PRELIMINARY FAUNA SURVEY (STAGE 1)

NSW WESTERN REGIONAL ASSESSMENTS

[MARCH 2000]

Brigalow Belt South

Resource and Conservation Assessment Council

BRIGALOW BELT SOUTH: REGIONAL ASSESSMENT (STAGE 1)

REPORT ON PRELIMINARY FAUNA SURVEY OF PILLIGA AND GOONOO FORESTS, NOVEMBER 1999 TO JANUARY 2000.

NSW National Parks and Wildlife Service,
Western Directorate, Dubbo.

30TH MARCH 2000

FINAL

A project undertaken for the Resource and Conservation Assessment Council
NSW Western Regional Assessments
project number [WRA15]

For more information and for information on access to data contact the:

Resource and Conservation Division, Department of Urban Affairs and Planning

GPO Box 3927
SYDNEY NSW 2001

Phone: (02) 9228 3166
Fax: (02) 9228 4967

ISBN 1 74029 156 5

This project has been funded and managed by the Resource and Conservation Division, Department of Urban Affairs and Planning

The project was also overseen and developed through the Resource and Conservation Assessment Council.

CONTENTS

The contents of this report are the result of a preliminary survey undertaken in the Pilliga and Goonoo ecosystems. The main results and issues raised as outcomes of this survey are as follows:

- The Brigalow Belt South, lying on the transition zone between eastern, western and northern biotic elements is an important area in terms of its biodiversity and unique assemblages of fauna and flora.

- This bioregion has already experienced high levels of species decline, with 14 extinct mammals, and 118 species currently found to be regionally significant (in terms of species decline), 51 of which were detected during this survey. This is largely a result of widespread land clearing, agricultural and forestry practices.

- Methods used in this survey were a combination of those undertaken by the coastal CRAs and techniques developed specifically to target western fauna, with its unique characteristics such as low population densities. The survey was constrained by limits on time, effort and scope during Stage 1 of the assessment.

- As a result of this survey, 12 species of frog, 39 reptiles, 155 birds, 17 non-flying native mammals, 16 bats and 10 introduced species were detected, giving a total of 249 native species. About 6 500 new records were collected for the NSW Wildlife Atlas, an increase of records of about 50% on the existing database for the bioregion. This result is similar to levels detected on the Sydney Basin CRA, with about ¼ of the effort. This result suggests that the diversity of fauna is still high in many of the areas surveyed.

- New, significant information was gained on several threatened species, particularly the Pilliga Mouse, Black-striped Wallaby, the Large-eared Pied Bat, Little Pied Bat, Little Cave Bat, Greater Long-eared Bat, Gilbert's Whistler, Malleefowl, Glossy Black Cockatoo, Squirrel Glider, Eastern Pygmy-possum and the Koala.

- Habitats, which were found to be important for the diversity of vertebrates in the bioregion, were Narrow-leaf Ironbark and Broad-leaf Ironbark forests, box woodlands, gully zones and heathy scrubs.

- Two major habitat components were identified as important for the maintenance of present levels of diversity. These are large, mature trees and shrubby understories. Both are highly susceptible to logging disturbance.

- Evidence found indicating the apparent decline of the availability of large hollows, as two species, considered common, the Brushtail and Ringtail Possums were virtually absent from most areas surveyed. No Ringtails were detected during the survey and only two Brushtails was seen alive. Other species dependent upon large, old trees, such as the Pale-headed Snake and the Squirrel Glider were also rare. This suggests that past logging in these forests has already compromised the recruitment and availability of this resource.

- This survey was restricted to the largest and probably most diverse of the Brigalow Belt South remnants. There is a strong need to expand the scope of this inventory as baseline information is currently lacking from most ecosystems that are still found in the bioregion. Less than half of the habitats in the Pilliga alone were sampled. Most of these were sampled at an inconclusive intensity.

- Conservation issues arising from the result of this survey suggest that there is a great need to protect a range of habitats currently outside the nature reserve system. Some of these, for example Narrow-leaf Ironbark, are still important for local biodiversity, yet have long histories of resource use. Currently only 2.6% of the bioregion is protected in nature reserves.

- There is a great need for the ongoing development of Ecologically Sustainable Forestry Management (ESFM). This requires ongoing research and data collection about timber resource availability and wildlife diversity and requirements, so that appropriate integrated models can be developed.

PROJECT SUMMARY

This report has been prepared for the Resource and Conservation Council (RACAC) as part of the preliminary (Stage 1) Western Regional Assessment of the Brigalow Belt South bioregion (see Figures 1-4).

The Western Regional Assessments are to be carried out across the Western and Central Divisions of NSW with the Brigalow Belt South bioregion being the first. The assessments will provide scientific information on which to base Forest Agreements, as well as providing information for the use of other regional planning instruments/organisations such as Regional Vegetation Management Committees and Catchment Management Boards.

Due to the short time available to undertake these preliminary (Stage 1) projects, this report must only be considered a brief summary of the results of initial surveys and analyses relevant to the commercially important forested areas of the bioregion potentially under consideration for Forest Agreements. This report can provide precautionary recommendations subject to further detailed assessment. A comprehensive (Stage 2) assessment will then be undertaken to verify this preliminary assessment and expand their relevance across the bioregion and vegetation types.

Specific objectives for this project were to:

- Provide new data on the distribution and, if possible abundance of vertebrate fauna, for use in forest management.
- Collect information on vertebrate fauna and their habitat to fill as many gaps as possible, focusing on threatened, regionally significant and forest dependant species.
- Collate information on the known and predicted regional distribution of each species to provide a regional context for the project.
- Assist in the identification of high conservation values.
- Assist in the identification of a Comprehensive, Representative and Adequate protected area network including reserves.
- Assist in developing conservation protocols as part of ESFM.
- Identify future surveys to expand preliminary results. As part of Stage 2, a bioregion wide regional assessment is needed to cover the full range of vegetation communities and habitats.

Specific results from Stage 1 include:

- Two hundred and forty nine species were detected in the Pilliga and Goonoo forests covering 155 birds, 39 reptiles, 12 frogs and 33 native mammals.
- Twenty -two threatened species were detected.
- Fourteen forest types, most of commercial logging interest, were assessed for vertebrate species.
- Probably the densest population of the threatened Greater Long-eared Bat in NSW exists in the box ironbark forests of the Brigalow Belt South.
- Many of the species found were of conservation concern because of habitat loss, declining populations and geographic isolation/extremes.
- Species presence in a number of forest types/vegetation communities have been determined and lists compiled.

Western Regional Assessment Unit Manager: Gary Saunders

Project Manager: Murray Ellis

Report Production: David Paull and Murray Ellis

GIS support: Brent Marchant, Steve Thornton

Data entry: Jade Freeman, Michelle Cavallaro

Data check: Chris Turbill, Tim Hoskings

Bat call analysis: Ray Williams

Hair analysis and scat identification: Barbara Triggs

Voucher specimen identification: Sandy Ingleby, Harry Parnaby

Team leaders: David Paull, Jeremy Little, Mark Fitzgerald

Team members: Rebecca Drury, Matthew Ryan, Chris Turbill

Field assistance: David Coote, Catriona McKenzie, Jade Freeman, Michelle Cavallaro

Coonabarabran District support: Paul Jennings, Jamie Molloy, Peter Brookhouse

External Reviewers: Hugh Ford and Todd Soderquist

Other persons (NPWS, State Forests and DLWC staff) provided information, advice or data directly or indirectly to this project. Peter Chrisite and Miranda Gott reviewed an early draft of the report.

1. INTRODUCTION

1.1 OVERVIEW OF BRIGALOW BELT SOUTH

The Brigalow Belt South is a large bioregion in northern New South Wales, which stretches from the western edge of the New England Tablelands and the Nandewar Ranges to the Darling River Plains bioregion in the west. To the north it crosses the Queensland border and stretches through the western slopes of Queensland with a total area of 277 038 sq. km. At its southern perimeter it is bordered by the South West Slopes and Sydney Basin bioregions (see Fig. 1). The area of the Brigalow Belt South in New South Wales is approximately 52 049 sq. km, or 18.7% of the total area of this bioregion. State Forests, Timber Reserves and Crown Lands together contain most of the wooded remnants found in this bioregion (Brigalow Belt South Vegetation Survey and Mapping Project).

This fauna assessment considers only the largest remnants of this bioregion. These are the extensive Pilliga complex and the Goonoo and associated remnants. The western Pilliga lies within the Pilliga Outwash Province, while the eastern Pilliga, including the Nature Reserve and the Goonoo region lies within the Northern Sandstones Province (Morgan and Terrey 1992).

1.2 BIOLOGICAL SIGNIFICANCE OF BRIGALOW BELT SOUTH

Significantly, very little information has been published on the habitats and fauna of the region of the northwest slopes of New South Wales for which the Brigalow Belt South, as defined by Thackway and Cresswell (1995), is a large part. This bioregion encompasses the *Callitris*-ironbark-box and red gum forests and woodlands of the western slopes and adjacent plains. It also contains other vegetation formations such as grasslands, mallee, heathlands and shrublands. One popular account of the early settlement and nature of the vegetation fauna has been given by Rolls (1981), which has received wide attention in both the media and the community. However Rolls' description of the pre-European nature of largest remnant in this bioregion, the Pilliga "scrub", as a largely homogenous, open woodland, has been recently challenged by Mitchell (1991), Norris *et al.* (1991) and Benson and Redpath (1997). All these critiques point to the heterogeneity of the vegetation in the Pilliga based on a critical review of past and current evidence. Mitchell (1991) cites evidence of early explorers on the existence of thick scrub before European arrival, Benson and Redpath (1997) point to the higher mature tree densities (approximately 30 per hectare) that would have been found in areas of ironbark forest in pre-European days, while Norris *et al.* (1991) examined early forestry type maps from 1914, 1938 and 1970. They found the most significant change in the vegetation of the Pilliga was a decline in true forest cover, probably due to the extensive logging and tree culling carried out during this time (Date and Paull 1999).

An examination of the vegetation of this "cypress-ironbark" belt today shows a wide variety of plant species and communities with an extremely high floristic diversity of both fire-sensitive and fire-tolerant species. This is partly due to the transitional nature of this bioregion which straddles both the Bassian or wetter coastal areas and the Eyrean, or dry, zone of the inland. Today the vegetation is largely shaped and dependent on fire cycles, though prior to the last ice age, the vegetation of the region may be described as "dry rainforest" (Flannery 1994). This is evident today in some of the plants which are fire-sensitive, such

as *Callitris* spp and Brigalow *Acacia harpophylla* and the presence of dry rainforest relics, such as Red Ash *Alphitonia excelsa* and Rusty Fig *Ficus rubignosa*. Today the flora of the Pilliga may be described as a complex mosaic of vegetation types and communities, variously described as both "semi-arid" and "warm-temperate". The region also has a distinctive climate with a higher than average rainfall during the "dry" quarter (winter) than the semi-arid zone to the west (Nix 1986), giving the bioregion a distinctive bimodal annual rainfall pattern.

The vertebrate fauna is also characterised by a high mixing of species, showing both coastal and inland origins with a minor tropical element. The tree-dependent mammals are of a coastal origin, while the terrestrial species are generally of an inland origin. There is some endemism, for example the Pilliga Mouse. The reptile and frog fauna are mostly of inland origins, though with strong coastal elements and some endemism, for example the Ocellated Velvet Gecko *Oedura monilis.* The bird fauna is also comprised of roughly equal numbers of species, which have coastal and inland origins. This high level of mixing of species with different zoogeographic origins, largely accounts for the high vertebrate diversity, which was found in the Brigalow Belt South prior to a wave of mammal extinction earlier this century (Paull and Date 1999). This diversity was comparable to the diversity found in any of the coastal bioregions (Date and Paull 1999). By contrast the fauna of the South-west Slopes Bioregion is less diverse (Caughley and Gall 1985; Bauer *et al.* 1999) despite a heavy mixing of coastal and inland species. This may be an artefact of higher levels of vegetation clearing and a lack of tropical elements in the vegetation and the fauna, such as Brigalow *Acacia harpophylla* and the Brush-tailed Bettong *Bettongia tropica*.

The Brigalow Belt South in New South Wales today is a highly fragmented bioregion. The area of land covered in woody vegetation is around 1 248 986 ha or 24% of the Brigalow Belt South in New South Wales (Brigalow Belt South Vegetation Survey and Mapping Project). The rest of the bioregion has either been cleared of woody vegetation or is now agricultural lands derived from grasslands or grassy woodlands. Of the wooded cover, 506 581 ha or 9.6% of the area of the Brigalow Belt South, lies within State Forests, another 626 855 ha, or 12% is found on privately managed lands and another 115 550 ha (2.2%) in Nature Reserves/National Parks. The target areas for this study, the Pilliga State Forests, the Pilliga Nature Reserve and Goonoo State Forest represent the largest continuous areas of forested bushland remnants in the bioregion, so are significant both in terms of their biodiversity and the large areas of land they cover (approx. 500 000 and 62 500 ha, respectively) despite extensive levels of internal timber removal. Considerable areas of remnant vegetation once existed on crown timber lands (privately leased lands with a government option on the timber) in the bioregion, of approximately 968 399 ha (Forestry Commission 1980, 1984, 1985, 1986, 1988). Wooded, privately held lands have been subject to varying levels of unsustainable land use such that 340 000 ha of the bioregion outside the State Forest and National Parks and Wildlife estate is now under wooded cover.

Approximately 2.6% of the bioregion (wooded and non-wooded) is protected in Nature Reserves and National Parks, well below that which is accepted as a minimum by current national standards (JANIS 1997) of regional biodiversity conservation.

1.3 LEVEL OF PREVIOUS KNOWLEDGE OF FAUNA

The current level of knowledge of pre-European and present diversity of native mammals is summarised by Paull and Date (1999). Other vertebrate groups such as the bats, birds, reptiles and frogs had received no systematic survey prior to 1993, when State Forests commissioned a vertebrate survey across its estate on the northwest slopes (Date and Paull 1999). This was supplemented by the first study of bats undertaken in the Brigalow Belt by Coles (1995). This information is contained in draft reports and is yet to be published. Allomes *et al.* (1982) reported on a fauna study undertaken in the Pilliga state forests and adjacent lands.

Other records exist in various databases, such as the Australian Museum, National Parks and Wildlife Service of NSW Wildlife Atlas and State Forest records. There are a few scientific papers, particularly

Shelley (1998) on the fauna in Goonoo State Forest, the National Parks and Wildlife Service's assessment of Coolah Tops (1995), Bustard's (1967-71) papers on the reptile fauna of the Pilliga State Forests, Fox and Briscoe (1981) and Lim's (1992) studies on the Pilliga Mouse *Pseudomys pilligaensis*, a study by Rabbidge (1987) on the Black-striped Wallabies in the Narrabri district, Paull's (1998) study of small mammals in Pilliga East State Forest, Parnaby and Hoye's study of bats in the Pilliga Nature Reserve (1997), Cleland's (1919) and Chisholm's (1936) work on Pilliga birds, Heron's (1973) work on the birds of Goonoo and Korn's (1988) work on the Malleefowl of Goonoo State Forest. A fauna survey was also conducted in the Goobang and Nangar National Parks by the National Parks and Wildlife Service (1997). Although outside the Brigalow Belt bioregion, these areas contain similar *Callitris*-ironbark country to this bioregion. Almost nothing is known of the invertebrate diversity in the Brigalow Belt South.

The National Parks and Wildlife Service of NSW has recently compiled a dataset of all vertebrate species previously recorded from the bioregion and have included the results from the present survey. The sources for this include the NPWS Wildlife Atlas, CSIRO records, records of the Australian Museum, the Royal Australian Ornithologists Union (now Birds Australia), fauna surveys done by Date and Paull (1999), Coles (1995), Parnaby and Hoye (1997), Paull (1998) and other studies done in the bioregion. All records of threatened or otherwise significant fauna were placed upon GIS derived maps as part of the bioregional fauna assessment of the Brigalow Belt South. All species known from the bioregion but which were not recorded during this preliminary survey are included as Appendix 8.5. The total number of species-based records compiled on the Atlas of NSW database is now around 21 000 records, with about 6 500 coming from this survey.

Date and Paull's (1999) and Cole's (1995) sister studies of the state forests of the Brigalow Belt were the most comprehensive cross-taxonomic study done within this bioregion prior to this survey. They found these state forests to contain a diverse fauna of native vertebrates, with 175 birds, 19 bats, 22 non-flying native mammals, 63 reptiles and 19 frogs across the Brigalow Belt South and adjoining areas of the Nandewar Ranges. 20 species of threatened species were detected, with one possible record of an unknown hopping-mouse (*Notomys* sp.). Most sites were located in the Pilliga state forests. A number of small state forests were also targeted. Surveys in Goonoo State Forest revealed five frog, 14 reptile, nine native mammal, nine bat and 41 bird species, including three threatened species. Shelley's (1998) study in Goonoo State Forest recorded four frog, nine reptile, six non-flying native mammals, nine bats and 51 bird species, there were four threatened species, including the only record of Koala known from this forest. By contrast, the Pilliga supports one of the most significant populations of Koala in eastern Australia, estimated to be around 20 000 in the State Forests alone (R. Kavanagh, State Forests of NSW, pers. comm.).

Paull and Date (1999) found that out of a historic diversity of 43 non-flying native mammals that were found on the western slopes in New South Wales, 11 are currently thought to be extinct, 22 species are rare or declining and only 10 were found to be widespread or common. Of the extinct species, most were ground dwelling, grassy understorey-dependent species. This reflects the early decline of animals, which occupied the most nutrient-rich habitats, which ultimately became the most favoured and productive agricultural lands. The species presently most under threat are shrubby understorey and tree-dependent species currently found in the woodland remnants, such as those targeted during this preliminary survey. This emphasises the importance of the remaining remnants as refuges for the extant native mammals and the many other tree-dependent and understorey-dependent fauna currently found in the bioregion.

2. METHODS

2.1 SITE SELECTION

Study sites were selected to enhance the previous coverage of fauna survey sites, expanding upon the studies conducted by State Forests. Sites were chosen to cover the geographic range of the major forest areas and to cover many of the vegetation units being assessed by simultaneous botanical surveys. Since the botanical data was not analysed by the time the fauna sites had to be chosen, a combination of the stratification used to select the botanical sites and the opinions of the survey botanists as to how the sites were grouped was used to identify the fauna survey sites. Sites were not assessed as to their potential as fauna habitat prior to the survey being undertaken so that the range of sites would be sampled without *a priori* biases. Vegetation types likely to be of commercial interest and hence requiring data for the development of Forest Agreements were given priority in stage 1.

The sites were grouped into three major areas in order to facilitate the survey logistics, the Pilliga West region, Goonoo region and East Pilliga region (see Figures 2-4).

2.2 SURVEY TECHNIQUES

Methodology used in this fauna survey follows that adopted for CRA surveys undertaken elsewhere in the state, though some different techniques and trapping intensities were used. Standard methods adopted include those used to survey birds, Anabat surveys and nocturnal playbacks (National Parks and Wildlife Service 1998).

All surveys were conducted at sites with an area of 2 ha (100m x 200m). Observations of fauna outside these sites were recorded as opportunistic sightings. A prolonged survey period in comparison to coastal surveys was used. Elliott trapping was undertaken systematically at all survey sites, over a period of six nights totalling 300 trap nights per site. This was justified due to an anticipated low trapping rate, often less than 1%, for small ground mammals in western New South Wales. Similar trapping periods were undertaken during the Western Region Biodiversity Conservation project, where capture rates were found to plateau after six days. Work by the NPWS Western Zone staff in Goobang National Park found that species detection rates tended not to plateau after four days, though this was for all vertebrate species (National Parks and Wildlife Service 1997). Studies undertaken by Read (1995) on the Darling River revealed a 10 day survey period was insufficient to detect all species utilising a site.

All such observations were located using the Australian Map Grid (AMG) reference system.

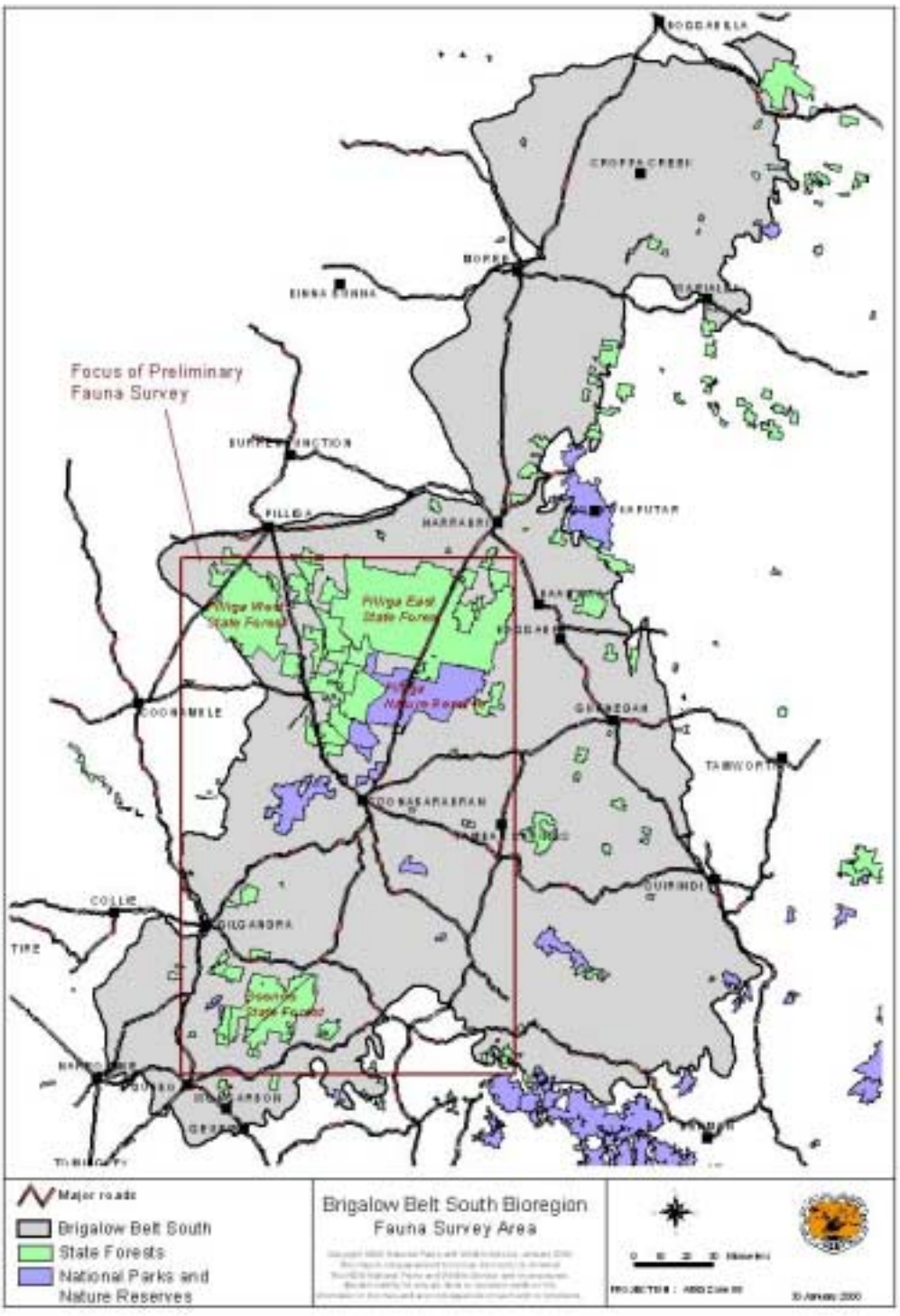


Figure 1. Location of the three areas studied for fauna in relation to the State Forests, National Parks and Nature Reserves in the southern part of the Brigalow Belt South Bioregion.

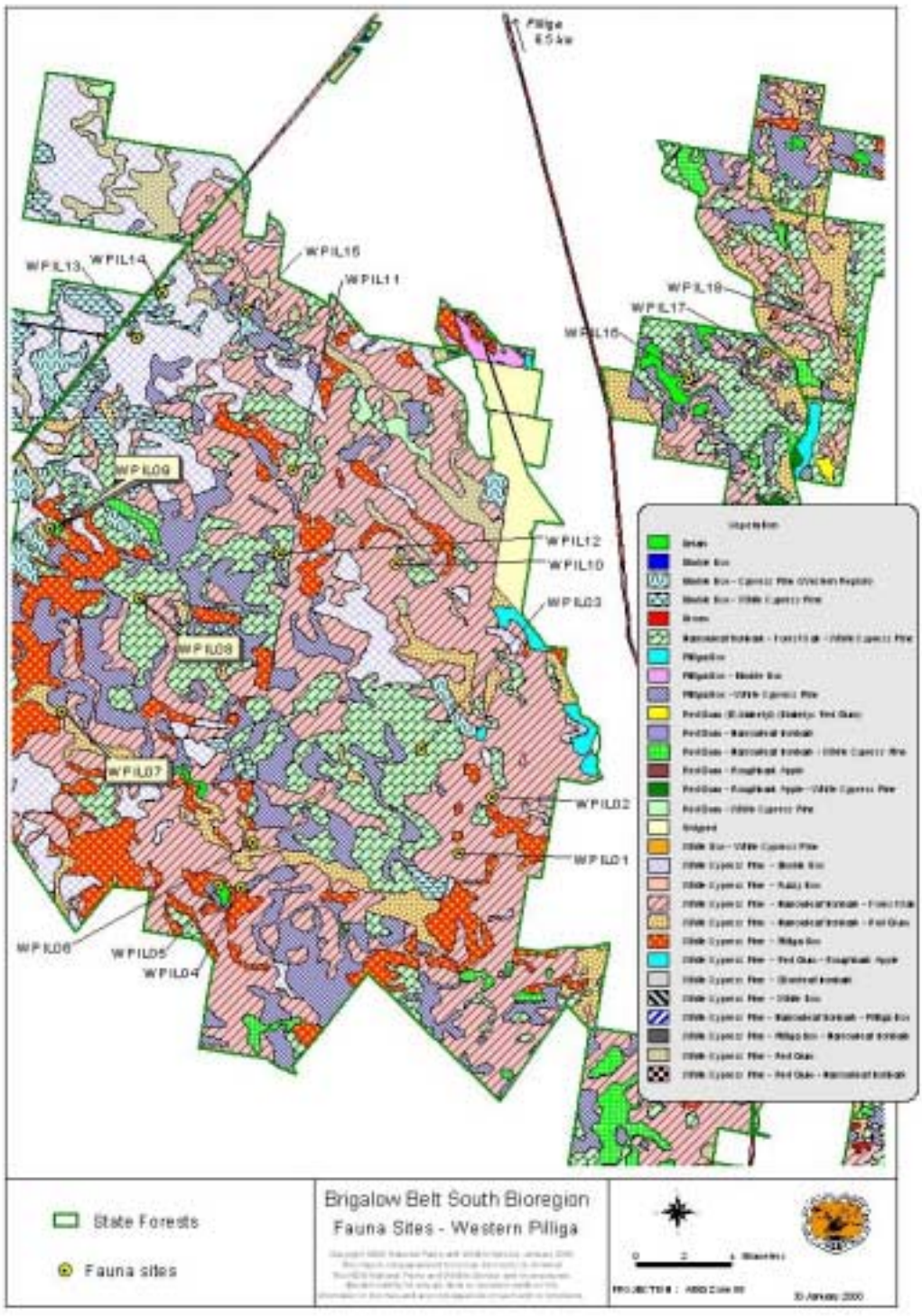


Figure 2. Distribution of study sites used in the West Pilliga study area.

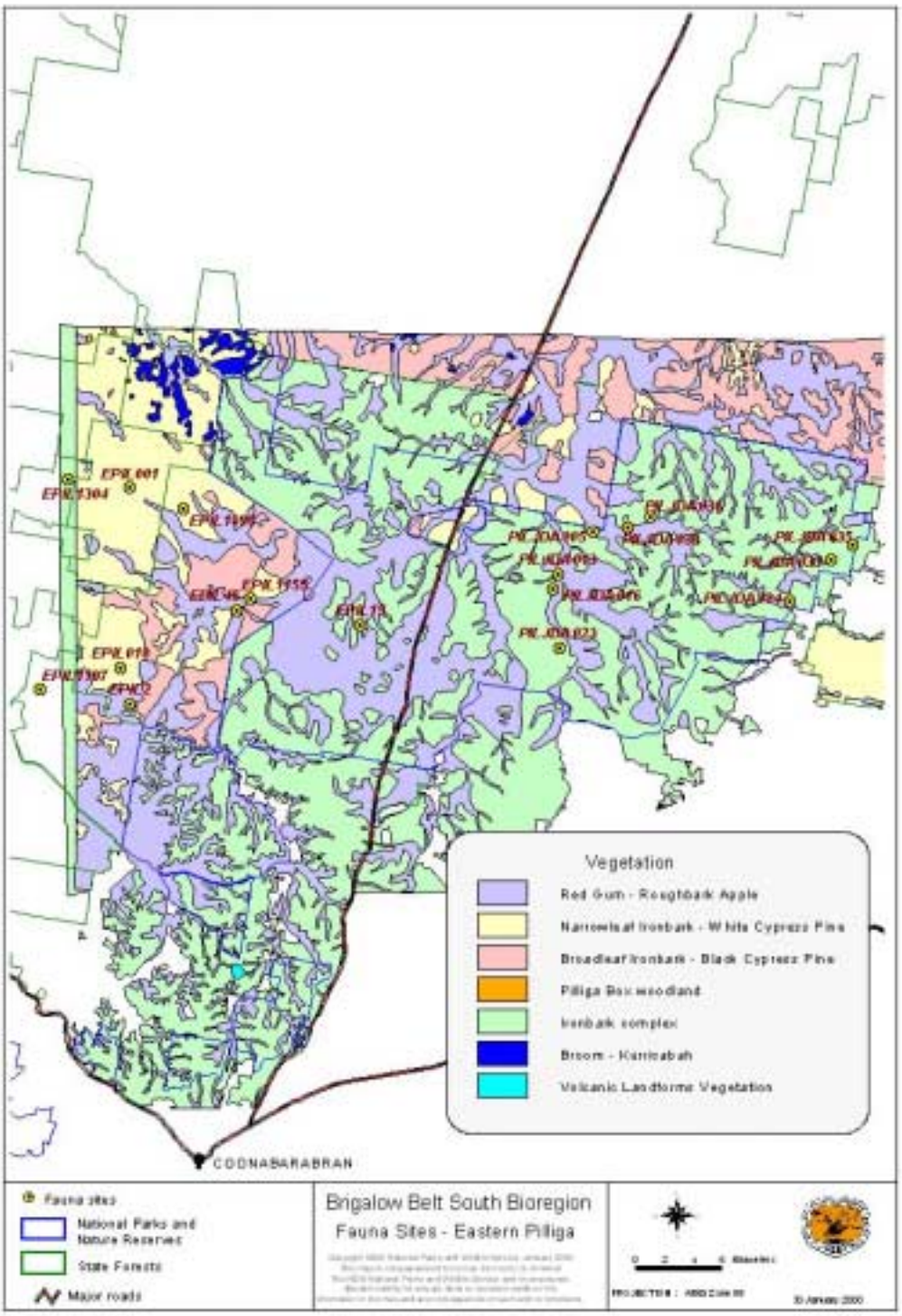


Figure 3. Distribution of study sites used in the East Pilliga study area.

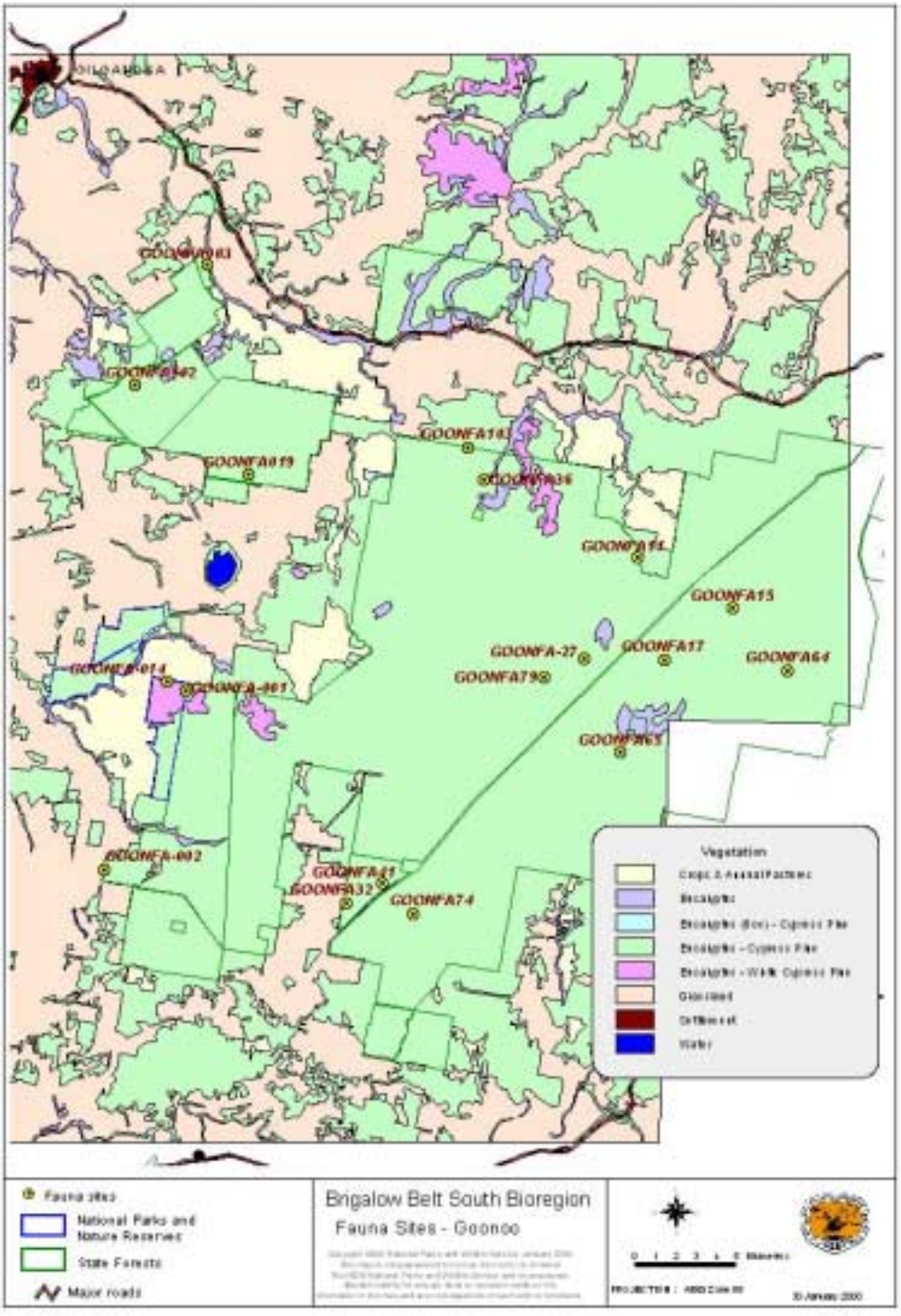


Figure 4. Distribution of study sites used in the Goonoo study area.

2.2.1 Elliott traps

Fifty Elliott traps were laid per site set in a rectangle of 200mx100m, with traps placed at each side and along one end, at ten metre intervals. Up to 10 traps at each site were mounted in trees or shrubs. Traps were baited with peanut butter/oats/sultana mixture. Traps were set for six nights, giving 300 trap nights per site.

2.2.2 Hair tubes

Ten hair tubes were placed at one end of the grid at ten metre intervals. Tubes were set in trees or shrubs and were left out for six nights giving 60 trap nights per site. Hair samples were removed at the end of the sampling period and sent to Barbara Triggs for identification.

2.2.3 Playbacks

Nocturnal playbacks were undertaken at night, generally after 10.00 p.m. and night-time spotlight searches were completed. At least five minutes of call were played per species. These were played in short bursts inter-spaced with short waiting periods. For nocturnal playbacks, windy and rainy nights were avoided. Targeted species were the Bush Thick-knee *Burhinus magnirostris*, the Koala *Phascolarctos cinereus*, the Squirrel Glider *Petaurus norfolcensis*, the Sugar Glider *Petaurus breviceps*, the Barking Owl *Ninox connivens* and the Masked Owl *Tyto novaehollandiae*. Playbacks for day birds were undertaken during a morning playback. Targeted species were the Malleefowl *Leipoa ocellata*, the Glossy Black Cockatoo *Calyptorhynchus lathami*, the Swift Parrot *Lathamus discolor*, the Turquoise Parrot *Neophema pulchella*, the Regent Honeyeater *Xanthomyza phrygia*, the Painted Honeyeater *Grantiella picta* and the Gilbert's Whistler *Pachycephala inornata*. A 10-minute listening period was undertaken at the end of the playbacks.

2.2.4 Bird counts

Two people spaced roughly 100 m apart undertook bird counts at each site. They were conducted between sunrise and 8.00 am in the morning. All birds within a 20-minute period were recorded. Different people surveyed each site in this manner on different days for a total of 1.3333 person-hours per site.

2.2.5 Habitat search

A habitat search was undertaken in a 20 x 50 m area adjacent to each site, targeting reptiles and other small vertebrates and mammal scats. They were conducted between 9.00 am and 11.00 am. The full range of microhabitats encountered was actively searched where possible. One search was undertaken per site, with no time limit, until that area was exhausted. Additional areas were searched opportunistically.

2.2.6 Harp trapping

One harp trap was placed within each site for three nights and was then moved to a road, track or creek line adjacent to the site, which contained the same habitat. Extra traps were used opportunistically. These were usually placed near a dam.

2.2.7 Bat echolocation survey

An active search with an Anabat recorder was undertaken across each site for half an hour. Fixes on calling bats were followed to obtain call sequence where possible. These recordings were made from dusk, usually between 8.30 and 9.00 p.m. Calls were analysed by Ray Williams.

2.2.8 Stag watch

Undertaken for bats and other tree-dependent fauna systematically at all sites. Motionless observers watched selected tree/s for half an hour at each site, attempting to spotlight and identify any animals emerging from the trees. These were undertaken from dusk, usually between 8.30 and 9.00 p.m.

2.2.9 Nocturnal search

Two people undertook a search with spotlights for half an hour (one work hour) at all of the two-hectare sites. By investigating tree hollows and branches as well as hollow logs and ground layers both arboreal and terrestrial fauna were targeted. These were undertaken between 9.00 and 10.30 p.m.

2.2.10 Trip-lining

Trip-lining was undertaken at selected dams to capture bats. Lines were stretched across the dams a few centimetres above water level for at least an hour at each dam investigated.

2.2.11 Predator scat collection

Any fox, dog, owl or cat scats found were collected for an analysis of their hair contents.

2.2.12 Frog searches

In addition to standard sites, where water bodies occurred, frogs were targeted for a nocturnal search. These involved active searching of water bodies for at least half an hour, while listening for frog calls. Calls were identified where possible, using Dave Stewart's "Frog Calls of north-east New South Wales". The occurrence of any identifiable fish life observed was also noted.

2.3 EFFORT

A total of 54 standardised sites were surveyed during this study. Several others sites were set up opportunistically as Elliott-trap lines, harp trap sites, bird survey sites, habitat search sites, camp list sites and trip-line sites and are not included in this analysis. A total of 16,200 trap-nights were undertaken for the Elliott lines, 540 trap nights for the hair-tubes and 270 trap nights for the harp traps. Total number of trap nights undertaken for all trapping methods amounted to 17,010 trap-nights.

Bird counts accounted for 1,400 hours of effort. Nocturnal and diurnal playbacks accounted for 54 hours, as did both the diurnal and nocturnal habitat searches. The Anabat surveys and stag watches accounted for 27 hours of effort each in total. The total amount of effort expended for these fauna detection methods amounted to 1,628 hours in total.

The surveys were undertaken between the spring of November 1999 and the summer of January 2000. The first round of surveys were undertaken in Pilliga West/Quegobla State Forests between the 12th and the 25th of November, at the Goonoo State Forest region between the 9th and the 22nd of December and at Pilliga East and the Pilliga Nature Reserve between the 6th and 19th of January.

2.4 LIMITATIONS OF SURVEY

There were critical limitations upon the effectiveness of this fauna assessment. The results must be viewed as a pilot study for further comprehensive surveys.

- **Limited geographic scope**. Only three areas were targeted for this study. These represent the largest of the remnants in the Brigalow Belt South, the Pilliga West, Pilliga East and Goonoo and associated forests and reserves. This study did not target the many hundreds of smaller state forests, timber reserves, crown timber lands, nature reserves and bushland remnants found on privately owned lands. Missing from this biased targeting were remnants to the north of the Pilliga as well as several other of the larger remnants such as Bebo and Trinkey State Forests. No non-forested systems were surveyed during Stage 1.

- **Limited habitat coverage**. The survey targeted as many habitat types as practicably possible but with an emphasis on areas likely to require data for Forest Agreements. A three-month time frame created survey limitations. A small subset of the habitat types found in the bioregion was sampled for their fauna. Habitat types covered by this survey are shown in the Results and Discussion, while a listing of those not covered and covered is given at Appendix 8.5 to this report. Additional vegetation mapping being conducted concurrently with this study is likely to identify additional habitats not yet surveyed.

- **Limited time**. Very limited time was available to prepare for the regional survey, and to then process and present all the results in this report. The results of the hair-tube samples, predator scat analysis and of the bat sonar surveys (Anabat) may take several weeks before they can be completed. Analysis of their effectiveness as methods is not possible in this report until the samples are analysed and the data received and incorporated into the main dataset. These results may contain some additional species not yet recorded in this survey or new habitats for species already recorded by other methods, and so the results presented here may represent a limited picture of the fauna diversity in the region. The survey was restricted to three months of the year, during the hottest parts of late spring and summer. The timing of the survey meant that not all taxa could be surveyed adequately because this time of the year is not optimal for the detection of many species. Most birds have finished breeding, are moulting and are generally more cryptic; winter is an important time for the breeding and seasonal congregation of some birds and mammals; reptiles also have finished breeding and are active for shorter periods of the day; rainfall is generally lower than in spring, decreasing the detection level of frogs.

- **Limited effort.** Only fifty four sites were surveyed during Stage 1, well short of the sampling effort undertaken in other Comprehensive Regional Assessments (CRAs) in other areas of New South Wales. For example 279 sites were surveyed in the Lower North East CRA. The Sydney Basin CRA, which received the lowest effort, had 187 sites sampled, along with 117 targeted survey sites. The small sample size of survey sites for this regional assessment was largely the result of a very limited time frame and few personnel available for the surveys.

- **Limited scope of methodologies**. Pit trapping was not undertaken because of logistical considerations of preparation and installation time, but may prove useful for further work. This may have reduced the detection levels of some species.

- **Limited effectiveness of site selection.** Because of time constraints, adequate ground truthing of the survey areas could not be made. The important vegetation mapping of the study area was a concurrent project and hence little of its information was available at the time of the initial site selection. Site selection was based on a random selection of stratified vegetation plots and was not based on the potential wildlife values of the sites. As a result, the returns of the study were not maximised in terms of species detection, though may be a more accurate reflection of overall fauna values throughout the areas surveyed by covering a range of vegetation types and disturbance histories without observer *a priori* decisions as to what is valuable fauna habitat.

3. RESULTS

3.1 0VERALL SPECIES PRESENCE

The total number of species detected during the preliminary survey was 249 with 6 502 individual records. These are initial results, as no Anabat or scat analysis was available at the time of writing and the hair tube results have not been fully databased. Biases in the survey results are indicated where appropriate. Common names are used for the birds and mammals, while scientific names are used for frogs and reptiles because often accepted common names for these animals are lacking. The full list of common and scientific names is provided in Appendix 9.1.

3.1.1 Native animals

For all detection methods so far analysed, birds were the most frequently recorded of the vertebrate classes with 155 species observed giving 3960 individual records. There were 39 reptiles detected giving 452 records, 17 non-flying native mammals detected with 734 records, 16 bats detected with 1 052 records and 12 frogs detected with 109 records.

Frogs were not detected in great densities, though this result may reflect a number of habitat and seasonal constraints mentioned earlier. Intermittent drainage systems found in the Pilliga and Goonoo tend to be dry on the surface most of the time. Easily the most common species were *Litoria latopalmata* and *Litoria peronii* with *Limnodynastes ornatus* and *Limnodynastes terraereginae* also widespread. Frogs were detected by call, during nocturnal frog searches, during spotlight searches, or opportunistically on roads at night. One species, *Limnodynastes terraereginae*, was caught in an Elliott trap.

Most reptile species were also recorded infrequently, with *Morethia boulengeri, Heteronotia binoei, Egernia striolata* and *Amphibolurus nobbi* the most common and widespread species. Too many reptile species were recorded infrequently, for reasons indicated in the Project Summary, to give any reliable indication of density. Most individuals were detected during daytime habitat searches, while some were detected during spotlight searches and others, specifically *Amphibolurus byrnei, Pogona barbata, Varanus varius, Demansia psammophis, Egernia striolata* and *Morethia boulengeri* were caught in Elliott traps.

Of the 155 birds detected by observation or call, a number can be regarded as common, that is, a large number of individuals detected and found occurring across a large number of sites. The most common birds found across the survey areas were the Mallee Ringneck, Glossy Black Cockatoo, Galah, Grey-crowned Babbler, Spotted Pardalote, Grey Fantail, Rufous Whistler, Eastern Yellow Robin, Grey Shrikethrush, Noisy Friarbird, White-eared Honeyeater, Yellow-faced Honeyeater, Spiny-cheeked Honeyeater, Superb Fairy Wren, Pied Currawong, White-throated Treecreeper, Weebill, Western Gerygone, Yellow Thornbill, Inland Thornbill, Common Bronzewing and the Owlet Nightjar.

Another group (those detected only once) can be regarded as rare. These species were judged to contain some regionally significant species, judging by their known rarity in the bioregion or were unexpected species. These were the Fork-tailed Swift, the Bush Stone-curlew, Red-kneed Dotterel, Masked Lapwing, Australasian Bittern, Yellow-billed Spoonbill, Azure Kingfisher, Brush Cuckoo, Whistling Kite, Black-breasted Buzzard, Australian Hobby, Brolga, Buff-banded Rail, Striated Thornbill, White-winged Triller, Torresian Crow, the White-backed Swallow, Welcome Swallow, Singing Honeyeater, Yellow-throated

Miner, Gilbert's Whistler, Australian Pelican, Great Cormorant, Crimson Rosella and the Cockatiel. Some of these are waterbirds, which you would expect to be rare in these ecosystems, given the general lack of standing water.

Of the non-flying native mammals, there were 41 records from hair-tube analysis and 693 records from observations, trap records, scats and calls. A number of species were found to be common and widespread in the bioregion, including the Eastern Grey Kangaroo, Red-necked Wallaby, Swamp Wallaby, Sugar Glider, Koala and the Yellow-footed Antechinus. The Yellow-footed Antechinus was the most frequently recorded mammal in this survey. Rare mammals (those detected less than five times and at few sites) were the Black-striped Wallaby, Feathertail Glider, Eastern Pygmy-possum, Water Rat, Wallaroo and the Red Kangaroo. The Feathertail Glider and the Eastern Pygmy-possum are considered difficult species to detect, though a range of methods were used to increase their chances of detection, including stag-watches, nocturnal searches, Elliott trapping and hair-tubing. Pygmy-possums were caught in Elliott traps positioned at the base of trees; another was caught by hand in a low bush. The Feathertail Glider was observed during a stag-watch. Wallabies and kangaroos were generally identified opportunistically, as was the case for the three rare species, or from scats found on-site. Some individuals were observed on-site during nocturnal searches.

Five species were caught using Elliott traps; that is the Sugar Glider, Pilliga Mouse, Yellow-footed Antechinus, Eastern Pygmy-possum and the Common Dunnart. Three species were positively identified from hair-tubes, Yellow-footed Antechinus, Common Brushtail Possum, and the Common Dunnart. Nine species were detected by spotlight searches and stag-watches, the Feathertail Glider, Eastern Pygmy-possum, Common Brushtail Possum, Squirrel Glider, Sugar Glider, Koala, Red-neck Wallaby, Yellow-footed Antechinus and the Common Dunnart. Six species were detected from scat identification or diggings, the Koala, Echidna, Eastern Grey Kangaroo, Red-necked Wallaby, Swamp Wallaby and the Common Brushtail Possum. All the macropods were detected opportunistically on roads during the day or at night. Two native species were detected during daytime habitat searches, the Eastern Grey Kangaroo and the Yellow-footed Antechinus. Three species were detected from call playbacks, the Sugar Glider, Squirrel Glider and the Koala. One species was detected opportunistically during a daytime stream search, the Water Rat. From these results, spotlight searches appear to have been the most productive, in terms of species observed, while Elliott trapping accounted for about half the individual records, most of which were Yellow-footed Antechinus, and it was the only method successful in detecting Pilliga Mice. Road observations at night are potentially useful for detecting rare species such as the Black-striped Wallaby.

The most common and widespread bats detected by harp-trapping were Little Forest Bat, Gould's Wattled Bat, Greater Long-eared Bat, Lesser Long-eared Bat, Gould's Long-eared Bat, Inland Broad-nosed Bat and the Little Broad-nosed Bat. The rarest bats (recorded less than five times) were White-striped Freetail Bat, Yellow-bellied Sheathtail Bat, Chocolate Wattled Bat, Little Pied Bat and the Eastern Cave Bat. Some of these mammals may have their detection rate increased after analysis of echolocation samples as some, particularly high foraging species, such as the Sheathtails and the Freetail Bats are not easily caught in harp-traps.

3.1.2 Introduced mammals

There were 10 introduced animal species detected with 194 individuals being found. House Mice were most abundant (88 individuals) with pigs, goats and foxes also common throughout the survey area. There were no introduced birds such as sparrows or starlings detected within the survey areas. Only one cat was observed, horses were scarce, only found in small groups in the Pilliga West State Forest and the Pilliga Nature Reserve. Cattle were detected on the edges of the Pilliga Nature Reserve and Goonoo State Forest and were probably straying stock. Black Rats were detected only in Goonoo State Forest and in the Pilliga Nature Reserve.

House Mice were caught in Elliott traps and detected in hair-tubes, Black Rats were caught in Elliott traps only, while all other species were observed opportunistically or detected on-site by their scats.

3.1.3 Threatened fauna

All threatened fauna detected during the preliminary survey were pooled in Table 1 along with the frequency with which each species was detected. Opportunistic sightings and site-specific sightings are both included. No threatened frogs were detected and none from the bioregion are currently listed as threatened in New South Wales. Only one reptile from the bioregion is currently listed as threatened, *Hoplocephalus bitorquatus.* This species was detected during the surveys on two occasions during habitat searches.

Table 1. Threatened species detected during preliminary survey of Brigalow Belt South (Stage 1).
(Key: E-endangered; V-Vulnerable [per TSC Act 1995]

Class	Species	Common Name	Status	individuals
Reptilia	*Hoplocephalus bitorquatus*	Pale-headed Snake	V	2
Aves	*Leipoa ocellata*	Malleefowl	E	6
	Botaurus poiciloptilus	Australasian Bittern	V	1
	Grus rubicundus	Brolga	V	1
	Burhinus grallarius	Bush Stone-curlew	E	1
	Lophoictinia isura	Square-tailed Kite	V	3
	Hamirostra melanosternon	Black-breasted Buzzard	V	1
	Calyptorhynchus lathami	Glossy Black Cockatoo	V	55
	Neophema pulchella	Turquoise Parrot	V	38
	Ninox connivens	Barking Owl	V	13
	Tyto novaehollandiae	Masked Owl	V	2
	Pachycephala inornata	Gilbert's Whistler	V	1
Mammalia	*Macropus dorsalis*	Black-striped Wallaby	E	1
	Petaurus norfolcensis	Squirrel Glider	V	7
	Cercartetus nanus	Eastern Pygmy-possum	V	3
	Phascolarctos cinereus	Koala	V	55
	Pseudomys pilligaensis	Pilliga Mouse	V	18
	Chalinolobus dwyeri	Large-eared Pied Bat	V	23
	Chalinolobus picatus	Little Pied Bat	V	3
	Nyctophilus timoriensis	Greater Long-eared Bat (eastern form)	V	83
	Saccolaimus flaviventris	Yellow-bellied Sheathtail Bat	V	3
	Vespadelus troughtoni	Eastern Cave Bat	V	2
Total	**22 species**			**322**

There were 22 threatened species detected out of a possible 55 identified for the bioregion (Appendix 9.7). There were one reptile, 11 birds and ten native mammals, including five bats. Three species listed under category 1 of the *Threatened Species Conservation Act (1995)* as endangered were detected, the Malleefowl, Bush Stone-curlew and the Black-striped Wallaby. Numbers of Glossy Black Cockatoo, Turquoise Parrot, Koala and GreaterLong- Long-eared Bat detected may be indicative of reasonably large populations of these species within the targeted survey areas though more work is needed to determine the geographical extent of these populations and their long-term viability. It is likely that the areas surveyed may be important refuges for these species within a statewide context. There were 322 records of threatened species recorded during the surveys.

3.2 GEOGRAPHIC BREAKDOWN OF SPECIES PRESENCE

Below is a summary of the fauna as it was detected at each of the three major survey areas. Species lists for all the survey areas are presented in Appendix 8.2.

3.2.1 West Pilliga state forests

One hundred and sixty one native animal species and six introduced species were detected during this survey in Pilliga West and Quegobla State Forests. This total includes 12 frog species, 105 bird species, 12 non-flying mammal species, 10 bat species and 21 reptile species. Eleven threatened species were detected during this survey. These were *Hoplocephalus bitorquatus,* Glossy Black Cockatoo, Turquoise Parrot, Barking Owl, Masked Owl, Squirrel Glider, Koala, Pilliga Mouse, Little Pied Bat, Greater Long-eared Bat and Yellow-bellied Sheathtail Bat. An additional species, the Brolga, was detected opportunistically outside the state forest boundary, on the western side of Pilliga West State Forest.

The most common frog species detected were the tree-frogs *Litoria latopalmata* and *Litoria peronii* found around dams and the Northern Banjo Frog *Limnodynastes terraereginae* which was found to range widely throughout the forested areas. The most common reptile species detected were *Morethia boulengeri, Egernia striolata, Heteronotia binoei* and *Gehyra variegata.* The most common bird species detected were the thornbills, (Inland, Yellow, Chestnut-rumped and the Weebill), Western Gerygone, Speckled Warbler, White-throated Treecreeper, Grey Butcherbird, Superb Fairy Wren, Spiny-cheeked Honeyeater, Grey Shrikethrush, Eastern Yellow Robin, Rufous Whistler, Grey Fantail and the Galah. The most commonly detected non-flying mammals were the Koala, the Yellow-footed Antechinus, Eastern Grey Kangaroo, Red-necked Wallaby, Swamp Wallaby and the Common Dunnart. The most frequently recorded bat species were Gould's Wattled Bat, Little Forest Bat, Lesser Long-eared Bat and Gould's Long-eared Bat

Introduced mammals detected in Pilliga West were horses, cattle, goats, pigs, foxes and House Mice. Goats, pigs and foxes appear to be the most widespread of these species.

3.2.2 Goonoo area state forests/Coolbaggie Nature Reserve

Six introduced and 159 native animal species were detected during the survey in Goonoo State Forest and other nearby lands. This total includes seven frog species, 108 bird species, 11 non-flying mammal species, 10 bat species and 22 reptile species. Nine threatened species were detected during this survey. These were the Glossy Black Cockatoo, Turquoise Parrot, Barking Owl, Masked Owl, Malleefowl, Square-tailed Kite, Eastern Pygmy-possum, Squirrel Glider and the Greater Long-eared Bat. An additional species, the Australasian Bittern, was detected opportunistically outside the study boundary on the Castlereagh River near Mendooran.

Only two frog species were found to be common at the time of this study. They were the tree-frogs *Litoria latopalmata* and *Litoria peronii, which* were found around dams. The most common reptile species detected were *Morethia boulengeri* and *Oedura robusta.* Most reptiles were scarce at the time of this survey. The South-east Slider *Lerista bougainvillii* was detected here, an extension to its previously known range. The most common bird species detected were the Owlet Nightjar, the thornbills, (Inland, Yellow, Buff-rumped and Weebill), the White-throated Treecreeper, Superb Fairy Wren, Yellow-faced Honeyeater, Noisy Friarbird, Grey Shrikethrush, Eastern Yellow Robin, Rufous Whistler, Grey Fantail and the Galah. The most commonly detected non-flying mammals were the Yellow-footed Antechinus, Eastern Grey Kangaroo, Red-necked Wallaby, Swamp Wallaby and the Sugar Glider. The most frequently recorded bat species were Gould's Wattled Bat, Little Forest Bat, Lesser Long-eared Bat and the Greater Long-eared Bat

Introduced mammals detected in Goonoo were goats, pigs, foxes, rabbits, Black Rats and House Mice. Pigs were widespread throughout the area, while House Mice were locally abundant at some sites.

3.2.3 Eastern Pilliga state forests/Pilliga Nature Reserve

Eight introduced and 167 native species were detected during the last survey round in Stage 1. Six frogs were detected, 27 reptiles, 14 non-flying mammals, 14 bats and 106 birds. Thirteen threatened species were detected; the Glossy Black Cockatoo, Turquoise Parrot, Black-breasted Buzzard, Square-tailed Kite, Gilbert's Whistler, Eastern Pygmy-possum, Koala, Squirrel Glider, Pilliga Mouse, Eastern Cave Bat, Large-eared Pied Bat, Yellow-bellied Sheathtail Bat and the Greater Long-eared Bat

Frogs were once again scarce, even along creek beds, containing some of the biggest gullies examined in Stage 1. More reptile species were detected in this area, though again most were scarce. Only *Amphibolurus nobbi, Ctenotus robustus, Morethia boulengeri* and *Egernia striolata* were detected in significant numbers. The Robust Velvet Gecko *Oedura robusta* was recorded in the Pilliga for the first time. Records of the Litter Skink, *Lygisaurus foliorum* are western extensions to their previously known range.

The most common bird species were the Common Bronzewing, White-throated Treecreeper, Grey Butcherbird, Pied Currawong, Superb Fairy Wren, Variegated Fairy Wren, White-eared Honeyeater, Grey Shrikethrush, Eastern Yellow Robin, Rufous Whistler, Grey Fantail, Spotted Pardalote, Glossy Black Cockatoo, Little Lorikeet and the Mallee Ringneck. Significant birds detected were the Gilbert's Whistler, not previously recorded from the Pilliga, the Bush Stone-curlew, detected on the edge of the Pilliga East forest and private land on the eastern boundary, and the Yellow-plumed Honeyeater, not recorded from the Pilliga before.

The most commonly detected non-flying mammals were the Eastern Grey Kangaroo, Red-necked Wallaby and the Yellow-footed Antechinus; most native mammal species were rarely detected. The Pilliga Mouse was detected at 10 new locations for this species. Another noteworthy mammal detected was the Black-striped Wallaby, confirming its presence in the Pilliga State Forests. The last time it was definitely recorded here was in 1987. Of the 14 bat species detected there were four threatened species. The most common species were Gould's Wattled Bat, Little Forest Bat, Gould's Long-eared Bat and the Inland Broad-nosed Bat. Rare bats detected were the four threatened species and the Chocolate Wattled Bat, at the inland edge of its range in the Pilliga area.

3.2.4 Regional Biogeography

Data collected during the Stage 1 surveys was compared to other NPWS survey data from the western slopes and plains of NSW. The western plains sites were located from approximately 90km north west of the West Pilliga study area across to South Australia (Mazzer *et al*. 1998, Smith *et al*. 1998) while the western slopes sites were from approximately 100km south of the Goonoo sites south to Nangar National Park (Faulkner *et al*. 1997). Sites within the Stage 1 surveys were located over approximately 250km within the Brigalow Belt South bioregion.

Analysis of species presence/absence (excluding flying birds) data by the use of PATN revealed that the sites within the bioregion showed the least association with the western plains sites and formed a distinct group with only a few sites being more similar to sites in the Hervey Ranges from the South West Slopes bioregion. Within the main group of Brigalow Belt South sites a series of sites from Pilliga West formed the most distinct entity.

This is shown in Figure 5 where the dendrogram resulting from PATN indicates the similarity of sites or groups of sites (named on the dendrogram after their geographic/vegetation makeup) to one another. The further to the right that a group is defined the more diverse is its composition. The further to the right that two sites are linked by the branching structure the less they have in common.

Additional data from earlier State Forest studies and scientific licence reports may be able to be incorporated into future analyses as site based dataset but the lack of details about microhabitat use means that birds flying over sites cannot be excluded. Similarly, care will be needed to make sure that the

species potentially sampled in each study are the same or that species potentially not sampled (e.g. bats if no ultrasonic or harp sampling was used) are excluded from all datasets.

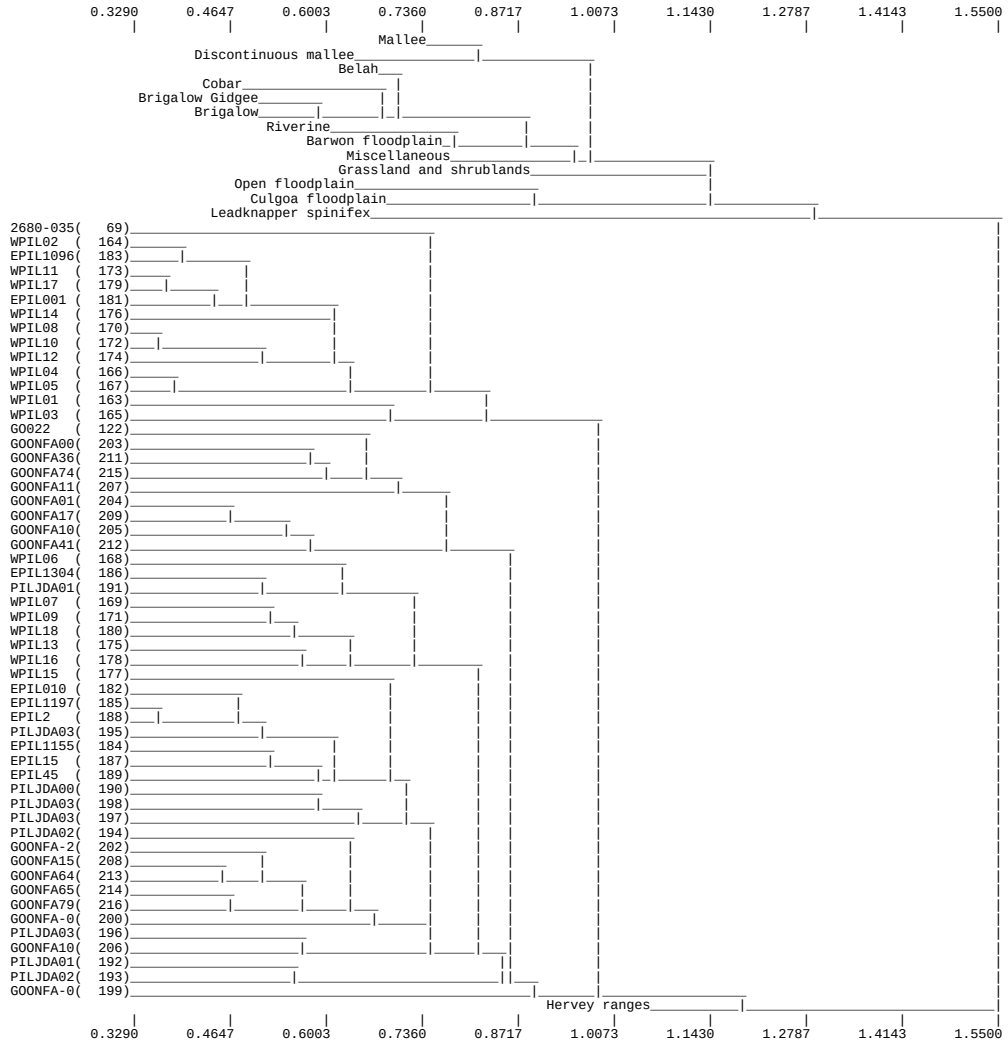


Figure 5. Dendrogram showing the relationship of the Brigalow Belt South Stage 1 survey sites to other NPWS western slopes and plains survey sites.

3.3 SPECIES OCCURRENCE WITHIN VEGETATION TYPES

The sites surveyed were grouped according to the major tree associations present. A composite list of the species found within each major association was compiled. These associations belong to the same scheme as developed for the Brigalow Belt South Vegetation Survey and Mapping Project. Systematic sites were grouped with some opportunistic sites where a suitable number of fauna records existed. The sample size for each of the sites was not even, so this is only an indication of the species presence within each tree association (habitat). Some associations were only represented by one site and so were excluded from this analysis. This includes River Red Gum, *Eucalyptus camldulensis/Casuarina cunninghamiana*, Western Grey Box, *Eucalyptus microcarpa* and Green Mallee, *Eucalyptus viridis*. The association at the opportunistic site at Dinner Time Tank, Pilliga West State Forest, was a mix of Pilliga Box, Bimble Box and Narrow-leaf Ironbark and is also not included.

The vertebrate fauna diversity of each association and the presence of threatened fauna are compared. This categorisation does not reflect understorey attributes of the sites though these are described. The fauna species lists for each association are given in Appendix 8.4. The results are summarised in Table 2. Two Narrow-leaf Ironbark associations and two Red Gum associations were identified. Vertebrate diversity was found to be similar in all habitat types, except a high diversity in the Narrow-leaf Ironbark type found on flat ground and a lower diversity in the two under-sampled types, Poplar Box and Belah woodlands.

3.3.1 Narrow-leaf Ironbark *(E. crebra/A. luehmannii/C. glaucophylla/C. endlicheri)* forests

Sites: WPIL1, WPIL2, WPIL3, WPIL6, WPIL11, WPIL12, WPIL8, GOONFA017, GOONFA036, EPIL1096, EPIL005.

This association was found in all survey areas targeted during the preliminary assessment, particularly in the Pilliga West and Goonoo State Forests, but also at some sites in east Pilliga and in the Pilliga Nature Reserve. Typically, this association was found on flat sandy soils with an often sparse understorey of shrubs, though with an extensive understorey of grasses and forbs. It is closely associated with White Cypress Pine *Callitris glaucophylla* and Bull Oak *Allocasuarina luehmannii.*

By far the greatest number of vertebrates was detected in this habitat, despite extensive tree loss in many areas surveyed. There were 141 species detected, including seven threatened species. These were; four birds the Barking and Masked Owls, the Turquoise Parrot and the Glossy Black Cockatoo; two arboreal marsupials, the Koala and the Squirrel Glider; and one bat species, the Greater Long-eared Bat. This habitat contained the highest diversity of bird (94) and reptile (20) species for all habitats sampled.

3.3.2 Gully Narrow-leaf Ironbark (*E. crebra*) with Red Gum (*E. blakelyi*)

Sites: WPIL10, GOONFA015, GOONFA027, GOONFA041, EPIL045, Bark Hut Dam (opportunistic camp site)

This association is similar to the above association but with a different position. It is always found on deep sands on or near sloping ground leading to a gully often lined with a red gum strip of *E. blakelyi.* Due to its topography, this association often has a relatively dense understorey of shrubs.

This was found to contain slightly less diversity of animal species than the above type, with 101 vertebrates detected including six threatened species. These were the *Hoplocephalus bitorquatus* Turquoise Parrot, Barking Owl, the Koala, the Pilliga Mouse and the Greater Long-eared Bat.

3.3.3 Broad-leaf Ironbark (*E. fibrosa/C. trachyphloia/C. endlicheri*) forests

Sites: EPIL010, EPIL002, EPIL001, EPIL015, EPIL036, EPIL038, EPIL033, EPIL035, Willala Mt

This association was found only in the east Pilliga surveys at sites in the eastern Pilliga state forests and in the Pilliga Nature Reserve. It was found consistently in upslope areas with skeletal soils and often on rocky ground. Understories are usually well developed and highly variable in structure, ranging from tall scrub to low, dense shrub layers, and was often very diverse. This association is typically found with Brown Bloodwood *Corymbia trachyphloia* and Black Cypress Pine *Callitris endlicheri.*

This association contains a similar diversity of animal species to the above type, with 102 species detected, but with the greatest number of threatened species (11) near or on sites. This included; five birds, the Gilbert's Whistler, Glossy Black Cockatoo, Black-breasted Buzzard, Square-tailed Kite and the Turquoise Parrot. Two threatened, small non-flying mammals were detected, the Pilliga Mouse and the Eastern Pygmy-possum, both indicative of the well developed understories found in this habitat. The Pilliga Mouse was caught in burnt and unburnt habitats, while the pygmy-possum was caught in unburnt vegetation where it was active in tall tea-tree *Leptospermum* bushes. Koala scats were also found at

several sites. Three threatened bats were also detected in Broad-leaf Ironbark habitats. These were the Greater Long-eared Bat, the Eastern Cave Bat and the Large-eared Pied Bat. The latter two are thought to roost in caves, though both are likely to use suitable nearby habitat for foraging. The highest number of bat species was detected in this habitat (12 species). A Black-striped Wallaby was also observed off-site in Broad-leaf Ironbark habitat in Timmallallie State Forest, making a total of 12 threatened species detected in this habitat.

3.3.4 Blue-leaf Ironbark (*E. nubila/C. endlicheri*) forests

Sites: GOONFA064, GOONFA019, GOONFA074, GOONFA065, GOONFA079

This association was found only in the Goonoo and Lincoln State Forests, in similar topographical situations to the above type and found with Black Cypress Pine. It differs from Broad-leaf Ironbark habitats in that there are no bloodwoods present, and the understories range from sparse to dense, though generally floristically diverse.

This association was the least diverse of the ironbark associations with 82 vertebrates detected, including five threatened species, the birds; Glossy Black Cockatoo, Barking Owl and the Malleefowl; a marsupial, the Eastern Pygmy-possum and a bat; the Greater Long-eared Bat. Only four bat species were detected from Blue-leaf Ironbark sites, the lowest for any tree-dominated association surveyed in this preliminary assessment.

3.3.5 Pilliga Box (*E. pilligaensis/C. glaucophylla*) woodlands

Sites: WPIL4, WPIL15, WPIL17, EPIL1304

This association was surveyed in the Pilliga West, Quegobla and Baradine State Forests on richer loamy soils, often in topographical depressions. It usually has a very sparse understorey, dominated by grasses, typically in association with White Cypress Pine and sometimes with Narrow-leaf Ironbark.

It was found to contain a relatively high diversity of vertebrates with 105 species detected, including six threatened species. Two threatened bird species were detected from these woodlands; the Turquoise Parrot and the Barking Owl, one marsupial; the Koala and three bats; the Little Pied Bat, the Yellow-bellied Sheathtail Bat and the Greater Long-eared Bat. Pilliga Box trees provide a high level of habitat for wildlife, with old trees containing many hollows. Understories in this habitat are more susceptible to grazing by introduced animals because of the open, grassy understories.

3.3.6 Bimble Box (*E. populnea*) woodlands

Sites: WPIL13, WPIL14

This association was surveyed only in the Pilliga West State Forest where significant stands occur. It resembles habitats containing Pilliga Box, though usually found on flat, sandier soils. Also usually associated with White Cypress Pine and Narrow-leaf Ironbark and often with a much more extensive tall shrubby understorey.

It is the least diverse of all the habitats assessed in this analysis with only 58 vertebrates detected, though this may be partly due to low sampling effort (only two sites). Four threatened species were detected in this habitat. These were *Hoplocephalus bitorquatus,* the Koala, Little Pied Bat and the Greater Long-eared Bat. Bimble Box trees also bear high numbers of hollows and are likely to be suitable for a wider range of species than is indicated here. Understories in this habitat, like the previous association, are highly susceptible to feral penetration and disturbance. No threatened birds were observed in this habitat during this survey.

3.3.7 Red Gum (*E. blakelyi*) woodlands

Sites: WPILO7, WPIL09, EPIL1155, Salisbury Waterholes (opportunistic camp site)

This association was surveyed in the Pilliga West State Forest and in the Pilliga Nature Reserve. It is usually found with White Cypress Pine and also with Brown Bloodwood. Usually found on deep sands away from gully zones, with or without shrubby understories. Red Gum can be mallee-form in these situations, although it still grows as large stems.

These habitats are highly diverse, both floristically and faunistically, with 110 vertebrate species detected during the preliminary survey, including 81 bird species and five threatened species. The threatened species detected were; two birds, the Barking Owl and the Turquoise Parrot, two arboreal marsupials; the Koala and the Squirrel and Glider; and the bat, the Greater Long-eared Bat.

3.3.8 Red Gum/Rough-barked Apple (*E. blakelyi/ A. floribunda*) woodlands

Sites: EPIL011, EPIL24, EPIL016, EPIL023, EPIL013.

This association is generally a gully zone habitat, but is sometimes on deep sand outwashes some distance from gullies. It is found in Goonoo State Forest and in the Pilliga Nature Reserve. It often has a dense understories and/or extensive litter cover. It is different from the above habitat by usually having bigger, taller trees and the presence of Rough-barked Apple. Sometimes found with the ironbarks *E. sideroxylon* and *E. crebra*.

These habitats were found to be diverse with 97 species and 7 threatened species. These were the Turquoise Parrot, the Koala, the Squirrel Glider, Pilliga Mouse, Eastern Pygmy-possum and the bats, the Greater Long-eared Bat and the Yellow-bellied Sheathtail Bat. With the exception of the Koala and Pilliga Mouse, the rest are likely to be reliant upon the hollows found extensively in this habitat type.

Table 2. Distribution of threatened species across identified habitats

(Key. 1: Narrow-leaf Ironbark forest, 2: Narrow-leaf ironbark/Red Gum gully, 3: Broad-leaf Ironbark forest, 4: Blue-leaf Ironbark forest, 5: Pilliga Box woodland, 6: Bimble Box woodland, 7: Red Gum woodland, 8: Red Gum/Rough-barked Apple woodland, 9: Heathy Scrub, 10: Belah woodland. Numbers of threatened species shown in parentheses)

Taxa	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Frogs	8	2	4	0	5	6	3	0	4	3
Reptiles	20	12(1)	10	12	10	7(1)	11	10	11	7
Birds	94(4)	67(2)	68(5)	59(2)	71(2)	34	81(2)	71(1)	86(2)	46(1)
Mammals	10(2)	10(2)	9(3))	7(1)	9(1)	6(1)	7(2)	8(4)	6(1)	4(1)
Bats	9(1)	10(1)	12(3)	4(1)	10(3)	5(2)	8(1)	8(2)	4	6(1)
Total	**141(7)**	**101(6)**	**103(11)**	**82(4)**	**105(6)**	**58(4)**	**110(5)**	**97(7)**	**111(3)**	**66(3)**
Ferals	5	4	4	3	2	2	5	4	3	3

3.3.9 Heath/Scrubland/Mallee (*M. uncinata/A. triptera/E. dumosa/E. dwyeri/E. chloroclada*)

Sites: WPIL18, GOONFA001, GOONFA103, GOONFA014, GOONFA002, EPIL1197.

This association is dominated by a shrubby understorey and generally has extensive stands of Broombush *Melaleuca uncinata*, shrubby She-oak, *Allocasuarina* spp. and Spur-winged Wattle *Acacia triptera*, sometimes forming low heathlands with a high diversity of plants. This association features very low mallee *Eucalyptus* emergents of various species. Mostly surveyed in Goonoo State Forest, but also in Quegobla State Forest where it was associated with Narrow-leaf Ironbark and in Timmallallie State Forest

where it was associated with Baradine Red Gum, *E. chloroclada* and Brown Bloodwood. A very diverse habitat found on a variety of soil types.

It was one of the most diverse communities surveyed during this preliminary study, with 111 vertebrate species and 86 bird species, though with only three threatened species detected. Two threatened birds, the Glossy Black Cockatoo and the Malleefowl were found in this habitat. Two individuals of the Malleefowl, including a chick, were detected only in the Goonoo area, and one mammal, the Pilliga Mouse, only from the Pilliga. Only four bats were recorded from this habitat type, reflecting its rather open upper canopy of mallee-form trees.

3.3.10 Belah (*C. cristata*) woodlands

Sites: WPIL5, WPIL16

This association was surveyed at two sites located in Pilliga West and in Quegobla State Forests, which were almost pure stands of this oak. Found on waterlogged loamy soils, with a very sparse understorey, dominated by grasses. One of the most species-poor communities surveyed in terms of its fauna with only 66 vertebrate species recorded with relatively low numbers of birds (46 species) and non-flying mammals (four species). This may be due in part to the poor coverage of this type during the surveys. Three threatened species were detected, the Barking Owl, the Koala and the Greater Long-eared Bat. Belah occurs in rather small, discrete patches, and so any of these species are able to move in and out of this habitat in relatively short periods of time into nearby habitats.

3.4 HABITAT SELECTION PREFERENCES BY KEY SPECIES

A number of threatened species were recorded at relatively high frequencies and so their habitat selection was analysed. In order to obtain a better picture the use of tree resources in the survey areas, other, more common species are included where sufficient records were collected. Tree dependent species included in this analysis are the Greater Long-eared Bat, Glossy Black Cockatoo, Koala, Barking Owl, and the Squirrel Glider, the Common Brushtail Possum, *Trichosurus vulpecula* and the Sugar Glider *Petaurus breviceps*. Ground dependent species analysed are the Yellow-footed Antechinus *Antechinus flavipes* and the Pilliga Mouse, although the Antechinus does make use of tree hollows as dens. The Turquoise Parrot, though recorded often, was rarely detected at sites and so habitat designations could not be assigned nor densities calculated and is excluded from this analysis.

In the graphs presented below, the relative density that each species was detected at in each of the identified tree associations is illustrated. Because the sample size for each tree association was not even, the number of sites found with that association divides the total number of records for each species in each association. The graphs therefore present average density of number of individuals per 2ha.

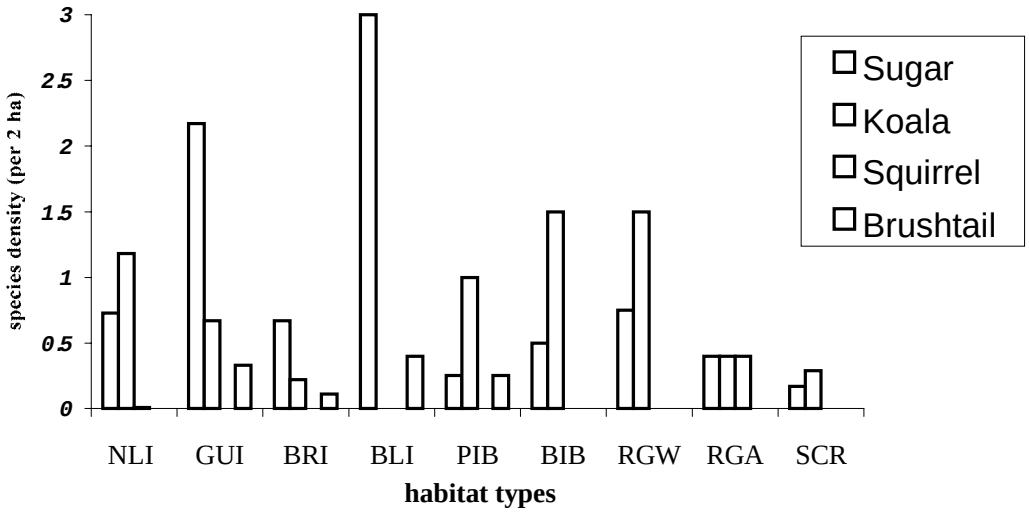
Habitats where family, or social groups of some species were observed, particularly for Sugar Gliders, Koalas and Glossy Black Cockatoos, are indicated in the text. The fauna discussed are presented in three groups; large and medium-sized arboreal marsupials; hollow-dependent birds and the Greater Long-eared Bat; and the two small mammals, the Pilliga Mouse and the Yellow-footed Antechinus.

Belah is not included in this analysis due to low numbers of the targeted fauna species found in this habitat. The x-axes are labelled according to the tree associations (habitats) as follows; 1-Narrow-leaf Ironbark (**NLI**) forest (flat ground), 2-Gully Narrow-leaf Ironbark/Red Gum (**GUI**), 3-Broad-leaf Ironbark (**BRI**) forest, 4-Blue-leaf Ironbark (**BLI**) forest, 5- Pilliga Box (**PIB**) woodland, 6-Bimble Box (**BIB**) woodland, 7-Red Gum (**RGW**) woodland, 8-Red Gum/Rough-barked Angophora (**RGA**) woodland, 9-Heathy scrub (**SCR**). Gully habitats types 2 and 8; flat ground are types 1, 5, 6, 7, 9; and ridge habitats are types 3 and 4.

3.4.1 Arboreal marsupials

The densities of the four most abundant arboreal marsupials in different habitats are present in figure 6.

Figure 6. Arboreal marsupial habitat selection



Selection by the Sugar Glider shows a strong preference for gully Narrow-leaf Ironbark/Red Gum and Blue-leaf Ironbark forests occurring at densities of 2-3 animals per site. Family groups were observed in these habitat types. Other habitats preferred were Narrow-leaf Ironbark, Broad-leaf Ironbark and Red Gum woodlands. This species displayed the widest habitat selection of the arboreal marsupials, also found in heathy scrub. A noteworthy observation is the mixed preference for gully versus flat ground or ridge, displaying a preference for gully lines over flat ground in Narrow-leaf Ironbark, though showing a strong preference for Blue-leaf Ironbark on ridges. Ironbark communities seem to be the preferred habitats for this species in the survey areas, probably because of a high level of nectar and hollow resource that is associated with ironbark species.

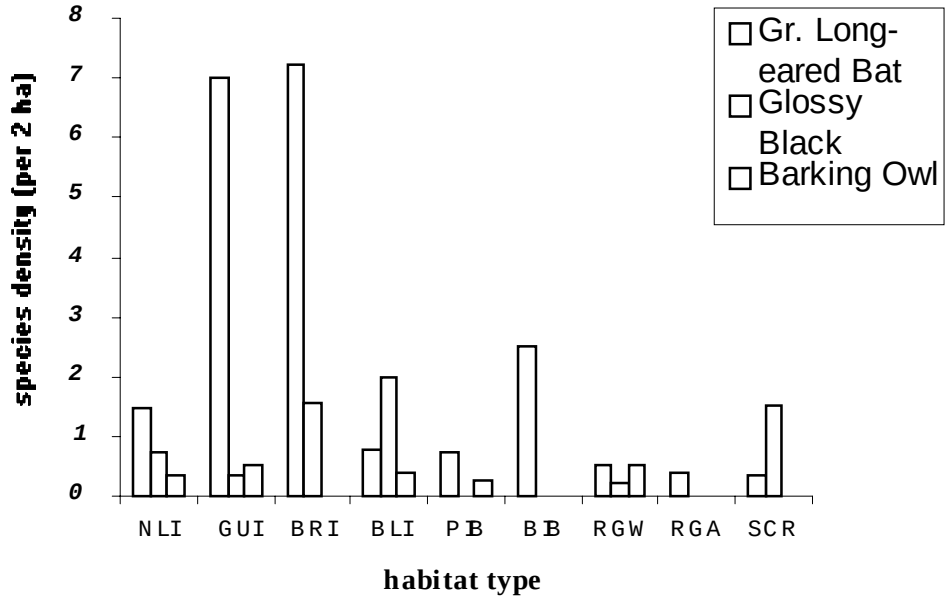
Koalas showed preferences for Narrow-leaf Ironbark forest, Bimble Box woodland and Red Gum woodlands at densities of between 1 and 1.5 animals per site. These types include multiple sightings of Koala, such as mother and young, and in one instance, a mating pair. It also prefers Pilliga Box woodland and gully Narrow-leaf Ironbark/Red Gum. It is found in a wide range of habitats, except Blue-leaf Ironbark, indicative of its general absence from Goonoo State Forest. This data shows no strong preference for flat ground versus gully. Koalas were also detected in patches of Belah, though in box trees rather than the Belahs themselves.

Squirrel Gliders and Brushtail Possums were detected infrequently during the surveys, both recorded at very low overall densities. Brushtails were detected in gully Narrow-leaf Ironbark/Red Gum strips, Broad-leaf Ironbark forest, Blue-leaf Ironbark forest, Pilliga Box woodlands and Western Grey Box woodland, the latter not indicated because of low sample size. Squirrel Gliders were detected in Narrow-leaf Ironbark forest and Red Gum/Rough-barked Apple woodlands, with a family group found in a mixed Box/ Narrow-leaf Ironbark area in Pilliga West State Forest, but not included here because only one site contained this association during the surveys.

3.4.2 Hollow dependant animals

The densities of three threatened hollow dependant species in different habitats are present in figure 7.

Figure 7. Hollow-dependent animal habitat selection



Glossy Black Cockatoos were observed in half the habitats surveyed, the dominants preferred reflect those habitats where suitable food she-oaks, *Allocasuarina* and *Casuarina* species, were present. These were the ridge habitats of Broad-leaf Ironbark, Blue-leaf Ironbark and heathy scrub types where the Glossy Black occurred at average densities of between 1 and 2 birds per site. Feeding areas were detected in all of these types. Most observations of this species were small feeding groups or pairs. This species was absent from Narrow-leaf Ironbark forest in Pilliga West State Forest where its preferred food species do not exist, and was also absent from box and Red Gum/Rough-barked Apple habitats for the same reasons.

Greater Long-eared Bats were captured in relatively large numbers giving an accurate picture of their foraging habitat selection. They displayed the strongest preference for gully Narrow-leaf Ironbark/Red Gum and Broad-leaf Ironbark types where they were found at a density of between six and eight animals per site. This bat is also found widely in box and Narrow-leaf Ironbark. All records are indicative of individuals caught in harp-traps on-site or close to the site in the same vegetation. Multiple captures were more common in the two preferred types. It is found widely in gully, flat ground and ridge habitats.

Barking Owls were detected in five different habitats, all at relatively low densities of less than one individual per site. These were Narrow-leaf Ironbark, gully Narrow-leaf Ironbark/Red Gum, Broad-leaf Ironbark and Blue-leaf Ironbark forests and Pilliga Box woodlands. About half the detections made of this species involved more than one animal, usually two, at any one site, as a response to playback. Given that animals may travel some distance to respond to playbacks, this may not be an accurate reflection of actual habitat preferences. Their presence is more likely to reflect areas where there are high densities of arboreal mammals, particularly Sugar Gliders, a species which seems to prefer ironbark communities.

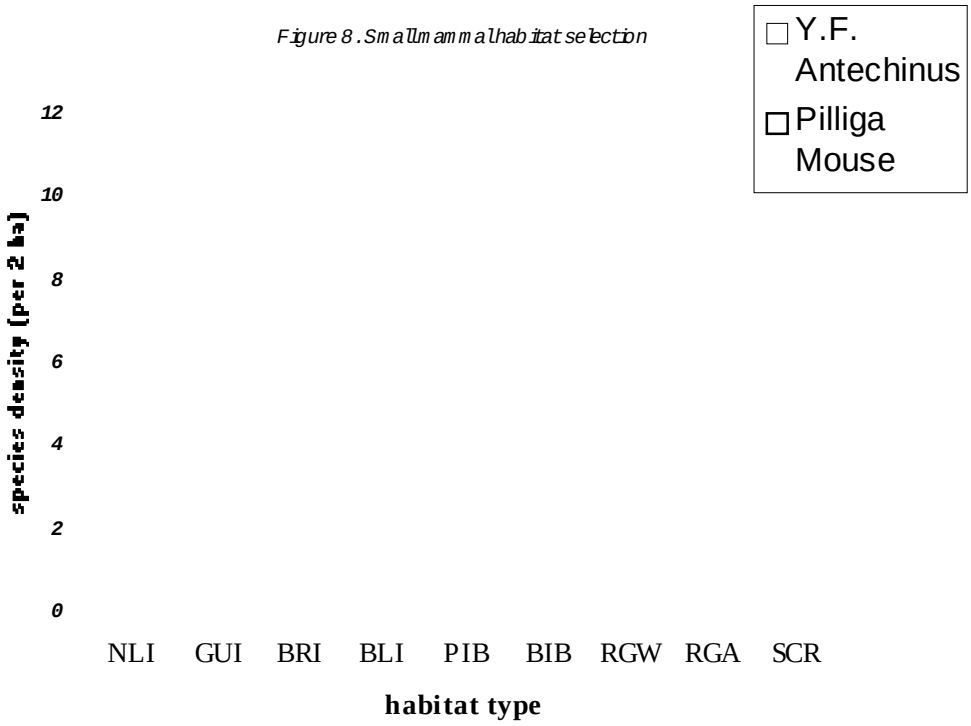
3.4.3 Small mammals

The densities of two ground utilising species in different habitats are present in figure 8.

This survey found that Yellow-footed Antechinus select hollows in trees and logs for shelter. It was found widely in nearly all habitats surveyed, though most commonly in Red Gum/Rough-barked Apple woodlands where it was found at a density of between 10 and 12 animals per site. It occurred at densities in all other habitats surveyed at between four and eight animals per site. Most of these captures were of

juvenile or sub-adult animals, because trapping was undertaken in the post-breeding period. Typically a site was found to have several young animals, with an adult female and adult male. This species was also found to be capable of living in ground holes at the base of mallee clumps.

Figure 8. Small mammal habitat selection



The Pilliga Mouse was detected in four habitats from the Pilliga surveys only. It scored most frequently in Red Gum/Rough-barked Apple habitats in the Pilliga Nature Reserve and in heathy scrub habitats in Timmallallie State Forest and Quegobla State Forest. Several recaptures were found at all locations where this species was trapped. All mature habitats where this species was caught were characterised by a well-developed understorey cover of low shrubs with an extensive litter cover. A little surprisingly, one sub-adult male was caught in a mature gully Narrow-leaf Ironbark/Red Gum strip. Two others were caught in a burnt Broad-leaf Ironbark forest site characterised by a medium height shrubby regrowth understorey, dominated by *Cassinia* and *Acacia*. This species was trapped at another site with a mature Broad-leaf Ironbark/Bloodwood overstorey though with a diverse understorey of heath and shrubs (~50 species).

4. DISCUSSION

4.1 IMPORTANT FAUNA/HABITAT RELATIONSHIPS

4.1.1 Patterns of diversity and abundance

Though samples sizes in this study can be considered both small and uneven, the results indicate that a wide range of habitats is important for the native fauna in the survey areas. Narrow-leaf Ironbark, Broad-leaf Ironbark, Pilliga Box, Red Gum and heathy scrub consistently contained the highest diversities and highest numbers of threatened species. All, except Narrow-leaf Ironbark, contained highest numbers of hollow-dependent fauna. Reptiles and frogs were poorly recorded and so do not serve as useful indicators for this study.

The diversity of native non-flying mammals was relatively even throughout the different types examined. Diversity was lowest in mallee/scrub, Belah and Bimble Box types. Red Gum/Rough-barked Apple woodlands contained the highest numbers of threatened mammal species, though densities were not high. These gully zones contain large, hollow bearing trees and provide optimal habitat for a range of mammals, including the Eastern Pygmy-possum, Squirrel Glider, Sugar Glider, Turquoise Parrots and the Greater Long-eared Bat.

The highest densities of small and medium-sized hollow-dependent species were found in gully Narrow-leaf Ironbark/Red Gum, Blue-leaf Ironbark and Broad-leaf Ironbark forests. All of these species are also found throughout flat Narrow-leaf Ironbark habitats, though at consistently lower densities (Table 3). The Squirrel Glider is an exception, though a low sample size for this species hinders this comparison.

Table 3. Relative densities of arboreal mammals in survey areas across habitat type expressed as individuals per 2 ha.

species	NLI	GUI	BRI	BLI	PIB	BIB	RGW	RGA	SCR
Y.F. Antechinus	5.09	7	7.22	6.8	6.5	0	6.5	10.8	4
Gr. Long-eared Bat	1.45	7	7.22	0.8	0.75	2.5	0.5	0.4	0.33
Glossy Black	0.73	0.33	1.56	2	0	0	0.2	0	1.5
Barking Owl	0.36	0.5	0	0.4	0.25	0	0.5	0	0
Koala	1.18	0.67	0.22	0	1	1.5	1.5	0.4	0.29
Sugar	0.73	2.17	0.67	3	0.25	0.5	0.75	0.4	0.17
Squirrel	0.01	0	0	0	0	0	0	0.4	0
Brushtail	0	0.33	0.11	0.4	0.25	0	0	0	0

4.1.2 Gully zones

The two habitats surveyed which can be typified as "gully zones" are Red Gum/Rough-barked Apple and Narrow-leaf Ironbark/Red Gum types, the overall diversity of fauna and number of threatened species present in these types is not significantly different from adjacent habitat on flat ground. However, there were some differences in the composition of this fauna, particularly the mammals. Sugar Gliders seemed to prefer gullies in some areas and not in others, Koalas showed no strong preference, while the Greater Long-eared Bat was caught in high densities in gully habitats though harp-traps were not always placed in the gully lines themselves. Yellow-footed Antechinus showed a strong preference for Red Gum/Rough-barked Apple woodland, though most other species had higher densities in the gully ironbark type. All these mammals are particularly reliant on hollows and cracks in trees and logs. Densities and the composition of bird communities in and away from gullies are yet to be analysed.

The results of this study show that the Koala uses Narrow-leaf Ironbark habitats for feeding and maintaining territories, though opportunistic observations of this species in the Pilliga show that some gullies with red gums are heavily used by groups of Koalas, particularly females. Soderquist and MacNally (in press) and MacNally *et al.* (in press) found a clear preference by arboreal mammals and birds for gully zones in the box/ironbark communities of Victoria. The sample size in the present survey is relatively small, though indications are that these areas are important for local wildlife. This supports the conclusion that further on the ground sampling, particularly in different seasons and plant flowering times, is needed to gain better understandings of the ecology of these species, particularly in relation to the use of gums, ironbarks, red gums and gully zones as a resource.

4.1.3 Tree hollow dependent fauna

Tree hollow usage was not explored other than opportunistic observations of animals. Greater Long-eared Bats were observed to fly into dead limbs of Narrow-leaf Ironbark when released at dusk, Squirrel Gliders were heard to call and were observed within old Narrow-leaf Ironbark, Mugga Ironbark, *E. sideroxylon* and Pilliga Box trees with many hollows. Sugar Gliders were observed both in old, hollowed ironbark trees and in small trees while feeding and calling.

On the ground observations made during the survey indicate that there is a relationship between mammal diversity and density and the densities of large trees with hollows, of any association. Squirrel Gliders were only detected where there were high densities of hollow bearing trees, usually of more than one species. Sugar Gliders were detected in ironbark communities where there were also high numbers of mature trees. Yellow-footed Antechinus, likewise, were most dense in any area with these characteristics. Tree-dependent bat species were more frequently caught in habitats of high mature tree densities (box and ironbark associations) and not in areas of stunted trees such as found in some Blue-leaf Ironbark and heathy scrub sites. Pale-headed Snakes were also recorded in senescent and dead trees, indicating a preference for these very old forest elements. Tree species it selected were the White Cypress Pine and the Narrow-leaf Ironbark. The Feathertail Glider was only observed once in a very large Narrow-leaf Ironbark.

A significant observation in this study was the lack of records of the Brushtail Possum and the Ringtail Possum. Only a handful of Brushtails were detected, mostly from scat piles, while no Ringtails were recorded during this survey. This is an alarming result as both these species probably use the larger tree hollows found in dry forests (Traill 1991; Soderquist and MacNally, in press). Currently, the data from this study is being compared to that collected during surveys conducted in 1993/94 (Date and Paull 1999). The results show that there has been a decline in these possums in the last six years, mainly from Narrow-leaf Ironbark forests in the Pilliga (Paull and Kerle, in prep.). There are also other indicators, which suggest that there has been a decline in the Narrow-leaf Ironbark arboreal fauna. These are the relatively low densities of mammals found in this habitat (Figs 5 and 6) despite higher survey effort in this type compared to other types and the relative abundance of the arboreal fauna in the Goonoo compared to the Pilliga.

Of all arboreal mammals recorded in Narrow-leaf Ironbark during this survey, the most numerous were Koalas, a species not dependent on hollows for its survival, except perhaps during fires. The next most common species was the Sugar Glider, though its densities were not as high as found in other less

exploited ironbark types, such as Broad-leaf and Blue-leaf. Other species known to use Narrow-leaf Ironbark are the Brushtail Possum and the Squirrel Glider. Date and Paull (1999) found that Brushtails favoured Narrow-leaf Ironbark above all other tree species, yet during this survey, none was found in this species. Only four Brushtails were detected in the Pilliga State Forests, in Pilliga Box, Broad-leaf Ironbark and Red Gum. No other arboreal mammal was found in any density where it could be considered common or widespread, despite the extra survey effort given to this type. The Squirrel Glider, Pale-headed Snake and Feathertail Glider are also very rare species detected in Narrow-leaf Ironbarks.

It is difficult to explain this result other than to suggest some decline in the availability of hollow refugia for the possums. These animals may in fact be at minimum carrying levels throughout extensive areas of the Pilliga, particularly Pilliga West State Forest, suggesting that the hollow resource has been severely compromised for the larger arboreal mammals in these areas. Much removal of Narrow-leaf Ironbark has occurred in Pilliga West State Forest over the last 20 years for the "insultimber" industry, whereas little hardwood removal has occurred in Goonoo over the same period of time. Nine Brushtails were detected in Goonoo compared with one old scat pile from Pilliga West with the same amount of survey effort. This scat pile was found under a box tree. This apparent decline may have serious follow-on effects for other fauna particularly predators like owls. Bats, gliders and antechinus use smaller hollows and these were caught in good numbers indicating that, while large hollows, particularly crown hollows found in large, old trees may be reduced, smaller hollows and cracks are still widely available for wildlife.

4.1.4 Shrubby understorey fauna

An important biotic resource of the fauna in the Brigalow Belt South is the understorey (Paull and Date 1999), particularly the extensive and diverse shrubby understories found throughout the woodlands in areas surveyed in this project. Most ground dwelling species are dependent on this resource for shelter, such as the Pilliga Mouse and Black-striped Wallaby or food, such as the Red-necked Wallaby and Swamp Wallaby. There is also a large suite of birds, which are dependent on shrubby understories; a lot of these birds are rare elsewhere in the bioregion due to extensive understorey removal. The lack of species reliant on grassy understories currently found in the Pilliga and the Goonoo, such as kangaroos and some birds indicates that this is not a major resource for the local fauna compared to shrubby understorey species which comprise the bulk of the terrestrial species. Shrubby understories are particularly susceptible to artificial fire regimes and overstorey tree removal. Both processes can severely disrupt natural germination and growth cycles of shrub species. They are also prone to disturbance during the course of logging operations from impacts of heavy machinery.

4.2 NEW INFORMATION GAINED ABOUT THE BIOLOGY OF THREATENED AND OTHER SPECIES

4.2.1 Squirrel Glider

Seven Squirrel Gliders were detected during the surveys, including one from Goonoo State Forest, the first for this area. Two of these records came from responses to Squirrel Glider call playbacks, one was a spotlighted individual and another group of four animals (family group?) were heard calling opportunistically. Interestingly, when a playback was done near this group of animals, no response was given. This species was heard calling from old Mugga Ironbark and Narrow-leaf Ironbark and Pilliga Box trees and one was spot lit in an old Red Gum (*E. blakelyi*). All trees were old and hollow bearing with a diameter at breast height >60 cm. Previous records of this species are very sparse from this bioregion (Paull and Date 1999).

4.2.2 Large-eared Pied Bat

Perhaps the most significant fauna information gained during this survey was on the bat species, this survey was the most comprehensive survey of bats to date in the Brigalow Belt South. The Large-eared Pied Bat is one of the rarest species of bat in New South Wales, currently known only less than 20 records. Only one was detected during the coastal CRAs, from Wollemi National Park. Using echolocation detectors, Coles (1995) detected 13 locations for the Large-eared Pied Bat across the Brigalow Belt South, including Pilliga West and Pilliga East State Forests. Parnaby and Hoye (1997) made only one likely detection from an echolocation survey in the Pilliga Nature Reserve.

In this survey, a colony of bats was detected at Willala Mountain on the eastern side of the Pilliga. In total, 23 individuals were detected using harp traps. 21 individuals were trapped from one location at Willala Mountain, where the trap was placed outside a small cave entrance. Another individual was trapped only 200 metres away at a smaller outcropping, while yet another was trapped from a site some 15 km south of this location, close to no outcroppings. This is the only bat species in New South Wales where there are currently no known maternity roosting sites. Two previously recorded locations have been abandoned (Parnaby and Hoye 1997, Duncan *et al.* 1999). The colony of bats found during this survey was mostly one-year-old animals, perhaps before breeding age. Three adult females were caught and one was found to be lactating at this colony. The time of year when the animals were caught, January, is at the end of most bats normal breeding season (Churchill 1998).

Little is known of the specificity of the roost requirements, habitat requirements, breeding cycle or life cycle. Information gained on this survey will assist in the formulation of a recovery plan for this species. The cave where most of the bats were caught was one of the larger caves in the area, consisting of a main entrance, with other "chimneys" coming off near the cave opening, providing several possible roosting sites. When these bats were released, they flew into the chimneys or into the main cave entrance. When inspected during the day, the main colony was located, only some 20 metres from the cave entrance. There were about 20-25 bats at the roost site at this time.

The habitat in the areas where these bats were caught is mostly a low forest of Broad-leaf Ironbark/Brown Bloodwood. This association is dominant throughout the eastern side of the Pilliga East State Forest and the adjacent Nature Reserve. It is unclear if this species forages widely over the adjacent forest, or whether it may also seek tree roosts, though the single animal caught away from any outcroppings suggests that this species will use tree roosts. It is believed that this species generally forages close to cliff lines (G. Hoye, pers. comm.). Willala Mountain is on privately owned land and is not frequently visited by people, though some do come to the cave, evidenced by the scratchings on the rock. It is a sandstone outcrop, which is consistent with the known cave preferences of this species (Churchill 1998).

4.2.3 Eastern Cave Bat

The Eastern Cave Bat is a species rarely recorded in New South Wales; hence it's listing on the *Threatened Species Conservation Act (1995).* It is more rarely recorded in western New South Wales, with only several old records from the Warrumbungles National Park and more recently from the Pilliga Nature Reserve (Glenn Hoye, pers. comm.), from Yaminbah Rockholes, Borah Creek and from private land in the central area of the Pilliga.

Little is known about this species, particularly in the western part of its range, though it is likely to be a cave dweller, foraging quite close to outcrops (G. Hoye, pers. comm.). Two individuals were caught during this survey, one along a track, near Willala Mountain, another outside the cave entrance where the Large-eared Pied Bats were caught. When released at dusk, it flew into the cave with the Pied Bats. It is likely that this species generally roosts singly or in pairs, though one maternity colony was recently found in the Pilliga containing about 500 individuals (G. Hoye, pers. comm.).

It is likely that the Eastern Cave Bat is a species-complex, and the form from the Pilliga may be distinct from the coastal forms of this species (G. Hoye, pers. comm.).

4.2.4 Little Pied Bat

Very little is known of the habitat and roost requirements of the Little Pied Bat in New South Wales (Duncan *et al.* 1999). It has been recorded from Tarawi Nature Reserve foraging in *E. socialis* mallee and caught foraging in *E. largiflorens* in both Mootwingee and Kinchega National Parks (Ellis and Henle 1988). The animals from Mootwingee were recorded close to quartzite outcropping; while the animals from Kinchega National Park were discovered roosting in timber-framed buildings. It has been widely captured, in low densities, across much of the Western Division of New South Wales in woodlands and around old buildings (Mazzer *et al*. 1998, Smith *et al.* 1998). The three caught in this study from the northern region of the Pilliga at Pilliga West and Quegobla State Forests. Here they were caught foraging in Bimble Box and Pilliga Box woodlands. No suitable outcroppings of rock exist for a considerable distance from these sites. During his echolocation survey of the Brigalow Belt South state forests, Coles (1995) detected six locations for the Little Pied Bat, most from Pilliga West State Forest, another from Etoo and another from Montrose State Forests. The latter has substantial rocky outcroppings. Parnaby and Hoye (1997) made eight possible and probable recordings of its echolocation calls in the Pilliga Nature Reserve.

It is likely that this bat species is mostly using tree roosts in this bioregion, as recorded in Queensland (Schultz *et al.* 1994), or roosts in old buildings.

4.2.5 Greater Long-eared Bat

Eighty-five Greater Long-eared Bats were caught during this preliminary survey, most coming from Goonoo State Forest. Whether caught in Goonoo or in the Pilliga, this species seems to prefer Narrow-leaf Ironbark communities, as well selecting Broad-leaf Ironbark in the Pilliga. One gully ironbark capture site in Goonoo State Forest caught six animals in one night, suggesting a roost present nearby. It is one of the few threatened species in the study which was recorded heavily from gully habitats, though was also caught foraging in ironbark forest, away from these drainage lines. Little is currently known about the roost selection or habitat preferences of this tree-roosting species (Duncan *et al.* 1999). Parnaby and Hoye (1997) caught only two individuals during their study of the Pilliga Nature Reserve. The number caught in this survey, almost triples the number of previous records of this species across the state, indicating that the Brigalow Belt South is an important stronghold for the Greater Long-eared Bat.

Like the Eastern Cave Bat, this species has recently been identified as a species-complex (Duncan *et al.* 1999). The form, which occurs in the survey area, is identified as the south-eastern form, re-named the Eastern Long-eared Bat.

4.2.6 Koala

The Koala was recorded frequently during the preliminary survey, found from a wide range of habitats, including two ironbark associations, Narrow-leaf and Broad-leaf in the Pilliga. It is known to select red gums and box species in the Pilliga (Date and Paull 1999), where it was recorded again. This study confirms its selection of ironbarks of both species as food trees. Whether ironbarks are an optimal or marginally preferred species is unclear, though they are regularly used by this species, often in areas some distance from gullies, particularly in Pilliga West State Forest. Ironbark associations are widespread in the Pilliga, though the Koalas' selection of this species helps explain the size of their population in this region. It is likely that the choice of a number of species of feed trees assists the maintenance of this large population as well as broadening potential areas for dispersal.

Koala scats were detected in scrubby Broad-leaf Ironbark habitats on the eastern side of the Pilliga. This may challenge previously accepted views on the diet of this species in the bioregion.

4.2.7 Pilliga Mouse

Evidence from this study shows that this species will inhabit ironbark communities associated with gullies and Broad-leaf Ironbark communities where suitable understorey conditions exist. These communities

support a relatively thick understorey either with a high diversity of shrubs, as found at one site on the eastern side of the Pilliga Nature Reserve, or with a less diverse post-fire community dominated by *Cassinia* and *Acacia* as found at one site on the western edge of the nature reserve.

Other sites in Timmallallie State Forest where this mouse was detected were associated with a low Baradine Red Gum mallee with a diverse and thick understorey of heath and spinifex. This mouse was also detected in Quegobla State Forest in a Broombush/Narrow-leaf Ironbark forest ecotone. The Pilliga Mouse seems to avoid habitats with Narrow-leaf Ironbark on flat ground, Blue-leaf Ironbark and box habitats probably due to a combination of understorey and soil depth factors (D. Paull, unpbl. data).

4.2.8 Black-striped Wallaby

Another significant finding of this survey was the location of a Black-striped Wallaby in Timmallallie State Forest. This finding confirms earlier accounts of this species from northern Pilliga East (Rabbidge 1987) and Euligal State Forests (Date and Paull 1999) where it was observed in Narrow-leaf Ironbark/White Cypress Pine habitat with an understorey of thick young pines and wattles. Grasses and sedges dominated the groundstorey here. This wallaby needs a grassy understorey on which to feed. It was observed feeding in grassy areas near Lucky Flat (Rabbidge 1987) and may also move into adjacent grazing lands at night. The Black-striped Wallaby is currently also known from Brigalow Park Nature Reserve and nearby lands (Henderson 2000), locations which are quite close (12 km) to the northern boundary of the Pilliga. Here it selects Brigalow/White Cypress Pine habitats.

The record from Timmallallie State Forest was a definite sighting on Top Crossing Road. The animal appeared to be blinded and/or unused to the presence of a vehicle. The nocturnal habit of the Black-striped Wallaby may account for the low detection rate of this species in the Pilliga region, as few cars venture into the forest at night, except along the main through roads. It is likely that small groups of this species are to be found throughout the eastern Pilliga state forests judging by the wide distance separating confirmed records. It probably also is able to cover the distance between Brigalow Park Nature Reserve and the northern edge of the Pilliga East State Forest quite comfortably. Old, unsubstantiated records exist of this species in Wittenbra State Forest (Rolls 1981). In Timmallallie the habitat where the individual was sighted was a low Broad-leaf Ironbark/Bloodwood overstorey dominated by a thick understorey of Black Cypress Pine, wattles, and a low covering of a mixture of grasses, shrubs and *Macrozamia* sp.

This species is endangered in New South Wales.

4.2.9 Barking Owl

Fifteen individuals were recorded during the survey, 14 from Pilliga West State Forest and another one from Goonoo State Forest. Detection levels for this species and for the Masked Owl may have been compromised by the lateness of the season and the windy conditions experienced during the latter two trips during this survey. The Barking Owl was detected in a wide variety of habitats. Low numbers give a poor indication of habitat preferences for this species. It is likely to feed on arboreal mammals, particularly in the central region of Pilliga West where it was detected, and so areas of high glider abundance may be preferred by this species. It was detected in Narrow-leaf and Blue-leaf ironbark, Box and red gum communities.

4.2.10 Malleefowl

Four individual malleefowls were detected in Goonoo State Forest and two in Coolbaggie Nature Reserve during this survey. The animals in the state forest were detected on the eastern side of the Mendooran Road, in Blue-leaf Ironbark forest with an extensive shrubby understorey. This observation was only several kilometres west of an area known for its concentration of mounds (Korn 1988). All observed

birds were flushed from roads. One of the sightings was of three individuals together, which looked like a pair and another smaller bird but with adult plumage. Of the birds observed in Coolbaggie Nature Reserve, one was a juvenile bird, the other an adult in the same area, but observed on a different day. The sighting of the young bird is significant, as none has been seen in the Goonoo area for some years (Terry Korn, pers. comm.). These birds were on the northern edge of Coolbaggie. A breeding mound has been seen from this area before (Korn 1988). In Coolbaggie, the habitat was Broombush scrub, with a scattered overstorey of White Mallee *E. dumosa*.

This species once existed in the Pilliga region. An active mound was seen as recently as 1995 (David Johnstone, pers. comm.). Adult birds may still persist in the Pilliga. This requires urgent investigation.

4.2.11 Yellow-footed Antechinus

Large numbers were caught during this study, highlighting the value of Elliott trapping as a systematic survey technique for this species. Many were caught in traps mounted in trees. Observations of animals when released showed that they quickly escaped into hollow logs or up trees into hollows and cracks. It seems that this species is strongly arboreal, taking advantage of any tree association as long as appropriate microhabitat exists.

Other observations were made of this animal's life cycle. The time of the survey coincided with the end of its breeding season. Lactating females were caught in November in Pilliga West SF. The Goonoo surveys in December yielded mainly post-lactating females with large numbers of small immature animals. The East Pilliga surveys in January caught post-lactating females with immature animals of a bigger , almost adult size (>20 grams). Significantly, the largest animal caught was a male in December when the females were post-lactating. The equal ratio of adult males and adult females caught indicates that if any "die-off" of males does take place, it is not a large proportion of the adult male population.

The genetic relationships of this species are being investigated by Sydney University. It is possible that the animal found in this survey is in fact a separate species in the Yellow-Footed Antechinus complex (Chris Dickman, pers. comm.).

4.2.12 Yellow-bellied Sheathtail Bat

Three of these rare large bats were detected during the survey. One was harp-trapped in Pilliga Box woodlands in Pilliga West State Forest, the other two were observed making low passes along creeklines in the Pilliga Nature Reserve. This species generally forages above the canopy (Churchill 1998) and hence is rarely captured in harp traps. Echolocation recordings made during this study may increase its detection rate. Coles (1995) detected 17 individuals of this species using echolocation. This number includes records from Pilliga West and some from the eastern Pilliga. Little is known of the life history, roosting requirements and movements of this species in New South Wales, where it is generally detected only in the warmer months. The present study has confirmed that this bat will forage relatively low to the ground in suitable wide pathways such as roads and creeks. The habitats in which it was detected during this survey also have high levels of hollow availability, known to be essential roost sites for this species (Churchill 1998).

4.3 OCCURRENCE OF OTHER REGIONALLY SIGNIFICANT SPECIES

These regional assessment surveys may be useful in an evaluation of the status of the many species found in the bioregion. If the threatened fauna, which was detected during this survey are included, there are 119 species considered to be regionally significant, of these, 51 were detected during the preliminary survey. Very little work has been done to determine the status of many of the declining fauna species in western New South Wales, despite high levels of habitat fragmentation in this region. Appendix 8.6 is a listing of regionally significant species based on an assessment of several criteria:

- species which are thought to be in decline elsewhere in western New South Wales (Reid 1999),
- species for which there are few records in the Brigalow Belt South,
- and/or species that are on the edge of their known distribution in New South Wales or are predicted to occur in the Brigalow Belt South using BIOCLIM (Ayres *et al.*1996).

If species were detected during this survey and are not listed as threatened species but are considered regionally significant, they are denoted with an X in the last column. Threatened species detected during the surveys are also included in Appendix 9.6.

Species known to be extinct in the Brigalow Belt South are given in Appendix 8.7.

4.4 GAPS AND PERFORMANCE IN SURVEYS

4.4.1 Gaps

The main gaps in this survey were; some expected species were not recorded; the narrow range of habitats sampled; and a reliance on the botanical assessment of each site for habitat attributes during the preliminary survey.

- Species not detected were some threatened diurnal birds, such as the Regent, Pied and Painted Honeyeaters. There was a low return of reptiles (only 37 detected from a known diversity of over 80 species for the bioregion (Date and Paull 1999) and frogs. Owls were also detected infrequently, particularly as the survey moved into the summer.
- There was a poor coverage of habitat types found across the bioregion; only a small proportion of total types were actually surveyed for fauna. Fourteen were sampled out of a total of 58 for the Pilliga alone (see Appendix 8.5).
- Disturbance history data, particularly fire or logging, was being compiled concurrent to this survey and hence was not available for site selection. These factors may significantly affect the distribution and density of fauna.
- Another important omission due to time constraints was the lack of quantified data on the wildlife habitat characteristics of each site, particularly tree densities, composition, sizes, flowering and hollow availability. Structural vegetation characteristics, such as percentage cover, were assessed for all the fauna sites, though time restraints did not allow a correlation of these data sets.
- There were a number of other limiting factors placed on this survey, which would have reduced the thoroughness of this study. These include the timing, the short-time frame, low level of effort and personnel available compared to other CRAs and a limited scope for using other survey techniques.

- An unequal knowledge of some fauna among the personnel (ie. surveyor bias) may have been important factor, given the low numbers of personnel involved with the fauna surveys.

4.4.2 Level of diversity

Table 4 shows a comparison of the results of this survey with other CRA results, in total number of vertebrates detected and numbers of threatened species detected. Twenty-two threatened species were detected out of a total of 55 known from the Brigalow Belt South. If frogs are excluded from this analysis, as there are no threatened frogs known from the bioregion, then this comparison of numbers of species is favourable to that found in other CRAs.

Table 4. Comparison of species detection levels in other CRAs
(Key: BBS: Brigalow Belt South; UNE: Upper North East; LNE: Lower North east; SB: Sydney Basin; TSC: species listed in Threatened Species Conservation Act 1995)

Taxa	**BBS**		**UNE**		**LNE**		**SB**	
	All taxa	TSC	All taxa	TSC	All tax	TSC	All taxa	TSC
Frogs	12	0	40	7	40	8	25	4
Reptiles	39	1	87	4	87	4	47	2
Birds	155	11	162	12	200	14	164	8
Mammals	17	5	14	12	40	10	28	5
Bats	16	5	27	11	33	11	24	8
Totals	249	22	330	46	400	47	288	27

These relatively good returns may be a reflection of the quality of the sites surveyed in terms of wildlife habitat. All areas targeted during this preliminary survey (Pilliga and Goonoo) are in the largest and most diverse of the western remnants. These two factors indicate high fauna diversity and may underline the significant value of these areas.

The results of this survey compare favourably with the other major survey undertaken in the Brigalow Belt South (Date and Paull 1999). The spring bias in these surveys probably favoured the higher detection rate of reptiles, with 63 species detected compared to 39 in this survey.

5.RECOMMENDATIONS

5.1 IMPLICATIONS FOR FUTURE SURVEY EFFORT

5.1.1 Justification for increased level of effort in Brigalow Belt South

Based on the effort expended during this preliminary survey, which only focused on 54 sites, there is an obligation in terms of consistency and perceived transparency for the Brigalow Belt South regional fauna assessment to increase the number of fauna sites. Large sections of the bioregion remain unsurveyed as do a large proportion of the major vegetation types found there. There are also many other reasons illustrated in section 5.4 which need to be addressed.

It is recommended that at least other sites be surveyed in the forests of the Pilliga/Goonoo complexes, and additional sites within National Parks and Nature Reserves in the bioregion, and additional sites within smaller state forests and remnants on privately held lands, including non-woody habitats, such as grasslands.

This level of increased effort needs to be undertaken in a two to three year period, to cover seasonal variations. This needs to be undertaken by a range of personnel with experience in a wide range of taxa, including invertebrates, an extremely diverse and functional part of the biota, for which very little is known.

With the completion of the vegetation and disturbance studies the range of potential strata across the region can be properly assessed and determinations made as to how the sites sampled so far fit within those strata. Areas of grassland and shrubland need to be identified to include in the stratification. This will enable fauna species lists to be compiled for the major vegetation types for use in planning situations within the bioregion.

5.1.2 Need for further targeted surveys

All prior CRAs in New South Wales had extensive specifically targeted fauna surveys. This approach is necessary to increase the detection rate of threatened and rare species, which otherwise may be difficult to detect during routine surveys done over short periods of time. Species such as the Regent Honeyeater and the Pale-headed Snake require extra effort, undertaken by personnel with specialist knowledge, as many of these species are cryptic in terms of their behaviour or have specific times of the year or weather conditions that favour their detection. Recommended species to target in further fauna surveys include:

- Hollow-dependent species, such as the Masked and Barking Owls, Squirrel Glider and Pale-headed Snake,
- Honeyeaters, such as the Regent, Painted and Pied Honeyeaters,
- Parrots, such as the Superb, Swift Parrots;
- Terrestrial small mammals; such as the Stripe-faced Dunnart and native rats;

- Cave bats, such as the Pied Bats, Bentwing Bats, Horseshoe Bat; and

- Forest bats, such as the Greater Long-eared Bat and Yellow-bellied Sheathtail Bat.

Specific habitats need to be identified in advance of these surveys as to where each of these species is most likely to be and possibly be, based on present knowledge. These need to be surveyed to determine whether the species do use any of these expected habitats. Results from the preliminary surveys can be used as a guide to the detectability of the various species.

5.2 IMPLICATIONS FOR CONSERVATION IN THE BRIGALOW BELT

5.2.1 Identification of areas with high conservation values

Despite the limited scope of this survey, a number of areas surveyed by the fauna team were found to have high conservation and fauna habitat values. A number of criteria were used to identify these areas:

- High densities of threatened species,
- Relatively low level of logging or only old logging evident,
- Habitat type with identified high wildlife values, ie. types known to support a high biodiversity,
- Disturbance due to wildfire, which tends to promote habitat heterogeneity.

Potential areas conforming to this criteria will need to be mapped as the vegetation and disturbance projects are completed and compared to the fauna survey results.

5.2.2 Recommendations for Ecologically Sustainable Forestry Management

Habitat tree retention

This report emphasises the need for an ecologically sustainable retention of microhabitat throughout the State Forest estate in the Brigalow Belt South. This means trees that are hollow bearing and nectar bearing need to be retained across the landscape. Dead trees and hollow logs need to be preserved and recruited at levels not undertaken previously in all types of forest zonings. This is required for several principle reasons:

- Historical levels of logging and tree culling have compromised habitat availability for a variety of wildlife. Once common species, such as the Ringtail Possum, seem to be rare even in the largest of the Brigalow Belt South remnants. Levels of habitat tree recruitment and retention have to be increased to compensate for this historic shortfall.

- As a safety precaution in lieu of proper scientific investigation into the nature of the dynamics and relationships of the fauna and their habitat in the Cypress/ironbark woodlands and forests in New South Wales. Not enough is known about fauna shelter, food and dispersal requirements in this bioregion. A future research priority to quantify resource availability for wildlife across the State Forest estate in relation to the distribution and density of fauna, particularly key tree-dependent species.

- Evidence from this survey indicates that old trees are a *prime resource* for wildlife, which to a very high degree is an arboreally dependent community. Old trees are perhaps the single most important habitat component of these ecosystems. This study has shown that while ironbarks are an important species and their recruitment needs to be increased, sufficient volume of all species of large trees need to be conserved to maintain the diversity of these ecosystems. Another research priority is to analyse the natural tree densities of these ecosystems.

Buffer zones

Buffer zones need to be placed in a number of areas of particularly high conservation values in all harvesting areas. These areas can be identified as habitats which act as core areas for populations of fauna by supplying essential, possibly limiting, requirements. The buffer area provides additional resources for the population Several examples can be given here:

- Stands of Narrow-leaf Ironbark with a high level of mature stem density (>50 cm diameter at breast height) need to be included as a high priority for conservation zoning. This is particularly important in the Pilliga West State Forest and in the western side of the Pilliga east, where most intensive levels of logging have occurred. They can provide hollows that are scarce in the surrounding zone while the buffer areas ensure there is an excess of other resources for species limited by hollow availability.

- Gully zones, which may act as core or source areas for many species, and tend to have a higher proportion of large trees than surrounding habitat. These zones occupy very small areas of the State Forests in question, and yet this study shows that they are selected by a number of tree-dependent species, such as the Greater Long-eared Bat, the Squirrel and Sugar Gliders, Turquoise Parrot, Koala. Buffering around these drainage-lines need to be wide enough to incorporate adjacent habitat to facilitate dispersal to and from these zones and ameliorate disturbances from surrounding activities.

- Areas of non-commercial habitat types that have high wildlife values such as Broombush, Bloodwood/Acacia habitats, need to have buffering zones around their ecotones. Ecotones are often very sharp in these ecosystems and have been found to be used by such rare animals as the Pilliga Mouse and the Malleefowl (see Ch. 5.2.7 and 5.2.10). Buffer zones need to extend into adjacent habitat to facilitate dispersal to and from these areas.

Wildlife Corridors

- Wildlife corridors of undisturbed habitat need to be incorporated into the design of any harvest zone allowing connectivity between refuge areas. Such corridors may either need to be continuous or in a stepping stone arrangement depending upon the biology of the species involved.

Pest Management

Pigs, goats, foxes and House Mice are the most abundant and widespread of the introduced animals in these state forests. All except the mice are known to exert considerable pressure upon the indigenous habitats and animals. Controlling these pests is necessary for the sustainable management of wildlife populations.

- Foxes are a major threat to native fauna. Predation by foxes is listed as a threatening process under the *Threatened Species Conservation Act (1995).* Foxes have been documented to take a wide range of native fauna in the western ironbark ecosystems (Paull and Date 1999) including the apparently rare Brushtail Possum and a range of small species. Prolonged 1080 baiting has shown it to be successful in keeping fox numbers down in Goonoo State Forest, evidenced by the lack of scats and individuals detected during this survey and the ongoing breeding of Malleefowl in Goonoo. Alternative strategies may need to be found in order to complement or replace current baiting methods such as the use of alternative poisons to reduce risk to native wildlife.

- Pigs are a major conservation concern in these state forests and nature reserves because of their habit of turning the top soil layers and their devouring of almost anything nutritious, including bulbs, roots, green material, fruits and fauna. Their diggings have also been detected in areas occupied by the Pilliga Mice, a major concern because of the mouse's habit of digging extensive burrow systems (D. Paull, unpublished data). Pig activity destroys topsoil ground layers,

decreases the soil's ability to hold water and germinate seed. Pigs are successfully caught in pig-trap corrals, a method which needs to be applied on a systematic scale.

- Goats are also a major concern in the state forests and nature reserves in this bioregion. They are shrub and understorey browsers, and when they accumulate in substantial numbers, they can severely compromise the shrub cover in local areas. They also select preferred species on which to feed, causing possible local extinctions of particular plant species. Goats also like to inhabit areas of rock outcrop, which are havens for native wildlife, degrading local conditions in caves (Willala Mountain, D. Paull, pers. obs.). Like pigs, goats can be caught in corral traps, using nannies as lures. This also needs to be undertaken in systematic and ongoing scales.

- House Mice are a pest whose effect on the environment may be not easy to recognise. They do congregate in large numbers in areas of suitable habitat. Often these are the same areas selected by small native animals, such as Pilliga Mice. It is not known what dynamic exists between these species where they occur together, but House Mice do persist in areas occupied by Pilliga Mice (D. Paull, unpbl. data). At the very least may compete for resources, which Pilliga Mice also use. For the conservation of this rare native rodent, it is recommended that ongoing monitoring be undertaken where both species occur together, particularly in Pilliga Mouse over-winter congregation areas.

6. CONCLUSION

The results of this study highlight a number of important aspects of the distribution of fauna in the forests of the region. These can be extrapolated to estimate the current state of the ecosystems in the Brigalow Belt South in term of their conservation value and their future.

- There was found to be a consistently high diversity of vertebrate species (around 160 native species) detected at all groups of sites surveyed during this preliminary study. Relatively high numbers of threatened species were detected during all survey periods (9-12 species), though there were differences in the species composition.

- When compared with the results of the previous CRAs undertaken in this State, the numbers of threatened species found in this survey are high (see Discussion). This is significant considering that the effort expended during this preliminary survey was at an intensity at less than one third that undertaken in the CRAs already completed. This suggests a level of biodiversity, which is still high in the areas targeted by this survey. This warrants a more detailed examination to determine the full extent of these species distributions in these and other remnants in the bioregion as well as on agricultural lands.

- In terms of the identification of particular areas of high conservation value, this survey has only had a very limited effectiveness for reasons outlined previously. Preliminary evidence indicates that areas of native habitat with the lowest or oldest levels of logging, generally with the *oldest trees and those with the highest tree densities* were the most productive sites in terms of fauna detected. Other results suggest that *Narrow-leaf and Broad-leaf Ironbark communities* as the most diverse and containing the highest concentrations of threatened species of all the habitats targeted in this survey. As well as these ironbark associations, *Pilliga Box and Red Gum/Rough-barked Angophora* woodlands are important for arboreal mammals. In terms of gully versus flat ground, habitat values for wildlife were found to be consistent in terms of overall diversity across both types of topography, though the composition and preferences of particular fauna species was not consistent.

- As an assessment of techniques which may be used in any further fauna assessment of the Brigalow Belt South, this study has been extremely useful. Most of the survey methods employed gave very good returns, both in terms of species detected and numbers of individuals. A few of them may need some minor refinement in any further survey work. The Elliott trapping, harp trapping and bird census techniques used proved the most productive. With sufficient lead time for Stage 2, pit trapping should be incorporated into the sampling. Resampling of sites should be considered due to the seasonal abundances of some species changing due to such things as migratory or nomadic species and population cycles.

- For the development of Ecologically Sustainable Forest Management principles, this survey can only provide a brief insight into the identification of habitats with higher conservation values and types of amelioration necessary to achieve sustainable use of these forests. Again the development of these measures requires more on-the-ground truthing of fauna habitat requirements and autecological studies of the significant species to determine their life cycles and requirements.

- Important habitats for wildlife, such as Narrow-leaf and Broad-leaf Ironbark forests, and box woodlands are under-represented in conservation reserves in the bioregion (see the preliminary

overview of the Brigalow Belt South Bioregion in this series). In order to meet national biodiversity guidelines (JANIS 1997) new reserves need to be created as an urgent priority.

- The ecosystems are extremely heterogeneous, often forming mosaics of different habitat with very small areas; the preservation of such mixing of habitat is necessary for local diversity.

- The major components of these ecosystems for wildlife are the resources provided by tree and understorey habitat components.

- The fauna diversity of the Pilliga and Goonoo forests remains high, despite widespread extinction and decline of vertebrate life in the bioregion. There are signs, such as the low densities of hollow-dependent species, that these ecosystems now are under stress.

- The ecological sustainability of many of these habitats has been compromised by past land-use practices, such that restorative and precautionary conservation approaches are needed to ensure the ongoing viability of these systems and their biotic components.

- The use of commercially valuable forest types in the future needs to comply with principles of landscape conservation modelling and ecologically sustainable forest management. Further timber-use for short-term gain, which does not adhere to these principles, may jeopardise the ecological viability of whole ecosystems, particularly the tree-centred ecosystems of the Pilliga and the Goonoo.

- The true extent of biodiversity in the bioregion is still to be determined, as has the function of these systems to be investigated more fully.

- Further research needs to develop conservation management in the forests of the bioregion, particularly with respect to hollow usage by fauna, natural community structure and threatened species habitat requirements.

- Non-forest areas need to be assessed to determine the current biota of the region.

7. REFERENCES

Allomes, R., Andrews, S., Archinal, M., Cohn, J., Droulers, P., Faithful, E., Frewin, L., Green, S., Harris, K., Jarman, P., Jones, D., Leary, T., Pearson, D., Phillips, K., Ralston, M., Redenbach, C., Wellham, G., Wright, P. and Wyre, G., 1982. Fauna of Pilliga East State Forest and adjacent brigalow. Unpbl. Report by the Department of Ecosystems Management, University of New England.

Ayres, D., Nash, S. and Baggett, K., 1996. Threatened Species of Western New South Wales. NSW National Parks and Wildlife Service: Sydney.

Bauer, J.J., Bryant, A., Schrader, N., Goldney, D., Stone, B. and Paull, D.C., 1996. Draft Fauna Impact Statement for Proposed Forestry Operations in the South Western Cypress Pine Forests of New South Wales. Johnstone Centre for Parks, Recreation and Heritage: Charles Sturt University.

Benson, J.S. and Redpath, P.A., 1997. The nature of pre-European native vegetation in south-eastern Australia: a critique of Ryan, D.G., Ryan, J.R. and Starr, B.J., 1995. *The Australian Landscape – Observations of explorers and early settlers. Cunninghamiana* **5**(2)**:** 285-329.

Bustard, H.R., 1967a. Reproduction in the Australian gekkonid genus *Oedura* Gray 1842. *Herpetologica* 23: 276-284.

Bustard, H.R., 1967b. Activity cycle and thermoregulation in the Australian gecko *Gehyra variegata. Copeia* 1967: 753-758.

Bustard, H.R., 1968a. The ecology of the Australian gecko *Gehyra variegata* in northern New South Wales. *J. Zool.* 54: 113-138

Bustard, H.R., 1968b. The reptiles of Merriwindi State Forest, Pilliga West, northern New South Wales. *Herpetologica* 24: 131-140.

Bustard, H.R., 1968c. Temperature dependent activity in the Australian gecko *Diplodactylus vittatus. Copeia* 1968: 606-612.

Bustard, H.R., 1969a. The ecology of the Australian gecko *Heteronotia binoei* in northern New South Wales. *J. of Zool*. 156(4): 483-497.

Bustard, H.R., 1969b. Population ecology of the gekkonid lizard (*Gehyra variegata* Dumeril and Bibron) in exploited forests in northern New South Wales. *J. of Animal Ecol*. 38: 35-51.

Bustard, H.R., 1969c. The ecology of the Australian geckos *Diplodactylus williamsi* and *Gehyra australis* in northern New South Wales. *Proc. Kon. Ned. Akad. Wet.* 72: 451-477.

Bustard, H.R., 1970a. The role of behaviour in the natural regulation of numbers in the gekkonid lizard *Gehyra variegata. Ecology* 51: 724-28.

Bustard, H.R., 1970b. A population study of the scincid lizard *Egernia striolata* in northern New South Wales. *Proc. Kon. Ned. Akad. Wet*. 73: 186-213.

Bustard, H.R., 1971. A population study of the Eyed gecko, *Oedura ocellata* Boulenger, in northern New South Wales, Australia. *Copeia* 1971: 658-669.

Catling, P.C., Burt, R.J. and Kooyman, R., 1997. A comparison of techniques used in a survey of the ground-dwelling and arboreal mammals in forests in north-eastern New South Wales. *Wildl. Res.* **24:** 417-32.

Caughley, J. and Gall, B., 1985. Relevance of zoogegraphical transition to conservation of fauna: Amphibians and reptiles in the south-western slopes of New South Wales. *Aust. Zool.* **21**(6)**:** 513-27.

Chisholm, E.C., 1936. Birds of the Pilliga Scrub. *Emu* 37: 32-39.

Churchill, S., 1998. Australian Bats. Reed New Holland: Sydney.

Cleland, J.B., 1919. The birds of the Pilliga Scrub, New South Wales. *Emu* 18: 272-285.

Coles, R.B., 1995. Results of a Bat Survey for the Northwest Cypress Pine – Ironbark FIS. Report to State Forests of New South Wales, Western Region, Dubbo.

Date, E.M. and Paull, D.C., 1999. Fauna survey of the Cypress/ironbark forests of north-west New South Wales. Draft report to the State Forests of New South Wales, Dubbo.

Duncan, A., Baker, G.B. and Montgomery, N., 1999. The Action Plan for Australian Bats. Natural Heritage Trust: Canberra.

Ellis, M. and Henle, K., 1988. The mammals of Kinchega National Park, western N.S.W. *Aust. Zool.* **25:** 1-5.

Flannery, T., 1994. The Future Eaters. Reed Books: Melbourne.

Faulkner, W., LeBreton, M. and Ellis, M., 1997. Fauna Survey of Goobang and Nangar National Parks. Report by National Parks and Wildlife Service, Dubbo.

Forestry Commission, 1980. Management Plan for Forestry Operations in the Inverell Management Area.

Forestry Commission, 1984. Management Plan for Forestry Operations in the Gilgandra Management Area.

Forestry Commission, 1985. Management Plan for Forestry Operations in the Gunnedah Management Area.

Forestry Commission, 1986. Management Plan for Forestry Operations in the Pilliga Management Area.

Forestry Commission, 1988. Management Plan for Forestry Operations in the Dubbo Management Area.

Fox, B.J. and Briscoe, D., 1980. *Pseudomys pilligaensis,* a new species of murid rodent from the Pilliga Scrub, northern NSW. *Aust. Mammal.* 3: 109-125.

Henderson, A., 2000. Black-striped Wallaby population census and monitoring program report. Report by National Parks and Wildlife Service, Narrabri.

Heron, S.J., 1973. Birds of Goonoo State Forest, NSW. *Emu* 73:119-123.

JANIS, 1997. Nationally agreed criteria for the establishment of a Comprehensive, adequate and representative reserve system for forests in Australia. Report to joint ANZECC/MCFFA, National Forest Policy Statement Implementation sub-committee.

Korn, T., 1988. The Mallee Fowl of the Goonoo Forest, Dubbo. National Parks Journal **32**(4)**:** 22-24.

Lim, L., 1992. Conservation and Biology of the Rare Pilliga Mouse, *Pseudomys pilligaensis,* Fox and Briscoe 1980 (Muridae: Conilurini). Report to Department of Planning and National Parks and Wildlife Service, NSW.

MacNally, R., Soderquist, T. and Tzaros, C., in press. The conservation value of mesic gullies in dry woodland landscapes: avian assemblages in the box-ironbark ecosystems of southern Australia.

Mazzer, M., Ellis, M., Smith, J., Ayers, D., Cooper, M., Wallace, G. and Langdon, A., 1998. Fauna of Western New South Wales: the Southern Mallee Region. NSW National Parks and Wildlife Service, Sydney.

Mitchell, P.B., 1991. Historical perspective's on some vegetation and soil changes in semi-arid New South Wales. *Vegetation* **91:** 169-82.

Morgan, G. and Terrey, J., 1992. Nature Conservation in Western New South Wales. National Parks Association of New South Wales: Sydney.

National Parks and Wildlife Service, 1995. Coolah Tops National Park. Submission to the Resource and Conservation Assessment Council, Canberra.

National Parks and Wildlife Service, 1997. Fauna survey of Goobang and Nangar National Parks. Internal report to the National Parks and Wildlife Service, Dubbo.

National Parks and Wildlife Service, 1998. NSW Comprehensive regional assessments. Vertebrate Fauna Surveys. Field Survey Methods.

Nix, H., 1986. A biogeographic analysis of Australian elapid snakes. Pp 4-15 in R. Longmore (ed) Snakes: Atlas of Elapid Snakes of Australia. Australian Flora and Fauna Series Number 7.

Norris, E.H., Mitchell, P.B. and Hart, D.M., 1991. Vegetation changes in the Pilliga forests: a preliminary evaluation of the evidence. *Vegetation* **91:** 209-18.

Parnaby, H.E. and Hoye, G.A., 1997. A survey of the bat fauna of Pilliga Nature Reserve, near Coonabarabran, New South Wales. Report to National Parks and Wildlife Service.

Paull, D.C., 1998. Final Report for a Survey to Capture and Identify an Unknown Species of Hopping-mouse (*Notomys* sp.) from the Pilliga State Forests (November 1997-April 1998). Report to National Parks and Wildlife Service of NSW.

Paull, D.C. and Date, E.M., 1999. Patterns of decline in the native mammal fauna on the north-west slopes of New South Wales. *Aust. Zool.* **31**(1)**:** 210-24.

Paull, D.C and Kerle, J.A. (in prep.). Decline of the Brushtail and Ringtail Possums in the Pilliga forests.

Rabbidge, J.J., 1987. The Black-striped Wallaby in the Southwest Narrabri region. Unpbl. Dip. Nat. Res. thesis, University of New England.

Read, D.G., 1995. Fauna survey in the floodplain of the Great Anabranch of the lower Darling River. *Aust. Zool.* **30**(1)**:** 57-64.

Reid, J., 1999. Threatened and declining birds in the New South Wales Sheep-Wheat Belt. I. Diagnosis, Characteristics and Management. Unpbl. report to the National Parks and Wildlife Service, Dubbo.

Rolls, E., 1981. A Million Wild Acres. Penguin Books: Melbourne.

Schultz, M., deOliveira, M.C. and Eyre, T., 1994. Notes on the Little Pied Bat *Chalinolobus picatus* in central Queensland. *Queensland Naturalist* **33:** 35-38.

Shelley, D., 1998. Survey of vertebrate fauna and habitats in a cypress pine-ironbark forest in Central-West New South Wales. *Aust. Zool.* **30**(4)**:** 426-36.

Smith, J., M., Ellis, M., Ayers, D., Mazzer,, Wallace, G., Langdon, A., and Cooper, M. 1998. Fauna of Western New South Wales: the Northern Floodplains Region. NSW National Parks and Wildlife Service, Sydney.

Soderquist, T.R. and MacNally, R., in press. The conservation value of mesic gullies in dry forest landscapes: mammal populations in the box-ironbark ecosystems of southern Australia.

Thackway, R. and Cresswell, I.D., 1995. An Interim Biogeographic Regionalisation for Australia: a Framework for Setting Priorities in the National Reserves System Cooperative Program. Australian Nature Conservation Agency, Canberra

Traill, B., 1991. Box, ironbark forests: tree hollows, wildlife and management. Pp 119-23 *in* D. Lunney (ed) Conservation of Australia's forest fauna. Royal Australian Zoological Society: Mosman.

8. Appendices

8.1 STUDY SITE LOCATIONS

8.1.1 Pilliga West and Quegobla SFs

KEY ZONE EAST NORTH DESCRIPTION

WPIL02 55 683120 6602940 Pilliga West State Forest Heugh's Road, 1.1km East from A-line Road, through gateway, site is 25m South of Road, marked Ironbark

WPIL04 55 672671 6599162 Pilliga West State Forest East/West Road, 150m East from C-line Road intersection. Site 10m South from Road.

WPIL06 55 673179 6601044 Pilliga West State Forest C-line Road, 1.3km South from Margo Road intersection, Pilliga West.

WPIL15 55 672883 6623230 Pilliga West State Forest On Bulliwy Road, 900m from G-line intersection on northern side.

WPIL17 55 694500 6621450 Pilliga West State Forest Etoo Creek Road, 500m from Squire's Lane. Site on Eastern side of track.

WPIL09 55 664717 6614091 Pilliga West State Forest Steiner Road, 1.8km West from H-line Road T-junction, Pilliga West State Forest.

WPIL10 55 679125 6612650 Pilliga West State Forest B-H line Road, 150m West of B-line junction.

WPIL14 55 669400 6623970 Pilliga West State Forest On Tin Pan Alley Road to the South West.

WPIL12 55 674275 6613050 Pilliga West State Forest C-line Road 400m South of B-H line Road intersection.

WPIL05 55 671687 6599244 Pilliga West State Forest East/West Road, 1.3km South from C-line Road intersection. Site 25m South off Road.

WPIL07 55 665200 6606510 Pilliga West State Forest H-line Road, 1.3km South from Margos Road intersection, Pilliga West.

WPIL13 55 668333 6622062 Pilliga West State Forest On corner of H-line and Ramp Road.

WPIL18 55 697750 6622425 Pilliga West State Forest 2.65km East along Dry Road from Etoo Crossing Road; north of road.

WPIL08 55 668450 6611210 Pilliga West State Forest Z-line Road, 2.2km East from H-line Road intersection, Pilliga West State Forest.

WPIL11 55 674839 6616580 Pilliga West State Forest C-line, 500m North from Brumby Road intersection.

WPIL01 55 681730 6600610 Pilliga West State Forest A-line Road, 350m from Western Way intersection. Site 100m from road.

WPIL03 55 680180 6604940 Pilliga West State Forest Old Urawilki Road, 2.6km South West of A-line Road intersection. Site 10m North West of Road.

WPIL16 55 691260 6620400 Pilliga West State Forest Oak Road, 950m West of Wednesday Road; site on South side of Road.

8.1.2 Goonoo/allied SFs and Coolbaggie Nature Reserve

KEY ZONE EAST NORTH DESCRIPTION

GOONFA-27 55 684428 6461430 Goonoo State Forest ON TRACK FROM MENDORAN ROAD, 1.1KM NORTH OF NUMBER 2 BORE, 30M WEST OF ROAD.

GOONFA79 55 682400 6460550 Goonoo State Forest WITHERS ROAD, 350M WEST OF FRAZERS ROAD INTERSECTION. SITE 300M NORTH OF ROAD.

GOONFA15 55 691760 6463930 Goonoo State Forest DENMINE ROAD, 1.8KM EAST OF MOUNT CARL ROAD INTERSECTION.

GOONFA17 55 688345 6461382 Goonoo State Forest STARKEYS ROAD, 1.75KM EAST FROM MENDORAN ROAD.

GOONFA019 55 667800 6470550 Goonoo State Forest BRENNANS ROAD ON SMALL TRACK TO EAST, JUST NORTH OF MAIALA ROAD.

GOONFA64 55 694450 6460850 Goonoo State Forest STARKEYS ROAD, 1.7KM EAST OF MIRRIE ROAD.

GOONFA103 55 678621 6471920 HENDERSON'S ROAD, 1.75KM WEST OF KARTZHOFF ROAD.

GOONFA-002 55 660617 6450991 Goonoo State Forest FROM MOGRIGUY, TAKE FOREST ROAD, TURN NORTH UP REEDSDALE ROAD FOR 550M.

GOONFA41 55 674388 6450346 Goonoo State Forest APPROX. 300M WEST OF MENDOORAN ROAD BETWEEEN FREEMAN'S ROAD AND BAUMAN'S ROAD.

GOONFA-001 55 664652 6459859 Goonoo State Forest WESTERN BOUNDARY ROAD; 500M SOUTH OF GARLINGS ROAD; 10.8KM NORTH OF MOGRIGUY ROAD.

GOONFA65 55 686200 6456800 Goonoo State Forest GARLINGS ROAD, 1.35KM EAST OF BRENNAN'S ROAD INTERSECTION.

GOONFA102 55 662150 6475000 Eura State Forest GRANGE ROAD,900M EAST OF FRASER'S ROAD.

GOONFA36 55 679438 6470329 KARTZHOFF ROAD, 1.4KM SOUTH OF HENDERSON'S ROAD; 500M WEST OF ROAD.

GOONFA-014 55 663737 6460351 FIREBREAK ON NORTH SIDE OF COOLBAGGIE NATURE RESERVE. 850M EAST OF WESTERN BOUNDARY ROAD.

GOONFA32 55 672590 6449350 Goonoo State Forest 250M ESE OF ROAD; 1.5 KM ALONG BAUMAN'S ROAD FROM MENDOORAN ROAD.

GOONFA003 55 665700 6481000 CASTLEREAGH RIVER NORTH OF MAHERS HILL ROAD;BREELONG STATE FOREST.

GOONFA11 55 687033 6466497 Goonoo State Forest EASTERN BANK OF DENMIRE CREEK, VIA TRACK BETWEEN BREELONG AND DENMIRE ROADS.

GOONFA74 55 675915 6448800 Goonoo State Forest 250M SOUTH OF ROAD; 2.4KM EAST ALONG BALLIMORE ROAD FROM MENDOORAN ROAD.

8.1.3 East Pilliga SFs and Pilliga Nature Reserve

KEY ZONE EAST NORTH DESCRIPTION

EPIL1155 55 720100 6577200 Pilliga East State Forest TIMMALLALLEE ROAD, PILLIGA EAST STATE FOREST.

EPIL1304 55 707562 6585495 Pilliga East State Forest SOUTH OF RUINS ROAD, PILLIGA EAST STATE FOREST.

EPIL1197 55 705550 6570950 2.3KM WEST OF RYANS ROAD, ON DUGAN ROAD.

PILJDA035 55 761840 6580880 Pilliga Nature Reserve EAST BOUNDARY OF RESERVE 600M SOUTH OF 90 BEND.

PILJDA013 55 741430 6578930 BORA CREEK 2.1KM SOUTH OF SALISBURY WATERHOLES.

EPIL2 55 711800 6569900 DUGGINS ROAD 0.65KM WEST OF TOP CROSSING ROAD.

EPIL45 55 719200 6576400 Pilliga East State Forest 450M EAST OF NUMBER 1 BREAK ROAD TOWARDS CARAVAN CORNER.

EPIL001 55 711797 6584885 ADJACENT TO SNIG TRAIL OF RUINS ROAD, 5.1KM WEST OF GIBBICAN ROAD.

PILJDA005 55 743900 6581830 Pilliga Nature Reserve 25M SOUTH OF KERRINGLE ROAD. PILLIGA NATURE RESERVE.

PILJDA036 55 747822 6582870 SLOPE NORTH OF CREEK, 700M WEST OF GALLOWAY ROAD.

PILJDA023 55 741510 6573780 DEPRESSION WEST OF BORA CREEK 9.5 KM SOUTH OF SALISBURY TURNOFF.

PILJDA038 55 746280 6582160 CREEKLINE PARALLEL TO KERINGLE ROAD, PILLIGA NATURE RESERVE.

EPIL010 55 711175 6572424 LIMESTONE ROAD, 1.6KM WEST OF TOP CROSSING ROAD.

EPIL15 55 727740 6575390 Pilliga East State Forest CREEKLINE SOUTH OF NUMBER 1 BREAK ROAD.

PILJDA033 55 760331 6579875 WEST EDGE OF BAILLEY'S LOOKOUT.

PILJDA024 55 757520 6577023 CREEK 100M NORTH EAST END OF KERINGLE ROAD.

PILJDA016 55 741110 6577880 FLATS WEST OF BORA CREEK 3.3KM SOUTH OF SALISBURY.

EPIL1096 55 715545 6583411 Orr State Forest 1.0KM SOUTH OF RUINS ROAD, EAST OF GIBBICAN ROAD IN ORR STATE FOREST.

8.2 TOTAL FAUNA LIST FOR PRELIMINARY SURVEY

Key: Status (*Threatened Species Conservation Act 1995*: P-protected, E-endangered, V-vulnerable)

Class	Family	Scientific name	Common	Status	Records
Amp	Hylidae	*Litoria caerulea*	Green Tree Frog	P	3
	Hylidae	*Litoria latopalmata*	Gunther's Frog	P	23
	Hylidae	*Litoria peronii*	Peron's Tree Frog	P	25
	Hylidae	*Litoria rubella*	Desert Tree Frog	P	8
	Myobatrachidae	*Limnodynastes fletcheri*	Long-thumbed Frog	P	5
	Myobatrachidae	*Limnodynastes ornatus*	Ornate Burrowing Frog	P	14
	Myobatrachidae	*Limnodynastes tasmaniensis*	Spotted Grass Frog	P	7
	Myobatrachidae	*Limnodynastes terraereginae*	Northern Banjo Frog	P	14
	Myobatrachidae	*Neobatrachus sudelli*	Common Spadefoot Toad	P	6
	Myobatrachidae	*Notaden bennettii*	Crucifix Toad	P	1
	Myobatrachidae	*Ranidella parinsignifera*	Plains Froglet	P	1
	Myobatrachidae	*Uperoleia rugosa*	Wrinkled Toadlet	P	2
Ave	Anatidae	*Anas gibberifrons*	Grey Teal	P	2
	Anatidae	*Anas superciliosa*	Pacific Black Duck	P	7
	Anatidae	*Chenonetta jubata*	Maned Duck	P	6
	Apodidae	*Apus pacificus*	Fork-tailed Swift	P	1
	Apodidae	*Hirundapus caudacutus*	White-throated Needletail	P	30
	Aegothelidae	*Aegotheles cristatus*	Australian Owlet-nightjar	P	66
	Caprimulgidae	*Caprimulgus guttatus*	Spotted Nightjar	P	3
	Caprimulgidae	*Caprimulgus mystacalis*	White-throated Nightjar	P	21
	Podargidae	*Podargus strigoides*	Tawny Frogmouth	P	36
	Dromaiidae	*Dromaius novaehollandiae*	Emu	P	38
	Burhinidae	*Burhinus magnirostris*	Bush Thick-knee	E	1
	Charadriidae	*Erythogonys cinctus*	Red-kneed Dotterel	P	1
	Charadriidae	*Vanellus miles*	Masked Lapwing	P	1
	Ardeidae	*Ardea novaehollandiae*	White-faced Heron	P	2
	Ardeidae	*Ardea pacifica*	Pacific Heron	P	4
	Ardeidae	*Botaurus poiciloptilus*	Australasian Bittern	V	1
	Ardeidae	*Nycticorax caledonicus*	Rufous Night Heron	P	4
	Plataleidae	*Platalea flavipes*	Yellow-billed Spoonbill	P	1
	Plataleidae	*Threskiornis spinicollis*	Straw-necked Ibis	P	2
	Columbidae	*Geopelia cuneata*	Diamond Dove	P	9
	Columbidae	*Geopelia humeralis*	Bar-shouldered Dove	P	32
	Columbidae	*Geopelia placida*	Peaceful Dove	P	16
	Columbidae	*Ocyphaps lophotes*	Crested Pigeon	P	3
	Columbidae	*Phaps chalcoptera*	Common Bronzewing	P	84
	Alcedinidae	*Ceyx azurea*	Azure Kingfisher	P	1
	Alcedinidae	*Dacelo novaeguineae*	Laughing Kookaburra	P	71
	Alcedinidae	*Halcyon sancta*	Sacred Kingfisher	P	36
	Coraciidae	*Eurystomus orientalis*	Dollarbird	P	6
	Meropidae	*Merops ornatus*	Rainbow Bee-eater	P	28

	Cuculidae	*Chrysococcyx basalis*	Horsfield's Bronze-Cuckoo	P	28
	Cuculidae	*Chrysococcyx lucidus*	Shining Bronze-Cuckoo	P	20
	Cuculidae	*Chrysococcyx osculans*	Black-eared Cuckoo	P	13
	Cuculidae	*Cuculus pallidus*	Pallid Cuckoo	P	2
	Cuculidae	*Cuculus pyrrhophanus*	Fan-tailed Cuckoo	P	2
	Cuculidae	*Cuculus variolosus*	Brush Cuckoo	P	1
	Cuculidae	*Scythrops novaehollandiae*	Channel-billed Cuckoo	P	4
	Accipitridae	*Accipiter cirrhocephalus*	Collared Sparrowhawk	P	5
	Accipitridae	*Accipiter fasciatus*	Brown Goshawk	P	3
	Accipitridae	*Aquila audax*	Wedge-tailed Eagle	P	6
	Accipitridae	*Haliastur sphenurus*	Whistling Kite	P	1
	Accipitridae	*Hamirostra melanosternon*	Black-breasted Buzzard	V	1
	Accipitridae	*Hieraaetus morphnoides*	Little Eagle	P	4
	Accipitridae	*Lophoictinia isura*	Square-tailed Kite	V	3
	Falconidae	*Falco berigora*	Brown Falcon	P	2
	Falconidae	*Falco longipennis*	Australian Hobby	P	1
	Falconidae	*Falco peregrinus*	Peregrine Falcon	P	3
	Megapodiidae	*Leipoa ocellata*	Malleefowl	E	6
	Phasianidae	*Coturnix novaezelandiae*	Stubble Quail	P	2
	Turnicidae	*Turnix varia*	Painted Button-quail	P	10
	Gruidae	*Grus rubicundus*	Brolga	V	1
	Rallidae	*Rallus philippensis*	Buff-banded Rail	P	1
	Acanthizidae	*Acanthiza apicalis*	Inland Thornbill	P	73
	Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill	P	12
	Acanthizidae	*Acanthiza lineata*	Striated Thornbill	P	1
	Acanthizidae	*Acanthiza nana*	Yellow Thornbill	P	83
	Acanthizidae	*Acanthiza pusilla*	Brown Thornbill	P	7
	Acanthizidae	*Acanthiza reguloides*	Buff-rumped Thornbill	P	40
	Acanthizidae	*Acanthiza uropygialis*	Chestnut-rumped Thornbill	P	30
	Acanthizidae	*Gerygone fusca*	Western Gerygone	P	68
	Acanthizidae	*Gerygone olivacea*	White-throated Gerygone	P	27
	Acanthizidae	*Sericornis pyrrhopygius*	Chestnut-rumped Hylacola	P	19
	Acanthizidae	*Sericornis sagittatus*	Speckled Warbler	P	39
	Acanthizidae	*Smicrornis brevirostris*	Weebill	P	112
	Artamidae	*Artamus cyanopterus*	Dusky Woodswallow	P	18
	Artamidae	*Artamus leucorhynchus*	White-breasted Woodswallow	P	2
	Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike	P	44
	Campephagidae	*Coracina papuensis*	White-bellied Cuckoo-shrike	P	6
	Campephagidae	*Coracina tenuirostris*	Cicadabird	P	35
	Campephagidae	*Lalage sueurii*	White-winged Triller	P	1
	Climacteridae	*Climacteris leucophaea*	White-throated Treecreeper	P	155
	Climacteridae	*Climacteris picumnus*	Brown Treecreeper	P	28
	Corcoracidae	*Corcorax melanorhamphos*	White-winged Chough	P	33
	Corcoracidae	*Struthidea cinerea*	Apostlebird	P	7
	Corvidae	*Corvus coronoides*	Australian Raven	P	29
	Corvidae	*Corvus mellori*	Little Raven	P	9

	Corvidae	*Corvus orru*	Torresian Crow	P	1
	Cracticidae	*Cracticus nigrogularis*	Pied Butcherbird	P	14
	Cracticidae	*Cracticus torquatus*	Grey Butcherbird	P	95
	Cracticidae	*Gymnorhina tibicen*	Australian Magpie	P	38
	Cracticidae	*Strepera graculina*	Pied Currawong	P	109
	Dicaeidae	*Dicaeum hirundinaceum*	Mistletoebird	P	38
	Grallinidae	*Grallina cyanoleuca*	Australian Magpie Lark	P	37
	Hirundinidae	*Cecropis nigricans*	Tree Martin	P	2
	Hirundinidae	*Cheramoeca leucosternum*	White-backed Swallow	P	1
	Hirundinidae	*Hirundo neoxena*	Welcome Swallow	P	1
	Maluridae	*Malurus cyaneus*	Superb Blue Wren	P	92
	Maluridae	*Malurus lamberti*	Variegated Wren	P	46
	Meliphagidae	*Acanthagenys rufogularis*	Spiny-cheeked Honeyeater	P	81
	Meliphagidae	*Acanthorhynchus tenuirostris*	Eastern Spinebill	P	6
	Meliphagidae	*Anthochaera carunculata*	Red Wattlebird	P	25
	Meliphagidae	*Entomyzon cyanotis*	Blue-faced Honeyeater	P	9
	Meliphagidae	*Lichenostomus chrysops*	Yellow-faced Honeyeater	P	50
	Meliphagidae	*Lichenostomus leucotis*	White-eared Honeyeater	P	99
	Meliphagidae	*Lichenostomus melanops*	Yellow-tufted Honeyeater	P	9
	Meliphagidae	*Lichenostomus ornatus*	Yellow-plumed Honeyeater	P	6
	Meliphagidae	*Lichenostomus penicillatus*	White-plumed Honeyeater	P	30
	Meliphagidae	*Lichenostomus virescens*	Singing Honeyeater	P	1
	Meliphagidae	*Lichmera indistincta*	Brown Honeyeater	P	4
	Meliphagidae	*Manorina flavigula*	Yellow-throated Miner	P	1
	Meliphagidae	*Manorina melanocephala*	Noisy Miner	P	46
	Meliphagidae	*Melithreptus brevirostris*	Brown-headed Honeyeater	P	36
	Meliphagidae	*Philemon citreogularis*	Little Friarbird	P	15
	Meliphagidae	*Philemon corniculatus*	Noisy Friarbird	P	75
	Meliphagidae	*Plectorhyncha lanceolata*	Striped Honeyeater	P	55
	Muscicapidae	*Colluricincla harmonica*	Grey Shrike-thrush	P	137
	Muscicapidae	*Eopsaltria australis*	Eastern Yellow Robin	P	164
	Muscicapidae	*Melanodryas cucullata*	Hooded Robin	P	7
	Muscicapidae	*Microeca leucophaea*	Jacky Winter	P	36
	Muscicapidae	*Myiagra cyanoleuca*	Satin Flycatcher	P	3
	Muscicapidae	*Myiagra inquieta*	Restless Flycatcher	P	10
	Muscicapidae	*Myiagra rubecula*	Leaden Flycatcher	P	13
	Muscicapidae	*Oreoica gutturalis*	Crested Bellbird	P	17
	Muscicapidae	*Pachycephala inornata*	Gilbert's Whistler	V	1
	Muscicapidae	*Pachycephala pectoralis*	Golden Whistler	P	3
	Muscicapidae	*Pachycephala rufiventris*	Rufous Whistler	P	165
	Muscicapidae	*Petroica goodenovii*	Red-capped Robin	P	20
	Muscicapidae	*Rhipidura fuliginosa*	Grey Fantail	P	132
	Muscicapidae	*Rhipidura leucophrys*	Willie Wagtail	P	37
	Neosittidae	*Daphoenositta chrysoptera*	Varied Sittella	P	35
	Oriolidae	*Oriolus sagittatus*	Olive-backed Oriole	P	27
	Orthonychidae	*Cinclosoma punctatum*	Spotted Quail-thrush	P	10
	Paradisaeidae	*Chlamydera maculata*	Spotted Bowerbird	P	6

	Pardalotidae	*Pardalotus punctatus*	Spotted Pardalote	P	64
	Pardalotidae	*Pardalotus striatus*	Striated Pardalote	P	28
	Ploceidae	*Emblema guttata*	Diamond Firetail	P	3
	Ploceidae	*Emblema temporalis*	Red-browed Firetail	P	5
	Ploceidae	*Poephila bichenovii*	Double-barred Finch	P	15
	Sylviidae	*Acrocephalus stentoreus*	Clamorous Reed Warbler	P	2
	Sylviidae	*Cinclorhamphus cruralis*	Brown Songlark	P	2
	Sylviidae	*Cinclorhamphus mathewsi*	Rufous Songlark	P	8
	Timaliidae	*Pomatostomus superciliosus*	White-browed Babbler	P	28
	Timaliidae	*Pomatostomus temporalis*	Grey-crowned Babbler	P	58
	Zosteropidae	*Zosterops lateralis*	Silvereye	P	37
	Pelecanidae	*Pelecanus conspicillatus*	Australian Pelican	P	1
	Phalacrocoracidae	*Phalacrocorax carbo*	Great Cormorant	P	1
	Phalacrocoracidae	*Phalacrocorax melanoleucos*	Little Pied Cormorant	P	2
	Phalacrocoracidae	*Phalacrocorax sulcirostris*	Little Black Cormorant	P	2
	Podicipedidae	*Tachybaptus novaehollandiae*	Australasian Grebe	P	2
	Cacatuidae	*Cacatua galerita*	Sulphur-crested Cockatoo	P	26
	Cacatuidae	*Cacatua roseicapilla*	Galah	P	78
	Cacatuidae	*Calyptorhynchus lathami*	Glossy Black-Cockatoo	V	55
	Loriidae	*Glossopsitta concinna*	Musk Lorikeet	P	28
	Loriidae	*Glossopsitta pusilla*	Little Lorikeet	P	44
	Platycercidae	*Barnardius barnardi*	Mallee Ringneck	P	79
	Platycercidae	*Neophema pulchella*	Turquoise Parrot	V	38
	Platycercidae	*Platycercus elegans*	Crimson Rosella	P	1
	Platycercidae	*Platycercus eximius*	Eastern Rosella	P	46
	Platycercidae	*Psephotus haematonotus*	Red-rumped Parrot	P	3
	Polytelitidae	*Alisterus scapularis*	Australian King-Parrot	P	21
	Polytelitidae	*Aprosmictus erythropterus*	Red-winged Parrot	P	12
	Polytelitidae	*Nymphicus hollandicus*	Cockatiel	P	1
	Strigidae	*Ninox connivens*	Barking Owl	P	13
	Strigidae	*Ninox novaeseelandiae*	Southern Boobook	P	28
	Tytonidae	*Tyto alba*	Barn Owl	P	4
	Tytonidae	*Tyto novaehollandiae*	Masked Owl	V	2
Mam	Bovidae	*Bos taurus*	Cattle (feral)	U	5
	Bovidae	*Capra hircus*	Goat (feral)	U	13
	Suidae	*Sus scrofa*	Pig (feral)	U	30
	Canidae	*Vulpes vulpes*	Fox (feral)	U	39
	Felidae	*Felis catus*	Cat (feral)	U	1
	Leporidae	*Oryctolagus cuniculus*	Rabbit (feral)	U	9
	Equidae	*Equus caballus*	Horse (feral)	U	3
	Muridae	*Mus domesticus*	House Mouse (introduced)	U	93
	Muridae	*Rattus rattus*	Black Rat (introduced)	U	6
	Emballonuridae	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	V	3
	Molossidae	*Mormopterus sp. big penis*	Southern Mastiff-bat	P	10
	Molossidae	*Mormopterus sp. small penis*	Inland Mastiff-bat	P	13
	Molossidae	*Nyctinomys australis*	White-striped Mastiff-bat	P	1

	Pteropodidae	*Pteropus scapulatus*	Little Red Flying-fox	P	8
	Vespertilionidae	*Chalinolobus dwyeri*	Large Pied Bat	V	24
	Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat	P	324
	Vespertilionidae	*Chalinolobus morio*	Chocolate Wattled Bat	P	3
	Vespertilionidae	*Chalinolobus picatus*	Little Pied Bat	V	4
	Vespertilionidae	*Vespadelus troughtoni*	Eastern Cave Bat	V	2
	Vespertilionidae	*Vespadelus vulturnus*	Little Forest Bat	P	313
	Vespertilionidae	*Nyctophilus geoffroyi*	Lesser Long-eared Bat	P	67
	Vespertilionidae	*Nyctophilus gouldi*	Gould's Long-eared Bat	P	72
	Vespertilionidae	*Nyctophilus timoriensis*	Greater Long-eared Bat	V	83
	Vespertilionidae	*Scotorepens balstoni*	Western Broad-nosed Bat	P	72
	Vespertilionidae	*Scotorepens greyii*	Little Broad-nosed Bat	P	44
	Acrobatidae	*Acrobates pygmaeus*	Feathertail Glider	P	1
	Burramyidae	*Cercartetus nanus*	Eastern Pygmy-possum	V	3
	Macropodidae	*Macropus dorsalis*	Black-striped Wallaby	E	1
	Macropodidae	*Macropus giganteus*	Eastern Grey Kangaroo	P	54
	Macropodidae	*Macropus robustus*	Common Wallaroo	P	3
	Macropodidae	*Macropus rufogriseus*	Red-necked Wallaby	P	58
	Macropodidae	*Macropus rufus*	Red Kangaroo	P	2
	Macropodidae	*Wallabia bicolor*	Swamp Wallaby	P	49
	Petauridae	*Petaurus breviceps*	Sugar Glider	P	46
	Petauridae	*Petaurus norfolcensis*	Squirrel Glider	V	7
	Phalangeridae	*Trichosurus vulpecula*	Common Brushtail Possum	P	14
	Phascolarctidae	*Phascolarctos cinereus*	Koala	V	55
	Tachyglossidae	*Tachyglossus aculeatus*	Short-beaked Echidna	P	25
	Dasyuridae	*Antechinus flavipes*	Yellow-footed Antechinus	P	379
	Dasyuridae	*Sminthopsis murina*	Common Dunnart	P	12
	Muridae	*Hydromys chrysogaster*	Water Rat	P	1
	Muridae	*Pseudomys pilligaensis*	Pilliga Mouse	V	18
Rep	Agamidae	*Amphibolurus muricatus*	Jacky Lizard	P	7
	Agamidae	*Amphibolurus nobbi*	Nobbi	P	35
	Agamidae	*Lophognathus gilberti*	Gilbert's Dragon	P	1
	Agamidae	*Pogona barbata*	Bearded Dragon	P	12
	Elapidae	*Demansia psammophis*	Yellow-faced Whip Snake	P	2
	Elapidae	*Furina diadema*	Red-naped Snake	P	2
	Elapidae	*Hoplocephalus bitorquatus*	Pale-headed Snake	V	2
	Elapidae	*Pseudechis guttatus*	Blue-bellied Black Snake	P	2
	Elapidae	*Pseudechis porphyriacus*	Red-bellied Black Snake	P	1
	Elapidae	*Pseudonaja textilis*	Eastern Brown Snake	P	1
	Elapidae	*Simoselaps australis*	Coral Snake	P	1
	Elapidae	*Suta spectabilis*	Hooded Snake	P	1
	Gekkonidae	*Diplodactylus vittatus*	Wood Gecko	P	20
	Gekkonidae	*Diplodactylus williamsi*	Soft-tailed Gecko	P	3
	Gekkonidae	*Gehyra dubia*	Northern Gecko	P	2
	Gekkonidae	*Gehyra variegata*	Tree Dtella	P	32
	Gekkonidae	*Heteronotia binoei*	Byrnoe's Gecko	P	60
	Gekkonidae	*Oedura monilis*	Ocellated Velvet Gecko	P	13

	Gekkonidae	*Oedura robusta*	Robust Velvet Gecko	P	13
	Pygopididae	*Lialis burtonis*	Burton’s Legless Lizard	P	1
	Pygopodidae	*Pygopus lepidopodus*	Common Scaly-foot	P	2
	Scincidae	*Anomalopus leuckartii*	Two-clawed Worm-skink	P	2
	Scincidae	*Cryptoblepharus carnabyi*	Carnaby's Wall Skink	P	25
	Scincidae	*Ctenotus allotropis*		P	8
	Scincidae	*Ctenotus robustus*	Striped Skink	P	15
	Scincidae	*Egernia striolata*	Tree Skink	P	40
	Scincidae	*Eulamprus tenuis*	Barred-sided Skink	P	1
	Scincidae	*Lerista bougainvillii*	Bougainville's Skink	P	3
	Scincidae	*Lerista muelleri*	South-eastern Slider	P	6
	Scincidae	*Lerista punctatovittata*	Eastern Robust Slider	P	3
	Scincidae	*Lygisaurus foliorum*	Litter Skink	P	3
	Scincidae	*Morethia boulengeri*	Boulenger's Skink	P	67
	Scincidae	*Tiliqua scincoides*	Eastern Blue-tongued Lizard	P	2
	Scincidae	*Trachydosaurus rugosus*	Shingle-back	P	1
	Typhlopidae	*Ramphotyphlops bituberculatus*	Blind snake	P	1
	Typhlopidae	*Ramphotyphlops ligatus*	Blind Snake	P	1
	Varanidae	*Varanus gouldii*	Gould's Goanna	P	13
	Varanidae	*Varanus varius*	Lace Monitor	P	11
Total			249 spp.		6502

8.3 SPECIES LISTS PER SURVEY PERIOD

8.3.1 Pilliga West/Quegobla State Forests

Class	Family	Species	Common Name	Status	Count
Amphibia	Hylidae	*Litoria caerulea*	Green Tree Frog	P	2
	Hylidae	*Litoria latopalmata*	Gunther's Frog	P	9
	Hylidae	*Litoria peronii*	Peron's Tree Frog	P	10
	Hylidae	*Litoria rubella*	Desert Tree Frog	P	4
	Myobatrachidae	*Limnodynastes fletcheri*	Long-thumbed Frog	P	4
	Myobatrachidae	*Limnodynastes ornatus*	Ornate Burrowing Frog	P	7
	Myobatrachidae	*Limnodynastes tasmaniensis*	Spotted Grass Frog	P	7
	Myobatrachidae	*Limnodynastes terraereginae*	Northern Banjo Frog	P	12
	Myobatrachidae	*Neobatrachus sudelli*	Common Spadefoot Toad	P	5
	Myobatrachidae	*Notaden bennettii*	Crucifix Toad	P	1
	Myobatrachidae	*Ranidella parinsignifera*	Plains Froglet	P	1
	Myobatrachidae	*Uperoleia rugosa*	Rough Toadlet	P	2
Aves	Anatidae	*Anas superciliosa*	Pacific Black Duck	P	4
	Apodidae	*Hirundapus caudacutus*	White-throated Needletail	P	9
	Aegothelidae	*Aegotheles cristatus*	Australian Owlet-nightjar	P	20
	Caprimulgidae	*Caprimulgus mystacalis*	White-throated Nightjar	P	1
	Podargidae	*Podargus strigoides*	Tawny Frogmouth	P	12
	Dromaiidae	*Dromaius novaehollandiae*	Emu	P	13
		Grus rubicundus	Brolga	V	2
	Ardeidae	*Ardea pacifica*	Pacific Heron	P	1
	Ardeidae	*Nycticorax caledonicus*	Rufous Night Heron	P	3
	Columbidae	*Geopelia humeralis*	Bar-shouldered Dove	P	12
	Columbidae	*Geopelia placida*	Peaceful Dove	P	1
	Columbidae	*Phaps chalcoptera*	Common Bronzewing	P	15
	Alcedinidae	*Dacelo novaeguineae*	Laughing Kookaburra	P	9
	Alcedinidae	*Halcyon sancta*	Sacred Kingfisher	P	7
	Meropidae	*Merops ornatus*	Rainbow Bee-eater	P	8
	Cuculidae	*Chrysococcyx basalis*	Horsfield's Bronze-Cuckoo	P	3
	Cuculidae	*Chrysococcyx lucidus*	Shining Bronze-Cuckoo	P	5
	Cuculidae	*Chrysococcyx osculans*	Black-eared Cuckoo	P	5
	Cuculidae	*Cuculus pallidus*	Pallid Cuckoo	P	1
	Cuculidae	*Cuculus variolosus*	Brush Cuckoo	P	1
	Accipitridae	*Accipiter cirrhocephalus*	Collared Sparrowhawk	P	2
	Accipitridae	*Aquila audax*	Wedge-tailed Eagle	P	2
	Accipitridae	*Hieraaetus morphnoides*	Little Eagle	P	1
	Falconidae	*Falco berigora*	Brown Falcon	P	1
	Falconidae	*Falco peregrinus*	Peregrine Falcon	P	1
	Turnicidae	*Turnix varia*	Painted Button-quail	P	5
	Rallidae	*Rallus philippensis*	Buff-banded Rail	P	1

	Acanthizidae	*Acanthiza apicalis*	Inland Thornbill	P	21
	Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill	P	2
	Acanthizidae	*Acanthiza lineata*	Striated Thornbill	P	1
	Acanthizidae	*Acanthiza nana*	Yellow Thornbill	P	37
	Acanthizidae	*Acanthiza reguloides*	Buff-rumped Thornbill	P	3
	Acanthizidae	*Acanthiza uropygialis*	Chestnut-rumped Thornbill	P	26
	Acanthizidae	*Gerygone fusca*	Western Gerygone	P	20
	Acanthizidae	*Sericornis sagittatus*	Speckled Warbler	P	25
	Acanthizidae	*Smicrornis brevirostris*	Weebill	P	43
	Artamidae	*Artamus cyanopterus*	Dusky Woodswallow	P	5
	Artamidae	*Artamus leucorhynchus*	White-breasted Woodswallow	P	1
	Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike	P	7
	Campephagidae	*Coracina papuensis*	White-bellied Cuckoo-shrike	P	1
	Campephagidae	*Coracina tenuirostris*	Cicadabird	P	7
	Climacteridae	*Climacteris leucophaea*	White-throated Treecreeper	P	35
	Climacteridae	*Climacteris picumnus*	Brown Treecreeper	P	6
	Corcoracidae	*Corcorax melanorhamphos*	White-winged Chough	P	9
	Corcoracidae	*Struthidea cinerea*	Apostlebird	P	5
	Corvidae	*Corvus coronoides*	Australian Raven	P	4
	Corvidae	*Corvus mellori*	Little Raven	P	1
	Cracticidae	*Cracticus nigrogularis*	Pied Butcherbird	P	3
	Cracticidae	*Cracticus torquatus*	Grey Butcherbird	P	22
	Cracticidae	*Gymnorhina tibicen*	Australian Magpie	P	1
	Cracticidae	*Strepera graculina*	Pied Currawong	P	10
	Dicaeidae	*Dicaeum hirundinaceum*	Mistletoebird	P	13
	Grallinidae	*Grallina cyanoleuca*	Australian Magpie Lark	P	5
	Hirundinidae	*Cheramoeca leucosternum*	White-backed Swallow	P	1
	Maluridae	*Malurus cyaneus*	Superb Blue Wren	P	22
	Maluridae	*Malurus lamberti*	Variegated Wren	P	3
	Meliphagidae	*Acanthagenys rufogularis*	Spiny-cheeked Honeyeater	P	31
	Meliphagidae	*Lichenostomus chrysops*	Yellow-faced Honeyeater	P	1
	Meliphagidae	*Lichenostomus leucotis*	White-eared Honeyeater	P	17
	Meliphagidae	*Lichenostomus penicillatus*	White-plumed Honeyeater	P	10
	Meliphagidae	*Lichmera indistincta*	Brown Honeyeater	P	1
	Meliphagidae	*Manorina melanocephala*	Noisy Miner	P	9
	Meliphagidae	*Melithreptus brevirostris*	Brown-headed Honeyeater	P	10
	Meliphagidae	*Philemon citreogularis*	Little Friarbird	P	8
	Meliphagidae	*Philemon corniculatus*	Noisy Friarbird	P	12
	Meliphagidae	*Phylidonyris nigra*	White-cheeked Honeyeater	P	1
	Meliphagidae	*Plectorhyncha lanceolata*	Striped Honeyeater	P	9
	Muscicapidae	*Colluricincla harmonica*	Grey Shrike-thrush	P	35
	Muscicapidae	*Eopsaltria australis*	Eastern Yellow Robin	P	44
	Muscicapidae	*Microeca leucophaea*	Jacky Winter	P	10
	Muscicapidae	*Myiagra inquieta*	Restless Flycatcher	P	2

	Muscicapidae	*Myiagra rubecula*	Leaden Flycatcher	P	1
	Muscicapidae	*Oreoica gutturalis*	Crested Bellbird	P	8
	Muscicapidae	*Pachycephala pectoralis*	Golden Whistler	P	2
	Muscicapidae	*Pachycephala rufiventris*	Rufous Whistler	P	48
	Muscicapidae	*Petroica goodenovii*	Red-capped Robin	P	11
	Muscicapidae	*Rhipidura fuliginosa*	Grey Fantail	P	41
	Muscicapidae	*Rhipidura leucophrys*	Willie Wagtail	P	8
	Neosittidae	*Daphoenositta chrysoptera*	Varied Sittella	P	15
	Oriolidae	*Oriolus sagittatus*	Olive-backed Oriole	P	4
	Paradisaeidae	*Chlamydera maculata*	Spotted Bowerbird	P	4
	Pardalotidae	*Pardalotus punctatus*	Spotted Pardalote	P	7
	Pardalotidae	*Pardalotus striatus*	Striated Pardalote	P	6
	Ploceidae	*Poephila bichenovii*	Double-barred Finch	P	2
	Timaliidae	*Pomatostomus superciliosus*	White-browed Babbler	P	9
	Timaliidae	*Pomatostomus temporalis*	Grey-crowned Babbler	P	17
	Zosteropidae	*Zosterops lateralis*	Silvereye	P	14
	Phalacrocoracidae	*Phalacrocorax carbo*	Great Cormorant	P	1
	Phalacrocoracidae	*Phalacrocorax sulcirostris*	Little Black Cormorant	P	1
	Cacatuidae	*Cacatua galerita*	Sulphur-crested Cockatoo	P	2
	Cacatuidae	*Cacatua roseicapilla*	Galah	P	22
	Cacatuidae	*Calyptorhynchus lathami*	Glossy Black-Cockatoo	V	2
	Loriidae	*Glossopsitta concinna*	Musk Lorikeet	P	2
	Loriidae	*Glossopsitta pusilla*	Little Lorikeet	P	1
	Platycercidae	*Barnardius barnardi*	Mallee Ringneck	P	16
	Platycercidae	*Neophema pulchella*	Turquoise Parrot	V	10
	Platycercidae	*Platycercus elegans*	Crimson Rosella	P	1
	Platycercidae	*Platycercus eximius*	Eastern Rosella	P	2
	Platycercidae	*Psephotus haematonotus*	Red-rumped Parrot	P	1
	Polytelitidae	*Alisterus scapularis*	Australian King-Parrot	P	1
	Polytelitidae	*Aprosmictus erythropterus*	Red-winged Parrot	P	3
	Polytelitidae	*Nymphicus hollandicus*	Cockatiel	P	1
	Strigidae	*Ninox connivens*	Barking Owl	V	10
	Strigidae	*Ninox novaeseelandiae*	Southern Boobook	P	2
	Tytonidae	*Tyto alba*	Barn Owl	P	1
	Tytonidae	*Tyto novaehollandiae*	Masked Owl	V	1
Mammalia	Equidae	*Equus caballus*	Horse (feral)	U	2
	Bovidae	*Bos taurus*	Cattle (feral)	U	1
	Bovidae	*Capra hircus*	Goat (feral)	U	7
	Suidae	*Sus scrofa*	Pig (feral)	U	6
	Canidae	*Vulpes vulpes*	Fox (introduced)	U	21
	Muridae	*Mus domesticus*	House Mouse (introduced)	U	4
	Emballonuridae	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	V	2
	Molossidae	*Mormopterus sp. (big penis)*	Southern Freetail Bat	P	1
	Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat	P	42

	Vespertilionidae	*Chalinolobus picatus*	Little Pied Bat	V	3
	Vespertilionidae	*Vespadelus vulturnus*	Little Forest Bat	P	68
	Vespertilionidae	*Nyctophilus geoffroyi*	Lesser Long-eared Bat	P	32
	Vespertilionidae	*Nyctophilus gouldi*	Gould's Long-eared Bat	P	24
	Vespertilionidae	*Nyctophilus timoriensis*	Greater Long-eared Bat	V	16
	Vespertilionidae	*Scotorepens balstoni*	Western Broad-nosed Bat	P	5
	Vespertilionidae	*Scotorepens greyii*	Little Broad-nosed Bat	P	9
	Macropodidae	*Macropus giganteus*	Eastern Grey Kangaroo	P	16
	Macropodidae	*Macropus rufogriseus*	Red-necked Wallaby	P	12
	Macropodidae	*Macropus rufus*	Red Kangaroo	P	1
	Macropodidae	*Wallabia bicolor*	Swamp Wallaby	P	10
	Petauridae	*Petaurus breviceps*	Sugar Glider	P	8
	Petauridae	*Petaurus norfolcensis*	Squirrel Glider	V	5
	Phalangeridae	*Trichosurus vulpecula*	Common Brushtail Possum	P	1
	Phascolarctidae	*Phascolarctos cinereus*	Koala	V	34
	Tachyglossidae	*Tachyglossus aculeatus*	Short-beaked Echidna	P	4
	Dasyuridae	*Antechinus flavipes*	Yellow-footed Antechinus	P	26
	Dasyuridae	*Sminthopsis murina*	Common Dunnart	P	10
	Muridae	*Pseudomys pilligaensis*	Pilliga Mouse	V	5
Reptilia	Agamidae	*Lophognathus gilberti*	Gilbert's Dragon	P	1
	Agamidae	*Pogona barbata*	Bearded Dragon	P	4
	Agamidae	*Amphibolurus nobbi*	Nobbi Dragon	P	4
	Elapidae	*Demansia psammophis*	Yellow-faced Whip Snake	P	1
	Elapidae	*Hoplocephalus bitorquatus*	Pale-headed Snake	V	2
	Elapidae	*Pseudechis guttatus*	Spotted Black Snake	P	1
	Elapidae	*Suta spectabilis*	Hooded Snake	P	1
	Gekkonidae	*Diplodactylus vittatus*	Wood Gecko	P	7
	Gekkonidae	*Diplodactylus williamsi*	Spiny-tailed Gecko	P	2
	Gekkonidae	*Gehyra dubia*	Northern Gecko	P	2
	Gekkonidae	*Gehyra variegata*	Tree Dtella	P	30
	Gekkonidae	*Heteronotia binoei*	Bynoe's Gecko	P	38
	Gekkonidae	*Oedura monilis*	Ocellated Velvet Gecko	P	4
	Scincidae	*Cryptoblepharus carnabyi*	Carnaby's Wall Skink	P	12
	Scincidae	*Ctenotus allotropis*		P	3
	Scincidae	*Ctenotus robustus*	Striped Skink	P	1
	Scincidae	*Egernia striolata*	Tree Skink	P	28
	Scincidae	*Lerista punctatovittata*	Eastern Robust Slider	P	3
	Scincidae	*Morethia boulengeri*	Boulenger's Skink	P	21
	Varanidae	*Varanus gouldii*	Gould's Goanna	P	2
	Varanidae	*Varanus varius*	Lace Monitor	P	4

8.3.2 Goonoo/allied SFs and Coolbaggie NR

Class	Family	Species	Common Name	Status	Count
Amphibia	Hylidae	*Litoria latopalmata*	Gunther's Frog	P	7
	Hylidae	*Litoria peronii*	Peron's Tree Frog	P	10
	Hylidae	*Litoria rubella*	Desert Tree Frog	P	3
	Myobatrachidae	*Limnodynastes fletcheri*	Long-thumbed Frog	P	1
	Myobatrachidae	*Limnodynastes ornatus*	Ornate Burrowing Frog	P	2
	Myobatrachidae	*Limnodynastes terraereginae*	Northern Banjo Frog	P	1
	Myobatrachidae	*Neobatrachus sudelli*	Common Spadefoot Toad	P	1
Aves	Anatidae	*Anas gibberifrons*	Grey Teal	P	2
	Anatidae	*Chenonetta jubata*	Maned Duck	P	3
	Apodidae	*Apus pacificus*	Fork-tailed Swift	P	1
	Apodidae	*Hirundapus caudacutus*	White-throated Needletail	P	4
	Aegothelidae	*Aegotheles cristatus*	Australian Owlet-nightjar	P	21
	Caprimulgidae	*Caprimulgus mystacalis*	White-throated Nightjar	P	8
	Podargidae	*Podargus strigoides*	Tawny Frogmouth	P	14
	Dromaiidae	*Dromaius novaehollandiae*	Emu	P	13
	Charadriidae	*Erythogonys cinctus*	Red-kneed Dotterel	P	1
	Charadriidae	*Vanellus miles*	Masked Lapwing	P	1
	Ardeidae	*Ardea novaehollandiae*	White-faced Heron	P	1
	Ardeidae	*Ardea pacifica*	Pacific Heron	P	2
	Ardeidae	*Botaurus poiciloptilus*	Australasian Bittern	V	1
	Plataleidae	*Platalea flavipes*	Yellow-billed Spoonbill	P	1
	Plataleidae	*Threskiornis spinicollis*	Straw-necked Ibis	P	1
	Columbidae	*Geopelia cuneata*	Diamond Dove	P	4
	Columbidae	*Geopelia humeralis*	Bar-shouldered Dove	P	2
	Columbidae	*Geopelia placida*	Peaceful Dove	P	1
	Columbidae	*Ocyphaps lophotes*	Crested Pigeon	P	1
	Columbidae	*Phaps chalcoptera*	Common Bronzewing	P	10
	Alcedinidae	*Dacelo novaeguineae*	Laughing Kookaburra	P	16
	Alcedinidae	*Halcyon sancta*	Sacred Kingfisher	P	13
	Coraciidae	*Eurystomus orientalis*	Dollarbird	P	2
	Meropidae	*Merops ornatus*	Rainbow Bee-eater	P	2
	Cuculidae	*Chrysococcyx basalis*	Horsfield's Bronze-Cuckoo	P	4
	Cuculidae	*Chrysococcyx lucidus*	Shining Bronze-Cuckoo	P	4
	Cuculidae	*Chrysococcyx osculans*	Black-eared Cuckoo	P	3
	Cuculidae	*Cuculus pallidus*	Pallid Cuckoo	P	1
	Cuculidae	*Cuculus pyrrhophanus*	Fan-tailed Cuckoo	P	1
	Accipitridae	*Accipiter cirrhocephalus*	Collared Sparrowhawk	P	1
	Accipitridae	*Accipiter fasciatus*	Brown Goshawk	P	1
	Accipitridae	*Haliastur sphenurus*	Whistling Kite	P	1
	Accipitridae	*Hieraaetus morphnoides*	Little Eagle	P	2
	Accipitridae	*Lophoictinia isura*	Square-tailed Kite	V	1

	Falconidae	*Falco berigora*	Brown Falcon	P	1
	Falconidae	*Falco longipennis*	Australian Hobby	P	1
	Megapodiidae	*Leipoa ocellata*	Malleefowl	T	4
	Turnicidae	*Turnix varia*	Painted Button-quail	P	2
	Acanthizidae	*Acanthiza apicalis*	Inland Thornbill	P	24
	Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill	P	5
	Acanthizidae	*Acanthiza nana*	Yellow Thornbill	P	22
	Acanthizidae	*Acanthiza reguloides*	Buff-rumped Thornbill	P	23
	Acanthizidae	*Gerygone fusca*	Western Gerygone	P	11
	Acanthizidae	*Gerygone olivacea*	White-throated Gerygone	P	7
	Acanthizidae	*Sericornis pyrrhopygius*	Chestnut-rumped Hylacola	P	11
	Acanthizidae	*Sericornis sagittatus*	Speckled Warbler	P	6
	Acanthizidae	*Smicrornis brevirostris*	Weebill	P	24
	Artamidae	*Artamus cyanopterus*	Dusky Woodswallow	P	1
	Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike	P	16
	Campephagidae	*Coracina tenuirostris*	Cicadabird	P	6
	Campephagidae	*Lalage sueurii*	White-winged Triller	P	1
	Climacteridae	*Climacteris leucophaea*	White-throated Treecreeper	P	40
	Climacteridae	*Climacteris picumnus*	Brown Treecreeper	P	5
	Corcoracidae	*Corcorax melanorhamphos*	White-winged Chough	P	16
	Corvidae	*Corvus coronoides*	Australian Raven	P	3
	Corvidae	*Corvus mellori*	Little Raven	P	1
	Corvidae	*Corvus orru*	Torresian Crow	P	1
	Cracticidae	*Cracticus nigrogularis*	Pied Butcherbird	P	3
	Cracticidae	*Cracticus torquatus*	Grey Butcherbird	P	12
	Cracticidae	*Gymnorhina tibicen*	Australian Magpie	P	8
	Cracticidae	*Strepera graculina*	Pied Currawong	P	19
	Dicaeidae	*Dicaeum hirundinaceum*	Mistletoebird	P	6
	Grallinidae	*Grallina cyanoleuca*	Australian Magpie Lark	P	7
	Hirundinidae	*Hirundo neoxena*	Welcome Swallow	P	1
	Maluridae	*Malurus cyaneus*	Superb Blue Wren	P	21
	Maluridae	*Malurus lamberti*	Variegated Wren	P	10
	Meliphagidae	*Acanthagenys rufogularis*	Spiny-cheeked Honeyeater	P	11
	Meliphagidae	*Anthochaera carunculata*	Red Wattlebird	P	17
	Meliphagidae	*Lichenostomus chrysops*	Yellow-faced Honeyeater	P	25
	Meliphagidae	*Lichenostomus leucotis*	White-eared Honeyeater	P	19
	Meliphagidae	*Lichenostomus ornatus*	Yellow-plumed Honeyeater	P	6
	Meliphagidae	*Lichenostomus penicillatus*	White-plumed Honeyeater	P	3
	Meliphagidae	*Lichmera indistincta*	Brown Honeyeater	P	3
	Meliphagidae	*Manorina flavigula*	Yellow-throated Miner	P	1
	Meliphagidae	*Manorina melanocephala*	Noisy Miner	P	10
	Meliphagidae	*Melithreptus brevirostris*	Brown-headed Honeyeater	P	11
	Meliphagidae	*Philemon citreogularis*	Little Friarbird	P	4
	Meliphagidae	*Philemon corniculatus*	Noisy Friarbird	P	23

	Meliphagidae	*Plectorhyncha lanceolata*	Striped Honeyeater	P	6
	Muscicapidae	*Colluricincla harmonica*	Grey Shrike-thrush	P	24
	Muscicapidae	*Eopsaltria australis*	Eastern Yellow Robin	P	32
	Muscicapidae	*Melanodryas cucullata*	Hooded Robin	P	1
	Muscicapidae	*Microeca leucophaea*	Jacky Winter	P	5
	Muscicapidae	*Myiagra rubecula*	Leaden Flycatcher	P	1
	Muscicapidae	*Pachycephala rufiventris*	Rufous Whistler	P	42
	Muscicapidae	*Petroica goodenovii*	Red-capped Robin	P	7
	Muscicapidae	*Rhipidura fuliginosa*	Grey Fantail	P	30
	Muscicapidae	*Rhipidura leucophrys*	Willie Wagtail	P	4
	Neosittidae	*Daphoenositta chrysoptera*	Varied Sittella	P	12
	Oriolidae	*Oriolus sagittatus*	Olive-backed Oriole	P	12
	Orthonychidae	*Cinclosoma punctatum*	Spotted Quail-thrush	P	4
	Paradisaeidae	*Chlamydera maculata*	Spotted Bowerbird	P	2
	Pardalotidae	*Pardalotus punctatus*	Spotted Pardalote	P	15
	Pardalotidae	*Pardalotus striatus*	Striated Pardalote	P	12
	Ploceidae	*Emblema temporalis*	Red-browed Firetail	P	1
	Ploceidae	*Poephila bichenovii*	Double-barred Finch	P	1
	Sylviidae	*Acrocephalus stentoreus*	Clamorous Reed Warbler	P	1
	Sylviidae	*Cinclorhamphus mathewsi*	Rufous Songlark	P	4
	Timaliidae	*Pomatostomus superciliosus*	White-browed Babbler	P	7
	Timaliidae	*Pomatostomus temporalis*	Grey-crowned Babbler	P	7
	Zosteropidae	*Zosterops lateralis*	Silvereye	P	4
	Pelecanidae	*Pelecanus conspicillatus*	Australian Pelican	P	1
	Phalacrocoracidae	*Phalacrocorax sulcirostris*	Little Black Cormorant	P	1
	Cacatuidae	*Cacatua galerita*	Sulphur-crested Cockatoo	P	2
	Cacatuidae	*Cacatua roseicapilla*	Galah	P	20
	Cacatuidae	*Calyptorhynchus lathami*	Glossy Black-Cockatoo	V	18
	Loriidae	*Glossopsitta pusilla*	Little Lorikeet	P	9
	Platycercidae	*Barnardius barnardi*	Mallee Ringneck	P	17
	Platycercidae	*Neophema pulchella*	Turquoise Parrot	V	1
	Platycercidae	*Platycercus eximius*	Eastern Rosella	P	17
	Platycercidae	*Psephotus haematonotus*	Red-rumped Parrot	P	1
	Polytelitidae	*Alisterus scapularis*	Australian King-Parrot	P	7
	Polytelitidae	*Aprosmictus erythropterus*	Red-winged Parrot	P	4
	Strigidae	*Ninox connivens*	Barking Owl	V	2
	Strigidae	*Ninox novaeseelandiae*	Southern Boobook	P	14
	Tytonidae	*Tyto alba*	Barn Owl	P	1
	Tytonidae	*Tyto novaehollandiae*	Masked Owl	V	1
Mammalia	Bovidae	*Capra hircus*	Goat (feral)	U	1
	Suidae	*Sus scrofa*	Pig (feral)	U	7
	Canidae	*Vulpes vulpes*	Fox (feral)	U	4
	Leporidae	*Oryctolagus cuniculus*	Rabbit (feral)	U	2
	Muridae	*Mus musculus*	House Mouse (introduced)	U	63

	Muridae	*Rattus rattus*	Black Rat (introduced)	U	5
	Molossidae	*Mormopterus sp. (big penis)*	Southern Freetail Bat	P	5
	Pteropodidae	*Pteropus scapulatus*	Little Red Flying-fox	P	1
	Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat	P	55
	Vespertilionidae	*Chalinolobus morio*	Chocolate Wattled Bat	P	1
	Vespertilionidae	*Vespadelus vulturnus*	Little Forest Bat	P	65
	Vespertilionidae	*Nyctophilus geoffroyi*	Lesser Long-eared Bat	P	23
	Vespertilionidae	*Nyctophilus gouldi*	Gould's Long-eared Bat	P	1
	Vespertilionidae	*Nyctophilus timoriensis*	Greater Long-eared Bat	V	30
	Vespertilionidae	*Scotorepens balstoni*	Western Broad-nosed Bat	P	3
	Vespertilionidae	*Scotorepens greyii*	Little Broad-nosed Bat	P	1
	Burramyidae	*Cercartetus nanus*	Eastern Pygmy-possum	V	1
	Macropodidae	*Macropus giganteus*	Eastern Grey Kangaroo	P	13
	Macropodidae	*Macropus rufogriseus*	Red-necked Wallaby	P	10
	Macropodidae	*Wallabia bicolor*	Swamp Wallaby	P	20
	Petauridae	*Petaurus breviceps*	Sugar Glider	P	17
	Petauridae	*Petaurus norfolcensis*	Squirrel Glider	V	1
	Phalangeridae	*Trichosurus vulpecula*	Common Brushtail Possum	P	4
	Tachyglossidae	*Tachyglossus aculeatus*	Short-beaked Echidna	P	7
	Dasyuridae	*Antechinus flavipes*	Yellow-footed Antechinus	P	108
	Dasyuridae	*Sminthopsis murina*	Common Dunnart	P	2
	Muridae	*Hydromys chrysogaster*	Water Rat	P	1
Reptilia	Agamidae	*Amphibolurus muricatus*	Jacky Lizard	P	7
	Agamidae	*Amphibolurus nobbi*	Nobbi	P	5
	Agamidae	*Pogona barbata*	Bearded Dragon	P	5
	Elapidae	*Demansia psammophis*	Yellow-faced Whip Snake	P	1
	Elapidae	*Furina diadema*	Red-naped Snake	P	1
	Elapidae	*Pseudonaja textilis*	Eastern Brown Snake	P	1
	Gekkonidae	*Diplodactylus vittatus*	Wood Gecko	P	8
	Gekkonidae	*Gehyra variegata*	Tree Dtella	P	1
	Gekkonidae	*Heteronotia binoei*	Byrnoe's Gecko	P	15
	Gekkonidae	*Oedura monilis*	Ocellated Velvet Gecko	P	5
	Gekkonidae	*Oedura robusta*	Robust Velvet Gecko	P	11
	Scincidae	*Cryptoblepharus carnabyi*	Carnaby's Wall Skink	P	9
	Scincidae	*Ctenotus allotropis*		P	3
	Scincidae	*Ctenotus robustus*	Striped Skink	P	1
	Scincidae	*Eulamprus tenuis*	Barred-sided Skink	P	1
	Scincidae	*Lerista bougainvillii*	Bougainville's Skink	P	3
	Scincidae	*Lerista muelleri*	South-east Slider	P	4
	Scincidae	*Morethia boulengeri*	Boulenger's Skink	P	34
	Scincidae	*Tiliqua scincoides*	Eastern Blue-tongued Lizard	P	1
	Scincidae	*Trachydosaurus rugosus*	Shingle-back	P	1
	Varanidae	*Varanus gouldii*	Gould's Goanna	P	4
	Varanidae	*Varanus varius*	Lace Monitor	P	3

8.3.3 East Pilliga, Pilliga Nature Reserve

Class	Family	Species	Common Name	Status	Count
Amp	Hylidae	*Litoria caerulea*	Green Tree Frog	P	1
	Hylidae	*Litoria latopalmata*	Gunther's Frog	P	7
	Hylidae	*Litoria peronii*	Peron's Tree Frog	P	4
	Hylidae	*Litoria rubella*	Desert Tree Frog	P	1
	Myobatrachidae	*Limnodynastes ornatus*	Ornate Burrowing Frog	P	5
	Myobatrachidae	*Limnodynastes terraereginae*	Northern Banjo Frog	P	1
Ave	Anatidae	*Anas superciliosa*	Pacific Black Duck	P	2
	Anatidae	*Chenonetta jubata*	Maned Duck	P	3
	Apodidae	*Hirundapus caudacutus*	White-throated Needletail	P	13
	Aegothelidae	*Aegotheles cristatus*	Australian Owlet-nightjar	P	19
	Caprimulgidae	*Caprimulgus guttatus*	Spotted Nightjar	P	3
	Caprimulgidae	*Caprimulgus mystacalis*	White-throated Nightjar	P	9
	Podargidae	*Podargus strigoides*	Tawny Frogmouth	P	7
	Dromaiidae	*Dromaius novaehollandiae*	Emu	P	12
	Burhinidae	*Burhinus magnirostris*	Bush Thick-knee	E	1
	Ardeidae	*Ardea novaehollandiae*	White-faced Heron	P	1
	Ardeidae	*Ardea pacifica*	Pacific Heron	P	1
	Ardeidae	*Nycticorax caledonicus*	Rufous Night Heron	P	1
	Columbidae	*Geopelia cuneata*	Diamond Dove	P	4
	Columbidae	*Geopelia humeralis*	Bar-shouldered Dove	P	8
	Columbidae	*Geopelia placida*	Peaceful Dove	P	14
	Columbidae	*Phaps chalcoptera*	Common Bronzewing	P	34
	Alcedinidae	*Ceyx azurea*	Azure Kingfisher	P	1
	Alcedinidae	*Dacelo novaeguineae*	Laughing Kookaburra	P	15
	Alcedinidae	*Halcyon sancta*	Sacred Kingfisher	P	12
	Coraciidae	*Eurystomus orientalis*	Dollarbird	P	3
	Meropidae	*Merops ornatus*	Rainbow Bee-eater	P	14
	Cuculidae	*Chrysococcyx basalis*	Horsfield's Bronze-Cuckoo	P	13
	Cuculidae	*Chrysococcyx lucidus*	Shining Bronze-Cuckoo	P	1
	Cuculidae	*Cuculus pyrrhophanus*	Fan-tailed Cuckoo	P	1
	Cuculidae	*Scythrops novaehollandiae*	Channel-billed Cuckoo	P	2
	Accipitridae	*Accipiter cirrhocephalus*	Collared Sparrowhawk	P	2
	Accipitridae	*Accipiter fasciatus*	Brown Goshawk	P	2
	Accipitridae	*Aquila audax*	Wedge-tailed Eagle	P	4
	Accipitridae	*Hamirostra melanosternon*	Black-breasted Buzzard	V	1
	Accipitridae	*Hieraaetus morphnoides*	Little Eagle	P	1
	Accipitridae	*Lophoictinia isura*	Square-tailed Kite	V	2
	Falconidae	*Falco peregrinus*	Peregrine Falcon	P	2
	Phasianidae	*Coturnix novaezelandiae*	Stubble Quail	P	2
	Turnicidae	*Turnix varia*	Painted Button-quail	P	3
	Acanthizidae	*Acanthiza apicalis*	Inland Thornbill	P	27
	Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill	P	3
	Acanthizidae	*Acanthiza nana*	Yellow Thornbill	P	21
	Acanthizidae	*Acanthiza reguloides*	Buff-rumped Thornbill	P	12

	Acanthizidae	*Gerygone fusca*	Western Gerygone	P	21
	Acanthizidae	*Gerygone olivacea*	White-throated Gerygone	P	16
	Acanthizidae	*Sericornis pyrrhopygius*	Chestnut-rumped Hylacola	P	6
	Acanthizidae	*Sericornis sagittatus*	Speckled Warbler	P	7
	Acanthizidae	*Smicrornis brevirostris*	Weebill	P	34
	Artamidae	*Artamus cyanopterus*	Dusky Woodswallow	P	10
	Artamidae	*Artamus leucorhynchus*	White-breasted Woodswallow	P	1
	Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike	P	15
	Campephagidae	*Coracina papuensis*	White-bellied Cuckoo-shrike	P	1
	Campephagidae	*Coracina tenuirostris*	Cicadabird	P	17
	Climacteridae	*Climacteris leucophaea*	White-throated Treecreeper	P	56
	Climacteridae	*Climacteris picumnus*	Brown Treecreeper	P	13
	Corcoracidae	*Corcorax melanorhamphos*	White-winged Chough	P	5
	Corcoracidae	*Struthidea cinerea*	Apostlebird	P	1
	Corvidae	*Corvus coronoides*	Australian Raven	P	11
	Corvidae	*Corvus mellori*	Little Raven	P	2
	Cracticidae	*Cracticus nigrogularis*	Pied Butcherbird	P	6
	Cracticidae	*Cracticus torquatus*	Grey Butcherbird	P	30
	Cracticidae	*Gymnorhina tibicen*	Australian Magpie	P	13
	Cracticidae	*Strepera graculina*	Pied Currawong	P	47
	Dicaeidae	*Dicaeum hirundinaceum*	Mistletoebird	P	13
	Grallinidae	*Grallina cyanoleuca*	Australian Magpie Lark	P	13
	Hirundinidae	*Cecropis nigricans*	Tree Martin	P	2
	Maluridae	*Malurus cyaneus*	Superb Blue Wren	P	38
	Maluridae	*Malurus lamberti*	Variegated Wren	P	31
	Meliphagidae	*Acanthagenys rufogularis*	Spiny-cheeked Honeyeater	P	26
	Meliphagidae	*Acanthorhynchus tenuirostris*	Eastern Spinebill	P	6
	Meliphagidae	*Anthochaera carunculata*	Red Wattlebird	P	1
	Meliphagidae	*Entomyzon cyanotis*	Blue-faced Honeyeater	P	9
	Meliphagidae	*Lichenostomus chrysops*	Yellow-faced Honeyeater	P	19
	Meliphagidae	*Lichenostomus leucotis*	White-eared Honeyeater	P	51
	Meliphagidae	*Lichenostomus melanops*	Yellow-tufted Honeyeater	P	9
	Meliphagidae	*Lichenostomus penicillatus*	White-plumed Honeyeater	P	14
	Meliphagidae	*Lichenostomus virescens*	Singing Honeyeater	P	1
	Meliphagidae	*Manorina melanocephala*	Noisy Miner	P	16
	Meliphagidae	*Melithreptus brevirostris*	Brown-headed Honeyeater	P	13
	Meliphagidae	*Philemon citreogularis*	Little Friarbird	P	1
	Meliphagidae	*Philemon corniculatus*	Noisy Friarbird	P	24
	Meliphagidae	*Plectorhyncha lanceolata*	Striped Honeyeater	P	21
	Muscicapidae	*Colluricincla harmonica*	Grey Shrike-thrush	P	49
	Muscicapidae	*Eopsaltria australis*	Eastern Yellow Robin	P	65
	Muscicapidae	*Melanodryas cucullata*	Hooded Robin	P	6
	Muscicapidae	*Microeca leucophaea*	Jacky Winter	P	12
	Muscicapidae	*Myiagra cyanoleuca*	Satin Flycatcher	P	3
	Muscicapidae	*Myiagra inquieta*	Restless Flycatcher	P	8
	Muscicapidae	*Myiagra rubecula*	Leaden Flycatcher	P	11
	Muscicapidae	*Oreoica gutturalis*	Crested Bellbird	P	6

	Muscicapidae	*Pachycephala inornata*	Gilbert's Whistler	V	1
	Muscicapidae	*Pachycephala rufiventris*	Rufous Whistler	P	59
	Muscicapidae	*Rhipidura fuliginosa*	Grey Fantail	P	47
	Muscicapidae	*Rhipidura leucophrys*	Willie Wagtail	P	20
	Neosittidae	*Daphoenositta chrysoptera*	Varied Sittella	P	5
	Orthonychidae	*Cinclosoma punctatum*	Spotted Quail-thrush	P	4
	Pardalotidae	*Pardalotus punctatus*	Spotted Pardalote	P	39
	Pardalotidae	*Pardalotus striatus*	Striated Pardalote	P	7
	Ploceidae	*Emblema guttata*	Diamond Firetail	P	3
	Ploceidae	*Emblema temporalis*	Red-browed Firetail	P	4
	Ploceidae	*Poephila bichenovii*	Double-barred Finch	P	12
	Sylviidae	*Cinclorhamphus mathewsi*	Rufous Songlark	P	4
	Timaliidae	*Pomatostomus superciliosus*	White-browed Babbler	P	9
	Timaliidae	*Pomatostomus temporalis*	Grey-crowned Babbler	P	23
	Zosteropidae	*Zosterops lateralis*	Silvereye	P	16
	Phalacrocoracidae	*Phalacrocorax melanoleucos*	Little Pied Cormorant	P	2
	Podicipedidae	*Tachybaptus novaehollandiae*	Australasian Grebe	P	2
	Cacatuidae	*Cacatua galerita*	Sulphur-crested Cockatoo	P	17
	Cacatuidae	*Cacatua roseicapilla*	Galah	P	11
	Cacatuidae	*Calyptorhynchus lathami*	Glossy Black-Cockatoo	V	35
	Loriidae	*Glossopsitta concinna*	Musk Lorikeet	P	25
	Loriidae	*Glossopsitta pusilla*	Little Lorikeet	P	34
	Platycercidae	*Barnardius barnardi*	Mallee Ringneck	P	34
	Platycercidae	*Neophema pulchella*	Turquoise Parrot	V	27
	Platycercidae	*Platycercus eximius*	Eastern Rosella	P	22
	Polytelitidae	*Alisterus scapularis*	Australian King-Parrot	P	11
	Polytelitidae	*Aprosmictus erythropterus*	Red-winged Parrot	P	5
	Strigidae	*Ninox novaeseelandiae*	Southern Boobook	P	10
	Tytonidae	*Tyto alba*	Barn Owl	P	2
Mam	Bovidae	*Bos taurus*	Cattle (feral)	U	4
	Bovidae	*Capra hircus*	Goat (feral)	U	5
	Suidae	*Sus scrofa*	Pig (feral)	U	17
	Canidae	*Vulpes vulpes*	Fox (introduced)	U	14
	Felidae	*Felis catus*	Cat (feral)	U	1
	Equidae	*Equus caballus*	Horse (feral)	U	1
	Muridae	*Mus musculus*	House Mouse (introduced)	U	20
	Muridae	*Rattus rattus*	Black Rat (introduced)	U	1
	Emballonuridae	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	V	2
	Molossidae	*Mormopterus sp. (big penis)*	Southern Mastiff-bat	P	4
	Molossidae	*Mormopterus sp. (small penis)*	Inland Mastiff-bat	P	13
	Pteropodidae	*Pteropus scapulatus*	Little Red Flying-fox	P	7
	Vespertilionidae	*Chalinolobus dwyeri*	Large Pied Bat	V	23
	Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat	P	216
	Vespertilionidae	*Chalinolobus morio*	Chocolate Wattled Bat	P	2
	Vespertilionidae	*Vespadelus troughtoni*	Eastern Cave Bat	V	2
	Vespertilionidae	*Vespadelus vulturnus*	Little Forest Bat	P	148
	Vespertilionidae	*Nyctophilus geoffroyi*	Lesser Long-eared Bat	P	11

	Vespertilionidae	*Nyctophilus gouldi*	Gould's Long-eared Bat	P	46
	Vespertilionidae	*Nyctophilus timoriensis*	Greater Long-eared Bat	V	36
	Vespertilionidae	*Scotorepens balstoni*	Western Broad-nosed Bat	P	62
	Vespertilionidae	*Scotorepens greyii*	Little Broad-nosed Bat	P	33
	Burramyidae	*Cercartetus nanus*	Eastern Pygmy-possum	V	2
	Macropodidae	*Macropus dorsalis*	Black-striped Wallaby	E	1
	Macropodidae	*Macropus giganteus*	Eastern Grey Kangaroo	P	25
	Macropodidae	*Macropus robustus*	Common Wallaroo	P	3
	Macropodidae	*Macropus rufogriseus*	Red-necked Wallaby	P	36
	Macropodidae	*Wallabia bicolor*	Swamp Wallaby	P	18
	Petauridae	*Petaurus breviceps*	Sugar Glider	P	12
	Petauridae	*Petaurus norfolcensis*	Squirrel Glider	V	1
	Phalangeridae	*Trichosurus vulpecula*	Common Brushtail Possum	P	3
	Phascolarctidae	*Phascolarctos cinereus*	Koala	V	17
	Leporidae	*Oryctolagus cuniculus*	Rabbit	U	7
	Tachyglossidae	*Tachyglossus aculeatus*	Short-beaked Echidna	P	14
	Dasyuridae	*Antechinus flavipes*	Yellow-footed Antechinus	P	350
	Muridae	*Pseudomys pilligaensis*	Pilliga Mouse	V	13
Rep	Agamidae	*Amphibolurus nobbi*	Nobbi	P	23
	Agamidae	*Pogona barbata*	Bearded Dragon	P	3
	Elapidae	*Furina diadema*	Red-naped Snake	P	1
	Elapidae	*Pseudechis guttatus*	Blue-bellied Black Snake	P	1
	Elapidae	*Pseudechis porphyriacus*	Red-bellied Black Snake	P	1
	Elapidae	*Simoselaps australis*	Coral Snake	P	1
	Gekkonidae	*Diplodactylus vittatus*	Wood Gecko	P	5
	Gekkonidae	*Diplodactylus williamsi*	Soft-tailed Gecko	P	1
	Gekkonidae	*Gehyra variegata*	Tree Dtella	P	1
	Gekkonidae	*Heteronotia binoei*	Byrnoe's Gecko	P	7
	Gekkonidae	*Oedura monilis*	Ocellated Velvet Gecko	P	4
	Gekkonidae	*Oedura robusta*	Robust Velvet Gecko	P	2
	Pygopodidae	*Pygopus lepidopodus*	Common Scaly-foot	P	2
	Pygopodidae	*Lialis burtonis*	Burton’s Legless Lizard	P	1
	Scincidae	*Anomalopus leuckartii*		P	2
	Scincidae	*Anomalopus leuckartii*	Two-clawed Worm-skink	P	2
	Scincidae	*Cryptoblepharus carnabyi*	Carnaby's Wall Skink	P	4
	Scincidae	*Ctenotus allotropis*		P	2
	Scincidae	*Ctenotus robustus*	Striped Skink	P	13
	Scincidae	*Egernia striolata*	Tree Skink	P	11
	Scincidae	*Lerista muelleri*	South-east Slider	P	2
	Scincidae	*Lygisaurus foliorum*	Litter Skink	P	2
	Scincidae	*Morethia boulengeri*	Boulenger's Skink	P	12
	Typhlopidae	*Ramphotyphlops bituberculatus*	blind snake	P	1
	Typhlopidae	*Ramphotyphlops ligatus*	Blind snake	P	1
	Varanidae	*Varanus gouldii*	Gould's Goanna	P	7
	Varanidae	*Varanus varius*	Lace Monitor	P	4

8.4 FAUNA PRESENCE BY TREE ASSOCIATION

8.4.1.a Ironbark (*E. crebra*) forests

Frogs	Reptiles	Birds	Mammals	Bats	introduced
Litoria peronii	*Heteronotia binoei*	Speckled warbler	YF Antechinus	Little Forest Bat	House Mouse
Litoria rubella	*Lerista punctatovittata*	Grey Butcherbird	Common Dunnart	Lesser LE Bat	Pig
Litoria latopalmata	*Gehyra variegata*	Pied Butcherbird	Koala	Gould's LE Bat	Horse
Litoria caerulea	*Crypto. carnabyi*	WT Treecreeper	Feathertail Glider	Southern FT Bat	Goat
Limno. terraereg.	*Morethia boulengeri*	Brown Treecreeper	RN Wallaby	Inland FT Bat	Fox
Neobat. sudelli	*Egernia striolata*	Weebill	Sugar Glider	Greater LE Bat	
Limno. ornatus	*Oedura monilis*	Red Wattlebird	EG Kangaroo	Inland BN Bat	
Limno. tasman.	*Diplodactylus vittatus*	SC Honeyeater	Squirrel Glider	Little BN Bat	
	Diplodactylus williamsi	BH Honeyeater	Swamp Wallaby	Gould's Wattled Bat	
	Amphibolurus nobbi	Striped Honeyeater	Common Brushtail		
	Varanus gouldii	WE Honeyeater			
	Ctenotus allotropis	WP Honeyeater			
	Oedura robusta	YF Honeyeater			
	Varanus gouldii	BF Honeyeater			
	Varanus varius	Singing Honeyeater			
	Pogona barbata	Noisy Friarbird			
	Suta spectabilis	Little Friarbird			
	Furina diadema	Dusky Woodswallow			
	Ctenotus allotropis	EY Robin			
	Ctenotus robustus	Red-capped Robin			
		Grey Shrikethrush			
		Kookaburra			
		Sacred Kingfisher			
		Rufous Whistler			
		Golden Whistler			
		BS Dove			
		GC Babbler			
		WB Babbler			
		CR Thornbill			
		Yellow Thornbill			
		Inland Thornbill			
		Striated Thornbill			
		YR Thornbill			
		BR Thornbill			
		Grey Fantail			
		Bronzewing			
		WT Needletail			
		SF Wren			
		Mallee Ringneck			
		Variegated Wren			
		Red-winged Parrot			
		King Parrot			
		Eastern Rosella			
		Crimson Rosella			
		GB Cockatoo			
		SC Cockatoo			
		Little Lorikeet			
		Musk Lorikeet			
		Turquoise Parrot			
		Silvereye			
		Galah			
		Striated Pardalote			
		Spotted Pardalote			
		Varied Sitella			
		Mistletoebird			
		Western Gerygone			
		WT Gerygone			
		Sh. Bronze-cuckoo			
		Black-eared Cuckoo			
		Horse. Bronze-cuckoo			
		Channel-b. Cuckoo			
		FT Cuckoo			
		Pied Currawong			
		Barking Owl			

		Masked Owl Boobook Owl Barn Owl OB Oriole Aust. Raven Little Raven Magpie Peewee Crested Bellbird Noisy Miner Owlet Nightjar Tawny Frogmouth Painted Buttonquail WW Chough Rainbow Bee-eater Jacky Winter Spotted Bowerbird Crested Pigeon Willie Wagtail WT Eagle Collared Sparrowhawk BF Cuckoo-shrike Cicadabird Emu Leaden Flycatcher WT Nightjar Spotted Nightjar Black Duck WF Heron LP Cormorant Double-barred Finch			

8.4.1.b Gully ironbark (*E. crebra*) with Red Gum (*E. blakelyi*)

Frogs	Reptiles	Birds	Mammals	Bats	introduced
Litoria latopalmata	*Oedura monilis*	Grey Fantail	YF Antechinus	Lesser LE Bat	Goat
Litoria peronii	*Gehyra variegata*	Double-barred Finch	Common Dunnart	Greater LE Bat	Fox
	Hop. bitorquatus	WT Treecreeper	Pilliga Mouse	Little Forest bat	House Mouse
	Egernia striolata	Brown Treecreeper	RN Wallaby	Gould's Wattled Bat	Pig
	Crypto. carnabyi	SF Wren	Swamp Wallaby	Gould's LE Bat	
	Morethia boulengeri	WP Honeyeater	EG Kangaroo	Southern FT Bat	
	Heteronotia binoei	YF Honeyeater	Echidna	Inland BN Bat	
	Demansia psammophis	SC Honeyeater	Brushtail Possum	Chocolate Wttd Bat	
	Pogona barbata	BH Honeyeater	Koala	Inland FT Bat	
	Amphibolurus nobbi	WE Honeyeater	Sugar Glider	Little BN Bat	
	Oedura robusta	Striped Honeyeater			
	Ctenotus robustus	BF Honeyeater			
		Red Wattlebird			
		Weebill			
		Inland Thornbill			
		BR Thornbill			
		Yellow Thornbill			
		CR Thornbill			
		YR Thornbill			
		Speckled Warbler			
		GC Babbler			
		WB Babbler			
		LP Cormorant			
		Grey Shrikethrush			
		BF Cuckoo-shrike			
		EY Robin			
		RC Robin			
		Sh. Bronze-cuckoo			
		Horse. Bronze-cuckoo			
		Currawong			
		Spotted Pardalote			
		Mallee Ringneck			
		Striated Pardalote			
		King Parrot			
		Eastern Rosella			
		Turquoise Parrot			
		Galah			
		BF Cuckoo-shrike			
		Western Gerygone			
		WT Gerygone			
		Little Lorikeet			
		Rufous Whistler			
		Emu			
		Jacky Winter			
		Bronzewing			
		Mistletoebird			
		Grey Butcherbird			
		OB Oriole			
		Jacky Winter			
		Noisy Friarbird			
		WW Chough			
		Cicadabird			
		Peaceful Dove			
		BS Dove			
		Diamond Dove			
		Kookaburra			
		Sacred Kingfisher			
		Magpie			
		Painted Buttonquail			
		WT Needletail			
		Barking Owl			
		Boobook Owl			
		WT Nightjar			
		Owlet Nightjar			
		Tawny Frogmouth			
		Leaden Flycatcher			
		Noisy Miner			

8.4.2 Broad-leaf Ironbark (*E. fibrosa/C. trachyphloia)* forests

Frogs	Reptiles	Birds	Mammals	Bats	introduced
Limno. ornatus	*Crypto. carnabyi*	Rufous Whistler	YF Antechinus	Little Forest Bat	Pig
Litoria latopalm.	*Amphibolurus nobbi*	Gilberts Whistler	Pilliga Mouse	Greater LE Bat	Fox
Litoria peronii	*Pogona barbata*	Grey Fantail	EG Kangaroo	Gould's Wattled Bat	Rabbit
Limno. terraereg.	*Morethia boulengeri*	Speckled warbler	Echidna	Inland BN Bat	House Mouse
	Egernia striolata	SF Wren	Red-necked Wallaby	Gould's LE Bat	
	Heteronotia binoei	Variegated Wren	Swamp Wallaby	Little BN Bat	
	Diplodactylus vittatus	CR Heathwren	Sugar Glider	Southern FT Bat	
	Ctenotus robustus	Grey Shrikethrush	E Pygmy-possum	LE Pied Bat	
	Simoselaps australis	EY Robin	Koala	Lesser LE Bat	
	Lerista muelleri	Painted Button-quail		Chocolate Wttd Bat	
		Stubble Quail		LR Flying Fox	
		Sacred Kingfisher		Eastern Cave Bat	
		Weebill			
		Inland Thornbill			
		Yellow Thornbill			
		BR Thornbill			
		WT Treecreeper			
		BH Honeyeater			
		SC Honeyeater			
		WE Honeyeater			
		Striped Honeyeater			
		YT Honeyeater			
		YF Honeyeater			
		Eastern Spinebill			
		Noisy Friarbird			
		Double-barred Finch			
		WB Babbler			
		GC Babbler			
		Crested Bellbird			
		Emu			
		Silvereye			
		Leaden flycatcher			
		Jacky Winter			
		Satin Flycatcher			
		BB Buzzard			
		WT Eagle			
		Square-tailed Kite			
		RB Firetail			
		Mistletoebird			
		Grey Butcherbird			
		Pied Butcherbird			
		Spotted Pardalote			
		Striated Pardalote			
		Horse. Bronze-cuckoo			
		Western Gerygone			
		WT Gerygone			
		Turquoise Parrot			
		Mallee ringneck			
		GB Cockatoo			
		Little Lorikeet			
		Musk Lorikeet			
		Red-winged Parrot			
		SC Cockatoo			
		Aust. Raven			
		Currawong			
		Magpie			
		BF Cuckoo-shrike			
		Cicadabird			
		Rainbow Bee-eater			
		Bronzewing			
		Noisy Friarbird			
		Noisy Miner			
		Tawny Frogmouth			
		Boobook Owl			
		Owlet Nightjar			
		WT Nightjar			
		Spotted Nightjar			
		Spotted Quailthrush			

8.4.3 Blue-leaf Ironbark (*E. nubila*) forests

Frogs	Reptiles	Birds	Mammals	Bats	introduced
	Pogona barbata *Morethia boulengeri* *Lerista muelleri* *Lerista bougainvillii* *Heteronotia binoei* *Amphibolurus nobbi* *Crypto. carnabyi* *Oedura robusta* *Oedura monilis* *Diplodactylus vittatus* *Varanus varius* *Varanus gouldii*	WT Treecreeper Brown Treecreeper WW Chough Rufous Whistler Striated Pardalote Spotted Pardalote Mistletoebird Varied Sitella Grey Shrikethrush Inland Thornbill BR Thornbill YR Thornbill Yellow Thornbill Weebill Cicadabird BH Honeyeater WE Honeyeater YF Honeyeater Eastern Rosella GB Cockatoo Little Lorikeet Mallee Ringneck King Parrot Silvereye Variegated Wren SF Wren OB Oriole Currawong Magpie Little Raven Spotted Quailthrush WB Babbler EY Robin RC Robin Painted Button-quail Emu Jacky Winter Bronzewing BS Dove Grey Fantail Galah Currawong Sh. Bronze-cuckoo Horse. Bronze-cuckoo Fantailed Cuckoo Kookaburra Sacred Kingfisher Owlet Nightjar Tawny Frogmouth Boobook Owl Barking Owl Barn Owl WT Nightjar Noisy Friarbird Little Friarbird CR Heathwren Red Wattlebird Grey Shrikethrush WT Needletail	YF Antechinus Echidna EG Kangaroo Swamp Wallaby Eastern Pygmy-possum Sugar Glider Common Brushtail	Little Forest Bat Greater LE Bat Inland BN Bat Lesser LE Bat	Pig Rabbit Fox

8.4.4 Pilliga Box (*E. pilligaensis*) woodlands

Frogs	Reptiles	Birds	Mammals	Bats	introduced
Limno. terraereg. *Neobatrachus sudelli* *Litoria latopalmata* *Limno. Fletcheri* *Limno. tasman.*	*Demansia psammophis* *Morethia boulengeri* *Heteronotia binoei* *Gehyra variegata* *Gehyra dubia* *Crypto. carnabyi* *Diplo. vittatus* *Lophognathus* *Egernia striolata* *Pygopus lepidopodus*	Tawny Frogmouth Owlet Nightjar Noisy Miner Barking Owl Grey Butcherbird WT Needletail Rufous Whistler Noisy Friarbird Rainbow Bee-eater Weebill Yellow Thornbill CR Thornbill Inland Thornbill EY Robin Red-capped Robin Cicadabird WT Treecreeper Brown Treecreeper Varied Sitella SC Honeyeater BH Honeyeater Striped Honeyeater WE Honeyeater BH Honeyeater WP Honeyeater WT Needletail Crested Bellbird Kookaburra Mallee Ringneck Turquoise Parrot OB Oriole Jacky Winter Galah Bronzewing Western Gerygone Kookaburra Scared Kingfisher Pied Currawong Mistletoebird Rufous Whistler GC Babbler Grey Fantail Grey Shrikethrush Australian Raven Peewee WB Babbler Spotted Pardalote Striated Pardalote Silvereye Dusky Woodswallow Tree Martin Rufous Songlark Willie Wagtail Speckled Warbler Black-eared Cuckoo Horse. Bronze-cuckoo Channel-b. Cuckoo Varied Sitella Cicadabird BS Dove Leaden Flycatcher Mistletoebird Dusky Woodswallow Grey Butcherbird Variegated Wren Spotted Bowerbird Emu Apostlebird	Sugar Glider YF Antechinus Koala Swamp Wallaby RN Wallaby EG Kangaroo Common Dunnart Echidna Brushtail Possum	Lesser LE Bat Inland BN Bat Little Forest Bat Little BN Bat Gould's Wattled Bat YB Sheathtail Bat Little Pied Bat Gould's LE Bat Southern BN Bat Greater LE Bat	Goat Pig

		Jacky Winter Little Cuckoo-shrike BF Cuckoo-shrike			

8.4.5 Poplar Box (*E. populnea*) woodlands

Frogs	Reptiles	Birds	Mammals	Bats	introduced
Limno. tasman.	*Morethia*	Western Gerygone	Koala	Little Pied Bat	Goat
Litoria caerulea	*boulengeri*	Weebill	Sugar Glider	Little Forest Bat	Pig
Litoria peronii	*Crypto. carnabyi*	WT Treecreeper	EG Kangaroo	Gould's Wattled Bat	
Litoria rubella	*Morethia*	Grey Fantail	RN Wallaby	Little BN Bat	
Limno. terraereg.	*Heteronotia binoei*	Silvereye	Swamp Wallaby	Greater LE Bat	
Notaden bennettii	*Egernia striolata*	Rufous Whistler	Echidna		
	Gehyra variegata	Speckled Warbler			
	Hop. bitorquatus	Yellow Thornbill			
		Inland Thornbill			
		CR Thornbill			
		Weebill			
		BR Thornbill			
		Dusky Woodswallow			
		WT Needletail			
		Little Friarbird			
		Noisy Friarbird			
		Bar-shouldered Dove			
		Grey Shrikethrush			
		Magpie			
		Currawong			
		Grey Butcherbird			
		Aust. Raven			
		Galah			
		Grey-crowned Babbler			
		EY Robin			
		BH Honeyeater			
		WE Honeyeater			
		SC Honeyeater			
		BF Cuckoo-shrike			
		Rainbow Bee-eater			
		Pallid Cuckoo			
		Spotted Bowerbird			
		Boobook Owl			
		Owlet Nightjar			

8.4.6 Box (*E. microcarpa*) woodlands

Frogs	Reptiles	Birds	Mammals	Bats	introduced
Litoria peronii	*Lerista muelleri* *Morethia boulengeri* *Heteronotia binoei* *Ctenotus allotropis*	WT Treecreeper Peewee Grey Butcherbird BF Cuckoo-shrike OB Oriole Aust. Raven Noisy Friarbird Little Friarbird BF Cuckoo-shrike Emu Tawny Frogmouth WW Chough Sh. Bronze-cuckoo Horse. Bronze-cuckoo Eastern Rosella Mallee Ringneck Galah Noisy Miner Spotted Quailthrush Grey Fantail EY Robin RC Robin Striated Pardalote Spotted Pardalote BR Thornbill Yellow Thornbill Inland Thornbill Weebill Cicadabird Willie Wagtail Crested Pigeon WT Gerygone Varied Sitella Kookaburra Red wattlebird Striped Honeyeater YF Honeyeater BH Honeyeater WE Honeyeater Rufous Whistler Boobook Owl	YF Antechinus EG Kangaroo Common Brushtail	Little Forest Bat Southern FT Bat Inland BN Bat Lesser LE Bat	Black Rat

8.4.7 Red Gum (*E. blakelyi*) woodlands

Frogs	Reptiles	Birds	Mammals	Bats	introduced
Neobatrachus sudelli	*Morethia boulengeri*	Rufous Whistler	Koala	Greater LE Bat	House Mouse
Limno. ornatus	*Egernia striolata*	Grey Shrikethrush	YF Antechinus	Lesser LE Bat	Pig
Litoria rubella	*Oedura monilis*	Grey Fantail	EG Kangaroo	Little Forest Bat	Rabbit
	Heteronotia binoei	Pied Butcherbird	RN Wallaby	Little BN Bat	Horse
	Crypto. carnabyi	Kookaburra	Swamp Wallaby	Inland BN Bat	Cattle
	Gehyra variegata	Sacred Kingfisher	Sugar Glider	Gould's Wattled Bat	
	Amphibolurus nobbi	Superb Fairy Wren		Gould's LE Bat	
	Pygopus lepidopodus	Variegated Wren		LR Flying Fox	
	Lerista muelleri	Varied Sitella			
	Ctenotus robustus	Weebill			
	Ramph. bituberculatus	WT Eagle			
		Little Friarbird			
		Noisy Friarbird			
		WP Honeyeater			
		Brown Honeyeater			
		WE Honeyeater			
		YF Honeyeater			
		YT Honeyeater			
		Striped Honeyeater			
		SC Honeyeater			
		BF Honeyeater			
		Galah			
		SC Cockatoo			
		King Parrot			
		Eastern Rosella			
		Musk Lorikeet			
		Little Lorikeet			
		Turquoise Parrot			
		Mallee Ringneck			
		CR Thornbill			
		Yellow Thornbill			
		Inland Thornbill			
		BR Thornbill			
		CR Heathwren			
		WT Treecreeper			
		Brown Treecreeper			
		Mistletoebird			
		Rainbow Bee-eater			
		BF Cuckoo-shrike			
		Little Cuckoo-shrike			
		Aust. Raven			
		Little Raven			
		Grey Butcherbird			
		Dollarbird			
		EY Robin			
		Red-capped Robin			
		Sh. Bronze-cuckoo			
		Black-eared Cuckoo			
		Horse. Bronze-cuckoo			
		Silvereye			
		GC Babbler			
		WB Babbler			
		WT Needletail			
		Speckled Warbler			
		Willie Wagtail			
		Peregrine Falcon			
		Noisy Miner			
		Mallee Ringneck			
		Double-barred Finch			
		Rainbow Bee-eater			
		OB Oriole			
		Leaden Flycatcher			
		Jacky Winter			
		Dusky Woodswallow			
		RB Firetail			
		BS Dove			
		Bronzewing			
		Tawny Frogmouth			
		Owlet Nightjar			

		Barking Owl Boobook Owl Spotted Pardalote Western Gerygone WT Gerygone Cicada bird Currawong Peewee Nankeen Night-heron Black Duck			

8.4.8 Red Gum (*E. blakelyi/ A. floribunda*) woodlands

Frogs	Reptiles	Birds	Mammals	Bats	introduced
	Pogona barbata *Oedura monilis* *Oedura robusta* *Lerista muelleri* *Heteronotia binoei* *Morethia boulengeri* *Lygisaurus foliorum* *Anomalopus leuckartii* *Amphibolurus nobbi* *Ctenotus allotropis*	Grey Butcherbird Pied Butcherbird Rainbow Bee-eater Rufous Whistler WT Treecreeper Brown Treecreeper Varied Sitella Noisy Miner Noisy Friarbird Western Gerygone WT Gerygone Eastern Rosella Galah Mallee Ringneck Little Lorikeet Musk Lorikeet Turquoise Parrot Emu Spotted Pardalote Bronzewing Grey Fantail Kookaburra Sacred Kingfisher Double-barred Finch Diamond Firetail WW Chough Cicadabird BF Cuckoo-shrike Mistletoebird Peewee Magpie Aust. Raven Silvereye GC Babbler BS Dove Peaceful Dove EY Robin Hooded Robin Speckled Warbler SF Wren Variegated Wren Kookaburra Sacred Kingfisher BF Cuckoo-shrike Yellow Thornbill BR Thornbill Inland Thornbill YR Thornbill Weebill Willie Wagtail Dusky Woodswallow Horse. Bronze-cuckoo Black-eared Cuckoo Grey Shrikethrush Jacky Winter Restless Flycatcher Grey Butcherbird Peregrine Falcon YF Honeyeater Striped Honeyeater WE Honeyeater WP Honeyeater YT Honeyeater BH Honeyeater BF Honeyeater Eastern Spinebill Red Wattlebird Boobook Owl Tawny Frogmouth	YF Antechinus Squirrel Glider Koala Pilliga Mouse Echidna Swamp Wallaby RN Wallaby EG Kangaroo E. Pygmy-possum	Little Forest Bat Lesser LE Bat Gould's Wttd Bat YB Sheathtail Bat Inland BN Bat Gould's LE Bat Inland FT Bat Greater LE Bat	House Mouse Rabbit Pig Cattle

		Owlet nightjar WW Chough			

8.4.9 Red Gum/River Oak (*E. camaldulensis/C. cunninghamiana*) woodlands (EXW003)

Frogs	Reptiles	Birds	Mammals	Bats	Introduced
Limno. fletcheri *Litoria peronii* *Litoria latopalmata*	*Amphibolurus nobbi* *Morethia boulengeri* *Heteronotia binoei* *Crypto. carnabyi*	Red wattlebird Noisy Friarbird WT Treecreeper SC Cockatoo Galah Eastern Rosella Jacky Winter Grey Fantail Rufous Whistler Speckled Warbler OB Oriole Yellow Thornbill Sacred kingfisher Magpie Peewee Aust. Raven Currawong Rufous Whistler BF Cuckoo-shrike WT Gerygone Western Gerygone Noisy Miner Grey Teal YB Spoonbill Pelican WF Heron SF Wren Dollarbird Striated pardalote Spotted Pardalote WP Honeyeater Striped Honeyeater BH Honeyeater YF Honeyeater Willie Wagtail Grey Shrikethrush EY Robin WB Babbler Tawny Frogmouth Owlet Nightjar Boobook Owl Varied Sitella Grey Butcherbird Sacred Kingfisher Peaceful Dove	Common Dunnart YF Antechinus	Little Forest Bat Lesser LE Bat	House Mouse Black Rat

8.4.10 Scrubland/Mallee (*M. uncinata/A. triptera/E. dumosa/E. dwyeri/E. crebra*)

Frogs	Reptiles	Birds	Mammals	Bats	Introduced
Limno. ornatus	*Diplodact. vittatus*	CR Thornbill	Pilliga Mouse	Little BN Bat	Pig
Limno. terraereg.	*Heteronotia binoei*	Yellow Thornbill	YF Antechinus	Gould's Wattled Bat	Goat
Litoria peronii	*Gehyra variegata*	BR Thornbill	Echidna	Little Forest Bat	House Mouse
Litoria latopalmata	*Morethia boulengeri*	YR Thornbill	Sugar Glider	Lesser LE Bat	
	Egernia striolata	WT Treecreeper	EG Kangaroo		
	Lerista punctatovittata	Inland Thornbill	Swamp wallaby		
	Crypto. carnabyi	Brown Treecreeper			
	Amphibolurus muricatus	Western Gerygone			
	Ctenotus robustus	SC Honeyeater			
	Oedura monilis	Striped Honeyeater			
	Ctenotus allotropis	YF Honeyeater			
		WE Honeyeater			
		BH Honeyeater			
		Brown Honeyeater			
		YP Honeyeater			
		Red wattlebird			
		Double-barred Finch			
		EY Robin			
		Weebill			
		SF Wren			
		Variegated Wren			
		Bronzewing			
		WB Babbler			
		Currawong			
		Peewee			
		Magpie			
		Brown Songlark			
		Kookaburra			
		Rufous Songlark			
		Grey Fantail			
		Straw-necked Ibis			
		Masked Lapwing			
		Noisy Miner			
		YT Miner			
		OB Oriole			
		Silvereye			
		Mistletoebird			
		Dusky Woodswallow			
		Rufous Whistler			
		Grey Shrikethrush			
		SC Cockatoo			
		Varied Sitella			
		Kookaburra			
		Noisy Miner			
		Mistletoebird			
		Musk Lorikeet			
		Little Lorikeet			
		Variegated Wren			
		SB Wren			
		Red-rumped Parrot			
		Galah			
		Eastern Rosella			
		GB Cockatoo			
		RW Parrot			
		King Parrot			
		Mallee ringneck			
		Noisy Friarbird			
		Little Friarbird			
		Jacky Winter			
		Spotted Pardalote			
		Striated Pardalote			
		GC Babbler			
		Grey Butcherbird			
		Pied Butcherbird			
		WT Needletail			
		Brown Falcon			
		Cicadabird			
		Owlet Nightjar			
		Tawny Frogmouth			

		Boobook Owl Painted Buttonquail Spotted Bowerbird CR Heathwren Horse. Bronze-cuckoo Sh. Bronze-cuckoo Diamond Dove BF Cuckoo-shrike Little Raven Aust. Raven Western Gerygone Rainbow Bee-eater WW Chough Malleefowl Emu Varied Sitella Speckled warbler			

8.4.11 Belah (*C. cristata*) woodlands

Frogs	Reptiles	Birds	Mammals	Bats	Introduced
Limno. fletcheri *Limno. terraereg.* *Limno. ornatus*	*Lophognathus* *Gehyra variegata* *Heteronotia binoei* *Morethia* *Egernia striolata* *Ctenotus allotropis* *Diplodact. williamsi*	Rufous Whistler Golden Whistler Grey Shrikethrush Yellow Thornbill CR Thornbill Inland Thornbill BR Thornbill Weebill Speckled Warbler SC Honeyeater Striped Honeyeater WP Honeyeater WE Honeyeater Speckled Warbler Grey Fantail EY Robin Re-capped Robin Mistletoebird Olive-backed Oriole Pied Currawong Black-eared Cuckoo Sh. Bronze-cuckoo WT Treecreeper Western Gerygone Silvereye Noisy Miner Kookaburra Mallee ringneck Aust. Raven Peewee GC Babbler WT Treecreeper Varied Sitella Grey Butcherbird Bronzewing SF Wren Mistletoe bird Galah Currawong Owlet Nightjar Tawny Frogmouth Barking Owl WW Chough Jacky Winter BF Cuckoo-shrike Musk Lorikeet	Koala Common Dunnart RN Wallaby Swamp Wallaby	Little BN Bat Gould's Wattled Bat Inland BN Bat Greater LE Bat Lesser LE Bat Little Forest Bat	Cattle Pig Goat

8.4.12 Green Mallee (*E. viridis*)

Frogs	Reptiles	Birds	Mammals	Bats	introduced
	Morethia boulengeri *Diplo. vittatus*	Grey Fantail Pied Currawong OB Oriole BF Cuckoo-shrike Noisy Friarbird Rufous Whistler BR Thornbill Yellow Thornbill Inland thornbill CR Heathwren Noisy Miner Brown Treecreeper Red Wattlebird Galah Mallee ringneck Kookaburra Striated pardalote Spotted Pardalote WT Gerygone WT Treecreeper Brown Treecreeper Weebill Striped Honeyeater WE Honeyeater YF Honeyeater Noisy Miner Varied Sitella Bronzewing Grey Shrikethrush Grey Butcherbird Magpie Boobook Owl WT Nightjar Owlet Nightjar Tawny Frogmouth GC Babbler Cicadabird	YF Antechinus	Little Forest Bat Greater LE Bat	

8.5 HABITAT COVERAGE BY SURVEYS

Interim listing of the habitats in Pilliga and Goonoo forests based on existing mapping. Completion of the vegetation mapping project will impact on this listing.

Habitats surveyed	No. of sites	Habitats not surveyed
E. crebra/A. leuhmanni/C. glaucophylla	12	*A. harpophylla*
E. crebra/E. blakelyi	5	*E. fibrosa/C. trachyphloia/M. uncinata*
E. fibrosa/C. trachyphloia/C. endlicheri	9	*C. endlicheri*
E. nubila/C. endlicheri	6	*C. trachyphloia*
E. pilligaensis/C. glaucophylla	4	*C. trachyphloia/C. endlicheri*
E. populnea/C. glaucophylla	2	*Callitris verrocusa/E. blakelyi/A. floribunda*
E. microcarpa/C. glaucophylla	1	*C. trachyphloia/E. fibrosa*
E. camaldulensis/C. cunninghamiana	1	*C. trachyphloia/E. crebra*
E. blakelyi/C. glaucophylla	5	*C. trachyphloia/E. chloroclada/C. endlicheri*
E. chloroclada/C. glaucophylla	1	*C. trachyphloia/E. dwyeri/C. glaucophylla*
E. blakelyi/A. floribunda/C. glaucophylla	4	*C. trachyphloia/E. blakelyi/E. crebra*
C. cristata/C. glaucophylla	2	*C. trachyphloia*
M. uncinata/A. triptera/E. dwyeri, E. dumosa	5	*E. fibrosa/C. trachyphlioa/C. glaucophylla*
E. viridis	1	*E. fibrosa/C. glaucophylla*
		E. fibrosa/E. blakelyi
		C. endlicheri/E. sideroxylon
		E. sideroxylon/A. leuhmanni/C. glaucophylla
		C. glaucophylla/E. sideroxylon/A. leuhmanni
		E. crebra
		E. crebra/C. trachyphloia/C. glaucophylla
		E. crebra/C. trachyphloia/E. blakelyi
		E. crebra/C. glaucophylla
		E. crebra/C. glaucophylla/C. trachyphloia
		E. pilligaensis
		E. pilligaensis/E. populnea
		C. glaucophylla
		C. glaucophylla/C. trachyphloia/E. blakelyi
		E. conica/C. glaucophylla
		C. glaucophylla/E. crebra
		C. glaucophylla/E. crebra/C. trachyphloia
		C. glaucophylla/E. pilligaensis
		C. glaucophylla/E. crebra/E. blakelyi
		C. glaucophylla/E. albens
		C. glaucophylla/E. blakelyi
		C. glaucophylla/E. blakelyi/A. floribunda
		C. glaucophylla/E. melanophloia
		E. blakelyi
		C. endlicheri/E. blakelyi
		E. chloroclada/E. fibrosa
		E. blakelyi/A. floribunda
		E. melanophloia
		Swamp
		E. albens
		E. albens/C. glaucophylla

8.6 REGIONALLY SIGNIFICANT SPECIES

Species considered regionally significant for three reasons; very few records, known to be declining or at the edge of their distribution in New South Wales within the Brigalow Belt South. Conservation priority is given as an indication of level of threat from wood removal; either 1 (high level of threat, being tree and/or shrubby understorey dependent), 2 (possible threat, not known to use trees in Brigalow Belt South), or 3 (low level of threat, not found in wooded habitats or with shrubby understories).

Species name	Common name	Obs	Legal	Reason	Conservation priority
Leipoa ocellata	Malleefowl	X	E1	DECLINING	1
Turnix velox	Little Button-quail		P	RARE	3
Turnix pyrrhothorax	Red-chested Button-quail		P	RARE	3
Geophaps scripta	Squatter Pigeon		E1	EDGE	3
Gallirallus philippensis	Buff-banded Rail	X	P	RARE	3
Erythogonys cinctus	Red-kneed Dotterel	X	P	RARE	3
Limosa limosa	Black-tailed Godwit		V	EDGE	3
Rostratula benghalensis	Painted Snipe		V	RARE	3
Burhinus grallarius	Bush Stone-curlew	X	E1	DECLINING	1
Ardeotis australis	Australian Bustard		E1	EDGE	3
Grus rubicunda	Brolga	X	V	RARE	3
Ephippiorhynchus asiaticus	Black-necked Stork		E1	EDGE	3
Botaurus poiciloptilus	Australasian Bittern	X	V	RARE	3
Anseranas semipalmata	Magpie Goose		V	EDGE	3
Stictonetta naevosa	Freckled Duck		V	RARE	3
Oxyura australis	Blue-billed Duck		V	EDGE	3
Lophoictinia isura	Square-tailed Kite	X	V	RARE	1
Hamirostra melanosternon	Black-breasted Buzzard	X	V	RARE	2
Falco hypoleucos	Grey Falcon		V	EDGE	2
Ninox connivens	Barking Owl	X	V	RARE	1
Ninox strenua	Powerful Owl		V	EDGE	2
Tyto novaehollandiae	Masked Owl	X	V	RARE	1
Tyto capensis	Grass Owl		V	RARE	3
Calyptorhynchus banksii	Red-tailed Black-Cockatoo		V	RARE	2
Calyptorhynchus lathami	Glossy Black-Cockatoo	X	V	DECLINING	1
Cacatua leadbeateri	Major Mitchell's Cockatoo		V	EDGE	2
Polytelis swainsonii	Superb Parrot		V	RARE	2
Platycercus elegans	Crimson Rosella	X	P	EDGE	2
Platycercus adscitus	Pale-headed Rosella		P	EDGE	2
Psephotus varius	Mulga Parrot	X	P	EDGE	2
Northiella haematogaster	Blue Bonnet		P	EDGE	1
Neophema pulchella	Turquoise Parrot	X	V	RARE	2
Lathamus discolor	Swift Parrot		V	RARE	1
Alcedo azurea	Azure Kingfisher	X	P	EDGE	2
Apus pacificus	Fork-tailed Swift	X	P	RARE	2

Cacomantis variolosus	Brush Cuckoo	X	P	EDGE	2
Eudynamys scolopacea	Common Koel		P	EDGE	2
Cheramoeca leucosternus	White-backed Swallow	X	P	RARE	2
Myiagra cyanoleuca	Satin Flycatcher	X	P	EDGE	2
Melanodryas cucullata	Hooded Robin	X	P	DECLINING	2
Pachycephala inornata	Gilbert's Whistler	X	V	EDGE, RARE	1
Falcunculus frontatus	Crested Shrike-tit		P	RARE	2
Coracina maxima	Ground Cuckoo-shrike		P	RARE	3
Cinclosoma punctatum	Spotted Quail-thrush	X	P	RARE	1
Pomatostomus temporalis	Grey-crowned Babbler	X	P	DECLINING	1
Pomatostomus superciliosus	White-browed Babbler	X	P	DECLINING	1
Epthianura albifrons	White-fronted Chat		P	RARE	3
Epthianura tricolor	Crimson Chat		P	EDGE	3
Aphelocephala leucopsis	Southern Whiteface		P	RARE	3
Hylacola pyrrhopygia	Chestnut-rumped Heathwren	X	P	RARE	1
Hylacola cauta	Shy Heathwren		V	EDGE, RARE	1
Chthonicola sagittata	Speckled Warbler	X	P	DECLINING	2
Artamus personatus	Masked Woodswallow		P	RARE	2
Artamus superciliosus	White-browed Woodswallow		P	RARE	2
Artamus minor	Little Woodswallow		P	RARE	2
Climacteris affinis	White-browed Treecreeper		P	EDGE	2
Melithreptus gularis	Black-chinned Honeyeater		P	DECLINING	1
Certhionyx niger	Black Honeyeater		P	RARE	1
Lichmera indistincta	Brown Honeyeater	X	P	EDGE	1
Grantiella picta	Painted Honeyeater		V	RARE	1
Certhionyx variegatus	Pied Honeyeater		V	EDGE	2
Xanthomyza phrygia	Regent Honeyeater		E1	RARE	1
Lichenostomus virescens	Singing Honeyeater	X	P	EDGE	2
Lichenostomus ornatus	Yellow-plumed Honeyeater	X	P	EDGE	2
Manorina flavigula	Yellow-throated Miner	X	P	DECLINING	2
Stagonopleura guttata	Diamond Firetail	X	P	DECLINING	3
Neochmia modesta	Plum-headed Finch		P	RARE	3
Poephila cincta	Black-throated Finch		E1	RARE	3
Chlamydera maculata	Spotted Bowerbird	X	P	RARE	2
Dasyurus maculatus	Tiger Quoll		V	RARE	1
Phascogale tapoatafa	Brush-tailed Phascogale		V	RARE	1
Vespadelus troughtoni	Eastern Cave Bat	X	V	RARE	1
Planigale tenuirostris	Narrow-nosed Planigale		P	EDGE	3
Planigale gilesi	Paucident Planigale		P	EDGE	3
Sminthopsis crassicaudata	Fat-tailed Dunnart		P	RARE	3
Sminthopsis macroura	Stripe-faced Dunnart		V	RARE	3
Trichosurus vulpecula	Common Brushtail Possum	X	P	DECLINING	1
Pseudocheirus peregrinus	Common Ringtail Possum		P	DECLINING	1
Petaurus norfolcensis	Squirrel Glider	X	V	RARE	1

Acrobates pygmaeus	Feathertail Glider	X	P	RARE	1
Cercartetus nanus	Eastern Pigmy-possum	X	P	RARE	1
Phascolarctos cinereus	Koala	X	V	RARE	1
Aepyprymnus rufescens	Rufous Bettong		V	RARE	1
Petrogale penicillata	Brush-tailed Rock-wallaby		V	DECLINING	3
Macropus dorsalis	Black-striped Wallaby	X	E1	RARE	1
Macropus robustus	Common Wallaroo	X	P	RARE	2
Pteropus poliocephalus	Grey-headed Flying-fox		P	EDGE	1
Rhinolophus megaphyllus	Eastern Horseshoe-bat		P	RARE	2
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	X	V	RARE	1
Nyctophilus timoriensis	Greater Long-eared Bat	X	V	RARE	1
Miniopterus schreibersii	Common Bent-wing Bat		V	EDGE	3
Miniopterus australis	Little Bent-wing Bat		V	EDGE	3
Chalinolobus morio	Chocolate Wattled Bat	X	P	EDGE	2
Chalinolobus picatus	Little Pied Bat	X	V	EDGE	1
Chalinolobus dwyeri	Large Pied Bat	X	V	RARE	1
Myotis adversus	Large-footed Mouse-eared Bat		V	EDGE	3
Falsistrellus tasmaniensis	Great Pipistrelle		V	EDGE	1
Vespadelus baverstocki	Inland Forest Bat		V	RARE	2
Rattus villosissimus	Long-haired Rat		V	RARE	3
Hydromys chrysogaster	Water Rat	X	P	RARE	3
Pseudomys pilligaensis	Pilliga Mouse	X	V	RARE	2
Canis familiaris dingo	Dingo		U	RARE	3
Anomalopus mackayi	Three-clawed Worm-skink		E1	RARE	3
Tympanocryptis lineata	Lined Earless Dragon		P	RARE	3
Varanus tristis	Black-headed Monitor		P	RARE, EDGE	1
Lygisaurus foliorum	Litter Skink	X	P	EDGE	3
Carlia tetradactyla	Southern Rainbow Skink		P	RARE	2
Ctenotus strauchii			P	EDGE	3
Ctenotus uber			P	EDGE	3
Egernia cunninghami	Cunningham's Skink		P	EDGE	3
Egernia whitii	White's Skink		P	EDGE	3
Hemiergis decresiensis			P	EDGE	2
Bassiana platynota	Red-throated Skink		P	EDGE	2
Lerista bougainvillii	Bougainville's Skink	X	P	EDGE	2
Eulamprus tenuis	Barred-side Skink	X	P	EDGE	1
Morelia spilota	Carpet or Diamond Python		P	RARE	1
Acanthophis antarcticus	Common Death Adder		P	RARE	2
Rhinoplocephalus nigrescens	Eastern Small-eyed Snake		P	EDGE	2
Furina dunmalli	Dunmall’s Snake		P	EDGE	2
Hoplocephalus bitorquatus	Pale-headed Snake	X	V	DECLINING	1
Pseudechis australis	Mulga Snake		P	EDGE	3
Liasis maculosus	Eastern Children's Python		P	EDGE	1
Egernia saxatilis saxatilis	Warrumbungle's Black Rock Skink		P	RARE	3

Underwoodisaurus sphyrurus			V	RARE	3
Cyclorana verrucosa			P	EDGE	3
Notaden bennettii	Crucifix Frog		P	EDGE	3
Pseudophryne bibronii	Brown Toadlet		P	EDGE	3
Crinia sloanei	Sloane's Toadlet		P	EDGE	3
Elseya sp. (Namoi and Gwydir Rivers)			V	RARE	3

8.7 EXTINCT SPECIES

Below is a list of species thought to be extinct on the Brigalow Belt South. Species asterisked not recorded from New South Wales but are known from the Brigalow Belt South in Queensland and probably occurred in New South Wales. Hairy-nosed Wombat fossil remains are known at several locations in NSW. Darling Downs Hopping-mouse known from only one specimen from an unknown location. Sources as per Paull and Date (1999). In addition, the amber-rat, possibly of the Stick-nest Rat origin has been identified from caves at Willala Mountain (S. Ingleby, pers. comm..). These probably old sites for this species, whose specific identity is not clear, there being two possible species. Bone fragments found during this survey, possibly from this species, await identification. There are 14 species recorded, mostly terrestrial species. This is one of the worst rates of extinction for mammals in the world in historical times.

Common Name	Species
White-footed Rabbit-rat	*Conilurus albipes*
Plain's Rat	*Pseudomys australis*
Gould's Mouse	*Pseudomys gouldii*
Pale Field Rat	*Rattus tunneyi*
Western Quoll	*Dasyurus geoffroii*
Western Barred Bandicoot	*Perameles bougainville*
Bilby	*Macrotis lagotis*
Bridled Nailtail Wallaby	*Onychogalea fraenata*
Eastern Hare-wallaby	*Lagochestes leporides*
Brush-tailed Bettong	*Bettongia penicillata*
Burrowing Bettong	*Bettongia lesueur*
Northern Hairy-nosed Wombat*	*Lasiorhinus krefftii*
Darling Downs Hopping-mouse*	*Notomys mordax*
Stick-nest Rat	*Leporillus* sp.