$  s.e.m.) microbats in 10-minute surveys in different habitats on Case Study farms. Sample sizes: open pasture ( $n = 10$ ); native and introduced plantings (9); scattered trees (10); woodland and forest (11); wooded riparian (9); farm dams (4).

**Table 2.** The occurrence of microbats in different habitats on Case Study farms. Only definite records (based on ultrasonic calls) are indicated. Frequency is the proportion of 53 sites in which each species was recorded, and abundance is the total number of definite ultrasonic records across all sites.

# Frogs

Eleven species of frog were recorded on Case Study farms, nine species in watercourses and ten species at farm dams (Table 3). Every site turned up at least one frog.

The largest numbers of species (6-7) and individual (23-38) frogs were recorded on two large, well-vegetated farm dams, subject to only occasional grazing. Lesser numbers of frogs (1-5 species and 1-24 individuals) were recorded at permanent streams and waterholes in grazed paddocks, albeit only occasionally grazed.

Only one species of frog, the diminutive eastern dwarf tree frog, was recorded at most sites. The spotted grass frog, was recorded at about half the sites. The remaining species were recorded at five or less sites. Almost half the species were only recorded on one farm. This suggests that more species occur on each farm, or that there are more species on other farms in the region, or both.



Above—Eastern pobblebonk or banjo frog (*Limnodynastes dumerilii*) was found both at farm dams and along water ways. Its resonating ‘bonk’ call is distinctive and is often given by several frogs one after the other at slightly different frequencies. Photo—Stuart Green.



Above—Beeping froglet (*Crinia parinsignifera*). Photo—Stuart Green.



Above—The common eastern froglet (*Crinia signifera*) was found at both farm dams and along water ways. Its crik crik crik call is distinctive. Photo—Stuart Green.



Left—Lesueur’s frog (*Litoria lesueuri*). Photo—Stuart Green.

Below—Carefully managed, wooded riparian zones were important for production and biodiversity on Case Study farms. Fencing and strategic grazing of riparian zones as part of a whole property plan were employed on all three properties.



Table 3. Frogs recorded on the Case Study properties in waterways (permanent streams and waterholes) and farms dams (including an artificial wetland). Frequency is the proportion of 15 sites in which each species was recorded, and abundance is the total number of individuals recorded across all sites.

Frog Species	Property			Habitat		Frequency (%)	Abundance
	Nant Lodge & Hillside	Lana	The Hill	Farm dams	Waterways		
Number of sites	6	6	3	3	12		
Beeping froglet ( <i>Crinia parinsignifera</i> )						13%	22
Common eastern froglet ( <i>Crinia signifera</i> )						27%	23
Eastern pobblebonk or banjo frog ( <i>Limnodynastes dumerilii</i> )						13%	3
Long-thumbed or barking frog ( <i>Limnodynastes fletcheri</i> )						7%	3
Spotted grass frog ( <i>Limnodynastes tasmaniensis</i> )						47%	51
Eastern dwarf tree frog ( <i>Litoria fallax</i> )						87%	52
Broad-palmed rocketfrog ( <i>Litoria latopalmata</i> )						33%	17
Lesueur’s frog ( <i>Litoria lesueuri</i> )						13%	6
Peron’s tree frog ( <i>Litoria peronii</i> )						33%	7
Verreaux’s tree frog or whistling tree frog ( <i>Litoria verreauxii</i> )						27%	6
Eastern gungan or smooth toadlet ( <i>Uperoleia laevigata</i> )						13%	2



*Above—This well-vegetated farm dam at 'Lana' supported seven species of frog.*



*Above—Radiata pine block plantings and windbreaks amidst remnant timber at 'The Hill' provide habitat for several bird species that are vulnerable or declining on the Northern Tablelands of NSW. Photo—Michael Taylor.*



*Above—Riparian areas with mature native timber and surface water provide habitat for a wide range of birds, microbats and frogs.*

## Conclusions

The Case Study farms all supported common brushtail possums and a wide variety of birds, microbats and frogs.

Timber and surface water are very important for vertebrate fauna. The diversity and abundance of birds, arboreal marsupials and microbats all responded positively to their presence, and frogs were found at every farm dam and wooded riparian site investigated.

Many species of bird that are vulnerable or declining on the Northern Tablelands were found on Case Study farms. In addition to using natural timber, these species were also found in planted habitats such as windbreaks, block plantings, homestead gardens and whole paddock plantings of introduced and native trees and shrubs.

Woolgrowers' efforts to maintain, regenerate and restore tree cover on New England farms are having a positive benefit for species of conservation concern, including declining woodland birds destined for extinction in the wheat-sheep belt of NSW.

Timber is obviously important for arboreal marsupials on New England farms. Species other than brushtail possums were infrequent. Woolgrowers can assist the conservation of possums, gliders and koalas by restoring wooded corridors across the farmscape for habitat connectivity.

Mature native timber and surface water (both natural waterways and farm dams) are important for microbats for foraging habitat. Mature timber is also important for microbat roost sites (hollow limbs and trunks).

Frogs were widespread on Case Study farms, both in natural and constructed wetlands. Little-grazed, well-vegetated farm dams with dense fringing pasture, aquatic vegetation such as bulrushes, and natural or planted timber nearby, provide habitat for a range of frog species.

The surveys show that profitable wool production is compatible with the conservation of a wide range of vertebrate fauna on southern New England farms.

Despite differences in wool operation, level and intensity of development, and grazing management, all three farms host diverse vertebrate fauna. The common feature to all three properties is the diversity of pasture, wooded and wetland habitats. This diversity of habitats, in turn, provides resources for a wide range of birds, microbats and frogs as well as for brushtail possums.

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The Land, Water & Wool Northern Tablelands Project is led by Associate Professor Nick Reid, University of New England, in collaboration with Southern New England Landcare Ltd, and the Centre for Agricultural and Regional Economics.

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# Appendix

The status of 68 bird species and the habitats in which they occurred on Case Study farms in the summer of 2002-03. Status after Barrett et al. (1994). Declining woodland birds (Reid 1999) are indicated by an asterisk.