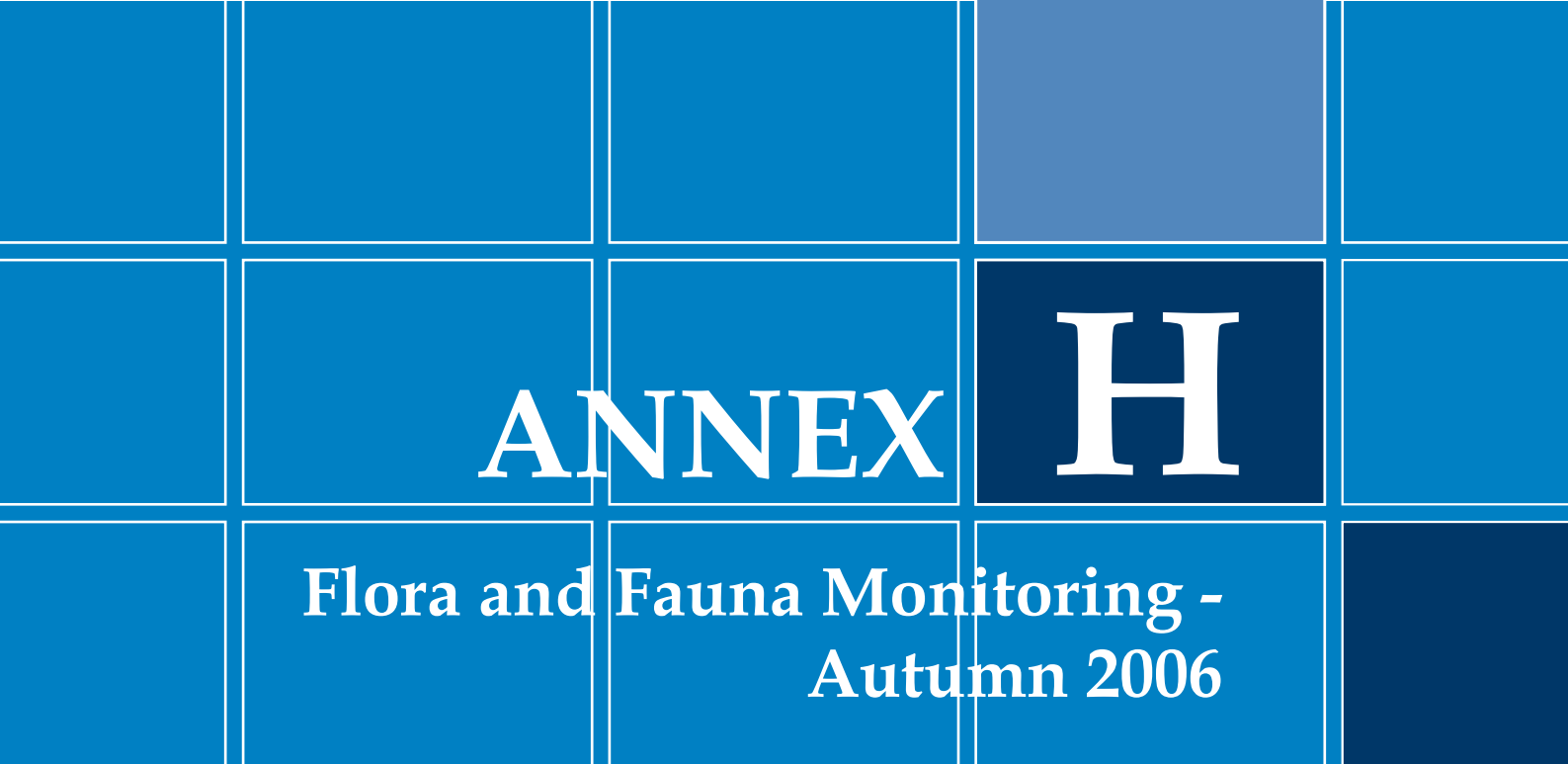
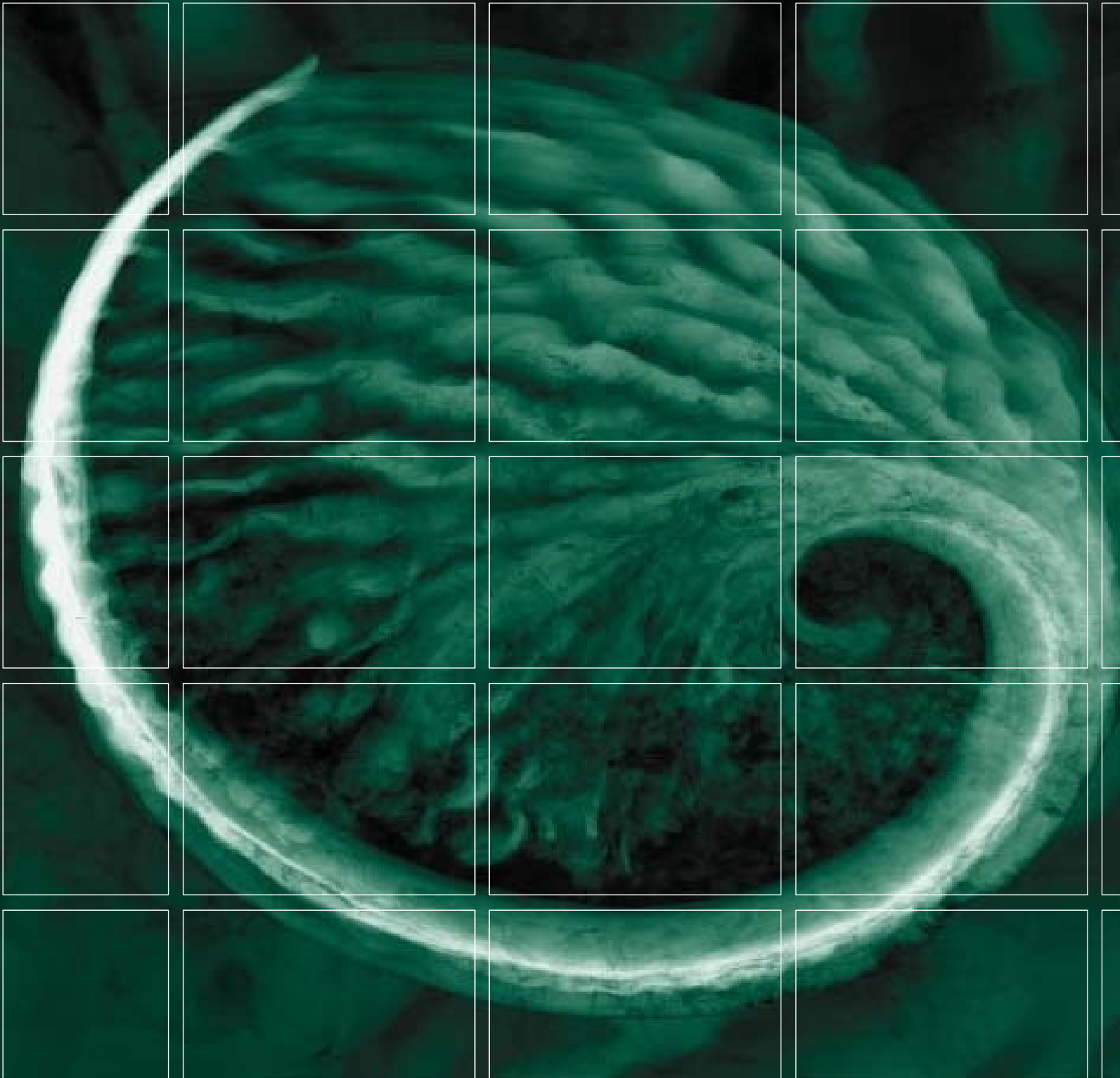


Subsidence Management Plan



**Ashton Coal
Longwall Panels 1 - 4**

Subsidence Management Plan
Written Report



Ashton Coal
Bi-annual Fauna Monitoring
Autumn Census

Ashton Coal Operations Pty Ltd

September 2006

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Approved by:	<u>Joanne Woodhouse</u>
Position:	Project Manager
Signed:	<u><i>Woodhouse.</i></u>
Date:	<u>4 September, 2006</u>
Approved by:	<u>Naomi Buchhorn</u>
Position:	Project Director
Signed:	<u><i>Buchhorn</i></u>
Date:	<u>4 September, 2006</u>
Partner:	<u><i>Paul Douglass</i></u>
	Paul Douglass

Environmental Resources Management Australia Pty Ltd Quality System

Ashton Coal Bi-annual Fauna Monitoring *Autumn Census*

Ashton Coal Operations Pty Ltd

September 2006

0032758 FINAL

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INTRODUCTION

Environmental Resources Management Australia Pty Ltd (ERM) was engaged by Ashton Coal Operations Pty Ltd to undertake a bi-annual fauna monitoring census within the southern woodland and along Bowmans Creek as required by the Ashton Coal Stage 1 Flora and Fauna Management Plan (White Mining Limited, 2003a). The survey was undertaken during May 2006.

1.1

BACKGROUND

Ashton Coal was granted conditional consent by the Minister for Planning on 11 October 2002 for the development of an open cut mine, an underground mine and construction and operation of associated surface facilities. As part of the consent conditions, 70 hectares of land referred to as the 'southern woodlands' has been set aside as a conservation zone. This conservation area is south of the New England Highway between Glennies Creek and the Hunter River. Refer to *Figures 1.1* and *1.2*.

Also included in the consent conditions was the preparation of a Flora and Fauna Management Plan (FFMP) and Monitoring Program. This FFMP was completed in September 2003 (White Mining Ltd, 2003a) and outlines:

- the establishment, maintenance and biannual monitoring of artificial roost, den and nest boxes; and
- the establishment of a biannual fauna monitoring program, including:
 - monitoring of the remnant (southern) woodland habitat and revegetated wildlife corridors;
 - monitoring of the resident grey-crowned babbler population including nest and communal roost sites;
 - monitoring of the speckled warbler population;
 - general avifauna surveys using point censuses;
 - trapping of small terrestrial and arboreal mammals at established locations in the southern woodland, revegetated woodland and key wildlife corridors; and
 - pitfall trapping at established locations in the southern woodland, revegetated woodland and key wildlife corridors.

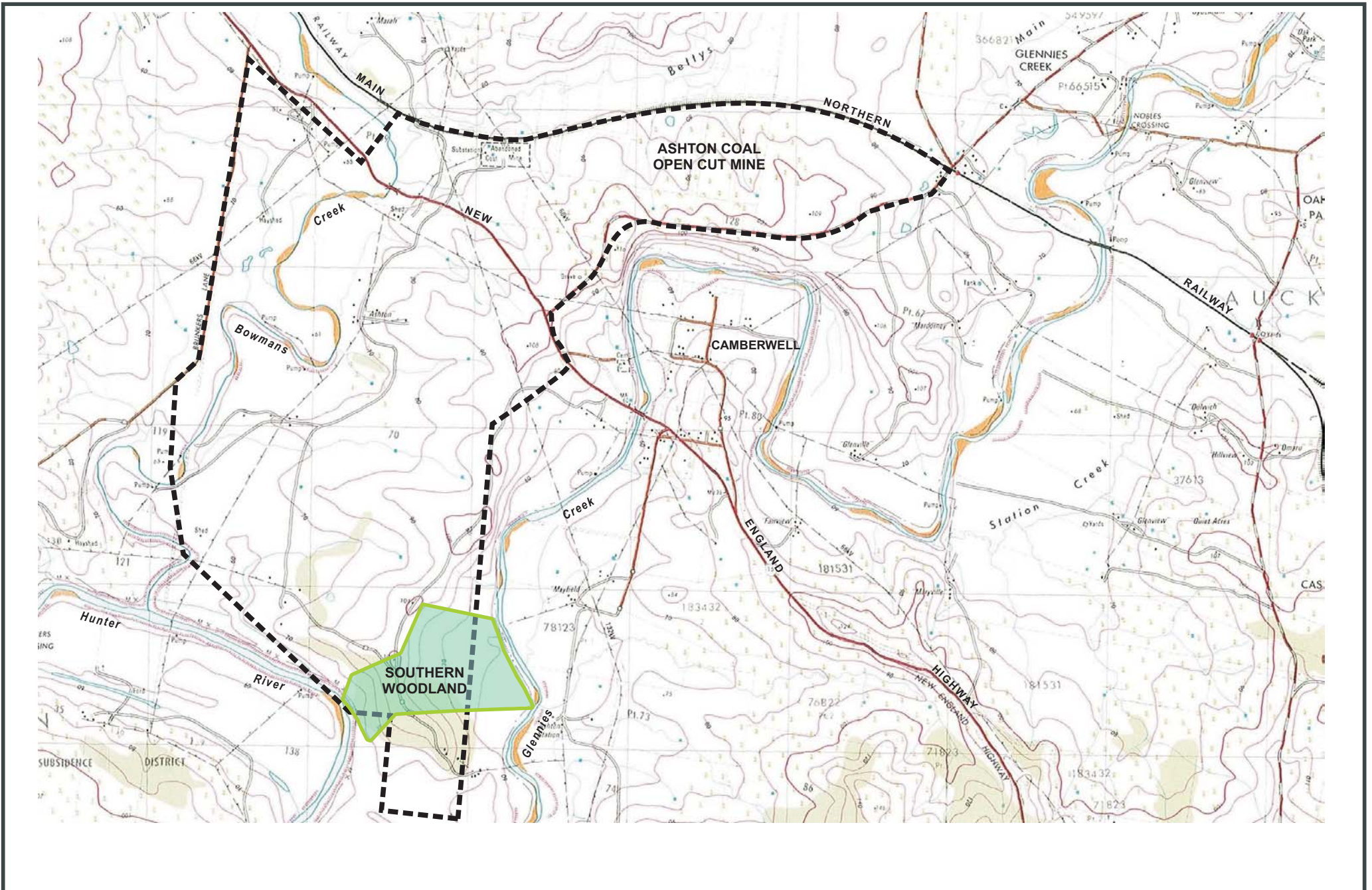
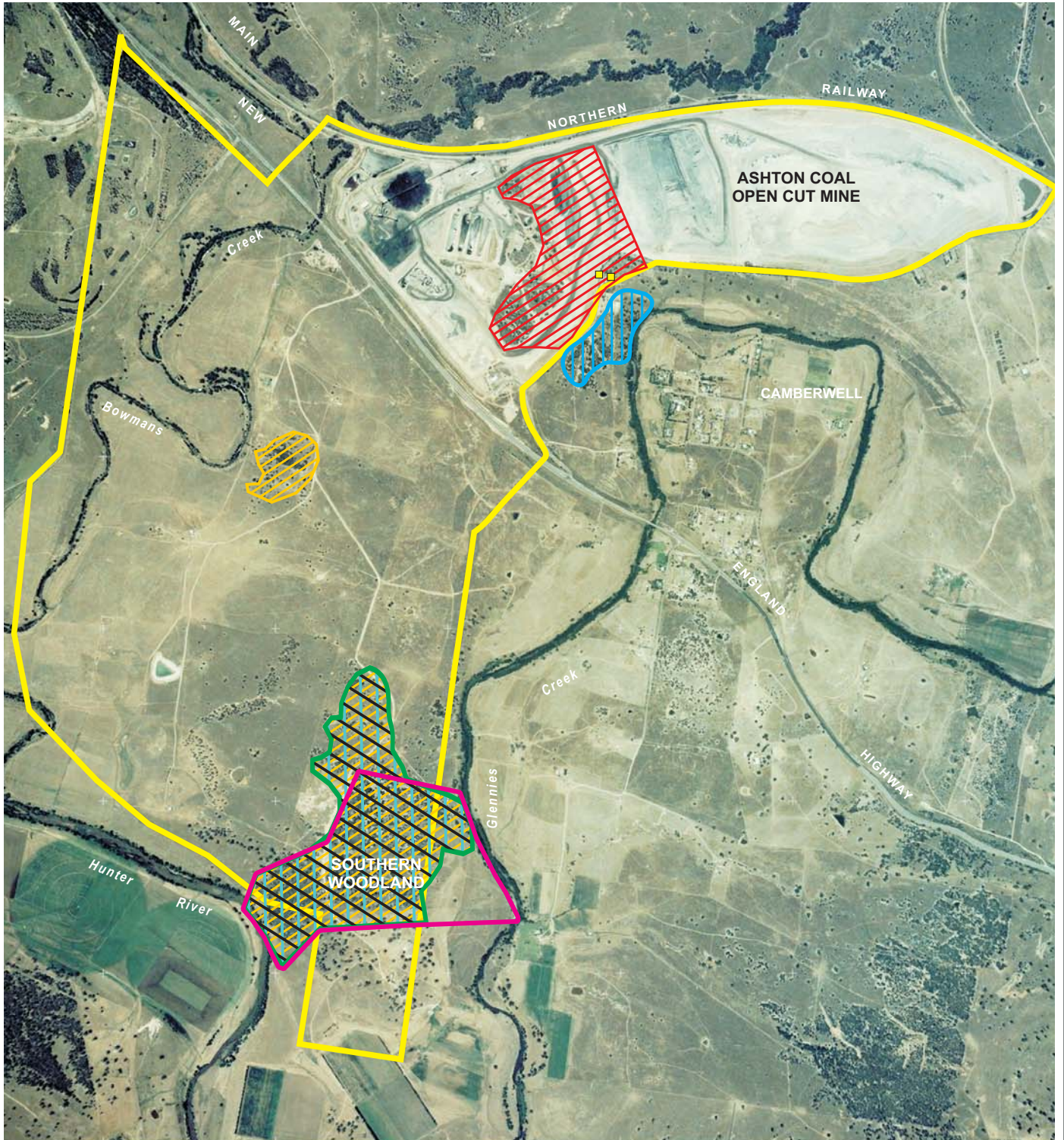


Figure 1.1 Locality Plan





- | | | | |
|---|--|--|--|
|  Mine Lease Boundary |  Indicative Voluntary Conservation Area |  Autumn 2005 Northern Grey-crowned Babbler Population |  Autumn 2005 Southern Grey-crowned Babbler Population |
|  Additional Grey-crowned Babbler nests |  Summer 2006 Northern Grey-crowned Babbler Population |  Summer 2006 Southern Grey-crowned Babbler Population |  Autumn 2006 Southern Grey-crowned Babbler Population |

Source: Ashton Coal Operations



0 500m
Approximate only

Figure 1.2

Southern Woodland and Grey-crowned Babbler Population

Ashton Coal - Biannual Fauna Monitoring, Camberwell NSW

1.2

PURPOSE OF MONITORING PROGRAMS

The biannual flora and fauna monitoring program aims to:

- ensure that existing areas of vegetation not affected by surface mining are maintained as viable habitats;
- ensure that the rehabilitation of the study area provides an environment that is equal to, or better than, the pre-mining environment and is available for threatened species that may inhabit the area; and
- monitor any impacts attributable to the development, including all restoration works.

2.1**LITERATURE REVIEW**

The following published information was reviewed in the preparation of this assessment:

- ERM (2006) Ashton Coal Bi-annual Fauna Monitoring – Summer Census;
- ERM (2005) Ashton Coal Bi-annual Fauna Monitoring - Autumn Census;
- White Mining LTD (2003a) Ashton Coal Project Flora and Fauna Management Plan;
- White Mining LTD (2003b) Ashton Coal Project Vegetation and Landscape Management Plan;
- White Mining LTD (2003c) Ashton Coal Project Archaeology and Cultural Heritage Management Plan;
- Parsons Brinckerhoff (2004a) Ashton Coal Project Pre-clearing Flora and Fauna Surveys – Combined Report; and
- Parsons Brinckerhoff (2004b) Ashton Coal – Southern Woodland Preliminary Ecological Assessment;

The Cultural Heritage Division of the Department of Environment and Conservation (formally NPWS) was also consulted prior to the commencement of the original fieldwork (2005) to ensure that trapping locations would not disturb any heritage items recorded within the southern woodland.

2.2**FAUNA HABITAT SURVEY**

Vegetation maps, field survey and previous assessments in the vicinity of the study area were used to identify and assess the distribution of habitat types.

The following habitat features were recorded:

- percentage cover of nesting/shelter/basking habitat in the study area such as tree hollows, leaf litter, bare ground, rocks, logs, vegetation, caves, rock outcrops, overhangs and crevices;
- presence of freshwater aquatic habitats such as streams, swamps and pools, noting their permanency (ie permanent, semi-permanent or ephemeral);
- cover abundance of dominant canopy species, and the presence of fire scars and dieback;
- connectivity to adjacent areas of habitat; and
- the extent and nature of previous disturbances.

2.3 FAUNA MONITORING

The locations of monitoring sites are shown in *Figure 2.1* and are discussed as follows.

2.3.1 *Pitfall Trapping*

Ten permanent pitfall traps have been installed in suitable habitat at four sites within the southern woodland. The traps consist of a plastic bucket (400 mm deep and 260 mm diameter) buried level to the ground surface, with a 5m long (30 cm high) drift fence connected to each of the traps as per the Lower Hunter and Central Coast Region Flora and Fauna Guidelines (Murray, *et. al.*, 2002). Dry leaf litter was placed in the bottom of the traps to provide shelter for any animals captured. The traps were checked early each morning and evening with any captures identified and immediately released.

These pitfall traps are permanent structures. Between surveys they are closed with lids and the fences removed. Photographs have been taken at each of the sites in order to monitor the condition and habitat values of the four sites (refer to *Annex A Photographs 1a to 4a*).

2.3.2 *Small and Medium Terrestrial Mammal Survey*

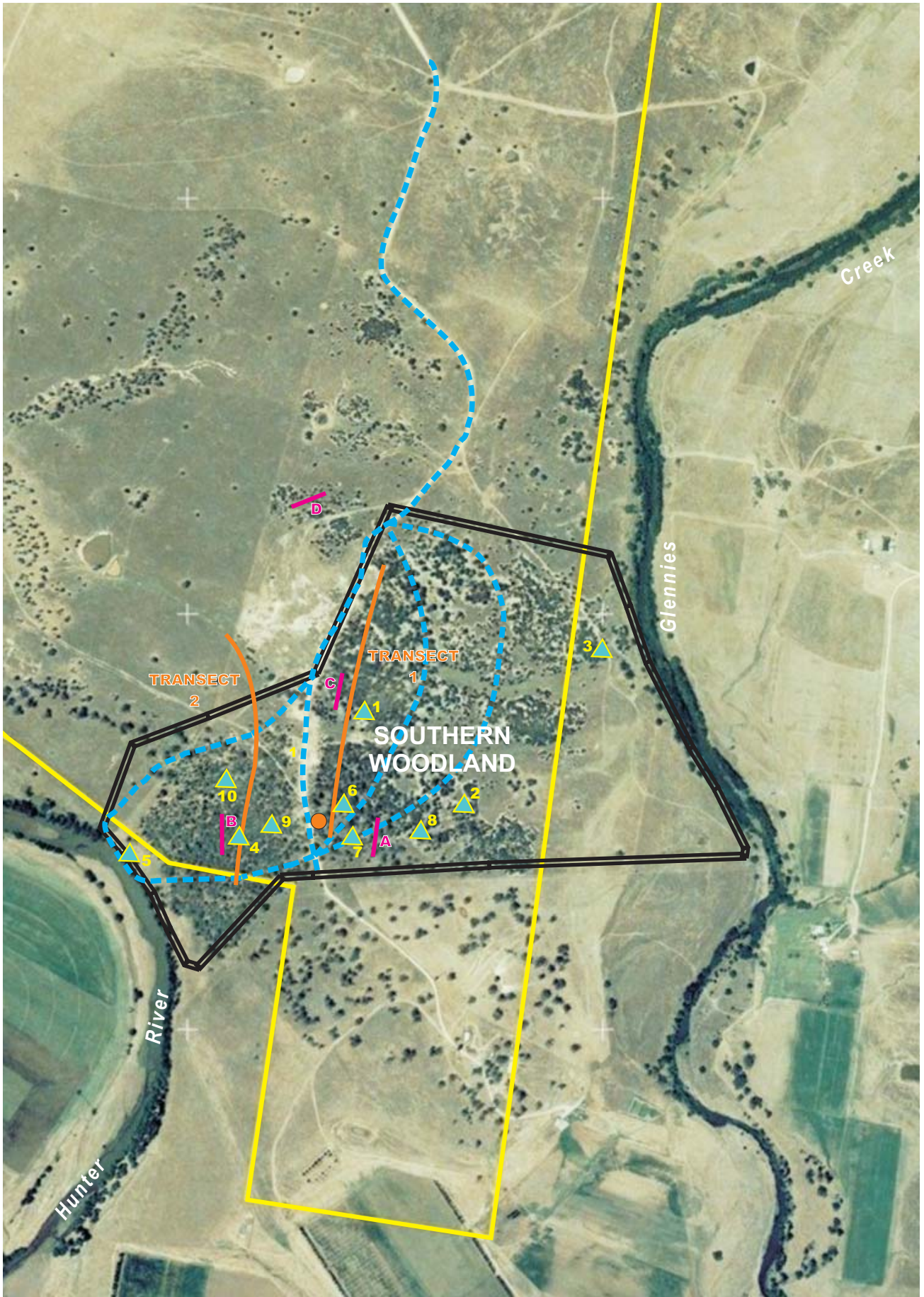
Fifty Elliott A traps were baited with peanut butter, honey and rolled oats and placed along two transects (lines of traps) to target small ground mammals.

The traps were placed at approximately ten metre intervals, depending on the nature of the ground cover. For example, traps were placed in potential runways in undergrowth, and near logs and rock outcrops. Dry leaves were used as bedding and a plastic bag placed over the trap in order to keep any captured animals warm and dry. The traps were set for four consecutive nights giving a total of 200 trap nights. The traps were checked early each morning with any captures being identified and released immediately. Traps were reset and re-baited where necessary.

Thirty hair tubes (*Faunatech*) were placed on the ground within the southern woodland for ten consecutive nights. Half of the terrestrial hair tubes were baited with peanut butter, honey and rolled oats, and half with sardines. The sardines targeted the tiger quoll, while the peanut butter mix targeted other ground-dwelling mammals. Hair tubes were secured to the ground along the fauna transects. Hairs collected from the tubes were sent to Barbara Triggs for identification.

2.3.3 *Arboreal Mammal Trapping*

Twenty Elliott-B traps were placed along the two fauna transects. These traps target small to medium-sized arboreal mammals such as the squirrel glider.

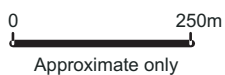


- | | | | |
|---------------------|--|------------------------------|-----------------------------------|
| Mine Lease Boundary | Indicative Voluntary Conservation Area | Fauna Trapline
TRANSECT 1 | Pitfall Trap Sites-permanent
A |
| Bird Surveys | Stationary Anabat Survey | Spotlight Route | |

Source: Ashton Coal Operations

Figure 2.1

Monitoring Sites



The traps were mounted on brackets on the trees approximately two metres above the ground.

The traps were baited with peanut butter, honey and rolled oats, while a vanilla essence water mixture was sprayed on the main trunks above the traps to attract arboreal fauna and mask the smell of humans. Dry leaves were used as bedding and a plastic bag placed over the trap in order to keep any captured animals warm and dry. The traps were set for four consecutive nights giving a total of 80 trap nights. The traps were checked early each morning with any captures being identified and released immediately. Traps were reset and re-baited where necessary.

Ten hair funnels (*Faunatech*) were mounted on tree trunks along the two fauna transects and left in the field for 10 consecutive nights. Half of the arboreal hair funnels were baited with peanut butter, honey and rolled oats, and half with sardines. The sardines targeted the tiger quoll, while the peanut butter mix targeted the squirrel glider. Hairs collected from the funnels were sent to Barbara Triggs for identification.

2.3.4 *Amphibian Surveys*

Surveys for amphibians were undertaken within the first week of May during the Autumn season which was outside the optimum sampling period between mid September and February. Both diurnal and nocturnal searches were undertaken in areas of suitable habitat including Hunter River over three person hours. Any frog calls heard during nocturnal and diurnal searches were compared with commercially available frog call recordings for identification.

2.3.5 *Microchiropteran Bat Surveys*

Two Anabat echolocation call detectors were used to record bat calls over two non-consecutive nights. The Anabat units remained stationary and surveys commenced within one hour after dusk. Bat calls were analysed by Glenn Hoye of Fly by Night Bat Surveys.

2.3.6 *Bird Surveys*

Ten diurnal bird point censuses were undertaken over four days. Each ten minute survey was conducted during periods of high activity ie. early morning. All bird species seen or heard were identified by the use of dichotomous keys and commercially available avifauna field guides. Additionally, opportunistic observations of birds were made during other fieldwork.

2.3.7 *Targeted Grey-Crowned Babbler Surveys*

The grey-crowned babbler is listed as vulnerable under the *Threatened Species Conservation Act 1995* (TSC Act) and is known to occur within the Ashton Coal study area, with two resident family groups reported. The family group occupying the southern woodland was reported to have increased from eight birds in September 2004 to 12 in January 2005 with the number of nests increasing from two to six respectively (Parsons Brinckerhoff, 2004b). The Autumn 2005 survey reported that while the number of birds within the southern group had not increased, the number of nests had increased to 11 from 6. This survey (ERM, 2005) also reported that the populations within the mine lease extension areas to the north of the highway had increased from eight in February 2004 (Parsons Brinckerhoff, 2004b) to 11 in June 2005. The Summer 2006 survey reported no increase in nests or individuals since June 2005 survey period (ERM, 2006).

In accordance with the Stage 1 FFMP, and to ensure that the mining has not adversely impacted on these family groups, targeted surveys for grey-crowned babbler were undertaken within the southern woodland and area to be open cut mined (north of the highway). The surveys recorded the location and number of any birds, the presence of breeding pairs and the location of any nests. A vegetation analysis was also undertaken to determine the suitability of the area in general as habitat for grey-crowned babblers.

2.3.8 *Targeted Speckled Warbler Surveys*

The speckled warbler (*Pyrrholaemus sagittatus*) is listed as vulnerable under the TSC Act and is known to occur within the Ashton Coal study area, with two individuals recorded. Two speckled warblers were observed foraging in grassland habitat in the southern woodland during the Summer survey (ERM, 2006). No nests were recorded in the study area. Targeted searches were conducted for the speckled warbler in the southern woodland and area to be open cut mined (north of the highway). The surveys recorded the location and number of any birds, the presence of breeding pairs and the location of any nests.

2.3.9 *General Observations and Spotlighting*

Opportunistic sightings and secondary indications (scats, scratches, diggings, tracks etc) of resident fauna were noted and included:

- four person hours of searching in suitable habitat for herpetofauna (reptiles and frogs);
- searches for whitewash, prey remains and regurgitation pellets from owls;
- checks for raptor nests;

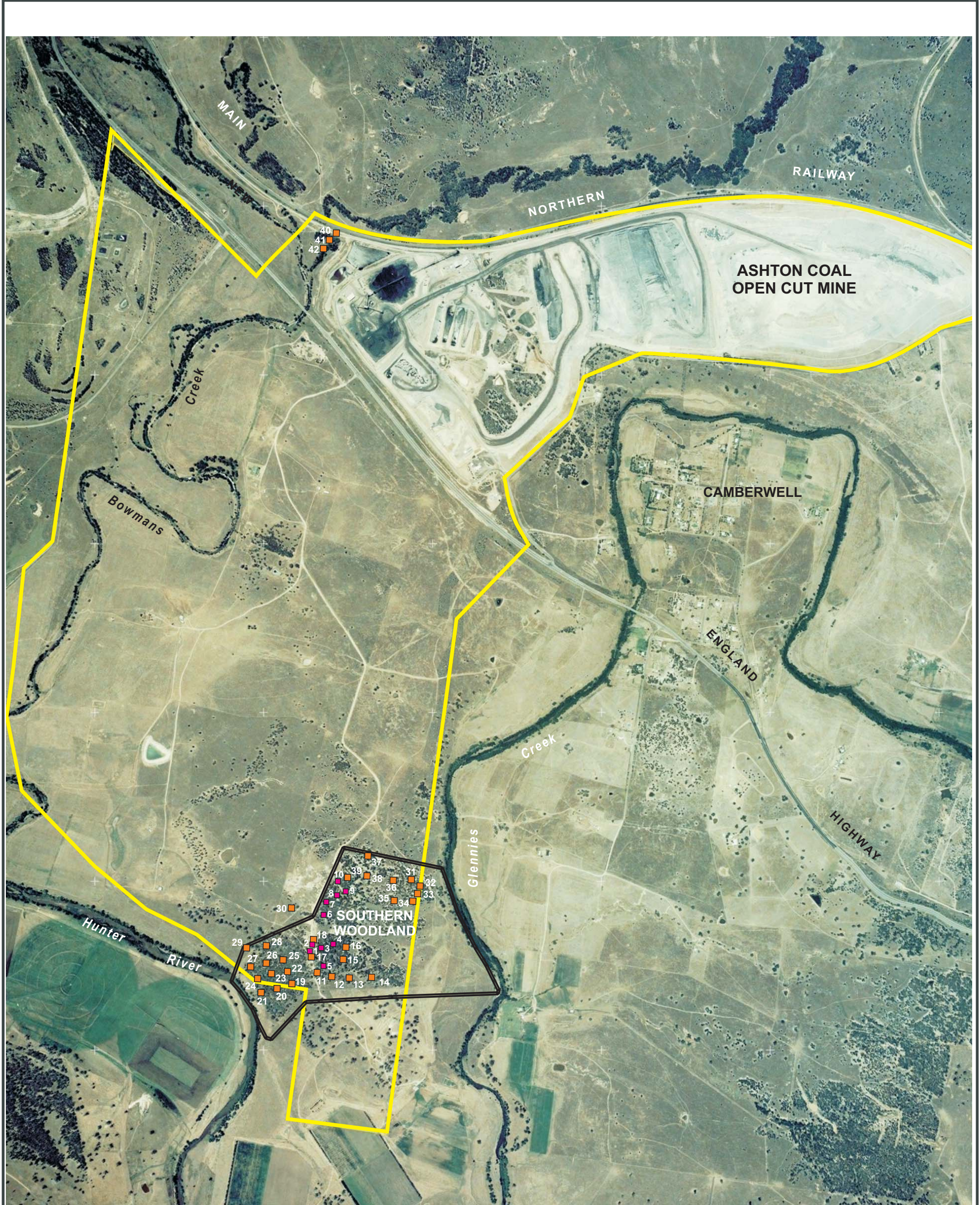
- checking trees for scratches consistent with arboreal mammals; and
- searches for characteristic scats.

2.4

NEST BOX MONITORING

Five medium and five large nest boxes were installed within the southern woodland by Parsons Brinckerhoff in July 2003. As required by the Stage 1 FFMP, an additional nine medium nest boxes, nine large nest boxes and 14 bat boxes were installed by ERM in 2005 within the southern woodland and along Bettys Creek (see *Figure 2.2*).

Animals using the boxes were noted and pest species such as wasps removed. Boxes were also inspected for damage and where necessary repaired.



Source: Ashton Coal Operations

Figure 2.2 Location of Nest Boxes



3.1 FAUNA HABITAT DESCRIPTION

3.1.1 *Vegetation Types and Structure*

The southern woodland contains one broad habitat type being open grassy woodland characterised by a dominance of *Allocasuarina luehmannii* (bullock). *Eucalyptus crebra* (narrow-leaved ironbark), *Eucalyptus melliodora* (yellow box) and *Eucalyptus fibrosa* (grey box) were also recorded as sub-dominant species and appear to be regenerating.

The understorey consists of juvenile specimens of the canopy species and a relatively sparse shrub layer dominated by *Acacia amblygona*, *Daviesia genistifolia*, *Acacia linifolia* (flax-leaved wattle), *Lycium ferocissimum* (African boxthorn) and *Eremophila deserti*. The percentage cover of the ground layer varied being most dense within the open grassy areas (refer to *Photograph 1*) and least dense within the areas dominated by bullock due to the dense layer of *Allocasuarina* needles (refer to *Photograph 2*). Ground cover species included *Aristida vagans*, *Cymbopogon refractus*, *Dichelachne rara*, *Microlaena stipoides*, *Lomandra glauca*, *Cheilanthes sieberi* and *Dichondra repens*.

Weed invasion was noted within the southern woodland and was most prolific around the margins of the woodland community and along the vehicle tracks dominated by prickly pear and fireweed.

3.1.2 *Habitat Resources and Opportunities*

The myrtaceous tree species in the canopy and shrub layers would provide a seasonal foraging resource for nectivorous birds and mammals (*Eucalyptus paniculata* flowers May to January, *Eucalyptus melliodora* flowers September to February and *Eucalyptus mollucana* flowers January to May). The variety of tree species would provide suitable feeding/foraging resources for folivorous fauna such as the common brushtail possum and insectivorous birds such as treecreepers. The availability of these myrtaceous species is relatively sparse due to the dominance of bullock and will increase as regeneration of the eucalypts continues.

The grasses and sedges provide seed and stem resources for granivorous and herbivorous species. The *Allocasuarina* species in the mid-storey and understorey strata may also provide a limited seasonal foraging resource for highly mobile granivorous fauna such as the glossy black cockatoo. The *Allocasuarina* species and eucalypts also provide suitable nesting habitat for the grey-crowned babbler. Understorey species such as *Lycium ferocissimum* provide foraging resources for many species favouring fruits and berries.



Photograph 1

Open grassy woodland.



Photograph 2

Open grassy woodland dominated by Bullock.

Photographs

Ashton Coal - Biannual Fauna Monitoring, Camberwell NSW

This habitat type has a moderate layer of leaf litter (5cm deep), fallen logs and rock outcrops that provide sheltering resources for small ground-dwelling mammals and reptiles. The grassy understorey and fallen timber also provides a suitable foraging substrate for the grey-crowned babbler and speckled warbler.

The study area contains a limited number mature eucalypt trees that provide hollows capable of providing shelter and breeding habitat for a large number of bird and arboreal mammal species. The installation of 42 nest and roost boxes in 2005 has increased the availability of this resource for arboreal mammals and microchiropteran bats.

Glennies Creek and the Hunter River are located to the east and west of the southern woodland and farm dams are located to the north and south of the southern woodland. These water resources provide habitat for aquatic avifauna and frogs as well as a drinking resource for many native species.

3.1.3 *Connectivity and Corridors*

The open grassy woodland is relatively well represented within the locality, although it currently provides only tenuous links with the surrounding vegetation. The southern woodland and the Hunter River have a vegetated link approximately 225 metres long at the south western boundary of the woodland. To the north, east and south, the woodland does not provide any vegetated links or wildlife corridors and is currently an isolated/remnant habitat resource. There is however, opportunity for revegetation along the eastern mine lease boundary to connect the southern woodland with Glennies Creek to the east and to the open cut mine to the north. A further vegetation corridor between the southern woodland and Bowman's Creek to the north is recommended as shown in *Figure 3.1*. The recommended revegetation areas are consistent with Ashton Coal Flora and Fauna Management Plan.

3.1.4 *Recommendations to Enhance the Habitat Value of the Southern Woodland*

The southern woodland provides habitat for a variety of native species although it is currently limited to those species that are highly mobile i.e. birds and large mammals, or those species requiring small home ranges such as small terrestrial mammals and reptiles. If the southern woodland was extended to the east by approximately 50 to 100 metres it would act as a wildlife corridor between the two large water systems (Hunter River and Bowmans Creek), providing greater habitat and movement opportunities for a diverse range of native species.

Hollow bearing, mature trees are a limited resource within the woodland and this has been addressed by the installation of 42 artificial nest and roost boxes targeting arboreal mammals and microchiropteran bats. Foraging habitat for arboreal mammals is also limited due to the relatively low abundance of eucalypt species. The southern woodland is currently regenerating, with a



- Mine Lease Boundary
- Indicative Voluntary Conservation Area
- Riparian Zone Corridor
- Wildlife & Vegetation Corridor

Source: Ashton Coal Operations

Figure 3.1 Recommended Vegetation Corridors



0 500m
Approximate only

small number of mature and juvenile eucalypts noted, however most of these appear to be overpowered by the faster growing bullocks. While the eucalypts will eventually co-dominate the southern woodland, supplementary planting would assist the regeneration process and provide an opportunity to increase the habitat value of the study area by extending the southern woodland to Glennies Creek in the east. There may also be an opportunity to remove some of the faster growing bullocks to promote the regeneration of eucalypts within the southern woodland.

To enhance the habitat value of the southern woodland, encourage a more diverse range of native species and provide a safe movement/habitat corridor the following recommendations have been made:

- cattle should be periodically excluded from the southern woodland to encourage the natural revegetation of these areas;
- supplementary planting of locally occurring native species is recommended at the eastern and western boundaries of the woodland. This would establish a connection with the riparian vegetation associated with Glennies Creek to the east and enhance the connection with the riparian vegetation along the Hunter River to the west. Cattle must be excluded from all supplementary planting areas;
- species to be used in revegetation should include *Eucalyptus crebra*, *Eucalyptus moluccana*, *Eucalyptus fibrosa*, *Corymbia maculata*, *Eucalyptus blakelyi*, *Eucalyptus punctata*, *Daviesia ulicifolia*, *Acacia decora*, *Acacia amblygona* and *Acacia parvipinnula*; and
- annual surveys should be conducted within the revegetated areas in conjunction with the fauna monitoring census to ensure no significant loss of trees as well as monitoring the use of the newly established corridors by native fauna.

3.2

PITFALL TRAPPING

No reptiles were trapped in the pitfall traps during the current survey period.

The absence of species caught in the pitfall traps was probably due to the cooler weather experienced during the survey period rather than a lack of resident reptile species. Compared to the previous survey (Summer 2006), the current results identified a reduction from two to zero reptile species. This may be attributed to seasonal patterns in reptile activity with the most active season occurring during the warmer months.

3.3 TERRESTRIAL MAMMAL TRAPPING

Two species of small terrestrial mammal were trapped during the survey being *Antechinus flavipes* (yellow-footed antechinus) and *Mus musculus* (house mouse) (see Annex B). Both of these species are common to the woodland environment.

The terrestrial hair tube survey also recorded the presence of house mouse as well as *Trichosurus* sp (most probably brushtail possum).

3.4 ARBOREAL MAMMAL TRAPPING

Two arboreal mammal species were trapped during the survey being *Trichosurus vulpecula* (brushtail possum) and *Petaurus breviceps* (sugar glider). Brushtail possums were commonly recorded during the nocturnal surveys however no sugar gliders were observed during nocturnal surveys.

The current results identified one new species through arboreal trapping being *Petaurus breviceps*. Hair and scat analysis recorded the presence of *Petaurus* species (most probably *Petaurus breviceps*). Arboreal hair tube surveys recorded the presence of *Trichosurus* sp in both transects. As brushtail possums were commonly recorded during the nocturnal surveys, this species is most probably *Trichosurus vulpecula* (brushtail possum).

3.5 AMPHIBIAN SURVEYS

One frog species, *Crinia signifera* (eastern common froglet) was heard calling from the eastern boundary of the southern woodland during diurnal surveys. No frog species were heard or observed during nocturnal surveys. Previous amphibian surveys (ERM, 2005) identified *Limnodynastes tasmaniensis* (spotted marsh frog) and eastern common froglet by calls from the eastern boundary of the southern woodland.

The paucity of amphibian species recorded is probably due to fine weather conditions at the time of sampling rather than the absence of additional amphibian species. Amphibians generally call during or immediately following rainfall periods.

3.6 MICROCHIROPTERAN BAT SURVEYS

No microchiropteran bats species were recorded during the survey period. Previous microchiropteran surveys (ERM, 2006) recorded 10 bats including four species listed as vulnerable under the TSC Act: *Mormopterus beccarii* (Beccari's freetail-bat), *Mormopterus norfolkensis* (eastern freetail-bat),

Miniopterus schreibersii oceansis (eastern bent-wing bat) and *Myotis adversus* (fishing bat) (ERM, 2006).

Despite the paucity of results in the current survey period, the southern woodland represents valuable foraging and roosting habitat for microchiropteran bats given the proximity to permanent water resources and available foraging habitat. The provision of ten bat boxes within the southern woodland enhances the roosting habitat for these species. Recommended revegetation works will also enhance the existing habitat resources provided by this woodland. The bat boxes had no evidence of use and it was suggested that they may be improved by the adherence of chicken mesh, flyscreen material or pool carpet to the landing strips of each bat nest box.

3.7 BIRD SURVEYS

A large number of common woodland birds were observed within the study area (see Annex C). Commonly encountered species include *Corvus coronoides* (Australian raven), *Rhipidura fuliginosa* (grey fantail), *Acanthiza nana* (yellow thornbill), *Strepera graculina* (pied currawong) and *Manorina melanocephala* (noisy miner). Grey-crowned babbler and speckled warblers were also recorded and have been given further consideration in the following sections.

Previous surveys identified two owl species roosting in the southern woodland, *Ninox novaeseelandiae* (southern boobook owl) and *Tyto alba* (barn owl). No owls were identified during the current survey period.

The current survey identified three additional bird species (white-browed scrub wren, grey shrike-thrush and zebra finch) compared to previous surveys (ERM, 2006; ERM, 2005; PB, 2004).

3.7.1 Targeted Grey-Crowned Babbler Surveys

Home ranges of the grey-crowned babbler can reach 12 hectares with the species tending to nest in groups of five to twelve individuals (Frith 1982). Groups tend to forage for half the day turning over objects, rummaging through leaf matter and soil within their territory (Slater 2001). Preferred habitat comprises open woodland dominated by mature eucalypts with regrowth, tall shrubs and an intact ground layer for breeding and foraging. The species forages on a range of material and the removal of habitat such as fallen timber significantly impacts their viability.

Six birds were observed foraging within the southern woodland along the north eastern boundary (see avifauna point census 3 in Annex C and Figure 1.2). The number of birds within the southern woodland group does not appear to have increased since the previous survey in February 2006 (ERM, 2006) with the number of nests remaining at 11.

Grey-crowned babbler population (see *Figure 1.2*) area since the June 2005 survey period (ERM, 2005). The quality and extent of habitat has been significantly reduced (by approximately 60%) as a result of clearing for mining activities. The number of nests recorded during the February 2006 survey (3) has reduced from three to two. The other nest appears to have been removed by the clearing operations.

Previous fauna monitoring reports (ERM 2005; ERM 2006) indicated that this population of grey-crowned babblers may relocate to an area of habitat on the southern side of Glennies Creek Road, which is also owned by Ashton Coal Properties.

Previous surveys (ERM, 2006) indicated use of this area as foraging habitat for two grey-crowned babblers. The current survey did not identify the presence of individual babblers however two additional babbler nests were identified either side of Glennies Creek Road and may be utilised as breeding habitat.

Given that the original eight babblers from the northern population were not located, it is likely that they have relocated to another habitat remnant within the surrounding privately owned lands. The location of two additional nests either side of Glennies Creek Road suggests the babblers are continuing to use this remnant habitat. However further surveys should be conducted during the breeding months (July to February) to ensure the population is actively using these nests and represents a breeding population.

To improve habitat for babblers, it is recommended that any timber cleared from the mine extension area continue to be relocated south of Glennies Creek Road and stacked into piles to provide additional foraging habitat within this area. Grazing should be excluded from this area to encourage the growth of a shrub layer and provide additional foraging resources. Suitable nesting sites already exist within the canopy of the woodland.

3.7.2 *Targeted Speckled Warbler Surveys*

Speckled warblers occupy a ten hectare breeding range and a slightly larger home range when not breeding. Breeding occurs between August and January when 3 to 4 glossy red-brown eggs are laid. Round, dome shaped nests are constructed of grass and bark situated in hollows on the ground or the base of dense shrub species. Nests are built with a side entrance in areas of dense branches and other litter. Often speckled warblers join mixed species foraging groups including brown, yellow-rumped or striated thornbills (Pizzey *et al.* 2003). Speckled warblers are listed as vulnerable under the TSC Act and prefer a range of eucalypt dominated communities supporting a grassy understorey within gullies or rocky ridges.

Three speckled warblers were observed foraging in grassland habitat of the southern woodland near pitfall trap A (see *Figure 2.1* and *Annex B*). This indicates an increase in the population of speckled warbler by one compared

to the previous survey (ERM, 2006). However no warbler nests were observed within the study area in current or previous surveys (ERM, 2006).

Given the extent of the southern woodland, the conserved habitat should be large enough to sustain a viable population of this species provided that the necessary habitat resources (ie dense shrub and grass layer) are retained.

3.8 GENERAL OBSERVATIONS AND SPOTLIGHTING

Diggings consistent with *Perameles nasuta* (long-nosed bandicoot) were commonly observed within the southern woodland, as well as many burrows and scats characteristic of *Oryctolagus cuniculus* (rabbit) (refer to Annex C).

Lepus capensis (brown hare) were often observed sheltering within the dense grass layer or boxthorn thickets during the diurnal surveys and *Macropus giganteus* (eastern grey kangaroo) were commonly encountered during both the nocturnal and diurnal surveys.

Trichosurus vulpecula (brushtail possum) and *Pseudocheirus peregrinus* (ringtail possum) scats were recorded at the base of the eucalypt trees scattered throughout the southern woodland. At least five brushtail possums were recorded during spotlighting.

A total of two reptile species *Lampropholis guichenoti* (garden skink) and *Physignathus lesuerii* (eastern water dragon) were observed during herpetofauna surveys and during amphibian surveys. The current survey period identified a reduction in the total number of reptile species observed compared to the previous surveys (ERM, 2006).

3.9 NEST BOX MONITORING

The nest boxes were checked for resident fauna, evidence of use and the presence of pest species. The condition, occupancy and location of all nest boxes on the study area have been provided in Table 3.1.

Scat and hair analysis recorded the presence of *Trichosurus* species in nest boxes 4, 5, 28, 35 and 36. This species was most probably brushtail possum given that they were commonly recorded during nocturnal surveys.

No population analysis has been undertaken as not enough data has been collected at this stage of the monitoring program. At this stage, no bat nest boxes have had evidence of use. It was suggested that the landing strips of the bat nest boxes may be improved by the adherence of chicken mesh, flyscreen material or pool carpet to this part of the nest box. These additions to the bat nest boxes will be installed during the spring census. Nest box 31 was not located within the southern woodland and if unable to be located prior to the spring fauna census a replacement nest box will be erected during the next fauna census.

Table 3.1 Results of Nest Box Monitoring

No.	Nest Box Type	Location AMG		September 2004 (PB 2004)	June 2005 (ERM 2005)	February 2006 (ERM 2006)	May 2006 Occupancy	Condition
1	brush-tail possum	E 318700	N 6403685	scats of brush-tail possum	-	-	cobwebs	-
2	sugar glider	E 318712	N 6403717	wasp nest	-	-	cobwebs	-
3	ring-tail possum	E 318752	N 6403702	-	chewed entrance	-	-	scratched entrance
4	sugar glider	E 318806	N 6403721	-	-	-	scats, fur	old scratches at entrance
5	ring-tail possum	E 318763	N 6403619	scats of brush-tail possum	ring-tail possum scats	chewed entrance	cobwebs, scats	chewed entrance
6	brush-tail possum	E 318761	N 6403852	two ring-tail possums	-	-	brush-tail possum	-
7	ring-tail possum	E 318772	N 6403912	-	chewed entrance	chewed entrance	-	chewed entrance
8	sugar glider	E 318819	N 6403940	-	-	-	mudnests	-
9	sugar glider	E 318858	N 6403959	-	-	-	mudnests	-
10	sugar glider	E 318823	N 6404003	-	-	-	cobwebs	-
11	brush-tail possum	E 318706	N 6403544	-	-	brush-tail possum	brush-tail possum	-
12	squirrel glider	E 318735	N 6403550	-	-	-	-	-
13	microchiropteran bat	E 318800	N 6403582	-	-	-	cobwebs	-
14	squirrel glider	E 318925	N 6403537	-	-	-	-	-
15	squirrel glider	E 318937	N 6403583	-	-	-	-	-
16	ring-tail possum	E 318825	N 6403657	-	-	-	-	-
17	microchiropteran bat	E 318734	N 6403675	-	-	-	-	screw loose on lid
18	microchiropteran bat	E 318726	N 6403601	-	-	-	cobwebs	-
19	squirrel glider	E 318562	N 6403522	-	-	-	redback spider	-
20	ring-tail possum	E 318538	N 6403484	-	-	-	-	chipped entrance
21	brush-tail possum	E 318469	N 6403474	-	-	-	brush-tail possum	-
22	microchiropteran bat	E 318564	N 6403564	-	-	-	-	-

No.	Nest Box Type	Location		September 2004 (PB 2004)	June 2005 (ERM 2005)	February 2006 (ERM 2006)	May 2006	
		AMG					Occupancy	Condition
23	squirrel glider	E 318511	N 6403556	-	-	-	-	-
24	microchiropteran bat	E 318489	N 6403545	n/a	n/a	-	-	-
25	microchiropteran bat	E 318548	N 6403632	n/a	n/a	-	mudnest, cobwebs	-
26	microchiropteran bat	E 318524	N 6403600	n/a	n/a	-	-	-
27	squirrel glider	E 318472	N 6403607	n/a	n/a	-	-	chewed/ scratched at entrance
28	ringtail possum	E 318474	N 6403691	n/a	n/a	-	-	-
29	ringtail possum	E 318434	N 6403653	n/a	n/a	-	-	-
30	squirrel glider	E 318592	N 6403840	n/a	n/a	-	-	-
31	squirrel glider	E 319216	N 640397	n/a	n/a	-	missing nest box	-
32	squirrel glider	E 319165	N 6403941	n/a	n/a	-	-	chewed entrance
33	microchiropteran bat	E 319120	N 6403917	n/a	n/a	-	-	-
34	microchiropteran bat	E 319091	N 6404018	n/a	n/a	-	-	-
35	ringtail possum	E 319013	N 6403914	n/a	n/a	-	scats, hair	-
36	brush-tail possum	E 319039	N 6404003	n/a	n/a	ringtail scats, hair caught on entrance.	scats, hair	-
37	microchiropteran bat	E 318964	N 6404100	n/a	n/a	-	-	-
38	brush-tail possum	E 318922	N 6404004	n/a	n/a	-	cobwebs	-
39	microchiropteran bat	E 318869	N 6404010	n/a	n/a	-	cobwebs	-
40	microchiropteran bat	E 318689	N 6406973	n/a	n/a	-	cobwebs	-
41	microchiropteran bat	E 318675	N 6406939	n/a	n/a	-	cobwebs	-
42	microchiropteran bat	E 308653	N 6406907	n/a	n/a	-	-	-

DISCUSSION AND SUMMARY OF RECOMMENDATIONS

To enhance the habitat value of the southern woodland, encourage a more diverse range of native species and provide a safe movement/habitat corridor the following recommendations have been made throughout this report:

- cattle should be periodically excluded from the southern woodland to encourage the natural revegetation;
- supplementary planting of locally occurring native species is recommended at the eastern and western boundaries of the woodland to establish a connection with the riparian vegetation associated with Glennies Creek to the east and enhance the connection with the riparian vegetation along the Hunter River to the west;
- cattle must be excluded from all supplementary planting areas;
- species to be used in the revegetation should include locally occurring species such as *Eucalyptus crebra*, *Eucalyptus moluccana*, *Eucalyptus fibrosa*, *Corymbia maculata*, *Eucalyptus blakelyi*, *Eucalyptus punctata*, *Daviesia ulicifolia*, *Acacia decora*, *Acacia amblygona* and *Acacia parvipinnula*; and
- annual surveys should be conducted within the revegetated areas in conjunction with the fauna monitoring census to record any significant loss of trees as well as monitoring the use of the newly established corridors by native fauna.

The above recommendations would also enhance the habitat value of the southern woodlands for the resident grey-crowned babbler and speckled warbler populations. Any increase in habitat size would contribute to the long term viability of the local breeding populations of these vulnerable species. In regards to the northern population of grey-crowned babbler, which appears to also be viable in the short term, the following is recommended in order to retain its viability and closely monitor the population:

- this family group should continue to be encouraged to relocate to habitat on the southern side of Glennies Creek Road, outside of the mining area;
- trees cleared and fallen logs removed from the mine extension area should continue to be relocated south of Glennies Creek Road and stacked into piles to form suitable foraging habitat;
- surveys should be conducted during the breeding months between July and February; and
- grazing should be excluded from this area to encourage the growth of a shrub layer that will provide a foraging resource.

In addition to the recommendations to enhance the habitat value of the southern woodland for the grey-crowned babbler, the speckled warbler population will be encouraged in this habitat area by carrying out the following:

- fallen hollows should be retained and if possible increased to provide additional nesting habitat; and
- targeted searches for nests should be carried out during the next monitoring period to determine habitat range of this population and to establish an appropriate monitoring strategy to ensure it's long term viability in the study area.

Given that a total of two threatened bird species (speckled warbler and grey-crowned babbler) and four threatened microchiropteran species (Beccari's freetail-bat, eastern freetail-bat, eastern bent-wing bat and fishing bat) have been previously recorded within the southern woodland, it is important that conservation and revegetation measures as specified above be undertaken to maintain and improve the habitat value of the southern woodland as a permanent habitat for these six threatened species.

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Annex A

Monitoring Sites



Photograph 1a

Pitfall traps Site A - facing north
Autumn 2006.



Photograph 1b

Pitfall traps Site A - facing north
Summer 2006.



Photograph 1c

Pitfall traps Site A - facing south
east Autumn 2005.

Photographs

Ashton Coal - Biannual Fauna Monitoring, Camberwell NSW



Photograph 2a

Pitfall traps Site B - facing south west Autumn 2006.



Photograph 2b

Pitfall traps Site B - facing south west Summer 2006.



Photograph 2c

Pitfall traps Site B - facing south west Autumn 2005.

Photographs

Ashton Coal - Biannual Fauna Monitoring, Camberwell NSW



Photograph 3a

Pitfall traps Site C - facing north west Autumn 2006.



Photograph 3b

Pitfall traps Site C - facing north east Summer 2006.



Photograph 3c

Pitfall traps Site C - facing south east Autumn 2005.

Photographs

Ashton Coal - Biannual Fauna Monitoring, Camberwell NSW



Photograph 4a

Pitfall traps Site D - facing west
Autumn 2006.



Photograph 4b

Pitfall traps Site D - facing south
west Summer 2006.



Photograph 4c

Pitfall traps Site D - facing south
west Autumn 2005.

Photographs

Ashton Coal - Biannual Fauna Monitoring, Camberwell NSW

Annex B

Fauna Monitoring Results

Autumn Survey

Table B.1 Results of Terrestrial Elliott A Trapping

Date	Species	Trapline 1	Trapline 2
2 May 2006	<i>Antechinus flavipes</i>	-	1
3 May 2006	No terrestrial mammals captured	-	-
4 May 2006	<i>Mus musculus</i>	1	-
5 May 2006	<i>Mus musculus</i>	1	-

Table B.2 Results of Arboreal Trapping

Date	Species	Trapline 1	Trapline 2
2 May 2006	No arboreal mammals captured	-	-
3 May 2006	<i>Trichosurus vulpecula</i> (brush-tail possum)	2	-
4 May 2006	No arboreal mammals captured	-	-
5 May 2006	<i>Petaurus norfolcensis</i> (sugar glider)	1	-

Table B.3 Results of Pitfall Trapping

Date	Species	Site A	Site B	Site C	Site D
2 May 2006	No animals captured	-	-	-	-
3 May 2006	No animals captured	-	-	-	-
4 May 2006	No animals captured	-	-	-	-
5 May 2006	No animals captured	-	-	-	-

Table B.4 Results of Hair Tube Survey

Location	Definite	Probable
Transect 1 H3 arboreal	<i>Trichosurus</i> sp	-
Transect 1 H4	<i>Trichosurus</i> sp	-
Transect 1 H6 arboreal	one hair	<i>Trichosurus</i> sp
Transect 1 H8	<i>Trichosurus</i> sp	-
Transect 1 H9	<i>Trichosurus</i> sp	-
Transect 1 H10	<i>Trichosurus</i> sp	-
Transect 1 H14 arboreal	<i>Trichosurus</i> sp	-
Transect 1 H15	<i>Trichosurus</i> sp	-
Transect 2 H1 arboreal	<i>Trichosurus</i> sp	-
Transect 2 H4	<i>Trichosurus</i> sp	-
Transect 2 H6	<i>Trichosurus</i> sp	-
Transect 2 H8	<i>Trichosurus</i> sp; <i>Mus musculus</i>	-
Transect 2 H10	<i>M. musculus</i>	-
Transect 2 H11	<i>M. musculus</i>	-
Transect 2 H12 arboreal	<i>Trichosurus</i> sp	-
Transect 2 H14	<i>M. musculus</i>	-

Table B.5 Results of Avifauna Point Censuses

Site No.	AMG Co-ordinates		Scientific Name	Species		Observation Type
	Easting	Northing		Common Name		
1	318734	6403810	<i>Rhipidura fuliginosa</i>	grey fantail	O	
			<i>Smicrornis brevirostris</i>	weebill	O	
			<i>Acanthiza chrysorrhoa</i>	yellow-rumped thornbill	O	
			<i>Petroica goodenovii</i>	red-capped robin	O	
			<i>Corcorax melanorhamphos</i>	white-winged chough	O	
			<i>Corvus coronoides</i>	Australian raven	H	
			<i>Cracticus nigrogularis</i>	pied butcherbird		
2	318936	6403636	<i>Strepera graculina</i>	pied currawong		
			<i>Taeniopygia bichenovii</i>	double-barred finch	O	
			<i>Cacatua roseicapilla</i>	galah	H	
			<i>Malurus cyaneus</i>	superb fairy wren	O	
			<i>Sericornis frontalis</i>	white-browed scrub wren	O	
			<i>Chthonicola sagittata</i>	speckled warbler	O	
			<i>Colluricincla harmonica</i>	grey shrike-thrush	O	
3	319198	6403926	<i>Taeniopygia bichenovii</i>	double-barred finch	O	
			<i>Pomatostomus temporalis</i>	grey-crowned babbler	O	
			<i>Rhipidura leucophrys</i>	willie wagtail	O	
			<i>Gymnorhina tibicen</i>	Australian magpie	O	
			<i>Malurus cyaneus</i>	superb fairy-wren	O	
			<i>Strepera graculina</i>	pied currawong	O	
			<i>Taeniopygia bichenovii</i>	double-barred finch	O	
4	318508	6403561	<i>Rhipidura fuliginosa</i>	grey fantail	O	
			<i>Strepera graculina</i>	pied currawong	H	
			<i>Gymnorhina tibicen</i>	Australian magpie	H	
			<i>Malurus cyaneus</i>	superb fairy-wren	H	
			<i>Corvus coronoides</i>	Australian raven	H	
			<i>Pachycephala rufiventris</i>	rufous whistler	O	
			<i>Smicrornis brevirostris</i>	weebill	H	
5	318276	6403534	<i>Gymnorhina tibicen</i>	Australian magpie	H	
			<i>Strepera graculina</i>	pied currawong	H	
			<i>Rhipidura fuliginosa</i>	grey fantail	O	
			<i>Corvus coronoides</i>	Australian raven	H	
			<i>Malurus cyaneus</i>	superb fairy-wren	H	
			<i>Chenonetta jubata</i>	Australian wood duck	O	
			<i>Gymnorhina tibicen</i>	Australian magpie	H	
			<i>Pardalotus striatus</i>	striated pardalote	O	
			<i>Taeniopygia bichenovii</i>	double barred finch	H	
			<i>Smicrornis brevirostris</i>	weebill	O	
6	318684	6403596	<i>Zosterops lateralis</i>	silvereye	O	
			<i>Taeniopygia guttata</i>	zebra finch	O	
			<i>Malurus cyaneus</i>	superb fairy-wren	O	
			<i>Rhipidura fuliginosa</i>	grey fantail	O	
			<i>Smicrornis brevirostris</i>	weebill	H	
			<i>Strepera graculina</i>	pied currawong	H	
			<i>Manorina melanocephala</i>	noisy miner	H	
7	318718	6403553	<i>Petroica multicolor</i>	scarlet robin	O	
			<i>Rhipidura fuliginosa</i>	grey fantail	O	
			<i>Strepera graculina</i>	pied currawong	H	
			<i>Gymnorhina tibicen</i>	Australian magpie	H	
			<i>Manorina melanocephala</i>	noisy miner	H	

Site No.	AMG Co-ordinates		Species		Observation Type			
	Easting	Northing	Scientific Name	Common Name				
8	318856	6403577	<i>Acanthiza chrysorrhoa</i>	yellow-rumped thornbill	O			
			<i>Taeniopygia bichenovii</i>	double-barred finch	H			
			<i>Corvus coronoides</i>	Australian raven	O			
			<i>Cracticus nigrogularis</i>	pied butcherbird	O			
			<i>Cacatua roseicapilla</i>	galah	H			
			<i>Manorina melanocephala</i>	noisy miner	H			
			<i>Cacatua roseicapilla</i>	galah	O			
			<i>Strepera graculina</i>	pied currawong	H			
			<i>Rhipidura fuliginosa</i>	grey fantail	O			
			<i>Malurus cyaneus</i>	superb fairy-wren	O			
			<i>Corvus coronoides</i>	Australian raven	H			
			<i>Pachycephala pectoralis</i>	golden whistler	O			
			<i>Microeca fascinans</i>	jacky winter	O			
			<i>Pyrholaemus sagittatus</i>	speckled warbler	O			
9	318567	6403582	<i>Zosterops lateralis</i>	silveryeye	O			
			<i>Cacatua roseicapilla</i>	galah	O			
			<i>Rhipidura fuliginosa</i>	grey fantail	O			
			<i>Strepera graculina</i>	pied currawong	H			
			<i>Acanthiza chrysorrhoa</i>	yellow-rumped thornbill	O			
			<i>Corvus coronoides</i>	Australian raven	H			
			<i>Cacatua galerita</i>	sulphur-crested cockatoo	H			
			10	318460	6403681	<i>Lichenostomus penicillatus</i>	white-plumed honeyeater	O
						<i>Cacatua galerita</i>	sulphur-crested cockatoo	H
						<i>Acanthiza chrysorrhoa</i>	yellow-rumped thornbill	O
<i>Manorina melanocephala</i>	noisy miner	H						
<i>Strepera graculina</i>	pied currawong	H						
<i>Rhipidura leucophrys</i>	willie wagtail	O						
<i>Rhipidura fuliginosa</i>	grey fantail	O						

Observation Types: O = Observed; H = Heard

Annex C

Fauna Species Recorded in the Study Area

FAUNA SPECIES RECORDED IN THE STUDY AREA

The following list includes all species of birds, mammals, reptiles and frogs observed in the study area. These records are based on field observations and literature searches.

Scientific and Common Names

Scientific names for each fauna assemblage are in accordance with the following references:

- Birds Christidis and Boles (1994)
- Mammals Strahan (1995)
- Reptiles Cogger (1992)
- Amphibians Cogger (1992)
- Introduced species are indicated by an asterisk (*)

Conservation Status

EPBC

Commonwealth conservation status is referenced according to the *Environment Protection and Biodiversity Conservation Act 1999*, as follows:

- E Endangered;
- X Presumed Extinct; and
- V Vulnerable.

TSC

Conservation status is referenced according to the *Threatened Species Conservation Act 1995* as follows:

- E Endangered;
- CE Critically Endangered;
- X Presumed Extinct; and
- V Vulnerable.

Observation Type

How the species was recorded is indicated using the following key.

- ac identified from audible call;
- o observed directly;
- tt trapped in arboreal mammal trap;
- t trapped in terrestrial small mammal trap;
- s observed by spotlight search;
- ec detected by echolocation call analysis;
- i identified from indirect evidence (scats, scratch marks, hair sample, diggings);

- l reported in the study area during previous surveys and not during the current census; and
 x considered likely to occur based on habitat available and distribution.

Table C.1 Fauna Species Recorded in the Study Area

FAMILY Scientific Name	Common Name	Conservation Status		Observation Type	Observation Type	Observation Type
		EPBC	NSW	June 2005	February 2006	May 2006
<i>i. Birds</i>						
ALCEDINIDAE						
<i>Alcedo azurea</i>	azure kingfisher				o	l
ANATIDAE						
<i>Chenonetta jubata</i>	Australian wood duck			o	l	o
<i>Anas superciliosa</i>	pacific black duck			o	l	l
PODICIPEDIDAE						
<i>Tachybaptus novaehollandiae</i>	Australasian grebe			l	l	l
PELECANIDAE						
<i>Pelecanus conspicillatus</i>	Australian pelican			l	l	l
ARDEIDAE						
<i>Egretta novaehollandiae</i>	white-faced heron			l	l	l
<i>Ardea alba</i>	great egret			o	l	o
THRESKIORNITHIDAE						
<i>Threskiornis spinicollis</i>	straw-necked ibis			o	l	o
<i>Platalea regia</i>	royal spoonbill			o	l	l
ACCIPITRIDAE						
<i>Haliastur sphenurus</i>	whistling kite			l	l	l
<i>Haliaeetus leucogaster</i>	white-bellied sea-eagle			l	l	l
<i>Accipiter novaehollandiae</i>	grey goshawk			o	l	l
<i>Accipiter cirrhocephalus</i>	collared sparrowhawk			o	o	l
<i>Aquila audax</i>	wedge-tailed eagle			o	l	l
FALCONIDAE						
<i>Falco berigora</i>	brown falcon			l	l	l
<i>Falco cenchroides</i>	nankeen kestrel			o	l	l
TURNICIDAE						
<i>Turnix varia</i>	painted button-quail			o	l	o
CHARADRIIDAE						
<i>Vanellus miles</i>	masked lapwing			ac	ac	o
COLUMBIDAE						
<i>Phaps chalcoptera</i>	common bronzewing			o	l	l
<i>Ocyphaps lophotes</i>	crested pigeon			o	o	l
<i>Geopelia cuneata</i>	diamond dove			o	l	l
CACATUIDAE						
<i>Cacatua roseicapilla</i>	galah			o	o	ac
<i>Cacatua galerita</i>	sulphur-crested cockatoo			o	ac	ac
PSITTACIDAE						
<i>Platycercus eximius</i>	eastern rosella			o	o	o
<i>Psephotus haematonotus</i>	red-rumped parrot			l	l	l
CUCULIDAE						
<i>Cuculus pallidus</i>	pallid cuckoo			l	l	l
STRIGIDAE						
<i>Ninox novaeseelandiae</i>	southern boobook				o	l
TYTONIDAE						
<i>Tyto alba</i>	barn owl			s	o	l
AEGOTHELIDAE						

FAMILY Scientific Name	Common Name	Conservation Status		Observation	Observation	Observation
		EPBC	NSW	Type June 2005	Type February 2006	Type May 2006
<i>Aegotheles cristatus</i>	Australian owl- nightjar			1	1	1
HALCYONIDAE						
<i>Dacelo novaeguineae</i>	laughing kookaburra			o	ac,o	o
MEROPIIDAE						
<i>Merops ornatus</i>	rainbow bee-eater			1	1	1
MALURIDAE						
<i>Malurus cyaneus</i>	superb fairy-wren			o	o	o
<i>Malurus lamberti</i>	variegated fairy-wren			o	1	1
PARDALOTIDAE						
<i>Sericornis frontalis</i>	white-browed scrub wren			-	-	o
<i>Chthonicola sagittata</i>	speckled warbler		V		o	o
<i>Pardalotus punctatus</i>	spotted pardalote			1	1	1
<i>Pardalotus striatus</i>	striated pardalote			o	1	o
<i>Smicrornis brevirostris</i>	weebill			o	o	o
<i>Acanthiza pusilla</i>	brown thornbill			o	o	1
<i>Acanthiza chrysorrhoa</i>	yellow-rumped thornbill			o	o	o
PLOCEIDAE						
<i>Taeniopygia guttata</i>	zebra finch			-	-	o
MELIPHAGIDAE						
<i>Anthochaera chrysoptera</i>	little wattlebird			o	1	1
<i>Philemon corniculatus</i>	noisy friarbird			o	o	1
<i>Manorina melanocephala</i>	noisy miner			o	o	o
<i>Lichenostomus penicillatus</i>	white-plumed honeyeater			1	1	o
PETROICIDAE						
<i>Microeca fascinans</i>	jacky winter			o	1	o
<i>Petroica multicolor</i>	scarlet robin			o	1	1
<i>Petroica goodenovii</i>	red-capped robin			o	1	o
POMATOSTOMIDAE						
<i>Pomatostomus temporalis</i>	grey-crowned babbler		V	o	o	o
PACHYCEPHALIDAE						
<i>Colluricincla harmonica</i>	grey shrike-thrush			-	-	o
<i>Pachycephala pectoralis</i>	golden whistler			o	1	o
<i>Pachycephala rufiventris</i>	rufous whistler			o	o	o
DICRURIDAE						
<i>Grallina cyanoleuca</i>	magpie-lark			1	1	o
<i>Rhipidura fuliginosa</i>	grey fantail			o	o	o
<i>Rhipidura leucophrys</i>	willie wagtail			1	o	o
CAMPEPHAGIDAE						
<i>Coracina novaehollandiae</i>	black-faced cuckoo- shrike			o	o	1
ORIOOLIDAE						
<i>Oriolus sagittatus</i>	olive-backed oriole			o	o	1
ARTAMIDAE						
<i>Artamus personatus</i>	masked woodswallow			o	1	1
<i>Cracticus nigrogularis</i>	pied butcherbird			o	o	o
<i>Gymnorhina tibicen</i>	Australian magpie			o	o	o
<i>Strepera graculina</i>	pied currawong			o	ac, o	o
CORVIDAE						
<i>Corvus coronoides</i>	Australian raven			o	ac	o
CORCORACIDAE						
<i>Eurystomus orientalis</i>	dollarbird				o	1

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<i>Corcorax melanorhamphos</i>	white-winged cough			l	o	o
MOTACILLIDAE						
<i>Anthus novaeseelandiae</i>	Richard's pipit			o	o	l
PASSERIDAE						
<i>Taeniopygia bichenovii</i>	double-barred finch			o	o	o
<i>Neochemia temporalis</i>	red-browed finch			o	l	l
DICAEIDAE						
<i>Dicaeum hirundinaceum</i>	mistletoebird			o	l	l
HIRUNDINIDAE						
<i>Hirundo neoxena</i>	welcome swallow			o	o	o
STURNIDAE						
* <i>Acridotheres tristis</i>	* common myna			o	l	o
ii. Mammals						
BOVIDAE						
* <i>Bos Taurus</i>	* cattle			o	o	o
CANIDAE						
* <i>Canis familiaris</i>	* dog			o	l	l
* <i>Vulpes vulpes</i>	* fox			i	l	l
DASYURIDAE						
<i>Antechinus flavipes</i>	yellow-footed antechinus			t	t	t
EQUIDAE						
* <i>Equus caballus</i>	* horse			i	l	l
FELIDAE						
* <i>Felis catus</i>	* cat			s	l	l
LEPORIDAE						
* <i>Lepus capensis</i>	* brown hare			o	o	o
* <i>Oryctolagus cuniculus</i>	* rabbit			i	ol	o
MACROPODIDAE						
<i>Macropus giganteus</i>	eastern grey kangaroo			o	o	o
<i>Wallabia bicolor</i>	swamp wallaby				i	o
MURIDAE						
<i>Mus musculus</i>	house mouse			t	t	t
<i>Rattus rattus</i>	black rat			i	t	t
PERAMELIDAE						
<i>Isoodon macrourus</i>	northern brown bandicoot			i	i	i
<i>Perameles nasuta</i>	long-nosed bandicoot			i	i	i
PETAURIDAE						
<i>Pseudocheirus peregrinus</i>	common ringtail possum			i	i	i
PHALANGERIDAE						
<i>Trichosurus vulpecula</i>	common brushtail possum			s	s	t
PTEROPODIDAE						
<i>Pteropus poliocephalus</i>	grey-headed flying-fox	V	V	l	l	l
ZOSTEROPIDAE						
<i>Zosterops lateralis</i>	silveryeye				o	o
MOLOSSIDAE						
<i>Mormopterus beccarii</i>	Beccari's freetail-bat		V		ec	l
<i>Mormopterus norfolkensis</i>	eastern freetail-bat		V		ec	l
<i>Mormopterus planiceps</i>	southern freetail-bat				ec	l
<i>Mormopterus sp 2</i>	Freetail-bat				ec	l

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VESPERTILIONIDAE						
<i>Chalinolobus gouldii</i>	Gould's wattled bat			ec	ec	1
<i>Chalinolobus morio</i>	chocolate wattled bat			ec	ec	1
<i>Miniopterus schreibersii</i>	eastern bentwing-bat		V	ec	ec	1
<i>Myotis adversus</i>	fishing bat		V		ec	1
<i>Vespadelus vulturnus</i>	little forest bat			ec	ec	1
<i>Tadarida australis</i>	white-striped mastiff bat			ec	ec	1
iii. Reptiles						
SCINCIDAE						
<i>Lampropholis guichenoti</i>	garden skink			o	o	o
<i>Morethia boulengeri</i>					o	1
<i>Pseudemoia trilineata</i>					o	1
<i>Tiliqua scincoides</i>	blue tongue lizard				o	1
<i>Egernia striolata</i>	tree skink				t	1
AGAMIDAE						
<i>Physignathus lesuerii</i>	eastern water dragon				o	o
<i>Tympanocryptis diemensis</i>	mountain dragon				o	1
<i>Diporiphora australis</i>	tommy roundhead				o	1
TYPHLOPIDAE						
<i>Rhamphotyphlops wiedii</i>	blind worm snake				o	1
VARANIDAE						
<i>Varanus varius</i>	lace monitor			1	o	1
iv. Amphibians						
MYOBATRACHIDAE						
<i>Crinia signifera</i>	common eastern froglet				ac	ac
<i>Limnodynastes tasmaniensis</i>	spotted marsh frog				ac	1
<i>Uperoleia laevigata</i>	smooth toadlet			ac	1	1

ERM consulting services worldwide www.erm.com



Environmental Resources Management Australia

53 Bonville Ave

Thornton NSW 2322

Telephone (02) 4964 2150

Facsimile (02) 4964 2152