4 FUTURE WORK

Every effort was made during the recent systematic fauna surveys to sample the full variety of habitat types and fauna groups within south western Blue Mountains NP, and hence obtain a comprehensive picture of terrestrial vertebrate fauna within the area. The surveys were, however, subject to a number of constraints, in particular drought and access, leading to limitations and a recommendation that further work by undertaken within the area in coming years. Areas of endeavour that should be targeted in the future include:

- Systematic frog surveys using the nocturnal streamside search method described above. The surveys should be undertaken under appropriate weather conditions when the current drought breaks, that is on warm, humid nights in spring or early summer after an extended period of rain. Some surveys should also be undertaken in winter to target winter-breeding species. This program should specifically endeavour to ascertain whether Booroolong Frogs persist within the study area, focussing on rocky west-flowing creeks. Gathering information on the distribution of *Litoria nudidigita* would also be interesting, as it would contribute important information to the understanding of this newly described species.
- Further systematic surveys for medium sized ground mammals, particularly Quolls.
- Surveys for Yellow-bellied Gliders, particularly in the north west of the study area where numerous traces have been recorded, but no animals observed. Confirmation of the existence of the glider within this montane environment would contribute important information about the range and habitat tolerance of the species.
- Targeted surveys for Koalas in the east and south east of the study area, particularly in vegetation communities where Grey Gum and Forest Red Gum occur. These should be undertaken to ascertain whether the species occurs within the study area, and if so to estimate the species abundance and distribution.
- A questionnaire survey of adjoining landholders could provide valuable information on occurrence and abundance of both Koalas and Spotted-tailed Quolls in the area.
- Targeted surveys for Brush-tailed Rock-wallabies, particularly along the limestone cliffs and outcrops in the more inaccessible parts of Murruin Creek and Little Wombeyan Creek. These surveys would require some overnight walks or helicopter drop-offs.
- Undertake systematic survey techniques within vegetation types that remain under-sampled, particularly the Montane Slopes Dry Forests. These habitats may contain fauna species that have not yet been recorded for the study area.
- Any systematic work undertaken in the future should be undertaken utilising the methods described in Section 2.3 and in NPWS (1997). Data entry into the BSS is the responsibility of the survey coordinator and time and resources for data entry should be included within the original survey proposal. This will ensure that the data is available to all staff and clients of DEC with accurate details and also the data to be included in any analysis of systematic data undertaken.

4.1 RESEARCH INTO STUTTERING FROG

Due to the high significance of the Stuttering Frog population within the study area, a scientific research project on the species is highly recommended, in consultation with the species recovery team. A well designed project would contribute immensely to the understanding of the species in the area and across the region, and provide vital information for conservation management across the state. Any further work within the area, however, must be undertaken in strict accordance with the *Hygiene Protocol for the Control of Disease in Frogs* (NPWS 2001).

The project could include the following:

- A detailed study of population demographics. Most importantly, this would include determining the rate of recruitment and attrition, and whether any metamorphs are surviving through to adulthood and sexual maturity. The 2004 surveys suggest that though breeding is occurring, a number of metamorphs are dying from chytrid fungus. Research should determine the proportion of metamorphs that are dying, and whether low recruitment levels are threatening the viability of the population.

- Investigation into factors that have allowed the species to persist in the area, when all other known populations above 280 metres above sea level and west of the Divide have disappeared.
- Determination of the affect (if any) of mining tailings and pollutants present in Mountt Werong and Ruby Creeks on the species, and its interaction with chytrid fungus infection.
- Determination of specific risks to the survival of the species in the study area and consequent formation of appropriate management actions to address these risks in the short and long term.
- Detailed habitat assessment of the sites within the study area (including terrestrial and aquatic factors). From this attempts could be made to predict and investigate other suitable habitats in highland Blue Mountains and elsewhere.
- Publish outcomes of the research in a format that is useful for conservation management of the species across the region and the state.

5 THREATENED SPECIES PROFILES

This section provides a profile of each of the threatened fauna species that are known to occur within south western Blue Mountains NP, together with two additional threatened species that are considered likely to occur. The aim of these profiles is to provide: a background on the species biology; a summary of threats to the species; an assessment of how well the species is protected in the region; a map of known records of the species in the study area and the surrounding five kilometres; and an appraisal of the distribution and status of the species in Kanangra-Boyd and the surrounding area.

The list of threatened vertebrate fauna for the study area contains records of various levels of reliability. For this reason, a species profile has not been generated for all of the threatened species listed on the DEC Atlas of NSW Wildlife as occurring within the area. Only species that have been directly and reliably observed within the study area since 1950, or have been recorded on the Atlas of NSW Wildlife within two kilometres and considered likely to occur within the area, have been afforded a species profile. Table 4 presents all of the threatened species recorded on the Atlas of NSW Wildlife within five kilometres of the study area, together with annotation for each species regarding the latest record, reliability of identification and a rationale for the generation of a species profile.

Table 4: Threatened fauna species within and around south western Blue Mountains National Park

Scientific name	Common name	Status in NSW (TSC Act)	Status in Australia (EPBC Act)	No. of locations within study area[1]		No. of locations within a five kilometre radius of study area[1]	Notes on reliability and date of last record	Species profile generated?
				DEC[2]	Other[3]			
Litoria booroolongensis	Booroolong Frog	E	-	0	0	2	Not recorded in study area. Australian Museum specimens, one from 1976 on Kowmung River, one undated record from Wombeyan Caves.	N
Mixophyes balbus	Stuttering Frog	E	V	3	1	1	Observed in February 2004 at Ruby Creek and Mount Werong Creek.	Y
Calyptorhynchus lathami	Glossy Black-cockatoo	V	-	0	0	5	Not recorded in study area. Recently recorded by DEC out of study area.	N
Xanthomyza phrygia	Regent Honeyeater	E	E	0	1	1	Recorded by Royal Australasian Ornithologists Union in 1980 in 10 minute grid. Unlikely to occur in study area.	N
Ninox strenua	Powerful Owl	V	-	13	1	5	Regularly observed within study area.	Y
Tyto novaehollandiae	Masked Owl	V	-	1	0	1	Heard by DEC on Limeburners Trail in May 2003.	Y
Dasyurus maculatus	Spotted-tailed Quoll	V	E	0	1	1	Scat collected at Mount Werong in 2001.	Y
Petrogale penicillata	Brush-tailed Rock-wallaby	E	V	0	0	2	Not recorded in study area. Possible sighting 400 metres south east of study area in 2001; historical population at Wombeyan Caves.	Y
Bettongia gaimardi	Tasmanian Bettong	Presumed Extinct	-	0	0	1	Not recorded in study area. CSIRO subfossil record from 1987 in Wombeyan Caves.	N
Phascolarctos cinereus	Koala	V	-	0	1	2	Observed once in study area in 1995. Scat collected 500 metres south east of study area in 2001 and call heard 4.5 kilometres south east of study area in 2001.	Y
Petaurus australis	Yellow-bellied Glider	E	-	14	0	4	Observed in east of study area; scratches and feed marks recorded in north west of study area.	Y
Cercartetus nanus	Eastern Pygmy-possum	V	-	0	0	1	Undated Australian Museum specimen from the vicinity of Wombeyan Caves.	N
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	0	0	2	Not recorded in study area. Recorded by DEC three kilometres south of study area in 1999 and by CSIRO and Charles Sturt University between 1957 and 2000 at Wombeyan Caves.	Y
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	-	4	1	8	Captured in harp traps and recorded by anabat within study area.	Y
Miniopterus australis	Little Bent-wing Bat	V	-	0	0	1	CSIRO record from 1962 in vicinity of Wombeyan Caves.	N
Miniopterus schreibersii oceanensis	Eastern Bent-wing Bat	V	-	4	1	5	Recorded by anabat within study area.	Y
Scoteanax rueppellii	Greater Broad-nosed Bat	V	-	8	1	2	Captured in harp traps and recorded by anabat within study area.	Y

E Endangered

V Vulnerable

[1] Numbers indicate the number of records for the species, rather than the number of individuals

[2] Includes all records collected during CRA, SCA and Biodiversity Survey Priorities fauna surveys

[3] Includes records on the NSW Wildlife Atlas obtained from sources other than DEC systematic survey

STUTTERING FROG

Species Profile

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The Stuttering Frog (*Mixophyes balbus*) is a large (up to eight centimetres) frog that is highly camouflaged in the wet leaf-litter of the forest floor. After summer rains the males make a call that includes a soft stuttering, from which the species gets its common name. The thin barring on the limbs in combination with the blue crescent above the iris distinguishes it from other *Mixophyes* in NSW (Barker *et al.* 1995, NPWS 2000c). It is usually associated with flowing streams, often in rainforest or wet sclerophyll forests (Anstis 2002), where it feeds on insects and smaller frogs (Gilmore and Parnaby 1994). It breeds in spring and summer and has extremely long-lived tadpoles. It was formerly found along the coast and ranges between northern New South Wales and far-north eastern Victoria. It appears to have disappeared from the latter state, and is now only found patchily throughout the rest of its former distribution (Anstis 2002).

Threats

The threats to this species are poorly understood, however the main ones are thought to be habitat fragmentation and degradation, leading to the isolation of sub-populations and increased vulnerability to other threats and to local extinction via stochastic events such as epidemic disease (NSW Scientific Commitee 2002a). The Stuttering Frog is also threatened by chytrid fungus (chytridiomycosis, *Batrachochytrium dendrobatidis*) which is listed as a Key Threatening Process on the NSW TSC Act (1995). This fatal disease particularly affects higher altitude frog populations (greater than 400 metres) and stream-breeding frog species (NSW Scientific Committee 2003a). The disease is known to have seriously affected populations of the closely related Fleay's Barred Frog (*M. fleayi*) (Berger *et al.* 1998), but is recorded for the first time in the Stuttering Frog as part of this study. The Frog is also potentially threatened by predation of eggs and tadpoles by the exotic Plague Minnow (*Gambusia holbrooki*), also listed as a Key Threatening Process on the TSC Act. This small fish has not yet been reported within the study area (J. Bros pers. comm.), although targeted surveys for the species have not been undertaken.

Local and Regional Conservation Status

The Stuttering Frog is listed as Endangered on the NSW TSC Act (1995) and Vulnerable on the Commonwealth EPBC Act (1999). Within the southern portion of its range the frog appears to have declined dramatically in recent times. Surveys of forty historical locations of the species between Watagans National Park and Wombeyan Caves between 1999 and 2000 found frogs to be extant at only fourteen locations, of which thirteen were clustered between Gosford and the Watagan Mountains (A. White in prep.). Targeted surveys undertaken in 2000 from south of Sydney to Victoria found only two locations where frogs still occur (Daly *et al* 2002). Within the greater Sydney Basin the species is known to occur within Watagan and Macquarie Pass National Parks, as well as within Olney, Strickland and Awaba State Forests (DEC 2004c).

The Stuttering Frog was first discovered at Ruby Creek in 2000, when two adults were located in a pool near the falls (C. Barker pers. comm.). This is an eastern flowing creek within the catchment of the Kowmung River. Targeted surveys for the species undertaken as part of the current study located tadpoles in every large pool along Ruby Creek from 150 metres above the abandoned mine site to two kilometres north east of the falls. Also along this stretch, three dead metamorphs of the species were found. These were collected, and a post mortem undertaken by the Veterinary and Quarantine Centre at Taronga Zoo revealed the presence of chytrid fungus. No adult Stuttering Frogs were seen or heard calling at Ruby Creek during the surveys. Searches of potential habitat within the study area resulted in the discovery of two new sites for the species on Mount Werong Creek. Tadpoles of the species were located in the vicinity of the Middle Werong and Upper Werong fire trail crossings, but no adults were seen or heard calling. This is a significant find as Mount Werong creek is western flowing, within the catchment of the Abercrombie River.

The occurrence of the Stuttering Frog at Ruby and Mount Werong Creeks has very high conservation significance. These are the only known extant high elevation populations of the species; all other populations occur below 280 metres (A. White in prep.), while the records for the species obtained in this study range between 690 and 1080 metres above sea level. These sites are the western-most known location of the species in New South Wales (DEC 2004c), while Mount Werong Creek is the only known occurrence of the species on the western watershed of the Divide, south of the Hunter Valley. Between 1999 and 2004 tadpoles of the species have been recorded at only two other locations in the greater Sydney Basin (A. White pers. comm.). Clearly, conservation of the species within the study area is of very high priority, and crucial to the survival of the species across its range in NSW.

The identification of chytrid fungus-infected frogs at Ruby Creek should be treated with extreme concern. As mentioned above, this fatal disease has been implicated in the rapid decline and local extinction of sub-populations of a number of high-altitude stream-breeding frog species. Chytrid is virulent only to adult and metamorphosing amphibians, though it may be carried on the keratinised mouthparts of tadpoles (Berger *et al.* 1998). It is important to note that the dead chytrid-infected individuals located in this study were metamorphs, a stage in development when frogs are generally most susceptible to disease. It is probable that tadpoles in the population carry the disease, which then becomes virulent on metamorphosis. This may reduce the rate of recruitment to the adult population below a critical level, leading to long term population declines or crashes. Understanding this issue and the demographics of the population should be a focus of scientific research into the population.

Causes of the local extinctions of this species from all other historic sites above 280 metres in altitude are not known, but could be due to chytrid infections or to some related factor associated with elevated UV-B levels at higher elevations (A. White in prep.). Prior to the identification of chytrid, it had been postulated that the Mount Werong sub-population had been afforded a degree of immunity to the fungus because of pollutants in the catchment resulting from mining activities (R. Wellington pers. comm.). This has not been tested, and would be an important factor to examine in future research. Further scientific research within the study area is recommended, with the aim of determining factors influencing the species survival, its distribution, habitat preference and approximate population size (see Section 4.1 of this report). Such information would guide management actions for the species within the study area and across the region. Any further work or visitation within the area, however, must be undertaken in strict accordance with the *Hygiene Protocol for the Control of Disease in Frogs* (NPWS 2001). In the meantime, access to breeding sites should be limited as much as possible.

This species is of very high conservation concern. Management actions for the species in the study area should be considered immediately, in consultation the Central Threatened Species Unit and the species recovery team.

POWERFUL OWL

Species Profile

The Powerful Owl (*Ninox strenua*) is the largest owl in Australia and is distinguished by its relatively small, round head and long tail. It is dark brown above with prominent off-white barring, and paler underneath with diagnostic dark chevrons. It inhabits various forest habitats, though it usually breeds and roosts in closed forest, including rainforest and wet sclerophyll forest. It hunts in more open forests, where it feeds mainly on arboreal mammals, particularly Common Ringtail Possum (*Pseudocheirus peregrinus*) and Greater Glider (*Petauroides volans*). This owl usually nests in a hollow in a eucalypt within or below the canopy, and normally lays two eggs. They usually maintain a territory of between 300 and 1500 hectares, with size dependent on habitat quality and prey density. The species is endemic to eastern Australia, being recorded between Eungella (Queensland) to near the South Australia-Victoria border (Higgins 1999).

Threats

Past land clearance for agriculture has reduced the area of habitat available for the Powerful Owl (Garnett and Crowley 2000), particularly the availability of roost sites. The owl can, however, survive in areas with some levels of disturbance, such as in selectively logged forests (Kavanagh 1997) and suburban areas of Brisbane, Sydney and Melbourne (Garnett and Crowley 2000, DEC 2004d). Two of the determining factors for the species persistence in disturbed areas is the presence and suitable abundance of prey species (Chafer 1992) and nesting/roosting sites (Debus and Chafer 1994).

Local and Regional Conservation Status

The Powerful Owl is listed as Vulnerable on the NSW TSC Act (1995). Broad-scale modelling has predicted that a relatively large area of suitable habitat for this species occurs within the Sydney Basin Bioregion (NPWS 2000b), within which a high number of records occur (DEC 2004c). The species is less widespread in the South Eastern Highlands Bioregion, with concentrations of records in the Central Tablelands, around Tallaganda and in western Kosciuszko National Park. A large amount of modelled habitat is in reserves such as Blue Mountains, Royal and Brisbane Waters National Parks, as well as in the Sydney Catchment Authority Special Areas (Woronora and Warragamba). Recent DEC surveys within the Warragamba Special Area, and the neighbouring Blue Mountains, Kanangra-Boyd and Nattai National Parks have found Powerful Owls to be relatively abundant and widespread in the region (DEC in prep.).

Powerful Owls have been recorded throughout the study area, with the exception of the centre between Parliament Hill and Mt. Werong (Map 5). The absence of owls from around Mt. Werong may be due to a reduction in the number of suitable roosting sites as a result of extensive logging activities in the area in the past. The owl was directly observed at three locations in May 2004: two owls responded to nocturnal call playback surveys along Langs Road by coming in and perching five metres above the broadcaster; the third owl was spotted opportunistically flying across Little Wombeyan Creek fire trail. All other records of the owl within the study area have been detected by the bird's distinctive low-pitched hooting call, which can be heard over some distance. The species has been recorded in a wide variety of vegetation types, ranging from Montane Sandstone Dry Shrub Forests in the south of the study area, Tablelands Dry Forest in the east and Tablelands Snow Gum Woodland and Montane Sheltered Forest in the north. Powerful Owls inhabit a large home range that is likely to include areas of tall forests with some mesic influence for roosting, and areas with a high density of prey items, particularly the Greater Glider, for foraging. Suitable habitat for this species is widespread in the study area and prey density (particularly Greater Glider) is markedly high. As few threats currently impose on the species within the study area, the owl is likely to be widespread in this area, mirroring trends across the region.

MASKED OWL

Species Profile

The Masked Owl (*Tyto novaehollandiae*) is a large 'barn' owl, which has three colour morphs (with intermediates), but is distinguished from the similar Barn Owl (*T. alba*) by its larger size, more thickset and hunchbacked appearance, fully feathered legs and larger feet (Higgins 1999). It inhabits a wide range of woodland habitats with large hollows for roosting and open areas for hunting. It feeds mostly on ground-dwelling mammals, such as rats (*Rattus*) and Antechinus (*Antechinus*), and occasionally on diurnal birds, Sugar Gliders (*Petaurus breviceps*) and insects. The owl has a home range of 800 to 1200 hectares (Kavanagh 2002). It nests in hollow trees, usually eucalypts, where two to three eggs are the normal clutch (Higgins 1999). The nominate subspecies *novaehollandiae* was formerly found around the southern coast of Australia between Fraser Island (Queensland) and Carnarvon (Western Australia), though its range has contracted, particularly in Western Australia (Garnett and Crowley 2000). Other subspecies occur in Tasmania, northern Australia and in New Guinea and adjoining islands, some of which are sometimes considered separate species (Higgins 1999).

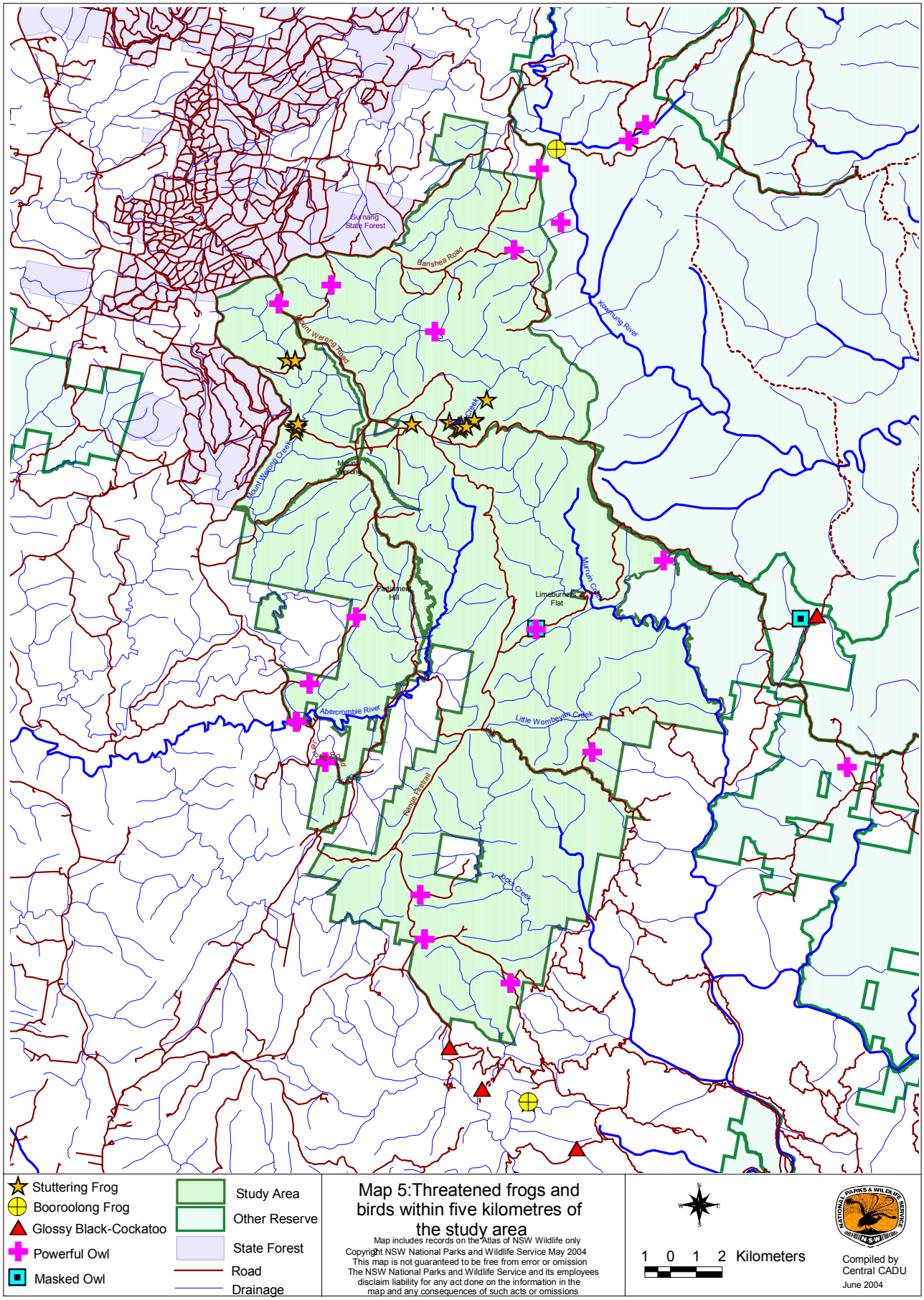
Threats

Clearance of native forest for agriculture and urban development, and the resulting fragmentation of habitat, has negatively affected the abundance of Masked Owls (Kavanagh 2002, Garnett and Crowley 2000). The species does not persist within fragments of forest less than 200 hectares (Kavanagh 2002). The species may be affected by logging, through removal of hollows or reduction in foraging habitat due to vigorous regrowth (Garnett and Crowley 2000), though it has been suggested that modern mosaic logging operations do not cause major changes to the abundance of the species (Kavanagh 2002).

Local and Regional Conservation Status

The Masked Owl is listed as Vulnerable on the NSW TSC Act (1995). Most records for the species in NSW are located in the NSW North Coast, Sydney Basin and South East Corner Bioregions, with a few scattered records west of the Divide (DEC 2004c). Records of the species in South Eastern Highlands are restricted to the eastern extremity of the Bioregion with records within NPWS reserves including Blue Mountains and Morton National Parks and Bungonia State Conservation Area (DEC 2004c). Significant numbers of the species have recently been recorded by DEC within the Warragamba Special Area and Greater Blue Mountains Area, including within Blue Mountains and Nattai National Parks (DEC in prep.). Observations have been made in areas not previously considered to contain substantial amounts of high quality habitat. Records of Masked Owl in the western sections of the Kanangra Area have high conservation significance, as they near the western extremity of the species known distribution.

The Masked Owl has been recorded once within the study area, heard calling in response to a nocturnal call playback survey in Limeburners fire trail in May 2003. The Masked Owl has also been recorded at one other location within a five kilometre radius of the study area, heard calling at Back Swamps Creek, during DEC fauna surveys in January 2004 (Map 5). Potential habitat for the species occurs in more open vegetation types in the east of the park. It is unlikely, however, that the species occurs in the far west or north west of the study area, as this is probably beyond the western and altitudinal extremity of the species distribution. Due to the large home range of this species it is hard to predict specifically where individuals would occur, however their home ranges are likely to incorporate areas of forest or woodland near minor drainage lines for roosting, and areas of woodland with a more open understorey and sparse ground cover for foraging.


Burnang State Forest
Banshea Road
Mount Werong Road
Koyhung River
Mount Maggy Creek
Mount Werong
Parliament Hill
Limeburners Flat
Abercrombie River
Little Wombeyan Creek
Range Freehold
Rock Creek
Stuttering Frog
Booroolong Frog
Glossy Black-Cockatoo
Powerful Owl
Masked Owl
Study Area
Other Reserve
State Forest
Road
Drainage
Map 5:Threatened frogs and birds within five kilometres of the study area
Map includes records on the Atlas of NSW Wildlife only
Copyright NSW National Parks and Wildlife Service May 2004
This map is not guaranteed to be free from error or omission
The NSW National Parks and Wildlife Service and its employees disclaim liability for any act done on the information in the map and any consequences of such acts or omissions
1 0 1 2 Kilometers
Compiled by Central CADU
June 2004

SPOTTED-TAILED QUOLL

Species Profile

The Spotted-tailed or Tiger Quoll (*Dasyurus maculatus*) is a medium-sized marsupial carnivore that is identifiable by its rufous to dark brown fur and white spots which are present on the body and tail. It is essentially terrestrial, but is also an agile climber. It feeds on a wide variety of birds, reptiles, mammals and invertebrates and it uses several 'latrines' within its territory for defecation (NPWS 1999a). There are three populations of this species. The first is in far north Queensland, the second extends from Southern Queensland to Victoria, and a final genetically distinct population occurs in Tasmania (Firestone *et al.* 1999).

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Threats

The main problems confronting the Spotted-tailed Quoll are believed to be habitat loss, habitat degradation, predation and competition by the introduced predators such as Cat (*Felis catus*) and Fox (*Vulpes vulpes*), and direct mortality at the hands of humans (Mansergh 1984). Quolls were heavily persecuted as killers of domestic fowl, and have been hunted and trapped to extinction in many parts of the country. In more recent years, baiting for foxes, dogs and dingoes may have taken a toll on this species (D. Andrew pers. comm.).

Local and Regional Conservation Status

The Spotted-tailed Quoll is listed as Vulnerable on the NSW TSC Act (1995) and as Endangered on the Commonwealth EPBC Act (1999). The southern populations are believed to have declined in range by up to 50 percent in recent years (Maxwell *et al.* 1996). Within NSW the species has been recorded most in the NSW North Coast, Sydney Basin and South East Corner Bioregions (DEC 2004c). Within the South Eastern Highlands Bioregion the species is most common in the south eastern corner with records from Blue Mountains, Tallaganda and Kosciuszko National Parks amongst others. The species is occasionally observed around the townships of the central Blue Mountains and Picton (DEC in prep.), either in the vicinity of chicken coops or as road kill. The low abundance of the species across the region is evidenced, however, by the fact that not a single Quoll has been observed within the Warragamba Special Area during two years of DEC surveys, despite a huge number of hours being spent in the field during both the day and night (DEC in prep.).

The Spotted-tailed Quoll is not known to have ever been directly observed within the study area. However, a single scat of the species was collected during the biodiversity surveys at Mount Werong in January 2001, though this is yet to be confirmed (Map 6). The species was known from Wombeyan Caves in the 1870s but has not been recorded there since. The closest recent records of the species lie within Kanangra-Boyd National Park, where the animal has been recorded five times since 1988 (DEC 2004b). Potential habitat for Quolls is widespread within the study area and prey items are dense. Further survey work, including extensive cage trapping over an extended time period, is required to determine whether the species persists within the study area, its distribution and abundance. Quolls may be effected by competition from introduced species, such as the Feral Pig (*Sus scrofa*), which are abundant in the study area (D. Andrew pers. comm.). High priority should be given to increasing public awareness of this species and its identification, and to encouraging neighbours and park visitors to report any sightings, together with accurate location information.

KOALA

Species Profile

The Koala (*Phascolarctos cinereus*) is a distinctive arboreal mammal of eucalypt forest and woodland. It feeds on a wide range of eucalypt and other tree species, though in a local area a few species will be preferred almost exclusively. Individuals spend most of the day resting in the forks of trees, and are most active following sunset (NPWS 1999b). They generally move about a home range, the size of which varies on the density of food trees and population size, though individuals, particularly dispersing juveniles, are known to travel up to 50 kilometres (Martin and Handasyde 1995; NPWS 1999b). Three subspecies occur between north Queensland and the Eyre Peninsula in South Australia. However, the distribution is now fragmented and introductions, such as to Phillip Island, have possibly altered the genetic diversity of many of the populations (Martin and Handasyde 1995).

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Threats

NPWS (1999b) summarises the threats to the Koala as follows: destruction of habitat by clearing for urban development, agriculture and mining; degradation of habitat through fragmentation and disturbance such as fire or weed invasion; direct mortality from dogs and motor vehicles; and infection by *Chlamydia* which causes keratoconjunctivitis (an infection of the eyes) and infertility. The latter appears to occur naturally in Koalas in NSW, and symptoms are displayed when animals are stressed (NPWS 2003d). In Victoria, populations that have been transferred from Phillip Island appear to have lost their immunity and rates can be high, but it does not appear to be a major threat (Menkhorst 1995). Throughout its entire range, loss, fragmentation and degradation of habitat is its greatest threat (NPWS 2003d). Reed *et al*. (1990) reported on a survey in 1986-87 that found that the Koala had disappeared from 50 to 75 percent of its known range in NSW and populations had been lost from many localities, particularly on the southern and western edges of their distribution.

Local and Regional Conservation Status

The Koala is listed as Vulnerable on the NSW TSC Act (1995). The species is widespread across the eastern third of the state, with records scattered throughout the South Eastern Highlands Bioregion (DEC 2004c). Records within reserves this Bioregion are regular in Morton National Park and Bungonia State Conservation Area, and less frequent in South East Forest National Park and a number of small Nature Reserves. Within the region, Koalas have recently been discovered in Nattai National Park and Wollondilly River Nature Reserve (DEC 2004e, DEC 2004f).

A single Koala was seen on Mt. Werong Road in October 1995, which is the only time the species has been recorded within the study area. In addition, two records for the species exist within a five kilometre radius: an individual was detected by its loud distinctive grunting approximately five kilometres to the south east in January 2001; and scats were collected 500 metres east of the study area, in the Murruin Creek valley, also in January 2001. The vegetation found in the greater Wollondilly Valley contains a number of tree species that are preferred foraging by the Koala. It is considered likely that this iconic mammal also occurs within the east of the study area, probably in relatively low numbers. The majority of potential habitat for the species occurs in the east and south east of the study area, in locations where Grey Gum (*Eucalyptus punctata*) and/or Forest Red Gum (*E. tereticornis*) make up a significant component of the canopy. Vegetation types potentially used by Koalas within the area include the Grassy Red Gum-Box-Ironbark Woodlands and Highlands Slopes Grey Gum Stringybark Forest. Much of this habitat occurs within regions that are difficult to access, which is perhaps the reason Koalas have only been observed once to date. Additional targeted surveys will need to be undertaken on foot, perhaps with helicopter drop offs, to determine the abundance and distribution of the species.

BRUSH-TAILED ROCK-WALLABY

Species Profile

The Brush-tailed Rock-wallaby (*Petrogale penicillata*) is a medium sized macropod, characterised by its distinctive facial markings, black paws and high levels of agility (NSW Scientific Committee 2003c). The tail is often used to aid identification, being long and thickly furred with a distinctive brush-like appearance near its tip (NPWS 2002). Habitats occupied by this species tend to take one of three forms: loose piles of large boulders containing a maze of subterranean holes and passageways; cliffs (usually over fifteen metres high with many mid level ledges covered by overhangs; or isolated rock stacks, usually sheer sided and often girdled with fallen boulders (NPWS 2002). Vegetation forms a vital component of the habitat, especially as refugia near major rock outcrops. The species typically exhibits low migration rates between colonies, impeding persistence and recovery of populations affected by threatening processes. Its range formerly extended between south east Queensland to the Victoria, but is was thought to be extinct in the latter state until small populations were rediscovered in the Grampians and near the Snowy River (Eldridge and Close 1995)

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Threats

Historical decline of the Brush-tailed Rock-wallaby is attributed to three factors: hunting for bounty and fur; predation by introduced predators; and competition with introduced herbivores (feral Goat (*Capra hircus*), Rabbit (*Oryctolagus cuniculus*) and stock) (NSW Scientific Committee 2003c). The major threats continuing to impact on the species include ongoing predation and competition with feral species such as Fox (*Vulpes vulpes*) and wild Dogs (*Canis lupus familiaris*), habitat modification by fire, vegetation clearing, disease transmission (toxoplasmosis and hydatosis) by feral carnivores (NSW Scientific Committee 2003c) and inbreeding (Environment ACT 1999).

Local and Regional Conservation Status

Brush-tailed Rock-wallabies are listed as Endangered on the NSW TSC Act (1995) and as Vulnerable on the commonwealth EPBC Act (1999). The Rock-wallabies were probably once widespread in the South Eastern Highlands, but are now restricted to the north eastern boundary. Known locations within the South Eastern Highlands and Sydney Basin Bioregions include Kangaroo Valley, Broke in the Hunter Valley and Morton National Park with an introduced population at Jenolan Caves (DEC 2004c). Recently, during DEC fauna surveys, a colony of Brush-tailed Rock-wallabies was discovered within Nattai National Park, contributing significantly to the conservation and management of the species (DEC 2004e). These locations fall within the most fragile metapopulation of Brush-tailed Rock-wallabies in NSW, and consequently are all of very high conservation significance (NSW Scientific Committee 2003c).

The Brush-tailed Rock-wallaby has not been recorded within the study area. This endangered species was formerly known from around Wombeyan Caves, though the last known individual from this population was captured and taken to Jenolan Caves in 1995 (R. Humphries pers. comm.). Anecdotal records from this area persist, though these have not been confirmed (D. Ashton pers. comm.). In November 2001, during systematic flora surveys, two individuals are thought to have been were observed in the Murruin Creek catchment, 400 metres south of the National Park boundary. The identification of these animals is uncertain, however, as the observer did not get a good enough look at the wallabies to be sure of their identity.

Broad-scale modelling has indicated that a small amount of medium to high quality habitat for Brush-tailed Rock-wallabies is contained within the study area, in the lower reaches of Ruby Creek before it joins the Kowmung River (NPWS 2000b). Potential habitat for the species also occurs within the south eastern corner of the study area, primarily along escarpments and steep rocky slopes that occur within the Murruin, Little Wombeyan and Limestone Creek valley systems. Numerous limestone outcrops are present in these environments, within which the agile Rock-wallabies may shelter. In particular, the limestone outcrops and cliffs downstream of Limeburners Flat, on Murruin Creek and a side gully, hold potential as habitat (J. Bros pers. comm.). Sites with a northerly aspect would be preferred (Environment ACT 1999), where habitat features provide opportunities for the wallabies to sun themselves during the morning and evening periods.

Targeted surveys are required to determine whether Brush-tailed Rock-wallabies occur within the study area. As much of the potential habitat is inaccessible, the surveys will require overnight walks, possibly in combination with helicopter drop offs. Recent anecdotal sightings of the species in the region, and the discovery of the population within Nattai National Park, lend hope for the survival of the species in the study area, such that determination of their presence or absence should be considered a high conservation and management priority.

YELLOW-BELLIED GLIDER

Species Profile

©Joel Winter/DEC

The Yellow-bellied Glider (*Petaurus australis*) is a nocturnal mammal found in tall open sclerophyll forests of eastern Australia. As an arboreal species, it requires mature hollow bearing trees within which to den during the day, and at night from which to leap and glide using a membrane that extends from the wrists to the ankles (NPWS 1999c). It is characterised by grey fur above and a whitish to orange fur underneath with large bare ears. The species is more often heard than seen, as it frequently emits a distinctive throaty shriek, which can be heard from some distance. It feeds on eucalypt nectar, sap, manna and invertebrates found under shedding bark. Its feeding habits to extract sap can leave deep V-notched incisions in the bark of eucalypts, with individuals and families demonstrating preference for repeated use of individual trees for many seasons (Mackowski 1988). Yellow-bellied Gliders are known to utilise a home range of between 30 and 65 hectares (Goldingay and Kavanagh 1991). The southern, nominate subspecies ranges between Portland (Victoria) and central coastal Queensland with a separate subspecies isolated in north Queensland in the vicinity of the Herbert River (Russell 1995).

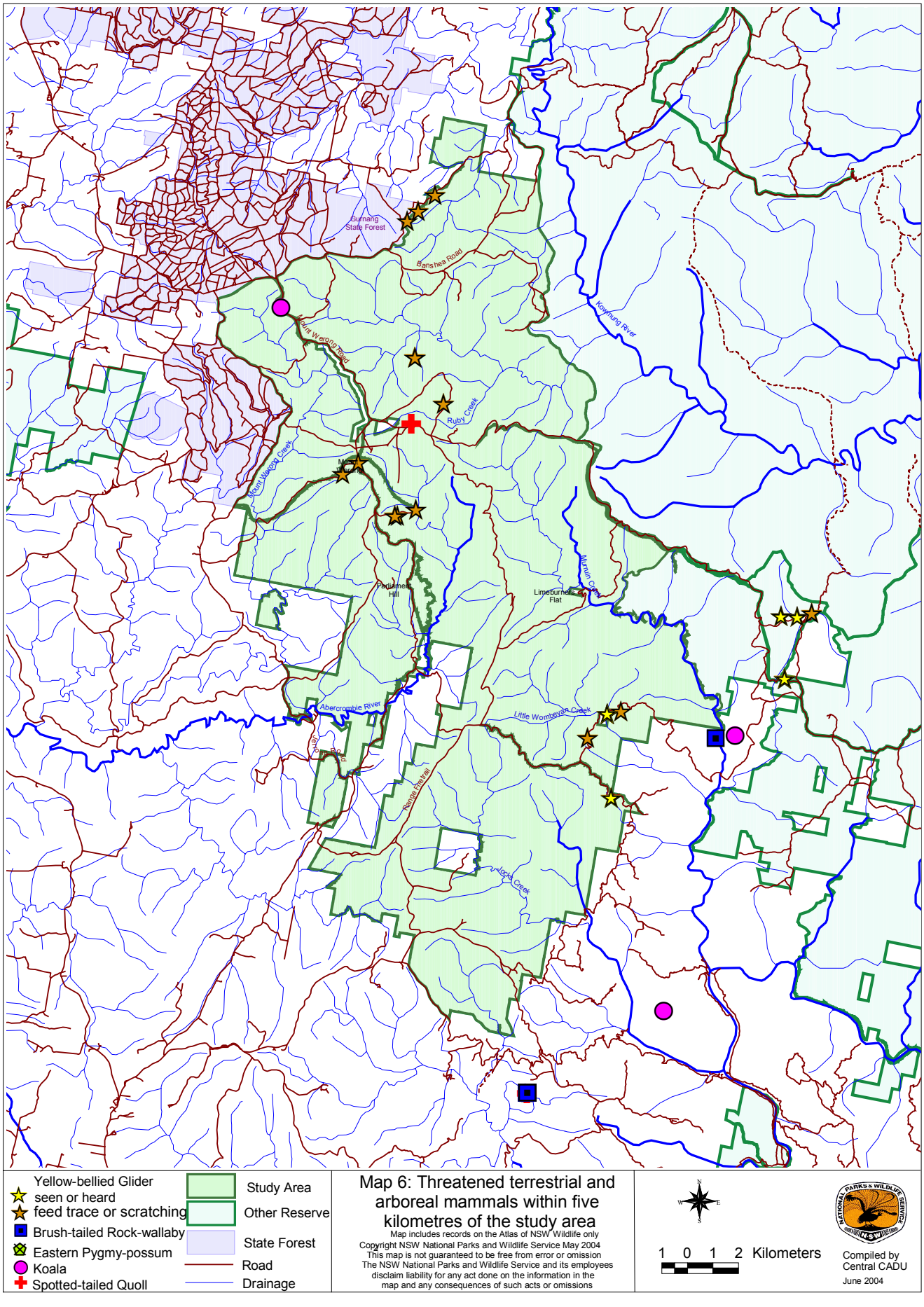
Threats

Yellow bellied Gliders are known to be greatly affected by the reduction of nesting resources when the availability of hollow bearing trees are lost through clearing, fragmentation or timber extraction (NPWS 1999c). Predation by cats and foxes are also thought to contribute to the species vulnerability. Impacts of fire regimes are poorly understood, although some suggest that availability of food is lost after fire (NPWS 1999c).

Local and Regional Conservation Status

The Yellow-bellied Glider is listed as Vulnerable on the NSW TSC Act (1995). In the South Eastern Highlands Bioregion, records are mainly located at the eastern extremity of the region, with isolated populations to the north and west of Kosciuszko National Park (DEC 2004c). Recent DEC surveys have discovered the species to be more abundant than previously thought in the escarpments and gullies in the Blue Mountains and Nattai National Parks. During the recent DEC fauna surveys the species have been found to be abundant and widespread in the Warragamba Special Area, particularly where Grey Gum (*Eucalyptus punctata*), a known feed tree (Mackowski 1988), makes up a component of the canopy. The species habitat preferences will be modelled in order to obtain better understanding of the species occurrence and status across this region (DEC in prep).

The Glider has been directly observed at only two locations, each at lower elevations (below 800 metres) in the east of the study area, in the vicinity of Little Wombeyan Creek and the Maneveland fire trail. Though neither of the Gliders were located within communities containing Grey Gum (Highlands Gorge River Peppermint Forest and Northern Plateau Moist Fern/Herb/ Grass Forest), both observations were made in areas where Grey Gum occurs within 200 metres. Evidence of Yellow-bellied Glider activity, in the form of incision marks, has been noted twice within Highlands Slopes Grey Gum Stringy bark Forest in this area of the study area. In addition to these observations, evidence of Yellow-bellied Glider activity has been recorded at a number of locations in the centre and north west of the study area. Here, feeding incisions and scratches have been recorded at eleven locations, yet Yellow-bellied Gliders have not been seen or heard despite the extensive spotlighting and nocturnal call playback surveys. Habitat within the centre and north west of the study area is not typical of Yellow-bellied Gliders, as their preferred feed trees are absent, and the landscape is at higher altitude than is characteristic of the species (DEC 2004c). All of these records were taken by a single observer during a single field trip in 1998, and unfortunately the age of the scars was not recorded. These records warrant further investigation in order to validate their reliability and accuracy. Targeted surveys for the Yellow-bellied Glider should be undertaken in the north west of the study area to determine whether the Gliders do occur here. Such a finding would yield very important information on the habitat and altitude range and tolerance of the species, which is vital for effective conservation management.


Gunnang State Forest
Banshea Road
Mount Werong Road
Ruby Creek
Mount Marong Creek
Parliament Hill
Limeburners Flat
Kowmung River
Murrin Creek
Abercrombie River
Little Womboyan Creek
Range Fire Trail
Jacks Creek
Yellow-bellied Glider
seen or heard
feed trace or scratching
Brush-tailed Rock-wallaby
Eastern Pygmy-possum
Koala
Spotted-tailed Quoll
Study Area
Other Reserve
State Forest
Road
Drainage
Map 6: Threatened terrestrial and arboreal mammals within five kilometres of the study area
Map includes records on the Atlas of NSW Wildlife only
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This map is not guaranteed to be free from error or omission
The NSW National Parks and Wildlife Service and its employees disclaim liability for any act done on the information in the map and any consequences of such acts or omissions
1 0 1 2 Kilometers
Compiled by Central CADU
June 2004

LARGE-EARED PIED BAT

Species Profile

©Narawan Williams

The Large-eared Pied Bat (*Chalinolobus dwyeri*) is readily recognisable from other members of its genus by the combination of large ears and overall black colour, with bands of white fur along the sides of the body, that join to form a V-shape (Parnaby 1992a; Churchill 1998). The call (undetectable by the human ear) is an alternate pattern made at a low frequency, which is readily distinguishable from all other species (Reinhold *et al.* 2001). Originally described from Copeton in 1966, it has been recorded from a number of scattered locations on either side of the Great Dividing Range between Rockhampton (Queensland) and Bungonia (New South Wales) (Hoye and Dwyer 1995). It has been found in a wide range of habitats, including wet and dry eucalypt forest, Cypress (*Callitris*) forest and sub-alpine woodland (Duncan *et al.* 1999). It is a cave-roosting species, though it has also been detected roosting in disused mine shafts, overhangs and once in an abandoned Fairy Martin (*Petrochelidon ariel*) nest (Churchill 1998). It seems to prefer the 'twilight' areas of caves, and may be dependent on sandstone outcrops (Duncan *et al.* 1999, Hoye and Dwyer 1995).

Threats

The only confirmed threat to this species is the destruction or interference of roost sites. Other potential threats include mining induced subsidence (particularly coal-mining in sandstone areas) which may destroy roost sites, habitat destruction for agriculture and urban development, and predation by feral animals (Duncan *et al.* 1999).

Local and Regional Conservation Status

The Large-eared Pied Bat is listed as Vulnerable on the NSW TSC Act (1995) and also as Vulnerable on the Commonwealth EPBC Act (1999). The Sydney Basin appears to support a significant proportion of the Large-eared Pied Bat population, with scattered records occurring to the north and west of the Bioregion (DEC 2004a). Recent survey conducted by DEC across the Greater Blue Mountains has found the species to be more widespread in the region than previously thought, yielding important information on the species habitat preferences and conservation status (DEC in prep.). Within the South Eastern Highlands Bioregion, the species is restricted to the north and east, with Jenolan Karst Conservation Reserve and Wombeyan Caves Reserve forming the western boundary of the species known distribution (DEC 2004a). The species is protected within Blue Mountains and Wollemi National Parks, and to a lesser extent Royal, Gardens of Stone and Morton National Parks.

The Large-eared Pied Bat has not been detected within the study area, but has recently been recorded at Wombeyan Caves, one and a half kilometres south of the National Park boundary, during southern zone CRA surveys in 1999 and by Charles Sturt University in 2000 (Herr 2000). There is high potential for the species to also occur within the study area, as (in addition to Wombeyan Caves) the species is known to occur within similar habitats and altitudes as exist in the study area in the adjacent Kanangra-Boyd National Park (DEC 2004b) and in the eastern blocks of Blue Mountains National Park (DEC 2004c). The study area borders the far western extremity of the species known range, however, and the species is therefore likely to occur only in the east of the study area, east of the Dividing Range. Potential roost sites for the species occur within south western Blue Mountains National Park, however the species may roost outside the park and utilise the study area as only foraging habitat.

Records of the species within the region have high conservation value (as they are at the western extent of the species known distribution) and it therefore recommended that further systematic bat survey be undertaken in the study area, particularly in the south east, to positively determine whether the species occurs.

EASTERN FALSE PIPISTRELLE

Species Profile

The Eastern False Pipistrelle (*Falsistrellus tasmaniensis*) is a relatively large (up to 70 millimetres) bat that is similar to the Greater Broad-nosed Bat (*Scoteanax rueppellii*), though it has two pairs of upper incisors, a gap between the incisors and the canines, and larger ears (Parnaby 1992a; Churchill 1998). Its ultrasonic call pattern can be confused with various species of *Scotorepens* and the Greater Broad-nosed Bat, though good quality calls can be distinguished (Reinhold *et al.* 2001). It is found in small numbers throughout its range in south eastern Australia, between south east Queensland and western Victoria, and Tasmania. It seems to prefer wet habitats, particularly riparian or high rainfall areas, with large trees (greater than 20 metres) (Menkhorst and Lumsden 1995). It may be more common at high elevations (Phillips 1995), though it has been recorded between sea level and 1500 metres in Victoria (Menkhorst and Lumsden 1995). It usually roosts in hollows in *Eucalyptus*, though it has been recorded in caves (Churchill 1998). It may hibernate over winter and has been known to travel at least twelve kilometres from its roost site (Churchill 1998).

©Linda Broome/DEC

Threats

Threats to the species are poorly known, but the main threat would appear to be destruction of roosting sites, through land clearance and logging (Gilmore and Parnaby 1994).

Local and Regional Conservation Status

The Eastern False Pipistrelle is listed as Vulnerable on the NSW TSC Act (1995). Records for the species are scattered across both the Sydney Basin and South Eastern Highlands Bioregion. Broad-scale modelling has predicted areas of high quality habitat in the Blue Mountains National Park, the Woronora Plateau, and the Watagan Ranges, as well as on the Boyd Plateau of Kanangra-Boyd National Park (NPWS 2000b). A large number of sightings have been made in Wollemi National Park and the species has also been recorded in Gardens of Stone, Blue Mountains, Abercrombie River, Wadbilliga, Tallaganda and Woomargama National Parks. Recent DEC surveys have recorded the species to be widespread at low density in Blue Mountains National Park and to a lesser extent Nattai National Park (DEC in prep, DEC 2004e). The species has recently been reported at Wombeyan Caves, one and a half kilometres south of the study area (Herr 2000).

During the 2004 surveys, the Eastern False Pipistrelle was captured at two locations in the study area (at the top of Mt. Werong and just south of Banshea Road). It was also detected by its ultrasonic call at a third location, flying over pool of water at the start of Wattle Creek fire trail, just north of Lanigans Swamp. In addition, the species was captured a number of times during CRA surveys immediately south of the study area, on private land between Broughtons Lookout and Wombeyan Caves (Map 7). It appears from these results that the species prefers higher elevations within the study area, having not been recorded below 800 metres in altitude, and twice recorded above 1000 metres. This species of bat has recently been found to be widespread in the neighbouring Kanangra-Boyd National Park, where it also has not been recorded below 1000 metres above sea level (DEC 2004c). The species was also found to exhibit this higher altitude preference during DEC surveys of Coolah Tops National Park (NPWS 1998). As with all bats a better understanding of habitat requirements and further survey is needed to establish its conservation status in the study area and the surrounding region. It is expected, however, that the species occurs in low numbers across the higher elevation landscapes in the study area, particularly in taller forests such as the Montane Sheltered Forests.

COMMON BENT-WING BAT

Species Profile

©Stefan Eberhard/DEC

The Common Bent-wing Bat (*Miniopterus schreibersii*) is the most widely distributed bat in the world, occurring through Europe, Africa and Australasia (Churchill 1998), though recent research suggests that there may be three taxa in Australia (Duncan *et al.* 1999). The subspecies *oceanensis* is the relevant taxa for New South Wales and extends at least between central Victoria and Cape York Peninsula, Queensland (Duncan *et al.* 1999) and is commonly called the Eastern Bent-wing Bat. This species is distinguished from most others by the long last bone in the third wing digit and from the Little Bent-wing Bat (*M. australis*) by the longer forearm (greater than 44mm) (Parnaby 1992a). The ultrasonic call can be distinctive, however it is often inseparable from *Vespadelus darlingtoni* and *V. regulus* (Reinhold *et al.* 2001). It utilises a wide variety of habitats where it usually roosts in caves, though it has been known to use mines and road culverts (Churchill 1998). It is a fast flying species that usually feeds above the canopy (Churchill 1998) and has been known to travel up to 65 kilometres in a night (Dwyer 1966 in Ayers *et al.* 1996). Though individuals often use numerous roosts, they congregate en masse at a small number of caves to breed and hibernate (Churchill 1998).

Threats

Damage and disturbance to roosting sites are the greatest threats to this species. Because only relatively few nursery caves are used, significant population changes can occur if these sites are damaged (Dwyer 1995). Disturbance of hibernating colonies can lead to starvation due to loss of energy reserves (Gilmore and Parnaby 1994). Disturbance of smaller roosts by recreational caving and tourism may also be significant, as may modification to feeding habitat by agriculture and urban development (Gilmore and Parnaby 1994). Some individuals are preyed upon by feral Cats (*Felis catus*) and, less often, foxes (*Vulpes vulpes*) (Dwyer 1995).

Local and Regional Conservation Status

The Common Bent-wing Bat is listed as Vulnerable on the NSW TSC Act (1995) as the Eastern Bent-wing Bat. The species is widely recorded in the eastern third of NSW, with the number of records decreasing with distance from the coast (DEC 2004c). Sightings for the species are scattered throughout the South Eastern Highlands Bioregion, and good numbers have been recorded in the Sydney Basin Bioregion in recent years (DEC 2004c). Broad-scale habitat modelling for the species has identified a very large area of suitable habitat within these bioregions (NPWS 2000b), reflecting the large distances that this species travels whilst foraging. Individuals have been recorded in a diverse range of National Parks. Within the region the species has recently been recorded during recent DEC fauna surveys in Nattai, Kanangra-Boyd, Blue Mountains, and Abercrombie River National Parks and Bargo and Nattai State Conservation Areas. The species has also recently been recorded at Wombeyan Caves (Herr 2000).

This species has been detected by its ultrasonic call at three locations in the north of the study area during the 2004 surveys, including the Murruin Range, Ruby Creek and flying along Banshea Road. In addition, the species was recorded during the biodiversity survey around Mt. Werong in January 2001, and was detected by Anabat at a number of locations to the south and east of the study area during the CRA surveys. The Common Bent-wing Bat is a high flying species which can travel at 50 kilometres per hour at many times the height of the canopy (Churchill 1998) and so is not commonly caught in harp traps. Large numbers of the species are known to occur in Kanangra-Boyd National Park, which houses a large roosting site at Colong Caves (DEC 2004b). It remains unknown whether this species roost within the study area, however the Anabat detectors did not record the species at the entrance to any of the limestone cave systems. The study area is well within the possible foraging distance for bats that roost at Colong Caves. Alternatively, other roost sites for the bat may exist within the study area, in caves that are less accessible to humans. Due to the high mobility of the species, it is difficult to predict which habitats and areas of the study area the species would use preferentially, however the bats are expected to be widespread.

GREATER BROAD-NOSED BAT

Species Profile

©Michael Murphy

The Greater Broad-nosed Bat (*Scoteanax rueppellii*) is a large microchiropteran bat that can only be confused with the Eastern False Pipistrelle but can be separated by having only one pair of upper incisors and smaller ears (Parnaby 1992a). Its ultrasonic calls can also be confused with this species, and with species of the genus *Scotorepens* (Reinhold *et al*. 2001). It is usually found in gullies draining east from the Great Dividing Range between south east New South Wales and north Queensland (Atherton Tablelands), where it utilises creeks and clearings for hunting (Churchill 1998; Hoye and Richards 1995). It is often said to be a lowland species, though Ayers *et al.* (1996) mention several examples of this species being recorded at higher altitudes. It usually roosts in tree hollows, though it may also utilise old buildings (Churchill 1998).

Threats

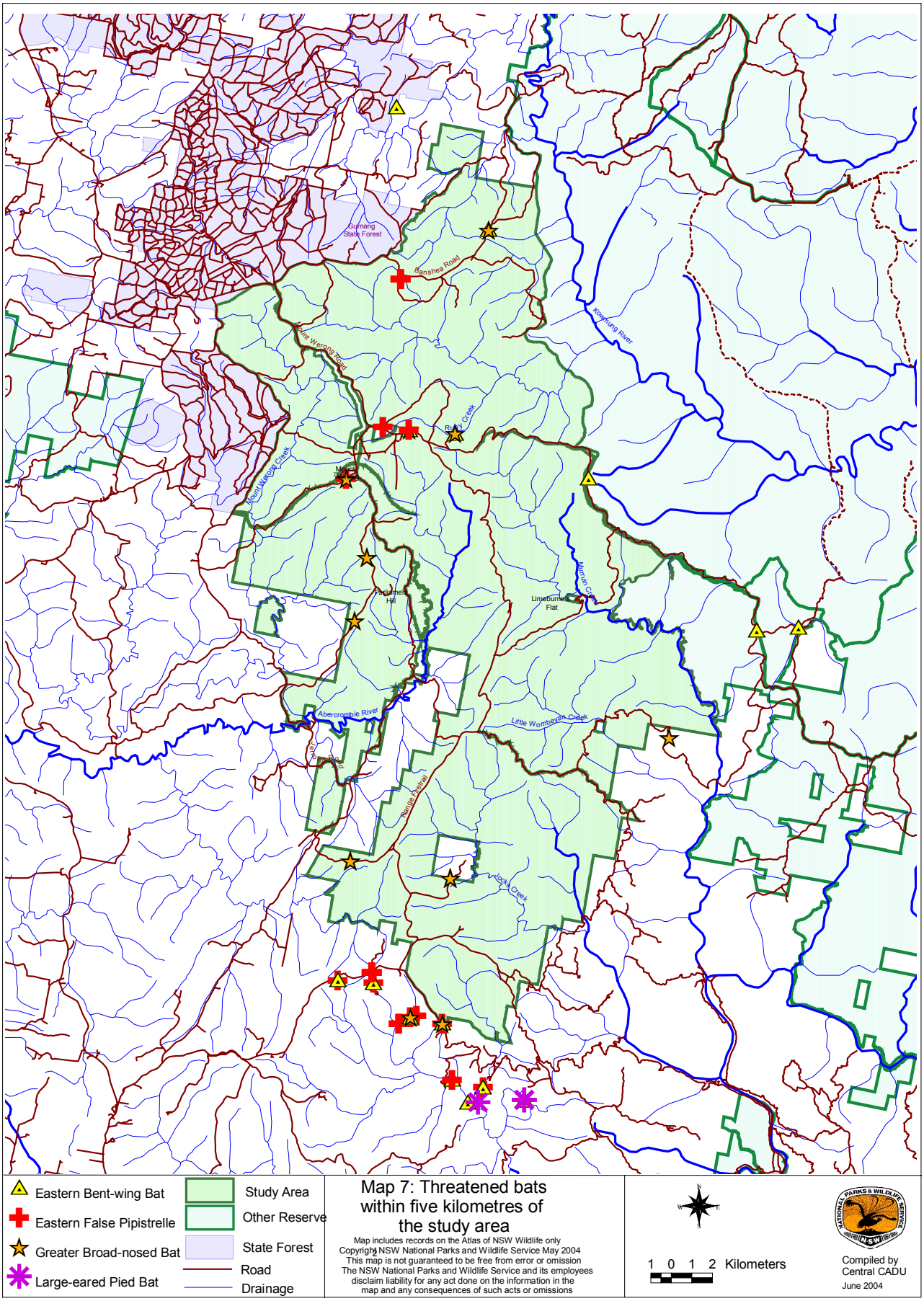
The threats to this species are poorly known, though they probably include habitat clearance for agriculture and urban development, and logging, which may remove suitable hollows (Duncan *et al.* 1999).

Local and Regional Conservation Status

The Greater Broad-nosed Bat is listed as Vulnerable on the NSW TSC Act (1995). The majority of records for the species in NSW occur in the NSW North Coast, South East Corner and Sydney Basin, with some records in the New England Tableland Bioregion (DEC 2004c). Within the South Eastern Highlands the species is mainly restricted to the eastern extremities of the Bioregion. The species is reasonably well reported from NPWS reserves, including Wollemi, Wyrrabalong, Abercrombie River and Wadbilliga National Parks (DEC 2004a). Recent DEC surveys in Blue Mountains and Nattai National Parks have found the species to be widespread across the southern Blue Mountains (DEC in prep.).

The species is widespread within the study area, being the most frequently encountered of the threatened microbats. During the 2004 survey the Greater Broad-nosed Bat nine individuals were captured at five harp trap locations and the species was detected by its ultrasonic call at a further two locations (Map 7). In addition, the species was recorded during the biodiversity survey at Mt. Werong in 2001, and has been recorded at locations to the south and east of the study area during CRA and SCA fauna surveys (Map 7). The species has most frequently been recorded within Tablelands Silvertop Ash-Brittle Gum Woodlands, but also within Montane Sheltered Forests and Montane Sandstone Dry Shrub Forests. This species is highly likely to occur at further locations within the study area in a variety of vegetation types.

The DEC Kanangra Area (including south Western Blue Mountains and Kanangra-Boyd National Parks) is near the western limit of the known distribution of the species. Furthermore, some of the captures made within the study area are at an altitude previously not considered typical for the species, as has recently been found to be the case in Kanangra-Boyd National Park (DEC 2004b). During the 2004 surveys, the species was recorded at up to 1200 metres above sea level. The records collected this are therefore contribute important information to our knowledge of the species, its distribution and its habitat. The occurrence of the species within the Kanangra Area has high conservation significance as it may be at the extreme of the species ecological tolerance.


Gurnang State Forest
Banshea Road
Mount Werong Road
Kowmung River
Mount Werong Creek
Murrin Creek
Limeburners Flat
Abercrombie River
Little Womberyan Creek
Ranges FireTrail
Jocks Creek
Eastern Bent-wing Bat
Eastern False Pipistrelle
Greater Broad-nosed Bat
Large-eared Pied Bat
Study Area
Other Reserve
State Forest
Road
Drainage
Map 7: Threatened bats within five kilometres of the study area
Map includes records on the Atlas of NSW Wildlife only
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This map is not guaranteed to be free from error or omission
The NSW National Parks and Wildlife Service and its employees disclaim liability for any act done on the information in the map and any consequences of such acts or omissions
1 0 1 2 Kilometers
Compiled by Central CADU
June 2004

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APPENDIX A

Location of, vegetation type and techniques undertaken at systematic fauna survey sites in south western Blue Mountains National Park.

Site number	Easting	Northing	Vegetation community	Broad flora group	Diurnal bird census	Diurnal reptile census	Sitespotlight census	Harp trap	Bat ultrasound detection	Nocturnal call playback	Nocturnal streamside search	Elliott trap
BND25O	226410	6219900	Montane Gully Brown Barrel Forest	Montane Sheltered Forest	1	1	1			1		
BND32O	223384	6218462	Highlands Gorge River Peppermint Forest	Highlands Gorge River Peppermint Forest		1	1			1	1	
BND48O	223770	6212028	Northern Plateaux Moist Fern/Herb/Grass Forest	Montane Sheltered Forest	1	1	1					
BND49W	224654	6213670	Highlands Gorge River Peppermint Forest	Highlands Gorge River Peppermint Forest	1	1	1					
BND51W	224127	6211389	Montane Exposed Silvertop Ash Forest	Montane Sandstone Dry Shrub Forests				1				
BND52W	224528	6213285	Highlands Gorge River Peppermint Forest	Highlands Gorge River Peppermint Forest					1			
BND53W	223763	6213197	Montane Exposed Silvertop Ash Forest	Montane Sandstone Dry Shrub Forests		1			1			
BND58O	224858	6210442	Northern Plateaux Moist Fern/Herb/Grass Forest	Montane Sheltered Forest			1			1		
BND59O	223780	6211982	Northern Plateaux Moist Fern/Herb/Grass Forest	Montane Sheltered Forest								1
BND60W	224887	6213795	Montane Exposed Silvertop Ash Forest	Montane Sandstone Dry Shrub Forests								1
GUR01O	774880	6224400	Montane Gully Brown Barrel Forest	Montane Sheltered Forest	1	1						
GUR02O	776424	6220350	Montane Gully Brown Barrel Forest	Montane Sheltered Forest		1						
GUR03W	776086	6224472	Montane Sheltered Narrow-leaved Peppermint Forest	Montane Sheltered Forest				1				
GUR04W	773336	6225110	Montane Gully Brown Barrel Forest	Montane Sheltered Forest				1				
GUR05O	772717	6223168	Montane Gully Brown Barrel Forest	Montane Sheltered Forest		1	1			1		
GUR06W	773181	6221170	Tablelands Exposed Silvertop Ash-Brittle Gum Woodland	Tablelands Exposed Silvertop Ash-Brittle Gum Woodland			1			1		
GUR07O	771743	6223478	Montane Exposed Silvertop Ash Forest	Montane Sandstone Dry Shrub Forests				1				
GUR08O	776348	6224420	Tablelands Shrub/Grass Moist Forest	Montane Sheltered Forest	1	1	1					
GUR09W	768512	6222390	Tablelands Shrub/Grass Moist Forest	Montane Sheltered Forest	1	1	1					

Site number	Easting	Northing	Vegetation community	Broad flora group	Diurnal bird census	Diurnal reptile census	Sitespotlight census	Harp trap	Bat ultrasound detection	Nocturnal call playback	Nocturnal streamside search	Elliott trap
GUR10W	767536	6223083	Northern Plateaux Moist Fern/Herb/Grass Forest	Montane Sheltered Forest				1				
GUR11W	769281	6221579	Tablelands Shrub/Grass Moist Forest	Montane Sheltered Forest				1				
GUR12W	771571	6226985	Montane Exposed Silvertop Ash Forest	Montane Sandstone Dry Shrub Forests				1				
GUR13W	764980	6221580	Tablelands Dry Shrub/Tussock Grass Forest	Tablelands Dry Forests				1				
GUR14W	771270	6223813	Northern Plateaux Moist Fern/Herb/Grass Forest	Montane Sheltered Forest				1				
GUR15W	766657	6229923	Tablelands Shrub/Grass Moist Forest	Montane Sheltered Forest				1				
GUR16W	769671	6230938	Tablelands Snow Gum Woodland	Tablelands Snow Gum Woodland				1				
GUR17W	771915	6230510	Tablelands Shrub/Grass Moist Forest	Montane Sheltered Forest				1				
GUR18O	775009	6229659	Tablelands Shrub/Grass Moist Forest	Montane Sheltered Forest				1				
GUR19W	774799	6230488	Northern Plateaux Moist Fern/Herb/Grass Forest	Montane Sheltered Forest				1				
GUR20W	774023	6225033	Montane Exposed Silvertop Ash Forest	Montane Sandstone Dry Shrub Forests					1			
GUR21W	771804	6224868	Northern Plateaux Moist Fern/Herb/Grass Forest	Montane Sheltered Forest					1		1	
GUR22W	768970	6225122	Tablelands Shrub/Grass Moist Forest	Montane Sheltered Forest					1			
GUR23W	773126	6232869	Tablelands Shrub/Grass Moist Forest	Montane Sheltered Forest					1			
GUR24O	775491	6229431	Tablelands Shrub/Grass Moist Forest	Montane Sheltered Forest					1			
GUR25W	769964	6225035	Tablelands Shrub/Grass Moist Forest	Montane Sheltered Forest								1
GUR26W	766934	6224258	Tablelands Shrub/Grass Moist Forest	Montane Sheltered Forest	1	1	1					
GUR27O	766533	6229783	Tablelands Shrub/Grass Moist Forest	Montane Sheltered Forest	1	1	1				1	
GUR28W	773388	6231571	Tablelands Shrub/Grass Moist Forest	Montane Sheltered Forest	1	1	1					
GUR29W	769710	6225644	Montane Exposed Silvertop Ash Forest	Montane Sandstone Dry Shrub Forests	1	1	1					
GUR30W	764371	6221058	Tablelands Dry Shrub/Tussock Grass Forest	Tablelands Dry Forests	1	1	1					
GUR31W	764955	6229999	Tablelands Snow Gum Woodland	Tablelands Snow Gum Woodland	1		1					
GUR32W	770025	6231051	Tablelands Snow Gum Woodland	Tablelands Snow Gum Woodland	1	1	1					
GUR33W	770365	6227209	North East Tablelands Shrub/Herb/Grass Dry Forest	North East Tablelands Dry Gully Forest	1	1						

Site number	Easting	Northing	Vegetation community	Broad flora group	Diurnal bird census	Diurnal reptile census	Sitespotlight census	Harp trap	Bat ultrasound detection	Nocturnal call playback	Nocturnal streamside search	Elliott trap
GUR34W	766875	6231628	Tablelands Snow Gum Woodland	Tablelands Snow Gum Woodland	1	1			1			
GUR35O	771532	6226270	Northern Plateaux Moist Fern/Herb/Grass Forest	Montane Sheltered Forest	1	1	1					
GUR36W	773368	6224905	Montane Slopes Stringybark Forest	Montane Slopes Dry Forests	1	1	1					
GUR37W	774429	6224918	Montane Exposed Silvertop Ash Forest	Montane Sandstone Dry Shrub Forests	1	1	1					
GUR38W	774597	6230448	Northern Plateaux Moist Fern/Herb/Grass Forest	Montane Sheltered Forest	1	1	1					
GUR39W	773700	6233270	Northern Plateaux Moist Fern/Herb/Grass Forest	Montane Sheltered Forest	1	1	1					
GUR40W	765641	6222350	Tablelands Exposed Silvertop Ash-Brittle Gum Woodland	Tablelands Exposed Silvertop Ash-Brittle Gum Woodland	1	1	1					
GUR41W	765545	6224869	North East Tablelands Shrub/Herb/Grass Dry Forest	North East Tablelands Dry Gully Forest	1	1	1	1			1	
GUR42H	772245	6231426	Southern Escarpment Edge Moist Heath-*Oxylobium ellipticum*	Southern Escarpment Edge Moist Heath	1	1						
GUR43W	765496	6227493	Northern Plateaux Moist Fern/Herb/Grass Forest	Montane Sheltered Forest	1		1	1			1	
MAR01O	774827	6217054	Montane Slopes Stringybark Forest	Montane Slopes Dry Forests						1		
MAR03O	770336	6206742	Tableland and Escarpment Moist Herb/Fern Grass Forest	Tableland and Escarpment Moist Herb/Fern Grass Forest	1	1						
MAR04W	771270	6211719	Northern Plateaux Moist Fern/Herb/Grass Forest	Montane Sheltered Forest	1	1	1					
MAR05W	771900	6212705	Tablelands Exposed Silvertop Ash-Brittle Gum Woodland	Tablelands Exposed Silvertop Ash-Brittle Gum Woodland	1	1	1					
MAR06W	767870	6211329	North East Tablelands Shrub/Herb/Grass Dry Forest	North East Tablelands Dry Gully Forest	1		1					
MAR07W	766656	6211901	Tablelands Dry Shrub/Tussock Grass Forest	Tablelands Dry Forests	1		1					
MAR08W	768533	6218628	Tablelands Exposed Silvertop Ash-Brittle Gum Woodland	Tablelands Exposed Silvertop Ash-Brittle Gum Woodland		1	1					
MAR09W	773734	6212684	Montane Exposed Silvertop Ash Forest	Montane Sandstone Dry Shrub Forests	1	1	1					
MAR10W	765538	6213466	Tablelands Dry Shrub/Tussock Grass Forest	Tablelands Dry Forests	1	1	1					
MAR11W	770170	6216441	Tablelands Dry Shrub/Tussock Grass Forest	Tablelands Dry Forests		1						

Site number	Easting	Northing	Vegetation community	Broad flora group	Diurnal bird census	Diurnal reptile census	Sitespotlight census	Harp trap	Bat ultrasound detection	Nocturnal call playback	Nocturnal streamside search	Elliott trap
MAR12W	767243	6208089	Tablelands Exposed Silvertop Ash-Brittle Gum Woodland	Tablelands Exposed Silvertop Ash-Brittle Gum Woodland	1	1	1					
MAR13W	770433	6215140	Tablelands Shrub/Tussock Grass Forest-*Eucalyptus dives/Chionochloa pallida*	Tablelands Dry Forests				1				
MAR14W	767688	6208084	Tablelands Exposed Silvertop Ash-Brittle Gum Woodland	Tablelands Exposed Silvertop Ash-Brittle Gum Woodland				1				
MAR15W	771610	6207410	Montane Exposed Silvertop Ash Forest	Montane Sandstone Dry Shrub Forests				1				
MAR16W	775495	6211569	Montane Exposed Silvertop Ash Forest	Montane Sandstone Dry Shrub Forests				1				
MAR17W	766047	6214921	Tablelands Dry Shrub/Tussock Grass Forest	Tablelands Dry Forests				1				
MAR18W	767856	6217517	Tablelands Exposed Silvertop Ash-Brittle Gum Woodland	Tablelands Exposed Silvertop Ash-Brittle Gum Woodland	1			1				
MAR19W	768342	6220005	Tablelands Exposed Silvertop Ash-Brittle Gum Woodland	Tablelands Exposed Silvertop Ash-Brittle Gum Woodland				1				
MAR20W	770095	6216527	Tablelands Dry Shrub/Tussock Grass Forest	Tablelands Dry Forests				1				
MAR21W	768928	6213514	Tablelands Shrub/Tussock Grass Forest-*Eucalyptus dives/Chionochloa pallida*	Tablelands Dry Forests					1			
MAR22W	770100	6209819	Tablelands Exposed Silvertop Ash-Brittle Gum Woodland	Tablelands Exposed Silvertop Ash-Brittle Gum Woodland					1			
MAR23O	769050	6213960	Tablelands Shrub/Tussock Grass Forest-*Eucalyptus dives/Chionochloa pallida*	Tablelands Dry Forests						1		
MAR24O	769900	6218750	Tablelands Exposed Silvertop Ash-Brittle Gum Woodland	Tablelands Exposed Silvertop Ash-Brittle Gum Woodland						1		
MAR26M	772733	6213214	Montane Heath-Mallee	Mallee Heath								1
MAR27M	771806	6212413	Tablelands Exposed Silvertop Ash-Brittle Gum Woodland	Tablelands Exposed Silvertop Ash-Brittle Gum Woodland								1
MAR29O	774794	6211450	Northern Plateaux Moist Fern/Herb/Grass Forest	Montane Sheltered Forest								1
RCH01O	770503	6204996	Tableland and Escarpment Moist Herb/Fern Grass Forest	Tableland and Escarpment Moist Herb/Fern Grass Forest	1	1	1					

Site number	Easting	Northing	Vegetation community	Broad flora group	Diurnal bird census	Diurnal reptile census	Sitespotlight census	Harp trap	Bat ultrasound detection	Nocturnal call playback	Nocturnal streamside search	Elliott trap
RCH02W	772297	6204789	Montane Exposed Silvertop Ash Forest	Montane Sandstone Dry Shrub Forests	1	1	1					
RCH03O	773827	6203330	Montane Exposed Silvertop Ash Forest	Montane Sandstone Dry Shrub Forests	1	1	1					
RCH04W	773555	6203588	Montane Exposed Silvertop Ash Forest	Montane Sandstone Dry Shrub Forests					1			
t-f-syd-60-034	764865	6229675	Tablelands Snow Gum Woodland	Tablelands Snow Gum Woodland			1			1		
t-f-syd-60-035	766884	6230415	Tablelands Snow Gum Woodland	Tablelands Snow Gum Woodland	1		1			1		
t-f-syd-60-036	766304	6228148	Tablelands Snow Gum Woodland	Tablelands Snow Gum Woodland						1		
t-f-syd-60-037	769600	6231510	Tablelands Snow Gum Woodland	Tablelands Snow Gum Woodland			1			1		
t-f-syd-60-038	772157	6231669	Tablelands Shrub/Grass Moist Forest	Montane Sheltered Forest			1			1		
t-f-syd-60-040	770126	6227614	Northern Plateaux Moist Fern/Herb/Grass Forest	Montane Sheltered Forest	1					1		
t-f-syd-60-041	773638	6224869	Montane Gully Brown Barrel Forest	Montane Sheltered Forest						1		
t-f-syd-60-042	771492	6224287	Northern Plateaux Moist Fern/Herb/Grass Forest	Montane Sheltered Forest	1		2			2		
t-f-syd-60-044	774829	6230736	Northern Plateaux Moist Fern/Herb/Grass Forest	Montane Sheltered Forest	1		1			1		
t-f-syd-60-045	765808	6224712	Tablelands Shrub/Grass Moist Forest	Montane Sheltered Forest			1			1		
t-f-syd-60-046	765115	6221762	Tablelands Dry Shrub/Tussock Grass Forest	Tablelands Dry Forests			1			1		
t-f-syd-60-047	768045	6223042	Northern Plateaux Moist Fern/Herb/Grass Forest	Montane Sheltered Forest			2			1		
t-f-syd-60-048	767920	6223479	Tablelands Shrub/Grass Moist Forest	Montane Sheltered Forest	1		1			1		
t-f-syd-60-049	769536	6221453	Northern Plateaux Moist Fern/Herb/Grass Forest	Montane Sheltered Forest	1					1		
t-f-syd-60-050	764246	6221140	Tablelands Dry Shrub/Tussock Grass Forest	Tablelands Dry Forests			1			1		
t-f-syd-60-054	765653	6222349	Tablelands Exposed Silvertop Ash-Brittle Gum Woodland	Tablelands Exposed Silvertop Ash-Brittle Gum Woodland	1							
t-f-syd-60-055	769492	6224823	Tablelands Snow Gum Woodland	Tablelands Snow Gum Woodland	1							
Total					44	37	48	24	11	24	5	6

APPENDIX B

List of the fauna species within south western Blue Mountains NP, including the Abercrombie and Murruin Catchments, from the DEC Atlas of NSW Wildlife. Records have been included from DEC systematic surveys, licensed data sets (Birds Australia and the Australian Museum) and incidental observations submitted by individuals, including park rangers and field officers; catchment officers; bushwalkers and naturalists; scientific researchers working in the area; and other visitors to the park. The final column shows fauna species that have not been recorded within the park, but have been observed within a five kilometre radius of the park. The list contains records of various levels of reliability and spatial accuracy. Species where there is doubt about the occurrence within the study area have been marked with an asterisk *. Introduced species are indicated with the addition of an [I].

Family	Scientific Name	Common Name	Conservation Status	Species occurring within study area			Species not recorded within the study area, but recorded within a 5km radius.
				DEC Systematic Survey	Licensed Datasets	Other Sources	
Frogs							
Myobatrachidae	*Crinia signifera*	Common Eastern Froglet	P	✓		✓	
Myobatrachidae	*Limnodynastes dumerilii*	Banjo Frog	P	✓		✓	
Myobatrachidae	*Limnodynastes peronii*	Striped Marsh Frog	P	✓			
Myobatrachidae	*Limnodynastes tasmaniensis*	Spotted Marsh Frog	P	✓			
Myobatrachidae	*Mixophyes balbus*	Stuttering Frog	E	✓		✓	
Myobatrachidae	*Pseudophryne bibronii*	Bibron's Toadlet	P	✓			
Myobatrachidae	*Uperoleia laevigata*	Smooth Toadlet	P			✓	
Hylidae	*Litoria booroolongensis*	Booroolong Frog	E				✓
Hylidae	*Litoria dentata*	Keferstein's Tree Frog	P				✓
Hylidae	*Litoria ewingii*	Brown Tree Frog	P				✓
Hylidae	*Litoria littlejohni*	Littlejohn's Tree Frog	V				✓
Hylidae	*Litoria lesueuri*	Lesueur's Frog	P				✓
Hylidae	*Litoria nudidigita*		P	✓			
Hylidae	*Litoria peronii*	Peron's Tree Frog	P	✓		✓	
Hylidae	*Litoria verreauxii*	Verreaux's Tree Frog	P	✓		✓	
Reptiles							
Chelidae	*Chelodina longicollis*	Eastern Snake-necked Turtle	P	✓			
Agamidae	*Amphibolurus muricatus*	Jacky Lashtail	P	✓		✓	
Agamidae	*Physignathus leseurii*	Eastern Water Dragon	P	✓		✓	
Agamidae	*Pogona barbata*	Eastern Bearded Dragon	P			✓	
Agamidae	*Tympanocryptis diemensis*	Mountain Heath Dragon	P	✓			
Varanidae	*Varanus varius*	Lace Monitor	P	✓			
Scincidae	*Bassiana duperreyi*	Bold-striped Cool-skink	P	✓		✓	
Scincidae	*Bassiana platynota*	Red-throated Cool-skink	P	✓			
Scincidae	*Cryptoblepharus virgatus*	Cream-striped Shinning-skink	P	✓			
Scincidae	*Ctenotus robustus*	Robust Ctenotus	P				✓

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Scincidae	*Ctenotus taeniolatus*	Copper-tailed Ctenotus	P	✓			
Scincidae	*Egernia cunninghami*	Cunningham's Spiny-tailed Skink	P				✓
Scincidae	*Egernia saxatilis intermedia*	Black Crevice-skink	P	✓			
Scincidae	*Egernia whitii*	White's Rock-skink	P	✓			
Scincidae	*Eulamprus heatwolei*	Warm-temperate Water-skink	P	✓		✓	
Scincidae	*Eulamprus quoyii*	Eastern Water-skink	P	✓			
Scincidae	*Eulamprus tympanum*	Cool-temperate Water-skink	P	✓			
Scincidae	*Hemiergis decresiensis*	Three-toed Earless Skink	P	✓	✓	✓	
Scincidae	*Lampropholis delicata*	Dark-flecked Garden Sunskink	P	✓			
Scincidae	*Lampropholis guichenoti*	Pale-flecked Sunskink	P	✓		✓	
Scincidae	*Lygisaurus foliorum*	Tree-base Litter-skink	P				✓
Scincidae	*Niveoscincus coventryi*	Southern Forest Cool-skink	P	✓			
Scincidae	*Pseudemoia entrecasteauxii*	Tussock Cool-skink	P	✓			
Scincidae	*Pseudemoia pagenstecheri*		P				✓
Scincidae	*Pseudemoia spenceri*	Trunk-climbing Cool-skink	P	✓		✓	
Scincidae	*Saiphos equalis*	Yellow-bellied Three-toed Skink	P	✓		✓	
Scincidae	*Saproscincus mustelinus*	Weasel Shadeskink	P	✓		✓	
Scincidae	*Tiliqua nigrolutea*	Blotched Bluetongue	P	✓		✓	
Elapidae	*Austrelaps ramsayi*	Highlands Copperhead	P	✓			
Elapidae	*Demansia psammophis*	Yellow-faced Whipsnake	P				✓
Elapidae	*Drysdalia rhodogaster*	Mustard-bellied Snake	P				✓
Elapidae	*Notechis scutatus*	Mainland Tiger Snake	P	✓			
Elapidae	*Pseudechis porphyriacus*	Red-bellied Black Snake	P	✓			
Elapidae	*Pseudonaja textilis*	Eastern Brown Snake	P	✓			
Birds							
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis	P		✓		
Anatidae	*Anas gracilis*	Grey Teal	P				✓
Anatidae	*Anas superciliosa*	Pacific Black Duck	P		✓		
Anatidae	*Chenonetta jubata*	Australian Wood Duck	P		✓		
Anatidae	*Cygnus atratus*	Black Swan	P	✓			
Podicepedidae	*Poliocephalus poliocephalus*	Hoary-headed Grebe	P		✓		
Podicepedidae	*Tachybaptus novaehollandiae*	Australasian Grebe	P		✓		
Phalacrocoracidae	*Phalacrocorax carbo*	Great Cormorant	P		✓		
Ardeidae	*Egretta novaehollandiae*	White-faced Heron	P		✓		
Accipitridae	*Accipiter fasciatus*	Brown Goshawk	P	✓			
Accipitridae	*Aquila audax*	Wedge-tailed Eagle	P	✓	✓		
Accipitridae	*Hieraaetus morphnoides*	Little Eagle	P	✓			

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Falconidae	*Falco berigora*	Brown Falcon	P		✓		
Falconidae	*Falco cenchroides*	Nankeen Kestrel	P		✓		
Falconidae	*Falco peregrinus*	Peregrine Falcon	P	✓	✓		
Charadriidae	*Vanellus miles*	Masked Lapwing	P		✓		
Columbidae	*Leucosarcia melanoleuca*	Wonga Pigeon	P		✓		
Cacatuidae	*Cacatua galerita*	Sulphur-crested Cockatoo	P	✓	✓	✓	
Cacatuidae	*Callocephalon fimbriatum*	Gang-gang Cockatoo	P	✓	✓	✓	
Cacatuidae	*Calyptorhynchus funereus*	Yellow-tailed Black-Cockatoo	P	✓	✓	✓	
Cacatuidae	*Calyptorhynchus lathami*	Glossy Black-cockatoo	V				✓
Cacatuidae	*Eolophus roseicapillus*	Galah	P		✓	✓	
Psittacidae	*Alisterus scapularis*	Australian King-Parrot	P	✓	✓	✓	
Psittacidae	*Glossopsitta pusilla*	Little Lorikeet	P				✓
Psittacidae	*Platycercus adscitus eximius*	Eastern Rosella	P		✓	✓	
Psittacidae	*Platycercus elegans*	Crimson Rosella	P	✓	✓	✓	
Cuculidae	*Cacomantis flabelliformis*	Fan-tailed Cuckoo	P	✓	✓	✓	
Cuculidae	*Cacomantis variolosus*	Brush Cuckoo	P		✓		
Cuculidae	*Chalcites lucidus*	Shining Bronze-Cuckoo	P		✓	✓	
Cuculidae	*Cuculus pallidus*	Pallid Cuckoo	P		✓		
Cuculidae	*Scythrops novaehollandiae*	Channel-billed Cuckoo	P	✓	✓		
Strigidae	*Ninox boobook*	Southern Boobook	P	✓	✓	✓	
Strigidae	*Ninox strenua*	Powerful Owl	V	✓		✓	
Tytonidae	*Tyto novaehollandiae*	Masked Owl	V	✓			
Podargidae	*Podargus strigoides*	Tawny Frogmouth	P	✓	✓	✓	
Caprimulgidae	*Eurostopodus mystacalis*	White-throated Nightjar	P	✓			
Aegothelidae	*Aegotheles cristatus*	Australian Owlet-nightjar	P	✓			
Apodidae	*Hirundapus caudacutus*	White-throated Needletail	P	✓	✓		
Halcyonidae	*Dacelo novaeguineae*	Laughing Kookaburra	P	✓	✓	✓	
Halcyonidae	*Todiramphus sanctus*	Sacred Kingfisher	P	✓	✓		
Meropidae	*Merops ornatus*	Rainbow Bee-eater	P				✓
Coraciidae	*Eurystomus orientalis*	Dollarbird	P		✓		
Menuridae	*Menura novaehollandiae*	Superb Lyrebird	P	✓	✓	✓	
Climacteridae	*Climacteris erythrops*	Red-browed Treecreeper	P	✓	✓		
Climacteridae	*Cormobates leucophaeus*	White-throated Treecreeper	P	✓	✓	✓	
Maluridae	*Malurus cyaneus*	Superb Fairy-wren	P	✓	✓		
Maluridae	*Malurus lamberti*	Variegated Fairy-wren	P				✓
Pardalotidae	*Pardalotus punctatus*	Spotted Pardalote	P	✓	✓	✓	
Pardalotidae	*Pardalotus striatus*	Striated Pardalote	P	✓	✓	✓	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill	P		✓		

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Acanthizidae	*Acanthiza lineata*	Striated Thornbill	P	✓	✓	✓	
Acanthizidae	*Acanthiza nana*	Yellow Thornbill	P		✓		
Acanthizidae	*Acanthiza pusilla*	Brown Thornbill	P	✓	✓	✓	
Acanthizidae	*Acanthiza reguloides*	Buff-rumped Thornbill	P	✓	✓		
Acanthizidae	*Calamanthus pyrrhopygius*	Chestnut-rumped Heathwren	P		✓		
Acanthizidae	*Gerygone mouki*	Brown Gerygone	P				✓
Acanthizidae	*Gerygone olivacea*	White-throated Gerygone	P		✓		
Acanthizidae	*Origma solitaria*	Rockwarbler	P		✓		
Acanthizidae	*Sericornis citreogularis*	Yellow-throated Scrubwren	P				✓
Acanthizidae	*Sericornis frontalis*	White-browed Scrubwren	P	✓	✓	✓	
Meliphagidae	*Acanthorhynchus tenuirostris*	Eastern Spinebill	P	✓	✓	✓	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird	P	✓	✓	✓	
Meliphagidae	*Anthochaera chrysoptera*	Little Wattlebird	P				✓
Meliphagidae	*Lichenostomus chrysops*	Yellow-faced Honeyeater	P	✓	✓	✓	
Meliphagidae	*Lichenostomus leucotis*	White-eared Honeyeater	P	✓	✓	✓	
Meliphagidae	*Manorina melanocephala*	Noisy Miner	P		✓		
Meliphagidae	*Manorina melanophrys*	Bell Miner	P				✓
Meliphagidae	*Meliphaga lewinii*	Lewin's Honeyeater	P				✓
Meliphagidae	*Melithreptus brevirostris*	Brown-headed Honeyeater	P	✓	✓		
Meliphagidae	*Melithreptus lunatus*	White-naped Honeyeater	P	✓	✓	✓	
Meliphagidae	*Philemon corniculatus*	Noisy Friarbird	P	✓	✓		
Meliphagidae	*Philemon citreogularis*	Little Friarbird	P	✓			
Meliphagidae	*Phylidonyris nigra*	White-cheeked Honeyeater*	P			✓	
Meliphagidae	*Phylidonyris novaehollandiae*	New Holland Honeyeater	P	✓	✓		
Meliphagidae	*Phylidonyris pyrrhoptera*	Crescent Honeyeater	P		✓	✓	
Meliphagidae	*Xanthomyza phrygia*	Regent Honeyeater*	E		✓		
Petroicidae	*Eopsaltria australis*	Eastern Yellow Robin	P	✓	✓	✓	
Petroicidae	*Microeca fascinans*	Jacky Winter	P		✓		
Petroicidae	*Petroica boodang*	Scarlet Robin	P	✓	✓	✓	
Petroicidae	*Petroica goodenovii*	Red-capped Robin*	P		✓		
Petroicidae	*Petroica phoenicea*	Flame Robin	P	✓	✓	✓	
Petroicidae	*Petroica rosea*	Rose Robin	P	✓		✓	
Eupetidae	*Cinclosoma punctatum*	Spotted Quail-thrush	P	✓	✓		
Eupetidae	*Psophodes olivaceus*	Eastern Whipbird	P	✓	✓		
Neosittidae	*Daphoenositta chrysoptera*	Varied Sittella	P	✓	✓		
Pachycephalidae	*Colluricincla harmonica*	Grey Shrike-thrush	P	✓	✓	✓	
Pachycephalidae	*Falcunculus frontatus*	Eastern Shrike-tit	P	✓	✓	✓	
Pachycephalidae	*Pachycephala pectoralis*	Golden Whistler	P	✓	✓	✓	

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Pachycephalidae	*Pachycephala rufiventris*	Rufous Whistler	P	✓	✓	✓	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark	P		✓		
Dicruridae	*Monarcha melanopsis*	Black-faced Monarch	P		✓		
Dicruridae	*Myiagra cyanoleuca*	Satin Flycatcher	P	✓	✓	✓	
Dicruridae	*Myiagra inquieta*	Restless Flycatcher	P		✓		
Dicruridae	*Myiagra rubecula*	Leaden Flycatcher	P	✓	✓		
Dicruridae	*Rhipidura albiscapa*	Grey Fantail	P	✓	✓	✓	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail	P	✓	✓		
Dicruridae	*Rhipidura rufifrons*	Rufous Fantail	P	✓		✓	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike	P	✓	✓	✓	
Campephagidae	*Coracina tenuirostris*	Cicadabird	P	✓	✓	✓	
Oriolidae	*Oriolus sagittatus*	Olive-backed Oriole	P	✓	✓		
Artamidae	*Artamus cyanopterus*	Dusky Woodswallow	P	✓	✓		
Artamidae	*Cracticus nigrogularis*	Pied Butcherbird	P				✓
Artamidae	*Cracticus torquatus*	Grey Butcherbird	P	✓	✓		
Artamidae	*Gymnorhina tibicen*	Australian Magpie	P	✓	✓	✓	
Artamidae	*Strepera graculina*	Pied Currawong	P	✓	✓	✓	✓
Artamidae	*Strepera versicolor*	Grey Currawong	P	✓	✓	✓	✓
Corvidae	*Corvus coronoides*	Australian Raven	P	✓	✓	✓	
Corvidae	*Corvus mellori*	Little Raven	P		✓		
Corcoracidae	*Corcorax melanorhamphos*	White-winged Chough	P	✓	✓		
Ptilonorhynchidae	*Ptilonorhynchus violaceus*	Satin Bowerbird	P	✓	✓	✓	
Alaudidae	*Alauda arvensis*	Eurasian Skylark[I]	U				✓
Motacillidae	*Anthus australis*	Australian Pipit	P		✓		
Passeridae	*Passer domesticus*	House Sparrow[I]	U		✓		
Fringillidae	*Carduelis carduelis*	European Goldfinch[I]	U		✓		
Estrildidae	*Neochmia temporalis*	Red-browed Finch	P		✓		
Dicaeidae	*Dicaeum hirundinaceum*	Mistletoebird	P	✓	✓		
Hirundinidae	*Hirundo neoxena*	Welcome Swallow	P		✓		
Hirundinidae	*Petrochelidon ariel*	Fairy Martin	P				✓
Hirundinidae	*Petrochelidon nigricans*	Tree Martin	P		✓		
Zosteropidae	*Zosterops lateralis*	Silvereye	P	✓	✓	✓	
Muscicapidae	*Zoothera lunulata*	Bassian Thrush	P				✓
Sturnidae	*Sturnus vulgaris*	Common Starling[I]	U		✓		
Mammals							
Tachyglossidae	*Tachyglossus aculeatus*	Short-beaked Echidna	P	✓			
Dasyuridae	*Antechinus flavipes*	Yellow-footed Antechinus	P				✓

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Dasyuridae	*Antechinus stuartii*	Brown Antechinus	P	✓		✓	
Dasyuridae	*Antechinus swainsonii*	Dusky Antechinus	P				✓
Dasyuridae	*Dasyurus maculatus*	Spotted-tailed Quoll	V			✓	
Dasyuridae	*Sminthopsis murina*	Common Dunnart	P			✓	
Phascolarctidae	*Phascolarctos cinereus*	Koala	V			✓	✓
Vombatidae	*Vombatus ursinus*	Common Wombat	P	✓		✓	
Burramyidae	*Cercartetus nanus*	Eastern Pygmy-possum	V				✓
Petauridae	*Petaurus australis*	Yellow-bellied Glider	V	✓			
Petauridae	*Petaurus breviceps*	Sugar Glider	P	✓		✓	
Pseudocheiridae	*Petauroides volans*	Greater Glider	P	✓	✓	✓	
Pseudocheiridae	*Pseudocheirus peregrinus*	Common Ringtail Possum	P	✓		✓	
Acrobatidae	*Acrobates pygmaeus*	Feathertail Glider	P	✓			
Phalangeridae	*Trichosurus vulpecula*	Common Brushtail Possum	P	✓		✓	
Phalangeridae	*Trichosurus caninus*	Mountain Brushtail Possum	P				✓
Potoroidae	*Bettongia gaimardi*	Tasmanian Bettong*	E4				✓
Macropodidae	*Macropus giganteus*	Eastern Grey Kangaroo	P	✓		✓	
Macropodidae	*Macropus robustus*	Common Wallaroo	P	✓			
Macropodidae	*Macropus rufogriseus*	Red-necked Wallaby	P	✓		✓	
Macropodidae	*Petrogale penicillata*	Brush-tailed rock Wallaby	V				✓
Macropodidae	*Wallabia bicolor*	Swamp Wallaby	P	✓		✓	
Pteropodidae	*Pteropus scapulatus*	Little Red Flying-fox	P				✓
Rhinolophidae	*Rhinolophus megaphyllus*	Eastern Horseshoe-bat	P	✓			
Molossidae	*Mormopterus* sp. 1	Undescribed Freetail-bat	P			✓	
Molossidae	*Nyctinomus australis*	White-striped Freetail-bat	P	✓		✓	
Vespertilionidae	*Chalinolobus dwyeri*	Large-eared Pied Bat	V				✓
Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat	P	✓		✓	
Vespertilionidae	*Chalinolobus morio*	Chocolate Wattled Bat	P	✓		✓	
Vespertilionidae	*Falsistrellus tasmaniensis*	Eastern False Pipistrelle	V	✓		✓	
Vespertilionidae	*Miniopterus australis*	Little Bentwing-bat*	V				✓
Vespertilionidae	*Miniopterus schreibersii oceanensis*	Eastern Bentwing-bat	V	✓		✓	
Vespertilionidae	*Nyctophilus geoffroyi*	Lesser Long-eared Bat	P	✓			
Vespertilionidae	*Nyctophilus gouldi*	Gould's Long-eared Bat	P	✓			
Vespertilionidae	*Scoteanax rueppellii*	Greater Broad-nosed Bat	V	✓		✓	
Vespertilionidae	*Scotorepens orion*	Eastern Broad-nosed Bat	P	✓		✓	
Vespertilionidae	*Vespadelus darlingtoni*	Large Forest Bat	P	✓		✓	
Vespertilionidae	*Vespadelus regulus*	Southern Forest Bat	P	✓			
Vespertilionidae	*Vespadelus vulturnus*	Little Forest Bat	P	✓	✓	✓	
Muridae	*Rattus fuscipes*	Bush Rat	P	✓		✓	

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Muridae	*Rattus lutreolus*	Swamp Rat	P				✓
Leporidae	*Oryctolagus cuniculus*	Rabbit[I]	U	✓		✓	
Canidae	*Canis lupus*	Dingo, domestic dog[I]	U	✓		✓	
Canidae	*Canis lupus dingo*	Dingo	U	✓			
Canidae	*Vulpes vulpes*	Fox[I]	U	✓		✓	
Felidae	*Felis catus*	Cat[I]	U	✓		✓	
Suidae	*Sus scrofa*	Pig[I]	U	✓		✓	
Bovidae	*Bos taurus*	European Cattle[I]	U			✓	
Bovidae	*Capra hircus*	Goat[I]	U			✓	
Cervidae	*Dama dama*	Fallow Deer[I]	U	✓			




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