APPENDIX A

Fauna Surveys as part of the Southern Extension Area at Ulan Coal Mine – Modification 3 (Biodiversity Monitoring Services 2014)

FAUNA SURVEYS OF PART OF THE SOUTHERN EXTENSION AREA AT ULAN COAL MINE – MODIFICATION 3

A Report by Biodiversity Monitoring Services, March 2014

1. INTRODUCTION

In order to accommodate the proposed changes to the Ulan West longwall layout, the main headings need to be turned after LW 5. Ulan West development is currently progressing ahead of schedule and it is estimated that the headings will need to be turned in approximately September 2015. Accordingly, relevant approvals need to be in place at this time.

The favoured approval path for both projects is modification under section 75W of the EP&A Act. In order to enable the environmental impact assessments to be completed in support of this modification, additional baselines studies are required for areas outside of the existing mine plan.

There are two areas that require baseline studies, both on the western edge of Ulan Coal Mine boundary. The approximate locations of the two areas, called Modification North and Modification South, are shown in **Figure 1**.

Surveys for terrestrial vertebrate fauna were undertaken in each area. Some access restrictions were imposed within private land but the majority of the areas were covered by the surveys. As Figure 1 shows, the vegetation cover within each area is a mixture of woodland and cleared grassland. The woodland habitat has been partially logged in the past and the cleared grassland has been grazed by domestic stock. There are numerous tracks through each area, either for access to surrounding land or for the establishment of exploratory boreholes. Several farm dams are found in the areas. These were either dry or low in water at the time of the survey due to the present dry conditions in the region.

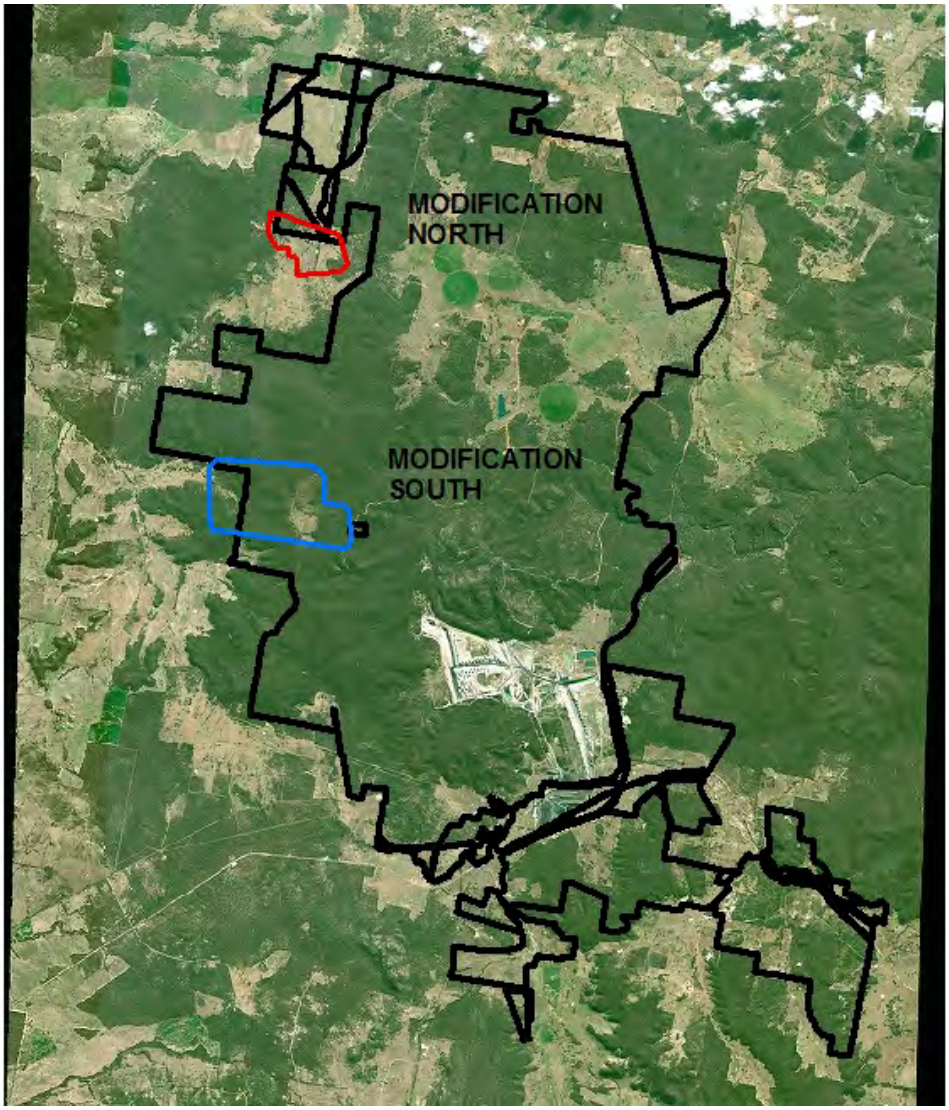


Figure 1: Locations of Modification North and Modification South

2. SCOPE OF THIS REPORT

The present report provides information about fauna use of two areas within Ulan Coal Mine, with a particular emphasis on the terrestrial vertebrate fauna located during surveys in February and June 2014. The report also draws upon a number of previous fauna surveys that have occurred within Ulan Coal Mine. Previous fauna surveys have occurred on a regular basis since 1995 and the data from these surveys is used to complement the results from the current surveys and to compare the biodiversity values of the Modification Areas with that from entire Ulan Coal Mine.

Although the emphasis is on those species listed as Threatened both in NSW and Federally, populations of all terrestrial vertebrates are also documented and biodiversity values for each fauna group assessed.

Because Modification Areas are widely spaced (see Figure 1) it is necessary to describe the fauna within each survey area separately, then to amalgamate the data to provide an overall description of the fauna and an assessment of the biodiversity values.

This report describes the terrestrial vertebrate fauna known from the two Modification Areas. There is a description of the existing environment of the survey area within a regional context. Survey methodology and survey effort are described within the body of the report. In addition, there are quantitative descriptions of the structural characteristics of habitats occurring within the Modification Areas as well as documentation of the presence of any Threatened Species within the Modification Areas and in the locality of the mine.

3. EXISTING ENVIRONMENT

3.1 Study Area

Ulan Coal Mine is located north-east of Mudgee in the Central West/Upper Hunter region. The mine is mainly within the Sydney Basin IBRA Region, but is also within the Brigalow Belt South and NSW South West Slopes Regions. Consequently, much of the landscape, flora and fauna is variable. The area containing Ulan Coal Mine is considered to be a ‘crossover area’ between the coast (via the Hunter River catchment) and inland NSW.

Ulan Coal Mine is found within the Goulburn River Hills Sub-region (Denny 1997[1]) which describes the area as:

GOULBURN RIVER HILLS SUB-REGION (938 km²)

Located to the west of Goulburn River Mountains Sub-Region, but characterised by low hills and plainsland (Relief 30-90m). Characterised by undulating hills with some low steep-sided palaeodrainage systems. Includes Ulan and Gulgong and the easterly flowing Goulburn River and the westerly flowing Talbragar River.

CHARACTERISTICS OF THE GOULBURN RIVER HILLS SUB-REGION

Geology	Mesozoic Sediments (53%); Palaeozoic Sediments (41%); Acid/Intermediate Intrusives (6%)
Soils	Stony Sandy Loams (6%); Massive Red and Yellow Earths (63%); Yellow and Red Texture Contrast Soils (16%); Deep Black Cracking Clays (13%); Stony Sandy Loams (6%)
Present-day Cover	Degraded Grasslands (1%); Dry Forests and Woodlands (39%); Non-forest Systems (22%); Disturbed Forests (38%)
Conservation Areas	Goulburn River NP (16602ha); Munghorn Gap NR (4584ha) TOTAL 22.6%

3.2 Climate

The Ulan area experiences a temperate climate with an average annual rainfall of approximately 600 mm. Whilst rainfall is spread throughout the year, it is on average higher in the summer months and occurs on fewer days (i.e. is more intense). The highest recorded monthly rainfall at Wollar was 391.5 mm recorded in February 1955, which included the highest daily rainfall total of 180.8 mm. The highest daily rainfalls have been recorded during summer (December to February) and in June.

[1] Denny, M. 1997 Bioregionalisation of Eastern NSW Report to NSW Heritage Council and National Parks Association

Average annual rainfall is spread fairly evenly through the year, but with a distinct spring/summer dominance (BoM, 2013). Highest rainfall on average is in January (70.5 millimetres [mm] in Gulgong and 66.6 mm in WOllar) and lowest in April for Gulgong (44.2 mm) and Wollar (37.8 mm) (BoM, 2013).

Climate at Gulgong and Mudgee is characterised by warm to hot summers and cold winters. The warmest month is January with maximum daily temperatures at Gulgong and Mudgee of approximately 30.9 degrees Celsius (°C) and 31.0°C, respectively, followed by December (29.6°C and 29.8°C, respectively) (BoM, 2013). The coldest month is July with mean daily minimum temperatures of 2.6°C and 1.3°C for Gulgong and Mudgee, respectively (BoM, 2013).

Rainfall and temperature records during the surveys in March and June 2014 are taken from the nearest weather station with complete records at Gulgong and are shown in Table 1 (data for Gulgong, Station 062013, from the Commonwealth Bureau of Meteorology). It can be seen that the maximum temperatures were mainly in the high twenties and minimum temperatures rarely below 10^{o}C during the March surveys. Such temperatures are within the normal range for March. Some rain fell during the survey, but the amounts were low and it was relatively dry for most of the survey period. The temperatures were lower during the June (winter) surveys with minimums approaching zero, and some sleet falling.

TABLE 1: WEATHER DATA DURING SURVEYS

Date	Minimum temperature (°C)	Maximum temperature (°C)	Rainfall (mm)
10/03/2014	13.7	29.3	0
11/03/2014	14	28	0
12/03/2014	11.7	29.3	0
13/03/2014	12.5	28.9	0
14/03/2014	15	29	0
15/03/2014	12.5	27.5	6.2
16/03/2014	16	24.9	0
17/03/2014	7.4	23.9	8.4
18/03/2014	9.4	27.8	0
19/03/2014	10.8	29.7	0
20/03/2014	13.4	27.5	0
21/03/2014	14.9	27.5	0
22/06/2014	6	18.4	0.2
23/06/2014	2.5	13	0
24/06/2014	5	12.1	0
25/06/2014		13.6	0
26/06/2014		14.9	0
27/06/2014	2	16.5	0
28/06/2014	4.5	16.5	0
29/06/2014	5	10.4	2.2

3.3 Landform and Hydrology

The upper catchment of Talbragar River (Mona Creek) is within the northern survey area (Mod 4 North) and the southern survey area (Mod 4 South) contains water courses flowing both west to Talbragar River and east to the Goulburn River. The landform in both areas is a mixture of valley floors, steep hills and undulating land. Some cliff lines are found in both areas.

3.4 Land Use

The current land use in the study area and surrounds is mining with some limited stock grazing. Historically, the land use within the study area would have been stock grazing on pastures comprising a mix of native and introduced grasses. Both of the study areas have been extensively

logged in the past.

3.5 Vegetation

The dominant vegetation community type within both areas is woodland and forest as well as derived grassland. Some of the woodland and forest is considered as regenerating after previous logging and clearing. More than half of the northern survey area is cleared land that is currently grassland, whereas the southern area does not contain this community type, although the regenerating ironbark open forest and White Box woodland are still represented by cleared land.

4.0 METHODS

4.1 Desktop Review

A desktop investigation was carried out to identify terrestrial fauna and preferred habitats that may be present within the study area and surrounds. A review of existing data was undertaken and a list of potential threatened fauna species that could occur within the Extension Areas was developed. The databases reviewed included:

- a search of the NSW Office of Environment and Heritage (OEH) BioNet Atlas of NSW Wildlife Database for records of threatened fauna within the locality (Central West – Kerrabee CMA sourced 29th March 2014) (Appendix 1);
- a search of the SEWPaC Protected Matters database for matters of national environmental significance within 20km of Ulan (sourced 29th march 2014), and
- a search of the Atlas of Living Australia Search Tool using a circle of 20 km radius around Ulan (www.biocache.ala.org.au, accessed 29.03.2014) (Appendix 2)[2]

[2] The Atlas of Living Australia is a national database of all of Australia's flora and fauna supervised by CSIRO and utilising data from 17 organisations. The relevant organisations for providing data on fauna distribution are Australian National Wildlife Collection, OEH Atlas of NSW Wildlife, BirdLife Australia, Birdata, OZCAM (Online Zoological Collections of Australian Museums), Australian Museum Arachnology Collection, Centre for Australian National Biodiversity Research, Commonwealth

- a review of the previous fauna surveys undertaken within the study area and surrounds for the annual monitoring program as well as other investigations at Ulan Coal Mine. These surveys have been undertaken since 1995 and some of the data obtained has come from the Modification 3 survey areas. These are listed in Appendix 3.

The desktop review resulted in a list of threatened species that could potentially be impacted by the development based on previous records (i.e. previous surveys and database results) and potential habitat within the study area. These threatened species were targeted during field surveys (Section 4.2) and are discussed in Section 4.3.

4.2 Field Surveys

4.2.1 Survey Area

The survey area is divided into two parts, at the northern and southern end of the western side of Ulan Coal Mine boundary. The two areas, Modification North and Modification South are shown in Figure 1. The northern area is mainly within cleared grazed land and is still occupied by landholders. There are several small farm dams within the area that held small quantities of water during the surveys. The southern area is within Ulan Coal Mine boundaries but also contains land that is privately held as well as Crown land. There are two areas of previously cleared land that are currently regenerating. There is a small farm dam and a cabin in the southern area.

4.2.2 Survey Sites

Six survey sites were established within the survey area during the spring surveys and these are shown in Figure 2. Five of the sites provided detailed information about fauna

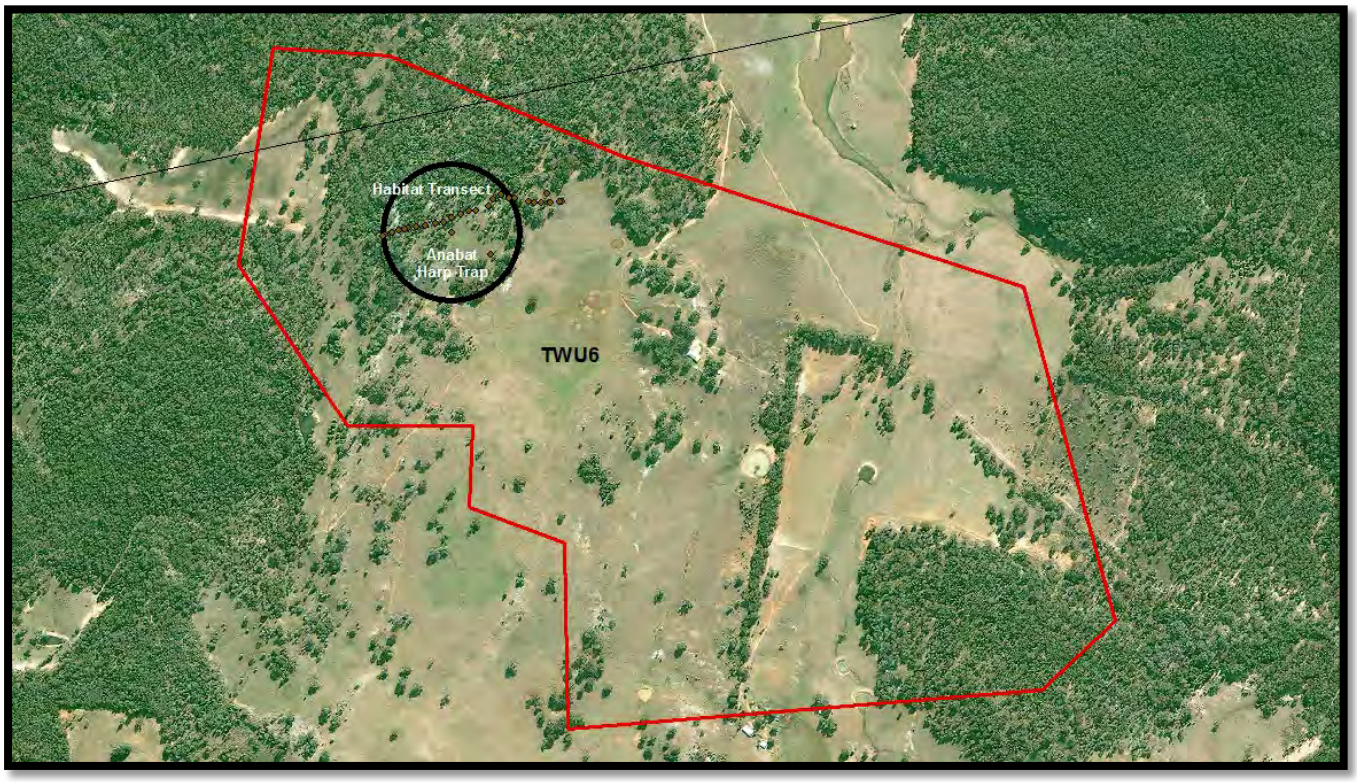
Scientific and Industrial Research Organisation, Australian Museum Herpetology Collection.

usage and habitat values, whilst one site gave observational data. In addition, three sites were established during winter 2014 to undertake targeted surveys of threatened bird species during winter. These sites are shown in Figure 3. As much of each survey area was traversed as possible, and any fauna located either directly or indirectly was recorded.

A description of the habitats and locations of each survey site is given in Table 3.

FIGURE 2: SURVEY AREAS AND SITES IN MODIFICATION 3 AREA

a. NORTH AREA



b. SOUTH AREA

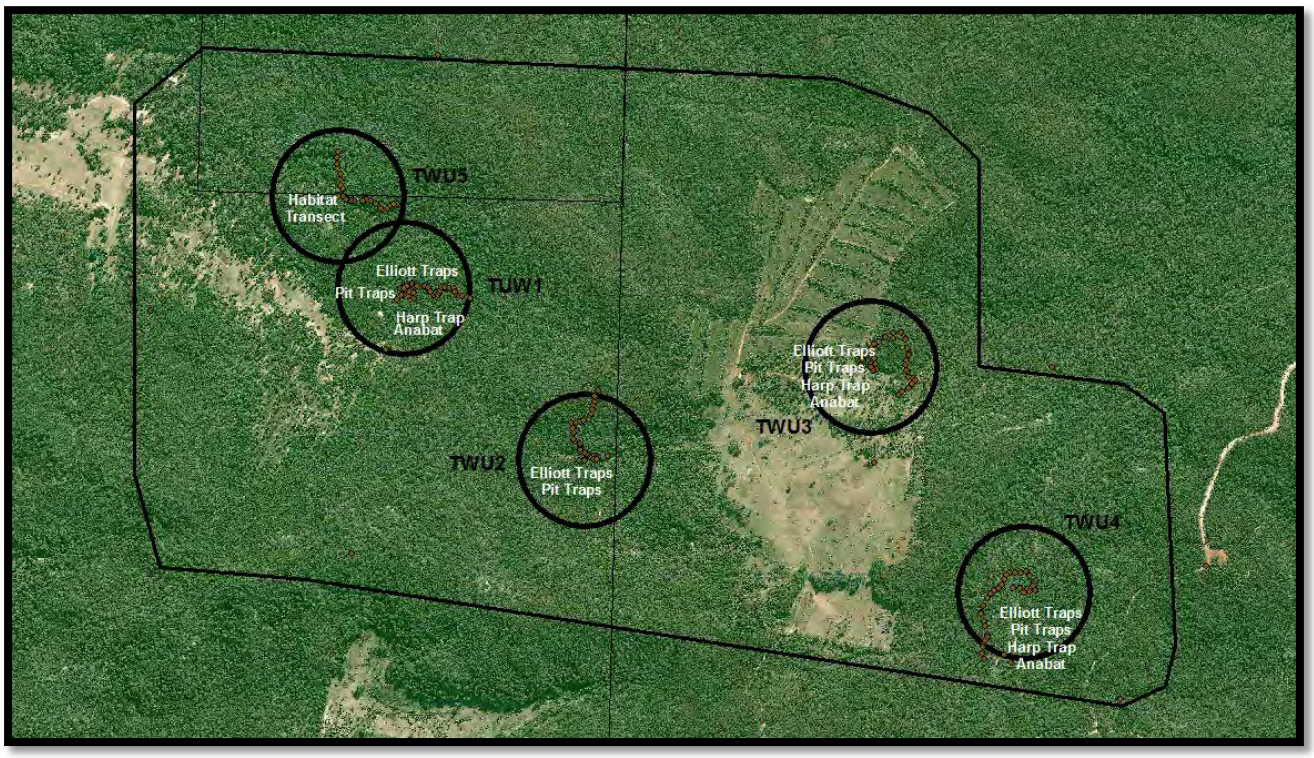
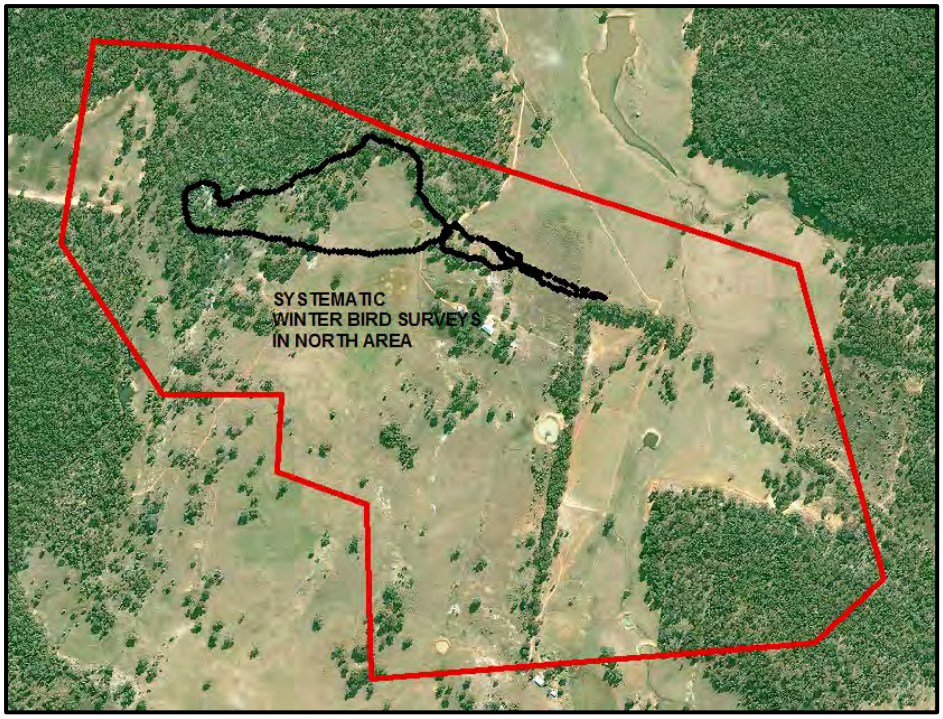
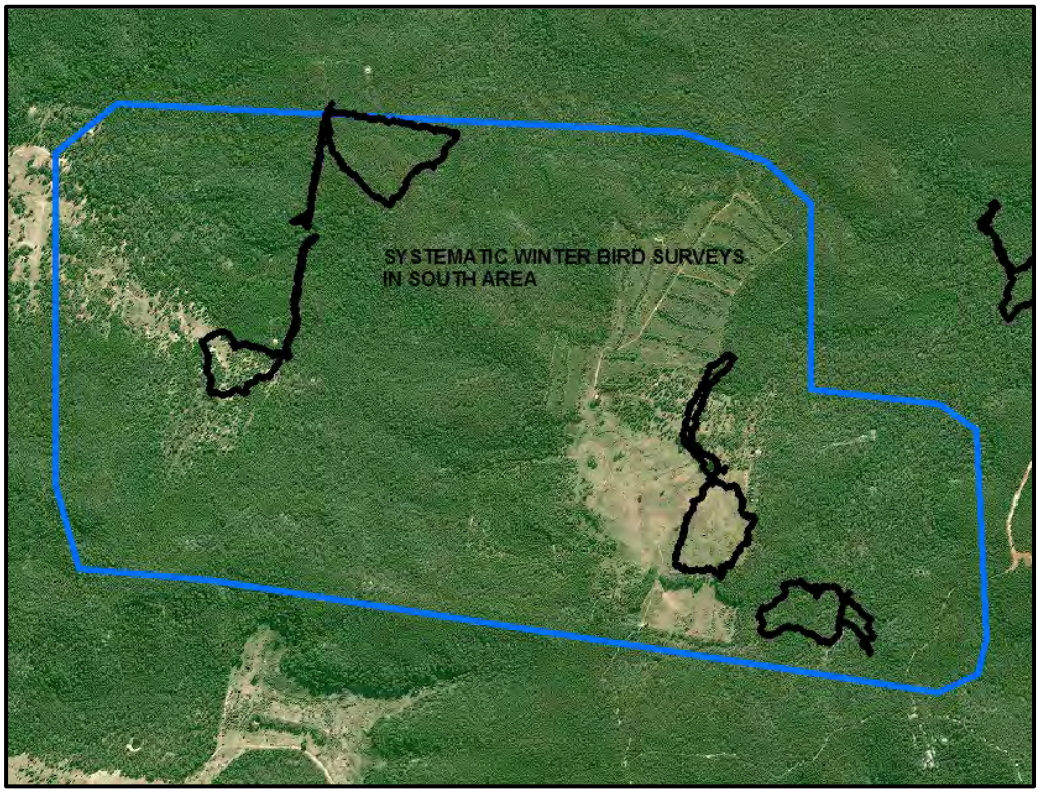


FIGURE 3: ROUTES OF SYSTEMATIC WINTER BIRD SURVEYS IN MODIFICATION 3 AREA

a. NORTH AREA


SYSTEMATIC
WINTER BIRD SURVEYS
IN NORTH AREA

b. SOUTH AREA


SYSTEMATIC WINTER BIRD SURVEYS
IN SOUTH AREA

Red-necked Wallaby Photographed with Remote Camera at TUW4

TABLE 3: LOCATIONS AND DSCRIPTIONS OF EACH SURVEY SITE

SITE NAME	DESCRIPTION	EASTING	NORTHING	SURVEY TYPE
TUW1	Rock outcrop within woodland next to Crown land	752319	6433363	Detailed
TUW2	Rocky rise and ephemeral creek line close to open grassland	752917	6432794	Detailed
TUW3	Rocky rise near low hill close to cleared land	753860	6433104	Detailed
TUW4	Red gum lined creek line within woodland	754365	6432360	Detailed
TUW5	Rocky cliff line within	752105	6433666	Observational

	Crown land			
TUW6	Sparse woodland containing a rocky outcrop and surrounding a cleared paddock	753317	6439698	Observational

The habitat characteristics of each survey site were documented using a standard transect method for structural habitat measurement. The methodology used is given in Section 4.2.4 and the results are in Table 4.

TABLE 4: HABITAT CHARACTERISTICS OF EACH SURVEY SITE

% Cover	TUW1	TUW2	TUW3	TUW4	TUW5	TUW6
Tree Cover	18	24	36	20	40	36
Tall Shrub Cover	12	20	24	24	40	8
Tall Sapling Cover	4	8	16	16	8	24
Low Shrub Cover	32	52	56	72	48	60
Low Sapling Cover	0	4	8	12	0	28
Cutting Grass	12	12	16	40	4	20
Grass Cover	40	52	56	80	56	80
Forb Cover	20	28	40	20	36	60
Fern Cover	16	20	20	4	12	20
Litter Cover	92	100	100	100	92	100
Log Cover	56	48	44	72	32	24
Rock Cover	44	52	72	0	44	24
% Trees with Hollows	12	12	12	8	12	8

4.2.3 Survey Approach

Because of the distance between the two areas and difficulties of access both Detailed and Observational sites were established to ensure complete coverage was obtained. In addition, it was possible to cover each area on foot and to record any fauna located, either directly (visual) or indirectly (scats, burrows, nests etc).

Four Detailed survey sites were established in those areas that contained the greatest amount of woodland habitat and are most likely to be the most sensitive to mining activities. Observational sites were located within each area and provided information about the fauna using a set survey effort. The data from these sites complemented that from the Detailed survey sites and opportunistic observations.

Measurement of habitat characteristics were undertaken in all areas. Habitat characteristics can be used to develop habitat values within the Modification 3 area.

4.2.4 Winter Bird Surveys

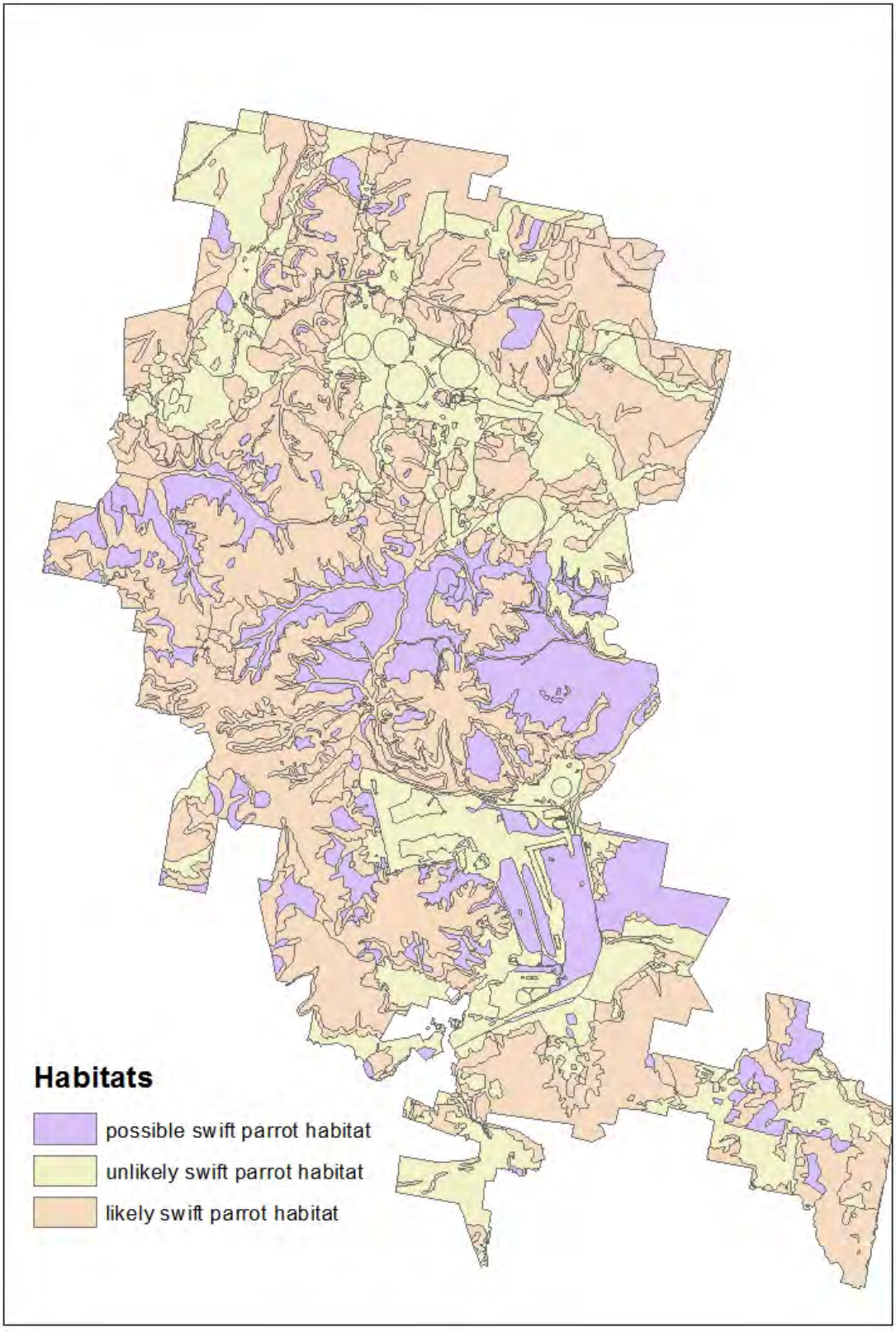
Surveys for winter birds targeted two threatened species listed under the Federal EPBC Act i.e. Swift Parrot and Regent Honeyeater. Both species have the potential of migrating into the area containing Ulan Coal Mine in winter to utilize any flowering trees with sufficient nectar. Modelling[3] of the information on tree species preferences and availability of these tree species within Ulan Coal Mine provides a map of the distribution of habitats that could be used by both species.

[3] Ecological Monitoring Program for Ulan Coal Mine 2013 1. Terrestrial Fauna and Habitats A Report by Biodiversity Monitoring Services, December 2013

Figure 4 shows the distribution of likely, possible and unlikely habitats for Swift Parrot and Regent Honeyeater.

The boundaries of the two Modification areas were overlaid on the habitat map and those parts of areas where likely and possible habitat would be found were surveyed for birds, particularly the Swift Parrot and Regent Honeyeater. Two persons walked for 30 minutes in opposite directions through the targeted habitats and recorded any bird species sighted. Also, trees were inspected for any sign of blossom occurring.

Figure 3: Distribution of Habitats for Swift Parrot and Regent Honeyeater



4.3.5 Survey Methodology

The survey methods followed the guidelines developed and issued by the OEH and by SEWPaC including:

- *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities Working Draft* (NSW Department of Environment and Conservation [DEC], 2004);
- *Threatened Species Survey and Assessment Guidelines: Field Survey Methods for Fauna Amphibians* (NSW Department of Environment and Climate Change [DECC], 2009);
- *Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999* (SEWPaC, 2010a);
- *Survey guidelines for Australia's threatened bats: Guidelines for detecting bats listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999* (SEWPaC, 2010b);
- *Survey guidelines for Australia's threatened frogs: Guidelines for detecting frogs listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999* (SEWPaC, 2010c);
- *Survey Guidelines for Australia's Threatened Mammals* (SEWPaC, 2011a); and
- *Survey Guidelines for Australia's Threatened Reptiles* (SEWPaC, 2011b).

A desktop review (Section 4.1) and field surveys (Section 4.2) were conducted to determine the fauna species and habitat present within the study area and surrounds. A summary of the various techniques used in each Area is given in Table 5.

Koala Spotlighted on Trig Road, near Site TUW4

Table 5: Survey Techniques Used at each Survey Site

Site	GE	TE	LE	Cage	Hair	GT	Pit	Spot	Cam	Harp	Ana	Call1	Call2	Hab	BP	BA	Opp	Scat1	Scat2	Herp	Sc	SP	VE	BN	AT	DO
TUW1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
TUW2	X	X	X	X	X	X	X	X	X	-	-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
TUW3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
TUW4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
TUW5								X		-	-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
TUW6								X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

CODE:

GE Ground Elliotts; TE Tree-mounted Elliotts; LE Large Elliotts; Cage Cage Traps; Hair Hair Funnels; GT Glider Tubes; Pit Pit Traps; Spot Spotlighting Transects; Cam Remote Camera Traps; Harp Harp Traps; Ana Bat Call Recording with Anabat; Call1 Call Broadcast for Marsupials; Call2 Call Broadcasting for Nocturnal Birds; Hab Habitat Structural Analysis; BP Bird Point Count; BA Bird Area Search; Opp Opportunistic Sightings; Scat1 Scat Recognition; Scat2 Scat Analysis; Herp Searches for Reptiles and Amphibians; Sc Scratch Recognition; SP Sand Plots; VE Visual Encounter; BN Burrows and Nests Recognition; AT Animal Track Recognition; DO Direct Observation

The following sections describe the techniques used in detail.

Elliott Trapping

At each detailed survey site 25 small (8 x 10 x 33 centimetre [cm]) Elliott traps were laid in straight lines for five days throughout the habitats. This is equivalent to 100 trap nights over four consecutive nights at each site. The traps were baited with a mixture of rolled oats, peanut butter and bacon fat, and a small piece of dacron was placed within each trap (as protection against the cold). A freezer bag was placed over the end of each trap to prevent the contents becoming wet from rain. At each trap site a description of the physical characteristics of the habitat within a 1 m radius was noted. This information is used in the analysis of habitat values. Two large Elliott traps was placed at each site (totalling eight trap nights per night).

Cage Traps

Three Tomahawk cage traps were laid on the ground and three Tomahawk traps were mounted on trees at each site (24 trap-nights). Two large Elliott traps were placed at each site (8 trap-nights). The large Elliott traps and the Tomahawk traps were baited with apple, muesli bar and chicken.

Hair Funnels

Hair funnels (from Faunatech) were used instead of large and small hair tubes. The design of the tapered hair funnels is such that both large and small animals can be detected by a single funnel. Five hair funnels were set out at each detailed survey site for four nights and baited with a mixture of rolled oats, peanut butter and bacon fat. Where possible, some of the hair funnels were set onto ‘habitat trees’ (these are considered to be trees that showed signs of use by arboreal marsupials and have obvious hollows).

Glider Traps

Tree-mounted plastic tubes were used to capture small arboreal mammals (e.g. Squirrel Glider). These act as vertically mounted pit traps and were baited with a mixture of rolled oats, peanut butter and honey. Two traps were placed at each detailed survey site over four consecutive nights.

Pitfall Traps

Pit traps were constructed from a 20 litre bucket and combined with a 20 m drift fence made from fly-screen wire mesh. These were used where the ground could be dug to a depth to accommodate the buckets. Pit traps were established at four sites (Areas D1 to D4) and used for five days.

Spotlighting

Spotlighting from a moving vehicle was undertaken along tracks within the study area. Spotlighting on foot was also undertaken at some fauna survey sites (TUW1 and TUW6).

Remote Cameras

Digital Scouting Cameras with infrared illumination were set up at all Detailed sites and run for five days. In addition, a remote camera was set up at a small bait station to record any fauna attracted to the bait.

Bird Surveys

In addition to the results obtained from general observations and spotlighting, listening and observing periods were undertaken at all sites. A 30 minute search was used where the observer walked around each site, as well as observing and listening for calls from a single point (point surveys). Where possible, up to four periods of observation were undertaken (two in the morning and two in the late afternoon) at each site.

Call Detection and Playback

Calls of several species of arboreal marsupials and nocturnal birds were broadcast during the night at Detailed survey sites D1 to D4. Calls were broadcast through a megaphone for

approximately five minutes, with a 10 minute listening time. Calls from the Koala (*Phascolarctos cinereus*), Sugar Glider (*Petaurus breviceps*), Squirrel Glider (*Petaurus norfolcensis*), Yellow-bellied Glider (*Petaurus australis*), Bush Stone-curlew (*Burhinus grallarius*), Powerful Owl (*Ninox strenua*), Masked Owl (*Tyto novaehollandiae*), Tawny Frogmouth (*Podargus strigoides*), Barking Owl (*Ninox connivens*), Eastern Grass Owl (*Tyto capensis*), Australian Owlet-nightjar (*Aegotheles cristatus*), Barn Owl (*Tyto alba*), Southern Boobook (*Ninox boobook*) and the Spotted Nightjar (*Eurostopodus mystacalis*) were broadcast.

Herpetological Searches

Systematic searches for reptiles and amphibians were undertaken within each habitat type at each survey site. Litter was raked and rocks and logs turned over. One hundred logs and/or rocks were turned over in sites D1 to D4 and O1. Loose bark was prised from the trunks of dead trees. Each search took approximately 30 minutes and was repeated at each site. Searches for amphibians took place in any wet areas at night using spotlights and recognition of characteristic calls. Spotlighting searches were also undertaken for reptiles, particularly in areas of rock.

Bat Call Detection

An Anabat II Bat Detector with a Compact Flash Storage ZCAIM was placed at Detailed sites TUW1, TUW3, TUW4 and at Observational Site TUW6 for two nights and recorded any bat calls. Bat calls were analysed by Glenn Hoye, FBN Bat Surveys PL.

Harp Traps

Harp traps usually consist of a 1.8 m square frame made of aluminium mounted on adjustable legs. Monofilament fishing line is strung vertically in the frame in two banks, with the lines c. 2.5 cm apart and the banks separated by c. 10 cm, and with the lines of each bank offset. Below the bottom of the frame is a canvas catch bag lined with plastic. Traps are

usually placed in vegetation corridors, over water tanks, and at cave or mine entrances. Bats fly into the fishing lines and slide down into the catch bag from which they cannot escape (Plate 4). Harp traps were placed within Detailed sites TUW1, TUW3, TUW4 and at Observational site TUW6.

Animal Track Recognition

Areas of sand on tracks (sand plots) were inspected for evidence of animal movement. Paw prints and other animal signs e.g. scratches, were identified and recorded.

Opportunistic Observations and Scat Analysis

Any sightings of fauna were recorded whilst moving throughout the survey area (Visual Encounter/Direct Observation) and located using a Global Positioning System. Any scats and owl casts were collected and identified, and their contents analysed. Burrows and nests observed were noted and identified, where possible. Sand plots were used where the ground surface permitted.

4.3.4 Survey Effort

A total of 24 person-days were spent surveying for fauna within the Modification 3 Area in spring, and two person-days in winter. Table 6 provides the survey efforts for each site and each technique used in the Modification 3 area.

Table 5: Survey Effort for Each Site in Modification 3 Area

Site	GE	TE	LE	Cage	Hair	GT	Pit	Spot	Cam	Harp	Ana	Call1	Call2	Hab	BP	BA	Opp	Scat1	Scat2	Herp	Sc	SP	VE	BN	AT	DO
TUW1	100	20	8	30	20	8	16	2	8	2	2	2	2	X	24 person days total throughout the Survey Area											
TUW2	100	20	8	30	20	8	12	2	8	0	0	0	0	X	24 person days total throughout the Survey Area											
TUW3	100	20	8	30	20	8	12	2	8	2	1	0	0	X	24 person days total throughout the Survey Area											
TUW4	100	20	8	30	20	8	12	2	8	2	2	2	2	X	24 person days total throughout the Survey Area											
TUW5								2		0	0	0	0	X	24 person days total throughout the Survey Area											
TUW6								2		2	2	2	2	X	24 person days total throughout the Survey Area											
Total	400 TN	80 TN	32 TN	120 TN	80 TN	32 TN	52 TN	12 hrs	32 TN	8 TN	7 TN	6 nights	6 nights		24 person days total throughout the Survey Area											

CODE:

GE Ground Elliotts; TE Tree-mounted Elliotts; Cage Cage Traps; Hair Hair Funnels; GT Glider Tubes; Pit Pit Traps; Spot Spotlighting Transects; Cam Remote Camera Traps; Harp Harp Traps; Ana Bat Call Recording with Anabat; Call1 Call Broadcast for Marsupials; Call2 Call Broadcasting for Nocturnal Birds; Hab Habitat Structural Analysis; BP Bird Point Count; BA Bird Area Search; Opp Opportunistic Sightings; Scat1 Scat Recognition; Scat2 Scat Analysis; Herp Searches for Reptiles and Amphibians; Sc Scratch Recognition; SP Sand Plots; VE Visual Encounter; BN Burrows and Nests Recognition; AT Animal Track Recognition; DO Direct Observation

TN – Number of Trap Nights

4.3.6 Targeted Surveys for Threatened Species

Records were extracted from the NSW Wildlife Atlas, Atlas of Living Australia and the EPBC Act protected matters search tool, as described in Section 4.1, for threatened fauna species and populations recorded within 20 kilometres of the study area. The results of these database searches are presented in Appendices 1 and 2.

The database results and records of threatened species previously recorded within or surrounding the study area were used as a guide to determine which threatened populations or species (or their habitats) might be present within the study area and surrounds. Habitat requirements of threatened species listed in the database results were reviewed and if habitat resources for the species were present within the study area then this species was also considered to possibly occur within the study area/surrounds for the purpose of the surveys.

The assessment of threatened fauna species likelihood of occurrence within the study area and surrounds is provided in Table 7. A total of 38 threatened fauna species are assessed in Table 7. Threatened species that have the potential to occur within the study area (i.e. excluding those with an "unlikely" rating) are further assessed in Section 6.0.

The following species, although listed as they or their habitat were predicted to occur in the EPBC Act protected matters search, were excluded from assessment in Table 7 due to a lack of necessary habitat components (i.e. wetland habitat), namely the: Murray Cod (*Maccullochella peelii*), Australasian Bittern (*Botaurus poiciloptilus*) and Australian Painted Snipe (*Rostratula australis*). These species are not discussed further in this report.

All of the field survey techniques listed in Section 4.2 were considered appropriate to identify all threatened species listed in Table 7.

4.3.7 Habitat Assessment

a. Trap Site Description

As each Elliott trap was laid in the detailed survey sites (TUW 1 to TUW 4) habitat components within the trap site were recorded. A description was made of the upper, middle and lower storey vegetation, as well as the ground cover, within an area formed by a 1 m radius around each trap. For example, if 15 trap sites out of a trap line of 20 Elliott traps contained a shrub, then it was estimated that the shrub cover in that survey site was 75%.

A similar approach was taken for habitat assessment within the two Observational sites i.e. a walk 250 m in length was undertaken and the habitat was measured at 10 m intervals.

b. Walking Transects

A second method for describing habitat characteristics involves a 50 m walking transect at each survey site. Within each transect, the following habitat characteristics are measured:

1. Upper and Middle Strata Vegetation Density. During walking transects the number of trees and saplings (upper strata) and shrubs (middle strata) are counted within a strip 50m long and 2m wide. The densities of trees and shrubs are calculated as number per hectare.
2. Tree and Shrub Height. Any trees/saplings or shrubs located during the transect are measured for height. Trees are measured to the nearest metre and shrubs and saplings

to the nearest 10cm. Mean heights are calculated from these measurements.

3. Lower Strata Vegetation Density. At five points along each transect, a quarter square metre quadrat is laid upon the ground. Visual estimates are made of the relative proportions of ground cover contributed by grass, forbs, moss, vines, rocks, ferns, litter and logs. These are measured as % cover, using canopy cover as the parameter for grass, forbs and ferns. Total % ground cover within some quadrats is more than 100% because of the overlapping nature of some of the components.
4. Diameter Breast Height (DBH). The diameter of each tree within the transect is measured at about breast height (this is a standard forestry measurement of tree size).
5. Grass and Forb Height. The average height of the grasses and forbs within each quadrat is measured to the nearest 1cm, when the plants are less than 10cm tall, and in 5cm intervals if taller than 10cm.
6. Litter Mass. All leaf litter is cleared from each quadrat and placed in a plastic bag and weighed to the nearest 10g. Larger sticks and rocks are rejected.
7. Presence of hollows and mistletoe. Each tree encountered along the transect was inspected and the presence of tree hollows, scratches and mistletoe was documented.

TABLE 7: THREATENED SPECIES KNOWN FROM THE LOCALITY OF THE MODIFICATION 3 AREA

Scientific Name	Common Name	Habitat Preference	Species Previously Recorded within the Study Area or Surrounds?	Likelihood of Occurrence
Lophoictinia isura	Square-tailed Kite	Eucalypt woodland, open forest and heath-woodland.	Located within Ulan Coal Mine during monitoring surveys	Possible to occur in the Modification 3 area.
Hieraaetus morphnoides	Little Eagle	Woodland, forest, farmland, grasslands, crops, treeless dune fields, and recently logged areas.	Located within Ulan Coal Mine during monitoring surveys	Possible to occur in the Modification 3 area.
Hamirostra melanosternon	Black-breasted Buzzard	Woodlands, grasslands and timbered watercourses	Located on one occasion at Ulan Coal Mine	Possible to occur in the Modification 3 area.
Anseranas semipalmata	Magpie Geese	Seasonal wetlands and dams	Located on one occasion at Ulan Coal Mine (Rowans Dam)	Unlikely to occur as no preferred habitats
Calyptorhynchus lathami	Glossy Black-cockatoo	Forest and woodland with abundant Casuarina trees.	Located within Ulan Coal Mine during monitoring surveys	Occurs in the Modification 3 area.
Callocephalon fimbriatum	Gang-gang Cockatoo	Woodland and forests of mountains and gullies.	Located within Ulan Coal Mine during monitoring surveys	Possible to occur in the Modification 3 area.
Glossopsitta pusilla	Little Lorikeet	Open eucalypt forests and woodlands.	Located within Ulan Coal Mine during monitoring surveys	Possible to occur in the Modification 3 area.
Neophema pulchella	Turquoise Parrot	Open woodlands and eucalypt forests with a ground cover of grasses and under storey of low shrubs. Pasture edges.	Located within Ulan Coal Mine during monitoring surveys	Possible to occur in the Modification 3 area.

Scientific Name	Common Name	Habitat Preference	Species Previously Recorded within the Study Area or Surrounds?	Likelihood of Occurrence
Lathamus discolor	Swift Parrot	Dry sclerophyll eucalypt forests and woodlands.	Some sightings of Swift Parrot at Ulan Coal Mine.	Possible to occur in the Modification 3 area as preferred tree species available.
Polytelis swainsonii	Superb Parrot	Box-Gum, Box-Cypress-pine and Boree Woodlands and River Red Gum Forest.	No records in the Ulan area.	Possible to occur but unlikely as no records despite surveys for more than 30 years.
Tyto novaehollandiae	Masked Owl	Diverse range of wooded habitat.	Not known from Ulan Coal Mine despite more than 30 years surveys.	Possible to occur but unlikely as no records despite surveys for more than 30 years.
Ninox strenua	Powerful Owl	Forests and woodlands.	Located within Ulan Coal Mine during monitoring and other surveys.	Possible to occur in the Modification 3 area.
Ninox connivens	Barking Owl	Dry forests and woodlands	Located within Ulan Coal Mine and surroundings during monitoring and other surveys.	Possible to occur in the Modification 3 area.
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	Eucalypt woodlands (including Box-Gum Woodland) and dry open forest.	Located within Ulan Coal Mine during monitoring and other surveys.	Possible to occur in the Modification 3 area.
Chthonicola sagittata	Speckled Warbler	Eucalyptus dominated communities that have a grassy understorey (OEH, 2013a).	Located within Ulan Coal Mine during monitoring and other surveys.	Occurs in the Modification 3 area.
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	Drier open forests or woodlands dominated by box and ironbark eucalypts.	Located within Ulan Coal Mine during monitoring surveys.	Occurs in the Modification 3 area.

Scientific Name	Common Name	Habitat Preference	Species Previously Recorded within the Study Area or Surrounds?	Likelihood of Occurrence
Anthochaera Phrygia	Regent Honeyeater	Temperate eucalypt woodlands and open forests.	Not known from Ulan Coal Mine despite more than 30 years surveys. Known from nearby Moolarbin.	Possible to occur in the Modification 3 area but unlikely as not found in area despite more than 30 years surveys.
Grantiella picta	Painted Honeyeater	Forest, dry scrub and woodland (often with abundant mistletoe).	Located within Ulan Coal Mine during monitoring surveys.	Possible to occur in the Modification 3 area.
Certhionyx variegatus	Pied Honeyeater	Arid woodland, mallee, acacia scrub, spinifex and drier heath.	Not known from Ulan Coal Mine despite more than 30 years surveys.	Unlikely to occur in the Modification 3 area, as range is to the west and utilise Acacia woodlands not available at study area.
Melanodryas cucullata cucullata	Hooded Robin (SE form)	Lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee.	Located within Ulan Coal Mine during monitoring and other surveys.	Possible to occur in the Modification 3 area.
Petroica boodang	Scarlet Robin	Forests and woodlands.	Located within Ulan Coal Mine during monitoring and other surveys.	Occurs in the Modification 3 area.
Petroica phoenicea	Flame Robin	Rainforest, wet eucalypt forest, woodland and more open woodland and farmland.	Located within Ulan Coal Mine during monitoring and other surveys.	Possible to occur in the Modification 3 area.
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	Open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands.	Located within Ulan Coal Mine during monitoring and other surveys.	Occurs in the Modification 3 area.
Daphoenositta chrysoptera	Varied Sittella	Eucalypt forests and woodlands.	Located within Ulan Coal Mine during monitoring and other surveys.	Occurs in the Modification 3 area.
Scientific Name	**Common Name**	**Habitat Preference**	**Species Previously Recorded**	**Likelihood of Occurrence**

			within the Study Area or Surrounds?	
Stagonopleura guttata	Diamond Firetail	Grassy eucalypt woodlands, open forest, mallee, natural and derived grasslands.	Located within Ulan Coal Mine during monitoring and other surveys.	Possible to occur in the Modification 3 area.
Mammals				
Dasyurus maculatus	Spotted-tailed Quoll	Rainforest, open forest, woodland, coastal heath and inland riparian forest.	Not known from Ulan Coal Mine despite more than 30 years surveys.	Unlikely to occur in the Modification 3 area due to a lack of records within or near the study area.
Phascolarctos cinereus	Koala	Eucalypt forests and woodlands (OEH, 2013a).	Some records of sightings in and near Ulan Coal Mine.	Occurs in the Modification 3 area.
Petaurus norfolcensis	Squirrel Glider	Forest and woodland with habitat hollows and nectar resources.	Located within Ulan Coal Mine during monitoring surveys.	Possible to occur in the Modification 3 area.
Petrogale penicillata	Brush-tailed Rock-wallaby	Rocky escarpments.	One possible sightings several years ago but no record since despite targeted searches.	Unlikely to occur in the Modification 3 area due to a lack of records within or near the study area.
Pteropus poliocephalus	Grey-headed Flying Fox	Mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest.	An individual located at Ulan Coal Mine recently after more than 30 years surveys.	Possible to occur in the Modification 3 area as an individual in transect.
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	Wet and dry forests, grasslands, shrublands, Mallee and open woodlands.	Located within Ulan Coal Mine during monitoring surveys.	Possible to occur in the Modification 3 area.
Mormopterus norfolkensis	Eastern Freetail-bat	Rainforest, Melaleuca forest, monsoon forest, tall open forest, River Red Gum and Yellow Box woodlands, riparian open forest and dry sclerophyll forest (Churchill, 2008).	Located within Ulan Coal Mine during monitoring surveys.	Possible to occur in the Modification 3 area.
Scientific Name	**Common Name**	**Habitat Preference**	**Species Previously Recorded**	**Likelihood of Occurrence**

			within the Study Area or Surrounds?	
Miniopterus schreibersii oceanensis	Eastern Bentwing-bat	Rainforest, wet and dry sclerophyll forest, monsoon forest, open woodland, Melaleuca forests and open grasslands (Churchill, 2008).	Located within Ulan Coal Mine during monitoring surveys.	Occurs in the Modification 3 area.
Nyctophilus corbeni	Corben's/ South-eastern Long-eared Bat	Rainforest, wet and dry sclerophyll forest, paperbark forest and open grasslands (OEH, 2013a).	Not located at Ulan Coal Mine but known from nearby Wilpinjong.	Possible to occur in the Modification 3 area.
Chalinolobus dwyeri	Large-eared Pied Bat	Dry sclerophyll forests and woodlands, sub-alpine woodland, the edge of rainforest, wet sclerophyll forest and sandstone outcrop country (Churchill, 2008).	Located within Ulan Coal Mine during monitoring surveys.	Occurs in the Modification 3 area.
Falsistrellus tasmaniensis	Eastern False Pipistrelle	Wet sclerophyll and coastal mallee, tall and wet forests where trees are more than 20 m high (Churchill, 2008).	Located within Ulan Coal Mine during monitoring surveys.	Possible to occur in the Modification 3 area.
Vespadelus troughtoni	Eastern Cave Bat	Dry open forest and woodland, near cliffs or rocky overhangs (OEH, 2013a).	Located within Ulan Coal Mine during monitoring surveys.	Possible to occur in the Modification 3 area.
Pseudomys novaehollandiae	New Holland Mouse	Open heathland, open woodland with a heathland understorey and vegetated sand dunes (SEWPaC, 2013b).	Not known from Ulan Coal Mine despite more than 30 years surveys.	Unlikely to occur in the Modification 3 area due to a lack of records within or near the study area.

4.3.8 Statistical Analyses of Results

Because of the accumulation of data under formal survey conditions it is possible to calculate some comparisons and relationships from the results of the survey.

Total numbers and species richness (number of species per site) are the simplest measures used to determine biodiversity of a site. However, these indices miss the information that some species may be rare and others common. The Simpson's Index of Diversity (D) takes into account both the abundance patterns and the species richness of a community. This index measures the probability that two individuals randomly selected from a sample will belong to the same species (or some category other than species). It is possible to calculate Simpson's Index of Diversity for mammal, bird and reptile populations from each survey site for most survey periods.

An Evenness score is also calculated. Evenness is a measure of the relative abundance of different species making up the richness of an area. A low value for Evenness means that the sample is dominated by a large number of one or two species. A high Evenness value means that most species in the sample have a similar abundance.

The advantage of the long history of fauna surveys in Ulan Coal Mine is that comparisons can be drawn between the data from the Modification 3 area and that from Ulan Coal Mine. Such a comparison provides information about the Modification 3 area in regards to its similarity with the remainder of the mine environment. It will assist in deciding whether the Modification 3 area is representative of the overall biodiversity of the area.

5 RESULTS

5.1 Fauna Recorded

A total of 86 bird, 21 native mammal, 8 introduced mammal, 15 reptile and four amphibian species were located within the Modification 3 area. These are listed, together with their status in NSW, in Table 8.

TABLE 8: FAUNA SPECIES LOCATED WITHIN THE MODIFICATION 3 SURVEY AREAS

a. BIRDS

Scientific Name	Common Name	Status
Pelecanidae		
Pelecanus conspicillatus	Australian Pelican	P
Dromaiidae		
Dromaius novaehollandiae	Emu	P
Anatidae		
Chenonetta jubata	Australian Wood Duck	P
Ardeidae		
Egretta novaehollandiae	White-faced Heron	P
Threskiornithidae		
Threskiornis spinicollis	Straw-necked Ibis	P
Accipitridae		
Aquila audax	Wedge-tailed Eagle	P
Falconidae		
Falco cenchroides	Nankeen Kestrel	P
Charadriidae		
Vanellus miles	Masked Lapwing	P
Columbidae		
Ocyphaps lophotes	Crested Pigeon	P
Phaps chalcoptera	Common Bronzewing	P
Cacatuidae		
Cacatua galerita	Sulphur-crested Cockatoo	P
Calyptorhynchus lathami	Glossy Black-Cockatoo	V
Calyptorhynchus funereus	Yellow-tailed Black-Cockatoo	P
Eolophus roseicapillus	Galah	P

Scientific Name	Common Name	Status
Psittacidae		
Alisterus scapularis	Australian King-Parrot	P
Psephotus haematonotus	Red-rumped Parrot	P
Glossopsitta concinna	Musk Lorikeet	P
Platycercus adscitus eximius	Eastern Rosella	P
Platycercus elegans	Crimson Rosella	P
Cuculidae		
Cacomantis flabelliformis	Fan-tailed Cuckoo	P
Strigidae		
Ninox novaeseelandiae	Southern Boobook	P
Podargidae		
Podargus strigoides	Tawny Frogmouth	P
Halcyonidae		
Todiramphus sanctus	Sacred Kingfisher	P
Dacelo novaeguineae	Laughing Kookaburra	P
Meropidae		
Merops ornatus	Rainbow Bee-eater	P
Menuridae		
Menura novaehollandiae	Superb Lyrebird	P
Climacteridae		
Climacteris picumnus	Brown Treecreeper (eastern sub-species)	V
Cormobates leucophaeus	White-throated Treecreeper	P
Maluridae		
Malurus lamberti	Variegated Fairy-wren	P
Malurus cyaneus	Superb Fairy-wren	P
Pardalotidae		
Pardalotus punctatus	Spotted Pardalote	P
Pardalotus striatus	Striated Pardalote	P
Acanthizidae		
Acanthiza chrysorrhoa	Yellow-rumped Thornbill	P
Acanthiza lineata	Striated Thornbill	P
Acanthiza nana	Yellow Thornbill	P
Acanthiza pusilla	Brown Thornbill	P
Acanthiza reguloides	Buff-rumped Thornbill	P
Gerygone olivacea	White-throated Gerygone	P
Origma solitaria	Rockwarbler	P
Pyrrholaemus sagittatus	Speckled Warbler	V
Sericornis frontalis	White-browed Scrubwren	P
Smicrornis brevirostris	Weebill	P
Meliphagidae		
Acanthagenys rufogularis	Spiny-cheeked Honeyeater	P
Acanthorhynchus tenuirostris	Eastern Spinebill	P
Anthochaera carunculata	Red Wattlebird	P
Lichenostomus chrysops	Yellow-faced Honeyeater	P
Lichenostomus leucotis	White-eared Honeyeater	P

Scientific Name	Common Name	Status
Lichenostomus penicillatus	White-plumed Honeyeater	P
Manorina melanocephala	Noisy Miner	P
Melithreptus brevirostris	Brown-headed Honeyeater	P
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subsp.)	V
Melithreptus lunatus	White-naped Honeyeater	P
Myzomela sanguinolenta	Scarlet Honeyeater	P
Philemon corniculatus	Noisy Friarbird	P
Plectorhyncha lanceolata	Striped Honeyeater	P
Petroicidae		
Eopsaltria australis	Eastern Yellow Robin	P
Microeca fascinans	Jacky Winter	P
Petroica rosea	Rose Robin	P
Petroica boodang	Scarlet Robin	V
Pomatostomidae		
Pomatostomus temporalis temporalis	Grey-crowned Babbler (south-eastern sub-species)	V
Eupetidae		
Cinclosoma punctatum	Spotted Quail-thrush	P
Psophodes olivaceus	Eastern Whipbird	P
Neosittidae		
Daphoenositta chrysoptera	Varied Sittella	V
Pachycephalidae		
Colluricincla harmonica	Grey Shrike-thrush	P
Falcunculus frontatus	Eastern Shrike-tit	P
Pachycephala pectoralis	Golden Whistler	P
Pachycephala rufiventris	Rufous Whistler	P
Dicruridae		
Grallina cyanoleuca	Magpie-lark	P
Rhipidura albiscapa	Grey Fantail	P
Rhipidura leucophrys	Willie Wagtail	P
Artamidae		
Artamus cyanopterus	Dusky Woodswallow	P
Cracticus nigrogularis	Pied Butcherbird	P
Cracticus torquatus	Grey Butcherbird	P
Gymnorhina tibicen	Australian Magpie	P
Strepera graculina	Pied Currawong	P
Campephagidae		
Coracina novaehollandiae	Black-faced Cuckoo-shrike	P
Oriolidae		
Oriolus sagittatus	Olive-backed Oriole	P
Corvidae		
Corvus coronoides	Australian Raven	P
Corcoracidae		
Corcorax melanorhamphos	White-winged Chough	P

Scientific Name	Common Name	Status
Zosteropidae		
Zosterops lateralis	Silvereye	P
Dicaeidae		
Dicaeum hirundinaceum	Mistletoebird	P
Motacillidae		
Anthus australis	Australasian Pipit	P
Estrilidae		
Taeniopygia bichenovii	Double-barred Finch	P
Stagonopleura guttata	Diamond Firetail	V
Neochmia temporalis	Red-browed Finch	P

b. MAMMALS

Scientific Name	Common Name	Status
Tachyglossidae		
Tachyglossus aculeatus	Short-beaked Echidna	P
Dasyuridae		
Antechinus flavipes	Yellow-footed Antechinus	P
Petauridae		
Petaurus breviceps	Sugar Glider	P
Phalangeridae		
Trichosurus vulpecula	Common Brushtail Possum	P
Pseudocheiridae		
Pseudocheirus peregrinus	Common Ringtail Possum	P
Phascolarctidae		
Phascolarctos cinereus	Koala	V
Vombatidae		
Vombatus ursinus	Bare-nosed Wombat	P
Macropodidae		
Macropus giganteus	Eastern Grey Kangaroo	P
Macropus robustus	Common Wallaroo	P
Macropus rufogriseus	Red-necked Wallaby	P
Wallabia bicolor	Swamp Wallaby	P
Muridae		
Rattus fuscipes	Southern Bush Rat	P
Vespertilionidae		
Mormopterus sp.4	Southern Freetail Bat	P
Miniopterus schreibersii oceanensis	Eastern Bent-wing Bat	V
Scotorepens balstoni	Inland Broad-nosed Bat	P
Chalinolobus gouldii	Gould's Wattled Bat	P
Chalinolobus morio	Chocolate Wattled Bat	P
Nyctophilus geoffroyi	Lesser Long-eared Bat	P
Nyctophilus gouldi	Gould's Long-eared Bat	P
Tadarida australis	White-striped Mastiff Bat	P
Vespadelus vulturnus	Little Forest Bat	P

Scientific Name	Common Name	Status
Canidae		
Canis lupus	Dingo, domestic dog	U
Vulpes vulpes	Red Fox	U
Felidae		
Felis catus	Cat	U
Bovidae		
Bos taurus	European cattle	U
Capra hircus	Goat	U
Suidae		
Sus scrofa	Feral Pig	U
Leporidae		
Lepus capensis	Brown Hare	U
Oryctolagus cuniculus	Rabbit	U

c. REPTILES

Scientific Name	Common Name	Status
Cheluidae		
Chelodina longicollis	Eastern Snake-necked Turtle	P
Agamidae		
Amphibolurus nobbi	Nobbi	P
Pogona barbata	Eastern Bearded Dragon	P
Gekkonidae		
Diplodactylus vittatus	Eastern Stone Gecko	P
Oedura lesueurii	Lesueur's Velvet Gecko	P
Varanidae		
Varanus varius	Lace Monitor	P
Scincidae		
Anomalopus leuckartii	Two-claw Worm-skink	P
Carlia tetradactyla	Southern Rainbow Skink	P
Cryptoblepharus virgatus	Cream-striped Shining-skink	P
Ctenotus taeniolatus	Copper-tailed Ctenotus	P
Eulamprus tenuis	Bar-sided Forest-skink	P
Morethia boulengeri	South-eastern Morethia Skink	P
Elapidae		
Pseudechis porphyriacus	Red-bellied Black Snake	P
Pseudonaja textilis	Eastern Brown Snake	P

d. AMPHIBIANS

Scientific Name	Common Name	Status
Myobatrachidae		
Limnodynastes dumerilii	Eastern Banjo Frog	P
Limnodynastes ornatus	Ornate Burrowing Frog	P
Neobatrachus sudelli	Painted Burrowing Frog	P
Pseudophryne bibronii	Bibron's Toadlet	P

Code: NSW Status P – Protected, V – Vulnerable, U – Introduced

Threatened Species highlighted in green

Table 9 provides information about the biodiversity values for each fauna group.

Table 9: Biodiversity Indices for Fauna Groups in the Modification 3 Area

Fauna Group	Evenness	Simpson's Index of Diversity (1/D)	Number Recorded	Species Richness
BIRDS	0.875	0.975	2142	86
NATIVE MAMMALS (non-bats)	0.681	0.742	280	12
BATS*	0.649	0.622	36	6
REPTILES	0.774	0.841	107	15
AMPHIBIANS	0.678	0.561	12	4

***Bat records from harp trap captures only**

These values can be compared with those obtained from the 2013 monitoring surveys within Ulan Coal Mine. The 2013 report for fauna monitoring surveys at Ulan Coal Mine[4] provides information on the biodiversity indices for the entire mine area. As the survey effort and area covered was far greater for the monitoring surveys when compared to that in the Modification area only Evenness and Simpson's Index of Diversity are used as comparison. The results from the monitoring surveys and the Modification 3 surveys are given in Table 10 and shown in Figure 3.

TABLE 10: BIODIVERSITY INDICES FOR MODIFICATION 3 AREA AND ULAN COAL MINE

a. BIODIVERSITY INDICES

Survey	Evenness			Simpson's Index of Diversity			Species Richness		
	Bird	Mammal	Reptile	Bird	Mammal	Reptile	Bird	Mammal*	Reptile
Modification 3 Area	0.87	0.68	0.77	0.97	0.74	0.84	86	12	15
Ulan Coal Mine 2013	0.83	0.67	0.79	0.98	0.74	0.87	144	11	18

b. RANGE OF VALUES FOR SIMPSON'S INDEX OF DIVERSITY FROM 8 – 14 YEARS SURVEYS AT ULAN COAL MINE

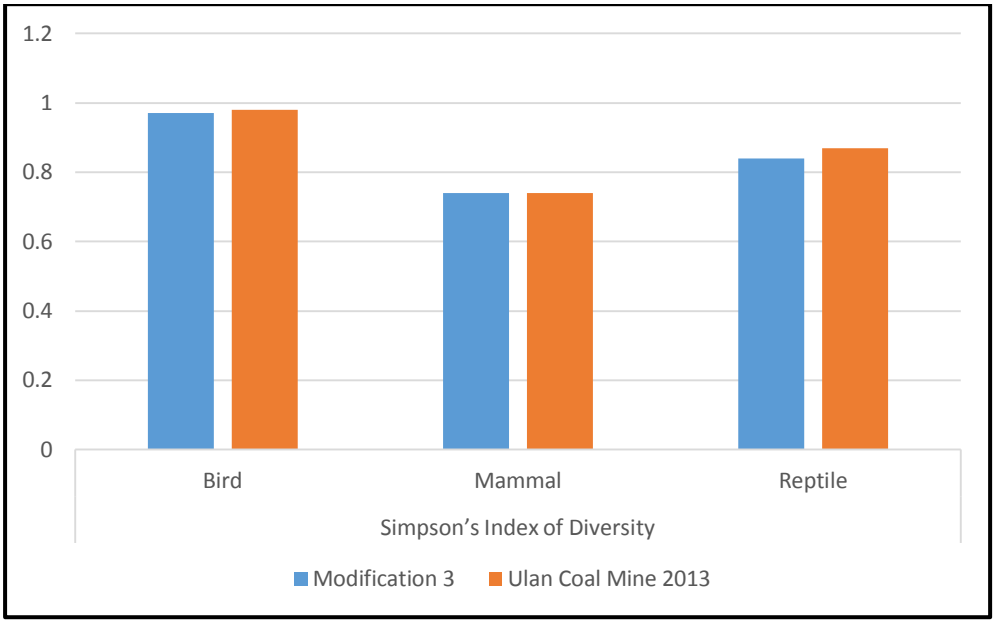
Fauna Group	25th Percentile	Median	75th Percentile
Birds	0.90	0.94	0.97
Mammals	0.60	0.62	0.66
Reptiles	0.79	0.84	0.86

* Non-bat species

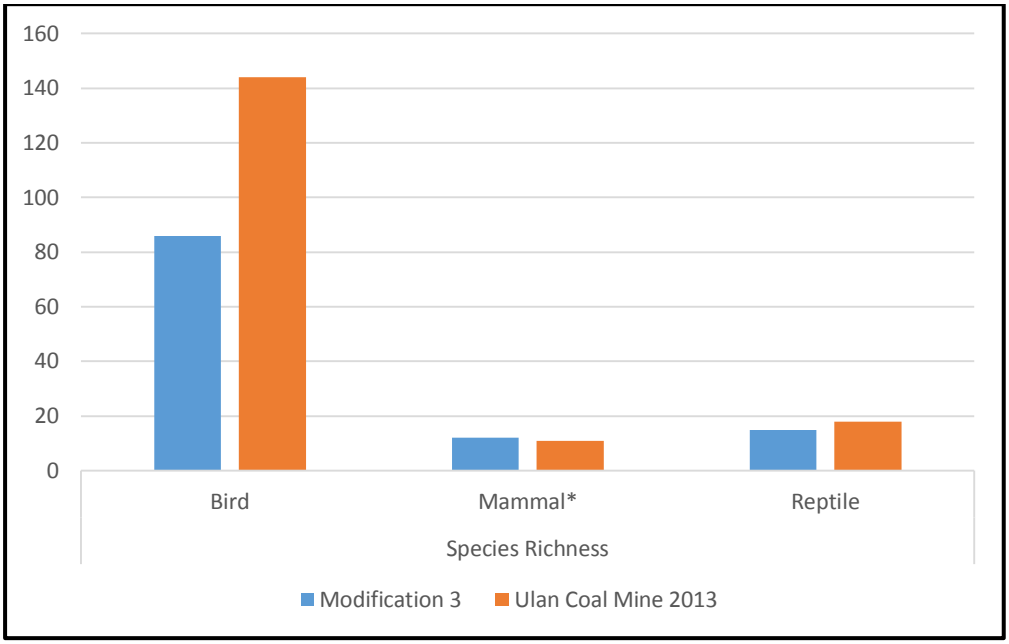
[4] Ecological Monitoring Program for Ulan Coal Mine 2013 1. Terrestrial Fauna and Habitats A Report by Biodiversity Monitoring Services, December 2013

FIGURE 3: COMPARISON BETWEEN BIODIVERSITY INDICES FROM MODIFICATION 3 AREA AND ULAN COAL MINE

A. SIMPSON'S INDEX OF DIVERSITY



B. SPECIES RICHNESS



The comparisons show that the biodiversity measured within the Modification 3 area is similar to that found throughout Ulan Coal Mine (no significant differences using a non-parametric Mann-Whitney Rank Sum Test). This is to be expected as, overall, the habitats and their characteristics are similar. Bird species richness was lower within the Modification 3 area but that would be due to the smaller area and less survey time. Similarly for reptile species richness. The biodiversity values obtained from the Modification 3 area are within or close to the upper end (75th percentile) of 'normal' ranges of these values for all of Ulan Coal Mine. The use of this comparative analysis shows that the land within the Modification 3 area can be managed in a similar fashion to that currently in use throughout Ulan Coal Mine.

5.2 Threatened Fauna Species

5.2.1 Number of Threatened Species in Modification 3 Area

Ten threatened species were located during the present surveys of the Modification 3 Area. These are given as Table 11, together with information about how and where located. Figure 4 shows the locations of these Threatened species. Of the 10 species located, the Glossy Black-Cockatoo and Grey-crowned Babbler were the most common, followed by the Speckled Warbler, Scarlet Robin and Varied Sittella. The Eastern Bent-wing Bat was the only threatened bat species located (by analysis of anabat recordings), although nine bat species were located within the Modification area.

Although targeted surveys for the Swift Parrot and Regent Honeyeater were undertaken within the Modification 3 area during winter, neither species were located. Tree inspection showed that few eucalypt trees were in flower at the time of the survey and that the preferred feed tree species had mainly

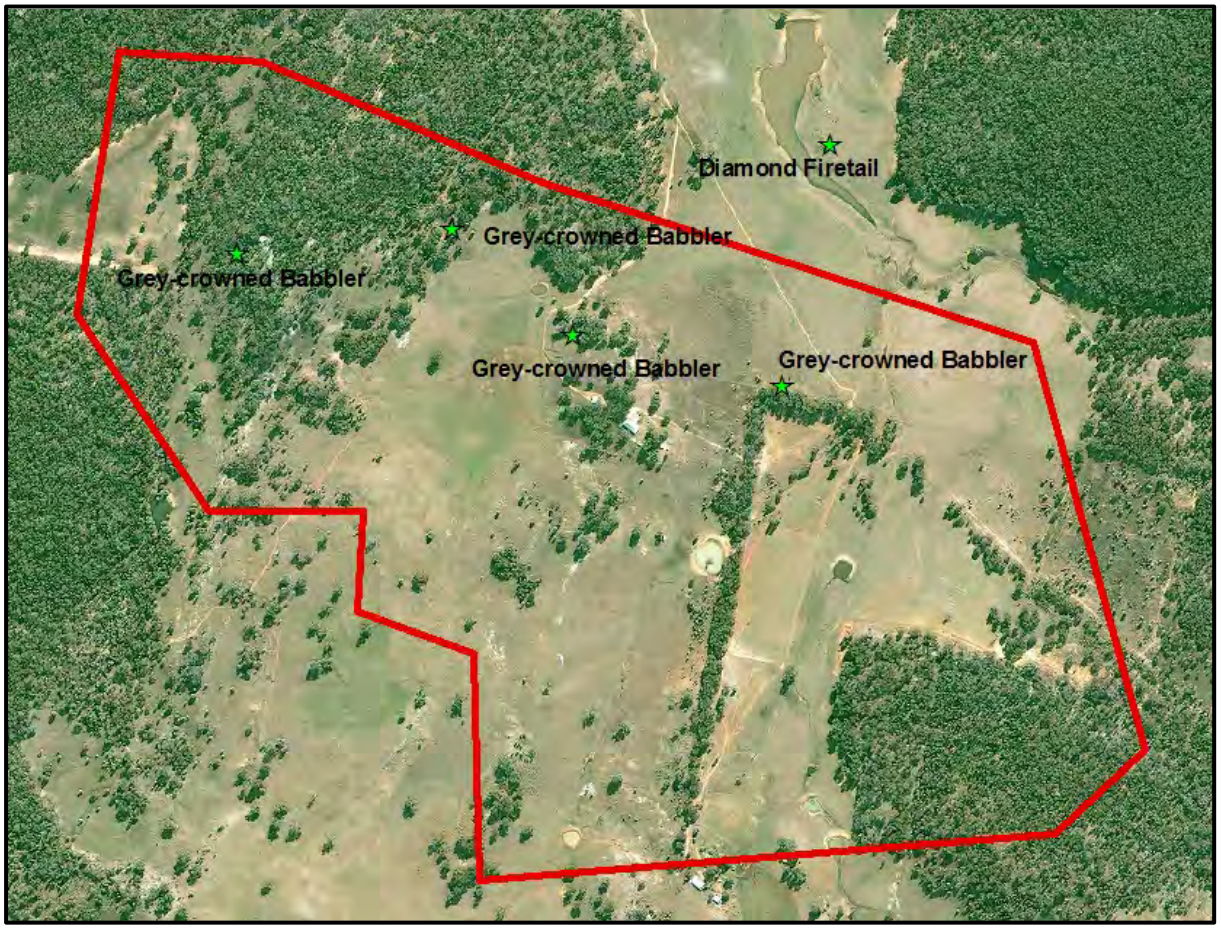
undergone flowering. A survey for the Swift Parrot and Regent Honeyeater was also undertaken throughout Ulan Coal Mine and, again, none were located and no preferred feed tree species were in flower.

TABLE 11: THREATENED SPECIES LOCATED WITHIN MODIFICATION 3 AREA

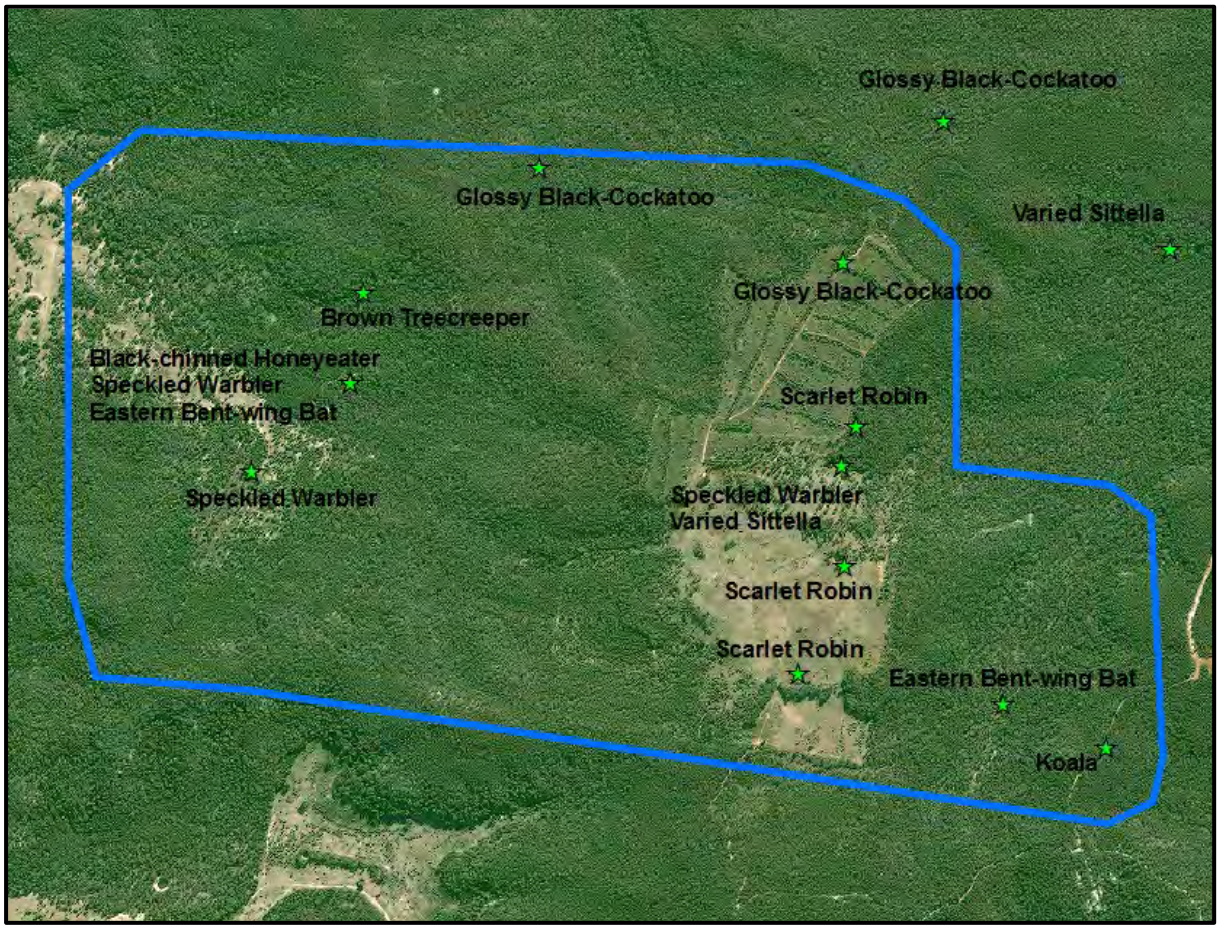
DATE	EASTING	NORTHING	COMMON	NUMBER	METHOD
13/03/2014	752319	6433363	Black-chinned Honeyeater (eastern subsp.)	1	Heard
25/06/2014	752360	6433647	Brown Treecreeper	1	Sight
19/03/2014	754214	6439938	Diamond Firetail	1	Sight
15/03/2014	753862	6433743	Glossy Black-Cockatoo	2	Sight
15/03/2014	754178	6434185	Glossy Black-Cockatoo	1	Heard
2/05/2014	754997	6431645	Glossy Black-Cockatoo	1	Feeding Signs
28/06/2014	752910	6434036	Glossy Black-Cockatoo	1	Feeding signs
19/03/2014	753526	6439786	Grey-crowned Babbler (south-eastern sub-species)	2	Heard
20/03/2014	753746	6439592	Grey-crowned Babbler (south-eastern sub-species)	2	Heard
26/06/2014	753137	6439741	Grey-crowned Babbler (south-eastern sub-species)	2	Heard
26/06/2014	754127	6439499	Grey-crowned Babbler (south-eastern sub-species)	6	Sight
16/03/2014	754687	6432223	Koala	1	Spotlight
14/03/2014	753869	6432789	Scarlet Robin	1	Heard
25/06/2014	753720	6432453	Scarlet Robin	2	Sight
25/06/2014	753902	6433227	Scarlet Robin	1	Sight
16/03/2014	753860	6433104	Speckled Warbler	1	Sight
17/03/2014	752319	6433363	Speckled Warbler	1	Sight
25/06/2014	752008	6433087	Speckled Warbler	1	Sight
26/06/2014	753137	6439741	Speckled Warbler	2	Sight
16/03/2014	753860	6433104	Varied Sittella	3	Sight
28/04/2014	752768	6434841	Varied Sittella	20	Sight
25/06/2014	754889	6433785	Varied Sittella	1	Sight
14/03/2014	752319	6433363	Eastern Bent-wing Bat	?	Call
15/03/2014	754365	6432360	Eastern Bent-wing Bat	?	Call
18/03/2014	753526	6439786	Eastern Bent-wing Bat	?	Call

FIGURE 4: DISTRIBUTION OF THREATENED SPECIES RECORDS WITHIN OR NEAR MODIFICATION 3 AREAS

a. North Area



b. South Area


Glossy Black-Cockatoo
Glossy Black-Cockatoo
Varied Sittella
Glossy Black-Cockatoo
Brown Treecreeper
Black-chinned Honeyeater
Speckled Warbler
Eastern Bent-wing Bat
Scarlet Robin
Speckled Warbler
Speckled Warbler
Varied Sittella
Scarlet Robin
Scarlet Robin
Eastern Bent-wing Bat
Koala

5.3 Habitat Assessment

The habitat characteristics were measured by two methods; trap site descriptions and walking transects. Both method are described in Section 4.3.7. The results from the trap site descriptions are shown in Table 4 and those from the walking transects are in Table 12.

TABLE 12: HABITAT CHARACTERISTICS OF THE SIX SURVEY SITES

	TUW1	TUW2	TUW3	TUW4	TUW5	TUW6	Mean
Tree Ht (m)	9.5	8.3	12	10.5	10.1	10.3	10.1
Tree DBH (cm)	22.9	21.8	32.5	24.2	26.5	37.7	27.6
Shrub Ht (cm)	129	122	100	86.9	56.4	47.5	90.3
Sapling Ht (m)	-	4.4	7	3.1	6	0.8	4.3
Grass %	8	2.4	11.4	9	34	51	19.3
Forb %	1	1.4	2.4	0.2	1	25	5.2
Litter %	84	70	87	70	85	87	80
Stick %	9	6.2	8.4	4.8	9	5	7.1
Rock %	0	8.4	7.8	0	1.4	0	2.9
Tree/ha	1600	2250	2333	2600	2333	1719	2139
Sapling/ha	0	1250	334	2000	334	3841	1293
Shrub/ha	6800	10250	1002	4600	3674	936	4544
Grass Ht (cm)	5.3	10.3	10	7.2	3.6	8.2	7.4
Forb Ht (cm)	40	19	19.8	4	2	7.4	15.4
Litter Wt (g/m^2)	560	388	624	528	520	376	499
Log Area (cm^2)	5.99	6.34	8.16	9.31	2.14	0.43	5.4
Log Cover %	12	15.8	13.6	18.6	3.57	0.7	10.7
Tree hollow %	0	22.2	35.7	15.4	14.3	45.4	22.2
Tree scratch %	25	22.2	35.7	30.8	42.9	18.2	29.1
Stag/ha	0	1000	334	200	334	0	311

The results from the walking transects show that the Modification 3 area supports relatively high tree and sapling cover as well as log cover. By calculating the ranges of

values for the parameters measured at Ulan Coal Mine over the years it is possible to obtain a series of percentiles that can be compared with that obtained from Modification 3. The percentiles provide a range of values for each characteristic measured within the habitats. Values within the 25th and 75th percentiles can be considered as being within the 'normal' range for Ulan Coal Mine. Percentile values for Ulan Coal Mine are given in Table 13 together with the mean values for each characteristic measured within Modification 3.

TABLE 13: HABITAT CHARACTERISTIC VALUES FOR ULAN COAL MINE AND MEAN VALUES FOR MODIFICATION 3

Characteristic	25th percentile	Median	75th percentile	Mean Modification 3
Tree Ht (m)	8	10	12	10.1
Tree DBH (cm)	17	24	34	27.6
Shrub Ht (cm)	0.8	2.1	100	90.3
Sapling Ht (m)	0.9	4	6	4.3
Grass %	5	15	50	19.3
Forb %	5	5	15	5.2
Litter %	60	87.5	100	80
Stick %	2	3.5	10	7.1
Rock %	0	0	1	2.9
Tree/ha	1000	1369	2000	2139
Sapling/ha	200	598	1001	1293
Shrub/ha	1900	4180	6090	4544
Grass Ht (cm)	5	8	12	7.4
Forb Ht (cm)	4	8	13	15.4
Litter Wt (g/m²)	320	400	560	499
Log Area (cm²)	0.24	0.44	0.9	5.4
Tree hollow %	0	15.5	27	22.2
Tree scratch %	0	17	33	29.1
Stag/ha	0	125	357	311

Table 13 shows that the overall habitat characteristics for the Modification 3 area are mainly within the 'normal' range

of values obtained from Ulan Coal Mine, with tree and sapling densities being above the highest percentile. It can be concluded that the habitat values within the Modification 3 area are similar to that found throughout the Ulan Coal Mine area and are representative of woodland/grassland environments in this part of the Central West of NSW. The use of this comparative analysis shows that the land within the Modification 3 area can be managed in a similar fashion to that currently in use throughout Ulan Coal Mine.

Trees were inspected for tree hollows within each area and the number of small, medium and large hollows documented. Small hollows were considered to be less than 10 cm diameter, medium between 10 and 20 cm and large hollows greater than 20 cm. Table 14 gives the number of hollows of different sizes in each Extension Area. As the habitat was measured in each area within a set transect of 250m length by 2m width it is possible to calculate the number of trees with hollows per hectare and these results are also given in Table 14.

TABLE 14: PROPORTION OF TREE HOLLOWS IN EACH AREA

AREA	% TREES WITH HOLLOWS				
	Small	Medium	Large	Total	Number of Trees with Hollows per hectare
TUW1	8	4	8	12	60
TUW2	12	8	4	16	80
TUW3	12	4	4	12	60
TUW4	4	4	0	8	40
TUW5	8	8	4	12	60
TUW6	8	0	0	8	40
Mean	8.7	4.7	3.3	11.3	57

Overall, the habitat characteristics within the Modification 3 area are similar to that found within Ulan Coal Mine and can be considered typical of woodland/grassland habitats within

this part of the Upper Hunter region. Tree sizes are not at the upper end of the range as the Modification 3 area has been disturbed by logging, clearing and stock grazing in the past. However, the habitat values are sufficient to support a diversity of fauna species.

APPENDIX 1: OEH THREATENED SPECIES RECORDS – CENTRAL WEST KERRABEE CMA ACCESSED 29.03.2014

Scientific Name	Common Name	NSW Status	Date	Easting	Northing
Oxyura australis	Blue-billed Duck	V	10/11/2008	757769	6439234
Oxyura australis	Blue-billed Duck	V	12/11/2008	758439	6441601
Circus assimilis	Spotted Harrier	V	9/06/1997	761343	6450845
Hamirostra melanosternon	Black-breasted Buzzard	V	24/01/2005	757485	6439672
Pedionomus torquatus	Plains-wanderer	E1		762475	6450939
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	22/04/2012	754515	6434198
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	22/01/2005	754794	6445288
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	25/01/2005	754794	6445288
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	15/11/2004	754515	6434198
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	26/01/2007	754794	6445288
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	14/11/2008	754794	6445288
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	19/05/2009	754515	6434198
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	22/05/2009	754515	6434198
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	16/09/2010	754794	6445288
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	29/09/2010	754515	6434198
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	24/09/2010	754515	6434198
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	25/09/2010	754515	6434198
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	21/11/2005	754515	6434198
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	11/11/2003	754515	6434198
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	11/11/2003	754515	6434198
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	11/11/2003	754515	6434198
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	11/11/2003	754515	6434198
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	4/02/2001	754515	6434198
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	15/12/2004	745621	6456610
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	21/12/2004	745354	6445520
Glossopsitta pusilla	Little Lorikeet	V	15/10/2012	755335	6442225
Lathamus discolor	Swift Parrot	E1	17/11/2005	757513	6440781
Lathamus discolor	Swift Parrot	E1	17/11/2005	757513	6440781
Ninox connivens	Barking Owl	V	22/01/2005	756570	6440805
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V	15/10/2012	756909	6441157
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V	23/01/2005	755387	6442225
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V	11/11/2004	755052	6435330
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V	12/11/2004	756099	6437372
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V	16/11/2005	755387	6442225
Climacteris picumnus	Brown Treecreeper	V	16/11/2005	755387	6442225

victoriae	(eastern subspecies)				
Scientific Name	**Common Name**	**NSW Status**	**Date**	**Easting**	**Northing**
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V	11/11/2003	754531	6435551
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V	11/11/2003	755052	6435330
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V	11/11/2003	754182	6435995
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V	3/12/2003	754182	6435995
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V	11/11/2003	755052	6435330
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V	11/11/2003	754182	6435995
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V	3/12/2003	754182	6435995
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V	11/11/2003	754531	6435551
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V	5/02/2001	755650	6437451
Chthonicola sagittata	Speckled Warbler	V	17/08/2012	757634	6440562
Chthonicola sagittata	Speckled Warbler	V	17/08/2012	757587	6439514
Chthonicola sagittata	Speckled Warbler	V	17/08/2012	757587	6439514
Chthonicola sagittata	Speckled Warbler	V	17/08/2012	757927	6440131
Chthonicola sagittata	Speckled Warbler	V	18/08/2012	755930	6436827
Chthonicola sagittata	Speckled Warbler	V	23/10/2012	754179	6436023
Chthonicola sagittata	Speckled Warbler	V	23/01/2007	755031	6437003
Chthonicola sagittata	Speckled Warbler	V	16/04/2008	753271	6432855
Chthonicola sagittata	Speckled Warbler	V	20/05/2009	754069	6435812
Chthonicola sagittata	Speckled Warbler	V	10/09/2010	757818	6440845
Chthonicola sagittata	Speckled Warbler	V	2/12/2003	754182	6435995
Chthonicola sagittata	Speckled Warbler	V	2/12/2003	754182	6435995
Grantiella picta	Painted Honeyeater	V	13/10/2012	758022	6441168
Grantiella picta	Painted Honeyeater	V	9/11/2005	755234	6442231
Grantiella picta	Painted Honeyeater	V	9/11/2005	755234	6442231
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	18/08/2012	755432	6438633
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	12/10/2012	755855	6438411
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	15/10/2012	755368	6439015
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	15/10/2012	755335	6442225
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	15/10/2012	755335	6442225
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	19/01/2005	757412	6440222
Pomatostomus	Grey-crowned Babbler	V	23/01/2007	755031	6437003

temporalis temporalis	(eastern subspecies)				
Scientific Name	**Common Name**	**NSW Status**	**Date**	**Easting**	**Northing**
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	11/11/2008	757395	6440645
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	14/11/2008	757395	6440645
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	13/11/2008	757546	6439963
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	17/04/2008	757419	6439877
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	9/09/2010	757442	6439969
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	11/09/2010	757442	6439969
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	19/09/2010	757560	6440290
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	17/09/2010	757281	6440495
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	29/09/2010	754860	6435407
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	7/11/2005	755134	6441795
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	22/11/2005	757622	6440508
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	23/11/2005	757617	6440494
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	7/11/2005	755134	6441795
Daphoenositta chrysoptera	Varied Sittella	V	17/08/2012	757634	6440562
Daphoenositta chrysoptera	Varied Sittella	V	19/08/2012	752321	6436400
Daphoenositta chrysoptera	Varied Sittella	V	13/10/2012	755368	6439015
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	V	1/03/2006	753908	6440036
Stagonopleura guttata	Diamond Firetail	V	26/01/2007	757441	6439357
Stagonopleura guttata	Diamond Firetail	V	1/03/2006	753908	6440036
Stagonopleura guttata	Diamond Firetail	V	4/11/1990	759675	6447188
Phascolarctos cinereus	Koala	V	28/11/1986	759513	6440184
Petaurus norfolcensis	Squirrel Glider	V	26/05/2009	755692	6436066
Petaurus norfolcensis	Squirrel Glider	V	16/12/2005	755836	6435428
Petaurus norfolcensis	Squirrel Glider	V	14/11/2003	754182	6435995
Petaurus norfolcensis	Squirrel Glider	V	14/11/2003	754182	6435995

APPENDIX 2: ATLAS OF LIVING AUSTRALIA RECORDS WITHIN 20KM OF ULAN – THREATENED SPECIES

Scientific Name	Vernacular Name	Latitude	Longitude
"Climacteris picumnus"	"Brown Treecreeper"	-32.25	149.75
"Climacteris picumnus"	"Brown Treecreeper"	-32.25	149.75
"Stagonopleura guttata"	"Diamond Firetail"	-32.25	149.75
"Stagonopleura guttata"	"Diamond Firetail"	-32.25	149.75
"Calyptorhynchus lathami"	"Glossy Black-Cockatoo"	-32.3	149.8
"Melanodryas cucullata"	"Hooded Robin"	-32.25	149.75
"Melanodryas cucullata"	"Hooded Robin"	-32.25	149.75
Melithreptus gularis	Black-chinned Honeyeater	-32.25	149.75
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	-32.208	149.72
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	-32.208	149.72
Climacteris picumnus	Brown Treecreeper	-32.25	149.75
Climacteris picumnus	Brown Treecreeper	-32.25	149.75
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	-32.20360354	149.7564806
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	-32.31314903	149.8023621
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	-32.36509839	149.7678283
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	-32.20361123	149.7566106
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	-32.21286116	149.7738305
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	-32.21286116	149.7738305
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	-32.20361123	149.7566106
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	-32.36509839	149.7678283
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	-32.36509839	149.7678283
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	-32.36509839	149.7678283
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	-32.36509839	149.7678283
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	-32.28166516	149.7232989
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	-32.26197371	149.7026388
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	-32.27160668	149.8130019
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	-32.19334503	149.7368505

Scientific Name	Vernacular Name	Latitude	Longitude
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	-32.30691308	149.806661
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	-32.26543125	149.7591611
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	-32.26543125	149.7591611
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	-32.26543125	149.7591611
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	-32.21243117	149.7721605
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	-32.36509839	149.7678283
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	-32.30655083	149.8051104
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	-32.34259941	149.8152296
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	-32.3042407	149.7991044
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	-32.21836175	149.8150725
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	-32.26535333	149.83658
Petrogale penicillata	Brush-tailed Rock-wallaby	-32.20243123	149.7571606
Burhinus grallarius	Bush Stone-curlew	-32.30172566	149.6504349
Nyctophilus corbeni	Corben's Long-eared Bat	-32.26476393	149.835925
Stagonopleura guttata	Diamond Firetail	-32.36509839	149.7678283
Stagonopleura guttata	Diamond Firetail	-32.36509839	149.7678283
Stagonopleura guttata	Diamond Firetail	-32.19334503	149.7368505
Stagonopleura guttata	Diamond Firetail	-32.27160668	149.8130019
Stagonopleura guttata	Diamond Firetail	-32.26739707	149.8266681
Stagonopleura guttata	Diamond Firetail	-32.19334503	149.7368505
Stagonopleura guttata	Diamond Firetail	-32.25	149.75
Stagonopleura guttata	Diamond Firetail	-32.30368085	149.8040133
Stagonopleura guttata	Diamond Firetail	-32.30435137	149.8002119
Stagonopleura guttata	Diamond Firetail	-32.30244737	149.8006842
Stagonopleura guttata	Diamond Firetail	-32.36509839	149.7678283

Scientific Name	Vernacular Name	Latitude	Longitude
Callocephalon fimbriatum	Gang-gang Cockatoo	-32.21	149.76
Calyptorhynchus lathami	Glossy Black-Cockatoo	-32.3	149.8
Calyptorhynchus lathami	Glossy Black-Cockatoo	-32.2	149.7
Calyptorhynchus lathami	Glossy Black-Cockatoo	-32.2	149.7
Calyptorhynchus lathami	Glossy Black-Cockatoo	-32.2	149.7
Calyptorhynchus lathami	Glossy Black-Cockatoo	-32.2	149.7
Calyptorhynchus lathami	Glossy Black-Cockatoo	-32.2	149.7
Calyptorhynchus lathami	Glossy Black-Cockatoo	-32.2	149.7
Calyptorhynchus lathami	Glossy Black-Cockatoo	-32.2	149.7
Calyptorhynchus lathami	Glossy Black-Cockatoo	-32.2	149.7
Calyptorhynchus lathami	Glossy Black-Cockatoo	-32.2	149.7
Calyptorhynchus lathami	Glossy Black-Cockatoo	-32.2	149.7
Calyptorhynchus lathami	Glossy Black-Cockatoo	-32.2	149.7
Calyptorhynchus lathami	Glossy Black-Cockatoo	-32.2	149.7
Calyptorhynchus lathami	Glossy Black-Cockatoo	-32.2	149.7
Calyptorhynchus lathami	Glossy Black-Cockatoo	-32.2	149.7
Calyptorhynchus lathami	Glossy Black-Cockatoo	-32.2	149.7
Calyptorhynchus lathami	Glossy Black-Cockatoo	-32.2	149.7
Calyptorhynchus lathami	Glossy Black-Cockatoo	-32.2	149.7
Calyptorhynchus lathami	Glossy Black-Cockatoo	-32.2	149.7
Calyptorhynchus lathami	Glossy Black-Cockatoo	-32.2	149.7
Calyptorhynchus lathami	Glossy Black-Cockatoo	-32.2	149.7
Calyptorhynchus lathami	Glossy Black-Cockatoo	-32.2	149.7
Calyptorhynchus lathami	Glossy Black-Cockatoo	-32.2	149.7
Pomatostomus temporalis	Grey-crowned Babbler	-32.24999	149.74999
Pomatostomus temporalis	Grey-crowned Babbler	-32.25	149.75
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	-32.25906399	149.7601307
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	-32.25906399	149.7601307
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	-32.22277376	149.773363
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	-32.26511986	149.758414
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	-32.25850537	149.7578213
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	-32.25850537	149.7578213
Melanodryas cucullata	Hooded Robin	-32.25	149.75
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	-32.30335686	149.8414589
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	-32.36509839	149.7678283
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	-32.27160668	149.8130019
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	-32.21611383	149.7883599

Scientific Name	Vernacular Name	Latitude	Longitude
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	-32.27155202	149.8114083
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	-32.3042407	149.7991044
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	-32.30244737	149.8006842
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	-32.22107571	149.7006619
Phascolarctos cinereus	Koala	-32.36300284	149.7366834
Chalinolobus dwyeri	Large-eared Pied Bat	-32.25479477	149.8349782
Hieraaetus morphnoides	Little Eagle	-32.32195	149.72
Hieraaetus morphnoides	Little Eagle	-32.21787538	149.814644
Hieraaetus morphnoides	Little Eagle	-32.24251478	149.7621121
Hieraaetus morphnoides	Little Eagle	-32.24434866	149.7664859
Hieraaetus morphnoides	Little Eagle	-32.32195	149.72
Hieraaetus morphnoides	Little Eagle	-32.27160668	149.8130019
Hieraaetus morphnoides	Little Eagle	-32.25	149.75
Hieraaetus morphnoides	Little Eagle	-32.21836175	149.8150725
Glossopsitta pusilla	Little Lorikeet	-32.28806	149.6469
Glossopsitta pusilla	Little Lorikeet	-32.27173545	149.7214526
Glossopsitta pusilla	Little Lorikeet	-32.21236412	149.7254883
Glossopsitta pusilla	Little Lorikeet	-32.25	149.75
Glossopsitta pusilla	Little Lorikeet	-32.30655083	149.8051104
Grantiella picta	Painted Honeyeater	-32.24999	149.74999
Grantiella picta	Painted Honeyeater	-32.21787538	149.814644
Grantiella picta	Painted Honeyeater	-32.25	149.75
Anthochaera phrygia	Regent Honeyeater	-32.31926264	149.6492149
Anthochaera phrygia	Regent Honeyeater	-32.3	149.8
Anthochaera phrygia	Regent Honeyeater	-32.30537505	149.7011541
Petroica boodang	Scarlet Robin	-32.36509839	149.7678283
Petroica boodang	Scarlet Robin	-32.20912861	149.7255262
Petroica boodang	Scarlet Robin	-32.26086189	149.7572665
Petroica boodang	Scarlet Robin	-32.25	149.75

Scientific Name	Vernacular Name	Latitude	Longitude
Chthonicola sagittata	Speckled Warbler	-32.22157402	149.7244904
Chthonicola sagittata	Speckled Warbler	-32.36509839	149.7678283
Chthonicola sagittata	Speckled Warbler	-32.20189947	149.7292806
Chthonicola sagittata	Speckled Warbler	-32.22281231	149.7245808
Chthonicola sagittata	Speckled Warbler	-32.26518126	149.7583311
Chthonicola sagittata	Speckled Warbler	-32.21243144	149.725731
Chthonicola sagittata	Speckled Warbler	-32.26518126	149.7583311
Chthonicola sagittata	Speckled Warbler	-32.22361	149.8144
Chthonicola sagittata	Speckled Warbler	-32.29055	149.6639
Chthonicola sagittata	Speckled Warbler	-32.36509839	149.7678283
Chthonicola sagittata	Speckled Warbler	-32.36509839	149.7678283
Chthonicola sagittata	Speckled Warbler	-32.36509839	149.7678283
Chthonicola sagittata	Speckled Warbler	-32.36509839	149.7678283
Chthonicola sagittata	Speckled Warbler	-32.36509839	149.7678283
Chthonicola sagittata	Speckled Warbler	-32.36509839	149.7678283
Chthonicola sagittata	Speckled Warbler	-32.36509839	149.7678283
Chthonicola sagittata	Speckled Warbler	-32.36509839	149.7678283
Chthonicola sagittata	Speckled Warbler	-32.20991828	149.7215742
Chthonicola sagittata	Speckled Warbler	-32.20528319	149.7553415
Chthonicola sagittata	Speckled Warbler	-32.25962902	149.7586198
Chthonicola sagittata	Speckled Warbler	-32.20426881	149.7600962
Chthonicola sagittata	Speckled Warbler	-32.21238658	149.6871661
Chthonicola sagittata	Speckled Warbler	-32.21243144	149.725731
Chthonicola sagittata	Speckled Warbler	-32.26518126	149.7583311
Chthonicola sagittata	Speckled Warbler	-32.21787538	149.814644

Scientific Name	Vernacular Name	Latitude	Longitude
Chthonicola sagittata	Speckled Warbler	-32.26656252	149.7573867
Chthonicola sagittata	Speckled Warbler	-32.26323483	149.7600868
Chthonicola sagittata	Speckled Warbler	-32.260888	149.7573097
Chthonicola sagittata	Speckled Warbler	-32.26511986	149.758414
Chthonicola sagittata	Speckled Warbler	-32.36509839	149.7678283
Chthonicola sagittata	Speckled Warbler	-32.36509839	149.7678283
Chthonicola sagittata	Speckled Warbler	-32.36509839	149.7678283
Chthonicola sagittata	Speckled Warbler	-32.36509839	149.7678283
Chthonicola sagittata	Speckled Warbler	-32.36509839	149.7678283
Chthonicola sagittata	Speckled Warbler	-32.32406845	149.8055976
Chthonicola sagittata	Speckled Warbler	-32.2230621	149.7248955
Chthonicola sagittata	Speckled Warbler	-32.36509839	149.7678283
Chthonicola sagittata	Speckled Warbler	-32.36509839	149.7678283
Chthonicola sagittata	Speckled Warbler	-32.36509839	149.7678283
Chthonicola sagittata	Speckled Warbler	-32.36509839	149.7678283
Chthonicola sagittata	Speckled Warbler	-32.36509839	149.7678283
Chthonicola sagittata	Speckled Warbler	-32.22482609	149.7231461
Chthonicola sagittata	Speckled Warbler	-32.26535333	149.83658
Chthonicola sagittata	Speckled Warbler	-32.22378087	149.7238785
Chthonicola sagittata	Speckled Warbler	-32.23355766	149.7703258
Chthonicola sagittata	Speckled Warbler	-32.24196907	149.7658398
Petaurus norfolcensis	Squirrel Glider	-32.21243144	149.725731
Petaurus norfolcensis	Squirrel Glider	-32.21243144	149.725731
Petaurus norfolcensis	Squirrel Glider	-32.20338362	149.7307141
Petaurus norfolcensis	Squirrel Glider	-32.20418471	149.7303021

Scientific Name	Vernacular Name	Latitude	Longitude
Petaurus norfolcensis	Squirrel Glider	-32.21276388	149.7446606
Petaurus norfolcensis	Squirrel Glider	-32.21415258	149.7242903
Petaurus norfolcensis	Squirrel Glider	-32.2104368	149.7670297
Petaurus norfolcensis	Squirrel Glider	-32.20748055	149.7404339
Petaurus norfolcensis	Squirrel Glider	-32.21243144	149.725731
Petaurus norfolcensis	Squirrel Glider	-32.21243144	149.725731
Daphoenositta chrysoptera	Varied Sittella	-32.20306	149.7833
Daphoenositta chrysoptera	Varied Sittella	-32.21286116	149.7738305
Daphoenositta chrysoptera	Varied Sittella	-32.21286116	149.7738305
Daphoenositta chrysoptera	Varied Sittella	-32.36509839	149.7678283
Daphoenositta chrysoptera	Varied Sittella	-32.21738336	149.7684641
Daphoenositta chrysoptera	Varied Sittella	-32.25	149.75

APPENDIX 3:

Biodiversity Monitoring Services 2009 *Ulan Underground Mine Extensions – Terrestrial and Aquatic Fauna Monitoring Survey Programme To Satisfy Conditions of Consent for ML 1341 and ML 1468* Report to UCML

Biodiversity Monitoring Services 2010 *Ulan Underground Mine Extensions – Terrestrial and Aquatic Fauna Monitoring Survey Programme To Satisfy Conditions of Consent for ML 1341 and ML 1468* Report to UCML

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Biodiversity Monitoring Services 2012 *Ecological Monitoring Program for Ulan Coal Mine 2012 1. Terrestrial Fauna and Habitats* Report to UCML

Biodiversity Monitoring Services 2013 *Ecological Monitoring Program for Ulan Coal Mine 2013 1. Terrestrial Fauna and Habitats* Report to UCML

Mount King Ecological Surveys 1981 *Flora and Fauna Survey of Areas Affected by Extension to Ulan Colliery* Report to Kinhill Stearns Engineers

Mount King Ecological Surveys 1992 *Stage 3 Development of Ulan Coal Mine* Report on Flora and Fauna Survey of Proposed Expansion Area

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Mount King Ecological Surveys 1995 *Ulan Underground Mine Extension Fauna Monitoring Programme Second Report*

Mount King Ecological Surveys 1995 *Ulan Coal Mines Second Longwall Project A preliminary flora and fauna assessment*

Mount King Ecological Surveys 1996 *Ulan Underground Mine Extension Fauna Monitoring Programme Third Report*
Mount King Ecological Surveys 1997 *Ulan Coal Mines Ltd Proposed Second Long Wall Project Draft SIS*

Mount King Ecological Surveys 1997 *Ulan Underground Mine Extension Fauna Monitoring Programme Fourth Report*

Mount King Ecological Surveys 1998 *Ulan Coal Mines Ltd Proposed Mine Expansion Project Species Impact Statement Appendix B* in Mining Lease Application No. 80 Environmental Impact Statement Ulan Coal Mines Ltd/Kinhill

Mount King Ecological Surveys 1998 *Modification and Consolidation of Development Consents for Current Operations and Proposed New Works within Existing Operations at Ulan Coal Mines (SEPP 34 Investigations)*

Mount King Ecological Surveys 1998 *Ulan Underground Mine Extension Fauna Monitoring Programme Fifth Report*

Mount King Ecological Surveys 1999 *Ulan Underground Mine Extension Fauna Monitoring Programme Sixth Report*

Mount King Ecological Surveys 1999 *Mine Expansion Area at Ulan Coal Mines, near Mudgee Flora and Fauna Assessment*

Mount King Ecological Surveys 1999 *Flora and Fauna Assessment of Hardstand Area for Proposed Ventilation Shaft, Access Track and Access Road to Shaft Site, Ulan Coal Mines*

Mount King Ecological Surveys 2001 *Ulan Underground Mine Extension Fauna Monitoring Programme Seventh Report*

Mount King Ecological Surveys 2002 *Bobadeen Road Quarry – Flora and Fauna Assessment*

Mount King Ecological Surveys 2003 *Ulan Underground Mine Extension Fauna Monitoring Programme Eighth Report*

Mount King Ecological Surveys 2004 *Ulan Underground Mine Extension Fauna Monitoring Programme Ninth Report*

Mount King Ecological Surveys 2005 *Ulan Underground Mine Extension Fauna Monitoring Programme Tenth Report*

Mount King Ecological Surveys 2006 *Ulan Underground Mine Extension Fauna Monitoring Programme Eleventh Report*

Mount King Ecological Surveys 2007 *Ulan Underground Mine Extension Fauna Monitoring Programme Twelfth Report*

Mount King Ecological Surveys 2007 *Summer Fauna Survey of Longwall W2-W3 SMP Application Area*

Mount King Ecological Surveys, Gingra Ecological Surveys and FBN Bat Surveys PL 2004 *Biodiversity Surveys within Ulan Coal Mines* A report on flora and fauna surveys at Biodiversity Management Areas, Ulan Coal Mines

Mount King Ecological Surveys, Gingra Ecological Surveys and FBN Bat Surveys PL 2005 *Biodiversity Surveys within Ulan Coal Mines* A report on flora and fauna surveys at Biodiversity Management Areas, Ulan Coal Mines for 2005

APPENDIX B

Threatened and Migratory Species, Endangered Populations and TECs with Potential to Occur in Proposed Modification Areas

Appendix B - Threatened and Migratory Species, Endangered Populations and TECs with Potential to Occur in Proposed Modification Areas

The following tables identify the threatened and migratory species, endangered populations, threatened ecological communities (TECs) that have potential to occur within a 10 kilometre radius of the proposed modification areas. This information was obtained from database searches and literature reviews, as well as from professional opinion of potential for species to occur, based on ecological knowledge and experience within the area. For each species, population or community identified, the status; specific habitat requirements; known distribution; source of information; potential for occurrence in both the Ulan Coal Complex and the proposed modification areas and the requirement or otherwise for a 'Test for Ecological Significance' under the EP&A Act or the EPBC Act is stated.

Table 1 - Threatened Flora Species Recorded or with Potential to Occur in Proposed Modification Areas

THREATENED FLORA SPECIES						
Species	**Legal Status**	**Specific Habitat**	**Distribution in Relation to Ulan Coal Complex**	**Reservation in the Region**	**Occurrence in Proposed Modification Areas and Potential for Significant Impact**	**Test for Ecological Significance Required?**
Ausfeld's wattle *Acacia ausfeldii*	V (TSC) 3RCa (ROTAP)	Mostly found in remnant patches of eucalypt woodland particularly along roadsides with flat, sandy ground. This species in typically associated with *Eucalyptus albens, E. blakelyi* and *Callitris* spp., with an understorey dominated by *Cassinia* spp. and grass species.	This species is found in the NSW South-western Slopes Bioregion, east of Dubbo in the Ulan – Gulgong Area. Ausfeld's wattle has also been recorded in the Brigalow Belt South and Sydney Basin bioregions. The Ulan Coal Complex is within the known distribution of this species.	Munghorn Gap NR Goulburn River NP Yarrobil NP Goodiman SCA	The species has been previously recorded in the Ulan Coal Complex. This species has not been recorded from the proposed modification areas. There is potential habitat for this species within the proposed modification areas. While the expected impact to potential habitat for this species will be minimal, a Test for Ecological Significance has been provided as a precautionary measure.	Yes

THREATENED FLORA SPECIES						
Species	**Legal Status**	**Specific Habitat**	**Distribution in Relation to Ulan Coal Complex**	**Reservation in the Region**	**Occurrence in Proposed Modification Areas and Potential for Significant Impact**	**Test for Ecological Significance Required?**
leafless tongue-orchid *Cryptostylis hunteriana*	V (EPBC) V (TSC)	The larger populations typically occur in woodland dominated by scribbly gum (*Eucalyptus sclerophylla*), silvertop ash (*E. sieberi*), red bloodwood (*Corymbia gummifera*) and black sheoak (*Allocasuarina littoralis*); appears to prefer open areas in the understorey of this community and is often found in association with the large tongue orchid (*C. subulata*) and the tartan tongue orchid (*C. erecta*).	This species has been recorded from as far north as Gibraltar Range National Park south into Victoria around the coast as far as Orbost. It is known historically from a number of localities on the NSW south coast and has been observed in recent years at many sites between Batemans Bay and Nowra.	This species is not known to occur in any reserves in the region.	The Ulan Coal Complex provides some suitable habitat for this species, however it has not been recorded during many years of survey. This species has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to pose a significant impact on this species.	No
finger panic grass *Digitaria porrecta*	E (TSC) 3E (ROTAP)	Native grassland, woodlands or open forest with a grassy understorey, on richer soils. Often found along roadsides and travelling stock routes where there is light grazing and occasional fire.	Found in NSW and Queensland. In NSW, occurs on north-west slopes and plains, from near Moree south to Tambar Springs and from Tamworth to Coonabarabran. The Ulan Coal Complex is not within the known distribution of this species.	This species is not known to occur in any reserves in the region.	The Ulan Coal Complex provides some suitable habitat for this species, however it has not been recorded during many years of survey. This species has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to pose a significant impact on this species.	No

THREATENED FLORA SPECIES						
Species	**Legal Status**	**Specific Habitat**	**Distribution in Relation to Ulan Coal Complex**	**Reservation in the Region**	**Occurrence in Proposed Modification Areas and Potential for Significant Impact**	**Test for Ecological Significance Required?**
painted diuris *Diuris tricolor*	V (TSC) 3K (ROTAP)	Sclerophyll forest among grass, often with *Callitris*. Usually on sandy soils, either on flats or small rises.	Muswellbrook LGA is the eastern limit of the known range and the only recorded occurrence in the Sydney Basin Bioregion. The distribution of this species is defined by Warialda to the north, Cobar to the west, and Tumut to the south. The Ulan Coal Complex is within the known distribution of this species.	Munghorn Gap NR Gonnoo SCA	The Ulan Coal Complex provides some suitable habitat for this species, however it has not been recorded during many years of survey. There is potential habitat for this species within the proposed modification areas. While the expected impact to potential habitat for this species will be minimal, a Test for Ecological Significance has been provided as a precautionary measure.	Yes
Cannon's stringybark *Eucalyptus cannonii*	V (TSC) 2VCi (ROTAP)	Populations are usually large (at least 6000 individuals) and fall within altitudes of 460 and 1040 metres. Cannon's stringybark is associated with a diverse range of vegetation, and can form hybrids with *Eucalyptus macrorhyncha* and *Eucalyptus sparsifolia*.	This species is restricted to an area of approximately 60 by 100 kilometres in the NSW Central Tablelands. The western border of this area is between Bathurst and Mudgee and the eastern border is between Lithgow and Bylong. The Ulan Coal Complex is within the known distribution of this species.	Munghorn Gap NR Goulburn River NP Wollemi NP (Bell 1998) Avisford NR (Bell 1995)	The Ulan Coal Complex provides some suitable habitat for this species, however it has not been recorded during many years of survey. There is potential habitat for this species within the proposed modification areas. While the expected impact to potential habitat for this species will be minimal, a Test for Ecological Significance has been provided as a precautionary measure.	Yes

THREATENED FLORA SPECIES						
Species	**Legal Status**	**Specific Habitat**	**Distribution in Relation to Ulan Coal Complex**	**Reservation in the Region**	**Occurrence in Proposed Modification Areas and Potential for Significant Impact**	**Test for Ecological Significance Required?**
Euphrasia arguta	CE (TSC) CE (EPBC)	Historic records of the species noted the following habitats: 'in the open forest country around Bathurst in sub humid places', 'on the grassy country near Bathurst', and 'in meadows near rivers'. Plants from the Nundle area have been reported from eucalypt forest with a mixed grass and shrub understorey; here, plants were most dense in an open disturbed area and along the roadside, indicating the species had regenerated following disturbance.	*Euphrasia arguta* has only been recorded from relatively few places within an area extending from Sydney to Bathurst and north to Walcha.	This species is not known to occur in any reserves in the region.	The Ulan Coal Complex provides some suitable habitat for this species, however it has not been recorded during many years of survey. This species has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to pose a significant impact on this species.	No
Homoranthus darwinioides	V (TSC) V (EPBC) 3VCa (ROTAP)	Grows in various woodland habitats with shrubby understorey, usually in gravelly sandy soils. Landforms the species has been recorded growing on include flat sunny ridge tops with scrubby woodland, sloping ridges, gentle south-facing slopes, and a slight depression on a roadside with loamy sand.	Rare in the Central Tablelands and western slopes of NSW, occurring from Putty to the Dubbo district. It is found west of Muswellbrook between Merriwa and Bylong, and north of Muswellbrook to Goonoo SF. The species has been collected from Lees Pinch, but not relocated at its original locality north of Mt Coricudgy above the headwaters of Widden Brook. Goonoo SF is established as a definite locality. There was also an outlying location of this species previously to the south-west of Sydney. The Ulan Coal Complex is within the known distribution of this species.	Goulburn River NP (Bell 1998)	The species has been previously recorded in the Ulan Coal Complex. This species has not been recorded from the proposed modification areas. There is potential habitat for this species within the proposed modification areas. While the expected impact to potential habitat for this species will be minimal, a Test for Ecological Significance has been provided as a precautionary measure.	Yes

THREATENED FLORA SPECIES						
Species	**Legal Status**	**Specific Habitat**	**Distribution in Relation to Ulan Coal Complex**	**Reservation in the Region**	**Occurrence in Proposed Modification Areas and Potential for Significant Impact**	**Test for Ecological Significance Required?**
hoary sunray *Leucochrysum albicans* var. *tricolor*	E (EPBC)	This species is restricted to non-sandy soils and is typically associated with *E. pauciflora* woodlands and tussock grassland (Department of Primary Industries, Water and Environment 2003).	This species is distributed throughout the Central Tablelands, Southern Tablelands and the Central Western Slopes Botanical Subdivisions (Botanic Gardens Trust 2009). Most records of this species are from the west of the Great Dividing Range, south of Sydney. The Ulan Coal Complex is within the known distribution of this species.	This species is not known to occur in any reserves in the region.	The species has been previously recorded in the Ulan Coal Complex. This species has not been recorded from the proposed modification areas. There is potential habitat for this species within the proposed modification areas. While the expected impact to potential habitat for this species will be minimal, a Test for Ecological Significance has been provided as a precautionary measure.	Yes
Ozothamnus tesselatus	V (TSC) V (EPBC) 2VC (ROTAP)	Dry sclerophyll forest and woodlands.	Restricted to a few locations north of Rylstone, with the current known western limit of the species identified near Stony Pinch in Goulburn River NP Unconfirmed recording exists near Mt Owen. The Ulan Coal Complex is within the known distribution of this species.	Goulburn River NP Wollemi NP (Bell 1998)	The Ulan Coal Complex provides some suitable habitat for this species, however it has not been recorded during many years of survey. This species has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to pose a significant impact on this species.	No

THREATENED FLORA SPECIES						
Species	**Legal Status**	**Specific Habitat**	**Distribution in Relation to Ulan Coal Complex**	**Reservation in the Region**	**Occurrence in Proposed Modification Areas and Potential for Significant Impact**	**Test for Ecological Significance Required?**
Omeo storksbill *Pelargonium sp. (G.W. Carr 10345)*	E (TSC) E (EPBC)	Known to colonise dry lake beds.	Known from only 3 locations in NSW, with two on lake-beds on the basalt plains of the Monaro and one at Lake Bathurst. A population at a fourth known site on the Monaro has not been seen in recent years.	This species is not known to occur in any reserves in the region.	The Ulan Coal Complex does not provide suitable habitat for this species and it has not been recorded during many years of survey. This species has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to pose a significant impact on this species.	No
Philotheca ericifolia	V (EPBC) 3RC (ROTAP)	Grows chiefly in dry sclerophyll forest and heath on damp sandy flats and gullies. It has been collected from a variety of habitats including heath, open woodland, dry sandy creek beds, and rocky ridge and cliff tops. Associated species include *Melaleuca uncinata, Eucalyptus crebra, E. rossii, E. punctata and Corymbia trachyphloia*. This species flowers in the spring and produces fruit from November to December.	This species is known only from the upper Hunter Valley and Pilliga to Peak Hill districts of NSW. The records are scattered over a range of over 400 kilometres between West Wyalong and the Pilliga Scrub. In the upper Hunter it grows on exposed rocky outcrops around Scone. The distribution of this species is bounded by Wee Waa to the north, West Wyalong to the south-west and Wingen to the east. The Ulan Coal Complex is within the known distribution of this species.	Wollemi NP	The Ulan Coal Complex provides some suitable habitat for this species, however it has not been recorded during many years of survey. This species has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to pose a significant impact on this species.	No

THREATENED FLORA SPECIES						
Species	**Legal Status**	**Specific Habitat**	**Distribution in Relation to Ulan Coal Complex**	**Reservation in the Region**	**Occurrence in Proposed Modification Areas and Potential for Significant Impact**	**Test for Ecological Significance Required?**
scant pomaderris *Pomaderris queenslandica*	E (TSC)	This species is found in moist eucalypt forest or sheltered woodlands with a shrubby understorey, and occasionally along creeks.	This species is widely scattered but not common in north-east NSW and in Queensland. It is only known from a few locations on the New England Tablelands and North-west Slopes; including near Torrington and Coolatai, and also from several locations on the NSW North Coast. The distribution of this species is bounded by Wallangra to the north, Bagawa SF to the east, near Parkes to the south-west, and just north of Sydney to the south-east. The Ulan Coal Complex is within the known distribution of this species.	Manobalai NR Goulburn River NP	This species was recorded from an area to the south of the open cut and within the Spring Gully Cliff Line Management Area in 2014. This species has not been recorded within the proposed modification areas, however potential habitat is present in these area. While the expected impact to potential habitat for this species will be minimal, a Test for Ecological Significance has been provided as a precautionary measure.	Yes
Prasophyllum sp. Wybong (C.Phelps ORG 5269)	CE (EPBC)	Leek orchids are generally found in shrubby and grassy habitats in dry to wet soil. *Prasophyllum* sp. Wybong is known to occur in open eucalypt woodland and grassland.	*Prasophyllum* sp. Wybong occurs within the Border Rivers (Gwydir, Namoi, Hunter), Central Rivers and Central West Natural Resource Management Regions. The species occurs within the Sydney Basin, New England Tablelands, Brigalow Belt South and NSW South Western Slopes IBRA Bioregions.	This species is not known to occur in any reserves in the region.	The Ulan Coal Complex provides some suitable habitat for this species, however it has not been recorded during many years of survey. This species has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to pose a significant impact on this species.	No

THREATENED FLORA SPECIES						
Species	**Legal Status**	**Specific Habitat**	**Distribution in Relation to Ulan Coal Complex**	**Reservation in the Region**	**Occurrence in Proposed Modification Areas and Potential for Significant Impact**	**Test for Ecological Significance Required?**
silky Swainson pea *Swainsona sericea*	V (TSC)	Sometimes found in association with cypress pine Callitris sp. On the Monaro it is found in Natural Temperate Grassland and Snow Gum *Eucalyptus pauciflora* Woodland. In the Southern Tablelands and the South-west Slopes it is found in Box Gum Woodland.	This species ranges in distribution from the Northern Tablelands to the Southern Tablelands and further inland on the slopes and plains. It is also found in SA, Victoria and Queensland. The Ulan Coal Complex is within the known distribution of this species.	This species is not known to occur in any reserves in the region.	The Ulan Coal Complex provides some suitable habitat for this species, however it has not been recorded during many years of survey. This species has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to pose a significant impact on this species.	No
Zieria obcordata	E (TSC) E (EPBC)	This species grows in eucalypt woodland or shrubland dominated by species of *Acacia* on rocky hillsides. Also occurs in *Eucalyptus* and *Callitris* dominated woodland with an open, low shrub understorey, on moderately steep, west to north-facing slopes in sandy loam amongst granite boulders.	Occurs at two sites with a geographic separation of 105 km. These are Bulbudgeree Station near Wellington, comprising of a single population of 77 plants and Crackerjack Rock/Rock Forests area NW of Bathurst, comprising of 5 population across 3 sites, totalling to 259 plants.	This species is not known to occur in any reserves in the region.	The Ulan Coal Complex provides some suitable habitat for this species, however it has not been recorded during many years of survey. This species has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to pose a significant impact on this species.	No

THREATENED FLORA SPECIES						
Species	**Legal Status**	**Specific Habitat**	**Distribution in Relation to Ulan Coal Complex**	**Reservation in the Region**	**Occurrence in Proposed Modification Areas and Potential for Significant Impact**	**Test for Ecological Significance Required?**
austral toadflax *Thesium australe*	V (TSC) V (EPBC) 3VCi+ (ROTAP)	This species occurs in grassland or grassy woodland and is often found in damp sites in association with kangaroo grass (*Themeda australis*). This species is a root parasite that takes water and some nutrient from other plants, especially kangaroo grass.	This species is found in very small populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands. It is also found in Tasmania, Queensland and in eastern Asia. Occurs also at Mangoola, west of Muswellbrook, NSW.	This species is not known to occur in any reserves in the region.	The Ulan Coal Complex provides some suitable habitat for this species, however it has not been recorded during many years of survey. This species has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to pose a significant impact on this species.	No
Tylophora linearis	V (TSC) E (EPBC)	This species grows in dry scrub and open forest. Recorded from low-altitude sedimentary flats in dry woodlands of *Eucalyptus fibrosa, Eucalyptus sideroxylon, Eucalyptus albens, Callitris endlicheri, Callitris glaucophylla* and *Allocasuarina luehmannii*.	Found in the Barraba, Mendooran, Temora and West Wyalong districts in the northern and central western slopes of NSW.	Goonoo SF Eura SF Coolbaggie NR	The Ulan Coal Complex provides some suitable habitat for this species, however it has not been recorded during many years of survey. This species has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to pose a significant impact on this species.	No

Notes:

a	adequately reserved	NP	National Park	t	total population reserved
C	in a conservation reserve	NR	Nature Reserve	TSC	*Threatened Species Conservation Act 1995*
EPBC	*Environment Protection and Biodiversity Conservation Act 1999*	PD	preliminary determination	X	extinct
i	inadequately reserved	R	rare	2	found over < 100 kilometres
K	poorly known	ROTAP	Rare or Threatened Australian Plant	3	found over > 100 kilometres
LGA	Local Government Area	SF	State Forest	-	species recorded from a reserve but population size unknown

Table 2 - Endangered Flora Populations Recorded or with Potential to Occur in Proposed Modification Areas

ENDANGERED FLORA POPULATIONS						
Population	**Legal Status**	**Specific Habitat**	**Distribution in Relation to Proposed Modification Areas**	**Reservation in the Region**	**Occurrence in Proposed Modification Areas and Potential for Significant Impact**	**Test for Ecological Significance Required?**
weeping myall *Acacia pendula* in the Hunter Catchment	EP (TSC)	Grows on major river floodplains on heavy clay soils, sometimes as the dominant species and forming low open woodlands. Within the Hunter catchment it typically occurs on heavy soils, sometimes at the margins of small floodplains, but also in more undulating locations remote from floodplains, such as at Jerrys Plains.	There are at least 30 naturally occurring remnants of the *A. pendula* population in the Hunter catchment. These range as far east as Bulga, and as far west as Kerrabee, west of Sandy Hollow. *Acacia pendula* is not known to occur naturally further north than the Muswellbrook-Wybong area. Eight planted *A. pendula* populations (not naturally occurring) have been recorded in the Hunter, and it is likely that numerous more planted populations occur. The Ulan Coal Complex occurring within the Hunter Catchment is within the known distribution of this population.	Wollemi NP	The population has not been recorded in the Ulan Coal Complex; however, it could occur there. This population has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to pose a significant impact on this population.	No
tiger orchid *Cymbidium canaliculatum* in the Hunter Catchment	EP (TSC)	This species occurs within dry sclerophyll forests and woodlands of tablelands and western slopes, growing in hollows of trees. It is usually found occurring singly or as a single clump, typically between two and six metres above the ground.	The population of *Cymbidium canaliculatum* in the Hunter Catchment is at the south-eastern limit of the geographic range for this species. The Ulan Coal Complex occurring within the Hunter Catchment is within the known distribution of this population.	Goulburn River NP Ferntree Gully Environmental Reserve (Hill & Peake 2007)	The population has not been recorded in the Ulan Coal Complex; however, it could occur there. This population has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to pose a significant impact on this population.	No

ENDANGERED FLORA POPULATIONS						
Population	**Legal Status**	**Specific Habitat**	**Distribution in Relation to Proposed Modification Areas**	**Reservation in the Region**	**Occurrence in Proposed Modification Areas and Potential for Significant Impact**	**Test for Ecological Significance Required?**
river red gum *Eucalyptus camaldulensis* in the Hunter Catchment	EP (TSC)	River red gums are located on the banks and floodplains of watercourses on alluvial soils. This endangered population may occur with *Eucalyptus tereticornis*, *E. melliodora*, *Casuarina cunninghamiana* subsp. *cunninghamiana* and *Angophora floribunda*.	The Hunter population occurs as far east as Hinton, east of Maitland, west to Bylong, and north to near Scone. Currently only 28 populations are known in the Hunter Valley, covering an area of only 83 hectares and constituting about 1840 trees, and occurring over a range of at least 2000 km^2. The Ulan Coal Complex occurring within the Hunter Catchment is within the known distribution of this population.	This population is not known to occur in any reserves in the region.	The population has not been recorded in the Ulan Coal Complex; however, it could occur there. This population has not been recorded within the proposed modification areas. A record of the species comes from the Talbragar River to the north of the Ulan Coal Complex, however this is not within the bounds of the listed population. There is no potential for the proposed modifications to pose a significant impact on this population.	No

Notes: EP endangered population
NP National Park
TSC NSW Threatened Species Conservation Act 1995

Table 3 - Threatened Ecological Communities Recorded or with Potential to Occur in Proposed Modification Areas

THREATENED ECOLOGICAL COMMUNITIES						
Community	**Legal Status**	**Specific Habitat**	**Distribution in Relation to Proposed Modification Areas**	**Reservation in the Region**	**Occurrence in Proposed Modification Areas and Potential for Significant Impact**	**Test for Ecological Significance Required?**
Hunter Valley Weeping Myall Woodland of the Sydney Basin Bioregion.	EEC (TSC)	This community comprises a dense to open tree canopy up to 15 metres tall, depending on disturbance and regrowth history. The most common tree is weeping myall (*Acacia pendula*), which may occur with narrow-leaved ironbark (*Eucalyptus crebra*), cooba (*Acacia salacina*) and/or trees within the *Acacia homalophylla – Acacia melvillei* complex. Understorey shrubs may include stiff canthium (*Canthium buxifolium*), sticky hopbush (*Dodonaea viscosa*), wilga (*Geijera parviflora*), native olive (*Notelaea microphylla* var. *microphylla*) and silver cassia (*Senna zygophylla*). The shrub stratum is absent from some stands.	Currently known from parts of the Muswellbrook and Singleton LGAs in the central Hunter Valley, but may occur elsewhere, including the Upper Hunter LGA. The Ulan Coal Complex is within the expected distribution of this TEC.	This TEC is not known to occur in any reserves in the region.	This TEC has not been recorded in the Ulan Coal Complex; however, it could occur there. This TEC has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to comprise a significant impact on this TEC.	No
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	EEC (EPBC) EEC (TSC)	This community comprises woodlands which typically form mosaics with grasslands and wetlands, and are characterised by Coolibah (Eucalyptus coolabah) and, in some areas, Black Box (E. largiflorens). Other tree species may be present including River Cooba (Acacia stenophylla), Cooba (A. salicina), Belah (Casuarina cristata) and Eurah (Eremophila bignoniiflora).	This EEC is a floodplain ecological community situated within the upper reaches of the Murray-Darling Basin and southern part of the Fitzroy River system and is limited to the Darling Riverine Plains and Brigalow Belt South bioregions.	This TEC is not known to occur in any reserves in the region.	This TEC has not been recorded in the Ulan Coal Complex; however, it could occur there. This TEC has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to comprise a significant impact on this TEC.	No

THREATENED ECOLOGICAL COMMUNITIES						
Community	**Legal Status**	**Specific Habitat**	**Distribution in Relation to Proposed Modification Areas**	**Reservation in the Region**	**Occurrence in Proposed Modification Areas and Potential for Significant Impact**	**Test for Ecological Significance Required?**
Natural Grasslands on Basalt and Fine Textured Alluvial Plains of northern NSW and Southern Queensland.	CEEC (EPBC)	The species composition of these tussock grasslands is highly variable. It occurs in areas with wet summers, low winter rainfall; and typically fine-cracking clay soils.	This community is distributed from Chinchilla in Queensland through to Dubbo in NSW. Key communities in NSW occur in the Liverpool Plains around Gunnedah and the Moree-Plains northeast of Moree. The Ulan Coal Complex is within the known distribution of this TEC.	This TEC is not known to occur in any reserves in the region.	This TEC has not been recorded in the Ulan Coal Complex; however, it could occur there. This TEC has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to comprise a significant impact on this TEC.	No
Central Hunter Grey Box - Ironbark Woodland in the NSW North Coast and Sydney Basin Bioregions	EEC (TSC)	Central Hunter Grey Box - Ironbark Woodland occurs in areas of relatively low rainfall and high temperatures. It is associated mostly with Permian lithology, and is situated on gently undulating hills, slopes and valleys, or occasionally on rocky knolls.	Central Hunter Grey Box - Ironbark Woodland occurs in the Central Hunter Valley between about Singleton and Muswellbrook. It is known to occur in the Cessnock, Singleton and Muswellbrook LGAs but may occur elsewhere within the Sydney Basin Bioregion.	This TEC is not known to occur in any reserves in the region.	This TEC has not been recorded in the Ulan Coal Complex; however, it could occur there. This TEC has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to comprise a significant impact on this TEC.	No
Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	EEC (EPBC)	This community generally occurs in landscapes of low-relief such as flat to undulating plains, low slopes and rises and, to a lesser extent, drainage depressions and flats. The ecological community may extend to more elevated hillslopes on the fringes of its range where it intergrades with other woodland or dry sclerophyll forest communities.	The Grey Box (*E. microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia ecological community occurs from central-western NSW, through northern and central Victoria into South Australia.	This TEC is not known to occur in any reserves in the region.	This TEC has not been recorded in the Ulan Coal Complex; however, it could occur there. This TEC has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to comprise a significant impact on this TEC.	No

THREATENED ECOLOGICAL COMMUNITIES						
Community	**Legal Status**	**Specific Habitat**	**Distribution in Relation to Proposed Modification Areas**	**Reservation in the Region**	**Occurrence in Proposed Modification Areas and Potential for Significant Impact**	**Test for Ecological Significance Required?**
White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grasslands.	CEEC (EPBC)	This CEEC can occur as either woodland or derived grassland (grassy woodland from which trees have been removed). Ground layer consists of native tussock grasses and herbs, and a sparse, scattered shrub layer. White box (*Eucalyptus albens*), yellow box (*E. melliodora*), or Blakely's red gum (*E. blakelyi*), dominate, where trees remain. In the Nandewar bioregion where grey box (*E. moluccana* or *E. microcarpa*) may also be dominant or co-dominant in the community.	This CEEC occurs along the western slopes and tablelands of the Great Dividing Range from southern Queensland through NSW to central Victoria. The Ulan Coal Complex is within the known distribution of this TEC.	Small areas of this TEC are known to occur in Goulburn River NP, Wollemi NP and Avisford NR.	This CEEC has been recorded within the Ulan Coal Complex and also within the proposed modification areas. While the expected impact to this EEC will be minimal, a Test for Ecological Significance has been provided as a precautionary measure.	Yes
White Box – Yellow Box – Blakely's Red Gum Woodland.	EEC (TSC)	This EEC is characterised by the presence or prior occurrence of white box (*Eucalyptus albens*), yellow box (*E. melliodora*) and/or Blakely's red gum (*E. blakelyi*). In the Hunter Valley hybrids between *E. albens* and grey box (*E. moluccana*) are included. The trees may occur as pure stands, mixtures of the three species or in mixtures with other trees, including wattles. Several other eucalypts commonly co-occur. Shrubs are generally sparse or absent, though they may be locally common.	This EEC is found from the Queensland border in the north, to the Victorian border in the south. It occurs in the tablelands and western slopes of NSW. It is known to occur in Goobang NP to the west.	Goulburn River NP Wollemi NP	This EEC has been recorded within the Ulan Coal Complex and also within the proposed modification areas. While the expected impact to this EEC will be minimal, a Test for Ecological Significance has been provided as a precautionary measure.	Yes

Note: TEC threatened ecological community
CEEC critically endangered ecological community
EEC endangered ecological community
EPBC Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
LGA local government area
TSC: NSW Threatened Species Conservation Act 1995

Table 4 - Threatened Fauna Species Recorded or with Potential to Occur in Proposed Modification Areas

THREATENED FAUNA SPECIES						
Species	**Legal Status**	**Specific Habitat**	**Distribution in Relation to Proposed Modification Areas**	**Reservation in the Region**	**Occurrence in Proposed Modification Areas and Potential for Significant Impact**	**Test for Ecological Significance Required?**
AMPHIBIANS						
giant barred frog *Mixophyes iteratus*	E (TSC) E (EPBC)	This species forages and lives amongst deep, damp leaf litter in rainforests, moist eucalypt forest and nearby dry eucalypt forest, at elevations below 1,000 metres. They breed around shallow, flowing rocky streams.	Coast and ranges from south-eastern Queensland to the Hawkesbury River in NSW. North-eastern NSW, particularly the Coffs Harbour-Dorrigo area, is now a stronghold. The Ulan Coal Complex is within the known distribution of this species.	Goulburn River NP	The Ulan Coal Complex provides some suitable habitat for this species, however it has not been recorded during many years of extensive surveys. This species has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to pose a significant impact on this species.	No
Booroolong frog *Litoria booroolongensis*	E (TSC) E (EPBC)	Live along permanent streams with some fringing vegetation cover such as ferns, sedges or grasses. Adults occur on or near cobble banks and other rock structures within stream margins. Shelter under rocks or amongst vegetation near the ground on the stream edge.	The Booroolong frog is restricted to NSW and north-eastern Victoria, predominantly along the western-flowing streams of the Great Dividing Range. It has disappeared from the Northern Tablelands and is now rare throughout most of the remainder of its range. Most recent records are from the south-west slopes of NSW. The Ulan Coal Complex is within the known distribution of this species.	This species is not known to occur in any reserves in the region.	The Ulan Coal Complex provides some suitable habitat for this species, however it has not been recorded during many years of extensive surveys. This species has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to pose a significant impact on this species.	No

THREATENED FAUNA SPECIES						
Species	**Legal Status**	**Specific Habitat**	**Distribution in Relation to Proposed Modification Areas**	**Reservation in the Region**	**Occurrence in Proposed Modification Areas and Potential for Significant Impact**	**Test for Ecological Significance Required?**
REPTILES						
pink-tailed legless lizard *Aprasia parapulchella*	V (TSC) V (EPBC)	This species typically inhabits areas which are well-drained, sloping, rocky, and open woodland with a mostly native grassland understorey. These lizards can usually be found beneath partially embedded rocks and make their burrows in black ant and termite nests.	This species is only known to be distributed across the Central and Southern Tablelands and the South-western Slopes. The strongest known concentration of this species is in the Canberra/Queanbeyan Region, however, other populations have been recorded in proximity to Cooma, Yass, Bathurst, Albury and West Wyalong. The Ulan Coal Complex is within the known distribution of this species.	Goulburn River NP	The Ulan Coal Complex provides some suitable habitat for this species, however it has not been recorded during many years of extensive surveys. This species has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to pose a significant impact on this species.	No
broad-headed snake *Hoplocephalus bungaroides*	E (TSC) V (EPBC)	This species shelters in rock crevices and under flat sandstone rocks on exposed cliff edges during autumn, winter and spring. Moves from the sandstone rocks to shelters in hollows in large trees within 200 metres of escarpments in summer.	The broad-headed snake is largely confined to Triassic and Permian sandstones, including the Hawkesbury, Narrabeen and Shoalhaven groups, within the coast and ranges in an area within approximately 250 kilometres of Sydney. The currently known range of this species is limited to the area bounded by, the coast, Upper Growee (north of Rylstone) to the north-west, and Morton NP. The Ulan Coal Complex is within the known distribution of this species.	Wollemi NP	The Ulan Coal Complex provides some suitable habitat for this species, however it has not been recorded during many years of extensive surveys. This species has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to pose a significant impact on this species.	No

THREATENED FAUNA SPECIES						
Species	**Legal Status**	**Specific Habitat**	**Distribution in Relation to Proposed Modification Areas**	**Reservation in the Region**	**Occurrence in Proposed Modification Areas and Potential for Significant Impact**	**Test for Ecological Significance Required?**
little whip snake *Suta flagellum*	V (TSC)	This species can be found in natural temperate grasslands and grassy woodlands, as well as secondary grasslands derived from cleared woodlands. The little whip snake is nocturnal and can typically be found beneath rocks and logs which may be partially embedded in the soil on well-drained, rocky landscapes.	The southern NSW distribution of the little whip snake is bounded by Crookwell in the north, Bombala in the south, Tumbarumba to the west and Braidwood to the east. The little whip snake is also known from an isolated location in the Mid-Western Region LGA.	This species is not known to occur in any reserves in the region.	The Ulan Coal Complex provides some suitable habitat for this species, however it has not been recorded during many years of extensive surveys. This species has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to pose a significant impact on this species.	No
BIRDS						
magpie goose *Anseranas semipalmata*	V (TSC)	Mainly found in shallow wetlands (less than 1 metre deep) with dense growth of rushes or sedges. Equally at home in aquatic or terrestrial habitats; often seen walking and grazing on land.	Rare in south-eastern Australia, with an increasing number of records in central and northern NSW. Vagrants can follow food sources to south-eastern NSW. The distribution of this species in NSW is widely distributed and erratic, with records from the coast to the west of the state. The Ulan Coal Complex is within the known distribution of this species.	This species is not known to occur in any reserves in the region.	The species has been recorded in the Ulan Coal Complex. This species has not been recorded within the proposed modification areas and it is highly unlikely that it would occur there. There is no potential for the proposed modifications to pose a significant impact on this species.	No

THREATENED FAUNA SPECIES						
Species	**Legal Status**	**Specific Habitat**	**Distribution in Relation to Proposed Modification Areas**	**Reservation in the Region**	**Occurrence in Proposed Modification Areas and Potential for Significant Impact**	**Test for Ecological Significance Required?**
mallefowl *Leipoa ocellata*	E (TSC) V (EPBC) MIG (EPBC)	The mallefowl is typically found in semi-arid and arid areas of temperate Australia, in shrubland and low woodlands dominated by dense but discontinuous mallee vegetation. They are usually on loamy or sandy soils with an annual average rainfall between 200 and 450 millimetres. The mallefowl has been known to forage in open grassland and farmland areas; and breeds in areas with plentiful leaf litter.	The mallefowl is distributed across southern Australia. Typically found west of the Great Dividing Range, from the Pilliga south-west through to the Griffith and Wentworth districts. A small number of records have been identified from east of the Great Dividing Range in the Goulburn River NP. The Ulan Coal Complex is broadly within the possible distribution of this species.	Goulburn River NP	The Ulan Coal Complex provides some suitable habitat for this species, however it has not been recorded during many years of extensive surveys. This species has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to pose a significant impact on this species.	No
blue-billed duck *Oxyura australis*	V (TSC)	This species prefers deep water in large permanent wetlands and swamps with dense aquatic vegetation. The species is completely aquatic, swimming low in the water along the edge of dense cover.	Widespread throughout NSW from the coast to the far west of the state, but most common in the southern Murray-Darling Basin area. The Ulan Coal Complex is within the known distribution of this species.	This species is not known to occur in any reserves in the region.	The species has been recorded in the Ulan Coal Complex. This species has not been recorded within the proposed modification areas and it is highly unlikely that it would occur there. There is no potential for the proposed modifications to pose a significant impact on this species.	No

THREATENED FAUNA SPECIES						
Species	**Legal Status**	**Specific Habitat**	**Distribution in Relation to Proposed Modification Areas**	**Reservation in the Region**	**Occurrence in Proposed Modification Areas and Potential for Significant Impact**	**Test for Ecological Significance Required?**
square-tailed kite *Lophoictinia isura*	V (TSC)	Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses.	Scattered records of the species throughout the state indicate that the species is a regular resident in the north, north-east and along the major west-flowing river systems. The Ulan Coal Complex is within the known distribution of this species.	Goulburn River NP Munghorn Gap NR Wollemi NP	The species has been previously recorded in the Ulan Coal Complex. This species has not been recorded from the proposed modification areas. There is potential habitat for this species within the proposed modification areas, however the expected impact to such habitat will be minimal. There is no potential for the proposed modifications to pose a significant impact on this species.	No
black-breasted buzzard *Hamirostra melanosternon*	V (TSC)	Lives in a range of inland habitats, especially along timbered watercourses (also the preferred breeding habitat). The black-breasted buzzard hunts over grasslands and sparsely timbered woodlands.	Found sparsely in areas of less than 500 millimetres rainfall, from north-western NSW and north-eastern SA to the east coast at about Rockhampton, then across northern Australia south almost to Perth, avoiding only the WA deserts. The Ulan Coal Complex is within the known distribution of this species.	This species is not known to occur in any reserves in the region.	The species has been previously recorded in the Ulan Coal Complex. This species has not been recorded from the proposed modification areas. There is potential habitat for this species within the proposed modification areas, however the expected impact to such habitat will be minimal. There is no potential for the proposed modifications to pose a significant impact on this species.	No

THREATENED FAUNA SPECIES						
Species	**Legal Status**	**Specific Habitat**	**Distribution in Relation to Proposed Modification Areas**	**Reservation in the Region**	**Occurrence in Proposed Modification Areas and Potential for Significant Impact**	**Test for Ecological Significance Required?**
spotted harrier *Circus assimilis*	V (TSC)	Their habitat of choice is open grassy woodland, grassland, inland riparian woodland and shrub steppe. Although mostly associated with native grasslands it has also been identified in agricultural farmland. Their nest is made in a tree and composed of sticks.	The spotted harrier can be found throughout mainland Australia except for areas of dense forest on the coast, escarpments and ranges and rarely ever in Tasmania. The Ulan Coal Complex is within the known distribution of this species.	Goulburn River NP	The species has been previously recorded in the Ulan Coal Complex. This species has not been recorded from the proposed modification areas. There is potential habitat for this species within the proposed modification areas, however the expected impact to such habitat will be minimal. There is no potential for the proposed modifications to pose a significant impact on this species.	No
little eagle *Hieraaetus morphnoides*	V (TSC)	This species is typically identified in open eucalypt forests, woodlands and open woodlands, and other areas where prey are plentiful. The nest in tall living trees within remnant patches.	The little eagle is distributed throughout mainland Australia except for the most densely forested parts of the Great Dividing Range escarpment. The Ulan Coal Complex is within the known distribution of this species.	Goulburn River NP Wollemi NP Coolah Tops NP Munghorn Gap NR	The species has been previously recorded in the Ulan Coal Complex. This species has not been recorded from the proposed modification areas. There is potential habitat for this species within the proposed modification areas, however the expected impact to such habitat will be minimal. There is no potential for the proposed modifications to pose a significant impact on this species.	No

THREATENED FAUNA SPECIES						
Species	**Legal Status**	**Specific Habitat**	**Distribution in Relation to Proposed Modification Areas**	**Reservation in the Region**	**Occurrence in Proposed Modification Areas and Potential for Significant Impact**	**Test for Ecological Significance Required?**
plains wanderer *Pedionomus torquatus*	E (TSC) V (EPBC)	This species occupies sparse and treeless native, lowland grasslands typically on red-brown, hard, clay soils. Their nests consist of a scratch in the ground lined with grasses. Their home-range is quite extensive and has been known to reach up to 21 hectares.	The distribution of the plains wanderer is scattered throughout areas of Queensland, NSW, Victoria and SA. Unconfirmed records of this species also exist from the NT. Most NSW identified birds have been in the Riverina region. The Ulan Coal Complex is not within the known distribution of this species.	This species is not known to occur in any reserves in the region.	The Ulan Coal Complex provides some suitable habitat for this species, however it has not been recorded during many years of extensive surveys. This species has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to pose a significant impact on this species.	No
Australian painted snipe *Rostratula benghalensis australis*	E (TSC) E (EPBC) MAR (EPBC) MIG (EPBC)	Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber.	In NSW, this species has been recorded at the Paroo wetlands, Lake Cowell, Macquarie Marshes and Hexham Swamp. Most common in the Murray-Darling Basin. It has a sporadic distribution across the entire state, from the east coast to the far west. The Ulan Coal Complex is within the known distribution of this species.	This species is not known to occur in any reserves in the region.	The Ulan Coal Complex provides some suitable habitat for this species, however it has not been recorded during many years of extensive surveys. This species has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to pose a significant impact on this species.	No

THREATENED FAUNA SPECIES						
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bush stone-curlew *Burhinus grallarius*	E (TSC)	This species inhabits open forests and woodlands with a sparse grassy ground layer and fallen timber. The bush stone curlew is largely nocturnal, being especially active on moonlit nights. It nests on the ground in a scrape or small bare patch laying two eggs in spring and early summer.	The bush stone-curlew is found throughout Australia except for the central southern coast and inland, the far south-east corner, and Tasmania. Only in northern Australia is it still common however, and in the south-east it is either rare or extinct throughout its former range. The Ulan Coal Complex is within the known distribution of this species.	This species is not known to occur in any reserves in the region.	The Ulan Coal Complex provides some suitable habitat for this species, however it has not been recorded during many years of extensive surveys. This species has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to pose a significant impact on this species.	No
glossy black-cockatoo *Calyptorhynchus lathami*	V (TSC)	Habitat for this species includes forests on low-nutrient soils, specifically those containing key *Allocasuarina* feed species (although they also eat seeds from eucalypts, angophoras, acacias, cypress pine and hakeas, and insect larvae). Nesting sites require large hollows, with breeding occurring in autumn and winter.	The glossy black-cockatoo has a distribution mostly confined to along the east coast and adjacent inland areas from western Victoria to Rockhampton in Queensland. In NSW, it has been recorded as far inland as Cobar and Griffith. The Ulan Coal Complex is within the known distribution of this species.	Munghorn Gap NP Goulburn River NP Wollemi NP Durridgeree SCA Nullo Mountain SF Manobalai NR Coolah Tops NP (NSW NPWS 1998)	The species has been previously recorded in the Ulan Coal Complex. There is potential habitat for this species within the proposed modification areas and it has been recorded in these areas by BMS (2014). While the expected impact to potential habitat for this species will be minimal, a Test for Ecological Significance has been provided as a precautionary measure.	Yes

THREATENED FAUNA SPECIES						
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gang-gang cockatoo *Callocephalon fimbriatum*	V (TSC)	In summer this species occurs in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In winter it moves to drier more open eucalypt forests and woodlands. Old growth trees are preferred for nesting and roosting.	In NSW this species occurs from the south-east coast to the Hunter region and inland to the Central Tablelands and South-west Slopes. It is bounded to the east by the coastline, to the north-west by an area just west of Curryall SF, and to the south-west by the Victorian border at Albury. The Ulan Coal Complex is within the known distribution of this species.	Goulburn River NP Wollemi NP Munghorn Gap NR	The species has been previously recorded in the Ulan Coal Complex. This species has not been recorded from the proposed modification areas. There is potential habitat for this species within the proposed modification areas. While the expected impact to potential habitat for this species will be minimal, a Test for Ecological Significance has been provided as a precautionary measure.	Yes
little lorikeet *Glossopsitta pusilla*	V (TSC)	This species can be found in dry-open eucalypt forests and woodlands, and have been identified in remnant vegetation, old growth vegetation, logged forests, and roadside vegetation. The little lorikeet usually forages in small flocks, not always with birds of their own species. They nest in hollows, mostly in living smooth-barked apples.	This species is distributed from just north of Cairns, around the east coast of Australia down to Adelaide. In NSW this species is found from the coast to the western slopes of the Great Dividing Range, extending as far west as Albury, Dubbo, Parkes and Narrabri. The Ulan Coal Complex is within the known distribution of this species.	Goulburn River NP Munghorn Gap NR Manobalai NR Wollemi NP Avisford NR Coolah Tops NP (NSW NPWS 1998)	The species has been previously recorded in the Ulan Coal Complex. This species has not been recorded from the proposed modification areas. There is potential habitat for this species within the proposed modification areas. While the expected impact to potential habitat for this species will be minimal, a Test for Ecological Significance has been provided as a precautionary measure.	Yes

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superb parrot *Polytelis swainsonii*	V (TSC) V (EPBC)	This species inhabits areas of Box-Gum, Box-Cypress-pine and bore Woodlands and River Red Gum Forest. These birds nest in the hollows- of large trees, often in small colonies with frequently more than one nest in a single tree.	This parrot is found throughout eastern inland NSW. The core breeding area for this species on the South-western Slopes is in the area bounded by Cowra and Yass in the East, and Grenfell, Cootamundra and Coolac in the west. During the winter months the birds from these areas migrate north to the upper Namoi and Gwydir Rivers. Birds are present all-year-round in the Riverina along the corridors of the Murray, Edward and Murrumbidgee Rivers. The Ulan Coal Complex is within the known distribution of this species.	This species is not known to occur in any reserves in the region.	The Ulan Coal Complex provides some suitable habitat for this species, however it has not been recorded during many years of extensive surveys. This species has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to pose a significant impact on this species.	No
swift parrot *Lathamus discolor*	E (TSC) E (EPBC) MAR (EPBC)	This species often visits box-ironbark forests, feeding on nectar and lerps. In NSW, typical tree species in which it forages include mugga ironbark, grey box, swamp mahogany, spotted gum, red bloodwood, narrow-leaved red ironbark, forest red gum and yellow box. This bird is a migratory species that breeds in Tasmania during the spring and summer, and migrates to the mainland during the cooler months of the year.	In NSW this species has been recorded from the western slopes region along the inland slopes of the Great Dividing Range, as well as forests along the coastal plains from southern to northern NSW. The Ulan Coal Complex is within the known distribution of this species.	Goulburn River NP Munghorn Gap NR	The species has been previously recorded in the Ulan Coal Complex. This species has not been recorded from the proposed modification areas. There is potential habitat for this species within the proposed modification areas. While the expected impact to potential habitat for this species will be minimal, a Test for Ecological Significance has been provided as a precautionary measure.	Yes

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turquoise parrot *Neophema pulchella*	V (TSC)	This species lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. It nests in tree hollows, logs or posts, from August to December.	The turquoise parrot's range extends from southern Queensland through to northern Victoria, from the coastal plains to the western slopes of the Great Dividing Range. The Ulan Coal Complex is within the known distribution of this species.	Goulburn River NP Munghorn Gap NR Wollemi NP	The species has been previously recorded in the Ulan Coal Complex. This species has not been recorded from the proposed modification areas. There is potential habitat for this species within the proposed modification areas. While the expected impact to potential habitat for this species will be minimal, a Test for Ecological Significance has been provided as a precautionary measure.	Yes
powerful owl *Ninox strenua*	V (TSC)	The powerful owl inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. It generally requires large tracts of forest or woodland habitat but can also occur in fragmented landscapes. The species breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. It roosts by day in dense vegetation.	The powerful owl occurs in eastern Australia, mostly on the coastal side of the Great Dividing Range, although as far west as Orange and Woomargama SF. It is also known from south western Victoria to Bowen in Queensland. The Ulan Coal Complex is within the known distribution of this species.	Goulburn River NP Munghorn Gap NR Wollemi NP Coolah Tops NP (NSW NPWS 1998)	The species has been previously recorded in the Ulan Coal Complex. This species has not been recorded from the proposed modification areas. There is potential habitat for this species within the proposed modification areas. While the expected impact to potential habitat for this species will be minimal, a Test for Ecological Significance has been provided as a precautionary measure.	Yes

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barking owl *Ninox connivens*	V (TSC)	Habitat for this species includes dry forests and woodlands, often in association with hydrological features such as rivers and swamps.	The barking owl is distributed sparsely throughout temperate and semi-arid areas of mainland Australia; however it is most abundant in the tropical north. Most records for this species occur west of the Great Dividing Range. The Ulan Coal Complex is within the known distribution of this species.	Goulburn River NP Durridgeree SCA Wollemi NP Coolah Tops NP (NSW NPWS 1998)	The species has been previously recorded in the Ulan Coal Complex. This species has not been recorded from the proposed modification areas. There is potential habitat for this species within the proposed modification areas. While the expected impact to potential habitat for this species will be minimal, a Test for Ecological Significance has been provided as a precautionary measure.	Yes
masked owl *Tyto novaehollandiae*	V (TSC)	This species is generally recorded from open forest habitat with sparse mid-storey but patches of dense, low ground cover. It is also recorded from ecotones between wet and dry eucalypt forest, along minor drainage lines and near boundaries between forest and cleared land.	The masked owl occurs sparsely throughout the Australian continent and nearby islands, including Tasmania and New Guinea. In NSW it is most commonly identified in the more coastal areas. The Ulan Coal Complex is within the known distribution of this species.	Goulburn River NP Munghorn Gap NR Coolah Tops NP (NSW NPWS 1998)	The Ulan Coal Complex provides some suitable habitat for this species, however it has not been recorded during many years of extensive surveys. This species has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to pose a significant impact on this species.	No

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brown treecreeper (eastern subspecies) *Climacteris picumnus victoriae*	V (TSC)	Typical habitat for this species includes drier forests, woodlands and scrubs with fallen branches; river red gums on watercourses and around lake-shores; paddocks with standing dead timber; and margins of denser wooded areas. This species prefers areas without a dense understorey.	This species occurs over central NSW, west of the Great Dividing Range and sparsely scattered to the east of the divide in drier areas such as the Cumberland Plain of Western Sydney, and in parts of the Hunter, Clarence, Richmond and Snowy River valleys. The Ulan Coal Complex is within the known distribution of this species.	Wollemi NP Manobalai NR Goulburn River NP (NSW NPWS 2001) Coolah Tops NP (NSW NPWS 1998)	The species has been previously recorded in the Ulan Coal Complex. There is potential habitat for this species within the proposed modification areas and it has been recorded in these areas by BMS (2014). While the expected impact to potential habitat for this species will be minimal, a Test for Ecological Significance has been provided as a precautionary measure.	Yes
speckled warbler *Chthonicola sagittata*	V (TSC)	The speckled warbler occurs in eucalypt-dominated communities that have a grassy understorey, leaf litter and shrub cover, often on rocky ridges or in gullies.	Patchy distribution throughout south-eastern Queensland, eastern half of NSW and into Victoria, as far west as the Grampians. In NSW it is not known to occur further away than 400 kilometres from the coast. The Ulan Coal Complex is within the known distribution of this species.	Munghorn Gap NR Goulburn River NP Wollemi NP Turrill SF Durridgeree SCA Coolah Tops NP (NSW NPWS 1998)	The species has been previously recorded in the Ulan Coal Complex. There is potential habitat for this species within the proposed modification areas and it has been recorded in these areas by BMS (2014). The expected impact to potential habitat for this species will be minimal and will not result in a potential significant impact on this species.	No

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regent honeyeater *Anthochaera phrygia*	CE (TSC) E (EPBC) MIG (EPBC)	This species generally occurs in temperate eucalypt woodlands and open forests of south eastern Australia. It is commonly recorded from box-ironbark eucalypt associations, wet lowland coastal forests dominated by swamp mahogany, spotted gum and riverine *Casuarina* woodlands. Within these habitats they prefer the wettest, most fertile sites, such as creek flats, river valleys and foothills.	Once recorded between Adelaide and the central coast of Queensland, its range has contracted dramatically in the last 30 years to between north-eastern Victoria and south-eastern Queensland. The Ulan Coal Complex is within the known distribution of this species.	Goulburn River NP Munghorn Gap NR Wollemi NP	The Ulan Coal Complex provides some suitable habitat for this species, however it has not been recorded during many years of extensive surveys. This species has not been recorded within the proposed modification areas. While the expected impact to potential habitat for this species will be minimal, a Test for Ecological Significance has been provided as a precautionary measure.	Yes
black-chinned honeyeater (eastern subspecies) *Melithreptus gularis gularis*	V (TSC)	Occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially mugga ironbark, white box, grey box, yellow box and forest red gum. Also inhabits open forests of smooth-barked gums, stringybarks, ironbarks and tea-trees.	The subspecies is widespread, from the tablelands and western slopes of the Great Dividing Range to the north-west and central-west plains and the Riverina. It is rarely recorded east of the Great Dividing Range, although regularly observed from the Richmond River district. It has also been recorded at a few scattered sites in the Hunter, Central Coast and Illawarra regions. The Ulan Coal Complex is within the known distribution of this species.	Goulburn River NP Munghorn Gap NR Wollemi NP	The species has been previously recorded in the Ulan Coal Complex. There is potential habitat for this species within the proposed modification areas and it has been recorded in these areas by BMS (2014). The expected impact to potential habitat for this species will be minimal and will not result in a potential significant impact on this species.	No

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painted honeyeater *Grantiella picta*	V (TSC)	Inhabits Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests. They construct a delicate hanging nest in the outer canopy of drooping eucalypts, she-oaks, paperbarks and mistletoes.	The greatest concentrations of this species of bird and almost all breeding occur on the inland slopes of the Great Dividing Range in NSW, Victoria and southern Queensland. During the winter it is more likely to be found in the north of its distribution. In NSW this bird has been identified from the coast to the far west. The Ulan Coal Complex is within the known distribution of this species.	Wollemi NP	The species has been previously recorded in the Ulan Coal Complex. This species has not been recorded from the proposed modification areas. There is potential habitat for this species within the proposed modification areas, however the expected impact to such habitat will be minimal. There is no potential for the proposed modifications to pose a significant impact on this species.	No
pied honeyeater *Certhionyx variegatus*	V (TSC)	This species primarily inhabits areas of arid and semi-arid wattle shrub (usually mulga, *Acacia aneura*), mallee, spinifex, and eucalypt woodland. They are highly nomadic and tend to follow flowering shrub patterns. The pied honeyeater nests in tree or shrub forks approximately 5 metres from the ground in cup-shaped nests made from grasses, twigs and spiders web.	This species is generally distributed throughout acacia, mallee and spinifex scrubs of arid and semi-arid Australia, however is known to occur further east on the Hunter Valley slopes and plains. The Ulan Coal Complex is within the known distribution of this species.	Munghorn Gap NR	The Ulan Coal Complex provides some suitable habitat for this species, however it has not been recorded during many years of extensive surveys. This species has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to pose a significant impact on this species.	No

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white-fronted chat *Epthianura albifrons*	V (TSC)	The distribution of the White-fronted Chat extends across the southern half of Australia, from the southernmost areas of Queensland to southern Tasmania and across to Western Australia as far north as Carnarvon. This species is found mostly in temperate to arid climates and very rarely sub-tropical areas, it occupies foothills and lowlands up to 1000 m above sea level.	In New South Wales the White-fronted Chat occurs mostly in the southern half of the state, occurring in damp open habitats along the coast, and near waterways in the western part of the state.	Munghorn Gap NR	The Ulan Coal Complex provides some suitable habitat for this species, however it has not been recorded during many years of extensive surveys. This species has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to pose a significant impact on this species.	No
scarlet robin *Petroica boodang*	V (TSC)	This robin can be found in woodlands and open forests from the coast through to inland slopes. The birds can sometimes be found on the eastern fringe of the inland plains in the colder months of the year. Woody debris and logs are both important structural elements of its habitat. It forages from low perches on invertebrates either on the ground or in woody debris or tree trunks.	The scarlet robin can be found in south-eastern Australia, from Tasmania to the southern end of Queensland, to western Victoria and southern SA. In NSW it is found throughout the eastern areas of the state, no further than 500 kilometres from the coast. The Ulan Coal Complex is within the known distribution of this species.	Coolah Tops NP Munghorn Gap NR Goulburn River NP Wollemi NP Avisford NR Nullo Mountain SF	The species has been previously recorded in the Ulan Coal Complex. There is potential habitat for this species within the proposed modification areas and it has been recorded in these areas by BMS (2014). The expected impact to potential habitat for this species will be minimal and will not result in a potential significant impact on this species.	No

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flame robin *Petroica phoenicea*	V (TSC)	This species is known to breed in moist eucalypt forests and woodlands. It can usually be seen on ridges and slopes in areas where there is an open understorey layer. This species migrates during the winter to more lowland areas such as grasslands where there are scattered trees, as well as open woodland of the inland slopes and plains.	This robin is located in south-eastern Australia from the Queensland border to Tasmania and into Victoria as well as south-east SA. In NSW it has been recorded from the coast to as far west as the NSW-Victoria border at Mildura. The Ulan Coal Complex is within the known distribution of this species.	Coolah Tops NP Wollemi NP	The species has been previously recorded in the Ulan Coal Complex. This species has not been recorded from the proposed modification areas. There is potential habitat for this species within the proposed modification areas, however the expected impact to such habitat will be minimal. There is no potential for the proposed modifications to pose a significant impact on this species.	No
pink robin *Petroica rodinogaster*	V (TSC)	This robin typically inhabits rainforests and tall-open eucalypt forests (predominantly in densely vegetated gullies). The pink robin usually forages on the ground; and builds a deep, sphere-shaped, cup nest. Their nest is constructed from green moss, cobweb and lichen and lined with pieces of fur and plant down.	The pink robin is distributed throughout Tasmania, as well as upland eastern Victoria and far eastern NSW (to Bombala). The species has been found as far north as the NSW Central Coast. The Ulan Coal Complex is within the known distribution of this species.	Munghorn Gap NR	The Ulan Coal Complex provides some suitable habitat for this species, however it has not been recorded during many years of extensive surveys. This species has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to pose a significant impact on this species.	No

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hooded robin (south-eastern form) *Melanodryas cucullata cucullata*	V (TSC)	Hooded robins are found in lightly timbered woodland, mainly dominated by acacia and/or eucalypts. They nest in either a tree fork or crevice in a cup constructed of bark and cobweb at a height between 1 and 5 metres.	Hooded robins are found all over mainland Australia, except Cape York and eastern Gulf of Carpentaria or inland around the Simpson Desert, on the Nullarbor Plain or south of the Kimberley Ranges. They are more commonly found in south-eastern Australia from Adelaide to Brisbane. The Ulan Coal Complex is within the known distribution of this species.	Wollemi NP Goulburn River NP (NSW NPWS 2001)	The species has been previously recorded in the Ulan Coal Complex. This species has not been recorded from the proposed modification areas. There is potential habitat for this species within the proposed modification areas, however the expected impact to such habitat will be minimal. There is no potential for the proposed modifications to pose a significant impact on this species.	No
grey-crowned babbler (eastern subspecies) *Pomatostomus temporalis temporalis*	V (TSC)	The grey-crowned babbler is typically found in open box-gum woodlands on slopes. Or box-cypress-pine and open box woodlands on alluvial plains. Also found in acacia shrubland and adjoining areas. This species lives in large family groups which roost at night in conspicuous dome-shaped stick nests.	Occurs throughout northern and south-eastern Australia. In NSW, this species occurs on the western slopes of the Great Dividing Range and on the western plains reaching as far west as Louth and Hay. It also occurs in woodlands in the Hunter Valley and in several locations on the North Coast of NSW. The Ulan Coal Complex is within the known distribution of this species.	Wollemi NP Goulburn River NP Munghorn Gap NP	The species has been previously recorded in the Ulan Coal Complex. There is potential habitat for this species within the proposed modification areas and it has been recorded in these areas by BMS (2014). The expected impact to potential habitat for this species will be minimal and will not result in a potential significant impact on this species.	No

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varied sittella *Daphoenositta chrysoptera*	V (TSC)	The varied sittella can typically be found in eucalypt forests and woodlands, especially of rough-barked species and mature smooth-barked gums with dead branches, it can also be identified in mallee and acacia woodlands. This species builds a cup shaped nest made of plant fibres and spiders webs which is placed at the canopy level in the fork of a living tree.	The varied sittella is a sedentary species that inhabits the majority of mainland Australia with the exception of the treeless deserts and open grasslands. Its NSW distribution is basically continuous from the coast to the far west. The Ulan Coal Complex is within the known distribution of this species.	Coolah Tops NP Durridgeree SCA Turrill SF Goulburn River NP Munghorn Gap NR Manobalai NR Wollemi NP	The species has been previously recorded in the Ulan Coal Complex. There is potential habitat for this species within the proposed modification areas and it has been recorded in these areas by BMS (2014). The expected impact to potential habitat for this species will be minimal and will not result in a potential significant impact on this species.	No
Australasian bittern *Botaurus poiciloptilus*	E (TSC) E (EPBC)	Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (*Typha* spp.) and spikerushes (*Eleoacharis* spp.).	This species may be found over most of the state except for the far north-west.	This species is not known to occur in any reserves in the region.	The Ulan Coal Complex provides some suitable habitat for this species, however it has not been recorded during many years of extensive surveys. This species has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to pose a significant impact on this species.	No

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diamond firetail *Stagonopleura guttata*	V (TSC)	Habitat includes a range of eucalypt dominated communities with a grassy understorey, including woodland, forest and mallee. Constant populations have not been identified in areas where there are no vegetated remnants larger than 200 hectares.	The diamond firetail occurs through central and eastern NSW, north into southern and central Queensland and south through Victoria to SA. In NSW it mainly occurs west of the Great Dividing Range, although populations are known from drier coastal areas such as the Cumberland Plain and the Hunter, Clarence, Richmond and Snowy River valleys. The Ulan Coal Complex is within the known distribution of this species.	Goulburn River NP Wollemi NP Munghorn Gap NP	The species has been previously recorded in the Ulan Coal Complex. There is potential habitat for this species within the proposed modification areas and it has been recorded in these areas by BMS (2014). The expected impact to potential habitat for this species will be minimal and will not result in a potential significant impact on this species.	No
MAMMALS						
spotted-tailed quoll *Dasyurus maculata*	V (TSC) E (EPBC)	Habitat for this species is highly varied, ranging from sclerophyll forest, woodlands, coastal heathlands and rainforests. Records exist from open country, grazing lands and rocky outcrops. Suitable den sites including hollow logs, tree hollows, rocky outcrops or caves.	In NSW the spotted-tailed quoll occurs on both sides of the Great Dividing Range, with the highest densities occurring in the north east of the state. It occurs from the coast to the snowline and inland to the Murray River. The Ulan Coal Complex is within the known distribution of this species.	Wollemi NP	The Ulan Coal Complex provides some suitable habitat for this species, however it has not been recorded during many years of extensive surveys. This species has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to pose a significant impact on this species.	No

THREATENED FAUNA SPECIES						
Species	**Legal Status**	**Specific Habitat**	**Distribution in Relation to Proposed Modification Areas**	**Reservation in the Region**	**Occurrence in Proposed Modification Areas and Potential for Significant Impact**	**Test for Ecological Significance Required?**
koala *Phascolarctos cinereus*	V (TSC) V (EPBC)	This species inhabits eucalypt forest and woodland, with suitability influenced by tree species and age, soil fertility, climate, rainfall and fragmentation patterns. The species is known to feed on a large number of eucalypt and non-eucalypt species; however it tends to specialise on a small number in different areas. *Eucalyptus tereticornis, E. punctata, E. cypellocarpa, E. viminalis, E. microcorys, E. robusta, E. albens, E. camaldulensis* and *E. populnea* are some preferred species.	The koala has a fragmented distribution throughout eastern Australia, with the majority of records from NSW occurring on the central and north coasts, as well as some areas further west. It is known to occur along inland rivers on the western side of the Great Dividing Range. The Ulan Coal Complex is within the known distribution of this species.	Goulburn River NP Wollemi NP Munghorn Gap NR Manobalai NR	The species has been previously recorded in the Ulan Coal Complex. There is potential habitat for this species within the proposed modification areas and it has been recorded in these areas by BMS (2014). While the expected impact to potential habitat for this species will be minimal, a Test for Ecological Significance has been provided as a precautionary measure.	Yes
squirrel glider *Petaurus norfolcensis*	V (TSC)	Inhabits a variety of mature or old growth habitats, including box, box-ironbark woodlands, river red gum forest, and blackbutt-bloodwood forest with heath understorey. It prefers mixed species stands with a shrub or acacia mid-storey, and requires abundant tree hollows for refuge and nest sites.	The species is widely though sparsely distributed in eastern Australia, from northern Queensland to western Victoria. In NSW it can be found from the coast, to no further than 400 kilometres west of the coast.	Goulburn River NP Wollemi NP Manobalai NR	The species has been previously recorded in the Ulan Coal Complex. This species has also been recorded within the proposed modification areas. There is potential habitat for this species within the proposed modification areas. While the expected impact to potential habitat for this species will be minimal, a Test for Ecological Significance has been provided as a precautionary measure.	Yes

THREATENED FAUNA SPECIES						
Species	**Legal Status**	**Specific Habitat**	**Distribution in Relation to Proposed Modification Areas**	**Reservation in the Region**	**Occurrence in Proposed Modification Areas and Potential for Significant Impact**	**Test for Ecological Significance Required?**
brush-tailed rock-wallaby *Petrogale penicillata*	E (TSC) V (EPBC)	This species occupies rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges facing north. It grazes grasses, forbs and the foliage and fruits of shrubs and trees in and adjacent to rocky areas. This species shelters or basks during the day in rock crevices, caves and overhangs and is most active at night.	The brush-tailed rock-wallaby was once abundant and ubiquitous throughout the mountainous country of south-eastern Australia. Its distribution roughly followed the Great Dividing Range for 2,500 kilometres from the Grampians in West Victoria to Nanango in south-east Queensland, with outlying populations in coastal valleys and ranges to the east of the divide, and the slopes and plains as far west as Cobar in NSW and Injune (500 kilometres NW of Brisbane) in Queensland. The Ulan Coal Complex is within the known distribution of this species.	Goulburn River NP Wollemi NP Manobalai NR	The species has been recorded in the Ulan Coal Complex on one occasion in 2001. It is possible that this species is no longer extant in the Ulan Coal Complex. Despite this, the dependence of this species on cliff line areas (which have the potential to be impacted by the proposed underground operations) requires that a detailed Test of Ecological Significance be completed for this species.	Yes
New Holland mouse *Pseudomys novaehollandiae*	V (EPBC)	Across the species' range the New Holland Mouse is known to inhabit open heathlands, open woodlands with a heathland understorey, and vegetated sand dunes.	The New Holland mouse currently has a disjunct, fragmented distribution across Tasmania, Victoria, New South Wales and Queensland.	This species is not known to occur in any reserves in the region.	The Ulan Coal Complex provides some suitable habitat for this species, however it has not been recorded during many years of extensive surveys. This species has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to pose a significant impact on this species.	No

THREATENED FAUNA SPECIES						
Species	**Legal Status**	**Specific Habitat**	**Distribution in Relation to Proposed Modification Areas**	**Reservation in the Region**	**Occurrence in Proposed Modification Areas and Potential for Significant Impact**	**Test for Ecological Significance Required?**
grey-headed flying-fox *Pteropus poliocephalus*	V (TSC) V (EPBC)	This species occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 kilometres of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.	Grey-headed flying-foxes are found within 200 kilometres of the eastern coast of Australia, from Bundaberg in Queensland to Melbourne in Victoria. The Ulan Coal Complex is close to the western limit of the known distribution of this species.	Wollemi NP	The Ulan Coal Complex provides some suitable habitat for this species, however it has not been recorded during many years of extensive surveys. This species has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to pose a significant impact on this species.	No
yellow-bellied sheathtail bat *Saccolaimus flaviventris*	V (TSC)	This species forages for insects, flying high and fast over the forest canopy, but lower in more open country. It forages in most habitats across its very wide range, with and without trees; and appears to defend an aerial territory. It roosts singularly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to use mammal burrows.	The yellow-bellied sheathtail-bat is a wide-ranging species found across northern and eastern Australia. In the most southerly part of its range – most of Victoria, south-western NSW and adjacent SA – it is a rare visitor in late summer and autumn. There are scattered records of this species across the New England Tablelands and North-west Slopes.	Wollemi NP Manobalai NR	The species has been previously recorded in the Ulan Coal Complex. This species has not been recorded from the proposed modification areas. There is potential habitat for this species within the proposed modification areas. While the expected impact to potential habitat for this species will be minimal, a Test for Ecological Significance has been provided as a precautionary measure.	Yes

THREATENED FAUNA SPECIES						
Species	**Legal Status**	**Specific Habitat**	**Distribution in Relation to Proposed Modification Areas**	**Reservation in the Region**	**Occurrence in Proposed Modification Areas and Potential for Significant Impact**	**Test for Ecological Significance Required?**
little bentwing-bat *Miniopterus australis*	V (TSC)	Prefers moist eucalypt forest, rainforest or dense coastal banksia scrub. This species roost in caves, tunnels and sometimes tree hollows during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats.	Occurs in coastal north-eastern NSW and eastern Queensland. In NSW it mostly occurs along the coast from the Queensland border to Sydney at its south-most, and to the west Ulan is the known western geographic distributional limit. One outlying record exists in NSW to the east of Mildura The Ulan Coal Complex is at the limit of distribution of this species.	This species is not known to occur in any reserves in the region.	The species has not been recorded in the Ulan Coal Complex, however has been recorded in the local area. Despite this, the dependence of this species on cliff line areas (which have the potential to be impacted by the proposed modifications) requires that a detailed Test of Ecological Significance be completed for this species.	Yes
eastern bentwing-bat *Miniopterus schreibersii oceanensis*	V (TSC)	This species hunts in forested areas and uses caves as the primary roosting habitat, but also uses derelict mines, storm-water tunnels, buildings and other man-made structures. It forms discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young.	Eastern bentwing-bats occur along the east and north-west coasts of Australia. In NSW they are found both east and west of the Great Dividing Range, but typically no further than 300 kilometres from the coast. (BioNet 2009) The Ulan Coal Complex is within the known distribution of this species.	Goulburn River NP Munghorn Gap NR Wollemi NP Manobalai NR Coolah Tops NP (NSW NPWS 1998)	The species has been previously recorded in the Ulan Coal Complex. There is potential habitat for this species within the proposed modification areas and it has been recorded in these areas by BMS (2014). The dependence of this species on cliff line areas (which have the potential to be impacted by the proposed modifications) requires that a detailed Test of Ecological Significance be completed for this species.	Yes

THREATENED FAUNA SPECIES						
Species	**Legal Status**	**Specific Habitat**	**Distribution in Relation to Proposed Modification Areas**	**Reservation in the Region**	**Occurrence in Proposed Modification Areas and Potential for Significant Impact**	**Test for Ecological Significance Required?**
south-eastern long-eared bat *Nyctophilus corbeni*	V (TSC) V (EPBC)	Inhabits a variety of vegetation types, including mallee, bulloak and box eucalypt dominated communities, but it is distinctly more common in box/ironbark/cypress-pine vegetation that occurs in a north-south belt along the western slopes and plains of NSW and southern Queensland. Roosts in tree hollows, crevices, and under loose bark.	Overall, the distribution of the south eastern form coincides approximately with the Murray Darling Basin with the Pilliga Scrub region being the distinct stronghold for this species. This species has been recorded throughout NSW with the exception of the extreme north-west of the state. and most areas east of the Great Dividing Range (with the exception of the areas around Sydney.) The Ulan Coal Complex is within the known distribution of this species.	Goulburn River NP Manobalai NR Wollemi NP	The species has been previously recorded in the Ulan Coal Complex. This species has not been recorded from the proposed modification areas. There is potential habitat for this species within the proposed modification areas. While the expected impact to potential habitat for this species will be minimal, a Test for Ecological Significance has been provided as a precautionary measure.	Yes
little pied bat *Chalinolobus picatus*	V (TSC)	These species inhabits dry-open forest open woodland, mulga woodlands, chenopod shrublands, cypress-pine forest, mallee, Bimbil box. It can be located in hot, dry areas but only if in proximity to a water source. The little pied bat roosts in a range of situations from caves, mineshafts and tunnels, through to tree hollows and buildings.	This bat species is distributed from inland Queensland to NSW (inclusive of the Western Plains and Slopes), to small areas of Victoria and SA. In NSW it is known from areas of the state west of the Great Dividing Range (BioNet 2009). The Ulan Coal Complex is within the known distribution of this species.	This species is not known to occur in any reserves in the region.	The species has been previously recorded in the Ulan Coal Complex. The dependence of this species on cliff line areas (which have the potential to be impacted by the proposed modifications) requires that a detailed Test of Ecological Significance be completed for this species.	Yes

THREATENED FAUNA SPECIES						
Species	**Legal Status**	**Specific Habitat**	**Distribution in Relation to Proposed Modification Areas**	**Reservation in the Region**	**Occurrence in Proposed Modification Areas and Potential for Significant Impact**	**Test for Ecological Significance Required?**
large-eared pied bat *Chalinolobus dwyeri*	V (TSC) V (EPBC)	The large-eared pied bat is generally found in a variety of drier habitats, including dry sclerophyll forests and woodlands, however, it probably tolerates a wide range of habitats. It tends to roost in the twilight zones of mines and caves, generally in colonies or common groups.	This species has a distribution from south western Queensland to NSW from the coast to the western slopes of the Great Dividing Range. In NSW this species is not known to occur further west than Warrumbungle NP. The Ulan Coal Complex is close to the distributional limit of this species – records further west appear to be disjunct occurrences.	Goulburn River NP Wollemi NP Munghorn Gap NR Manobalai NR Coolah Tops NP (NSW NPWS 1998)	The species has been previously recorded in the Ulan Coal Complex. The dependence of this species on cliff line areas (which have the potential to be impacted by the proposed modifications) requires that a detailed Test of Ecological Significance be completed for this species.	Yes
eastern false pipistrelle *Falsistrellus tasmaniensis*	V (TSC)	Habitat for this species includes sclerophyll forest. It prefers wet habitats, with trees over 20 metres high, and generally roosts in tree hollows or trunks.	This species has a range from south eastern Queensland, through NSW, Victoria and into Tasmania, and occurs from the Great Dividing Range to the coast. The Ulan Coal Complex is within the known distribution of this species.	Goulburn River NP Wollemi NP Coolah Tops NP (NSW NPWS 1998)	The species has been previously recorded in the Ulan Coal Complex. This species has not been recorded from the proposed modification areas. There is potential habitat for this species within the proposed modification areas. While the expected impact to potential habitat for this species will be minimal, a Test for Ecological Significance has been provided as a precautionary measure.	Yes

THREATENED FAUNA SPECIES						
Species	**Legal Status**	**Specific Habitat**	**Distribution in Relation to Proposed Modification Areas**	**Reservation in the Region**	**Occurrence in Proposed Modification Areas and Potential for Significant Impact**	**Test for Ecological Significance Required?**
southern myotis *Myotis macropus*	V (TSC)	This species generally roosts in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, and storm water channels, buildings, under bridges and in dense foliage. It forages over streams and pools catching insects and small fish by raking its feet across the water surface.	The large-footed myotis is found in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. It is rarely found more than 100 kilometres inland, except along major rivers. The Ulan Coal Complex is around the inland limit of distribution of this species.	This species is not known to occur in any reserves in the region.	The species has been previously recorded in the Ulan Coal Complex. The dependence of this species on cliff line areas (which have the potential to be impacted by the proposed modifications) requires that a detailed Test of Ecological Significance be completed for this species.	Yes
eastern cave bat *Vespadelus troughtoni*	V (TSC)	This species is a cave-roosting bat that is usually found in dry open forest and woodland, near cliffs or rocky overhangs. It has been recorded roosting in disused mine workings, occasionally in colonies of up to 500 individuals, and is occasionally found along cliff-lines in wet eucalypt forest and rainforest.	The eastern cave bat is found in a broad band on both sides of the Great Dividing Range from Cape York to Kempsey, with records from the New England Tablelands and the upper north coast of NSW. The western limit appears to be the Warrumbungle Range, and there is a single record from southern NSW, east of the ACT. In NSW this species appears to be bounded by the coast, the NSW-Queensland border at Bebo SF, Pilliga NR near Coonabarrabran, Toronto to the south and Wollemi NP to the south-west. (BioNet 2009). The Ulan Coal Complex is within the known distribution of this species.	Goulburn River NP Wollemi NP Manobalai NR	The species has been previously recorded in the Ulan Coal Complex. The dependence of this species on cliff line areas (which have the potential to be impacted by the proposed modifications) requires that a detailed Test of Ecological Significance be completed for this species.	Yes

THREATENED FAUNA SPECIES						
Species	**Legal Status**	**Specific Habitat**	**Distribution in relation to Ulan Coal Complex**	**Reservation in the Region (BioNet 2009)**	**Occurrence in Ulan Coal Complex and Potential for Significant Impact**	**Test for Ecological Significance Required?**
FISH						
Murray cod *Maccullochella peelii peelii*	V (EPBC)	This species is typically found in warm water habitats ranging from clear water to cloudy, and rocky to sandy bottomed. The waters are usually sheltered by rock or timber overhangs, with the fish strongly dependent on woody debris in the water column. They are not typically found in waters with depths greater than 5 metres.	This species is distributed throughout the warmer waters of the Murray-Darling basin. The Ulan Coal Complex is probably outside of the distribution of this species.	This species is not known to occur in any reserves in the region.	The Ulan Coal Complex provides some suitable habitat for this species in the Talbragar River, however it has not been recorded during many years of extensive surveys. This species has not been recorded from the proposed modification areas and there is no potential habitat for this species in these areas. There is no potential for a significant impact on this species as a result of the proposed modifications.	No

Note:

E	endangered
EPBC	Commonwealth *Environment Protection Biodiversity Conservation Act 1999*
EX	extinct
FM	NSW *Fisheries Management Act 1994*
LGA	local government area
NP	National Park
NR	Nature Reserve
PD	preliminary determination
SCA	State conservation Area
SCA	State Conservation Area
SF	State forest
TSC	NSW *Threatened Species Conservation Act 1995*
V	vulnerable

Table 5 – Migratory and Marine Species Recorded or with Potential to Occur in Proposed Modification Areas

MIGRATORY AND MARINE SPECIES						
Species	**Legal Status**	**Specific Habitat**	**Distribution in relation to Proposed Modification Areas**	**Reservation in the Region**	**Occurrence in Proposed Modification Areas and Potential for Significant Impact**	**Test for Ecological Significance Required?**
rainbow bee-eater *Merops ornatus*	MAR (EPBC) MIG (EPBC)	The preferred habitat of the rainbow bee-eater is open forests and woodlands, shrublands, and cleared or semi-cleared areas (commonly farmland). These areas are usually in close proximity to permanent water, however, during migration this bird may fly over areas of non-preferential habitat.	This species is distributed throughout most of mainland Australia as well as several near-shore islands. It is not found in Tasmania and has only been identified in a thin strip in the most arid regions of central WA. The Ulan Coal Complex is within the known distribution of this species.	Goulburn River NP (NSW NPWS 2001) Coolah Tops NP (NSW NPWS 1998 & Tame 1997)	The species has been previously recorded in the Ulan Coal Complex. This species has not been recorded from the proposed modification areas. There is potential habitat for this species within the proposed modification areas, however the expected impact to such habitat will be minimal. There is no potential for the proposed modifications to pose a significant impact on this species.	No
cicadabird *Coracina tenuirostris*	MAR (EPBC)	This species is rarely found in Australia outside of the months of September through May. It is typically found in forests and woodlands (Slater et al. 2003).	This species can be found on the eastern coast of Australia from Cape York through to the southern tip of Victoria. It can also be found in the northern parts of the NT as well as the north-most areas of WA. The Ulan Coal Complex is within the known distribution of this species.	Wollemi NP Goulburn River NP Munghorn Gap NR Manobalai NR Avisford NR Durridgeree SCA Coolah Tops NP (NSW NPWS 1998)	The species has been previously recorded in the Ulan Coal Complex. This species has not been recorded from the proposed modification areas. There is potential habitat for this species within the proposed modification areas, however the expected impact to such habitat will be minimal. There is no potential for the proposed modifications to pose a significant impact on this species.	No

MIGRATORY AND MARINE SPECIES						
Species	**Legal Status**	**Specific Habitat**	**Distribution in relation to Proposed Modification Areas**	**Reservation in the Region**	**Occurrence in Proposed Modification Areas and Potential for Significant Impact**	**Test for Ecological Significance Required?**
cattle egret *Ardea ibis*	MAR (EPBC) MIG (EPBC)	The cattle egret can be found in grasslands, wetlands and woodlands and has never been identified in arid areas. These birds are commonly sighted at garbage dumps, pastures and croplands (especially where poor drainage is present) are common (Australian Museum 2005).	The cattle egret is distributed throughout Asia, Africa, Europe and Australia. It is most commonly found in north-eastern WA, the NT and in south-eastern Australia from Bundaberg Queensland through to Port Augusta in SA. It has also been identified in Tasmania. The Ulan Coal Complex is within the known distribution of this species.	This species is not known to occur in any reserves in the region.	The species has been previously recorded in the Ulan Coal Complex. This species has not been recorded from the proposed modification areas. There is potential habitat for this species within the proposed modification areas, however the expected impact to such habitat will be minimal. There is no potential for the proposed modifications to pose a significant impact on this species.	No
great egret *Ardea alba*	MAR (EPBC) MIG (EPBC)	The great egret typically inhabits areas of shallow, flowing waters, but also uses damp grasslands and other watered areas. They can be observed both in flocks and on their own, and roost during the night in groups (Australian Museum 2005).	The great egret is distributed throughout the world, and is common throughout most areas of Australia, with exception to extremely arid areas. The Ulan Coal Complex is within the known distribution of this species.	Wollemi NP Goulburn River NP (NSW NPWS 2001)	The species has been previously recorded in the Ulan Coal Complex. This species has not been recorded from the proposed modification areas. There is potential habitat for this species within the proposed modification areas, however the expected impact to such habitat will be minimal. There is no potential for the proposed modifications to pose a significant impact on this species.	No

MIGRATORY AND MARINE SPECIES						
Species	**Legal Status**	**Specific Habitat**	**Distribution in relation to Proposed Modification Areas**	**Reservation in the Region**	**Occurrence in Proposed Modification Areas and Potential for Significant Impact**	**Test for Ecological Significance Required?**
white-bellied sea-eagle *Haliaeetus leucogaster*	MAR (EPBC) MIG (EPBC)	These birds are typically sighted perched in tall trees and soaring above bodies of water and land. They are territorial and form permanent breeding pairs (Australian Museum 2005).	This species is distributed across Australia, China, India, Indonesia, New Guinea, and south-east Asia. Within Australia it is distributed along and near the coast but can be found along major inland rivers. The Ulan Coal Complex is within the known distribution of this species.	Goulburn River NP	The Ulan Coal Complex provides some suitable habitat for this species, however it has not been recorded during many years of extensive surveys. This species has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to pose a significant impact on this species.	No
white-throated needletail *Hirundapus caudacutus*	MAR (EPBC) MIG (EPBC)	This species is only in Australia approximately between the months of October and May. They forage upon flying insects and drink whilst in flight. Feeding is typically associated with rising thermal currents typical with storm fronts and bushfires. (Australian Museum Online 2003)	This species is distributed over eastern and northern Australia. The Ulan Coal Complex is within the known distribution of this species.	Goulburn River NP Wollemi NP Munghorn Gap NR Coolah Tops NP (NSW NPWS 1998)	The species has been previously recorded in the Ulan Coal Complex. This species has not been recorded from the proposed modification areas. There is potential habitat for this species within the proposed modification areas, however the expected impact to such habitat will be minimal. There is no potential for the proposed modifications to pose a significant impact on this species.	No

MIGRATORY AND MARINE SPECIES						
Species	**Legal Status**	**Specific Habitat**	**Distribution in relation to Proposed Modification Areas**	**Reservation in the Region**	**Occurrence in Proposed Modification Areas and Potential for Significant Impact**	**Test for Ecological Significance Required?**
malleefowl *Leipoa ocellata*	MIG (EPBC)	The mallefowl is typically found in semi-arid and arid areas of temperate Australia, in shrubland and low woodlands dominated by dense but discontinuous mallee vegetation. They are usually on loamy or sandy soils with an annual average rainfall between 200 and 450 millimetres. The mallefowl has been known to forage in open grassland and farmland areas; and breeds in areas with plentiful leaf litter.	The mallefowl is distributed across southern Australia. Typically found west of the Great Dividing Range, from the Pilliga south-west through to the Griffith and Wentworth districts. A small number of records have been identified from east of the Great Dividing Range in the Goulburn River NP. The Ulan Coal Complex is broadly within the known distribution of this species.	Goulburn River NP – purported records	The Ulan Coal Complex provides some suitable habitat for this species, however it has not been recorded during many years of extensive surveys. This species has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to pose a significant impact on this species.	No
satin flycatcher *Myiagra cyanoleuca*	MAR (EPBC) MIG (EPBC)	This species typically inhabits wet areas of tall forests, particularly in gullies. The satin flycatcher moves north in the winter and is seldom seen in NSW, Tasmania, Victoria or SA during these times. This bird nests in loose colonies in broad-based cup-shaped nests on a bare horizontal branch. These nests are constructed from bark, grass, lichen and cobwebs (Australian Museum 2005).	The satin flycatcher can be found in both Australia and New Guinea. In Australia it is distributed along the east coast from Cape York through to Tasmania, also covering parts of south-eastern SA.	Munghorn Gap NR Coolah Tops NP (NSW NPWS 1998)	The species has been previously recorded in the Ulan Coal Complex. This species has not been recorded from the proposed modification areas. There is potential habitat for this species within the proposed modification areas, however the expected impact to such habitat will be minimal. There is no potential for the proposed modifications to pose a significant impact on this species.	No

MIGRATORY AND MARINE SPECIES						
Species	**Legal Status**	**Specific Habitat**	**Distribution in relation to Proposed Modification Areas**	**Reservation in the Region**	**Occurrence in Proposed Modification Areas and Potential for Significant Impact**	**Test for Ecological Significance Required?**
swift parrot *Lathamus discolor*	MAR (EPBC)	This species often visits box-ironbark forests, feeding on nectar and lerps. In NSW, typical tree species in which it forages include mugga ironbark, grey box, swamp mahogany, spotted gum, red bloodwood, narrow-leaved red ironbark, forest red gum and yellow box. This bird is a migratory species that breeds in Tasmania during the spring and summer, and migrates to the mainland during the cooler months of the year.	In NSW this species has been recorded from the western slopes region along the inland slopes of the Great Dividing Range, as well as forests along the coastal plains from southern to northern NSW. The Ulan Coal Complex is within the known distribution of this species.	Goulburn River NP Munghorn Gap NR	The species has been previously recorded in the Ulan Coal Complex. This species has not been recorded from the proposed modification areas. There is potential habitat for this species within the proposed modification areas. While the expected impact to potential habitat for this species will be minimal, a Test for Ecological Significance has been provided as a precautionary measure.	No
regent honeyeater *Anthochaera phrygia*	MIG (EPBC)	This species generally occurs in temperate eucalypt woodlands and open forests of south eastern Australia. It is commonly recorded from box-ironbark eucalypt associations, wet lowland coastal forests dominated by swamp mahogany, spotted gum and riverine *Casuarina* woodlands. Within these habitats they prefer the wettest, most fertile sites, such as creek flats, river valleys and foothills.	Once recorded between Adelaide and the central coast of Queensland, its range has contracted dramatically in the last 30 years to between north-eastern Victoria and south-eastern Queensland. The Ulan Coal Complex is within the known distribution of this species.	Goulburn River NP Munghorn Gap NR Wollemi NP	The Ulan Coal Complex provides some suitable habitat for this species, however it has not been recorded during many years of extensive surveys. This species has not been recorded within the proposed modification areas. While the expected impact to potential habitat for this species will be minimal, a Test for Ecological Significance has been provided as a precautionary measure.	No

MIGRATORY AND MARINE SPECIES						
Species	**Legal Status**	**Specific Habitat**	**Distribution in relation to Proposed Modification Areas**	**Reservation in the Region**	**Occurrence in Proposed Modification Areas and Potential for Significant Impact**	**Test for Ecological Significance Required?**
Japanese snipe *Gallinago hardwickii*	MAR (EPBC) MIG (EPBC)	The Japanese snipe can be found in permanent and ephemeral wetlands up to 2000 metres ASL. These water bodies are usually freshwater with low, dense vegetation. They forage in areas of mud with some vegetation cover and roost nearby to these areas. The Japanese snipe does not breed in Australia, only passing through for migration.	This species has been recorded from Cape York through to south-east SA. The range of this species extends from inland of the eastern tablelands in south-east Queensland to west of the Great Dividing Range in NSW. Richmond River, NSW is a favourite area for non-breeding birds. The Ulan Coal Complex is within the known distribution of this species.	This species is not known to occur in any reserves in the region.	The Ulan Coal Complex provides some suitable habitat for this species, however it has not been recorded during many years of extensive surveys. This species has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to pose a significant impact on this species.	No
Australian painted snipe *Rostratula benghalensis australis*	MAR (EPBC) MIG (EPBC)	Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber.	In NSW, this species has been recorded at the Paroo wetlands, Lake Cowell, Macquarie Marshes and Hexham Swamp. Most common in the Murray-Darling Basin. The Ulan Coal Complex is within the known distribution of this species.	This species is not known to occur in any reserves in the region.	The Ulan Coal Complex provides some suitable habitat for this species, however it has not been recorded during many years of extensive surveys. This species has not been recorded within the proposed modification areas. There is no potential for the proposed modifications to pose a significant impact on this species.	No
common sandpiper *Actitis hypoleucos*	MAR (EPBC) MIG (EPBC) Bonn CAMBA JAMBA ROKAMBA	This species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats.	This species is found along all coastlines of Australia and in many areas inland, the common sandpiper is widespread in small numbers. The population when in Australia is concentrated in northern and western Australia.	This species is not known to occur in any reserves in the region.	The species has been recorded in the Ulan Coal Complex. This species has not been recorded within the proposed modification areas and it is highly unlikely that it would occur there. There is no potential for the proposed modifications to pose a significant impact on this species.	No

MIGRATORY AND MARINE SPECIES						
Species	**Legal Status**	**Specific Habitat**	**Distribution in relation to Proposed Modification Areas**	**Reservation in the Region**	**Occurrence in Proposed Modification Areas and Potential for Significant Impact**	**Test for Ecological Significance Required?**
Caspian tern *Hydroprogne caspia*	MAR (EPBC) MIG (EPBC) CAMBA JAMBA	This species is found near the coast, in extensive wetlands, on coastal and interior beaches and sheltered estuaries. The Caspian tern lives equally well in fresh water and saline environments.	This species is found throughout Australia, concentrating on coastal areas.	This species is not known to occur in any reserves in the region.	The species has been recorded in the Ulan Coal Complex. This species has not been recorded within the proposed modification areas and it is highly unlikely that it would occur there. There is no potential for the proposed modifications to pose a significant impact on this species.	No
fork-tailed swift *Apus pacificus*	MAR (EPBC) MIG (EPBC)	The fork-tailed swift is mostly found in Australia through the months of October through to April. This swift spends most of its time when in flight ahead of storm fonts and updrafts (Slater et al. 2003).	The fork-tailed swift can be found throughout Australia during migrating. In Australia it is most common west of the Great Dividing Range. This species is uncommon in Tasmania. The Ulan Coal Complex is within the known distribution of this species.	Avisford NR Goulburn River NP (NSW NPWS 2001)	The species has been previously recorded in the Ulan Coal Complex. This species has not been recorded from the proposed modification areas. There is potential habitat for this species within the proposed modification areas, however the expected impact to such habitat will be minimal. There is no potential for the proposed modifications to pose a significant impact on this species.	No

MIGRATORY AND MARINE SPECIES						
Species	**Legal Status**	**Specific Habitat**	**Distribution in relation to Proposed Modification Areas**	**Reservation in the Region**	**Occurrence in Proposed Modification Areas and Potential for Significant Impact**	**Test for Ecological Significance Required?**
rufous fantail *Rhipidura rufifrons*	MAR (EPBC) MIG (EPBC)	The rufous fantail typically inhabits areas of dense wet forest, mangrove, rainforest or swamp woodlands. It prefers areas where there is intense shade available and is often seen close to ground. In winter it is seldom found in NSW or Victoria. Nests are about 5 metres from the ground in a small cup shape and constructed from thin grasses held together by cobwebs (Australian Museum 2005).	This species is distributed across the north and eastern coast of Australia, but is also found in Guam, New Guinea, the Solomon Islands and Sulawesi. The Ulan Coal Complex is within the known distribution of this species.	Goulburn River NP Wollemi NP Munghorn Gap NR Nullo Mountain SF	The species has been previously recorded in the Ulan Coal Complex. This species has not been recorded from the proposed modification areas. There is potential habitat for this species within the proposed modification areas, however the expected impact to such habitat will be minimal. There is no potential for the proposed modifications to pose a significant impact on this species.	No

Note:
EPBC Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
MAR marine
MIG migratory
NP National Park
NR Nature Reserve
SCA State Conservation Area
SF State Forest

APPENDIX C

Flora Species List

Appendix C - Flora Species List

The following list was developed from surveys undertaken of the proposed modification areas by Umwelt during 2014, as described within **Section 3.2.2** of the Ecological Assessment.

Plants were recorded from all four major vascular plant classes: cycads, conifers, ferns and flowering plants and included trees, tree mallees, shrubs, forbs, grasses, sedges, rushes, reeds, ferns, lithophytes, epiphytes, mistletoes, vines and twiners.

Although substantial, the list will not be comprehensive, because not all species are readily detected at any one time of the year. Many species flower only during restricted periods of the year, and some flower only once in several years. In the absence of flowering material, many of these species cannot be identified, or even detected.

Names of classes and families follow a modified Cronquist (1981) System.

Any species that could not be identified to the lowest taxonomic level are denoted in the following manner:

sp. specimens that are identified to genus level only;

The following abbreviations or symbols are used in the list:

asterisk (*) denotes species not native to the study area;
subsp. subspecies;

All vascular plants recorded or collected were identified using keys and nomenclature in Harden (1992, 1993, 2000 & 2002) and Wheeler et al. (2002). Where known, changes to nomenclature and classification have been incorporated into the results, as derived from *PlantNET* (Botanic Gardens Trust 2014), the on-line plant name database maintained by the National Herbarium of New South Wales.

Common names used follow Harden (1992, 1993, 2000 & 2002) where available, and draw on other sources.

Family/Subfamily	**Scientific Name**	**Common Name**
Filicopsida (Ferns)		
Adiantaceae	*Adiantum aethiopicum*	common maidenhair
	Cheilanthes austrotenuifolia	rock fern
	Cheilanthes distans	bristly cloak fern
	Cheilanthes sieberi subsp. *sieberi*	rock fern
Ophioglossaceae	*Ophioglossum lusitanicum*	adders tongue
Cycadopsida (Cycads)		
Zamiaceae	*Macrozamia* sp.	
Coniferopsida (Conifers)		
Cupressaceae	*Callitris endlicheri*	black cypress pine
	Callitris glaucophylla	white cypress pine
Magnoliopsida (Flowering Plants) – Liliidae (Monocots)		
Anthericaceae	*Arthropodium milleflorum*	pale vanilla-lily
	Laxmannia gracilis	slender wire lily
	Laxmannia sp.	
	Thysanotus patersonii	twining fringe-lily

Family/Subfamily	Scientific Name	Common Name
Cyperaceae	*Cyperus gracilis*	slender flat-sedge
	Gahnia aspera	rough saw-sedge
	Lepidosperma laterale	variable sword-sedge
	Lepidosperma sp.	
	Schoenus ericetorum	
Iridaceae	*Patersonia* sp.	
Juncaceae	*Juncus* sp.	a rush
Lomandraceae	*Lomandra confertifolia*	matrush
	Lomandra filiformis	
	Lomandra filiformis subsp. *filiformis*	
	Lomandra glauca	pale mat-rush
	Lomandra longifolia	spiny-headed mat-rush
	Lomandra multiflora subsp. *multiflora*	many-flowered mat-rush
	Lomandra sp.	mat-rush
Orchidaceae	*Acianthus fornicatus*	pixie caps
	Chiloglottis sp.	
	Diuris sulphurea	hornet orchid
	Glossodia major	waxlip orchid
	Microtis sp.	
	Pterostylis concinna	trim greenhood
	Pterostylis sp.	greenhood
	Thelymitra sp.	
Phormiaceae	*Dianella revoluta* var. *revoluta*	a blue flax lily
Poaceae	*Aristida ramosa*	purple wiregrass
	Aristida sp.	a wiregrass
	Aristida vagans	threeawn speargrass
	Arundinella nepalensis	reedgrass
	Austrostipa sp.	a speargrass
	Austrostipa verticillata	slender bamboo grass
	Bothriochloa decipiens	red grass
	Bothriochloa macra	red grass
	Cleistochloa rigida	
	Dichelachne sp.	a plumegrass
	Digitaria sp.	a finger grass
	Echinopogon ovatus	forest hedgehog grass
	Eragrostis brownii	browns lovegrass
	Microlaena stipoides var. *stipoides*	weeping grass
Poaceae	*Paspalidium* sp.	
Poaceae	*Rytidosperma* sp.	
Poaceae	*Sporobolus creber*	slender rats tail grass
Xanthorrhoeaceae	*Xanthorrhoea* sp.	
Magnoliopsida (Flowering Plants) – Magnoliidae (Dicots)		
Acanthaceae	*Brunoniella australis*	blue trumpet
Apiaceae	*Hydrocotyle laxiflora*	stinking pennywort
Asteraceae	**Arctotheca calendula*	capeweed
	**Bidens pilosa*	cobblers pegs
	Brachyscome sp.	
	Calotis lappulacea	yellow burr-daisy
	Calotis sp.	a burr-daisy
	Cassinia aculeata	dolly bush
	Cassinia arcuata	sifton bush
	Cassinia sp. D	
	Chrysocephalum semipapposum	clustered everlasting
	**Conyza bonariensis*	flaxleaf fleabane
	Cymbonotus lawsonianus	
	**Hypochaeris radicata*	catsear

Family/Subfamily	Scientific Name	Common Name
	Lagenophora sp.	
	Olearia microphylla	
	Olearia sp.	
	**Sonchus oleraceus*	common sowthistle
	**Taraxacum officinale*	dandelion
	**Tolpis barbata*	yellow hawkweed
Boraginaceae	**Echium plantagineum*	Patersons curse
Brassicaceae	**Lepidium africanum*	common peppercress
Cactaceae	**Opuntia stricta* var. *stricta*	common prickly pear
Campanulaceae	*Wahlenbergia* sp.	bluebell
Caryophyllaceae	*Stellaria pungens*	prickly starwort
Casuarinaceae	*Allocasuarina diminuta*	
	Allocasuarina gymnanthera	
	Allocasuarina luehmannii	bulloak
Chenopodiaceae	*Einadia hastata*	berry saltbush
	Einadia nutans	climbing saltbush
	Einadia sp.	
Convolvulaceae	*Dichondra repens*	kidney weed
Crassulaceae	*Crassula sieberiana*	Australian stonecrop
Dilleniaceae	*Hibbertia circumdans*	
Droseraceae	*Drosera peltata*	a sundew
Ericaceae	*Acrotriche rigida*	
	Astroloma humifusum	native cranberry
	Brachyloma daphnoides	daphne heath
	Epacris reclinata	fuchsia heath
	Leucopogon attenuatus	a beard-heath
	Leucopogon muticus	blunt beard-heath
	Leucopogon sp.	a beard-heath
	Lissanthe strigosa	peach heath
	Melichrus erubescens	ruby urn heath
	Melichrus urceolatus	urn heath
	Styphelia triflora	pink five-corners
Euphorbiaceae	**Euphorbia* sp.	
Fabaceae (Faboideae)	*Dillwynia* sp.	
	Glycine clandestina	twining glycine
	Glycine microphylla	small-leaf glycine
	Glycine tabacina	variable glycine
	Hardenbergia violacea	false sarsaparilla
	Indigofera australis	Australian indigo
	Podolobium ilicifolium	prickly shaggy pea
	Pultenaea microphylla	a bush pea
Fabaceae (Mimosoideae)	*Acacia buxifolia*	box-leaved wattle
	Acacia decora	western silver wattle
	Acacia doratoxylon	currawang
	Acacia gladiiformis	sword wattle
	Acacia implexa	hickory wattle
	Acacia linearifolia	narrow-leaved wattle
	Acacia penninervis	mountain hickory
	Acacia spectabilis	Mudgee wattle
	Acacia sp.	wattle
	Acacia terminalis	sunshine wattle
	Acacia triptera	spurwing wattle
	Acacia ulicifolia	prickly Moses
	Acacia verniciflua	varnish wattle
Geraniaceae	**Erodium* sp.	crowfoot

Family/Subfamily	Scientific Name	Common Name
Goodeniaceae	*Dampiera* sp.	
	Goodenia hederacea	ivy goodenia
	Goodenia sp.	
Haloragaceae	*Gonocarpus tetragynus*	poverty raspwort
	Haloragis heterophylla	variable raspwort
Lamiaceae	**Marrubium vulgare*	white horehound
	Oncinocalyx betchei	
Lauraceae	*Cassytha* sp.	
Loranthaceae	*Amyema miquelii*	box mistletoe
	Amyema quandang	grey mistletoe
	Amyema sp.	mistletoe
Myrsinaceae	**Anagallis arvensis*	scarlet pimpernel
Myrtaceae	*Angophora floribunda*	rough-barked apple
	Calytrix tetragona	common fringe-myrtle
	Eucalyptus agglomerata	blue-leaved stringybark
	Eucalyptus albens	white box
	Eucalyptus blakelyi	Blakelys red gum
	Eucalyptus cinerea	argyle apple
	Eucalyptus crebra	narrow-leaved ironbark
	Eucalyptus dwyeri	Dwyers red gum
	Eucalyptus fibrosa	red ironbark
	Eucalyptus macrorhyncha	red stringybark
Myrtaceae (cont)	*Eucalyptus melliodora*	yellow box
	Eucalyptus microcarpa	western grey box
	Eucalyptus moluccana	grey box
	Eucalyptus punctata	grey gum
	Eucalyptus rossii	inland scribbly gum
	Eucalyptus sparsifolia	narrow-leaved stringybark
Myrtaceae (cont)	*Eucalyptus tereticornis*	forest red gum
	Harmogia densifolia	
	Leptospermum sphaerocarpum	
	Leptospermum sp.	tea-tree
	Melaleuca thymifolia	thyme honey-myrtle
	Micromyrtus ciliata	fringed heath-myrtle
	Micromyrtus sp.	
	Sannantha cunninghamii	
Oxalidaceae	*Oxalis perennans*	
	Oxalis sp.	
Phyllanthaceae	*Phyllanthus hirtellus*	thyme spurge
	Phyllanthus virgatus	wiry spurge
Pittosporaceae	*Billardiera scandens*	hairy apple berry
	Bursaria spinosa subsp. *spinosa*	native blackthorn
Plantaginaceae	*Veronica plebeia*	trailing speedwell
Polygonaceae	**Acetosella vulgaris*	sheep sorrel
	Rumex brownii	swamp dock
Portulacaceae	*Calandrinia* sp.	a purslane
Proteaceae	*Grevillea ramosissima* subsp. *ramosissima*	fan grevillea
	Grevillea sericea	pink spider flower
	Grevillea sericea subsp. *sericea*	
	Grevillea triternata	
	Hakea dactyloides	finger hakea
	Persoonia linearis	narrow-leaved geebung
Rhamnaceae	*Cryptandra spinescens*	
Rubiaceae	**Galium* sp.	
	Opercularia diphylla	stinkweed
	Opercularia sp.	
	Pomax umbellata	pomax

Family/Subfamily	Scientific Name	Common Name
Rutaceae	*Boronia rubiginosa*	
	Correa reflexa	native fuschia
Santalaceae	*Exocarpos cupressiformis*	cherry ballart
Sapindaceae	*Dodonaea boroniifolia*	fern-leaf hop-bush
	Dodonaea viscosa	sticky hop-bush
	Dodonaea viscosa subsp. *viscosa*	
Solanaceae	*Solanum cinereum*	Narrawa burr
	**Solanum* sp.	
Stackhousiaceae	*Stackhousia viminea*	slender stackhousia
Sterculiaceae	*Brachychiton populneus* subsp. *populneus*	
Thymelaeaceae	*Pimelea* sp.	
Urticaceae	*Urtica incisa*	stinging nettle

APPENDIX D

Fauna Species List

Appendix D - Fauna Species List

The following list was developed from surveys of the proposed modification areas detailed in **Appendix A**. A more extensive fauna list can be found within the UCCO Project Ecological Assessment (Umwelt 2009), which encompasses years of survey effort by various groups across the entire mine site.

The following abbreviations or symbols are used in the list:

asterisk (*) denotes species not indigenous to the survey area;

subsp. subspecies;

MIG Listed migratory species under the EPBC Act; and

V Vulnerable under the *Threatened Species Conservation Act 1995* (TSC Act), or the EPBC Act.

Birds follow the scientific and common name nomenclature broadly follows Christidis and Boles (2008). Reptiles and amphibians follow the scientific and common name nomenclature of Cogger (2000). Mammals follow the scientific and common name nomenclature of Strahan (2002) for non bat species; and bat species follow the scientific and common name nomenclature from Churchill (2008).

Scientific Name	**Common Name**	**Conservation Status**	
		TSC Act	**EPBC Act**
AMPHIBIANS			
Myobatrachidae			
Limnodynastes dumerilii	eastern banjo frog		
Limnodynastes ornatus	ornate burrowing frog		
Neobatrachus sudelli	painted burrowing frog		
Pseudophryne bibronii	Bibrons toadlet		
REPTILES			
Cheluidae			
Chelodina longicollis	eastern snake-necked turtle		
Agamidae			
Amphibolurus nobbi	nobbi		
Pogona barbata	eastern bearded dragon		
Gekkonidae			
Diplodactylus vittatus	eastern stone gecko		
Oedura lesueurii	Lesueurs velvet gecko		
Varanidae			
Varanus varius	lace monitor		
Scincidae			
Anomalopus leuckartii	two-claw worm-skink		
Carlia tetradactyla	southern rainbow skink		
Cryptoblepharus virgatus	cream-striped shining-skink		
Ctenotus taeniolatus	copper-tailed Ctenotus		
Eulamprus tenuis	bar-sided forest-skink		
Morethia boulengeri	south-eastern Morethia Skink		

Scientific Name	Common Name	Conservation Status	
		TSC Act	EPBC Act
Elapidae			
Pseudechis porphyriacus	red-bellied black snake		
Pseudonaja textilis	eastern brown snake		
BIRDS			
Pelecanidae			
Pelecanus conspicillatus	Australian pelican		
Dromaiidae			
Dromaius novaehollandiae	emu		
Anatidae			
Chenonetta jubata	Australian wood duck		
Ardeidae			
Egretta novaehollandiae	white-faced heron		
Threskiornithidae			
Threskiornis spinicollis	straw-necked ibis		
Accipitridae			
Aquila audax	wedge-tailed eagle		
Falconidae			
Falco cenchroides	nankeen kestrel		
Charadriidae			
Vanellus miles	masked lapwing		
Columbidae			
Ocyphaps lophotes	crested pigeon		
Phaps chalcoptera	common bronzewing		
Cacatuidae			
Cacatua galerita	sulphur-crested cockatoo		
Calyptorhynchus lathami	glossy black-cockatoo	V	
Calyptorhynchus funereus	yellow-tailed black-cockatoo		
Eolophus roseicapillus	galah		
Psittacidae			
Alisterus scapularis	Australian king-parrot		
Psephotus haematonotus	red-rumped parrot		
Glossopsitta concinna	musk lorikeet		
Platycercus adscitus eximius	eastern rosella		
Platycercus elegans	crimson rosella		
Cuculidae			
Cacomantis flabelliformis	fan-tailed cuckoo		
Strigidae			
Ninox novaeseelandiae	southern boobook		
Podargidae			
Podargus strigoides	tawny frogmouth		
Halcyonidae			
Todiramphus sanctus	sacred kingfisher		
Dacelo novaeguineae	laughing kookaburra		

Scientific Name	Common Name	Conservation Status	
		TSC Act	EPBC Act
Meropidae			
Merops ornatus	rainbow bee-eater		MIG
Menuridae			
Menura novaehollandiae	superb lyrebird		
Climacteridae			
Climacteris picumnus	brown treecreeper (eastern sub-species)	V	
Cormobates leucophaeus	white-throated treecreeper		
Maluridae			
Malurus lamberti	variegated-wren		
Malurus cyaneus	superb fairy-wren		
Pardalotidae			
Pardalotus punctatus	spotted pardalote		
Pardalotus striatus	striated pardalote		
Acanthizidae			
Acanthiza chrysorrhoa	yellow-rumped thornbill		
Acanthiza lineata	striated thornbill		
Acanthiza nana	yellow thornbill		
Acanthiza pusilla	brown thornbill		
Acanthiza reguloides	buff-rumped thornbill		
Gerygone olivacea	white-throated gerygone		
Origma solitaria	rockwarbler		
Chthonicola sagittatus	speckled warbler	V	
Sericornis frontalis	white-browed scrubwren		
Smicrornis brevirostris	weebill		
Meliphagidae			
Acanthagenys rufogularis	spiny-cheeked honeyeater		
Acanthorhynchus tenuirostris	eastern spinebill		
Anthochaera carunculata	red wattlebird		
Lichenostomus chrysops	yellow-faced honeyeater		
Lichenostomus leucotis	white-eared honeyeater		
Lichenostomus penicillatus	white-plumed honeyeater		
Manorina melanocephala	noisy miner		
Melithreptus brevirostris	brown-headed honeyeater		
Melithreptus gularis gularis	black-chinned honeyeater (eastern subsp.)	V	
Melithreptus lunatus	white-naped honeyeater		
Myzomela sanguinolenta	scarlet honeyeater		
Philemon corniculatus	noisy friarbird		
Plectorhyncha lanceolata	striped honeyeater		
Petroicidae			
Eopsaltria australis	eastern yellow robin		
Microeca fascinans	Jacky winter		
Petroica rosea	rose robin		
Petroica boodang	scarlet robin	V	

Scientific Name	Common Name	Conservation Status	
		TSC Act	EPBC Act
Pomatostomidae			
Pomatostomus temporalis temporalis	grey-crowned babbler (south-eastern sub-species)	V	
Eupetidae			
Cinclosoma punctatum	spotted quail-thrush		
Psophodes olivaceus	eastern whipbird		
Neosittidae			
Daphoenositta chrysoptera	varied sittella	V	
Pachycephalidae			
Colluricincla harmonica	grey shrike-thrush		
Falcunculus frontatus	eastern shrike-tit		
Pachycephala pectoralis	golden whistler		
Pachycephala rufiventris	rufous whistler		
Dicruridae			
Grallina cyanoleuca	magpie-lark		
Rhipidura albiscapa	grey fantail		
Rhipidura leucophrys	willie wagtail		
Artamidae			
Artamus cyanopterus	dusky woodswallow		
Cracticus nigrogularis	pied butcherbird		
Cracticus torquatus	grey butcherbird		
Gymnorhina tibicen	Australian Magpie		
Strepera graculina	pied currawong		
Campephagidae			
Coracina novaehollandiae	black-faced cuckoo-shrike		
Oriolidae			
Oriolus sagittatus	olive-backed oriole		
Corvidae			
Corvus coronoides	Australian raven		
Corcoracidae			
Corcorax melanorhamphos	white-winged chough		
Zosteropidae			
Zosterops lateralis	silvereye		
Dicaeidae			
Dicaeum hirundinaceum	mistletoebird		
Motacillidae			
Anthus australis	Australasian pipit		
Estrilidae			
Taeniopygia bichenovii	double-barred finch		
Stagonopleura guttata	diamond firetail	V	
Neochmia temporalis	red-browed finch		

Scientific Name	Common Name	Conservation Status	
		TSC Act	EPBC Act
MAMMALS			
Tachyglossidae			
Tachyglossus aculeatus	short-beaked echidna		
Dasyuridae			
Antechinus flavipes	yellow-footed Antechinus		
Petauridae			
Petaurus breviceps	sugar glider		
Phalangeridae			
Trichosurus vulpecula	common brushtail possum		
Pseudocheiridae			
Pseudocheirus peregrinus	common ringtail possum		
Phascolarctidae			
Phascolarctos cinereus	koala	V	V
Vombatidae			
Vombatus ursinus	common wombat		
Macropodidae			
Macropus giganteus	eastern grey kangaroo		
Macropus robustus	common wallaroo		
Macropus rufogriseus	red-necked wallaby		
Wallabia bicolor	swamp wallaby		
Muridae			
Rattus fuscipes	southern bush rat		
Vespertilionidae			
Mormopterus sp.4	southern freetail bat		
Miniopterus schreibersii oceanensis	eastern bent-wing bat	V	
Scotorepens balstoni	inland broad-nosed bat		
Chalinolobus gouldii	Goulds wattled bat		
Chalinolobus morio	chocolate wattled bat		
Nyctophilus geoffroyi	lesser long-eared bat		
Nyctophilus gouldi	Goulds long-eared bat		
Tadarida australis	white-striped mastiff bat		
Vespadelus vulturnus	little forest bat		
Canidae			
*Canis lupus**	dingo, domestic dog		
*Vulpes vulpes**	fox		
Felidae			
*Felis catus**	cat		
Bovidae			
*Bos taurus**	European cattle		
*Capra hircus**	goat		
Suidae			
*Sus scrofa**	feral pig		

Scientific Name	Common Name	Conservation Status	
		TSC Act	EPBC Act
Leporidae			
*Lepus capensis**	brown hare		
*Oryctolagus cuniculus**	rabbit		

APPENDIX E

Test for Ecological Significance (NSW EP&A Act 1979)

Appendix E - Test for Ecological Significance – *Environmental Planning and Assessment Act 1979*

Part 3A of the EP&A Act requires a Test for Ecological Significance relating to the potential impacts of the proposed modification on listed threatened species, endangered populations or threatened ecological communities (TECs). An assessment that applies the key principles of the Section 5A assessment is used here to assess the potential for the proposed modifications to impact on threatened species, endangered populations or TECs within the proposed modification areas.

A Test for Ecological Significance is provided below for those identified threatened species, endangered populations or TECs considered (within **Appendix B**) to have the potential to be impacted by the proposed modification. The following species are assessed:

- Ausfeld's wattle (*Acacia ausfeldii*);
- painted diuris (*Diuris tricolor*);
- Cannon's stringybark (*Eucalyptus cannonii*);
- *Homoranthus darwinioides*;
- Scant pomaderris (*Pomaderris queenslandica*);
- White box – Yellow box – Blakely's Red Gum Woodland;
- glossy black-cockatoo (*Calyptorhynchus lathami*);
- gang-gang cockatoo (*Callocephalon fimbriatum*);
- little lorikeet (*Glossopsitta pusilla*);
- swift parrot (*Lathamus discolor*);
- turquoise parrot (*Neophema pulchella*);
- powerful owl (*Ninox strenua*);
- barking owl (*Ninox connivens*);
- brown treecreeper (eastern subspecies) (*Climacteris picumnus victoriae*);
- regent honeyeater (*Anthochaera phrygia*);
- koala (*Phascolarctos cinereus*);
- squirrel glider (*Petaurus norfolcensis*);
- brush-tailed rock-wallaby (*Petrogale penicillata*)*;*
- yellow-bellied sheathtail bat (*Saccolaimus flaviventris*);
- little bentwing-bat (*Miniopterus australis*);
- eastern bentwing-bat (*Miniopterus schreibersii oceanensis*);
- south-eastern long-eared bat (*Nyctophilus corbeni*);
- little pied bat (*Chalinolobus picatus*);
- large-eared pied bat (*Chalinolobus dwyeri*);
- eastern false pipistrelle (*Falsistrellus tasmaniensis*);
- southern myotis (*Myotis macropus*); and
- eastern cave bat (*Vespadelus troughtoni*).

Test for Ecological Significance under EP&A Act

1. Ausfeld's wattle (Acacia ausfeldii)

This species has not been recorded within the proposed modification areas, however potential habitat is present in the proposed modification areas. This species has been recorded previously within the Ulan Coal Complex and also within the locality. UCML manages an offset area specifically dedicated to protecting this species in the south west of the Ulan Coal Complex, along Highett Road. The proposed modification will not impact this offset area, nor will it impact known records of this species. A total of up to approximately 53.9 hectares of potential habitat for this species will be directly impacted as a result of the Proposed Surface Infrastructure. A further approximately 2728.3 hectares of potential habitat for this species lies within the Maximum Subsidence Affectation Area, however there is not expected to be any impact to habitat for this species as a result of subsidence.

a) Whether the life cycle of the species is likely to be disrupted such that a local viable population of the species is likely to be placed at risk of extinction.

This species has not been recorded in the proposed modification areas however is known to occur elsewhere in the Ulan locality. It is unlikely that the impact to up to approximately 53.9 hectares of potential habitat for this species would disrupt the life cycle such that a local viable population would be likely to be placed at risk of extinction.

b) In relation to the regional distribution of the habitat of the threatened species, whether a significant area of known habitat is to be modified or removed, or isolated from currently interconnecting or proximate areas.

The proposed modifications will result in the impact to up to approximately 53.9 hectares of potential habitat for this species. The proposed modifications will not modify, remove or isolate a significant area of known habitat from currently interconnecting or proximate areas.

c) Whether the species, or its habitat, are adequately represented in conservation reserves (or other similar protected areas) in the region.

This species is known to occur in four conservation reserves in the region: Munghorn Gap NR, Goulburn River NP, Yarrobil NP and Goodiman SCA. This is likely to comprise adequate representation of this species in the conservation reserves in the region.

d) Whether the species is at the limit of its known distribution.

If this species were to occur in the proposed modification areas, it would be within the known limits of the geographical distribution for this species.

2. Painted diuris (Diuris tricolor)

This species has not been recorded within the proposed modification areas, however potential habitat is present in the proposed modification areas. This species has not been recorded previously within the Ulan Coal Complex, however has been recorded nearby in the Ulan locality. The Proposed Modification will not impact known records of this species. A total of up to approximately 58.5 hectares of potential habitat for this species will be directly impacted as a result of the Proposed Surface Infrastructure. A further 3112.3 hectares of potential habitat for this species lies within the Maximum Subsidence Affectation Area, however there is not expected to be any impact to habitat for this species as a result of subsidence.

a) Whether the life cycle of the species is likely to be disrupted such that a local viable population of the species is likely to be placed at risk of extinction.

This species has not been recorded in the proposed modification areas and is known to occur elsewhere in the Ulan locality. Consequently it is unlikely that the removal of up to approximately 58.5 hectares of potential habitat for this species would disrupt the life cycle such that a local viable population would be likely to be placed at risk of extinction.

b) In relation to the regional distribution of the habitat of the threatened species, whether a significant area of known habitat is to be modified or removed, or isolated from currently interconnecting or proximate areas.

The proposed modifications will result in the removal of up to approximately 58.5 hectares of potential habitat for this species. The proposed modifications will not modify, remove or isolate a significant area of known habitat from currently interconnecting or proximate areas.

c) Whether the species, or its habitat, are adequately represented in conservation reserves (or other similar protected areas) in the region.

This species is known to occur in two conservation reserves in the region, Munghorn Gap NR and Goonoo SCA. This is unlikely to comprise adequate representation of this species in the conservation reserves in the region.

d) Whether the species is at the limit of its known distribution.

If this species were to occur in the proposed modification areas, it would be within the known limits of the geographical distribution for this species.

3. **Cannon's stringybark (*Eucalyptus cannonii*)**

This species has not been recorded within the proposed modification areas, however potential habitat is present in the proposed modification areas. This species has not been recorded previously within the Ulan Coal Complex, however has been recorded nearby within the Ulan locality. The Proposed Modification will not impact known records of this species. A total of up to approximately 58.6 hectares of potential habitat for this species will be directly impacted as a result of the Proposed Surface Infrastructure. A further approximately 2938.0 hectares of potential habitat for this species lies within the Maximum Subsidence Affectation Area, however there is not expected to be any impact to habitat for this species as a result of subsidence.

a) Whether the life cycle of the species is likely to be disrupted such that a local viable population of the species is likely to be placed at risk of extinction.

This species has not been recorded in the proposed modification areas and is known to occur elsewhere in the Ulan locality. Consequently it is unlikely that the removal of up to approximately 58.6 hectares of potential habitat for this species would disrupt the life cycle such that a local viable population would be likely to be placed at risk of extinction.

b) In relation to the regional distribution of the habitat of the threatened species, whether a significant area of known habitat is to be modified or removed, or isolated from currently interconnecting or proximate areas.

The proposed modifications will result in the removal of up to approximately 58.6 hectares of potential habitat for this species. The proposed modifications will not modify, remove or isolate a significant area of known habitat from currently interconnecting or proximate areas.

c) Whether the species, or its habitat, are adequately represented in conservation reserves (or other similar protected areas) in the region.

This species is known to occur in four conservation reserves in the region, Munghorn Gap NR, Goulburn River NP, Wollemi NP, Durridgere SCA and Avisford NR. This is considered likely to comprise adequate representation of this species in the conservation reserves in the region.

d) Whether the species is at the limit of its known distribution.

If this species were to occur in the proposed modification areas, it would be at the north-western known geographical distribution for this species.

4. Homoranthus darwinioides

This species has not been recorded within the proposed modification areas, however potential habitat is present in the proposed modification areas. This species has been recorded previously within the Ulan Coal Complex. The Proposed Modification will not impact known records of this species. A total of up to approximately 58.6 hectares of potential habitat for this species will be directly impacted as a result of the Proposed Surface Infrastructure. A further approximately 2938.0 hectares of potential habitat for this species lies within the Maximum Subsidence Affectation Area for the proposed modification, however there is not expected to be any impact to habitat for this species as a result of subsidence.

a) Whether the life cycle of the species is likely to be disrupted such that a local viable population of the species is likely to be placed at risk of extinction.

This species has not been recorded in the proposed modification areas and is known to occur elsewhere in the Ulan locality. Consequently it is unlikely that the removal of up to approximately 58.6 hectares of potential habitat for this species would disrupt the life cycle such that a local viable population would be likely to be placed at risk of extinction.

b) In relation to the regional distribution of the habitat of the threatened species, whether a significant area of known habitat is to be modified or removed, or isolated from currently interconnecting or proximate areas.

The proposed modifications will result in the removal of up to approximately 58.6 hectares of potential habitat for this species. The proposed modifications will not modify, remove or isolate a significant area of known habitat from currently interconnecting or proximate areas.

c) Whether the species, or its habitat, are adequately represented in conservation reserves (or other similar protected areas) in the region.

This species is known to occur in two conservation reserves in the region, Goulburn River NP and Goonoo SCA. This is considered likely to comprise adequate representation of this species in the conservation reserves in the region.

d) Whether the species is at the limit of its known distribution.

If this species were to occur in the proposed modification areas, it would be within the known geographical distribution for this species.

***5.* Scant pomaderris (*Pomaderris queenslandica*)**

This species has not been recorded within the proposed modification areas, however potential habitat is present in the proposed modification areas. This species has been recorded previously within the Ulan Coal Complex, to the south of the open cut area and within the Spring Gully Cliff Line Management Area. The proposed odification will not impact known records of this species. A total of up to approximately 58.6 hectares of potential habitat for this species will be directly impacted as a result of the Proposed Surface Infrastructure. A further approximately 2938.0 hectares of potential habitat for this species lies within the Maximum Subsidence Affectation Area for the proposed modification, however there is not expected to be any impact to habitat for this species as a result of subsidence.

a) Whether the life cycle of the species is likely to be disrupted such that a local viable population of the species is likely to be placed at risk of extinction.

This species has not been recorded in the proposed modification areas and is known to occur elsewhere in the Ulan locality, including in one of the Ulan Coal Offset Areas. Consequently it is unlikely that the removal of up to approximately 58.6 hectares of potential habitat for this species would disrupt the life cycle such that a local viable population would be likely to be placed at risk of extinction.

b) In relation to the regional distribution of the habitat of the threatened species, whether a significant area of known habitat is to be modified or removed, or isolated from currently interconnecting or proximate areas.

The proposed modifications will result in the removal of up to approximately 58.6 hectares of potential habitat for this species. The proposed modifications will not modify, remove or isolate a significant area of known habitat from currently interconnecting or proximate areas.

c) Whether the species, or its habitat, are adequately represented in conservation reserves (or other similar protected areas) in the region.

This species is known to occur in two conservation reserves in the region, Goulburn River NP and Manobalai Nature Reserve. This is considered likely to comprise adequate representation of this species in the conservation reserves in the region.

d) Whether the species is at the limit of its known distribution.

If this species were to occur in the proposed modification areas, it would be within the known geographical distribution for this species.

6. White Box – Yellow Box – Blakely's Red Gum Woodland

This EEC was recorded within the proposed modification areas above Longwall 7, 8, 9B and 12B. This EEC was also recorded within the Ulan Coal Complex, and has been recorded nearby in the Ulan locality. Of particular importance is the proposed reduction in impact to the White Box Woodland TEC, whereby the existing approval permits impact to 22.9 hectares of this TEC compared to up to approximately 8.5 hectares as per the proposed modifications. This results in a reduction of impact to approximately 14.4 hectares of this TEC. There is not expected to be any impact to this EEC as a result of subsidence.

a) Whether the life cycle of the species is likely to be disrupted such that a local viable population of the species is likely to be placed at risk of extinction.

Not applicable.

b) In relation to the regional distribution of the habitat of the threatened ecological community, whether a significant area of known habitat is to be modified or removed, or isolated from currently interconnecting or proximate areas.

The Proposed Modification will result in impact to approximately 8.5 hectares of this EEC, representing an approximately 14.4 hectare reduction in impact compared to the original approval. In relation to the regional distribution of this community, it is not considered that a significant extent of this EEC will modified or removed, or isolated from currently interconnecting or proximate areas.

c) Whether the community, or its habitat, are adequately represented in conservation reserves (or other similar protected areas) in the region.

This community is known to occur in three conservation reserves in the region, Goulburn River NP, Wollemi NP and Avisford NR. This is considered likely to comprise adequate representation of this species in the conservation reserves in the region.

d) Whether the community is at the limit of its known distribution.

This community is within the known geographical distribution for this EEC.

***7.* Glossy black-cockatoo (*Calyptorhynchus lathami*)**

This species was recorded in the proposed modification areas and has previously been recorded within the Ulan Coal Complex and within the Ulan locality. The proposed modification will involve removal of up to approximately 58.6 hectares of potential habitat for this species for the Proposed Surface Infrastructure. A further approximately 2938.0 hectares of potential habitat for this species lies within the Maximum Subsidence Affectation Area for the proposed modification, however habitat loss is not expected in this area.

a) Whether the life cycle of the species is likely to be disrupted such that a local viable population of the species is likely to be placed at risk of extinction.

The proposed modification will involve the removal of up to approximately 58.6 hectares of vegetation which has the potential to contain areas of specific foraging habitat for this species as well as hollow-bearing trees for breeding. Despite this loss it is unlikely that the proposed modification will disrupt the life cycle of this species such that a local viable population of this species is likely to be placed at risk of extinction.

b) In relation to the regional distribution of the habitat of the threatened species, whether a significant area of known habitat is to be modified or removed, or isolated from currently interconnecting or proximate areas.

The proposed modifications will result in the removal of up to approximately 58.6 hectares of potential habitat for this species. In relation to the regional distribution of potential habitat for this species, it is not likely that the proposed modification will modify, remove or isolate a significant area of known habitat from currently interconnecting or proximate areas.

c) Whether the species, or its habitat, are adequately represented in conservation reserves (or other similar protected areas) in the region.

This species is known to occur in one conservation reserve in the region being Wollemi NP. This is unlikely to comprise adequate representation of this species in the conservation reserves in the region.

d) Whether the species is at the limit of its known distribution.

The occurrence of this species within the proposed modification areas is within the known geographical distribution for this species.

8. **Gang gang-cockatoo (*Callocephalon fimbriatum*)**

This species was not recorded in the proposed modification areas although it has previously been recorded within the Ulan Coal Complex and also within the Ulan locality. The proposed modification will involve removal of up to approximately 58.6 hectares of potential habitat for this species for the Proposed Surface Infrastructure. A further approximately 2938.0 hectares of potential habitat for this species lies within the Maximum Subsidence Affectation Area for the proposed modification, however habitat loss is not expected in this area.

a) Whether the life cycle of the species is likely to be disrupted such that a local viable population of the species is likely to be placed at risk of extinction.

The proposed modification will involve removal of up to approximately 58.6 hectares of potential habitat for this species for the Proposed Surface Infrastructure. A further approximately 2938.0 hectares of potential habitat for this species lies within the Maximum Subsidence Affectation Area for the proposed modification, however habitat loss is not expected in this area.

b) In relation to the regional distribution of the habitat of the threatened species, whether a significant area of known habitat is to be modified or removed, or isolated from currently interconnecting or proximate areas.

The proposed modifications will result in the removal of up to approximately 58.6 hectares of potential habitat for this species. In relation to the regional distribution of potential habitat for this species, it is not likely that the proposed modification will modify, remove or isolate a significant area of known habitat from currently interconnecting or proximate areas.

c) Whether the species, or its habitat, are adequately represented in conservation reserves (or other similar protected areas) in the region.

This species is known to occur in three conservation reserves in the region being Munghorn Gap NR, Goulburn River NP, and Wollemi NP. This is likely to comprise adequate representation of this species in the conservation reserves in the region.

d) Whether the species is at the limit of its known distribution.

If this species were to occur in the proposed modification areas, it would be close to the north-western geographical distribution for this species.

9. **Little lorikeet (*Glossopsitta pusilla*)**

This species has been recorded in the proposed modification areas and the Ulan Coal Complex, as well as within the Ulan locality. The proposed modification will involve removal of up to approximately 58.6 hectares of potential habitat for this species for the Proposed Surface Infrastructure. A further approximately 2938.0 hectares of potential habitat for this species lies within the Maximum Subsidence Affectation Area for the proposed modification, however habitat loss is not expected in this area.

a) Whether the life cycle of the species is likely to be disrupted such that a local viable population of the species is likely to be placed at risk of extinction.

The proposed modification will involve the removal of up to approximately 58.6 hectares of vegetation which is likely to contain areas of foraging habitat for this species as well as hollow-bearing trees for breeding. Despite this loss it is unlikely that the proposed modification will disrupt the life cycle of this species such that a local viable population of this species is likely to be placed at risk of extinction

b) In relation to the regional distribution of the habitat of the threatened species, whether a significant area of known habitat is to be modified or removed, or isolated from currently interconnecting or proximate areas.

The proposed modifications will result in the removal of up to approximately 58.6 hectares of potential habitat for this species. In relation to the regional distribution of potential habitat for this species, it is not likely that the proposed modification will modify, remove or isolate a significant area of known habitat from currently interconnecting or proximate areas.

c) Whether the species, or its habitat, are adequately represented in conservation reserves (or other similar protected areas) in the region.

This species is known to occur in six conservation reserves in the region being Munghorn Gap NR, Goulburn River NP, Manobalai NR, Wollemi NP, Avisford NR and Coolah Tops NP. This is likely to comprise adequate representation of this species in the conservation reserves in the region.

d) Whether the species is at the limit of its known distribution.

The occurrence of this species within the proposed modification areas is within the known geographical distribution for this species.

10. **Swift parrot (*Lathamus discolor*)**

This species has not been recorded in the proposed modification areas; however has been recorded the Ulan Coal Complex, as well as within the Ulan locality. The proposed modification areas provide potential habitat for this species. The proposed modification will involve removal of up to approximately 58.6 hectares of potential habitat for this species for the Proposed Surface Infrastructure. A further approximately 2938.0 hectares of potential habitat for this species lies within the Maximum Subsidence Affectation Area for the proposed modification, however there is not expected to be any impact to habitat for this species as a result of subsidence.

a) Whether the life cycle of the species is likely to be disrupted such that a local viable population of the species is likely to be placed at risk of extinction.

The proposed modification will involve the removal of up to approximately 58.6 hectares of vegetation which is likely to contain areas of foraging habitat for this species. Despite this loss it is unlikely that the proposed modification will disrupt the life cycle of this species such that a local viable population of this species is likely to be placed at risk of extinction

b) In relation to the regional distribution of the habitat of the threatened species, whether a significant area of known habitat is to be modified or removed, or isolated from currently interconnecting or proximate areas.

The proposed modifications will result in the removal of up to approximately 58.6 hectares of potential habitat for this species. In relation to the regional distribution of potential habitat for this species, it is not likely that the proposed modification will modify, remove or isolate a significant area of known habitat from currently interconnecting or proximate areas.

c) Whether the species, or its habitat, are adequately represented in conservation reserves (or other similar protected areas) in the region.

This species is known to occur in two conservation reserves in the region being Munghorn Gap NP and Goulburn River NP. This potentially comprises adequate representation of this species in the conservation reserves in the region.

d) Whether the species is at the limit of its known distribution.

If this species were to occur in the proposed modification areas, it would be within the known geographical distribution for this species.

11. **Turquoise parrot (*Neophema pulchella*)**

This species has not been recorded in the proposed modification areas; however has been recorded in the Ulan Coal Complex, as well as within the Ulan locality. It is considered that the proposed modification areas contain appropriate habitat for this species to occur. The proposed modification will involve removal of up to approximately 58.7 hectares of potential habitat for this species for the Proposed Surface Infrastructure. A further approximately 3322.0 hectares of potential habitat for this species lies within the Maximum Subsidence Affectation Area for the proposed modification, however habitat loss is not expected in this area.

a) Whether the life cycle of the species is likely to be disrupted such that a local viable population of the species is likely to be placed at risk of extinction.

The proposed modification will involve the removal of up to approximately 58.7 hectares of vegetation which is likely to contain areas of foraging habitat for this species as well as hollow-bearing trees for breeding. Despite this loss it is unlikely that the proposed modification will disrupt the life cycle of this species such that a local viable population of this species is likely to be placed at risk of extinction

b) In relation to the regional distribution of the habitat of the threatened species, whether a significant area of known habitat is to be modified or removed, or isolated from currently interconnecting or proximate areas.

The proposed modifications will result in the removal of up to approximately 58.7 hectares of potential habitat for this species. In relation to the regional distribution of potential habitat for this species, it is not likely that the proposed modification will modify, remove or isolate a significant area of known habitat from currently interconnecting or proximate areas.

c) Whether the species, or its habitat, are adequately represented in conservation reserves (or other similar protected areas) in the region.

This species is known to occur in three conservation reserves in the region being Munghorn Gap NP, Wollemi NP and Goulburn River NP. This is likely to comprise adequate representation of this species in the conservation reserves in the region.

d) Whether the species is at the limit of its known distribution.

If this species were to occur in the proposed modification areas, it would be within the known geographical distribution for this species.

12. **Powerful owl (*Ninox strenua*)**

This species has not been recorded in the proposed modification areas; however has been recorded in the Ulan Coal Complex, as well as within the Ulan locality. It is considered that the proposed modification areas contain appropriate habitat for this species to occur. The proposed modification will involve removal of up to approximately 58.6 hectares of potential habitat for this species for the Proposed Surface Infrastructure. A further approximately 2938.0 hectares of potential habitat for this species lies within the Maximum Subsidence Affectation Area for the proposed modification, however habitat loss is not expected in this area.

a) Whether the life cycle of the species is likely to be disrupted such that a local viable population of the species is likely to be placed at risk of extinction.

The proposed modification will involve the removal of up to approximately 58.6 hectares of vegetation, which is likely to contain areas of foraging habitat for this species as well as hollow-bearing trees for breeding. Despite this loss it is unlikely that the proposed modification will disrupt the life cycle of this species such that a local viable population of this species is likely to be placed at risk of extinction

b) In relation to the regional distribution of the habitat of the threatened species, whether a significant area of known habitat is to be modified or removed, or isolated from currently interconnecting or proximate areas.

The proposed modifications will result in the removal of up to approximately 58.6 hectares of potential habitat for this species. In relation to the regional distribution of potential habitat for this species, it is not likely that the proposed modification will modify, remove or isolate a significant area of known habitat from currently interconnecting or proximate areas.

c) Whether the species, or its habitat, are adequately represented in conservation reserves (or other similar protected areas) in the region.

This species is known to occur in four conservation reserves in the region being Munghorn Gap NP, Wollemi NP, Coolah Tops NP and Goulburn River NP. This is likely to comprise adequate representation of this species in the conservation reserves in the region.

d) Whether the species is at the limit of its known distribution.

If this species were to occur in the proposed modification areas, it would be within the known geographical distribution for this species.

13. **Barking owl (*Ninox connivens*)**

This species has not been recorded in the proposed modification areas; however has been recorded in the Ulan Coal Complex, as well as within the Ulan locality. It is considered that the proposed modification areas contain appropriate habitat for this species to occur. The proposed modification will involve removal of up to approximately 58.6 hectares of potential habitat for this species for the Proposed Surface Infrastructure. A further approximately 2938.0 hectares of potential habitat for this species lies within the Maximum Subsidence Affectation Area for the proposed modification, however habitat loss is not expected in this area.

a) Whether the life cycle of the species is likely to be disrupted such that a local viable population of the species is likely to be placed at risk of extinction.

The proposed modification will involve the removal of up to approximately 58.6 hectares of vegetation, which is likely to contain areas of foraging habitat for this species as well as hollow-bearing trees for breeding. Despite this loss it is unlikely that the proposed modification will disrupt the life cycle of this species such that a local viable population of this species is likely to be placed at risk of extinction

b) In relation to the regional distribution of the habitat of the threatened species, whether a significant area of known habitat is to be modified or removed, or isolated from currently interconnecting or proximate areas.

The proposed modifications will result in the removal of up to approximately 58.6 hectares of potential habitat for this species. In relation to the regional distribution of potential habitat for this species, it is not likely that the proposed modification will modify, remove or isolate a significant area of known habitat from currently interconnecting or proximate areas.

c) Whether the species, or its habitat, are adequately represented in conservation reserves (or other similar protected areas) in the region.

This species is known to occur in four conservation reserves in the region being Durridgeree SCA, Wollemi NP, Coolah Tops NP and Goulburn River NP. This is likely to comprise adequate representation of this species in the conservation reserves in the region.

d) Whether the species is at the limit of its known distribution.

If this species were to occur in the proposed modification areas, it would be within the known geographical distribution for this species.

14. **Brown treecreeper (eastern subspecies) (*Climacteris picumnus victoriae*)**

This species was recorded in the proposed modification areas; and within the Ulan Coal Complex, as well as within the Ulan locality. The proposed modification will involve removal of up to approximately 58.6 hectares of potential habitat for this species for the Proposed Surface Infrastructure. A further approximately 2938.0 hectares of potential habitat for this species lies within the Maximum Subsidence Affectation Area for the proposed modification, however habitat loss is not expected in this area.

a) Whether the life cycle of the species is likely to be disrupted such that a local viable population of the species is likely to be placed at risk of extinction.

The proposed modification will involve the removal of up to approximately 58.6 hectares of vegetation, which is likely to contain areas of foraging and habitat for this species as well as hollow-bearing trees for breeding. Despite this loss it is unlikely that the proposed modification will disrupt the life cycle of this species such that a local viable population of this species is likely to be placed at risk of extinction

b) In relation to the regional distribution of the habitat of the threatened species, whether a significant area of known habitat is to be modified or removed, or isolated from currently interconnecting or proximate areas.

The proposed modifications will result in the removal of up to approximately 58.6 hectares of potential habitat for this species. In relation to the regional distribution of potential habitat for this species, it is not likely that the proposed modification will modify, remove or isolate a significant area of known habitat from currently interconnecting or proximate areas.

c) Whether the species, or its habitat, are adequately represented in conservation reserves (or other similar protected areas) in the region.

This species is known to occur in four conservation reserves in the region being Coolah Tops NP, Manobalai NR, Wollemi NP and Goulburn River NP. This is likely to comprise adequate representation of this species in the conservation reserves in the region.

d) Whether the species is at the limit of its known distribution.

The presence of this species in the proposed modification area is within the known geographical distribution for this species.

15. **Regent honeyeater (*Anthochaera phrygia*)**

This species has not been recorded in the proposed modification areas, nor within the Ulan Coal Complex. The proposed modification areas are considered to provide potential habitat for this species. The proposed modification will involve removal of up to approximately 58.6 hectares of potential habitat for this species for the Proposed Surface Infrastructure. A further approximately 2938.0 hectares of potential habitat for this species lies within the Maximum Subsidence Affectation area for the proposed modification, however habitat loss is not expected in this area.

a) Whether the life cycle of the species is likely to be disrupted such that a local viable population of the species is likely to be placed at risk of extinction.

The proposed modification will involve the removal of up to approximately 58.6 hectares of vegetation, which is likely to contain areas of foraging and potential breeding habitat for this species. Despite this loss it is unlikely that the proposed modification will disrupt the life cycle of this species such that a local viable population of this species is likely to be placed at risk of extinction

b) In relation to the regional distribution of the habitat of the threatened species, whether a significant area of known habitat is to be modified or removed, or isolated from currently interconnecting or proximate areas.

The proposed modifications will result in the removal of up to approximately 58.6 hectares of potential habitat for this species. In relation to the regional distribution of potential habitat for this species, it is not likely that the proposed modification will modify, remove or isolate a significant area of known habitat from currently interconnecting or proximate areas.

c) Whether the species, or its habitat, are adequately represented in conservation reserves (or other similar protected areas) in the region.

This species is known to occur in three conservation reserves in the region being Munghorn Gap NR, Wollemi NP and Goulburn River NP. This is likely to comprise adequate representation of this species in the conservation reserves in the region.

d) Whether the species is at the limit of its known distribution.

If this species were to occur in the proposed modification areas, it would be within the known geographical distribution for this species.

16. **Koala (*Phascolarctos cinereus*)**

This species was recorded in the proposed modification areas; and is known to occur within the Ulan locality. The proposed modification will involve removal of up to approximately 58.6 hectares of potential habitat for this species for the Proposed Surface Infrastructure. A further approximately 2938.0 hectares of potential habitat for this species lies within the Maximum Subsidence Affectation areas for the proposed modification, however there is not expected to be any impact to habitat for this species as a result of subsidence.

a) Whether the life cycle of the species is likely to be disrupted such that a local viable population of the species is likely to be placed at risk of extinction.

The proposed modification will involve the removal of up to approximately 58.6 hectares of vegetation, which is likely to contain areas of foraging and potential breeding habitat for this species. Despite this loss it is unlikely that the proposed modification will disrupt the life cycle of this species such that a local viable population of this species is likely to be placed at risk of extinction

b) In relation to the regional distribution of the habitat of the threatened species, whether a significant area of known habitat is to be modified or removed, or isolated from currently interconnecting or proximate areas.

The proposed modifications will result in the removal of up to approximately 58.6 hectares of potential habitat for this species. In relation to the regional distribution of potential habitat for this species, it is not likely that the proposed modification will modify, remove or isolate a significant area

of known habitat from currently interconnecting or proximate areas.

c) Whether the species, or its habitat, are adequately represented in conservation reserves (or other similar protected areas) in the region.

This species is known to occur in four conservation reserves in the region being Munghorn Gap NR, Wollemi NP, Manobalai NR and Goulburn River NP. This is likely to comprise adequate representation of this species in the conservation reserves in the region.

d) Whether the species is at the limit of its known distribution.

The presence of this species in the proposed modification areas is within the known geographical distribution for this species.

***17.* Squirrel glider (*Petaurus norfolcencis*)**

This species has not been recorded in the proposed modification areas; however has been recorded in the Ulan Coal Complex, as well as within the Ulan locality. It is considered that the proposed modification areas contain appropriate habitat for this species to occur. The proposed modification will involve removal of up to approximately 58.6 hectares of potential habitat for this species for the Proposed Surface Infrastructure. A further approximately 2938.0 hectares of potential habitat for this species lies within the Maximum Subsidence Affectation areas for the proposed modification, however habitat loss is not expected in this area.

a) Whether the life cycle of the species is likely to be disrupted such that a local viable population of the species is likely to be placed at risk of extinction.

The proposed modification will involve the removal of up to approximately 58.6 hectares of vegetation, which is likely to contain areas of foraging habitat for this species as well as hollow-bearing trees for breeding. Despite this loss it is unlikely that the proposed modification will disrupt the life cycle of this species such that a local viable population of this species is likely to be placed at risk of extinction

b) In relation to the regional distribution of the habitat of the threatened species, whether a significant area of known habitat is to be modified or removed, or isolated from currently interconnecting or proximate areas.

The proposed modifications will result in the removal of up to approximately 58.6 hectares of potential habitat for this species. In relation to the regional distribution of potential habitat for this species, it is not likely that the proposed modification will modify, remove or isolate a significant area of known habitat from currently interconnecting or proximate areas.

c) Whether the species, or its habitat, are adequately represented in conservation reserves (or other similar protected areas) in the region.

This species is known to occur in three conservation reserves in the region being Manobalai NR, Wollemi NP and Goulburn River NP. This is likely to comprise adequate representation of this species in the conservation reserves in the region.

d) Whether the species is at the limit of its known distribution.

If this species were to occur in the proposed modification areas, it would be within the known geographical distribution for this species.

***18.* Brush-tailed rock wallaby (*Petrogale penicillata*)**

This species was not recorded in the proposed modification areas; however has been recorded in the Ulan Coal Complex and the Ulan locality. Areas of rocky escarpment in the proposed modification areas are considered to provide potential habitat for this species. The proposed modification will involve impact to approximately 2,538.9 metres of potential cliff line habitat for this species.

a) Whether the life cycle of the species is likely to be disrupted such that a local viable population of the species is likely to be placed at risk of extinction.

This species has not been recorded within the proposed modification areas; however there is potential habitat present for it to occur in areas of rocky escarpment. The proposed modification may result in the loss or damage of up to approximately 2,538.9 metres of cliff line habitat that forms potential habitat for this species. It is not expected that this potential impact would result in substantial habitat loss for this species. Despite this potential impact, is unlikely that the proposed modifications will disrupt the life cycle of this species such that a local viable population of this species is likely to be placed at risk of extinction.

b) In relation to the regional distribution of the habitat of the threatened species, whether a significant area of known habitat is to be modified or removed, or isolated from currently interconnecting or proximate areas.

The proposed modification may result in the loss of (or damage to) up to approximately 2,538.9 metres of cliff line habitat that forms potential habitat for this species. This will reduce habitat availability for cliff line-dependent species. In relation to the regional distribution of potential habitat for this species, it is not likely that the proposed modification will modify, remove or isolate a significant area of known habitat from currently interconnecting or proximate areas.

c) Whether the species, or its habitat, are adequately represented in conservation reserves (or other similar protected areas) in the region.

This species is known to occur in three conservation reserves in the region being Manobalai NR, Wollemi NP and Goulburn River NP. This is likely to comprise adequate representation of this species in the conservation reserves in the region.

d) Whether the species is at the limit of its known distribution.

If this species were to occur in the proposed modification areas, it would be within the known geographical distribution for this species.

19. **Yellow-bellied sheathtail bat (*Saccolaimus flaviventris*)**

This species has not been recorded in the proposed modification areas; however has been recorded in the Ulan Coal Complex, as well as within the Ulan locality. It is considered that the proposed modification areas contain appropriate habitat for this species to occur. The proposed modification will involve removal of up to approximately 58.6 hectares of potential habitat for this species for the Proposed Surface Infrastructure. A further approximately 2938.0 hectares of potential habitat for this species lies within the Maximum Subsidence Affectation Area for the proposed modification, however habitat loss is not expected in this area.

a) Whether the life cycle of the species is likely to be disrupted such that a local viable population of the species is likely to be placed at risk of extinction.

The proposed modification will involve the removal of up to approximately 58.6 hectares of vegetation, which is likely to contain areas of foraging habitat for this species as well as hollow-bearing trees for breeding. Despite this loss it is unlikely that the proposed modification will disrupt the life cycle of this species such that a local viable population of this species is likely to be placed at risk of extinction

b) In relation to the regional distribution of the habitat of the threatened species, whether a significant area of known habitat is to be modified or removed, or isolated from currently interconnecting or proximate areas.

The proposed modifications will result in the removal of up to approximately 58.6 hectares of potential habitat for this species, as well as hollow-bearing trees for roosting. In relation to the regional distribution of potential habitat for this species, it is not likely that the proposed modification will modify, remove or isolate a significant area of known habitat from currently interconnecting or

proximate areas.

c) Whether the species, or its habitat, are adequately represented in conservation reserves (or other similar protected areas) in the region.

This species is known to occur in two conservation reserves in the region being Manobalai NR, and Wollemi NP. This potentially comprises adequate representation of this species in the conservation reserves in the region.

d) Whether the species is at the limit of its known distribution.

If this species were to occur in the proposed modification areas, it would be within the known geographical distribution for this species.

20. **Little bentwing-bat (*Miniopterus australis*)**

This species has not been recorded in the proposed modification areas or in the Ulan Coal Complex, however has been recorded within the Ulan locality. It is considered that the proposed modification areas contain appropriate habitat for this species to occur. The proposed modification will involve removal of up to approximately 58.6 hectares of potential habitat for this species for the Proposed Surface Infrastructure. A further approximately 2938.0 hectares of potential habitat for this species lies within the Maximum Subsidence Affectation Area for the proposed modification, and there is potential that sandstone cliffs that provide habitat for this species may be disturbed as a result of subsidence.

a) Whether the life cycle of the species is likely to be disrupted such that a local viable population of the species is likely to be placed at risk of extinction.

The proposed modification will involve the removal of up to approximately 58.6 hectares of vegetation, which is likely to contain areas of foraging habitat for this species. Despite this loss it is unlikely that the proposed modification will disrupt the life cycle of this species such that a local viable population of this species is likely to be placed at risk of extinction

b) In relation to the regional distribution of the habitat of the threatened species, whether a significant area of known habitat is to be modified or removed, or isolated from currently interconnecting or proximate areas.

The proposed modifications will result in the removal of up to approximately 58.6 hectares of potential habitat for this species. In relation to the regional distribution of potential habitat for this species, it is not likely that the proposed modification will modify, remove or isolate a significant area of known habitat from currently interconnecting or proximate areas.

c) Whether the species, or its habitat, are adequately represented in conservation reserves (or other similar protected areas) in the region.

This species is not known to occur in any conservation reserves in the region and is considered to be inadequately represented in the conservation reserves in the region.

d) Whether the species is at the limit of its known distribution.

If this species were to occur in the proposed modification areas, it would be at the known western geographical distribution for this species.

21. **Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*)**

This species was recorded in the proposed modification areas; the Ulan Coal Complex, as well as within the Ulan locality. The proposed modification will involve removal of up to approximately 58.6 hectares of potential habitat for this species for the Proposed Surface Infrastructure. A further approximately 2938.0 hectares of potential habitat for this species lies within the Maximum Subsidence Affectation Area for the proposed modification, and there is potential that sandstone cliffs that provide habitat for this species may be disturbed as a result of subsidence.

a) Whether the life cycle of the species is likely to be disrupted such that a local viable population of the species is likely to be placed at risk of extinction.

This species has been recorded within the proposed modification areas; and there is low potential that it roosts in areas of rocky escarpment. The proposed modification may result in the loss or damage of up to 2,538.9 metres of cliff line habitat that forms potential habitat for this species. It is not expected that this potential impact would result in substantial habitat loss for this species. Despite this potential impact, is unlikely that the proposed modifications will disrupt the life cycle of this species such that a local viable population of this species is likely to be placed at risk of extinction.

b) In relation to the regional distribution of the habitat of the threatened species, whether a significant area of known habitat is to be modified or removed, or isolated from currently interconnecting or proximate areas.

The proposed modification will result in the loss of (or damage to) up to approximately 2,538.9 metres of cliff line habitat that forms potential habitat for this species. This will reduce habitat availability for cliff line-dependent species. In relation to the regional distribution of potential habitat for this species, it is not likely that the proposed modification will modify, remove or isolate a significant area of known habitat from currently interconnecting or proximate areas.

c) Whether the species, or its habitat, are adequately represented in conservation reserves (or other similar protected areas) in the region.

This species is known to occur in five conservation reserves in the region being Goulburn River NP, Munghorn Gap NR, Manobalai NR, Coolah Tops NP and Wollemi NP. This is considered likely to comprise adequate representation of this species in the conservation reserves in the region.

d) Whether the species is at the limit of its known distribution.

If this species were to occur in the proposed modification areas, it would be within the known geographical distribution for this species.

22. **South-eastern long-eared bat (*Nyctophilus corbeni*)**

This species has not been recorded in the proposed modification areas; however has been recorded in the Ulan Coal Complex, as well as within the Ulan locality. It is considered that the proposed modification areas contain appropriate habitat for this species to occur. The proposed modification will involve removal of up to approximately 58.6 hectares of potential habitat for this species for the Proposed Surface Infrastructure. A further approximately 2938.0 hectares of potential habitat for this species lies within the Maximum Subsidence Affectation Area for the proposed modification, however habitat loss is not expected in this area.

a) Whether the life cycle of the species is likely to be disrupted such that a local viable population of the species is likely to be placed at risk of extinction.

The proposed modification will involve the removal of up to approximately 58.6 hectares of vegetation, which is likely to contain areas of foraging habitat for this species as well as hollow-bearing trees for breeding. Despite this loss it is unlikely that the proposed modification will disrupt the life cycle of this species such that a local viable population of this species is likely to be placed at risk of extinction

b) In relation to the regional distribution of the habitat of the threatened species, whether a significant area of known habitat is to be modified or removed, or isolated from currently interconnecting or proximate areas.

The proposed modifications will result in the removal of up to approximately 58.6 hectares of potential habitat for this species. In relation to the regional distribution of potential habitat for this species, it is not likely that the proposed modification will modify, remove or isolate a significant area of known habitat from currently interconnecting or proximate areas.

c) Whether the species, or its habitat, are adequately represented in conservation reserves (or other similar protected areas) in the region.

This species is known to occur in three conservation reserves in the region being Goulburn River NP, Coolah Tops NP and Wollemi NP. This is considered likely to comprise adequate representation of this species in the conservation reserves in the region.

d) Whether the species is at the limit of its known distribution.

If this species were to occur in the proposed modification areas, it would be at the western geographical distribution for this species.

23. **Little pied bat (*Chalinolobus picatus*)**

This species was not recorded in the proposed modification areas; however has been recorded in the Ulan Coal Complex, as well as within the Ulan locality. Areas of rocky escarpment as well as hollow bearing trees in the proposed modification areas are considered to provide potential habitat for this species. The proposed modification will involve removal of up to approximately 58.6 hectares of potential habitat for this species for the Proposed Surface Infrastructure. A further approximately 2938.0 hectares of potential habitat for this species lies within the Maximum Subsidence Affectation Area for the proposed modification, and there is potential that sandstone cliffs that provide habitat for this species may be disturbed as a result of subsidence.

a) Whether the life cycle of the species is likely to be disrupted such that a local viable population of the species is likely to be placed at risk of extinction.

The proposed modification will involve the removal of up to approximately 58.6 hectares of vegetation, which is likely to contain areas of foraging habitat for this species as well as hollow-bearing trees for breeding. Despite this loss it is unlikely that the proposed modification will disrupt the life cycle of this species such that a local viable population of this species is likely to be placed at risk of extinction

b) In relation to the regional distribution of the habitat of the threatened species, whether a significant area of known habitat is to be modified or removed, or isolated from currently interconnecting or proximate areas.

The proposed modifications will result in the removal of up to approximately 58.6 hectares of potential habitat for this species. In relation to the regional distribution of potential habitat for this species, it is not likely that the proposed modification will modify, remove or isolate a significant area of known habitat from currently interconnecting or proximate areas.

c) Whether the species, or its habitat, are adequately represented in conservation reserves (or other similar protected areas) in the region.

This species is not known to occur in any conservation reserves in the region and is considered unlikely to be adequately represented in the conservation reserves in the region.

d) Whether the species is at the limit of its known distribution.

If this species were to occur in the proposed modification areas, it would be at the eastern known geographical distribution for this species.

24. **Large-eared pied bat (*Chalinolobus dwyeri*)**

This species was not recorded in the proposed modification areas; however has been recorded in the Ulan Coal Complex, as well as within the Ulan locality. Areas of rocky escarpment in the proposed modification areas are considered to provide potential habitat for this species. The proposed modification will involve removal of up to approximately 58.6 hectares of potential habitat for this species for the Proposed Surface Infrastructure. A further approximately 2938.0 hectares of potential habitat for this species lies within the Maximum Subsidence Affectation Area for the proposed modification, and there is potential that approximately 2,538.9 metres of sandstone cliffs

that provide habitat for this species may be disturbed as a result of subsidence.

a) Whether the life cycle of the species is likely to be disrupted such that a local viable population of the species is likely to be placed at risk of extinction.

This species has been recorded within the proposed modification areas; and there is potential that it roosts in areas of rocky escarpment. The proposed modification may result in the loss or damage of up to approximately 2,538.9 metres of cliff line habitat that forms potential habitat for this species. It is not expected that this potential impact would result in substantial habitat loss for this species. Despite this potential impact, is unlikely that the proposed modifications will disrupt the life cycle of this species such that a local viable population of this species is likely to be placed at risk of extinction.

b) In relation to the regional distribution of the habitat of the threatened species, whether a significant area of known habitat is to be modified or removed, or isolated from currently interconnecting or proximate areas.

The proposed modification will result in the loss of (or damage to) up to approximately 2,538.9 metres of cliff line habitat that forms potential habitat for this species. This will reduce habitat availability for cliff line-dependent species. In relation to the regional distribution of potential habitat for this species, it is not likely that the proposed modification will modify, remove or isolate a significant area of known habitat from currently interconnecting or proximate areas.

c) Whether the species, or its habitat, are adequately represented in conservation reserves (or other similar protected areas) in the region.

This species is known to occur in five conservation reserves in the region being Goulburn River NP, Munghorn Gap NR, Manobalai NR, Coolah Tops NP and Wollemi NP. This is considered likely to comprise adequate representation of this species in the conservation reserves in the region.

d) Whether the species is at the limit of its known distribution.

If this species were to occur in the proposed modification areas, it would be within the known geographical distribution for this species.

25. **Eastern false pipistrelle (*Falsistrellus tasmaniensis*)**

This species has not been recorded in the proposed modification areas; however has been recorded in the Ulan Coal Complex, as well as within the Ulan locality. It is considered that the proposed modification areas contain appropriate habitat for this species to occur. The proposed modification will involve removal of up to approximately 58.6 hectares of potential habitat for this species for the Proposed Surface Infrastructure. A further approximately 2938.0 hectares of potential habitat for this species lies within the Maximum Subsidence Affectation Area for the proposed modification, however habitat loss is not expected in this area.

a) Whether the life cycle of the species is likely to be disrupted such that a local viable population of the species is likely to be placed at risk of extinction.

The proposed modification will involve the removal of up to approximately 58.6 hectares of vegetation, which is likely to contain areas of foraging habitat for this species as well as hollow-bearing trees for breeding. Despite this loss it is unlikely that the proposed modification will disrupt the life cycle of this species such that a local viable population of this species is likely to be placed at risk of extinction

b) In relation to the regional distribution of the habitat of the threatened species, whether a significant area of known habitat is to be modified or removed, or isolated from currently interconnecting or proximate areas.

The proposed modifications will result in the removal of up to approximately 58.6 hectares of potential habitat for this species. In relation to the regional distribution of potential habitat for this species, it is not likely that the proposed modification will modify, remove or isolate a significant area

of known habitat from currently interconnecting or proximate areas.

c) Whether the species, or its habitat, are adequately represented in conservation reserves (or other similar protected areas) in the region.

This species is known to occur in three conservation reserves in the region being Goulburn River NP, Coolah Tops NP and Wollemi NP. This is considered likely to comprise adequate representation of this species in the conservation reserves in the region.

d) Whether the species is at the limit of its known distribution.

If this species were to occur in the proposed modification areas, it would be at the western geographical distribution for this species.

26. **Southern myotis (*Myotis macropus*)**

This species was not recorded in the proposed modification areas; however has been recorded in the Ulan Coal Complex, as well as within the Ulan locality. Areas of rocky escarpment as well as hollow bearing trees in the proposed modification areas are considered to provide potential habitat for this species. The proposed modification will involve removal of up to approximately 58.6 hectares of potential habitat for this species for the Proposed Surface Infrastructure. A further approximately 2938.0 hectares of potential habitat for this species lies within the Maximum Subsidence Affectation Area for the proposed modification, and there is potential that sandstone cliffs that provides habitat for this species may be disturbed as a result of subsidence.

a) Whether the life cycle of the species is likely to be disrupted such that a local viable population of the species is likely to be placed at risk of extinction.

The proposed modification will involve the removal of up to approximately 58.6 hectares of vegetation which is likely to contain areas of foraging habitat for this species as well as hollow-bearing trees for breeding. Despite this loss it is unlikely that the proposed modification will disrupt the life cycle of this species such that a local viable population of this species is likely to be placed at risk of extinction

b) In relation to the regional distribution of the habitat of the threatened species, whether a significant area of known habitat is to be modified or removed, or isolated from currently interconnecting or proximate areas.

The proposed modifications will result in the removal of up to approximately 58.6 hectares of potential habitat for this species. In relation to the regional distribution of potential habitat for this species, it is not likely that the proposed modification will modify, remove or isolate a significant area of known habitat from currently interconnecting or proximate areas.

c) Whether the species, or its habitat, are adequately represented in conservation reserves (or other similar protected areas) in the region.

This species is not known to occur in any conservation reserves in the region and is considered unlikely to be adequately represented in the conservation reserves in the region.

d) Whether the species is at the limit of its known distribution.

If this species were to occur in the proposed modification areas, it would be at the western geographical distribution for this species.

27. Eastern cave bat (*Vespadelus troughtoni*)

This species was not recorded in the proposed modification areas; however has been recorded in the Ulan Coal Complex, as well as within the Ulan locality. Areas of rocky escarpment in the proposed modification areas are considered to provide potential habitat for this species. The proposed modification will involve removal of up to approximately 58.6 hectares of potential habitat for this species for the Proposed Surface Infrastructure. A further approximately 2938.0 hectares of potential habitat for this species lies within the Maximum Subsidence Affectation Area for the

proposed modification, however habitat loss is not expected in this area.

a) Whether the life cycle of the species is likely to be disrupted such that a local viable population of the species is likely to be placed at risk of extinction.

This species has been recorded within the proposed modification areas; and there is potential that it roosts in areas of rocky escarpment. The proposed modification may result in the loss or damage of up to approximately 2,538.9 metres of cliff line habitat that forms potential habitat for this species. It is not expected that this potential impact would result in substantial habitat loss for this species. Despite this potential impact, is unlikely that the proposed modifications will disrupt the life cycle of this species such that a local viable population of this species is likely to be placed at risk of extinction.

b) In relation to the regional distribution of the habitat of the threatened species, whether a significant area of known habitat is to be modified or removed, or isolated from currently interconnecting or proximate areas.

The proposed modification will result in the loss of (or damage to) up to approximately 2,538.9 metres of cliff line habitat that forms potential habitat for this species. This will reduce habitat availability for cliff line-dependent species. In relation to the regional distribution of potential habitat for this species, it is not likely that the proposed modification will modify, remove or isolate a significant area of known habitat from currently interconnecting or proximate areas.

c) Whether the species, or its habitat, are adequately represented in conservation reserves (or other similar protected areas) in the region.

This species is known to occur in three conservation reserves in the region being Goulburn River NP, Manobalai NR and Wollemi NP. This is considered likely to comprise adequate representation of this species in the conservation reserves in the region.

d) Whether the species is at the limit of its known distribution.

If this species were to occur in the proposed modification areas, it would be within the geographical distribution for this species.

Conclusion

The proposed modifications are not expected to have a significant impact on:
• Ausfeld's wattle (*Acacia ausfeldii*);
• painted diuris (*Diuris tricolor*);
• Cannon's stringybark (*Eucalyptus cannonii*);
• *Homoranthus darwinioides*;
• White Box – Yellow Box – Blakely's Red Gum Woodland EEC
• swift parrot (*Lathamus discolor*);
• brown treecreeper (eastern subspecies) (*Climacteris picumnus victoriae*);
• regent honeyeater (*Anthochaera phrygia*);
• koala (*Phascolarctos cinereus*);
The proposed modifications are not expected to have a significant impact on the following cave-dependent or hollow-dependent species, except in the rare unanticipated circumstance that rock fall as a result of subsidence directly impacts breeding/roosting habitat:
• glossy black cockatoo (*Calyptorhynchus lathami*);
• gang gang cockatoo (*Callocephalon fimbriatum*);
• little lorikeet (*Glossopsitta pusilla*);
• turquoise parrot (*Neophema pulchella*);
• powerful owl (*Ninox strenua*);
• barking owl (*Ninox connivens*);

• squirrel glider (*Petaurus norfolcensis*);
• brush-tailed rock wallaby (*Petrogale penicillata*);
• yellow-bellied sheath-tailed bat (*Saccolaimus flaviventris*);
• little bentwing-bat (*Miniopterus australis*);
• eastern bentwing bat (*Miniopterus schreibersii oceanensis*);
• south-eastern long-eared bat (*Nyctophilus corbeni*);
• little pied bat (*Chalinolobus picatus*);
• large-eared pied-bat (*Chalinolobus dwyeri*);
• eastern false pipistrelle (*Falsistrellus tasmaniensis*);
• southern myotis (*Myotis macropus*); and
• eastern cave bat (*Vespadelus troughtoni*).
This assessment has been made without consideration of the mitigation or ameliorative measures proposed as part of the proposed modifications. Rather, the conclusion on impacts provided above (and in the Ecological Assessment), is based purely on the anticipated effects that the proposed modifications would have on the ecological features of the area if the proposed modifications were implemented without any form of mitigation.

APPENDIX F

Assessment of Significance
(Commonwealth EPBC Act 1999)

Appendix F - Assessment of Significance under the Commonwealth *Environmental Protection and Biodiversity Conservation Act* (1999)

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) requires the completion of an Assessment of Significance relating to the potential impacts of an action on listed matters of national environmental significance (MNES). A search of the Department of the Environment (DoE) Protected Matters Search Tool (July 2014) identified a number of threatened ecological communities (TECs), threatened species and migratory/marine species listed under the EPBC Act that have the potential to occur within 10 kilometres of the proposed modification areas. Each of these MNES has been considered in terms of potential for the proposed modification to impact them. This has been based on proximity to the proposed modification areas, known habitat requirements, presence of modeled habitat, potential sensitivity to impact and listing level. Those determined to have the potential to be impacted by the proposed modification have been considered further in this assessment.

A number of MNES were recorded or have potential to occur within the proposed modification areas, and therefore have the potential to be impacted by the proposed modification. The following impact assessment addresses those direct and indirect impacts that may result on MNES within the proposed modification areas. Direct impacts, in this case, relate to the removal of vegetation (and associated habitat) for the construction of surface infrastructure facilities. This is the only vegetation that is proposed to be removed as part of the proposed modification. It is likely that potential indirect impacts will be limited to the Ulan West underground mining area, where subsidence-related impacts may include cracking or rock fall along cliff lines within the Maximum Subsidence Affectation Area.

The proposed modification seeks to alter the existing Approved Surface Infrastructure Area to reposition or remove infrastructure features which (while approved) have not yet been constructed, and also to add others not originally approved. As such, the impact assessment for this component of the proposed modification focuses on the net change in impact, being the difference between what is proposed and what is currently approved.

Threatened Ecological Communities (TECs)

The EPBC-listed White Box – Yellow Box – Blakely's Red Gum Woodland and Derived Native Grassland critically endangered ecological community (CEEC) has been recorded within the proposed modification areas, thus has potential to be impacted by the proposed modification and is subject to an Assessment of Significance below.

Endangered Species

Three endangered species listed under the EPBC Act have the potential to be impacted by the proposed modification, and have been subject to an Assessment of Significance. These species are:

- hoary sunray (*Leucochrysum albicans* var. *tricolor*);
- swift parrot (*Lathamus discolor*); and
- regent honeyeater (*Anthochaera phrygia*).

None of these species have been recorded within the proposed modification areas, however the hoary sunray (*Leucochrysum albicans* var. *tricolor*) and swift parrot (*Lathamus discolor*) have been recorded in the Ulan Coal Complex previously. The regent honeyeater (*Anthochaera phrygia*) has not been recorded within the Ulan Coal Complex during more than 20 years of detailed ecological surveys across the site.

Vulnerable Species

Five vulnerable species listed under the EPBC Act have the potential to be impacted by the proposed modification, and have been subject to an Assessment of Significance. These species are:

- *Homoranthus darwinioides*;
- koala (*Phascolarctos cinereus*);
- brush-tailed rock-wallaby (*Petrogale penicillata*);
- south-eastern long-eared bat (*Nyctophilus corbeni*); and
- large-eared pied bat (*Chalinolobus dwyeri*).

Of these species, only the koala (*Phascolarctos cinereus*) has been recorded within the proposed modification areas. The remaining species have been recorded previously within the Ulan Coal Complex.

Migratory Species

One migratory species listed under the EPBC Act has the potential to be impacted by the proposed modification, this being the rainbow bee-eater (*Merops ornatus*). The regent honeyeater (*Anthochaera phrygia*) is listed as a migratory species under the EPBC Act; however this species has been assessed in the endangered species section of the Assessment of Significance.

Assessment of Significance under *Environment Protection and Biodiversity Conservation Act 1999*

Threatened Ecological Communities

The White Box – Yellow Box – Blakely's Red Gum Woodland and Derived Native Grassland CEEC (hereafter referred to as White Box Woodland) has been recorded in a number of locations within the proposed modification areas. This CEEC is represented as a number of mapped community variants, reflecting the differences in species composition and condition of this community within the proposed modification areas (and the Ulan Coal Complex). The extent of White Box Woodland with the potential to be impacted by the proposed modification is identified in **Tables 1** and **2** below.

Table 1 – Extent of Impact on White Box Woodland CEEC within the proposed modification areas (Surface Infrastructure)

Vegetation Community	Proposed Surface Infrastructure Area (ha)	Approved Surface Infrastructure Area (ha)	Net Change in Area of Impact (ha)
Blakely's Red Gum Open Forest	5.9	7.3	-1.4
Derived Native Grassland	2.6	13.6	-11
White Box Woodland	0	1.4	-1.4
White Box Woodland (regenerating)	0	0.3	-0.3
Yellow Box - Red Gum Woodland	0	0.3	-0.3
TOTAL	**8.5**	**22.9**	**-14.4**

Table 1 identifies that the proposed changes to the surface infrastructure layout from the proposed modification is expected to result in a reduced overall impact to White Box Woodland. The currently approved impact to this CEEC in the proposed modification areas is approximately 22.9 hectares – primarily being the Derived Native Grassland variant, however also comprising mainly the White Box Woodland and Blakely's Red Gum Open Forest variants. The proposed modification alters the surface infrastructure requirements such that only approximately 2.6 hectares of the Derived Native Grassland variant and approximately 5.9 hectares of the Blakely's Red Gum Open Forest is now expected to be impacted in the proposed modification areas. UCML will not exceed the previously approved disturbance of approximately 22.9 hectares within the proposed modification areas. This impact will be in the form of direct clearing and all ecological values of the impacted areas will be removed. The proposed modification will therefore not result in a greater impact to White Box Woodland than currently approved. UCML will continue to manage their operations in accordance with EPBC Approval No 2009/5252 in order to not clear more than 69 hectares of White Box Woodland across the Ulan Coal Complex.

Table 2 – Extent of White Box Woodland CEEC within Maximum Subsidence Affectation Area

Vegetation Community	Proposed Maximum Subsidence Affectation Area	Approved Maximum Subsidence Affectation Area	Net Change in Area of Impact (ha)
Forest/Open Forest Formation			
Blakely's Red Gum Open Forest	41.4	26	15.4
Blakely's Red Gum Open Forest (regenerating)	29.2	19.6	9.6

Woodland Formation			
Modified White Box Woodland	12.7	11.6	1.1
White Box Woodland	83.2	65.7	17.5
White Box Woodland (regenerating)	25.7	0	25.7
Yellow Box – Red Gum Woodland	12.6	10.5	2.1
Grassland Formation			
Derived Native Grassland	224.6	201.9	22.7
TOTAL	**429.3**	**335.3**	**94**

The proposed modification requires a change to the Approved Maximum Subsidence Affectation Area which will result in an increase in the amount of White Box Woodland with potential to be impacted by subsidence from 335.3 hectares to 429.3 hectares. This represents a net increase of approximately 94 hectares in potential subsidence impacts to this CEEC.

The subsidence impacts associated with the proposed modification are not expected to result in loss of vegetation in terms of direct tree failure or death. Detailed subsidence modelling of the Ulan Coal Complex was completed by as part of the Ulan Coal – Continued Operations Environmental Assessment (Umwelt 2009b). The assessment defined that the area affected by subsidence generally extends above and immediately adjacent to the underground mining footprints (Strata Control Technology (SCT) 2009).

Subsidence predictions for the proposed alteration to the Ulan West mine plan and the potential range of impacts resulting from the predicted subsidence have been extensively monitored and documented by SCT (2014). These predictions indicate that the proposed alteration to the Ulan West mine plan will result in maximum predicted vertical subsidence within a typical range of 0.9 to 1.5 metres, increasing in areas of lower overburden depth up to about 1.8 metres. These were found to be consistent with previous subsidence predictions for the existing area and observed subsidence levels experienced at the Ulan Coal Complex, including those of the North 1 underground mining area (SCT 2010). This is not expected to result in impact to the condition or viability of vegetation communities within the affectation area, based on subsidence-related impacts as predicted in SCT (2014), and consideration of extensive monitoring of previous underground mining.

Detailed monitoring surveys of fauna species and habitat values of the vegetation above underground mining areas have been completed by Mount King (now Biodiversity Monitoring Services) since 1980, with studies in the Ulan West project area commencing in 2006. These surveys have been completed before, during and after underground mining in various locations across the Ulan Coal Complex. The statistical analyses completed on the data collected concluded that:

> *there have been no discernible impacts from subsidence upon threatened species, populations, habitats or ecological communities associated with the terrestrial environment" (Biodiversity Monitoring Services 2013).*

Given that detailed subsidence predictions are comparable between these previously mined areas and the currently proposed mining areas (SCT 2014), this conclusion from Biodiversity Monitoring Services (2013) is expected to be applicable to the Maximum Subsidence Affectation Area.

An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:

- **reduce the extent of an ecological community;**

The Proposed Surface Infrastructure Area is expected to require the removal of approximately 8.5 hectares of this CEEC, approximately 14.4 hectares less than the approved clearing within the proposed modification areas. The proposed modification will therefore not result in a greater impact to White Box Woodland than currently approved. The existing EPBC Approval limits clearing to 69 hectares of White Box Woodland across the Ulan Coal Complex. The proposed modification is not expected to result in a decrease to the extent or condition of White Box Woodland within the Maximum Subsidence Affectation Area.

The proposed modification will not result in a reduction to the extent of this CEEC.

- **fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines;**

The proposed modification will result in less fragmentation of White Box Woodland than previously approved, as it will result in a net decrease in the amount of CEEC that is required to be cleared. Nearly half of the total impact falling within the Derived Native Grassland variant means that fragmentation impacts are minimised. The proposed modification is not expected to result in a decrease to the extent or condition of White Box Woodland within the Maximum Subsidence Affectation Area.

- **adversely affect habitat critical to the survival of an ecological community;**

The approximately 8.5 hectares of this CEEC is not considered to be critical habitat for this community. The proposed modification is not expected to result in a decrease to the extent or condition of White Box Woodland within the Maximum Subsidence Affectation Area.

The proposed modification will not adversely affect habitat critical to the survival of this CEEC.

- **modify or destroy abiotic (non-living) factors (such as water, nutrients or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns;**

The proposed modification is not likely to adversely modify or destroy abiotic factors necessary for the survival of this CEEC.

- **cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora and fauna harvesting;**

The proposed modification is expected to result in an approximately 14.4 hectare reduction in impact for this CEEC within the proposed modification areas, when compared to the area originally approved. It is not likely that the impact to the approximately 8.5 hectares of CEEC within the Proposed Surface Infrastructure Area will result in substantial change to the species composition of an occurrence of this CEEC, nor will it cause a decline or loss of functionally important species within this CEEC. The proposed modification is not expected to result in a decrease to the extent or condition of White Box Woodland within the Maximum Subsidence Affectation Area.

The proposed modification will not result in a substantial change in the species composition of White Box Woodland (or its variants), including causing a decline or loss of functionally important species.

- **cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:**
  - **assisting invasive species, that are harmful to the listed ecological community, to become established, or**
  - **causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community;**

Nearly one third of the CEEC subject to impact in the Proposed Surface Infrastructure Area (being approximately 2.6 hectares) is Derived Native Grassland, which is highly modified as a result of past clearing. The proposed modification is not expected to result in a decrease to the extent or condition of White Box Woodland within the Maximum Subsidence Affectation Area. It is not likely that the proposed modification will result in an increase in detrimental chemicals such as herbicides, pesticides or pollutants within the CEEC.

It is not likely that the proposed modification will cause a substantial reduction in the quality or integrity of the CEEC.

- **or interfere with the recovery of an ecological community;**

The proposed modification will not interfere with the recovery of this CEEC. It will reduce the area to be cleared as a result of the current approved development, and there is expected to be no decrease in extent or condition as a result of underground mining.

Conclusion

The total area of White Box Woodland expected to be removed by the proposed modification is less than the already approved impact of approximately 22.9 hectares within the proposed modification areas. The proposed modification will therefore not result in a greater impact to White Box Woodland than currently approved. UCML will continue to manage their operations in accordance with their EPBC. In addition, modelling and monitoring has shown that underground mining at Ulan has not resulted in significant statistical differences in either habitat complexity or vegetation between the mined and unmined areas (Biodiversity Monitoring Services 2013).

It is not likely that the proposed modification will cause a significant impact on the White Box Woodland CEEC within the proposed modification areas.

Endangered Species

The hoary sunray (*Leucochrysum albicans* var. *tricolor*), swift parrot (*Lathamus discolor*) and regent honeyeater (*Anthochaera phrygia*) have not been recorded in the proposed modification areas, however all have potential habitat within the proposed modification areas. The swift parrot (*Lathamus discolor*) and hoary sunray (*Leucochrysum albicans* var. *tricolor*) have been recorded within the Ulan Coal Complex previously; however the regent honeyeater (*Anthochaera phrygia*) has not, despite the completion of over two decades of detailed ecological survey.

The extent of each vegetation community within the Proposed Surface Infrastructure Area is provided in **Table 3** below, along with the net change from the impact already approved.

Table 3 – Extent of Vegetation within Proposed Surface Infrastructure Area

Vegetation Community	Proposed Surface Infrastructure Area (ha)	Approved Surface Infrastructure Area (ha)	Net Change in Area of Impact (ha)
Blakely's Red Gum Open Forest*	5.9	7.3	-1.4
Derived Native Grassland*	2.6	13.6	-11.1
Grey Box Woodland	0.0	0.6	-0.6
Dry Heathland on Rocky Outcrops	0.1	0.0	0.1
Ironbark Open Forest Complex on Sandstone	38.61 – 38.08	18.1	20.51
Ironbark Open Forest Complex on Sandstone (regenerating)	1.0	0.7	0.3
Narrow-leaved Ironbark Open Forest on Alluvium/Colluvium	0.18	0.5	-0.32
Rough-barked Apple Open Forest on Alluvium/Colluvium	3.7	4.7	-1.0

Rough-barked Apple Open Forest on Alluvium/Colluvium (regenerating)	2.1	2.1	0.0
Scribbly Gum Woodland – Heathland on Sand Plateaux	0.7	0.8	-0.1
Stringybark-Ironbark Open Forest on Sandstone Slopes	1.6	0.6	1.0
Unimproved Pasture	2.1	5.2	-3.1
Water Bodies	0.0	0.2	-0.2
White Box Woodland*	0.0	1.4	-1.4
White Box Woodland (regenerating)*	0.0	0.3	-0.3
Yellow Box - Red Gum Woodland*	0.0	0.3	-0.3
TOTAL	**58.7**	**56.5**	**2.1**

Notes: Values have been rounded up to nearest single decimal place. All values subject to minor mapping/GIS-based discrepancies.

The hoary sunray (*Leucochrysum albicans* var. *tricolor*) has variable habitat requirements, thus will potentially be impacted by the loss of any habitat formations in **Table 3**. The proposed modification will result in up to approximately 2.1 hectares of additional clearance of potential habitat for this species, when compared to the existing approved development. This is not considered to be substantial in comparison to the 1614 ha of potential habitat retained in existing Biodiversity Offset Areas secured as part of the existing EPBC approval.

The swift parrot (*Lathamus discolor*) and regent honeyeater (*Anthochaera phrygia*) will be impacted by loss of potential Woodland and Open Forest/Forest habitat formations. The proposed modification will result in an approximately 2.8 hectare reduction of impact to the Woodland Formation and an approximately 19.36 hectare increase in impact to the Open Forest/Forest Formation. Overall, a net increase in impact on up to approximately 16.5 hectares of potential habitat for these species will occur as a result of the proposed modification (when compared to the existing approved development).

Loss of habitat as a result of subsidence has not been considered for threatened flora and fauna species as the proposed modification is not expected to result in a decrease to the extent or condition of vegetation communities and their associated habitat within the Maximum Subsidence Affectation Area. Detailed monitoring surveys of fauna species and habitat values of the vegetation above underground mining areas have been completed by Mount King (now Biodiversity Monitoring Services) since 1980. These surveys have been completed before, during and after underground mining in various locations across the Ulan Coal Complex. The statistical analyses completed on the data collected have concluded that:

- "There have been no discernible impacts from subsidence upon threatened species, populations, habitats or ecological communities associated with the terrestrial environment" (Biodiversity Monitoring Services 2013)

Given that detailed subsidence predictions are comparable between these previously mined areas and the currently proposed mining areas (SCT 2014), this conclusion from Biodiversity Monitoring Services (2013) is expected to be applicable to the Maximum Subsidence Affectation Area.

In this case, a '*population of a species'* is an occurrence of the species in a particular area. In relation to critically endangered, endangered or vulnerable threatened species, occurrences include but are not limited to:

- **a geographically distinct regional population; or**
- **a population, or collection of populations, that occurs within a particular bioregion.**

The hoary sunray (*Leucochrysum albicans* var. *tricolor*) was not recorded within the proposed modification areas, however has been recorded in the Ulan Coal Complex. The low numbers recorded within the Ulan Coal Complex are likely to be part of a larger regional population (or sub-population), and any records of this species from the Ulan Coal Complex would be likely to be part of that population (or sub-population).

The swift parrot (*Lathamus discolor*) has not been recorded within the proposed modification areas; however has been recorded in the Ulan Coal Complex. All records of this species on mainland Australia are commonly considered to be part of the same population. Records on the inland slopes of the Great Dividing Range are widespread, and distribution can vary seasonally in response to mass flowering of key eucalypt species. Despite the small numbers of records within the Ulan Coal Complex, these individuals would be considered to be part of the one population of swift parrot (*Lathamus discolor*) on mainland Australia.

The regent honeyeater (*Anthochaera phrygia*) has not been recorded within the proposed modification areas, or within the Ulan Coal Complex despite over two decades of detailed ecological survey. The proposed modification areas do not contain a geographically distinct regional population, or collection of local populations for this species.

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

- **lead to a long-term decrease in the size of a population;**

It is not likely that a net increase in impact to the potential habitat (up to approximately 2.1 hectares) for the hoary sunray (*Leucochrysum albicans* var. *tricolor*) would lead to a long-term decrease in the size of a population of this species. Further in relation to the swift parrot and regent honeyeater, it is not likely that net increase in impact to the potential habitat (up to approximately 16.5 hectares) would lead to a long-term decrease in the size of the mainland Australia population of the swift parrot (*Lathamus discolor*) or of a potential population of the regent honeyeater (*Anthochaera phrygia*).

- **reduce the area of occupancy of the species;**

The proposed modification will reduce the amount of potential habitat of the hoary sunray (*Leucochrysum albicans* var. *tricolor*) by up to approximately 2.1 hectares; however this is not substantial compared to the known and potential areas of habitat for this species elsewhere in the Ulan Coal Complex including the 1614 ha of potential habitat protected in the Biodiversity Offset Areas. As this species has not been recorded from the proposed modification areas, it is not likely that the proposed modification will reduce the area of occupancy of this species.

The proposed modification will reduce the amount of potential habitat for the swift parrot (*Lathamus discolor*) and regent honeyeater (*Anthochaera phrygia*) by up to approximately 16.5 hectares; however this is not substantial compared to the known and potential areas of habitat for these species elsewhere in the Ulan Coal Complex. As these species have not been recorded from the proposed modification areas, it is not likely that the proposed modification will reduce the area of occupancy of these species.

- **fragment an existing population into two or more populations;**

None of the above mentioned species have been recorded within the proposed modification areas, as such it is unlikely that existing populations of these species would be fragmented into two or more populations as a result of the proposed modification.

- **adversely affect habitat critical to the survival of a species;**

The proposed modification will result in net impact to up to approximately 2.1 hectares of potential habitat for the hoary sunray (*Leucochrysum albicans* var. *tricolor*) and up to approximately 16.5 hectares of potential habitat for the swift parrot (*Lathamus discolor*) and regent honeyeater (*Anthochaera phrygia*). None of these species have been recorded from the proposed modification areas, as such it is unlikely that habitat critical to the survival of these species will be adversely affected as a result of the proposed modification.

- **disrupt the breeding cycle of a population;**

It is highly unlikely that the proposed modification would disrupt a breeding cycle of any potentially occurring population of hoary sunray (*Leucochrysum albicans* var. *tricolor*). The swift parrot

(*Lathamus discolor*) breeds exclusively in Tasmania and migrates to mainland Australia during the non-breeding season. There is no potential for breeding of this species in the proposed modification areas. The regent honeyeater (*Anthochaera phrygia*) mainly breeds in three key sites from the Bundarra-Barraba area NSW, the Capertee Valley in NSW, and north-eastern Victoria. Breeding has also been recorded recently within the lower Hunter Valley. The regent honeyeater has not been previously recorded in the proposed modification areas, or Ulan Coal Complex. The proposed modification is not expected to disrupt the breeding cycle of the swift parrot (*Lathamus discolor*) or regent honeyeater (*Anthochaera phrygia*).

- **modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;**

The proposed modification will impact an additional up to approximately 2.1 hectares of potential habitat for the hoary sunray (*Leucochrysum albicans* var. *tricolor*); however it is unlikely that the removal of this extent of potential habitat is likely to cause this species to decline.

The proposed modification will remove up to approximately 16.5 hectares of potential habitat for the regent honeyeater (*Anthochaera phrygia*) and swift parrot (*Lathamus discolor*). The Ulan Coal Complex supports substantial areas of potential habitat for all three species. It is not likely that the proposed modification will decrease the availability or quality of habitat to the extent that these species are likely to decline.

- **result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat;**

The proposed modification will not result in invasive species that are harmful to the hoary sunray (*Leucochrysum albicans* var. *tricolor*), swift parrot (*Lathamus discolor*) or regent honeyeater (*Anthochaera phrygia*) becoming established in their habitat.

- **introduce disease that may cause the species to decline;**

The proposed modification will not introduce diseases relative to the hoary sunray (*Leucochrysum albicans* var. *tricolor*), swift parrot (*Lathamus discolor*) or regent honeyeater (*Anthochaera phrygia*) that may cause these species to decline.

- **interfere with the recovery of the species.**

The proposed modification is unlikely to interfere with the recovery of the hoary sunray (*Leucochrysum albicans* var. *tricolor*), regent honeyeater (*Anthochaera phrygia*) or swift parrot (*Lathamus discolor*).

Conclusion
The proposed modification is unlikely to have a significant impact on populations of hoary sunray (*Leucochrysum albicans* var. *tricolor*), regent honeyeater (*Anthochaera phrygia*) or swift parrot (*Lathamus discolor*) within the proposed modification areas.

Vulnerable Species

The koala (*Phascolarctos cinereus*) has been recorded within the proposed modification areas, as well as within the Ulan Coal Complex. *Homoranthus darwinioides*, the brush-tailed rock wallaby (*Petrogale penicillata*), south-eastern long-eared bat (*Nyctophilus corbeni*) and the large-eared pied bat (*Chalinolobus dwyeri*) have all been recorded in the Ulan Coal Complex; however not within the proposed modification areas. There is potential habitat for each of these species in the proposed modification areas.

The brush-tailed rock wallaby (*Petrogale penicillata*) and large-eared pied bat (*Chalinolobus dwyeri*) are dependent on cliff line/rocky escarpment habitats and thus have the potential to be impacted by damage to cliff lines (cracking or rock fall) as a result of subsidence within the proposed modification areas.

The extent of cliff lines across the Ulan Coal Complex and immediate surrounds was identified by a combination of digital elevation modelling, comparison with 1:25,000 series topographical maps, and field observations. Cliffs were defined as being greater than 10 metres in height. A digital elevation model (DEM) was developed based on airborne laser scanning (ALS) survey data of the Ulan Coal Complex and surrounds. Slope analysis of the DEM was used to identify the steeper sections of terrain and estimated heights of these sections. Field observations, height resolution contours and previous mapping of cliff lines on 1:25,000 series topographical maps were used to cross check the locations and heights of the identified cliff lines.

The above cliff line modelling was used to identify the amount of cliff line that may be subject to potential impact as a result of the proposed modification. The probability of impact on these cliff lines was calculated, based on advice from SCT (SCT, 2014) which provided generic probabilities for rock fall and perceptible impact for cliff lines within each of the five units within the Triassic sandstone sequence. These predicted rock fall probabilities ranged from 1 to 20 per cent. The assessment of potential impact has taken a conservative approach and assumed a 20 per cent probability of rock fall across all cliff lines within the Triassic sandstone sequences above the Maximum Subsidence Affectation Area.

The cliff formations in the proposed modification areas are mainly of relatively low height (i.e. 50 per cent of cliff lines are less than 15 metres high) and are a minor portion of the cliff formations that occur extensively across the region, including in the nearby Goulburn River National Park.

Predicted impacts to cliff line habitat in the proposed modification areas are provided in **Table 4.** The proposed modification will not impact cliff lines in the Brokenback Conservation Area.

Table 4 – Predicted Cliff Line Impacts within proposed modification areas

	Modelled Cliff Line Length (m)		
	Proposed Modification	**Approved Development**	**Net Change**
Surface Infrastructure Area	6	105	-99
Maximum Subsidence Affectation Area	7,673	6,310	1,363
Predicted Cliff Line Impact (20%)	1,535	1,283	252

Modelling from Umwelt (2009) has shown that there is a total of approximately 7,673 metres of cliff line within the Maximum Subsidence Affectation Area. When applying the 20 per cent probability of rock fall to this area, it is expected that approximately 1,535 metres of cliff line within the Maximum Subsidence Affectation Area may be subject to rock fall impact. This is 252 metres longer than the currently approved cliff line impact being less than 4 per cent of the total cliff line in the Maximum Subsidence Affectation Area.

The koala (*Phascolarctos cinereus*), south-eastern long-eared bat (*Nyctophilus corbeni*) and *Homoranthus darwinioides* have the potential to be impacted as a result of loss of vegetated habitat within the Proposed Surface Infrastructure Areas. However, loss of such habitat as a result of

subsidence is not likely to occur as the proposed modification is not expected to result in a decrease to the extent or condition of vegetation communities and their associated habitat within the Maximum Subsidence Affectation Area. As such, this assessment has only focused on those species with specific habitat features at risk from the proposed modification – being those dependent on cliff lines.

In this case, 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; or**
- **populations that are necessary for maintaining genetic diversity, and/or**
- **populations that are near the limit of the species range.**

Based on the above definition, it is not likely that any of these five species comprise important populations within the proposed modification areas.

An action has, will have, or is likely to have a significant impact on threatened species if it does, will, or is likely to:

- **lead to a long-term decrease in the size of an important population of a species;**

As it is not likely that any of the occurrences or potential occurrences of these species in the proposed modification areas would comprise important populations, it is not likely that the proposed modification will likely lead to a long-term decrease in the size of an important population of these species. This additional potential impact is not expected to lead to a long-term decrease in the size of an important population of the brush-tailed rock wallaby (*Petrogale penicillata*) and large-eared pied bat (*Chalinolobus dwyeri*).

- **reduce the area of occupancy of an important population, or;**

As it is not likely that any of the occurrences or potential occurrences of these species in the proposed modification areas would comprise important populations, it is not likely that the proposed modification will reduce the area of occupancy of any important populations of these species.

The predicted cliff line impact (when compared to the Approved Development) is not expected to reduce the area of occupancy of an important population of the brush-tailed rock wallaby (*Petrogale penicillata*) and large-eared pied bat (*Chalinolobus dwyeri*).

- **fragment an existing important population into two or more populations, or;**

It is not likely that any of the occurrences or potential occurrences of these species in the proposed modification areas would comprise important populations.

The net impact of the proposed modification to cliff line habitat across the proposed modification areas would be unlikely to fragment any existing important populations of these species into two or more populations.

- **adversely affect habitat critical to the survival of a species, or;**

None of the known or potential habitat to be impacted as a result of the proposed modification is likely to comprise habitat critical to the survival of these species. As such, it is unlikely that the proposed modification will adversely affect habitat critical to the survival of any of these species.

- **disrupt the breeding cycle of an important population, or;**

It is not likely that any of the occurrences or potential occurrences of these species in the proposed modification areas would comprise important populations. As such it is not considered likely that the proposed modification will result in disruption of the breeding cycle of an important population of these species. An increased potential cliff line impact of 252 metres (when compared to the Approved Development) is not expected to disrupt the breeding cycle of an important population of the brush-tailed rock wallaby (*Petrogale penicillata*) and large-eared pied bat (*Chalinolobus dwyeri*).

- **modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, or;**

The proposed modification will result in a net impact of up to approximately 16.5 hectares of Woodland or Open Forest/Forest habitat for the koala (*Phascolarctos cinereus*), south-eastern long-eared bat (*Nyctophilus corbeni*) and *Homoranthus darwinioides* within the proposed modification areas. This will not modify, destroy, remove, isolate, or decrease the availability or quality of habitat for any of these species, such that these species are likely to decline.

The proposed modification will result in impact to an additional approximately 252 metres of potential cliff line habitat for the brush-tailed rock wallaby (*Petrogale penicillata*) and large-eared pied bat (*Chalinolobus dwyeri*). This does not modify, destroy, remove, isolate, or decrease the availability or quality of habitat for any of these species, such that the species are likely to decline.

- **result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat;**

The proposed modification will not result in invasive species that are harmful to *Homoranthus darwinioides*, brush-tailed rock-wallaby (*Petrogale penicillata*), koala (*Phascolarctos cinereus*), large-eared pied bat (*Chalinolobus dwyeri*) or south-eastern long-eared bat (*Nyctophilus corbeni*) becoming established in their habitat.

- **interferes substantially with the recovery of the species;**

The proposed modification is unlikely to interfere substantially with the recovery of *Homoranthus darwinioides*, brush-tailed rock-wallaby (*Petrogale penicillata*), koala (*Phascolarctos cinereus*), large-eared pied bat (*Chalinolobus dwyeri*) or south-eastern long-eared bat (*Nyctophilus corbeni*).

Conclusion

The proposed modification is unlikely to have a significant impact on important populations of *Homoranthus darwinioides*, brush-tailed rock wallaby (*Petrogale penicillata*), koala (*Phascolarctos cinereus*), large-eared pied bat (*Chalinolobus dwyeri*) or south-eastern long-eared bat (*Nyctophilus corbeni*) within the proposed modification areas.

Migratory Species

The rainbow bee-eater (*Merops ornatus*) has been recorded within the proposed modification areas and the Ulan Coal Complex. Other migratory species have the potential to occur within the proposed modification areas but have not been recorded.

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

- **substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species;**

The proposed modification will not substantially modify, destroy or isolate an area of important habitat for a migratory species.

- **result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species; or**

The proposed modification will not result in invasive species that are harmful to recorded or potentially occurring migratory species becoming established in their habitat.

- **seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.**

It is not likely that the proposed modification areas contain an ecologically significant proportion of the entire population of the rainbow bee-eater (*Merops ornatus*). The proposed modification will require a net impact to 2.1 hectares of habitat for this species within the proposed modification areas, however this is not expected to seriously disrupt its lifecycle.

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 that is of critical importance to the species at particular life-cycle stages; 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.**

Records of the rainbow bee-eater (*Merops ornatus*) are distributed broadly across NSW. The proposed modification Area does not contain habitat that is critical to the life-stages of this species. The proposed modification Area is not at the limit of the known distribution for this species, nor is there any evidence to suggest this species is declining in the local area. It is not likely that the proposed modification Area forms an area of important habitat for the rainbow bee-eater (*Merops ornatus*), nor is it likely that local records of this species represent an ecologically significant proportion of its entire populations. This is also the case for species with potential to occur within the proposed modification Area that have not been recorded.

An ecologically significant proportion is:

- **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). Some factors that should be considered include the species' population status, genetic distinctiveness and species specific behavioural patterns (for example, site fidelity and dispersal rates).**

There are no obvious concentrations of records in the local area to suggest the presence of an ecologically significant proportion of the entire population of the rainbow bee-eater (*Merops ornatus*).

The population of a migratory species:

- **means the entire population or any geographically separate part of the population of any species or lower taxon of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries including Australia.**

There is potential that the proposed modification areas contain a sub-population of the species listed above, however this is not considered to be an ecologically significant proportion of the total population of this species.

Conclusion

The result of the above assessment on migratory species is that there will be no significant detrimental impact on listed migratory species recorded within the proposed modification areas as a result of the proposed modification. Similarly, it is not likely that the proposed modification will result in a significant impact on migratory species with potential to occur within the proposed modification areas that have not been recorded.

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