Appendix 5

Abel Underground Coalmine Sub-tropical Rainforest Monitoring Plan

This appendices is presented on the CD included on the inside front cover of this report.

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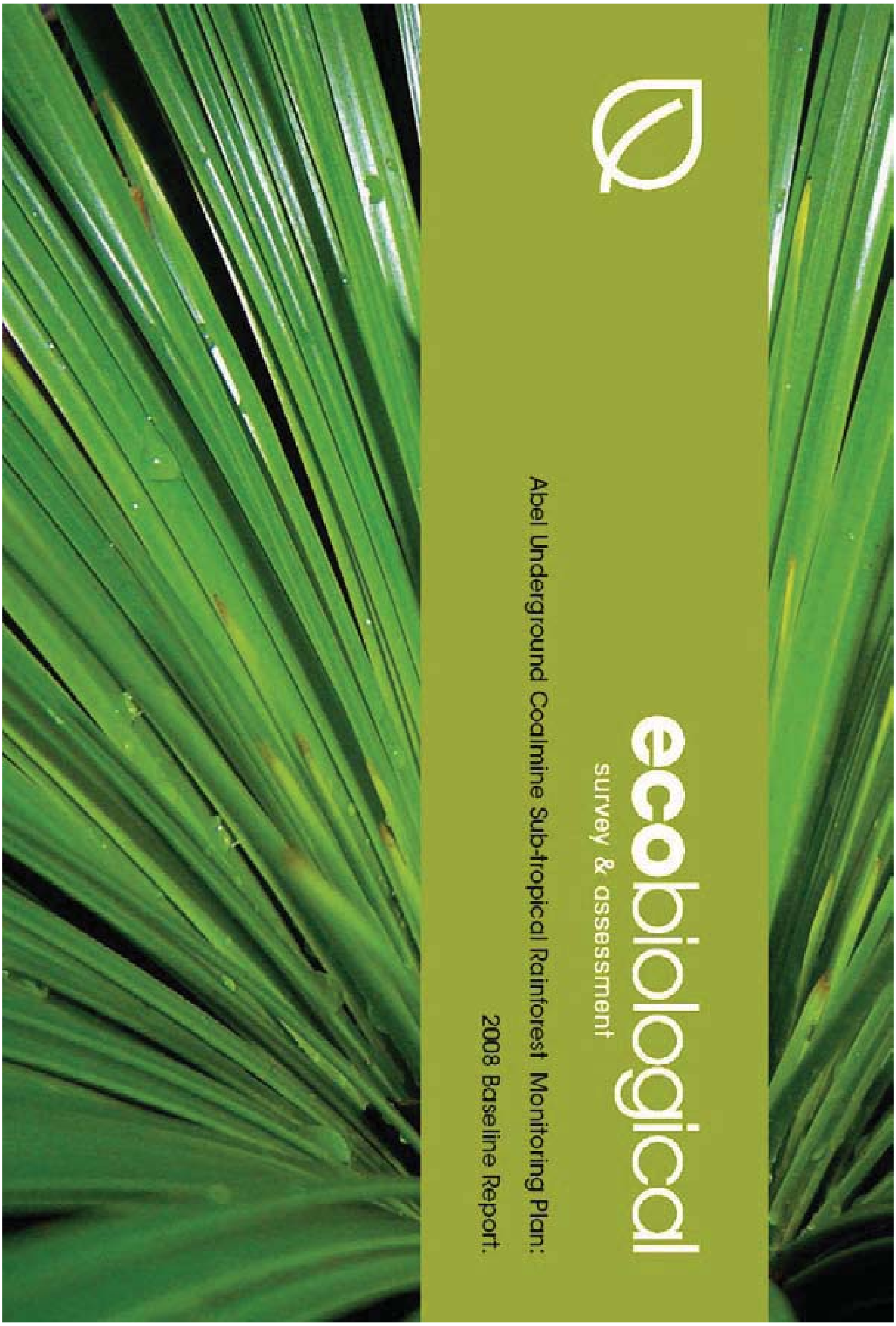
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Abel Underground Coalmine Sub-tropical Rainforest Monitoring Plan:
2008 Baseline Report.

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December 2008

Report prepared for Donaldson Coal Pty Ltd.

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Executive Summary

Donaldson Coal Pty Ltd commenced operations at Abel Underground Coalmine at Beresfield in the lower Hunter Valley, New South Wales, during 2008. To comply with part of the conditions of consent a Flora and Fauna Management Plan was prepared in late 2007 by EcoBiological.

This plan identified the need to establish a Sub-tropical Rainforest Monitoring Plan (SRMP) for the sub-tropical rainforest areas of Long Gully Creek. While there are several areas of rainforest in the surface vegetation, the most extensive and best developed lies in the Long Gully Creek system and this is the area that the rainforest monitoring was conducted in during November and December 2008. This area also lies where subsidence could have the largest impact. Monitoring of the sub-tropical rainforest is directed at assessing the stability of the rain forest to dry forest interface as well as floristic and faunal diversity in the rainforest proper.

This report provides a baseline assessment of the occurrence of flora, fauna and threatened species against which any changes over time can be measured and evaluated. It has been estimated that it will take approximately 10 years before any impact on the sub-tropical rainforest is likely to occur from subsidence, which will allow enough time to gather suitable information on the presence and status of threatened species present in this area. This information will then be available to inform best practice measures to be incorporated into the Subsidence Management Plan (SMP).

The Surface Ecological Monitoring Plan (SEMP), of which this plan forms a part of, will continue until one year after mining has passed the Long Gully and Blue Gum Creek catchments.

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1. Introduction

Donaldson Coal Pty Ltd (Donaldson) commenced mining during 2008 at a new underground mine (known as Abel Underground Coal Mine), located approximately 23 kilometres north-west of Newcastle. The mine will extract up to 4.5 million tonnes per year over 21 years using high productivity continuous miner based bord and pillar systems, and pillar extraction techniques. The seams to be mined are located under the Black Hill rural residential and adjoining forested areas. Mine access and associated surface infrastructure is located within the existing Donaldson Coal mine open cut void at Beresfield, with transfer of coal to the existing Bloomfield Coal Handling and Preparation Plant (CHPP) immediately to the north for coal washing and rail transport to the Port of Newcastle.

Underground coal mining is often associated with adverse environmental impacts because of subsidence (Bell *et al.* 2000, Sidle *et al.* 2000). Subsidence can cause loss of productive land, damage to underground pipelines and above-ground structures, decreased stability of slopes and escarpments, contamination of groundwater by acid drainage and dewatering of streams and groundwater supplies (Sidle *et al.* 2000). Of these, one of the major environmental concerns arising from the Abel mine is the effect of subsidence on local and regional hydrology. Surface and sub-surface cracking associated with mining subsidence can alter and create preferential flow paths, thus causing dewatering and rerouting of surface water and groundwater (Sidle *et al.* 2000). Alterations in channel and drainage morphology may also affect channel erosion, sediment delivery, and routing in streams and riparian habitat.

Associated with development approval for the Abel coal mine were a number of conditions of consent. These conditions included a requirement for the preparation of a Flora and Fauna Management Plan (F & FMP) which was prepared by EcoBiological in 2007. The F & FMP, which forms part of a comprehensive Environmental Management System for the Abel mine, sets out a strategy to monitor the effectiveness of the conservation measures proposed in the Environmental Assessment (EA) Statement of Commitments for the overall operation of the mine. Part of this strategy was to establish a Surface Ecological Monitoring Plan (SEMP) to monitor the effectiveness of the conservation measures proposed in the EA to mitigate against subsidence impacts on three distinct habitat areas; farm dams that form a belt across the mine site; subtropical rainforest areas of Long Gully Creek; and Pambalong Nature Reserve.

The SEMP outlines a monitoring plan for each of these areas by which baseline and subsequent monitoring data are to be gathered to inform future management. This report forms the baseline report for the Sub-tropical Rainforest Monitoring and Management Plan (SRMP) which forms part of the overall SEMP.

2. Location

The Abel Underground Mine is located within Newcastle, Cessnock and Maitland local government areas (LGAs). The majority of the underground mine and surface infrastructure area is within the Cessnock LGA.

The location of the underground mine area and surface facilities is shown in Figure 1. The underground mine area is bounded on the eastern side by the F3 Freeway; the western and southern sides by a tract of forest that extends south to the Central Coast and beyond to Hornsby, and the northern side by existing open cut coal mining activities within the Donaldson and Bloomfield mine leases.

The Abel underground mine area is approximately 2750 ha and consists of low undulating forested hills with patches of cleared land for 110 rural/residential properties. Large areas of land are owned by Donaldson, Coal and Allied and the Catholic Diocese of Maitland and Newcastle. Black Hill School, various local roads and other infrastructure are located in the area.

A ridgeline associated with Black Hill runs east-west through the proposed underground mine area. Tributaries of Buttai Creek, Viney Creek/Weakley's Flat Creek and Four Mile Creek drain northwards from this ridgeline. A wide catchment containing Long Gully and Blue Gum Creek drains from the ridgeline providing water to the wet swamp at Pambalong Nature Reserve. Some cliff-lines and steeper gullies are located along sections of the Black Hill ridge.

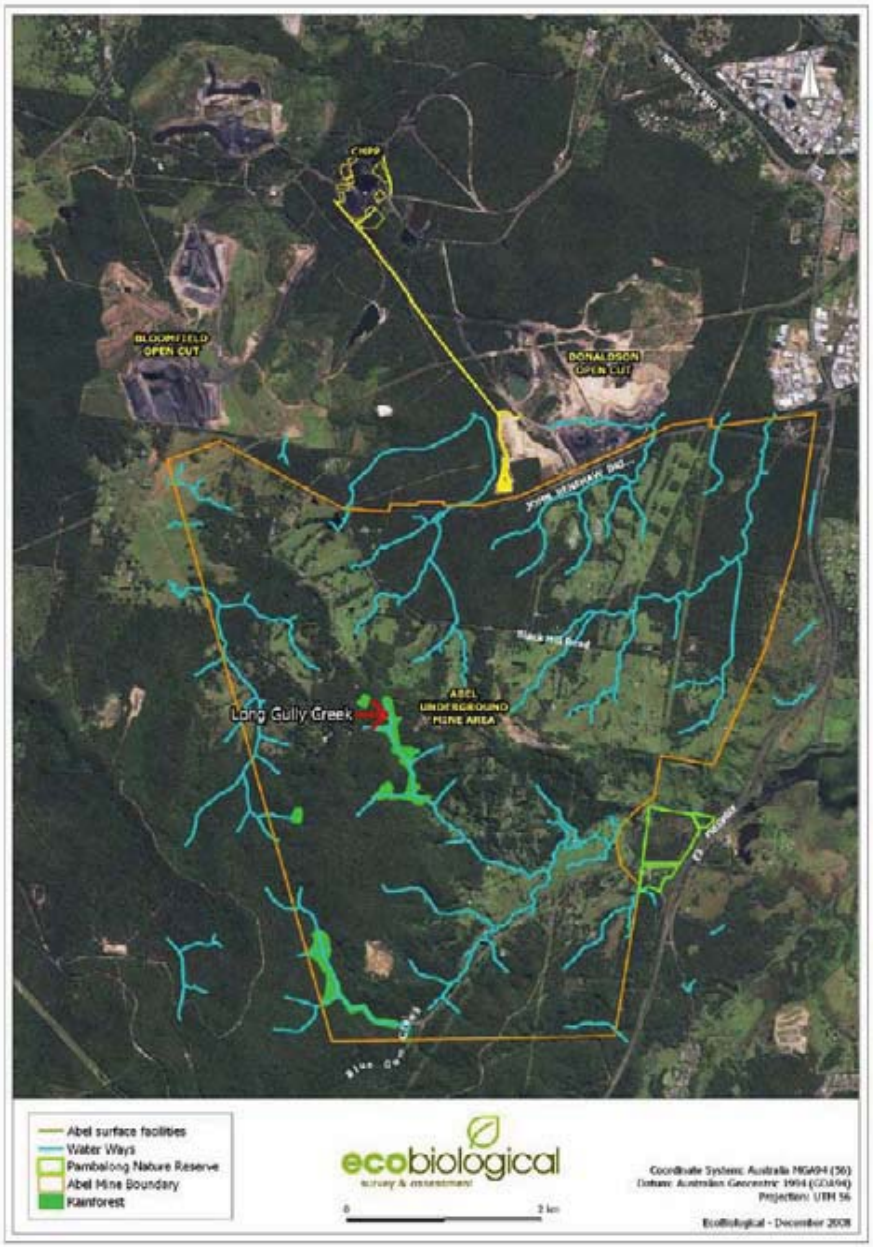

Figure 1: The location of the Abel Underground mine area and surface facilities.

3. Methods

3.1. Floral Diversity

Monitoring of rainforest vegetation across the rainforest gully was undertaken to indicate whether the rainforest community is stable, expanding or contracting. This was achieved using two transects extending across the width of the rainforest, starting and ending in the adjoining dry forest (Figure 2). The transect length across the rainforest gully for Transect 1 was 70m and 50m for Transect 2. Transects were divided into quadrats 5m long by 1m wide, end-to-end. The following was recorded for each quadrat:

- Total floristic content with the species being classified as a dry or moist forest species as well as whether the species belonged to the ground, shrub, midstorey or overstorey/emergent structural layers; and,
- An estimate of the density of vegetation in the ground, shrub, midstorey and overstorey/emergent and viney structural layers. The estimated density was taken for each 5m quadrat. Density estimates were taken in 10% increments for the ground, shrub and vine stratums. Density estimation for the mid and overstorey stratum is based on the percentage foliage cover (Walker and Hopkins 1988), where each species was determined and the total averaged.

A sample was taken from any plants unable to be identified at the subject site for later identification. Floristic identification and nomenclature was based on Harden (1992, 1993, 2000, 2002) with subsequent revisions as published on PlantNet (http://plantnet.rbgsyd.nsw.gov.au). Plants listed under the ROTAP scheme (Briggs and Leigh 1996) were also considered in this assessment along with species and vegetation deemed to be of local conservation significance.

Flora surveys were conducted between the 27th October and the 22nd of January 2009.

3.2. Faunal Diversity

In order to determine the rainforest-dependent species, faunal diversity monitoring was centred on two transects approximately 200m long, one situated in the rainforest and the second located in the surrounding dry forest. Fauna surveys were conducted between the 27th October and the 2nd of December 2008.

Both trapping transects consisted of an equal number of Elliott A traps, Elliott B traps on the ground, hair tubes and harp traps. Seven Elliott B tree traps were placed in the dry forest transect, as compared with three along the rainforest transect. The reduced number of tree traps along the rainforest transect was due to an inability to erect traps in some otherwise suitable trees due to hardness of tree trunks and presence of poisonous plant species surrounding these trees. The location of fauna survey activities is shown in Figure 2. Table 1 depicts the total trap night count.

Figure 2: Aerial photograph showing the location of flora and fauna survey activities within the sub-tropical rainforest along Long Gully Creek.

Table 1: Trapping statistics for the subject site.

Trap type	Traps	Nights	Trap nights
Elliott A	40	4	160
Elliott B Tree	10	4	40
Elliott B Ground	10	4	40
Harp Trap	2	4	8
Hair tubes	16	4	64

3.2.1. Arboreal Mammals

For arboreal mammals, 10 Elliott B traps and 16 hair tubes were placed in trees at heights of 3m or above, along 2 transects and baited with a mixture of rolled oats, honey, peanut butter and treacle. The trunks of trees containing the traps were sprayed with a mixture of honey and water. These traps were check daily for arboreal species and wafers from the hair tubes were collected after a 4-night period and checked for the presence of hair samples. Hair identification methods followed those of Brunner *et al* (2002). If any hair sample was from a vulnerable or endangered species, the sample was sent to Barbara Triggs, an expert in the field of hair identification for a second opinion.

Spotlighting was undertaken along each transect from dusk for a total of 4 person hours over 2 nights to identify the presence of any arboreal mammals. Trees were inspected during daylight hours for the presence of habitat hollows and if present these were watched at dusk to see if any nocturnal birds or mammals emerged.

3.2.2. Terrestrial Mammals

Forty Elliott A and 10 Elliott B traps were placed along 2 transects at regular intervals to target terrestrial mammal species. The traps were baited with a mix of rolled oats, honey, peanut butter and treacle and set in position for 4 consecutive nights and checked each morning.

Spotlighting was undertaken along each transect from dusk for a total of 4 person hours over 2 nights to identify the presence of any terrestrial mammals. Careful daytime searches were conducted to detect the presence of fauna activity such as diggings, droppings or scratch marks.

3.2.3. Bats

A harp trap was erected along each transect in bat 'flyways' such as across tracks, trails, creeks or natural forest openings to maximise the likelihood of captures. The harp traps were set in position for 4 consecutive nights and checked each morning. Bats captured were identified in the field and placed in specially designed 'soft release' boxes tethered to nearby trees which enable the bats to shelter during the day and exit the boxes on nightfall from narrow openings at the base of the box.

Anabat II bat-call recorders (Titley Electronics, Ballina) were used to record the calls of any Microchiropteran bats feeding in the area. The units were set up at dusk and recording occurred for a total of 4.5 hours at 4 locations over 2 nights. Spotlighting searches of blossoming trees were also undertaken to identify any Megachiropteran bat species.

3.2.4. Birds

A 20 minute bird survey of both the rainforest and dry forest transect was undertaken by walking the length of each transect on 28 October 2008 and again on 4 November 2008. Birds were identified either visually, with the aid of binoculars, or by call interpretation. Surveys were conducted in the morning when bird activity is maximised (Bibby *et al.* 2000). Opportunistic sightings were also recorded and listed separately to actual survey results.

After dark calls of threatened owl species (Powerful Owl, Masked Owl, Sooty Owl and Barking Owl) were broadcast over a megaphone in an attempt to encourage a call back response. The subject site was also searched to locate any regurgitated owl pellets. The size, shape and content of any pellets found were analysed to determine the species of owl from which the pellet originated as well as the prey species the owl had been feeding on. Analysis methods followed those of Brunner *et al.* (2002) and Triggs (1996).

3.2.5. Amphibians

A survey for amphibians was conducted along a portion of the length of the Long Gully rainforest. This involved standardised survey techniques for amphibian species including diurnal habitat searches, nocturnal spotlight surveys and dip netting for tadpoles. Call playback was also conducted for two species of threatened Barred River Frogs (*Mixophyes balbus* and *M. iteratus*) due to habitat being present that could form potential habitat for these species.

During diurnal surveys, dip netting and visual searches were carried out to locate any tadpoles present in any water bodies. During nocturnal surveys, spotlight searches were carried out by walking lengths of suitable habitat and using head torches to search for frogs by eye shine or by physical sightings.

Adult frogs encountered were identified by visual confirmation or by their distinct advertisement calls. Tadpoles were keyed out using diagnostic features including mouthparts (tooth rows, jaw sheaths and papillae), pigmentation, body size, tail structure (musculature, fin depth, fin shape, tip shape), eye direction and spacing, pupil pigmentation, nare shape and spacing, spiracle height and direction, vent length and direction, and tadpole behaviour according to Anstis (2002).

4. Results

4.1. Weather Conditions and Survey Activities

The prevailing weather conditions throughout the trapping survey period at the subject site were warm to hot, humid days, with light cloud cover to overcast conditions, occasional light showers and light to moderate winds. The mean minimum temperature was 15 ° C, and the mean maximum temperature was 29° C. A full list of survey activities and weather conditions during the survey period are provided in Table 2.

Table 2: Schedule of activities and weather conditions during the survey period.

Activity	Day	Date	Weather Conditions
Flora			
Transect 1	Thursday	30/10/08	Warm, humid day, overcast with moderate winds
Transect 2	Monday	15/12/08	Warm, humid, clear, no wind
Fauna			
Trapping	Monday to Friday	27 - 31/10/08	Warm to hot days and mild nights, clear to overcast skies, light to moderate winds with the occasional light shower
Nocturnal field work (Spotlighting, owl call playback, Anabat recording)	Thursday	13/11/08	Warm, clear night, slight breeze
	Tuesday	2/12/08	Warm, humid night, no cloud, rain or wind
Bird survey	Tuesday	28/10/08	Mild, humid morning, no rain or cloud, light to moderate winds
	Tuesday	4/11/08	Mild, clear morning, no rain and light breeze
Amphibian survey	Tuesday	28/10/08	Mild , clear evening with no rain and slight breeze

4.2. Floral diversity

A total of 54 flora species were identified on Transect 1 and 51 flora species were identified on Transect 2 (Appendix 1). Transect 1 commenced at a Lantana dominated clearing at the western side of the moist gully. This vegetation was determined as dry forest community.

No threatened flora species were recorded during surveys. One plant species *Eucalyptus fergusonii* subsp. *fergusonii* listed under ROTAP (Rare or Threatened Australian Plants) was recorded on Transect 2.

Flora species were assigned a preferred forest type or habitat, being either a dry forest or moist forest species (see Appendix 1). Figures 3 and 4 show the relationship between dry forest species and moist forest species over the length of each transect. A polynomial trend line has been applied to show the average curves for dry and moist forest species per 5m quadrat.

The trend lines show that the transition from dry forest to moist forest commences at 5m and from moist forest to dry forest at 50-55m for transect 1. For transect 2, the transition from dry forest to moist forest commences at 5-10m and from moist forest to dry forest at 40-45m. These transition boundaries will be used over time to determine the status of the rainforest, and in particular to note whether the moist forest community is contracting.

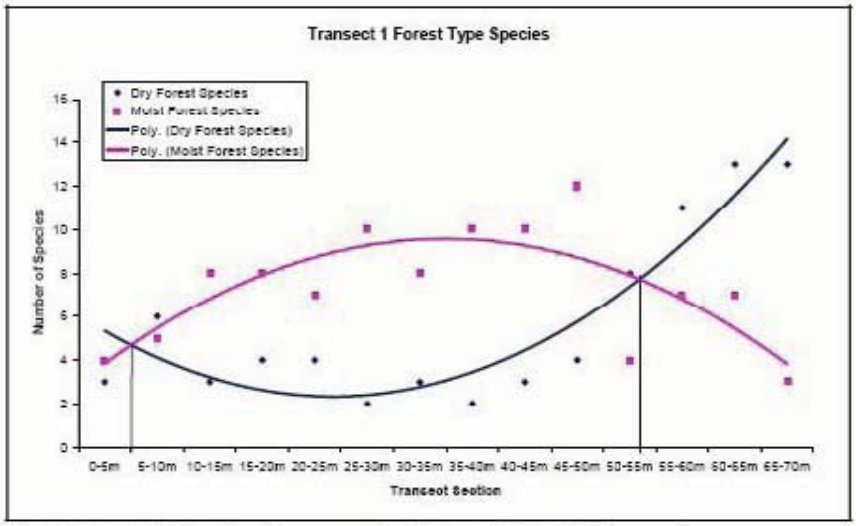

Figure 3. Transect 1 forest species curves, showing the relationship between dry and moist forest species across the length of the transect.

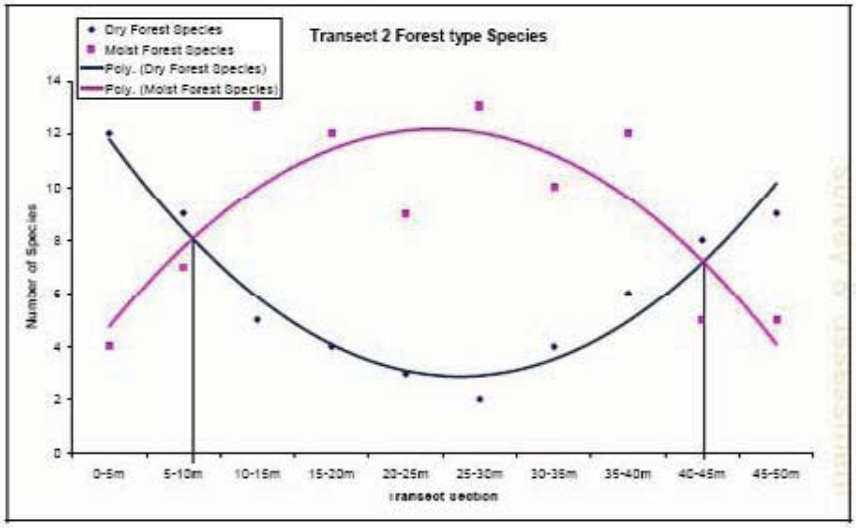

Figure 4. Transect 2 forest species curves, showing the relationship between dry and moist forest species across the length of the transect.

4.2.1. Baseline Structural Layer FPC Estimate

The estimated density for each species within all structural layers at each 5m quadrat has been averaged (Figures 5 and 6). Estimated foliage densities for each species are provided in Appendix 1.

In future years, to enable direct comparison of trends these figures will be separated into individual stratum for each transect and compared between years.

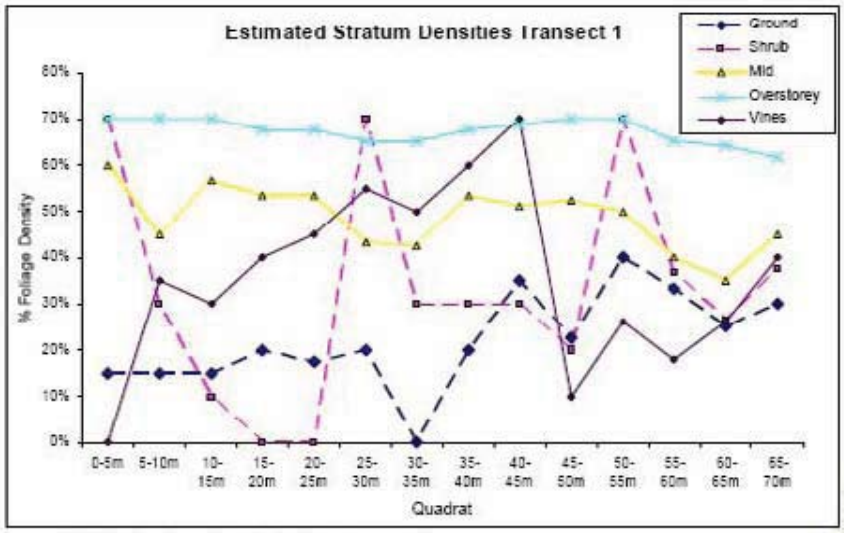

Figure 5. Estimated stratum densities for Transect 1.

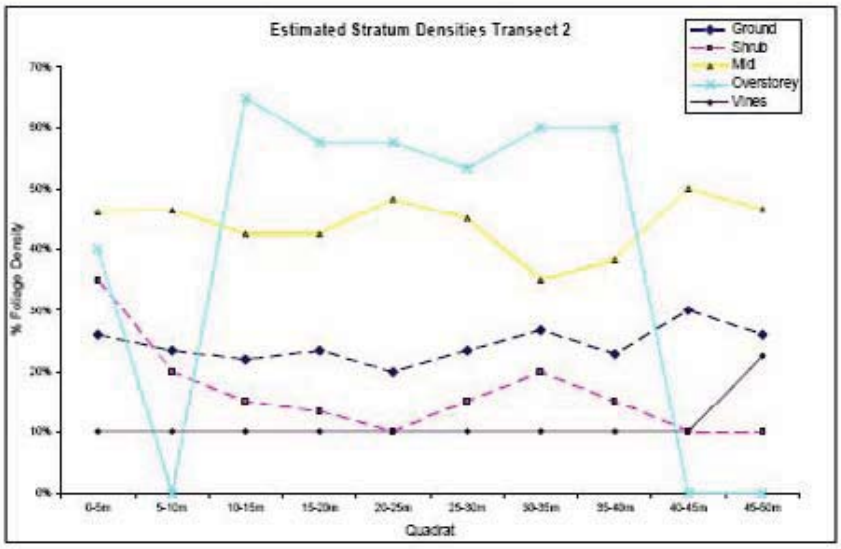

Figure 6. Estimated stratum densities for Transect 2.

4.3. Faunal diversity

A total of 55 fauna species were recorded on the subject site (Appendix 2). These comprised 2 frogs, 1 reptile, 3 arboreal mammals, 4 terrestrial mammals, 6 bats and 39 birds. Of these, three species are listed as significant (Vulnerable) under the NSW TSC Act (Table 3).

Table 3: Threatened fauna species recorded on the subject site.

Scientific Name	Common Name	Survey Method
Miniopterus australis	# Little Bentwing-bat	Anabat recording
Pteropus poliocephalus	Grey-headed Flying-fox	Spotlighting
Ninox strenua	Powerful Owl	Opportunistic

5. Conclusion

Monitoring of the Sub-tropical Rainforest area within the Long Gully Creek system has been undertaken in 2008 in accordance with the Flora and Fauna Management Plan for Abel Underground Coalmine (EcoBiological 2007). This first annual monitoring report provides baseline ecological data collected prior to mining activities occurring under the Long Gully. Annual surveys will provide ongoing data, which will be evaluated and any significant changes can be identified.

The results of this baseline investigation show the extent of the Sub-tropical Rainforest area within Long Gully Creek with the following threatened species confirmed as present:

- Powerful Owl;
- Little Bentwing-bat; and
- Grey-headed Flying-fox.

In all there were 73 species of plant, 2 frogs, 1 reptile, 3 arboreal mammals, 4 terrestrial mammals, 6 bats and 39 birds recorded along and within the vicinity of the two monitoring transects.

Annual monitoring prior to mining passing under the rainforest will enable determination of natural variation in species diversity and assemblages. Statistical analysis of this pre-mining data will be undertaken at an appropriate time (e.g. 12 months prior to mining passing under the rainforest gully) and for subsequent years post-mining to determine whether any trends are apparent in the data. The future implications of any evident trends should be used to inform best practice measures to be incorporated into the Subsidence Management Plan (SMP).

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Appendix 1: Flora species recorded on the survey transects

Transect 1 - 2008																			
Family	Scientific Name	Common Name	Forest Type	Stratum	Density	0-5m	5-10m	10-15m	15-20m	20-25m	25-30m	30-35m	35-40m	40-45m	45-50m	50-55m	55-60m	60-65m	65-70m
Acanthaceae	*Pseuderanthemum variabile*	Pastel Flower	D	G	10%		✓		✓	✓					✓			✓	✓
Adiantaceae	*Adiantum formosum*	Giant Maidenhair Fern	M	G	20%	✓			✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
Adiantaceae	*Adiantum hispidulum*	Rough Maidenhair Fern	M	G	10%	✓									✓				
Adiantaceae	*Pellaea falcata*	Sickle Fern	D	G	20%	✓				✓								✓	
Aphanopetalaceae	*Aphanopetalum resinosum*	Gum Vine	D	V	20%					✓							✓		
Apocynaceae	*Marsdenia rostrata*	Common Milk Vine	D	V	50%											✓	✓	✓	
Apocynaceae	*Parsonsia straminea*	Monkey Rope	D	V	30%											✓			
Araceae	*Gymnostachys anceps*	Settlers Flax	M	G	10%			✓											
Bignoniaceae	*Pandorea pandorana subsp. pandorana*	Wonga Wonga Vine	D	V	20%		✓									✓	✓		
Blechnaceae	*Doodia aspera*	Rasp Fern	D	G	50%				✓										✓
Capparaceae	*Capparis arborea*	Native Pomegranate	M	S	10%			✓							✓		✓	✓	✓
Davalliaceae	*Arthropteris tenella*		M	G	20%		✓	✓	✓	✓	✓		✓		✓		✓		
Dicksoniaceae	*Calochlaena dubia*	Rainbow Fern	M	G	20%				✓	✓	✓			✓				✓	
Dioscoreaceae	*Dioscorea transversa*	Native Yam	D	V	10%		✓	✓	✓						✓		✓	✓	✓
Ebenaceae	*Diospyros australis*	Black Plum	M	O	60%						✓	✓							
Euphorbiaceae	*Alchornea ilicifolia*	Dooewood	M	M	45%									✓					
Euphorbiaceae	*Baloghia inophylla*	Brush Bloodwood	M	M	50%				✓	✓	✓	✓	✓	✓	✓				
Euphorbiaceae	*Croton verreauxii*	Green Native Cascarilla	D	M	50%	✓						✓							✓
Fabaceae (Mimosoideae)	*Parasthlendron proximum var. proximum*	Snow Wood	M	M	50%									✓					
Lamiaceae	*Clerodendrum tomentosum*	Hairy Clerodendrum	M	M	20%						✓								
Lamiaceae	*Plectranthus parviflorus*		D	G	30%											✓	✓		✓
Lauraceae	*Cryptocarya microneura*	Murrogun	M	O	65%				✓	✓	✓		✓	✓				✓	
Lauraceae	*Neolitsea australiensis*	Green Bolly Gum	M	M	48%			✓	✓	✓	✓	✓	✓				✓	✓	✓
Lomandraceae	*Eustrephus latifolius*	Wombat Berry	D	V														✓	
Lomandraceae	*Geitonoplesium cymosum*	Scrambling Lily	D	V	10%			✓											
Malvaceae	*Hibiscus heterophyllus*	Native Rosella	D	M	40%		✓									✓	✓		
Meliaceae	*Synoum glandulosum subsp. glandulosum*	Scentless Rosewood	D	S	40%													✓	
Menispermaceae	*Stephania japonica var. discolor*	Snake vine	M	V	40%		✓												
Moraceae	*Ficus fraseri*	Sandpaper Fig	M	M	50%										✓				
Moraceae	*Ficus sp.*		D	O	60%														✓
Moraceae	*Streblus brunonianus*	Whalebone Tree	M	M	50%	✓	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓	
Myrtaceae	*Backhousia myrtifolia*	Grey Myrtle	M	O	70%						✓	✓		✓					
Myrtaceae	*Melaleuca styphelioides*		D	O	65%													✓	✓
Myrtaceae	*Rhodamnia rubescens*	Scrub Turpentine	D	M	50%													✓	
Myrtaceae	*Syncarpia glomulifera*	Turpentine	D	O	60%													✓	✓
Oleaceae	*Notelaea longifolia*	Large Mock-olive	D	S	40%														✓
Orchidaceae	*Dendrobium sp.*		D	-													✓		
Pittosporaceae	*Pittosporum rhombifolium*	Coffee Bush	M	S	20%										✓				

Transect 1cont. - 2008																			
Family	Scientific Name	Common Name	Forest Type	Stratum	Density	0-5m	5-10m	10-15m	15-20m	20-25m	25-30m	30-35m	35-40m	40-45m	45-50m	50-55m	55-60m	60-65m	65-70m
Pittosporaceae	*Pittosporum multiflorum*	Orange Thorn	M	S	30%		✓					✓	✓	✓	✓		✓	✓	✓
Poaceae	*Oplismenus aemulus*	Basket Grass	D	G	50%									✓	✓	✓	✓	✓	✓
Polypodiaceae	*Pyrrosia confluens* var. *confluens*	Horse-shoe Felt Fern	M	-			✓	✓					✓						
Rhamnaceae	*Alphitonia excelsa*	Red Ash	M	O	60%												✓	✓	
Rhamnaceae	*Ripogonum album*	White Supplejack	M	V	70%								✓						
Rubiaceae	*Morinda jasminoides*	Sweet Morinda	M	V	40%						✓	✓							
Sapindaceae	*Alectryon subcinereus*	Native Quince	M	M	60%									✓	✓	✓			
Sapindaceae	*Guioa semiglauca*		M	M	40%			✓										✓	
Sapotaceae	*Planchonella australis*	Black Apple	M	O	70%									✓	✓			✓	
Urticaceae	*Dendrocnide excelsa*	Giant Stinging Tree	M	O	70%	✓	✓	✓	✓	✓			✓	✓	✓				
Urticaceae	*Dendrocnide photinophylla*	Shiny-leaved Stinging Tree	M	O	70%										✓	✓	✓		
Verbenaceae	*Lantana camara*	Lantana	D	S	70%	✓					✓					✓	✓		✓
Vitaceae	*Cayratia clematidea*	Native Grape	D	V	80%											✓	✓	✓	
Vitaceae	*Cissus antarctica*	Water Vine	D	V	70%		✓	✓	✓	✓	✓	✓	✓	✓				✓	✓
Vitaceae	*Tetrastigma nitens*		M	V	40%							✓	✓			✓			

* Introduced species

Transect 2 - 2008															
Family	Scientific Name	Common Name	Forest Type	Stratum	Density	0-5m	5-10m	10-15m	15-20m	20-25m	25-30m	30-35m	35-40m	40-45m	45-50m
Acanthaceae	*Pseuderanthemum variabile*	Pastel Flower	D	G	20%	✓	✓	✓	✓		✓	✓	✓	✓	
Adiantaceae	*Adiantum formosum*	Giant Maidenhair Fern	M	G	30%	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Adiantaceae	*Adiantum hispidulum*	Rough Maidenhair Fern	M	G	10%								✓		
Adiantaceae	*Pellaea falcata*	Sickle Fern	D	G	10%	✓	✓								
Araceae	*Gymnostachys anceps*	Settlers Flax	M	G	10%					✓	✓		✓		
Bignoniaceae	*Pandorea pandorana subsp. pandorana*	Wonga Wonga Vine	D	V	10%	✓				✓				✓	✓
Blechnaceae	*Blechnum patersonii subsp. patersonii*	Strap Water Fern	M	G	20%							✓			
Blechnaceae	*Doodia aspera*	Rasp Fern	D	G	30%	✓	✓	✓				✓	✓	✓	
[illegible]	*Elaeis acuminata*	Koda	M	O	65%			✓							
Capparaceae	*Capparis arborea*	Native Pomegranate	M	S	10%	✓			✓	✓	✓		✓	✓	
Cunoniaceae	*Aceratosa acuminata*		M	G	10%				✓						✓
Convolvulaceae	*Dichondra repens*	Kidney weed	D	G	40%										✓
Cyperaceae	*Carex sp.*		M	G	10%										✓
Cyperaceae	*Gahnia aspera*		D	G	10%		✓	✓							
Davalliaceae	*Arthropteris tenella*		M	G	20%			✓	✓	✓	✓	✓			
Dicksoniaceae	*Calochlaena dubia*	Rainbow Fern	M	G	20%				✓		✓		✓		
Dioscoreaceae	*Dioscorea transversa*	Native Yam	D	V	10%		✓	✓	✓	✓			✓	✓	✓
Ebenaceae	*Diospyros australis*	Black Plum	M	O	65%						✓				
Elaeocarpaceae	*Elaeocarpus obovatus*	Blueberry Ash	M	O	60%				✓	✓		✓	✓		
Euphorbiaceae	*Alchornea ilicifolia*	Dotwood	M	M	40%				✓		✓	✓			
Euphorbiaceae	*Baloghia inophylla*	Brush Bloodwood	M	M	50%		✓	✓		✓	✓		✓		
Euphorbiaceae	*Croton eremaeus*	Green Native Cascarilla	D	M	45%	✓	✓					✓	✓		
Fabaceae (Mimosoideae)	*Acacia longissima*	Long-leaf Wattle	D	M	10%										✓
Flacourtiaceae	*Scolopia braunii*	Flintwood	M	M	40%		✓	✓							
Lauraceae	*Neolitsea australiensis*	Green Bolly Gum	M	M	55%								✓	✓	✓
Lomandraceae	*Geitonoplesium cymosum*	Scrambling Lily	D	V	10%				✓	✓				✓	
Malvaceae	*Hibiscus heterophyllus*	Native Rosella	D	M	55%	✓	✓	✓							✓
Meliaceae	*Toona ciliata*	Red Cedar	M	E	55%				✓	✓	✓				
Menispermaceae	*Legnephora moorei*	Round-leaf Vine	M	V	10%			✓							
Monimiaceae	*Doryphora sassafras*	Sassafras	M	M	50%	✓		✓							
Monimiaceae	*Wilkiea huegeliana*	Veiny Wilkiea	M	S	10%			✓	✓						
Monimiaceae	*Wilkiea macrophylla*	Large-leaved Wilkiea	M	M	20%							✓			
Moraceae	*Streblus brunoniana*	Whalebone Tree	M	M	45%	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Moraceae	*Trophis scandens*	Burny Vine	M	V	10%						✓	✓			
Myrtaceae	*Eucalyptus acmenoides*	White mahogany	D	E	40%	✓									
Myrtaceae	*+Eucalyptus fergusonii subsp. fergusonii*	Grey Ironbark	D	E	40%	✓									
Oleaceae	*Notelaea longifolia*	Large Mock-olive	D	S	10%									✓	
Oleaceae	*Olea paniculata*	Native Olive	M	O	40%						✓				
Orchidaceae	*Sarcochilus falcatus*	Orange-blossom Orchid	M	-					✓						
Pittosporaceae	*Pittosporum multiflorum*	Orange Thorn	M	S	20%		✓	✓	✓		✓	✓	✓		
Poaceae	*Oplismenus aemulus*	Basket Grass	D	G	40%	✓	✓		✓		✓	✓	✓	✓	✓
Polypodiaceae	*Pyrrosia confluens var. confluens*	Horse-shoe Felt Fern	D	-			✓						✓		

Transect 2 cont. - 2008															
Family	Scientific Name	Common Name	Forest Type	Stratum	Density	0-5m	5-10m	10-15m	15-20m	20-25m	25-30m	30-35m	35-40m	40-45m	45-50m
Rubiaceae	*Morinda jasminoides*	Sweet Morinda	D	V	10%	✓									
Rutaceae	*Geijera salicifolia* var. *latifolia*		M	M	10%								✓		
Sapindaceae	*Alectryon subcinereus*	Native Quince	M	M	50%		✓	✓				✓	✓	✓	
Sapindaceae	*Guioa semiglauca*		M	M	50%		✓			✓					
Sapotaceae	*Planchonella australis*	Black Apple	M	O	60%			✓							
Urticaceae	*Dendrocnide excelsa*	Giant Stinging Tree	M	O	70%			✓							
Verbenaceae	*Tectona grandis*	Teak	D	S	27%	✓								✓	✓
Vitaceae	*Cayratia clematidea*	Native Grape	D	V	10%	✓									✓
Vitaceae	*Cissus antarctica*	Water Vine	D	V	60%										✓

* Introduced species
+ ROTAP listed species

Appendix 2: Fauna species recorded on the subject site

Scientific Name	Common Name	Method	Confidence level (Anabat analysis)	Location	
Amphibians				Dry forest	Rainforest
Litoria fallax	Eastern Dwarf Tree Frog	Opportunistic record		+	
Litoria peronii	Peron's Tree Frog	Opportunistic record		+	
Reptiles					
Varanus varius	Lace Monitor	Opportunistic sighting		+	
Birds					
Aegotheles cristatus	Australian Owlet-nightjar	Spotlighting		+	+
Alisterus scapularis	Australian King-Parrot	Bird survey			+
Manorina melanophrys	Bell Miner	Bird survey		+	
Monarcha melanopsis	Black-faced Monarch	Bird survey		+	+
Macropygia amboinensis	Brown Cuckoo-dove	Bird survey		+	+
Gerygone mouki	Brown Gerygone	Bird survey		+	+
Acanthiza pusilla	Brown Thornbill	Bird survey		+	+
Acanthorhynchus tenuirostris	Eastern Spinebill	Bird survey		+	+
Psophodes olivaceus	Eastern Whipbird	Bird survey		+	+
Eopsaltria australis	Eastern Yellow Robin	Bird survey		+	+
Cacomantis flabelliformis	Fan-tailed Cuckoo	Bird survey		+	
Pachycephala pectoralis	Golden Whistler	Bird survey		+	+
Rhipidura fuliginosa	Grey Fantail	Bird survey		+	+
Colluricincla harmonica	Grey Shrike-thrush	Bird survey		+	+
Myiagra rubecula	Leaden Flycatcher	Bird survey		+	+
Meliphaga lewinii	Lewin's Honeyeater	Bird survey		+	+
Strepera graculina	Pied Currawong	Bird survey		+	
Rhipidura rufifrons	Rufous Fantail	Bird survey			+
Pachycephala rufiventris	Rufous Whistler	Bird survey		+	+
Todiramphus sanctus	Sacred Kingfisher	Bird survey		+	+
Myzomela sanguinolenta	Scarlet Honeyeater	Bird survey		+	+
Chrysococcyx lucidus	Shining Bronze-Cuckoo	Bird survey			+
Zosterops lateralis	Silvereye	Bird survey		+	+
Pardalotus punctatus	Spotted Pardalote	Bird survey		+	+

Birds cont.				Dry forest	Rainforest
Cinclosoma punctatum	Spotted Quail-thrush	Bird survey		+	
Acanthiza lineata	Striated Thornbill	Bird survey		+	
Sericornis frontalis	White-browed Scrubwren	Bird survey		+	+
Melithreptes lunatus	White-naped Honeyeater	Bird survey		+	
Cormobates leucophaeus	White-throated Treecreeper	Bird survey		+	+
Leucosarcia melanoleuca	Wonga Pigeon	Bird survey		+	
Lichenostomus chrysops	Yellow-faced Honeyeater	Bird survey		+	
Sericornis citreogularis	Yellow-throated Scrubwren	Bird survey			+
Corvus coronoides	Australian Raven	Opportunistic record		+	
Cacomantis variolosus	Brush Cuckoo	Opportunistic record		+	
Coracina tenuirostris	Cicadabird	Opportunistic record		+	
Centropus phasianinus	Pheasant Coucal	Opportunistic record		+	
Trichoglossus haematodus	Rainbow Lorikeet	Opportunistic record		+	
# Ninox strenua	Powerful Owl	Opportunistic record			+
Alectura lathami	Australian Brush-turkey	Opportunistic record			+
Terrestrial Mammals				**Dry forest**	**Rainforest**
Antechinus stuartii	Brown Antechinus	Trapping & hair ID		+	+
Isoodon sp.	Unidentified Bandicoot sp.	Spotlighting		+	+
Rattus fuscipes	Bush Rat	Trapping		+	+
Wallabia bicolor	Swamp Wallaby	Opportunistic diurnal sighting			+
Arboreal Mammals				**Dry forest**	**Rainforest**
Acrobates pygmaeus	Feathertail Glider	Spotlighting		+	
Petaurus breviceps	Sugar Glider	Spotlighting		+	
Petauroides volans	Greater Glider	Spotlighting			+
Bats				**Dry forest**	**Rainforest**
Chalinolobus gouldii	+Gould's Wattled Bat	Anabat analysis	Possible	+	
Chalinolobus morio	+Chocolate Wattled Bat	Anabat analysis	Possible	+	
Miniopterus australis	#+ Little Bentwing-bat	Anabat analysis	Confident	+	
Pteropus poliocephalus	# Grey-headed Flying-fox	Spotlighting		+	
Vespadelus pumilus	+Eastern Forest Bat	Anabat analysis	Probable	+	
Vespadelus vulturnus	Little Forest Bat	Trapping & Anabat analysis	Confident	+	+

* denotes an introduced species
# denotes a threatened species under the NSW TSC Act 1995
+ identified by Anabat analysis only

Appendix 3: Contributions and qualifications of EcoBiological staff

Name	Qualification	Title	Contribution
Kristy Peters	B. ParkMgt.	Ecologist (Ornithologist)	Bird surveys, report writing. Anabat analysis
Dan Pedersen	B. Sc.	Ecologist (Botanist)	Flora survey and ID
Kyan Parsons	B. Env Sc.	Ecologist (Botanist)	Flora survey and ID
Adam Blundell	B. Env Sc. (Hons)	Senior Environmental Scientist	Fauna hair identification, trap layout and checks, nocturnal fieldwork, report review
Simon Clulow	B. Sc./B. Teach	Ecologist (Herpetologist)	Amphibian survey
Dianna Brettschneider	B. App Sc.	GIS Manager	Preparation of map layouts for report