

NAMOI MINING PTY LTD

ABN: 24 071 158 373

Sunnyside Coal Project

via Gunnedah



Fauna Survey and Assessment

Prepared by

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March, 2008

**Specialist Consultant Studies Compendium
Part 3A**

Fauna Survey and Assessment

of the

Sunnyside Coal Project

via Gunnedah

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Cover Photograph:

An oblique aerial photograph of the property known as "Sunnyside", showing the Project Site and treed areas on and surrounding the property.

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EXECUTIVE SUMMARY

This report describes the results of a fauna survey and assessment of a site approximately 15 kilometres to the west of Gunnedah on the north-western slopes of New South Wales. The Project Site, on the property known as "Sunnyside", is proposed for an open cut coal mine.

The report contains lists of the fauna recorded in the Gunnedah district, lists of the fauna observed during the current field surveys, discussions of the threatened fauna species listed in the *Threatened Species Conservation Act 1995* (NSW) known and likely to occur in the area generally, and on the Project Site particularly. The fauna generally and the threatened fauna in particular associated with the woodland remnants in the area are documented. An assessment of the potential of the coal mine project to impact upon threatened species and their habitat is provided in the report. The woodland remnants would not be removed by the coal mine Project.

Recommendations are made to avoid and minimise the potential impacts on native fauna, particularly threatened species and their habitat. Special attention is given to those threatened species recorded on the Project Site, namely the Koala, Speckled Warbler and Grey-crowned Babbler. It is concluded that the proposed coal mine is not likely to have a significant effect on threatened fauna.

Recommendations are made to protect, manage and improve fauna habitat on the Project Site, particularly for the threatened species.

An assessment of the threatened species listed under the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth) is undertaken as part of the investigation. It is concluded that the coal mine Project is not likely to have a significant impact on any matter of national environmental significance and therefore referral to the Commonwealth Environment Minister is not warranted.

A draft Koala Plan of Management has been prepared separately to this fauna report, as required by *State Environmental Planning Policy No. 44 - Koala Habitat Protection*, as core Koala habitat is present on the Project Site – see Part 3B of the Specialist Consultant Studies Compendium.

Coverage of Fauna-related Issues in the Fauna Survey Assessment

Page 1 of 2

Fauna Issues Raised by Government Departments	Issue	Comment	Location in Document	
Department of Planning	Environmental impacts of the Project and key issues.	All key fauna issues are identified and assessed in terms of the potential impact of the coal mine.	Section 5: Fauna of Conservation Significance. Section 6: Impact of the Proposed Development.	
	Description of the existing environment.	A description of the existing environment relevant to native fauna is provided.	Section 2: The Project Site. Section 4.1: Description of Fauna Habitat	
	Description of the measures to avoid and minimise impacts.	Various recommendations are made to avoid and minimise impacts on fauna, most particularly by the Koala, in the Plan of Management.	Section 7: Impact Mitigation. Draft Koala Plan of Management	
	Monitoring of impacts.	The draft Koala Plan of Management includes provisions for monitoring Koalas and their habitat.	Section 7: Impact Mitigation. Draft Koala Plan of Management.	
	Impact on threatened species, etc.	Impacts are fully assessed under the provisions of the TSC Act.	Section 6.2: Impact on Threatened Species, Populations and Communities.	
	Preparation of a draft Koala Management Plan	Core Koala habitat has been identified and a management plan prepared.	Section 6.3: SEPP No. 44 – Koala Habitat Protection.	
	Long term management of Koala habitat	This matter is dealt with in the accompanying document.	Draft Koala Plan of Management Draft Koala Plan of Management	
	Department of Environment and Conservation	Undertake a field survey of the Project Site.	A fauna survey was undertaken in spring 2006.	Section 4: Survey Results.
		Consistency with Draft Guidelines for Threatened Species Assessment (DEC 2005)	The EPRD of DEC have stated that these draft guidelines should not be used until their gazettal.	-
		Consistency with Threatened Biodiversity Survey and Assessment Guidelines for Development and Activities (DEC 2004)	The report has been prepared to be consistent with these draft guidelines.	Whole report.
Impact on fauna, particularly threatened species.		All relevant threatened species in the district are discussed and assessed.	Section 5: Fauna of Conservation Significance. Section 6: Impact of the Proposed Development.	

Coverage of Fauna-related Issues in the Fauna Survey Assessment

Fauna Issues Raised by Government Departments and Conservation (contd)	Issue	Comment	Location in Document
Department of Environment and Conservation (contd)	Impact on Koala and Koala Habitat	Assessed under the TSC Act and SEPP No. 44; a draft Koala Plan of Management has been prepared	Section 6.2.1: Threatened Species Conservation Act. Draft Koala Plan of Management
	Measures for avoiding and minimising environmental impact	Recommendations are made in the report and a draft Koala Plan of Management has been prepared.	Section 7: Impact Mitigation Draft Koala Plan of Management.
	Loss of native vegetation (habitat) and mitigation measures	Very little native vegetation would be lost; the draft Koala Plan of Management identifies replanting areas.	Section 6: Impact of the Proposed Development. Section 7: Impact Mitigation.
Department of Natural Resources	Fauna survey, including species listed in FM Act 1994 and TSC Act 1995 and EPBC Act 1999.	A fauna survey was undertaken, with particular reference to identifying threatened species and their habitat on the Project Site and nearby.	Section 4: Survey Results. Section 5: Fauna of Conservation Significance.
	Assessment of habitat for all relevant species.	An assessment of all relevant threatened species is presented in the report.	Section 5.1: Threatened Species. Section 5.4: Fisheries Management Act.
	Description of the remnant of vegetation/habitat cleared.	A description of the affected vegetation/habitat is provided in the report.	Section 6.1: Impact on Vegetation and Habitat.
Department of Primary Industry	Proposals to effectively re-establish and maintain biodiversity.	The draft Koala Plan of Management sets out proposals for maintaining and enhancing habitat on the Project Site.	Section 7: Impact Mitigation. Draft Koala Plan of Management.
	Assessment of likely disturbance to fish and aquatic habitat, and listed threatened aquatic species.	There is no fish habitat on the Project Site.	Section 5.4: Fisheries Management Act.
	Potential blockages of fish passage.	The Project does not involve any creek crossings.	Section 5.4: Fisheries Management Act.
Gunnedah Shire Council	No fauna issues are raised by Council.	-	-

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1 INTRODUCTION

This report was commissioned by Olsen Environmental Consulting Pty Limited on behalf of Namoi Mining Pty Limited, the Proponent of the proposed Sunnyside Coal Mine (the "Project") to be developed near Gunnedah on the north-western slopes of New South Wales. This report, which examines the impact of the Project on native fauna, is one of a number of environmental studies being undertaken for incorporation in an *Environmental Assessment* for the Project.

The purpose of this report is to identify, describe and assess the importance of the fauna and fauna habitats occurring in and around the Project Site, to discuss the potential impact of the mine and related activities on fauna, particularly threatened species, and to provide recommendations that would help reduce or avoid impacts on native fauna and on the habitat of native fauna.

This report addresses the Director-General's requirements for the fauna component of the *Environmental Assessment*, set out as follows in correspondence from the Department of Environment and Conservation (DEC) dated 1 November 2006:

The following summary was provided by the DEC as to their requirements:

- "the impact on flora and fauna, particularly White Box Yellow Box Blakely's Red Gum Grassy Woodland, which is listed as an Endangered Ecological Community in Schedule 1 of the *Threatened Species Conservation Act 1995* and endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*;
- the impact on the Koala and habitats identified within woodland on the premises and adjacent to potential haulage routes to the coal loader located in Gunnedah; and
- the actions that would be taken to avoid or mitigate environmental impacts, or compensatory measures to minimise unavoidable impacts."

The following further requirements were set out in Attachment 'A' of the Department's letter.

1. "A field survey of the Project Site would be conducted and documented in accordance with the gazetted draft *Guideline for Threatened Species Assessment* and the document "Threatened Biodiversity Assessment – Guidelines for Developments and Activities" (Working Draft) (DEC 2004).
2. Likely impacts on threatened species and their habitat need to be assessed, evaluated and reported on. The assessment would specifically report on the considerations listed in Step 3 of the draft guideline.
3. Describe the actions that would be taken to avoid or mitigate impacts or compensate for unavoidable impacts of the Project on threatened species and their habitat. This would include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented.
4. Describe the extent of loss of any native vegetation and a strategy to offset any losses to ensure maintenance of, or improved outcome for biodiversity.
5. The EA needs to clearly state whether it meets each of the key thresholds set out in Step 5 of the guideline."

The DEC's standard Environmental Assessment Guidelines for Flora and Fauna (DEC undat.) were taken into account during field work and report preparation.

Section 2 of this report describes the location and setting of the Project, providing a summary of the geology of the Gunnedah Basin, the broad vegetation patterns of the Gunnedah district, and relevant climatic data. Section 2 also describes the topography of the Project, provides information on land use and briefly describes the Project.

Section 3 outlines the survey methods used during the fauna study, while Section 4 reports the results of the field studies and other investigations. Section 5 assesses the potential for threatened species, listed migratory species and endangered populations to occur in and around the Project Site. Section 6 examines the impact of the mine and related activities on fauna and fauna habitat, while Section 7 discusses impact mitigation.

2 THE PROJECT SITE

2.1 Location and Setting

The Project Site is located on the property known as "Sunnyside", which is on the western side of Coocooboonah Lane, just north of the Oxley Highway and the Old Gunnedah No.5 Colliery, about 15 kilometres to the west of Gunnedah; see **Figure 1**. The Project Site consists of the proposed open cut mine area, the land on which the associated infrastructure facilities are to be located, and all immediately adjoining areas, which is virtually the whole property. "Sunnyside" has had a long history of cropping and grazing.

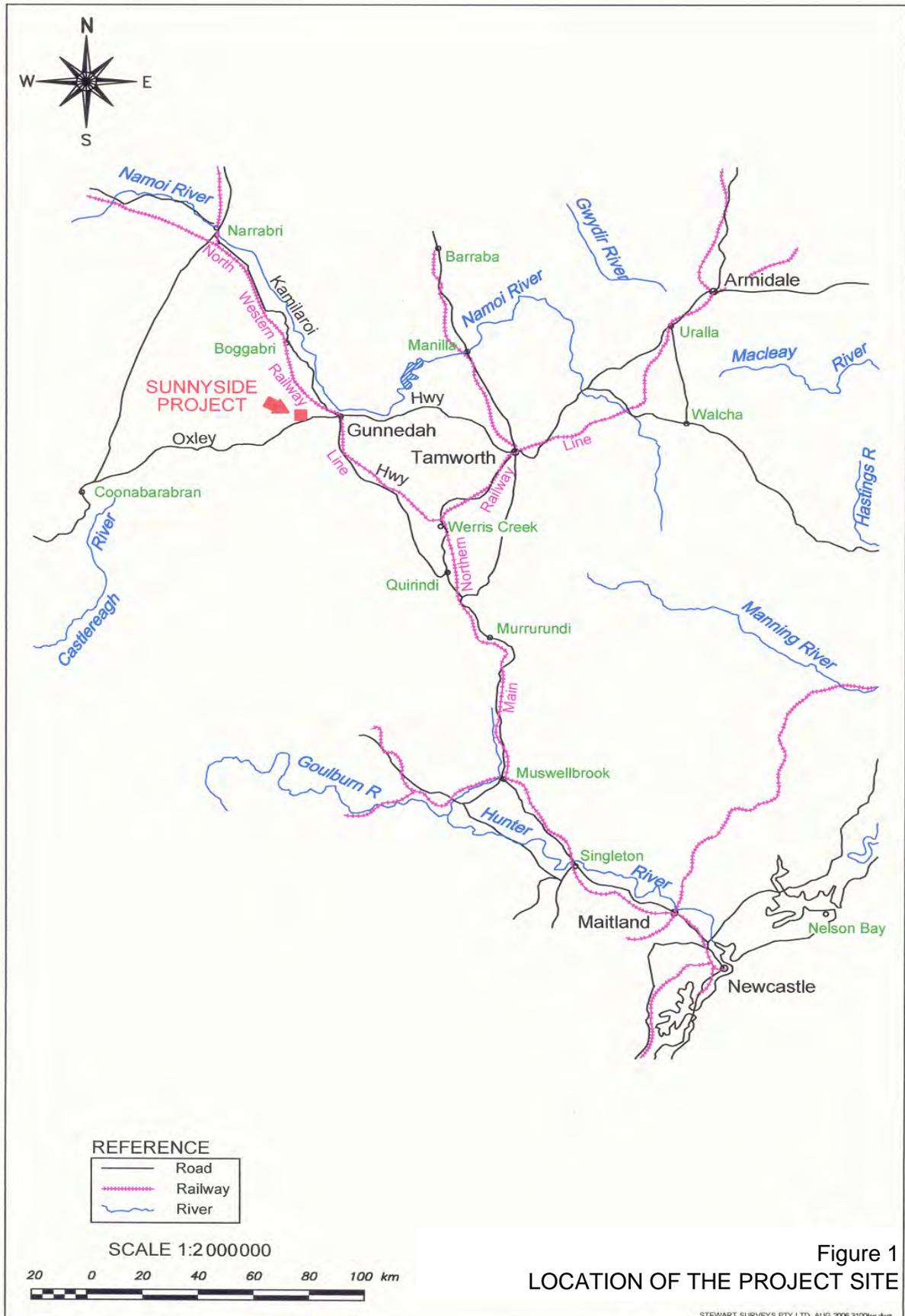
The Project Site consists of the proposed open cut mine area, and the land on which the associated infrastructure facilities are to be located. It covers 231ha (see **Figure 2**).

The area disturbed by the mine is to be located in the centre of the Project Site and would cover an area of about 90ha. The mine would produce up to one million tonnes of coal per annum.

The Project Site is located in the Gunnedah Basin, which is part of the Sydney Basin. Permian rocks dominate the area with the coal seam targeted for mining being the Hoskissons Coal member. Overlying this coal seam is the Benalabri Formation, composed of mudstone sequences. The Wallala Formation also out-crops locally. This formation is predominantly a lithic conglomerate of chert, jasper and volcanic pebbles in a coarse sandstone matrix.

The Gunnedah district is within the Liverpool Plains Province of the Northern Sandstones Region, as defined by Morgan and Terry (1992). The Liverpool Plains Province is characterised by "extensive grasslands on alluvial plains with small wooded sedimentary and volcanic hills".

"Sunnyside" ranges in elevation from about 310m AHD at the northern end of the property to 428m AHD in the south-eastern corner, where there is a pronounced knoll. The proposed open cut mine area is located on gently sloping land to the north and north-west of the knoll. A few small ephemeral watercourses cross the property from south to north, each of which have very small catchments so there are no pronounced channels, except in the south-eastern corner of the property.



Note: A colour version of this figure is presented on the Project CD

The following annual climatic data have been recorded for Gunnedah.

Mean Annual Daily Maximum Temperature:	26.0°C; range 16.7°C (July) - 34.0°C (December).
Mean Annual Daily Minimum Temperature:	10.9°C; range 2.9°C (July) - 18.3°C (December).
Mean Annual Rainfall:	616.4 mm.
Mean Number of Raindays:	71.7; range 4.3 (April) – 6.9 (October & December).

2.2 The Project

Namoi Mining Pty. Ltd. (NMPL) propose to establish a small scale open cut coal mine with a capacity to produce up to 1 million tonnes per annum (Mtpa) from the Hoskissons Coal Seam. NMPL is part of the Whitehaven Group of Companies. The Mine would be located within an area of approximately 231ha (the Project Site) on the “Sunnyside” property approximately 15 kilometres west of Gunnedah. The Project Site is located just north of the Oxley Highway and the old Gunnedah No. 5 Colliery site facilities and west of Coochooboonah Lane. Mining and associated activities would be undertaken within Lot 161 DP 755503 and Lot 1 DP 393755 “Sunnyside” owned by NMPL. There would be a purpose built transport route parallel to and north of Coochooboonah Lane. This would be located on Lots 162 and 163 DP 755503 which are part of the *Plain View* property. Arrangements with the owner of this property have been negotiated. The Project Site represents the area of potential maximum surface disturbance associated with all mining related activities. The Whitehaven Coal Handling and Preparation Plant (CHPP) and Rail Loading Facility, are located approximately 5 kilometres northwest of the Gunnedah Post Office and 17 kilometres by road east of “Sunnyside”. **Figure 2** shows the layout of the Project Site.

The Project would involve the development of an open cut mine and the construction of associated infrastructure such as coal handling, processing facilities and site facilities. The coal would be mined using traditional open cut methods, which involve drilling and blasting, followed by removal of the coal by heavy equipment.

The product coal would be transported by truck along the Coochooboonah Lane re-alignment to link the coal mine with the Oxley Highway to the south of the Project Site, then to the Whitehaven CHPP and Rail Loading Facility. The coal would be stockpiled at the rail siding prior to being loaded onto trains via a conveyor system.

The site facilities in the Project Site would consist of an office and bathhouse buildings, car park, stores yard, sewage treatment facility, air compressor and general mine buildings. There would also be an out-of-pit overburden emplacement immediately to the north of the proposed open cut pit, where the existing house and farm sheds are located. A coal processing plant is not required. Rather, the run-of-mine coal would be simply crushed and screened.

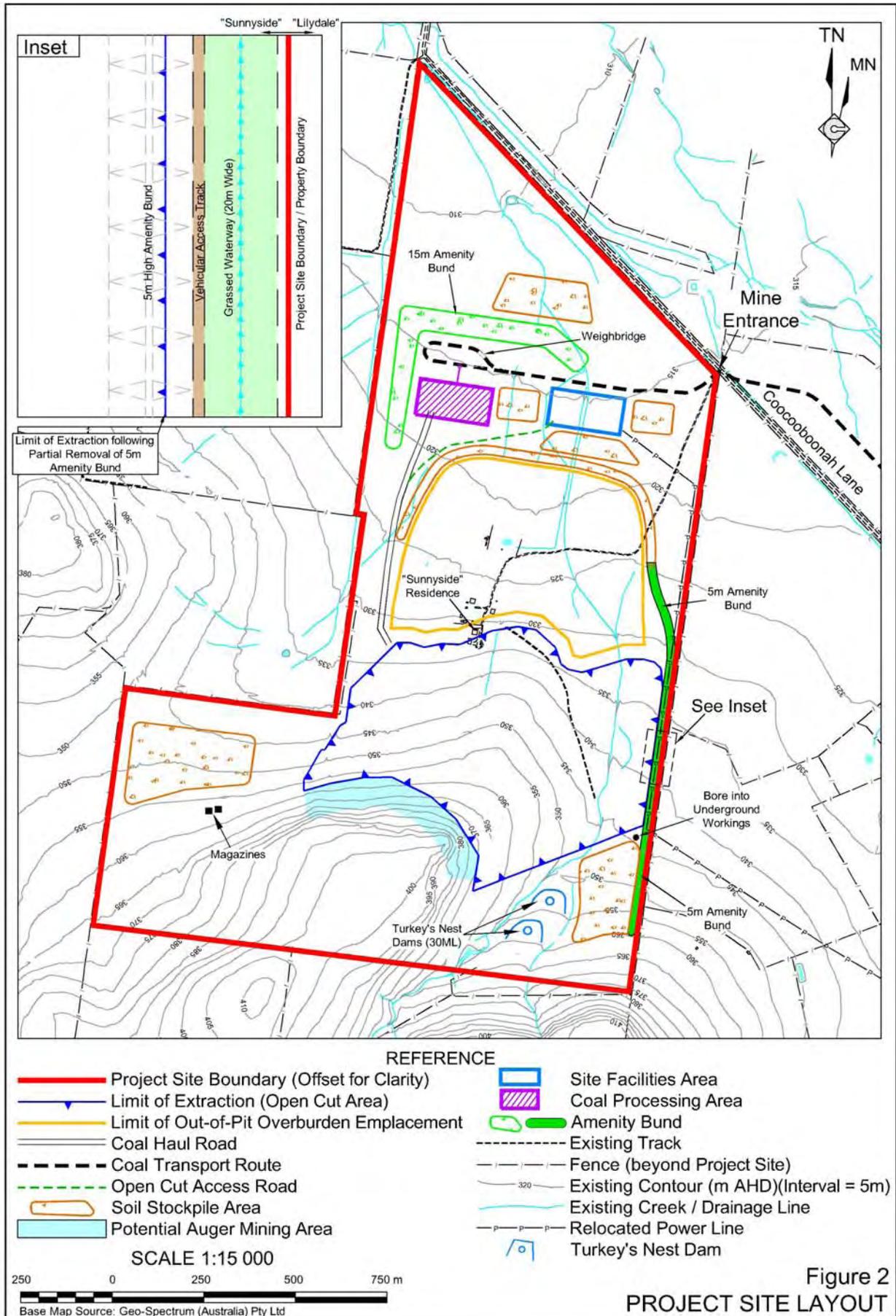


Figure Prepared by R.W. Corkery & Co. Pty Ltd
 Note: A colour version of this figure is presented on the Project CD

Initial investigations identified two haul road routes:

- one to the south of the mine directly from the property onto the Oxley Highway; and
- one to the northwest of Coochooonah Lane, on an adjoining property (see **Figure 3**). The latter route is the one selected for the haul road.

Coochooonah Lane would be re-aligned to provide coal haulage from the Project Site to the Oxley Highway. The re-aligned road would also provide access to the mine and continue to be used by local non-mine traffic. The re-aligned road would be an all weather bitumen-sealed road about to 3.2 kilometres long.

3 STUDY METHOD

3.1 Tasks

The following tasks were identified for the fauna study.

Background Studies

Task 1.

Review all existing information on the fauna and the environment in and around the Project Site. Consider all relevant information from the available sources, including information provided by the Proponent and government departments. Prepare a list of the vertebrate fauna previously recorded in the vicinity of the Project Site.

Task 2.

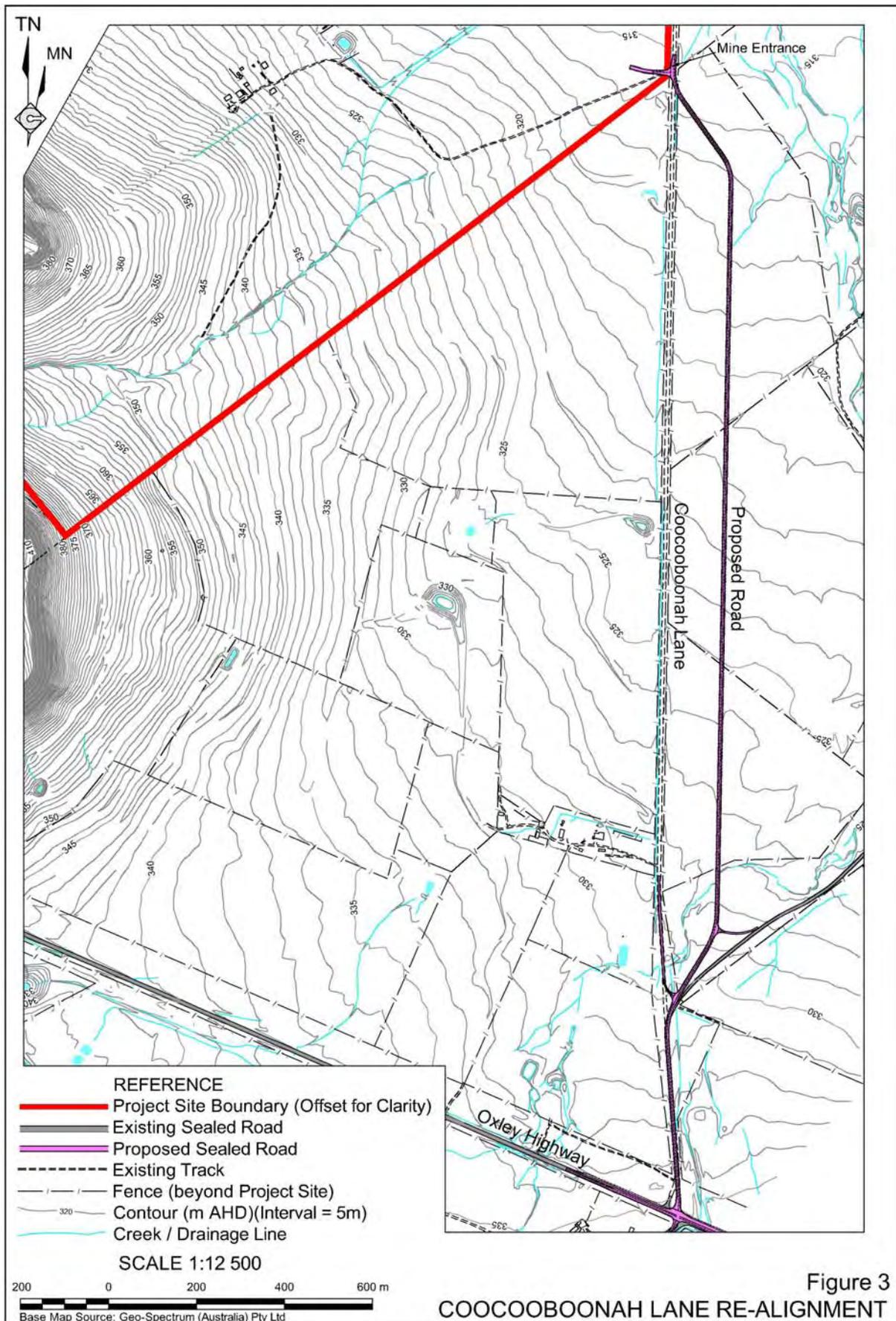
Identify fauna species, populations and communities listed under the New South Wales *Threatened Species Conservation Act 1995* (TSC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) with the potential to occur in the Project Site.

Task 3.

Determine what field studies are required to describe the fauna and fauna habitats of the Project Site and address the threatened species issues.

Task 4.

Prepare a fieldwork program to achieve the above.



Note: A colour version of this figure is presented on the Project CD

Field Studies

Task 5.

Undertake field studies in and around the Project Site to obtain the following information.

- A list of the vertebrate fauna species observed during the study period.
- A description of the fauna habitat available, particularly important habitat features.
- The threatened fauna species and habitat likely to be used by threatened fauna species.
- A map of the fauna habitat types in and adjacent to the Project Site, identifying habitat important for threatened fauna and native fauna, in general.

The study area for the field studies incorporated the entire Project Site as well as the surrounding land, such as the road reserves along the Oxley Highway and along Coocooboonah Lane (see **Figure 4**).

Report Preparation

Task 6.

Document the results of the above field studies.

Task 7.

Identify the key fauna issues and make recommendations to avoid or reduce significant impacts on habitat and species of particular importance.

Task 8.

Address the *Assessment Guidelines* associated with the TSC Act and the EPBC Act.

3.2 Background Investigations

Prior to the field studies being undertaken, information was obtained from various sources on the fauna species previously recorded in the district and on the general character of the Project Site. These sources of information included the NSW Wildlife Atlas maintained by the National Parks and Wildlife Service, topographical maps, vegetation maps and geological maps, and any reports on nearby sites containing relevant information.

A list of the vertebrate fauna species previously recorded in the district, within about 20 kilometres of the Project Site, was compiled from existing sources, especially the NSW Wildlife Atlas, available online.

3.3 Field Surveys

General

Diurnal fauna surveys were conducted in and adjacent to the Project Site early in spring, from 11 to 14 September 2006. The weather was fine, and cool to warm. The surrounding area was also investigated, to provide a general context for assessing the habitat in the Project Site.

Techniques for Recording Species

The survey focused on vertebrate species, i.e. mammals, birds, reptiles and amphibians, with the aim of detecting as many as possible of the species present. The survey results indicate which species were observed, but would not be regarded as a full inventory of the species that would occur in the Project Site. This could be obtained only during a long study spanning all seasons.

Mammals were identified by observation and by indirect means, i.e. by searching for scats, tracks and diggings, and inspecting tree trunks for claw marks. The birds in the area were identified by direct observation and by interpreting any characteristic calls.

A search for reptiles was conducted during the hottest periods, when sun and heat encourage activity. A search for sheltering and cryptic reptiles was made in habitat niches under rocks, logs and debris. Potential basking sites were investigated, especially on bare surfaces. Frogs were identified by interpreting distinctive calls and searching in moist areas and habitat niches.

Describing Habitat

Seven habitat survey sites were established in the Project Site, and a habitat survey sheet was completed at each one. These sites were carefully selected so that all of the natural habitats in the Project Site would be sampled; see **Figure 4**. The following information was recorded at each habitat survey site.

- The vegetation present.
- Habitat characteristics of the Project Site (such as rock outcrops).
- Features likely to attract threatened fauna.
- The fauna species observed.

Habitat assessment plays an important role in predicting which threatened species are likely to occur in any given area. The type of vegetation present, the presence/absence of rock outcrops, tree hollows, watercourses, wetlands, and special food plants for fauna are all taken into account.

Nomenclature

The names of the fauna species in this report are based mainly on the following publications: *The Mammals of Australia* (Strahan 1995), *Australian Bats* (Churchill 1998), *The Taxonomy and Species of Birds of Australia and its Territories* (Christidis & Boles 1994) and *Reptiles and Amphibians of Australia* (Cogger 1992). Most of the plant species names are from the *Flora of New South Wales* (Harden 1992-2002), although more recent nomenclature may occasionally have been used.

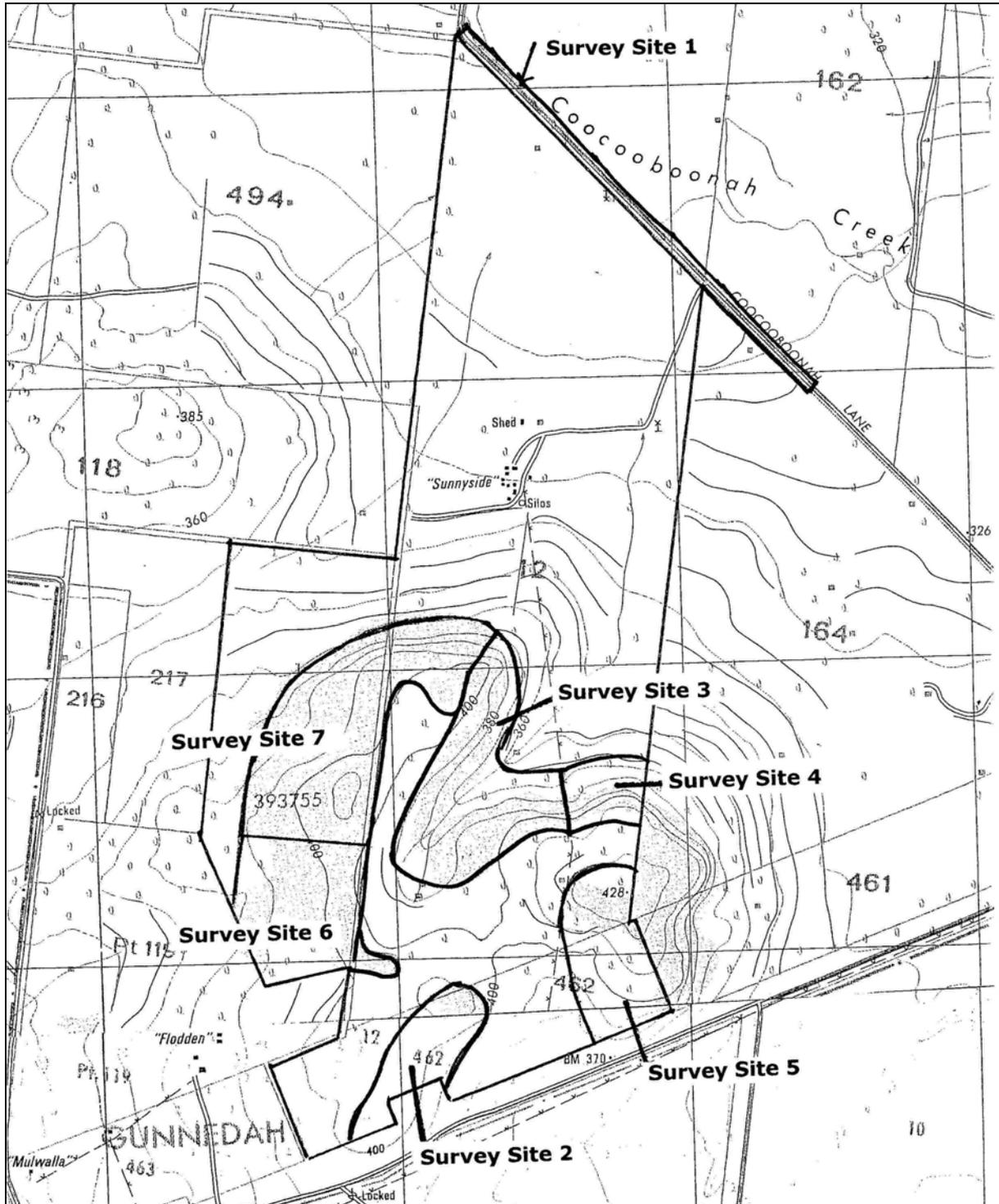


Figure 4
LOCATION OF THE HABITAT SURVEY SITES

4 SURVEY RESULTS

4.1 Description of Fauna Habitat

Most of the fauna habitat in and adjacent to the Project Site is exotic grassland, with rock outcrops and small areas of woodland on the southern part of the property. There are no wetlands in the Project Site except for a few small farm dams. The main creek passing through the Project Site is almost always completely dry.

Table 1 provides a list of the main fauna habitat types present, and notes on the key plant species (usually the trees) and other physical features. **Figure 5** shows where the various habitat types are located. The habitat descriptions following **Table 1** are based on the habitat survey sheets in **Appendix 1**. A more detailed study of the vegetation on and adjacent to the Project Site is provided in the flora report for the Project (Cunningham, 2007 – Part 8 *Specialist Consultant Studies Compendium*).

Table 1
Summary of Habitat Types

Habitat	Key Plant Species	Features	Survey Site
Exotic Grassland	<i>Hordeum</i> sp. Pasture weeds Some natives	Pasture improved, native pasture, grazing land, virtually treeless.	n/a
Hills Woodland	<i>Eucalyptus dealbata</i> <i>Eucalyptus albens</i> <i>Callitris glaucophylla</i>	Good quality woodland along the rocky escarpment; mostly small trees, native understorey, fallen logs and branches common, few tree hollows.	2, 3, 4, 5, 6, 7
Plains Woodland	<i>Eucalyptus albens</i> <i>Eucalyptus populnea</i> <i>Eucalyptus melliodora</i>	Some large trees, native shrubs, narrow remnants along road reserves, tree hollows common.	1
Rock Outcrops	<i>Alphitonia excelsa</i> <i>Notelaea microcarpa</i> <i>Geijera parviflora</i>	Rocky cliffs, overhangs, surfaces, diverse range of trees, mostly small trees.	3, 4, 7

Exotic Grassland

Most of the Project Site is covered by a mixture of exotic grassland and improved pasture. Native grasses and herbs dominate some areas, but only natives hardy enough to survive intensive grazing, species such as Three-awned Spear-grass *Aristida* sp., Burr-daisy *Calotis* sp., Blue Bell *Wahlenbergia* sp., Windmill Grass *Chloris* sp., Spear-grass *Stipa* sp. and New Holland Daisy *Vittadinia* sp.

The area of the proposed open cut is covered by a mosaic of improved pasture, exotic grassland and mixed native / exotic grassland, and occasional trees of Wilga *Geijera parviflora* and Kurrajong *Brachychiton populneus*. The area to be mined extends just into the treed area below the rocky escarpment. Here, there are numerous small pollarded trees of Whitewood *Atalaya hemiglauca*, heavily pruned during the drought to obtain stock feed. The understorey is a mixture of natives and exotics, and there are only scattered shrubs and no other trees. Around the farm house, Peppercorn *Schinus molle* and White Cedar *Melia azedarach* are the most common trees, along with various garden plants.

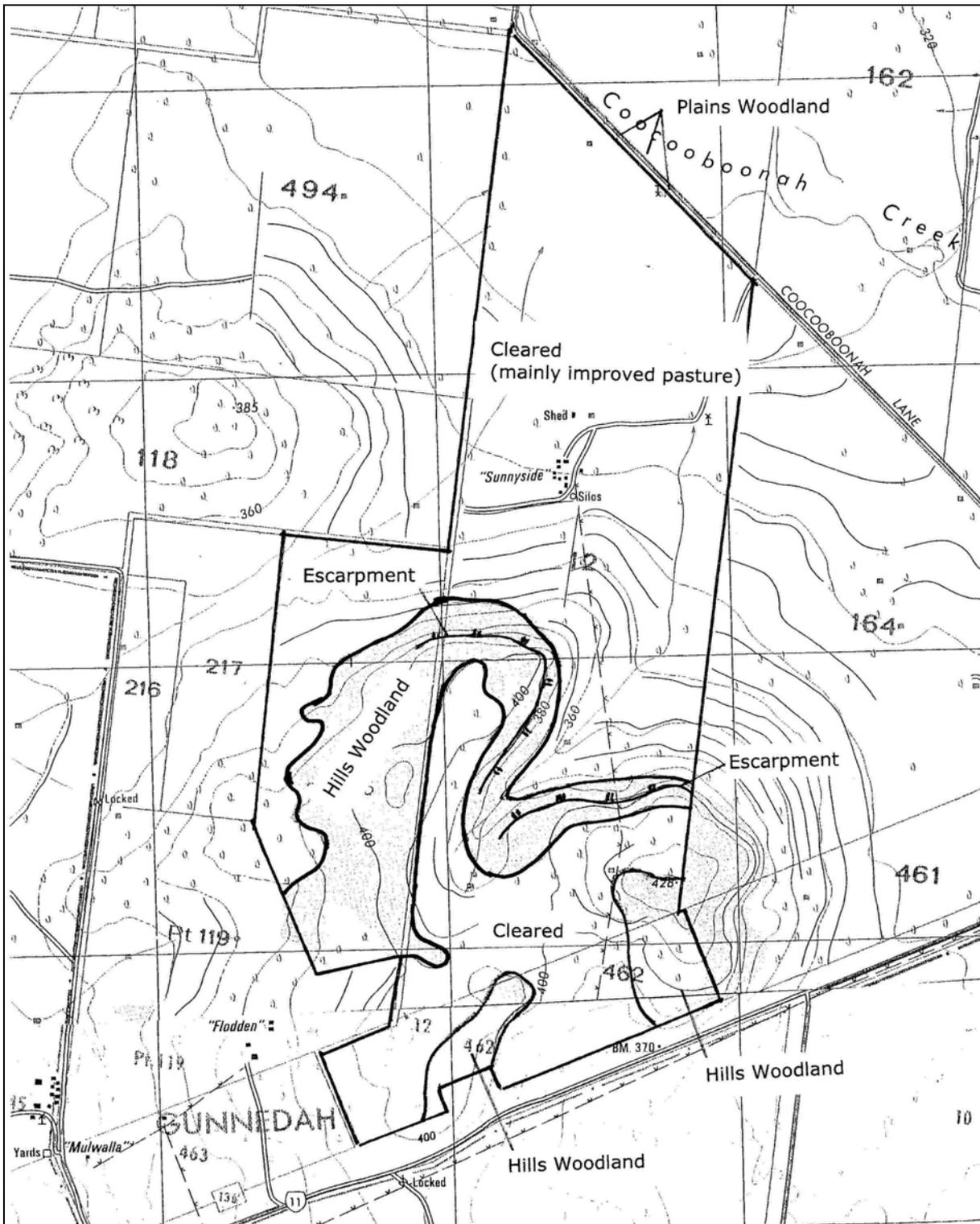


Figure 5
DISTRIBUTION OF MAIN HABITAT TYPES

The habitat value of these cleared parts of the Project Site is low. There is little to attract native animals with the food resource being scant for most species except, perhaps, for kangaroos and other macropods, and there are few shelter sites.

Hills Woodland (Tumble-down Red Gum - White Box - White Cypress)

The small rocky escarpment extending from east to west across the southern part of the "Sunnyside" property supports Hills Woodland. This woodland is dominated by White Box *Eucalyptus albens*, Tumble-down Red Gum *Eucalyptus dealbata*, Motherumbah *Acacia cheeli* and White Cypress *Callitris glaucophylla*, with occasional Red Ash *Alphitonia excelsa*, Kurrajong *Brachychiton populneus* and Weeping Pittosporum *Pittosporum phillyreoides*. Various small tree species are also present, including Wilga *Geijera parviflora*.

Most of the trees along the escarpment are small and many are multi-stemmed, which may be indicative of past clearing. Few of the trees are large and/or old enough to have developed hollows. The shrubs present include Hop Bush *Dodonaea viscosa*, Pinkwood *Beyeria viscosa*, Budda *Eremophila mitchelli*, Water Bush *Myoporum montanum* and Native Olive *Notelaea microcarpa*. The shrub layer is quite dense in some places. The ground cover is grassy, mostly rather open to sparse.

Plains Woodland (Yellow Box - White Box - Poplar Box Woodland)

Much of the Project Site would have originally been covered by Plains Woodland, but most of it was cleared many years ago. The Plains Woodland in the Project Site is now restricted to the road reserve of Coochoonah Lane, although there is also a narrow and discontinuous example along the lower section of the road reserve on the western boundary of the "Sunnyside" property.

The main tree species in this community are White Box *Eucalyptus albens*, Poplar Box *Eucalyptus populnea* and Yellow Box *Eucalyptus melliodora*, and smaller tree species such as Wilga *Geijera parviflora*, Yarran *Acacia omalophylla*, Desert Cassia *Senna zygomorpha*, Kurrajong *Brachychiton populneus* and Water Bush *Myoporum montanum*. The ground cover is grassy, containing a mix of native species and introduced herbaceous weeds. Some of the trees are large and have hollows, including a few dead trees.

Rock Outcrops (Red Ash - Native Olive - Wilga Forest)

The escarpment is characterised by large outcrops of sandstone and conglomerate rock, with many crevices and small overhangs. The habitat value of the rock outcrops is high for the native fauna of the local area, particularly for reptiles. Rock outcrops such as these provide ideal shelter sites for snakes, lizards and other reptiles.

Several Koalas were observed in the trees along the edge of the escarpment, probably trying to take advantage of any cool breeze. The prime Koala feed tree species, White Box *Eucalyptus albens*, is common along the escarpment, usually just above and/or just below the rocky area.

Some of the vegetation along the escarpment is quite distinctive because of the presence of plant species with rainforest affinities. These species include Red Ash *Alphitonia excelsa*, Native Olive *Notelaea microcarpa*, Whitewood *Atalaya hemiglauca*, Wilga *Geijera parviflora* and several species of vine.

4.2 Fauna Species Recorded

The fauna species recorded in and near the Project Site during this investigation have been listed in **Table 2**. Fauna species diversity was found to be high, with six native mammal species, fifty native birds, ten reptiles and one frog being recorded. Most of the species were recorded in the woodland on the property, which confirms the importance of remnant vegetation for native fauna. The patch of woodland in the Project Site is reasonably large and it is linked to other areas of woodland nearby, thereby increasing its habitat value.

Appendix 2 provides a list of all vertebrate fauna species previously recorded in the district, within about 20 kilometres of the Project Site; the list is based on NSW Wildlife Atlas data. The list in **Appendix 2** broadens our knowledge of the fauna of the district, as a whole.

Table 2
Fauna Species Recorded in and Near the Project Site

Page 1 of 2

Common Name	Taxonomic Name
Mammals	
Brown Hare*	<i>Lepus capensis</i>
Common Brushtail Possum	<i>Trichosurus vulpecula</i>
Common Wallaroo	<i>Macropus robustus</i>
Domestic Cattle*	<i>Bos taurus</i>
Eastern Grey Kangaroo	<i>Macropus giganteus</i>
Koala	<i>Phascolarctos cinereus</i>
Rabbit*	<i>Oryctolagus cuniculus</i>
Short-beaked Echidna	<i>Tachyglossus aculeatus</i>
Swamp Wallaby	<i>Wallabia bicolor</i>
Birds	
Australian King-Parrot	<i>Alisterus scapularis</i>
Australian Magpie	<i>Gymnorhina tibicen</i>
Australian Raven	<i>Corvus coronoides</i>
Australian Wood Duck	<i>Chenonetta jubata</i>
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>
Blue-faced Honeyeater	<i>Entomyzon cyanotis</i>
Brown Falcon	<i>Falco berigora</i>
Brown Goshawk	<i>Accipiter fasciatus</i>
Buff-rumped Thornbill	<i>Acanthiza reguloides</i>
Chestnut-rumped Thornbill	<i>Acanthiza uropygialis</i>
Cockatiel	<i>Nymphicus hollandicus</i>
Common Bronzewing	<i>Phaps chalcoptera</i>
Common Starling*	<i>Sturnus vulgaris</i>
Crested Pigeon	<i>Ocyphaps lophotes</i>
Double-barred Finch	<i>Taeniopygia bichenovii</i>
Eastern Rosella	<i>Platycercus eximius</i>
Eastern Yellow Robin	<i>Eopsaltria australis</i>
Galah	<i>Cacatua roseicapilla</i>

Table 2 (Cont'd)
Fauna Species Recorded in and Near the Project Site

Page 2 of 2

Common Name	Taxonomic Name
Birds (Cont'd)	
Golden Whistler	<i>Pachycephala pectoralis</i>
Grey Butcherbird	<i>Cracticus torquatus</i>
Grey Fantail	<i>Rhipidura fuliginosa</i>
Grey Shrike-thrush	<i>Colluricincla harmonica</i>
Grey-crowned Babbler	<i>Pomatostomus temporalis temporalis</i>
Laughing Kookaburra	<i>Dacelo novaeguineae</i>
Little Eagle	<i>Hieraaetus morphnoides</i>
Magpie-lark	<i>Grallina cyanoleuca</i>
Mistletoebird	<i>Dicaeum hirundinaceum</i>
Nankeen Kestrel	<i>Falco cenchroides</i>
Noisy Friarbird	<i>Philemon corniculatus</i>
Noisy Miner	<i>Manorina melanocephala</i>
Pacific Black Duck	<i>Anas superciliosa</i>
Pied Butcherbird	<i>Cracticus nigrogularis</i>
Pied Currawong	<i>Strepera graculina</i>
Red-rumped Parrot	<i>Psephotus haematonotus</i>
Rufous Whistler	<i>Pachycephala rufiventris</i>
Singing Honeyeater	<i>Lichenostomus virescens</i>
Speckled Warbler	<i>Chthonicola sagittata</i>
Spiny-cheeked Honeyeater	<i>Acanthagenys rufogularis</i>
Straw-necked Ibis	<i>Threskiornis spinicollis</i>
Striated Pardalote	<i>Pardalotus striatus</i>
Sulphur-crested Cockatoo	<i>Cacatua galerita</i>
Superb Fairy-wren	<i>Malurus cyaneus</i>
Tawny Frogmouth	<i>Podargus strigoides</i>
Weebill	<i>Smicrornis brevirostris</i>
Welcome Swallow	<i>Hirundo neoxena</i>
White-faced Heron	<i>Egretta novaehollandiae</i>
White-throated Gerygone	<i>Gerygone olivacea</i>
White-winged Chough	<i>Corcorax melanorhamphos</i>
Willie Wagtail	<i>Rhipidura leucophrys</i>
Yellow Thornbill	<i>Acanthiza nana</i>
Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>
Reptiles	
Carpet Python	<i>Morelia spilota variegata</i>
Eastern Bearded Dragon	<i>Pogona barbata</i>
Eastern Brown Snake	<i>Pseudonaja textilis</i>
Lace Monitor	<i>Varanus varius</i>
Robust Skink	<i>Ctenotus robustus</i>
Robust Velvet Gecko	<i>Oedura robusta</i>
Spotted Black Snake	<i>Pseudechis guttatus</i>
Thick-tailed Gecko	<i>Underwoodisaurus milii</i>
Two-clawed Worm-skink	<i>Anompalopus leuckartii</i>
Wall Lizard	<i>Cryptoblepharus virgatus</i>
Frogs	
Spotted Grass Frog	<i>Limnodynastes tasmaniensis</i>

*Introduced species.

5 FAUNA OF CONSERVATION SIGNIFICANCE

5.1 Threatened Species

5.1.1 Presence of Threatened Species

Threatened species are listed on schedules under the New South Wales *Threatened Species Conservation Act 1995* (TSC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Under the TSC Act, they are classified "endangered" (Schedule 1, Part 1), "vulnerable" (Schedule 2) or "presumed extinct" (Schedule 1, Part 4). Under the EPBC Act, they are classified "extinct", "critically endangered", "endangered", "vulnerable" or "conservation dependent".

Information on the occurrence of threatened species in New South Wales is available online from the NSW Wildlife Atlas, maintained by the Department of Environment and Conservation. The Atlas was searched for threatened species previously recorded within about 15 kilometres of the Project Site. These and a few additional species have been listed below, in **Table 3**, together with their classification under the TSC and EPBC Acts, and a summary assessment of their potential to occur in and adjacent to the Project Site. As previously discussed habitat assessment plays an important role in predicting which threatened species are likely to occur in any given area.

The threatened species recorded or expected to occur in or adjacent to the Project Site, or considered reasonably likely to occur there, have been discussed following **Table 3**. The remaining species are not likely to occur in the Project Site due to the lack of suitable habitat or because they are rare in this district.

Table 3
Threatened Fauna Species Occurring within 15km of the Project Site

Page 1 of 2

Species	TSC Act ⁺	EPBC Act ⁺	Potential to occur in the Project Site
Mammals			
Koala <i>Phascolarctos cinereus</i>	V	-	Koalas were recorded in the Project Site; see discussion below table.
Spotted-tailed Quoll <i>Dasyurus maculatus</i>	V	V	Spotted-tailed Quolls are not likely to occur here, given the general lack of records from this district.
Squirrel Glider <i>Petaurus norfolcensis</i>	V	-	Squirrel Gliders are not expected to occur in the Project Site; there is only one previous record from the local area.
Birds			
Black-chinned Honeyeater <i>Melithreptus gularis gularis</i>	V	-	The Black-chinned Honeyeater is a very rare visitor in this district. There has been only one previous record, from a site about 15 km to the south of the Project Site.

Table 3 (Cont'd)
Threatened Fauna Species Occurring within 15km of the Project Site

Page 2 of 2

Species	TSC Act ⁺	EPBC Act ⁺	Potential to occur in the Project Site
Mammals (Cont'd)			
Brown Treecreeper <i>Climacteris picumnus</i>	V	-	The Brown Treecreeper was not recorded, but could occur in the woodland on the property where there is suitable habitat.
Bush Stone-Curlew <i>Burhinus grallarius</i>	E	-	Possible; although not recorded in the local area, this district falls within the range of the Bush Stone-Curlew and there is suitable habitat in the Project Site.
Diamond Firetail <i>Stagonopleura guttata</i>	V	-	Diamond Firetails could occur in the Project Site, although there have been no local sightings. Woodland with a grassy understorey provides potential habitat.
Grey-crowned Babbler <i>Pomatostomus temporalis temporalis</i>	V	-	Grey-crowned Babblers were recorded in the Project Site; see discussion below table.
Hooded Robin <i>Melanodryas cucullata</i>	V	-	There are no local records, but the woodland in the Project Site provides potential habitat.
Masked Owl <i>Tyto novaehollandiae</i>	V	-	Possible, although there have been only a few records from the local area.
Painted Honeyeater <i>Grantiella picta</i>	V	-	Possible, but there has been only one previous sighting of this species in the local area.
Speckled Warbler <i>Chthonicola sagittata</i>	V	-	The Speckled Warbler was recorded in the Project Site; see discussion below table.
Square-tailed Kite <i>Lophoictinia isura</i>	V	-	Kites may occasionally occur on the property; there have been a few local records, including one to the west of Gunnedah.
Superb Parrot <i>Polytelis swainsonii</i>	V	V	Possible; although not recorded in the local area, this district falls within the range of this species.
Turquoise Parrot <i>Neophema pulchella</i>	V	-	Turquoise Parrots probably occur in the Project Site occasionally. The woodland provides potential habitat.
Reptiles			
Pale-headed Snake <i>Hoplocephalus bitorquatus</i>	V	-	This species could occur on the rocky escarpment, but there has been only one previous record from the local area.
Border Thick-tailed Gecko <i>Underwoodisaurus sphyrurus</i>	V	V	This gecko could occur on the escarpment; however, there have been few records from the local area.

+ V = vulnerable, E = endangered, - = not listed.

Discussion

5.1.2 Threatened Mammals recorded on or Adjacent to the Project Site

Koala *Phascolarctos cinereus*

Conservation Status: Vulnerable (TSC Act).

Distribution and Abundance: Prior to European settlement, Koalas were common in the eucalypt forests and woodlands extending from north Queensland, to New South Wales, Victoria and the south-eastern corner of South Australia. However, the species' distribution has contracted dramatically and abundance has declined. In New South Wales, a Koala survey in 1986-87 revealed that Koalas now mainly occur on the north coast, although they have a wide but highly fragmented distribution west of the Great Dividing Range and in the southern half of the state (Reed & Lunney 1990). They were found to be uncommon to rare in most locations.

Habitat: Koalas inhabit eucalypt forest and woodland, preferring stands on high nutrient soils and containing their preferred food tree species. Koalas now often live in marginal habitat because so much of their prime habitat has been cleared.

Threats: Koalas were hunted and killed for their pelts in the 19th and early 20th centuries, when several million were destroyed. Disease (chlamydiosis) is also a major cause of Koala mortality. In addition to these causes of mortality, European settlement brought profound change, with vast areas of Koala habitat being cleared to allow new land uses including agriculture, grazing, housing and mining. As a result, the population declined even further and the species' geographic range contracted markedly. Prime Koala habitat was preferentially cleared because it occurred on the best soils, so Koalas are now often forced to subsist in marginal habitat.

Koalas have probably always been adversely affected by bushfires, but in pre-European times they were less frequent and less intense, and were generally confined to the shrub and ground cover layers. The canopy was severely burnt only occasionally, allowing Koalas to survive in the treetops. Lee & Martin (1988) commented that "the catastrophic fires which accompanied European presence had a profound influence on their abundance".

The removal and fragmentation of Koala habitat is still a major threat to some populations, and intensive development in previously rural areas increase the threat of road kills and dog attacks. Phillips (1990) stated that "the impact of motor vehicles on Koalas nationwide is clearly significant although impossible to quantify. . . [and that] . . . the prevalence of Koala injuries and deaths resulting from altercations with domestic dogs is growing and, in urban areas adjoining forest habitat, individual and packs of uncontrolled dogs have a serious impact on Koala populations". The shooting and intentional killing of Koalas is only a minor problem.

The loss of treed corridors hampers the movement of Koalas from one area of habitat to another and stops recolonisation of areas devoid of Koalas, sometimes due to a catastrophic event such as a wildfire. Lee and Martin (1988) commented that "isolation and fragmentation may pose a greater threat to the survival of the Koala than chlamydiosis". Koala populations have become more isolated from one another, increasing the chance of local population crashes and extinctions.

Occurrence in the Gunnedah District: The Koalas of the Gunnedah district were studied by the National Parks and Wildlife Service and documented in their report entitled *Koalas and land use in Gunnedah Shire* (Smith 1992). The study confirmed the presence of several healthy colonies to the south and west of Gunnedah, where the population as a whole has increased dramatically since the 1970s. The absence of chlamydia or "wet bottom", the stress-related illness that can produce infertility, was an important finding of the study. However, although the population was found to be healthy and increasing in size, the author noted that "this growing number of koalas currently faces a finite and, in some localities, diminishing availability of habitat. Stress and illness brought about by overcrowding, declining food quality and quantity, increasing distances between shelter trees and mates, and physical injury from dog attacks and cars pose substantial threats to the continued good health of Gunnedah's koalas." As far as we are aware, no comprehensive studies have been undertaken in the 15 years since the NPWS study was undertaken.

Occurrence in the Project Site: Koalas were observed in the woodland on the "Sunnyside" property, in the following locations; see **Figure 6**.

Location	GPS Location	Tree Species	Survey Site
Coocooboonah Lane	56 0224808 6569640	<i>Eucalyptus albens</i>	1
Coocooboonah Lane	56 0224503 6569974	<i>Geijera parviflora</i>	1
Coocooboonah Lane	56 0225135 6569283	<i>Eucalyptus melliodora</i>	1
Coocooboonah Lane	56 0225317 6569157	<i>Eucalyptus albens</i>	1
South-western corner of "Sunnyside" Property	56 0224058 6566605	<i>Eucalyptus albens</i>	2
South-western corner of "Sunnyside" Property	56 0223876 6566397	<i>Eucalyptus dealbata</i>	2
Easement, Oxley Highway	56 0224344 6566520	<i>Eucalyptus albens</i>	-
Ridge south of farm house	56 0224373 6568048	<i>Eucalyptus albens</i>	3
Western part of woodland area	56 0223964 6568062	<i>Geijera parviflora</i>	7
Western part of woodland area	56 0223651 6567681	<i>Eucalyptus dealbata</i>	7
Western part of woodland area	56 0223893 6567846	<i>Alphitonia excelsa</i>	7
Eastern part of woodland area	56 0224568 6567516	<i>Geijera parviflora</i>	4

Figure 6 shows where Koalas were observed during this study. Koalas were seen in five tree species, namely *Eucalyptus albens*, *Eucalyptus melliodora*, *Eucalyptus dealbata*, *Geijera parviflora* and *Alphitonia excelsa*. All except Red Ash *Alphitonia excelsa* are among the ten "tree species favoured by Gunnedah Koalas" (Smith 1992), six of which occur in the Project Site.

Some of the trees in which we observed Koalas may have been used for resting rather than feeding. *Geijera parviflora* and *Alphitonia excelsa* have denser canopies than eucalypts, so the Koalas there may have been taking advantage of the shade during their daytime resting periods.

5.1.3 Threatened Woodland Birds recorded on the Project Site

Speckled Warbler *Pyrrholaemus sagittata*

Conservation Status: Vulnerable (TSC Act).

Distribution and Abundance: The Speckled Warbler's range extends from south-east Queensland, to eastern New South Wales and Victoria. The species has declined in abundance, impacted by the degradation and clearing of woodlands on the tablelands and slopes of New South Wales.

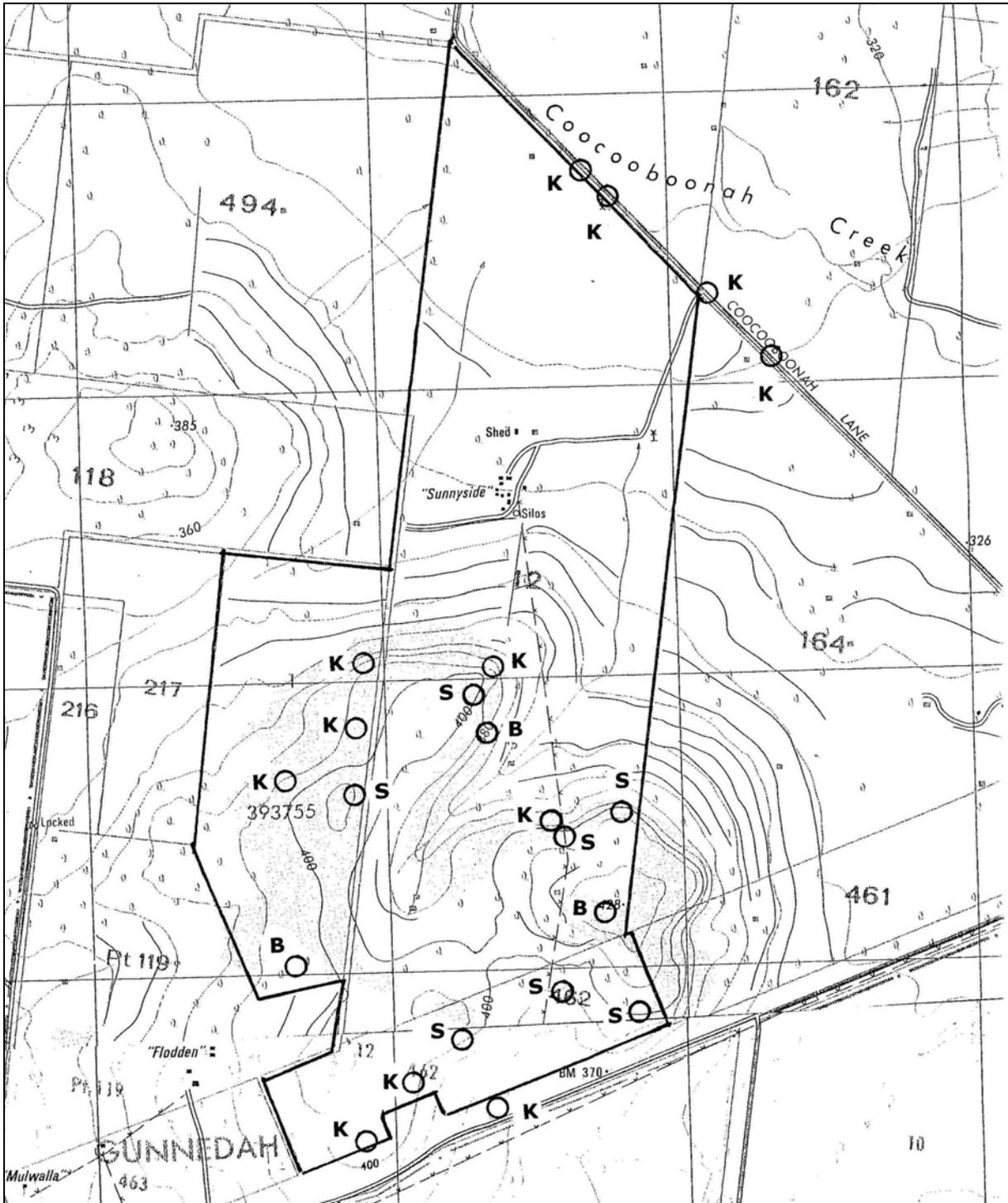


Figure 6
DISTRIBUTION OF THREATENED SPECIES OBSERVED ON THE PROJECT SITE

- K – Koala observations
- B – Grey-crowned Babbler observations
- S – Speckled Warbler observations

Habitat: The Speckled Warbler inhabits woodland and occasionally forest, usually where there is an open shrubby understorey and a grassy ground cover.

Threats: "The Speckled Warbler is threatened by clearance and fragmentation of habitat including removal of dead timber" . . . "habitat is susceptible to degradation by stock and weed invasion. Nesting on the ground also makes them vulnerable to predation from exotic mammalian predators such as foxes and cats" (NSW Scientific Committee 2001a).

Occurrence in the Gunnedah District: The Speckled Warbler has been recorded in the large areas of remnant woodland to the south-west of Gunnedah (NSW Wildlife Atlas). The species probably occurs in all sizable stands of woodland in this district.

Potential to Occur in the Project Site: The Speckled Warbler was observed in the woodland in the southern part of the Project Site; at least five pairs appear to be present. The birds were seen in the following locations; see **Figure 6**.

Location	GPS Location	No. of Birds	Survey Site
South-western corner of "Sunnyside" Property	56 0224203 6566725	1	2
Valley south of farm house	56 0224332 6567962	2	3
Far western woodland	56 0223884 6567613	1	7
South-eastern corner of "Sunnyside" Property	56 0224578 6566907	1	5
South-east corner of "Sunnyside" Property	56 0224829 6566805	1	5
Eastern edge of "Sunnyside" Property	56 0224568 6567516	1	4
Eastern edge of "Sunnyside" Property	56 0224761 6567554	1	4

Grey-crowned Babbler *Pomatostomus temporalis temporalis*

Conservation Status: Vulnerable (TSC Act).

Distribution and Abundance: Grey-crowed Babblers once occurred throughout eastern Australia, but the species is now extinct in most near-coastal locations. In New South Wales, the species "occurs on the western slopes and plains but was [sic] less common at the higher altitudes of the tablelands" (NSW Scientific Committee 2001b). The species has declined markedly in number across its range and has disappeared from many locations. The size of family groups has been reduced in many areas.

Habitat: Babblers inhabit woodland "dominated by mature eucalypts, with regenerating trees, tall shrubs, and an intact ground cover of grass and forbs" (NSW Scientific Committee 2001b).

Threats: The Babbler is threatened by the clearing and fragmentation of habitat, which is degraded "as a result of weed invasion and grazing by stock" (NSW Scientific Committee 2001b).

Occurrence in the Gunnedah District: The species has been recorded to the north and south of Gunnedah, in or near large stands of woodland (NSW Wildlife Atlas).

Potential to Occur in the Project Site: Grey-crowned Babblers were observed in the woodland in the southern part of the Project Site. There appeared to be two or possibly three groups of babblers in this woodland. Groups of birds were seen at the following locations (see **Figure 6**).

Location	GPS Location	No. of Birds	Survey Site
Valley south of farm house	56 0224336 6567807	5	3
Southwest part of "Sunnyside" Property	56 0223668 6567066	4	6
Southeast corner of "Sunnyside" Property	56 0224759 6567186	7	5

5.1.4 Threatened Woodland Birds expected on the Project Site

Brown Treecreeper *Climacteris picumnus*

Diamond Firetail *Stagonopleura guttata*

Hooded Robin *Melanodryas cucullata*

These three woodland bird species have declined as a result of the clearing of vast areas of woodland on the tablelands and slopes of New South Wales. They have been listed as vulnerable under the TSC Act. Although these birds were not recorded during this survey, all three species have been recorded in the Gunnedah district and may well occur in the woodland, immediately south of the Project Site.

Square-tailed Kite *Lophoictinia isura*

There is one record of the Square-tailed Kite near Gunnedah in the NSW Wildlife Atlas; this is between the Project Site and Gunnedah. The Kite may well occur in the woodlands around the Project Site, most likely in the warmer months. This woodland would only be a small part of the species foraging range, which is very large.

Turquoise Parrot *Neophema pulchella*

Turquoise Parrots mainly inhabit the woodlands and forests to the west of the Great Dividing Range, often occurring in valleys and river flats in hilly country. The NSW Wildlife Atlas contains several records from the area to the south-west of Gunnedah, in the vicinity of Black Jack Mountain and Black Jack State Forest where there are large areas of woodland. The Turquoise Parrot may visit the woodland immediately south of the Project Site from time to time.

5.1.5 Reptiles that could occur on the Project Site

Pale-headed Snake *Hoplocephalus bitorquatus*

The Pale-headed Snake, which is primarily a tree-dwelling species, has a patchy distribution in north-eastern New South Wales. In inland areas, it occurs in dry eucalypt forest, eucalypt woodland and cypress woodland, preferably in riparian areas. The NSW Wildlife Atlas contains only one record; from the Black Jack Mountain area to the south-west of Gunnedah. Because the species is so rare in this district and there are no riparian areas in the Project Site, the Pale-headed Snake is not expected to occur there, however, its possible presence in the woodland immediately south of the Project Site cannot be entirely discounted.

Border Thick-tailed Gecko *Underwoodisaurus sphyrurus*

This small gecko occurs on the tablelands and slopes of northern New South Wales and southern Queensland with its southern limit in the Tamworth region. This gecko inhabits rocky hills with dry forest and woodland, particularly where there are boulders, rock surfaces and fallen timber and leaf litter. This habitat occurs in the southern part of the Project Site, where the species may well occur. There is one regional record in the NSW Wildlife Atlas for the Black Jack Mountain area to the south-west of Gunnedah. A close relative of this species, the Thick-tailed Gecko *Underwoodisaurus milii*, was found in rocky areas in several places in the Project Site.

5.2 Migratory Species

In addition to threatened species, the EPBC Act allows for the listing of internationally protected migratory species, i.e. species listed under the Japan - Australia Migratory Bird Agreement (JAMBA), the China - Australia Migratory Bird Agreement (CAMBA) and the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention). Some of the species are not "migratory" in the strict sense of the word.

Numerous species recorded in or adjacent to the Project Site are internationally protected migratory species listed under the EPBC Act. These include diurnal birds of prey, such as the Nankeen Kestrel and Brown Falcon, and native ducks such as the Australian Wood Duck and Pacific Black Duck. Many common and widespread Australian bird species have been listed as internationally protected migratory species under the EPBC Act, so other listed species would no doubt occur in and around the Project Site from time to time.

5.3 Endangered Populations

Endangered populations in New South Wales are listed under the TSC Act (Schedule 1, Part 2). There are no provisions under the EPBC Act for the listing of endangered populations. No endangered populations have been declared in or near the Project Site or in the Gunnedah area.

5.4 Fisheries Management Act 1994

The *Fisheries Management Act 1994* contains threatened species provisions that are integrated into the *Environmental Planning & Assessment Act 1979*. These provisions relate to 'fish', used in a broad sense to refer to fin fish as well as invertebrates, and marine plants. In a similar way to the *Threatened Species Conservation Act 1995*, the *Fisheries Management Act* lists endangered species, endangered populations, endangered ecological communities and vulnerable species. These are listed on Schedules 4 to 6 of the Act.

The Sunnyside Coal Project is located on land where there are no watercourses, swamps or natural water bodies of any kind. The only wetlands on the property are several small farm dams. It is therefore concluded that none of the listed species, populations or communities would occur on the Project Site.

5.5 Other Fauna Values

Local Habitat

The remnant woodland immediately south of the Project Site is a valuable area of local habitat, especially if it is considered in a broader context, for so much of the Gunnedah landscape has been cleared. The habitat is of particularly good quality, as suggested by the diversity of fauna species recorded during the survey, and it has attributes that attract threatened fauna.

Habitat Corridors

Corridors of habitat promote the movement and interaction (physical and genetic) of fauna across the landscape. Some fauna species do not cross broad areas of cleared land. These species require continuous corridors of habitat to survive in a rural landscape, or at least strategically located "stepping stones" of habitat.

The woodland immediately south of the Project Site is on hilly terrain between the Namoi River plains in the east and the Collygra Creek lowlands in the west, where numerous woodland remnants exist. Some of these remnants, such as Wondoba State Forest, are very large compared to the woodland south of the Project Site. The woodland remnants are often linked by roadside remnants or scattered smaller remnants that form important "stepping stones" between the larger remnants.

6 IMPACT OF THE PROPOSED DEVELOPMENT

6.1 Impact on Vegetation and Habitat

The proposed Sunnyside Coal Mine would result in the complete removal of the habitats over an area of up to 100 hectares within the Project Site. These habitats are almost entirely composed of treeless exotic grassland and sown grassland. The higher parts of the Project Site support native groundcover species, that in some places are quite abundant. As noted above, there are a few scattered native trees in the area and a stand of Whitewood *Atalaya hemiglauca* on the highest part of the proposed mine area. Therefore, a small number of native trees would be removed, in addition to the exotic plantings around the farm house.

6.2 Impact on Threatened Species, Populations and Communities

6.2.1 Threatened Species Conservation Act 1995

The New South Wales *Environmental Planning and Assessment Act 1979*, as amended by the *Threatened Species Conservation Act 1995* and *Threatened Species Conservation Amendment Act 2002*, requires that various factors be taken into account in deciding whether a proposed action, development or activity is likely to have a significant effect on threatened species, populations or communities, or their habitats.

Assessment of Significance

Several threatened species have been recorded in the vicinity of the Project Site or are expected to occur there from time to time. The factors have been addressed below, to assist in determining whether the proposed coal mine is likely to have a significant effect on these species.

(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction

Response to (a):

Koala

The area around the Project Site supports a viable population of the Koala. The habitat of the site utilised by the Koalas, the woodland, would be retained and new woodland areas would be planted. There is potential for impacting on this species through various activities associated with the proposed coal mine, particularly road killed animals. A Koala Plan of Management has been prepared as a companion document to this report. The Plan addresses the management of the Koala and its habitat in the area, with particular consideration being given to local threats to the Koala population. The implementation of the measures outlined in the POM would ensure that the local population of the Koala would not be placed at risk of extinction.

Woodland Birds

Two woodland birds were observed adjacent to the Project Site and three other species may well occur there. The woodland habitat of these birds would not be impacted by the proposed activities. This woodland would in fact be expanded through a planting program. Under these circumstances, the development proposal is not likely to place any of these woodland birds in risk of extinction.

Other Species

Several other threatened species are discussed in Section 5 of this report as potentially occurring in the woodland and escarpment areas on and adjacent to the Project Site. As these areas are being retained, the development proposal is not likely to place these species at risk of extinction.

(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction

Response to (b):

The proposed coal mine is not likely to have an adverse effect on the life cycle of any species that constitutes an endangered population. No endangered populations have been declared on, or adjacent to, the Project Site or in the Gunnedah district.

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its occurrence is likely to be placed at risk of extinction

Response to (c)(i) and (ii):

No fauna endangered ecological communities or critically endangered ecological communities occur in the Project Site or in the Gunnedah district.

(d) in relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality

Response to (d)(i), (ii) and (iii):

The known and potential habitat of the threatened species discussed here would be retained and indeed expanded as part of the Project. Under these circumstances, the habitat of the species would not be removed, modified or fragmented.

(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly)

Critical habitat refers only to those areas of land listed in the Registers of Critical Habitat. No critical habitat has been declared on the Project Site or in the Gunnedah district.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan

Recovery Plans

A Draft Koala Recovery Plan has been compiled but has not been finalised (NPWS 2003). The draft plan identifies several management issues relating to the recovery of the Koala. The proposed coal mine does not involve habitat removal, but may include other potential impacts on Koalas. All relevant issues are dealt with in the companion document titled *Draft Koala Plan of Management*.

Threat Abatement Plans

No relevant Threat Abatement Plans have been prepared; only two such plans have been finalised, namely Predation by the Plague Minnow and Predation by the Red Fox.

(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

To date, the NSW Scientific Committee has listed 30 key threatening processes, while seven such processes are listed under the *Fisheries Management Act 1994*. The applicability of these processes to the development of the proposed coal mine has been summarised below.

Key Threatening Process	Applicable; Yes/No
Alteration of habitat following subsidence due to longwall mining	no
Alteration to the natural flow regimes of rivers, etc.	no
Anthropogenic Climate Change	yes
Bushrock removal	no
Clearing of native vegetation	yes
Competition and grazing by feral European Rabbit	no
Competition and habitat degradation by Feral Goats	no
Competition from Feral Honey Bees	no
Death or injury to marine species following capture in shark control programs	no
Entanglement in or ingestion of anthropogenic debris in marine and estuarine environments	no
Herbivory and environmental degradation caused by feral deer	no
High frequency fire resulting in the disruption of life cycle processes	no
Impact of Feral Pigs	no
Importation of Red Imported Fire Ants	no
Infection by Psittacine Circoviral Disease in Parrots	no
Infection of frogs by amphibian chytrid	no
Infection of native plants by <i>Phytophthora cinnamomi</i>	no
Introduction of the Large Earth Bumblebee	no
Invasion and establishment of exotic vines and scramblers	no
Invasion and establishment of the Cane Toad <i>Bufo marinus</i>	no
Invasion, establishment and spread of <i>Lantana camara</i>	no
Invasion of native plant communities by <i>Chrysanthemoides monilifera</i>	no
Invasion of native plant communities by exotic perennial grasses	no
Invasion of the Yellow Crazy Ant, <i>Anoplolepis gracilipes</i>	no
Loss and/or degradation of sites used for hill-topping by butterflies	no
Predation by <i>Gambusia holbrooki</i>	no
Predation by the European Red Fox	no
Predation by the Feral Cat	no
Predation from the Ship Rat on Lord Howe Island	no
Removal of dead wood and dead trees	no
<u>FM Act</u>	
Current shark meshing program	no
Hook and line fishing in areas with threatened fish	no
Introduction of fish to fresh waters	no
The removal of large woody debris	no
The degradation of native riparian vegetation	no
Instream structures altering natural river flow regimes	no
Introduction of fish and vegetation to coastal waters	no

Virtually all human activities contribute in some way to anthropogenic climate change. Some clearing of native vegetation would occur, principally understory species growing in the paddocks. Natural vegetation communities, e.g. woodland, would not be impacted upon.

Conclusion, TSC Act

The development of the proposed Sunnyside Coal Mine is not likely to have a significant effect on any threatened fauna species, populations or communities listed under the *Threatened Species Conservation Act 1995*, or their habitats.

6.2.2 Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* specifies that approval is required from the Commonwealth Minister for the Environment and Heritage for actions that have, would have or are likely to have, a significant impact on a matter of "national environmental significance".

Matters of national environmental significance are: listed threatened species and communities, migratory species protected under international agreements, RAMSAR wetlands of international importance, the Commonwealth marine environment, World Heritage properties, National Heritage places, and nuclear actions.

The Department of Environment and Heritage (2005) has published guidelines to assist in determining whether an action would have or is likely to have a significant impact on a matter of national environmental significance and, hence, whether a referral would be submitted to the Department for a decision by the Minister on whether assessment and approval is required under the EPBC Act.

The *Guidelines* state that, to make a decision as to whether or not to refer an action to the Minister, one should consider the following questions.

1. Are there matters of national environmental significance located in the area of the proposed action?
2. Considering the proposed action at its broadest scope, is there potential for impacts on matters of national environmental significance?
3. Are there any proposed measures to avoid or reduce impacts on matters of national environmental significance?
4. Are any impacts of the proposed action on matters of national environmental significance likely to be *significant* impacts?

The Guidelines provide the following important definitions.

"A *significant impact* is an impact which is important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts. You should consider all of these factors when determining whether an action is likely to have a significant impact on matters of national environmental significance."

"To be *likely*, it is not necessary for a significant impact to have a greater than 50% chance of happening, it is sufficient if a significant impact on a matter of national environmental significance is a real or not remote chance or possibility."

"*Population*, in relation to critically endangered, endangered or vulnerable, threatened species, means:

- a geographically distinct regional population, or collection of local populations; or
- a regional population, or collection of local populations occurring within a particular bioregion."

"An *important population* is a population that is necessary for a species' long-term survival and recovery. This may include populations that are:

- key source populations either for breeding or dispersal,
- populations that are necessary for maintaining genetic diversity, and/or
- populations that are near the limit of the species' range.

"*Habitat critical to the survival of a species* refers to:

- habitat identified in a recovery plan for the species as habitat critical for those species or communities; and/or
- habitat listed on the Register of Critical Habitat maintained by the Minister under the Act; and/or
- areas that are necessary:
 - for activities such as foraging, breeding, roosting, or dispersal,
 - for succession,
 - to maintain genetic diversity and long term evolutionary development, or
 - for the reintroduction of populations or recovery of the species."

Assessment of Significance

Of the listed threatened species in Table 3 three species are listed as vulnerable under the *EPBC Act*; these are Spotted-tail Quoll, Superb Parrot and Border Thick-tailed Gecko. The potential for the proposed coal mine to have a significant impact on these threatened species has been assessed below, by applying the relevant "significant impact criteria". The *Guidelines* contain "significant impact criteria" for each matter of national environmental significance and assist with the interpretation of the criteria.

Significant Impact Criteria for Vulnerable Species:

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it would:

- lead to a long-term decrease in the size of an *important population* of a species, or
- reduce the area of occupancy of an *important population*, or
- fragment an existing *important population* into two or more populations, or
- adversely affect habitat critical to the survival of a species, or
- disrupt the breeding cycle of an *important population*, or
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, or
- result in invasive species that are harmful a vulnerable species becoming established in the vulnerable species' habitat, or
- interferes substantially with the recovery of the species.

Impact of the Project on Vulnerable Species

The development of the coal mine is not likely to have any of the above impacts on the three vulnerable species listed in Table 3. The potential habitat for each of these species would be maintained and enhanced as part of the Project.

Significant Impact Criteria for Listed Migratory Species:

An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it would:

- substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of *important habitat* of the migratory species, or
- result in invasive species that are harmful to the migratory species becoming established in an area of *important habitat* of the migratory species, or
- seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an *ecologically significant proportion* of the population of the species.

The Guidelines provide the following definitions relating to these criteria for listed migratory species:

"An area of *important habitat* is:

- habitat utilised by a migratory species occasionally or periodically within a region that supports an *ecologically significant proportion* of the population of the species, or
- habitat utilised by a migratory species which is at the limit of the species' range, or
- habitat within an area where the species is declining."

"Listed migratory species cover a broad range of species with different life cycles and population sizes. Therefore, what is an *ecologically significant proportion* of the population varies with the species (each circumstance will need to be evaluated)."

"*Population*, in relation to migratory species, means the entire population of the species."

Impact of the Project on listed migratory species

The development of the coal mine would not have a significant impact on listed migratory species; no such species maintain an ecologically significant proportion of their population on the Project Site nor is the Project Site an important habitat for these species. Only small numbers of listed species inhabit the area from time to time; none are likely to have permanent populations there.

Conclusion, EPBC Act

The development of the proposed Sunnyside Coal Mine is not likely to have a significant impact on any matter of national environmental significance listed under the *Environment Protection and Biodiversity Conservation Act 1999*. Referral to the Commonwealth Minister for the Environment for assessment and approval is therefore not warranted.

6.3 SEPP No. 44 - Koala Habitat Protection

Gunnedah is one of the local government areas listed on Schedule 1 of *State Environmental Planning Policy No. 44 - Koala Habitat Protection* (SEPP 44) (New South Wales 1995). SEPP 44 encourages the conservation and management of natural vegetation that provides habitat for Koalas, to ensure a permanent free-living population over the species' present range and to reverse the current trend of Koala population decline; see **Appendix 3**.

SEPP 44 helps to identify "potential Koala habitat", namely "areas of native vegetation where the trees of the types listed in Schedule 2 [SEPP 44 – Feed Tree Species] constitute at least 15% of the total number of trees in the upper or lower strata of the tree component". If no Schedule 2 tree species are present or if they constitute less than 15% of the total number of trees present, then no further provisions of the Policy apply.

If more than 15% of the trees in the area are Schedule 2 tree species, then an assessment must be made by a qualified person to determine whether the area contains "core Koala habitat", a term applied to "an area of land with a resident population of Koalas, evidenced by attributes such as breeding females (that is, females with young) and recent sightings of and historical records of a population".

Three Schedule 2 Koala feed trees occur in the Gunnedah area, namely River Red Gum *Eucalyptus camaldulensis*, White Box *Eucalyptus albens* and Poplar Box *Eucalyptus populnea*. The Project Site and the surrounding land were investigated to determine if these tree species were present and in what numbers they occur. Two Schedule 2 Koala feed trees occur on or adjacent to the Project Site. White Box *E. albens* is very common in most of the stands of woodland immediately south of the Project Site, while Poplar Box *E. populnea* and White Box *E. albens* are common along Coochoonah Lane. Part of the Project Site and areas immediately adjacent to it is therefore "potential Koala habitat".

Several observations of Koalas were made within the Project Site, as set out in Section 5.1. These observations, the long history of Koalas in this area and the observation of past breeding nearby, lead to the conclusion that there is a resident population of Koalas in and adjacent to the Project Site and that the woodland in the area is "core Koala habitat". Clause 9 of SEPP No. 44 requires that a Koala Management Plan must be prepared if development is proposed in "core Koala habitat". A Koala Management Plan would therefore be required for this development. The requirements of such a Plan are set out in Part 3 of the Policy; see **Appendix 3**.

7 IMPACT MITIGATION

In considering the implications for fauna of this project, we have assessed avoiding, minimising and compensating for the impact of the coal mine on native fauna and fauna habitat. We have also discussed below management needs for the known threatened species on the Project Site.

Management of Threatened Species

- (i) A Koala Plan of Management as provided for under *SEPP No. 44 - Koala Habitat Protection* has been prepared as a separate document to this fauna report. The Plan particularly considers the following key requirements for locally managing the Koala population:
 - maintaining Koala feed trees on and adjacent to the Project Site;
 - improving the habitat for Koalas on and adjacent to the Project Site, particularly habitat corridors;
 - addressing the potential for Koalas roadkills.

This is a draft document and would be submitted to the Director-General of the Department of Environment and Climate Change (DECC) for approval.
- (ii) The threatened woodland birds present and likely to be present on the property would be protected and their habitat enhanced by the measures outlined in the Koala Plan of Management. That Plan promotes the protection of all stands of woodland, and planting proposals to link these stands.

Recommendations for Habitat Protection

The following recommendations are made to avoid, minimise and compensate for the impact of the coal mine of native fauna and fauna habitat.

- (i) The major areas of woodland immediately south of the Project Site would be completely protected. These areas would be delineated and their protection measures discussed in the Vegetation Management Plan and Koala Plan of Management,
- (ii) The remnant woodland along Coochooboonah Lane is of importance as habitat for the Koala and as an important local movement corridor for this species and other native animals. Clearing of this vegetation should be avoided. This includes trees (dead or alive), understorey plants and timber debris on the ground. The RTA has requested a modified intersection where the mine access road joins Coochooboonah Lane to enable the mine vehicles to give way to local traffic on Coochooboonah Lane. This would require the removal of approximately three trees within the Coochooboonah Lane reserve at the intersection.
- (iii) Immediately prior to their removal, the three trees will be inspected by a qualified fauna expert. The expert will ensure any Koala has moved out of the tree before the trees are removed. This is likely to be the next day.
- (iv) The removed trees should be cut into sections and relocated within the remaining vegetation along Coochooboonah Lane. This treatment will provide shelter habitat for ground animals. As part of their inspection, the fauna expert should recommend methods to relocate suitable tree hollows to nearby retained trees, should they be present.
- (v) The three mature trees will be removed from the edge of an existing break in the remnant vegetation along Coochooboonah Lane and their removal is not likely to seriously interrupt the use of the corridor by Koalas or other fauna. The proposal to establish nine hectares of new Koala habitat, 9.8 hectares of enriched Koala habitat and the management of 112 hectares of existing native vegetation as Koala habitat will more than offset the removal of three mature trees. These management activities will improve biodiversity outcomes following completion of the Project.

- (vi) The treed corridor along the inside of the western boundary of the Project Site forms another important, albeit interrupted, habitat corridor. There would be no clearing of this corridor.
- (vii) Regeneration of treed habitat in the above two areas would improve habitat corridor function in both areas. Plantings of local trees in gaps in the existing trees would strengthen these corridors and act as screening for the proposed coal mine. Plantings around the western edge of the proposed open cut would extend the corridor southwards to provide a link to the existing woodland.
- (viii) Because the Project Site contains core Koala habitat and a resident population of Koalas, a Koala Plan of Management, as provided for under *SEPP No. 44 - Koala Habitat Protection*, is required to be submitted to the Department of Environment and Conservation for their consideration.
- (ix) In conjunction with the Koala Plan of Management, a Vegetation Management Plan would be prepared. Such a plan would consider:
 - protecting the existing woodland;
 - methods for a planting program, including species selection and distribution;
 - control of noxious and invasive weeds;
 - an appropriate maintenance regime for the plantings; and
 - a strategy for monitoring/reporting.

8 CONCLUSION

The report provides the results of a field survey on the proposed site of the Sunnyside Coal Project, and an investigation of existing information on the fauna of the district.

The fauna habitats present on and around the Project Site are described. The field survey identified 71 vertebrate species on and around the Project Site; numerous other species recorded in the district are also expected to occur there. Three of the species recorded are listed as threatened under the *Threatened Species Conservation Act 1995*; several other species are expected to occur there.

The development of the proposed coal mine at *Sunnyside* is not likely to have a significant effect on any threatened fauna species, populations or communities listed under the *Threatened Species Conservation Act 1995*, or their habitats; the preparation of a Species Impact Statement is therefore not warranted.

The development of the proposed Sunnyside Coal Mine is not likely to have a significant impact on any matter of national environmental significance listed under the *Environment Protection and Biodiversity Conservation Act 1999*. Referral to the Commonwealth Minister for the Environment for assessment and approval is therefore not warranted.

Recommendations have been made in Section 7 of the report to avoid and minimise the impact of the coal mine on native fauna and their habitat. The key recommendations are the protection and management of the stands of woodland in the area, along with increasing their area and connectivity.

9 REFERENCES

- Christidis, L. & Boles, W. (1994). *The Taxonomy and Species of Birds of Australia and its Territories*. Royal Australasian Ornithologists Union, Victoria.
- Churchill, S. (1998). *Australian Bats*. Reed New Holland, Sydney, 230p.
- Cogger, H. (1992). *Reptiles and Amphibians of Australia*. Reed, Sydney, revised ed., 775p.
- Commonwealth of Australia (1999). *Environment Protection and Biodiversity Conservation Act 1999*. Commonwealth Government, Canberra.
- Department of Environment and Heritage (2005). *EPBC Act – Principal Significant Impact, Guidelines 1.1*. The Department, Canberra.
- Harden, G. (ed.) (1992-2002). *Flora of New South Wales. Volumes 1 - 4*. Royal Botanic Gardens/University of NSW Press, Sydney. incl. revised editions.
- Lee, A. & Martin, R. (1988). *The Koala. A Natural History*. Australian Natural History Series. NSW University Press, Sydney.
- Morgan, G. & Terry, J. (1992). *Nature Conservation in Western New South Wales*. National Parks Association of NSW Inc., Sydney, 138 pages plus appendices.
- National Parks & Wildlife Service (NPWS) (2003). *Draft Recovery Plan for Koala*. The Service, Hurstville, February.
- National Parks & Wildlife Service (NPWS). NSW Wildlife Atlas. Computer database of species records, various contributors, periodically updated.
- New South Wales (1979). *Environmental Planning & Assessment Act 1979*. NSW Government, Sydney.
- New South Wales (1994). *Fisheries Management Act 1994*. NSW Government, Sydney.
- New South Wales (1995). *Threatened Species Conservation Act 1995*. NSW Government, Sydney.
- New South Wales (2002). *Threatened Species Conservation Amendment Act 2002*. NSW Government, Sydney.
- New South Wales (1995). *State Environmental Planning Policy No. 44 - Koala Habitat Protection*. NSW Government, Sydney.
- New South Wales Scientific Committee (2001a). Final Determination – Speckled Warbler *Pyrrholaemus sagittata* (Latham 1802), vulnerable species listing.
- New South Wales Scientific Committee (2001b). Final Determination – Grey-crowned Babbler (eastern subspecies) – vulnerable species listing.

Strahan, R. (1995). *The Mammals of Australia*. Australian Museum/Reed Books, Sydney, 756p.

Phillips, B. (1990). *Koalas. The Little Australians we'd all hate to lose*. Australian National Parks and Wildlife Service, AGPS, Canberra.

Reed, P. & Lunney, D. (1990). Habitat Loss: the Key Problem for the Long-term Survival of Koalas in New South Wales, in Lunney, D., Urquhart, C. & Reed, P. (1988) (eds.) *Koala Summit*. Proceedings of the Koala Summit held at the University of Sydney, 7-8 November 1988, pp.9-31.

Smith, M. (1992). *Koalas and Land Use in Gunnedah Shire*. NPWS, Sydney.

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APPENDICES

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| Appendix 2 | List of Fauna Species for the Region |
| Appendix 3 | SEPP No. 44 – Koala Habitat Protection |
| Appendix 4 | Photographs |

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Appendix 1

Habitat Survey Sites

(No. of pages excluding this page = 7)

Habitat Survey Sheet

Project: Sunnyside Coal Project, Whitehaven Coal Site No.: SY01
Broad Habitat Type: Remnant natural woodland.
Location: Road reserve along Coocooboona Lane. Date: 11 September 2006
GPS: 56 0225317 6569157 Land Tenure: Crown road. 03.15 to 05.15 pm.
Soil Type: Deep sandy soil.
Altitude: 320 m. Slope: Level. Aspect: North. Topography: Broad plain.
Vegetation:
Woodland of *E. populnea*, *E. albens*, *E. melliodora*, with *Callitris glaucophylla*,
Acacia homalophylla and *Geijera parviflora*.
Shrubs common, including *Myoporum montanum*, *Senna zygophylla*.
Native grassland to weedy understorey.
Habitat Attributes:
Some large trees with hollows.
Special Habitat Attributes:
Koala food trees present - *E. populnea* and *E. albens*.
Potential for Threatened Fauna Species:
Observed:
Koala (4): 56 0224808 6569640 (in *E. albens*); 56 0224503 6569974 (in *Geijera parviflora*);
56 0225135 6569283 (in *E. melliodora*); 56 0225317 6569157 (in *E. albens*).

Species Recorded:

Mammals

Eastern Grey Kangaroo (roadkill)
Koala (4 observed, on two visits)
Rabbit* (observed, burrows)

Birds

Australian Magpie (4; nest)
Brown Falcon (1)
Brown Goshawk (1)
Cockatiel (2)
Common Starling* (2)
Crested Pigeon (1)
Eastern Rosella (4)
Galah (6)
Nankeen Kestrel (2)
Noisy Miner (5)
Pied Butcherbird (3)
Red-rumped Parrot (10)
Tawny Frogmouth (1)

Reptiles

Eastern Bearded Dragon (2)

Habitat Survey Sheet

Project: Sunnyside Coal Project, Whitehaven Coal

Site No.: SY02

Broad Habitat Type: Hills Woodland

Location: Southwest corner of Project Site.

Date: 12 September 2006

GPS: 56 0224058 6566605

Land Tenure: Private.

6.15 to 8.15 am.

Soil Type: Sandy and rocky.

Altitude: 405 m

Slope: Gentle

Aspect: East

Topography: Low ridge.

Vegetation:

Mainly *Eucalyptus dealbata* woodland on rocky ground of ridge; with *Callitris glaucophylla*, *Alphitonia excelsa*, *Geijera parviflora*, *Dodonaea viscosa*, *Myoporum montanum*, *Notelaea microcarpa*, *Acacia cheeli*.

Understorey grassy to shrubby. *Eucalyptus aldens* on lower section.

Probably mainly cleared in the past.

Habitat Attributes:

Woodland with dense patches of regrowth *Callitris glaucophylla*, scattered rocks, occasional larger outcrops. Very few tree hollows. Mistletoes common. Dam in south-western corner of site.

Special Habitat Attributes:

Contains some good quality woodland. Diverse range of native plants present. *Eucalyptus aldens* is a prime Koala food tree.

Potential for Threatened Fauna Species:

Observed: Koalas (2): 56 0224058 6566605 (in *E. albens*); 56 0223875 6566397 (in *E. dealbata*).

Speckled Warbler (1): 56 0224203 6566725.

Potential for other woodland birds to occur.

Another Koala nearby in the highway reserve: 56 0224344 6566520 (in *E. albens*).

Species Recorded:

Mammals

Koala (2 obs.)

Rabbit * (dung)

Mistletoebird (2)

Nankeen Kestrel (1)

Birds Noisy Minor (5)

Australian Magpie (1)

Australian Raven (1)

Australian Wood Duck (2)

Blue-faced honeyeater (1)

Buff-rumped thornbill (3)

Chestnut-rumped Thornbill (1)

Common Bronzewing (1)

Common Starling* (2)

Crested Pigeon (7)

Eastern Rosella (2)

Eastern Yellow Robin (1)

Galah (2)

Grey Butcherbird (1)

Grey Fantail (3)

Magpie-lark (1)

Pacific Black Duck (2)

Pied Butcherbird (2)

Pied Currawong (1)

Red-rumped Parrot (1)

Rufous Whistler (2)

Speckled Warbler (1)

Spiny-cheeked Honeyeater (2)

Striated Pardalote (1)

Sulphur-crested Cockatoo (1)

Superb Fairy-wren (3)

Weebill (3)

Welcome Swallow (2)

White-tinged Chough (1)

Yellow Thornbill (3)

Yellow-rumped Thornbill (3)

Habitat Survey Sheet

Project: Sunnyside Coal project, Whitehaven Coal	Site No.: SY03
Broad Habitat Types: Woodland and large rock outcrops/small escarpment.	
Location: Central valley, southeast of farmhouse.	Date: 12 September 2006
GPS: 45 022436 6567807	Land Tenure: private.
Soil Type: Sandy and rocky; extensive rocky outcrops.	11.30 am to 2.30 pm.
Altitude: 380 m Slope: Gentle to steep. Aspect: North-northeast. Topography: Small valley.	
Vegetation:	
Woodland. Mostly <i>Eucalyptus dealbata</i> and <i>Eucalyptus albens</i> .	
Small trees and shrubs abundant: <i>Myporoum montanum</i> , <i>Eremophila mitchellii</i> , <i>Beyeria viscosa</i> , <i>Notelaea microcarpa</i> , <i>Alphitonia excelsa</i> , <i>Geijera parviflora</i> , <i>Dodonaea viscosa</i> . Understorey grassy to shrubby (sometimes dense). Good quality woodland in most places.	
Habitat Attributes:	
Good quality woodland, large rock outcrops and small escarpments, with many crevices and some small overhangs. Dry sunny slopes. Mistletoes moderately common. Mostly small trees with few hollows. Dry watercourse in head of valley.	
Special Habitat Attributes:	
Extensive rock outcrops. Good quality woodland.	
Potential for Threatened Fauna Species:	
Observed: Koala (1): 56 0224373 6568048 (in <i>E. albens</i>).	
Speckled Warbler (2): 56 0224332 6567962.	
Grey-crowned Babbler (5): 56 0224336 6567807	
Potential for other threatened woodland birds to be present.	
Species Recorded:	
Mammals	
Common Brushtail Possum (dung)	
Eastern Grey Kangaroo (dung)	
Koala (1)	
Rabbit * (dung)	
Short-beaked Echidna (diggings)	
Swamp Wallaby (1)	
Birds	
Australian Magpie (3)	White-throated Gerygone (1)
Australian Raven (1, nest)	White-winged Chough (4)
Black-faced Cuckoo-shrike (1)	Willie Wagtail (3)
Brown Goshawk (1)	Yellow-rumped Thornbill (4)
Chestnut-rumped Thornbill (1)	Reptiles:
Crested Pigeon (10)	Thick-tailed Gecko (1)
Double-barred Finch (3)	Wall Lizard (1)
Eastern Rosella (2)	
Galah (4)	
Golden Whistler (1)	
Grey Fantail (2)	
Grey-crowned Babbler (5)	
Noisy Miner (6)	
Pied Butcherbird (1)	
Pied Currawong (1)	
Red-rumped Parrot (3)	
Rufous Whistler (1)	
Speckled Warbler (2)	
Striated Pardalote (3)	
Superb Fairy-wren (1)	

Habitat Survey Sheet

Project: Sunnyside Coal Project, Whitehaven Coal	Site No.: SY04
Broad Habitat Type: Woodland and large rock outcrops/small escarpment.	
Location: Ridge most eastern side of Project Site.	Date: 13 September 2006
GPS: 56 0224761 6567554	Land Tenure: Private.
	07.00 to 08.00 am.
Soil Type: Sandy and rocky; extensive rock outcrops.	
Altitude: 400 m Slope: Mostly steep. Aspect: North. Topography: Escarpment.	
Vegetation:	
Mainly rock outcrop community around small escarpment. <i>Eucalyptus albens</i> , <i>Alphitonia excelsa</i> , <i>Notelaea microcarpa</i> , <i>Eremophila mitchellii</i> , <i>Geijera parviflora</i> , <i>Beyeria viscosa</i> , <i>Dodonaea viscosa</i> , occasional <i>Callitris glaucophylla</i> . Plateau mainly cleared.	
Habitat Attributes:	
Small escarpment with boulders below. Mistletoe moderately common. Occasional small overhangs, crevices common.	
Special Habitat Attributes:	
Presence of Koala food tree <i>Eucalyptus albens</i> . Good quality retile habitat around escarpment.	
Potential for Threatened Fauna Species:	
Observed: Speckled Warbler (2): 56 0224761 6567554; 56 022468 6567516	
Koala (1): 56 022468 6567516 (in <i>Geijera parviflora</i>).	
Potential for other threatened woodland birds to be present.	
Species Recorded:	
Mammals	
Eastern Grey Kangaroo (5)	
Koala (1)	
Rabbit * (dung)	
Wallaroo (1)	
Birds	
Australian magpie (2)	Superb Fairy-wren (2)
Australian Raven (2)	Willie Wagtail (1)
Common Bronzewing (1)	Yellow Thornbill (4)
Common Starling * (2)	Yellow-rumped Thornbill (1)
Crested Pigeon (3)	Reptiles:
Double-banded Finch (3) (nest)	Carpet Python (1)
Eastern Rosella (6)	
Galah (3)	
Grey Fantail (2)	
Noisy Miner (7)	
Pied Butcherbird (2)	
Pied Currawong (1)	
Red-rumped Parrot (2)	
Singing Honeyeater (2)	
Speckled Warbler (2)	
Spiny-cheeked Honeyeater (2)	
Striated Pardalote (4)	

Habitat Survey Sheet

Project: Sunnyside Coal Project, Whitehaven Coal	Site No.: SY05
Broad Habitat Type: Mostly disturbed woodland, some natural woodland in north.	
Location: Far South-eastern corner of Project Site.	Date: 13 September 2006
GPS: 56 0224829 6566805	Land Tenure: Private. 08.05 to 10.00 am.
Soil Type: Sandy and rocky.	
Altitude: 420 m	Slope: Gentle. Aspect: Southwest Topography: Mid slope.
Vegetation: Woodland of <i>Eucalyptus dealbata</i> , with <i>Geijera parviflora</i> , <i>Callitris glaucophylla</i> , <i>Acacia cheeli</i> , <i>Dodonaea viscosa</i> and <i>Notelaea microcarpa</i> . <i>Eucalyptus albens</i> lower down slope to south; <i>Callitris glaucophylla</i> regeneration common on southern slope. Open grassy understorey, dense shrubs in some regenerating areas.	
Habitat Attributes: Mostly small, multi-stemmed trees. pen understorey. Mistletoes common. Scattered small rocks. Most trees small without hollows; a few dead trees do have hollows.	
Special Habitat Attributes: <i>Eucalyptus albens</i> Koala food tree. One stick nest found.	
Potential for Threatened Fauna Species: Observed: Speckled Warbler (1); 0224578 6566907 (1); 0224829 6566805 (1). Grey-crowned Babbler (7): 0224759 6567186 (7). Potential for other threatened woodland birds to be present.	
Species Recorded:	
Mammals	
Common Brushtail Possum (dung)	
Eastern grey Kangaroo (dung)	
Koala (dung)	
Rabbit * (dung)	
Swamp Wallaby (1)	
Birds	
Australian Magpie (2)	Noisy Miner (6)
Australian Raven (5)	Pied Butcherbird (2)
Black-faced Cuckoo-shrike (1)	Pied Currawong (1)
Brown Falcon (1)	Red-rumped Parrot (2)
Chestnut-rumped Thornbill (1)	Speckled Warbler (2)
Crested Pigeon (5)	Spiny-cheeked Honeyeater (3)
Double-barred inch (2)	Striated Pardalote (2)
Eastern Rosella (3)	Superb Fairy-wren (1)
Galah (1)	White-throated Warbler (1)
Golden Whistler (1)	Willie Wagtail (1)
Grey Fantail (2)	Yellow Robin (1)
Grey-crowned babbler (7)	Yellow Thornbill (1)
Magpie-lark (2)	Reptiles:
Mistletoebird (1)	Lace Monitor (1)
Nankeen Kestrel (1)	Robust Skink (1)
Noisy Friarbird (2)	

Habitat Survey Sheet

Project: Sunnyside Coal Project, Whitehaven Coal Site No.: SY06

Broad Habitat Type: Woodland, much of which is regrowth, and scattered trees.

Location: In south-western part of Project Site.

Date: 13 September 2006

GPS: 56 0223668 6567066

Land Tenure: Private.

10.05 to 11.10 am.

Soil Type: Sandy.

Altitude: 400 m

Slope: Mostly level. Aspect: West.

Topography: Broad gentle slope.

Vegetation:

Woodland of *Eucalyptus dealbata* and *Eucalyptus albens*, with *Geijera parviflora*, *Callitris glaucophylla*, *Accacia cheeli*, and the common shrubs *Dodonaea viscosa*, *Beyeria viscosa*, *Bursaria spinosa*, *Notelaea microcarpa*. Stand of *Eucalyptus albens* in the south and far west, with *Callitris glaucophylla* regeneration common in the south. Mostly with a grassy understorey, with shrubs common in some places.

Habitat Attributes:

Mostly small, multi-stemmed trees. Partially cleared with abundant regrowth in some places. Larger trees occasional, except if south and west. Very few tree hollows. Mistletoes common. Logs abundant on the ground.

Special Habitat Attributes:

Eucalyptus albens Koala food tree common, with a few *Eucalyptus populnea* in the south.

Potential for Threatened Fauna Species:

Observed: Grey-crowned Babbler (4): 022368 6567066.

Potential for other threatened woodland birds; Koala almost certainly present.

Species Recorded:

Mammals

Common Brush-tailed Possum (dung)

Eastern Grey Kangaroo (4)

Rabbit * (dung)

Short-beaked Echidna (diggings)

Birds

Australian King Parrot (1)

Australian Magpie (1)

Australian Raven (1)

Blue-faced Honeyeater (1)

Chestnut-rumped Thornbill (3)

Crested Pigeon (2)

Double-barred Finch (1)

Eastern Rosella (2)

Eastern Yellow Robin (1)

Galah (1)

Golden Whistler (1)

Grey Fantail (1)

Grey Shrike-thrush (1)

Grey-crowned Babbler (4)

Laughing Kookaburra (1)

Little Eagle (1)

Magpie-lark (1)

Noisy Friarbird (1)

Noisy Miner (6)

Pied Butcherbird (1)

Rufous Whistler (5)

Spiny-cheeked Honeyeater (2)

Striated Pardalote (4)

Superb Fairy-wren (2)

Weebill (3)

White-throated Gerygone (1)

Willie Wagtail (2)

Yellow Thornbill (2)

Reptiles:

nil

Habitat Survey Sheet

Project: Sunnyside Coal Project, Whitehaven Coal	Site No.: SY07
Broad Habitat Type: Hills Woodland, escarpment and rocky outcrops.	
Location: Central-western part of the Project Site.	Date: 13 September 2006
GPS: 56 0223893 6567846	Land Tenure: Private. 01.30 to 04.40 pm.
Soil Type: Sandy and rocky; large rock outcrops.	
Altitude: 390 m Slope: Mainly gentle. Aspect: North and west.	
Topography: Escarpment and plateau.	
Vegetation:	
Hills Woodland on plateau with escarpment community around rocky areas. The woodland is dominated by <i>Eucalyptus dealbata</i> and/or <i>Eucalyptus albens</i> . Other trees present include <i>Geijera parviflora</i> , <i>Acacia cheeli</i> and occasional <i>Alphitonia excelsa</i> and <i>Brachychiton populneus</i> , and, mainly in the far south, <i>Callitris glaucophylla</i> is present. Shrubs are often growing densely; the species include <i>Dodonaea viscosa</i> , <i>Beyeria viscosa</i> , and <i>Geijera parviflora</i> . The highest point is rocky and supports a low woodland of <i>Eucalyptus dealbata</i> . Around the small escarpment the trees and shrubs are <i>Alphitonia excelsa</i> , <i>Notelaea microcarpa</i> , <i>Geijera parviflora</i> and several species is vine.	
Habitat Attributes:	
Large rock outcrop and small escarpment in eastern part of site. Abundant fallen timber. Tree hollows few. Mistletoe occasional.	
Special Habitat Attributes:	
Woodland is mostly in a good condition containing shrubs and grassy understorey. Koala feed tree <i>Eucalyptus albens</i> is very common in most places.	
Potential for Threatened Fauna Species:	
Observed: Koala (3): 56 0223964 6568062 (in <i>Geijera</i>); 56 0223651 6567681 (in <i>E. dealbata</i>); 56 0223893 6567846 (in <i>Alphitonia</i>).	
Speckled Warbler (1): 56 0223884 6567613.	
Potential for other threatened woodland birds to be present.	
Species Recorded:	
Mammals	
Brown Hare * (2 obs.)	
Common Brushtail Possum (dung)	
Grey Kangaroo (1 obs, dung)	
Rabbit * (dung)	
Short-beaked Echidna (diggings)	
Wallaroo (2)	
Birds	
Australian Magpie (1)	Striated Pardalote (4)
Australian Raven (1)	Superb Fairy-wren (4)
Chestnut-rumped Thornbill (2)	Weebill (1)
Crested pigeon (1)	White-throated Gerygone (1)
Eastern Rosella (2)	White-winged Chough (6)
Galah (2)	Yellow Thornbill (1)
Grey Butcherbird (1)	Reptiles:
Grey Fantail (2)	Robust Velvet Gecko (1)
Grey Shrike-thrush (2)	<i>Anomalopus leuckertti</i> (3)
Mistletoebird (1)	Robust Skink (2)
Noisy Miner (7)	Thick-tailed Gecko (2)
Pied Butcherbird (1)	Wall Lizard (1)
Pied Currawong (1)	
Red-rumped Parrot (1)	
Spiny-cheeked Honeyeater (2)	

Appendix 2

List of Fauna Species for the Region

(No. of pages excluding this page = 8)

Family Common Name	Species	Atlas Region ¹	Gunnedah District ²	Project Site ³
Notes:				
1. NSW Wildlife Atlas; species recorded in the district, within ~20 kilometres of the Project Site.				
2. Recorded in the Gunnedah District during the current study.				
3. Recorded on the Project Site during the current study.				
* Introduced species.				
MAMMALS				
TACHYGLOSSIDAE				
Short-beaked Echidna	<i>Tachyglossus aculeatus</i>	1	2	3
DASYURIDAE				
Spotted-tailed Quoll	<i>Dasyurus maculatus</i>	1		
Common Dunnart	<i>Sminthopsis murina</i>	1		
Yellow-footed Antechinus	<i>Antechinus flavipes</i>	1		
PHASCOLARCTIDAE				
Koala	<i>Phascolarctos cinereus</i>	1	2	3
PETAURIDAE				
Sugar Glider	<i>Petaurus breviceps</i>	1		
Squirrel Glider	<i>Petaurus norfolcensis</i>	1		
PSEUDOCHEIRIDAE				
Common Ringtail Possum	<i>Pseudocheirus peregrinus</i>	1		
PHALANGERIDAE				
Common Brushtail Possum	<i>Trichosurus vulpecula</i>	1	2	3
MACROPODIDAE				
Eastern Grey Kangaroo	<i>Macropus giganteus</i>	1	2	3
Common Wallaroo	<i>Macropus robustus</i>	1	2	3
Red-necked Wallaby	<i>Macropus rufogriseus</i>	1		
Swamp Wallaby	<i>Wallabia bicolor</i>	1	2	3
EMBALLONURIDAE				
Yellow-bellied Sheath-tail-bat	<i>Saccolaimus flaviventris</i>	1		
MOLOSSIDAE				
Eastern Freetail Bat	<i>Mormopterus</i> sp.	1		
Undescribed Freetail-bats	<i>Mormopterus</i> spp.	1		
White-striped Freetail Bat	<i>Nyctinomus australis</i>	1		
VESPERTILIONIDAE				
Lesser Long-eared Bat	<i>Nyctophilus geoffroyi</i>	1		
Gould's Long-eared Bat	<i>Nyctophilus gouldi</i>	1		
Gould's Wattled Bat	<i>Chalinolobus gouldii</i>	1		
Chocolate Wattled Bat	<i>Chalinolobus morio</i>	1		
Eastern Broad-nosed Bat	<i>Scotorepens orion</i>	1		
Large Forest Bat	<i>Vespadelus darlingtoni</i>	1		
Little Forest Bat	<i>Vespadelus vulturnus</i>	1		

Family Common Name	Species	Atlas Region ¹	Gunnedah District ²	Project Site ³
VESPERTILIONIDAE cont...				
Large-eared Pied Bat	<i>Chalinolobus dwyeri</i>	1		
Little Pied Bat	<i>Chalinolobus picatus</i>	1		
Eastern Long-eared Bat	<i>Nyctophilus timoriensis</i>	1		
Inland Broad-nosed Bat	<i>Scotorepens balstoni</i>	1		
Little Broad-nosed Bat	<i>Scotorepens greyii</i>	1		
MURIDAE				
House Mouse*	<i>Mus musculus</i>	1		
Black Rat*	<i>Rattus rattus</i>	1		
CANIDAE				
Dingo	<i>Canis lupus dingo</i>	1		
Feral Dog*	<i>Canis lupus</i>	1		
Fox*	<i>Vulpes vulpes</i>	1		3
FELIDAE				
Feral Cat*	<i>Felis catus</i>	1		
LEPORIDAE				
Rabbit*	<i>Oryctolagus cuniculus</i>	1	2	3
Brown Hare*	<i>Lepus capensis</i>	1	2	3
SUIDAE				
Feral Pig*	<i>Sus scrofa</i>	1		
BOVIDAE				
Domestic Cattle*	<i>Bos taurus</i>	1	2	3
Feral Goat*	<i>Capra hircus</i>	1		
BIRDS				
CASUARIIDAE				
Emu	<i>Dromaius novaehollandiae</i>	1		
PHASIANIDAE				
Stubble Quail	<i>Coturnix pectoralis</i>	1		
ANATIDAE				
Black Swan	<i>Cygnus atratus</i>	1		
Australian Wood Duck	<i>Chenonetta jubata</i>	1	2	3
Pacific Black Duck	<i>Anas superciliosa</i>	1	2	3
Grey Teal	<i>Anas gracilis</i>	1		
PODICIPEDIDAE				
Australasian Grebe	<i>Tachybaptus novaehollandiae</i>	1		
PHALACROCORACIDAE				
Pied Cormorant	<i>Phalacrocorax varius</i>	1		
ARDEIDAE				
White-faced Heron	<i>Egretta novaehollandiae</i>	1	2	3
White-necked Heron	<i>Ardea pacifica</i>	1		

Family Common Name	Species	Atlas Region ¹	Gunnedah District ²	Project Site ³
THRESKIORNITHIDAE				
Australian White Ibis	<i>Threskiornis molucca</i>	1		3
Straw-necked Ibis	<i>Threskiornis spinicollis</i>	1	2	3
Yellow-billed Spoonbill	<i>Platalea flavipes</i>	1		
ACCIPITRIDAE				
Black-breasted Buzzard	<i>Hamirostra melanosternon</i>	1		
Black Kite	<i>Milvus migrans</i>	1		
Black-shouldered Kite	<i>Elanus axillaris</i>	1		3
Square-tailed Kite	<i>Lophoictinia isura</i>	1		
Whistling Kite	<i>Haliastur sphenurus</i>	1		
Brown Goshawk	<i>Accipiter fasciatus</i>	1	2	3
Wedge-tailed Eagle	<i>Aquila audax</i>	1		
Little Eagle	<i>Hieraaetus morphnoides</i>	1	2	3
Spotted Harrier	<i>Circus assimilis</i>	1		
FALCONIDAE				
Black Falcon	<i>Falco subniger</i>	1		
Brown Falcon	<i>Falco berigora</i>	1	2	3
Australian Hobby	<i>Falco longipennis</i>	1		
Peregrine Falcon	<i>Falco peregrinus</i>	1		
Nankeen Kestrel	<i>Falco cenchroides</i>	1	2	
TURNICIDAE				
Painted Button-quail	<i>Turnix varia</i>	1		
Little Button-quail	<i>Turnix velox</i>	1		
CHARADRIIDAE				
Masked Lapwing	<i>Vanellus miles</i>	1		
LARIDAE				
Silver Gull	<i>Larus novaehollandiae</i>	1		
COLUMBIDAE				
Diamond Dove	<i>Geopelia cuneata</i>	1		
Rock Dove*	<i>Columba livia</i>	1		
Common Bronzewing	<i>Phaps chalcoptera</i>	1	2	
Crested Pigeon	<i>Ocyphaps lophotes</i>	1	2	3
Peaceful Dove	<i>Geopelia striata</i>	1		
Bar-shouldered Dove	<i>Geopelia humeralis</i>	1		
CACATUIDAE				
Galah	<i>Cacatua roseicapilla</i>	1	2	3
Little Corella	<i>Cacatua sanguinea</i>	1		3
Sulphur-crested Cockatoo	<i>Cacatua galerita</i>	1	2	3
Cockatiel	<i>Nymphicus hollandicus</i>	1	2	

Family Common Name	Species	Atlas Region ¹	Gunnedah District ²	Project Site ³
PSITTACIDAE				
Musk Lorikeet	<i>Glossopsitta concinna</i>	1		
Little Lorikeet	<i>Glossopsitta pusilla</i>	1		3
Australian King-Parrot	<i>Alisterus scapularis</i>	1	2	3
Red-winged Parrot	<i>Aprosmictus erythropterus</i>	1		3
Australian Ringneck	<i>Barnardius zonarius</i>	1		
Mallee Ringneck	<i>Barnardius zonarius barnardi</i>	1		
Crimson Rosella	<i>Platycercus elegans</i>	1		
Eastern Rosella	<i>Platycercus eximius</i>	1	2	3
Red-rumped Parrot	<i>Psephotus haematonotus</i>	1	2	3
Turquoise Parrot	<i>Neophema pulchella</i>	1		
Blue Bonnet	<i>Northiella haematogaster</i>	1		
STRIGIDAE				
Southern Boobook	<i>Ninox novaeseelandiae</i>	1		
TYTONIDAE				
Masked Owl	<i>Tyto novaehollandiae</i>	1		
Barn Owl	<i>Tyto alba</i>	1		
PODARGIDAE				
Tawny Frogmouth	<i>Podargus strigoides</i>	1	2	3
CAPRIMULGIDAE				
White-throated Nightjar	<i>Eurostopodus mystacalis</i>	1		
AEGOTHELIDAE				
Australian Owlet-nightjar	<i>Aegotheles cristatus</i>	1		
APODIDAE				
White-throated Needletail	<i>Hirundapus caudacutus</i>	1		
Fork-tailed Swift	<i>Apus pacificus</i>	1		
HALCYONIDAE				
Laughing Kookaburra	<i>Dacelo novaeguineae</i>	1	2	3
Sacred Kingfisher	<i>Todiramphus sanctus</i>	1		
MEROPIDAE				
Rainbow Bee-eater	<i>Merops ornatus</i>	1		
CLIMACTERIDAE				
White-throated Treecreeper	<i>Cormobates leucophaeus</i>	1		
Brown Treecreeper	<i>Climacteris picumnus</i>	1		
MALURIDAE				
Superb Fairy-wren	<i>Malurus cyaneus</i>	1	2	3
Variiegated Fairy-wren	<i>Malurus lamberti</i>	1		
PARDALOTIDAE				
Spotted Pardalote	<i>Pardalotus punctatus</i>	1		
Striated Pardalote	<i>Pardalotus striatus</i>	1	2	3

Family Common Name	Species	Atlas Region ¹	Gunnedah District ²	Project Site ³
ACANTHIZIDAE				
Speckled Warbler	<i>Chthonicola sagittata</i>	1	2	3
Weebill	<i>Smicrornis brevirostris</i>	1	2	3
Western Gerygone	<i>Gerygone fusca</i>	1		
White-throated Gerygone	<i>Gerygone olivacea</i>	1	2	3
Brown Thornbill	<i>Acanthiza pusilla</i>	1		
Buff-rumped Thornbill	<i>Acanthiza reguloides</i>	1	2	3
Chestnut-rumped Thornbill	<i>Acanthiza uropygialis</i>	1	2	3
Inland Thornbill	<i>Acanthiza apicalis</i>	1		
Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>	1	2	3
Yellow Thornbill	<i>Acanthiza nana</i>	1	2	3
Striated Thornbill	<i>Acanthiza lineata</i>	1		
MELIPHAGIDAE				
Striped Honeyeater	<i>Plectorhyncha lanceolata</i>	1		
Spiny-cheeked Honeyeater	<i>Acanthagenys rufogularis</i>	1	2	3
Painted Honeyeater	<i>Grantiella picta</i>	1		
Little Friarbird	<i>Philemon citreogularis</i>	1		
Noisy Friarbird	<i>Philemon corniculatus</i>	1	2	3
Regent Honeyeater	<i>Xanthomyza phrygia</i>	1		
Noisy Miner	<i>Manorina melanocephala</i>	1	2	3
Blue-faced Honeyeater	<i>Entomyzon cyanotis</i>		2	
Lewin's Honeyeater	<i>Meliphaga lewinii</i>	1		
Yellow-faced Honeyeater	<i>Lichenostomus chrysops</i>	1		
White-eared Honeyeater	<i>Lichenostomus leucotis</i>	1		
Fuscous Honeyeater	<i>Lichenostomus fuscus</i>	1		
White-plumed Honeyeater	<i>Lichenostomus penicillatus</i>	1		3
Singing Honeyeater	<i>Lichenostomus virescens</i>	1	2	3
Yellow-throated Miner	<i>Manorina flavigula</i>	1		
Brown-headed Honeyeater	<i>Melithreptus brevirostris</i>	1		
Black-chinned Honeyeater	<i>Melithreptus gularis gularis</i>	1		
PETROICIDAE				
Jacky Winter	<i>Microeca fascinans</i>	1		
Red-capped Robin	<i>Petroica goodenovii</i>	1		
Hooded Robin	<i>Melanodryas cucullata</i>	1		
Eastern Yellow Robin	<i>Eopsaltria australis</i>	1	2	3
POMATOSTOMIDAE				
Grey-crowned Babbler	<i>Pomatostomus temporalis temporalis</i>	1	2	3
NEOSITTIDAE				
Varied Sittella	<i>Daphoenositta chrysoptera</i>	1		
PACHYCEPHALIDAE				
Golden Whistler	<i>Pachycephala pectoralis</i>	1	2	3
Rufous Whistler	<i>Pachycephala rufiventris</i>	1	2	3
Grey Shrike-thrush	<i>Colluricincla harmonica</i>	1	2	3
Eastern Shrike-tit	<i>Falcunculus frontatus</i>	1		

Family Common Name	Species	Atlas Region ¹	Gunnedah District ²	Project Site ³
DICRURIDAE				
Leaden Flycatcher	<i>Myiagra rubecula</i>	1		
Restless Flycatcher	<i>Myiagra inquieta</i>	1		
Magpie-lark	<i>Grallina cyanoleuca</i>	1	2	3
Grey Fantail	<i>Rhipidura fuliginosa</i>	1	2	3
Willie Wagtail	<i>Rhipidura leucophrys</i>	1	2	3
CAMPEPHAGIDAE				
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>	1	2	3
White-bellied Cuckoo-shrike	<i>Coracina papuensis</i>	1		
Cicadabird	<i>Coracina tenuirostris</i>	1		
White-winged Triller	<i>Lalage sueurii</i>	1		
Ground Cuckoo-shrike	<i>Coracina maxima</i>	1		
ORIOLIDAE				
Olive-backed Oriole	<i>Oriolus sagittatus</i>	1		
ARTAMIDAE				
White-browed Woodswallow	<i>Artamus superciliosus</i>	1		
Dusky Woodswallow	<i>Artamus cyanopterus</i>	1		
Pied Butcherbird	<i>Cracticus nigrogularis</i>	1	2	3
Grey Butcherbird	<i>Cracticus torquatus</i>	1	2	3
Australian Magpie	<i>Gymnorhina tibicen</i>	1	2	3
Pied Currawong	<i>Strepera graculina</i>	1	2	3
CORVIDAE				
Australian Raven	<i>Corvus coronoides</i>	1	2	3
CORCORACIDAE				
White-winged Chough	<i>Corcorax melanorhamphos</i>	1	2	3
Apostlebird	<i>Struthidea cinerea</i>	1		3
ALAUDIDAE				
Singing Bushlark	<i>Mirafra javanica</i>	1		
MOTACILLIDAE				
Australian Pipit	<i>Anthus australis</i>	1		
PASSERIDAE				
House Sparrow*	<i>Passer domesticus</i>	1		3
ESTRILDIDAE				
Zebra Finch	<i>Taeniopygia guttata</i>	1		
Double-barred Finch	<i>Taeniopygia bichenovii</i>	1	2	3
Plum-headed Finch	<i>Neochmia modesta</i>	1		
Red-browed Finch	<i>Neochmia temporalis</i>	1		
Diamond Firetail	<i>Stagonopleura guttata</i>	1		
DICAEIDAE				
Mistletoebird	<i>Dicaeum hirundinaceum</i>	1	2	3

Family Common Name	Species	Atlas Region ¹	Gunnedah District ²	Project Site ³
HIRUNDINIDAE				
White-backed Swallow	<i>Cheramoeca leucosternus</i>	1		
Welcome Swallow	<i>Hirundo neoxena</i>	1	2	3
Tree Martin	<i>Hirundo nigricans</i>	1		
Fairy Martin	<i>Hirundo ariel</i>	1		
SYLVIIDAE				
Rufous Songlark	<i>Cincloramphus mathewsi</i>	1		
ZOSTEROPIDAE				
Silvereye	<i>Zosterops lateralis</i>	1		
STURNIDAE				
Common Starling*	<i>Sturnus vulgaris</i>	1	2	3
FROGS				
MYOBATRACHIDAE				
Eastern Sign-bearing Froglet	<i>Crinia parinsignifera</i>	1		
Eastern Banjo Frog	<i>Limnodynastes dumerilii</i>	1		
Long-thumbed Frog	<i>Limnodynastes fletcheri</i>	1		
Ornate Burrowing Frog	<i>Limnodynastes ornatus</i>	1		
Painted Burrowing Frog	<i>Neobatrachus sudelli</i>	1		
Salmon-striped Frog	<i>Limnodynastes salmini</i>	1		
Spotted Marsh Frog	<i>Limnodynastes tasmaniensis</i>	1	2	3
Holy Cross Toad	<i>Notaden bennettii</i>	1		
Brown Toadlet	<i>Pseudophryne bibronii</i>	1		
HYLIDAE				
Broad-palmed Frog	<i>Litoria latopalmata</i>	1		
Green Tree Frog	<i>Litoria caerulea</i>	1		
Desert Tree Frog	<i>Litoria rubella</i>	1		
Peron's Tree Frog	<i>Litoria peronii</i>	1		
Water-holding Frog	<i>Cyclorana platycephala</i>	1		
REPTILES				
CHELIDAE				
Eastern Snake-necked Tortoise	<i>Chelodina longicollis</i>	1		
GEKKONIDAE				
Dubious Dtella	<i>Gehyra dubia</i>	1		
Varied Dtella	<i>Gehyra variegata</i>	1		
Prickly Gecko	<i>Heteronotia binoei</i>	1		
Robust Velvet Gecko	<i>Oedura robusta</i>	1	2	3
Eastern Spiny-tailed Gecko	<i>Strophurus williamsi</i>	1		
Thick-tailed Gecko	<i>Underwoodiasaurus milii</i>	1	2	3
Border Thick-tailed Gecko	<i>Underwoodiasaurus sphyrurus</i>	1		
PYGOPODIDAE				
Burton's Snake-Lizard	<i>Lialis burtonis</i>	1		
Eastern Hooded Scaly-foot	<i>Pygopus schraderi</i>	1		

Family Common Name	Species	Atlas Region ¹	Gunnedah District ²	Project Site ³
AGAMIDAE				
Jacky Lizard	<i>Amphibolurus muricatus</i>	1		
Nobbi Lashtail	<i>Amphibolurus nobbi</i>	1		
Dragon	<i>Lophognathus burnsi</i>	1		
Eastern Water Dragon	<i>Physignathus lesueurii</i>	1		
Eastern Bearded Dragon	<i>Pogona barbata</i>	1	2	3
VARANIDAE				
Sand Monitor	<i>Varanus gouldii</i>	1		
Lace Monitor	<i>Varanus varius</i>	1	2	3
SCINCIDAE				
Two-clawed Worm-skink	<i>Anompalopus leuckartii</i>	1	2	3
Tree-base Litter-skink	<i>Carlia foliorum</i>	1		
Shiny-palmed Shinning-skink	<i>Cryptoblepharus carnabyi</i>	1		
Wall Lizard	<i>Cryptoblepharus virgatus</i>	1	2	3
Brown-blazed Wedgesnout	<i>Ctenotus allotropis</i>	1		
Robust Skink	<i>Ctenotus robustus</i>	1	2	3
Copper-tailed Skink	<i>Ctenotus taeniolatus</i>	1		
Tree-crevice Skink	<i>Egernia striolata</i>	1		
Barred-sided Skink	<i>Eulamprus tenuis</i>	1		
Wood Mulch-slider	<i>Lerista muelleri</i>	1		
South-eastern Morethia skink	<i>Morethia boulengeri</i>	1		
Eastern Blue-tongued Lizard	<i>Tiliqua scincoides</i>	1		
TYPHLOPIDAE				
Proximus Blind Snake	<i>Ramphotyphlops proximus</i>	1		
Brown-snouted Blind Snake	<i>Ramphotyphlops wiedii</i>	1		
BOIDAE				
Carpet Python	<i>Morelia spilota variegata</i>	1	2	3
ELAPIDAE				
Eastern Shovel-nosed Snake	<i>Brachyuropsis australis</i>	1		
Red-naped Snake	<i>Furina diadema</i>	1		
Pale-headed Snake	<i>Hoplocephalus bitorquatus</i>	1		
Variable Black-naped Snake	<i>Parasuta dwyeri</i>	1		
Spotted Black Snake	<i>Pseudechis guttatus</i>	1	2 (pers. comm.)	
Eastern Brown Snake	<i>Pseudonaja textilis</i>	1	2 (pers. comm.)	

Nomenclature for all fauna species in this report is generally based on the following publications: Australian Museum's *The Mammals of Australia* (Strahan 1995), *Australian Bats* (Churchill 1998), *The Taxonomy and Species of Birds of Australia and its Territories* (Christidis & Boles 1994) and *Reptiles and Amphibians of Australia* (Cogger 1992). More recent names are occasionally used where changes have occurred.

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Appendix 3

SEPP No. 44 – Koala Habitat Protection

(No. of pages excluding this page = 4)

State Environmental Planning Policy No 44 - Koala Habitat Protection

Part 1 – Preliminary

1 Name of Policy

This Policy may be cited as *State Environmental Planning Policy No 44 - Koala Habitat Protection*.

2 Commencement

This Policy commences on 13 February 1995.

3 Aims, objectives etc

This Policy aims to encourage the proper conservation and management of areas of natural vegetation that provide habitat for Koalas to ensure a permanent free-living population over their present range and reverse the current trend of Koala population decline:

- (a) by requiring the preparation of plans of management before development consent can be granted in relation to areas of core Koala habitat, and
- (b) by encouraging the identification of areas of core Koala habitat, and
- (c) by encouraging the inclusion of areas of core Koala habitat in environment protection zones.

4 Definitions

In this Policy:

"**core Koala habitat**" means an area of land with a resident population of Koalas, evidenced by attributes such as breeding females (that is, females with young) and recent sightings of and historical records of a population.

"**guidelines**" means the guidelines, as in force from time to time, made for the purposes of this Policy by the Director.

"**potential Koala habitat**" means areas of native vegetation where the trees of the types listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component.

5 Land to which this Policy applies

- (1) This Policy applies to each local government area listed in Schedule 1.
- (2) However, it does not apply to land dedicated or reserved under the *National Parks and Wildlife Act 1974* or to land dedicated under the *Forestry Act 1916* as a State forest or flora reserve.

Part 2 – Development control of Koala habitats

6 Land to which this Part applies

This Part applies to land:

- (a) that is land to which this Policy applies, and
- (b) that is land in relation to which a development application has been made, and
- (c) that:
 - (i) has an area of more than 1 hectare, or
 - (ii) has, together with any adjoining land in the same ownership, an area of more than 1 hectare,whether or not the development application applies to the whole, or only part, of the land.

7 Step 1 - Is the land potential Koala habitat?

(1) Before a council may grant consent to an application for consent to carry out development on land to which this Part applies, it must satisfy itself whether or not the land is a potential Koala habitat.

(2) A council may satisfy itself as to whether or not land is a potential Koala habitat only on information obtained by it, or by the applicant, from a person who is qualified and experienced in tree identification.

(3) If the council is satisfied:

(a) that the land is not a potential Koala habitat, it is not prevented, because of this Policy, from granting consent to the development application, or

(b) that the land is a potential Koala habitat, it must comply with clause 8.

8 Step 2 - Is the land core Koala habitat?

(1) Before a council may grant consent to an application for consent to carry out development on land to which this Part applies that it is satisfied is a potential Koala habitat, it must satisfy itself whether or not the land is a core Koala habitat.

(2) A council may satisfy itself as to whether or not land is a core Koala habitat only on information obtained by it, or by the applicant, from a person with appropriate qualifications and experience in biological science and fauna survey and management.

(3) If the council is satisfied:

(a) that the land is not a core Koala habitat, it is not prevented, because of this Policy, from granting consent to the development application, or

(b) that the land is a core Koala habitat, it must comply with clause 9.

9 Step 3 - Can development consent be granted in relation to core Koala habitat?

(1) Before a council may grant consent to a development application for consent to carry out development on land to which this Part applies that it is satisfied is a core Koala habitat, there must be a plan of management prepared in accordance with Part 3 that applies to the land.

(2) The council's determination of the development application must not be inconsistent with the plan of management.

10 Guidelines - matters for consideration

Without limiting clause 17, a council must take the guidelines into consideration in determining an application for consent to carry out development on land to which this Part applies.

Part 3 - Plans of management

11 Preparation of plan of management

(1) A plan of management may be prepared for:

(a) the whole of a local government area listed in Schedule 1, or

(b) a part of such a local government area (including an area of land that is the subject of a development application).

(2) Anyone (including a council) may prepare a plan of management.

(3) A plan of management is to be prepared in accordance with the guidelines.

12 Consultation with Director-General of National Parks and Wildlife

A person who prepares a plan of management for the whole of a local government area listed in Schedule 1 must consult the Director-General of National Parks and Wildlife.

13 Approval of plan of management

(1) A plan of management prepared by the council has no effect unless it is approved by the Director.

(2) A plan of management prepared by a person other than the council has no effect unless it is approved by the council and by the Director.

(3) A plan of management takes effect on the day it is approved by the Director or on a later day specified in it for the purpose.

14 Amendment or repeal of plan of management

A plan of management may be amended or repealed by another plan of management prepared and approved in accordance with this Part.

Part 4 - Other environmental planning measures

15 Surveys, environmental protection zones and development control plans

In order to give effect to the aims of this Policy, a council of a local government area listed in Schedule 1 should:

- (a) survey the land within its area so as to identify areas of potential Koala habitat and core Koala habitat, and
- (b) make or amend a local environmental plan:
 - (i) to include land identified as a core Koala habitat within an environmental protection zone, or
 - (ii) to identify land that is a core Koala habitat and apply special provisions to control the development of that land, and
- (c) give consideration to preparing an appropriate development control plan for land that is or adjoins a core Koala habitat.

16 Preparation of local environmental studies

Without affecting the power of the Director to give a direction under section 74 (2) (b) of the *Environmental Planning and Assessment Act 1979* to a council, the Director would consider giving a direction that sections 57 and 61 of that Act are to apply to a draft local environmental plan (with the consequence that the council must prepare an environmental study of the land to which the draft local environmental plan applies) if, under the draft plan, it is proposed to zone (or rezone) land that is a potential Koala habitat or a core Koala habitat otherwise than as environment protection.

17 Guidelines - generally

- (1) In exercising any function under this Policy, a council must take into consideration the guidelines that are relevant to the exercise of the function.
- (2) Anyone may inspect the guidelines free of charge at any office of the Department of Planning during the hours when the office is open to the public.

Schedule 1 Local government areas (Clauses 5 (1), 11 (1), 12, 15)

Armidale	Liverpool
Ballina	Lockhart
Barraba	Macleay
Bathurst	Maitland
Bega Valley	Manilla
Bellingen	Merriwa
Berrigan	Moree Plains
Bingara	Mudgee
Blayney	Mulwaree
Blue Mountains	Murray
Bombala	Muswellbrook
Boorowa	Nambucca
Bourke	Narrabri
Brewarrina	Narrandera
Byron	Narromine
Cabonne	Newcastle
Campbelltown	Nundle

Central Darling	Nymbioda
Cessnock	Oberon
	Parkes
Coolah	Parry
Cooma-Monaro	Pittwater
Coonabarabran	Port Stephens
Coonamble	Quirindi
Copmanhurst	Richmond River
Corowa	Rylstone
Crookwell	Scone
Dumaresq	Severn
Dungog	Shoalhaven
Eurobodalla	Singleton
Evans	Snowy River
Forbes	Tallaganda
Gilgandra	Tenterfield
Gloucester	Tumbarumba
Gosford	Tumut
Grafton	Tweed
Great Lakes	Ulmarra
Greater Lithgow	Uralla
Greater Taree	Wagga Wagga
Gunnedah	Wakool
Gunning	Walcha
Guyra	Walgett
Hastings	Warren
Hawkesbury	Warringah
Hornsby	Weddin
Hume	Wentworth
Inverell	Windouran
Kempsey	Wingecarribee
Ku-ring-gai	Wollondilly
Kyogle	Wollongong
Lake Macquarie	Wyong
Leeton	Yallaroi
Lismore	Yarrowlumla
	Yass

Schedule 2 Feed tree species
(Clause 4)

Scientific Name	Common Name
<i>Eucalyptus tereticornis</i>	Forest red gum
<i>Eucalyptus microcorys</i>	Tallowwood
<i>Eucalyptus punctata</i>	Grey Gum
<i>Eucalyptus viminalis</i>	Ribbon or manna gum
<i>Eucalyptus camaldulensis</i>	River red gum
<i>Eucalyptus haemastoma</i>	Broad leaved scribbly gum
<i>Eucalyptus signata</i>	Scribbly gum
<i>Eucalyptus albens</i>	White box
<i>Eucalyptus populnea</i>	Bimble box or poplar box
<i>Eucalyptus robusta</i>	Swamp mahogany

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Appendix 4

Photographs

(No. of pages excluding this page = 1)



Photograph 1. Treed escarpment across the southern part of the “Sunnyside” property.



Photograph 2. Rock outcrops are typical on the southern part of the “Sunnyside” property.

Note: A colour version of these photographs is presented on the Project CD