

LIDDELL COAL OPERATIONS

APPENDIX **G**

Threatened Species Assessment (Umwelt 2013)

APPENDICES

Attachment A – Threatened Species Assessment

Tables 1 and 2 identify the threatened and migratory flora and fauna species and threatened ecological communities (TECs) that have potential to occur within a 10 kilometre radius of the centre of the Referral Area. This information was obtained from searches undertaken of the Office of Environment and Heritage (OEH) Atlas of NSW Wildlife (2013), the Department of Sustainability, Environment, Water, Population and Communities (DSEWPC) Protected Matters Database (2013), the NSW OEH Threatened Species website (search for the Hunter CMA subregion), the Department of Primary Industries (DPI) – Fishing and Agriculture Threatened and Protected Species Records Viewer (2013) and literature reviews undertaken by Umwelt and ELA.

Tables 1 and 2 contain the relevant ecological details of each listing (including their habitat requirements, known range and reservation within conservation reserves), as well as an assessment as to whether there may be an impact on any recorded or potentially occurring threatened and migratory species or TECs as a result of the Proposed Action. It should be noted that some species are listed in both tables as they are listed under both threatened species legislation and international migratory species conventions. In these cases the information presented is repeated, except for the legal listing (which is relevant to the table under which it is listed). This assessment is based on the information contained in Section 3.0 of the main text of the Referral as well as the specific habitat requirements of each threatened and migratory species or TEC. For the purposes of the information contained within these tables, the 'region' is broadly defined as the Sydney Basin Bioregion.

Table 1 – Threatened Flora and Threatened Ecological Community Assessment

Species	Legal Status	Specific Habitat	Distribution in Relation to the Referral Area	Reservation Within the Region ¹ (Bionet 2013)	Occurrence in Referral Area and Potential for Significant Impact	Detailed Assessment of Significance Completed?
THREATENED FLORA SPECIES						
Lobed blue-grass <i>Bothriochloa biloba</i>	V (EPBC)	Grows in woodlands and grasslands on poorer soils.	Regionally recorded across much of the central and upper Hunter Valley with fewer records in the lower Hunter but as far east as Maitland.	This species is not known from any conservation reserves in the region.	The Referral Area provides suitable habitat for this species, although it has not been recorded there. This species is potentially sensitive to the Proposed Action.	Yes
Leafless tongue-orchid <i>Cryptostylis hunteriana</i>	V (TSC) V (EPBC) 3VC (ROTAP)	This species appears to favour moist soils on the flat coastal plains. Occupies swamp heath, but also in sclerophyll forest and woodland, often on sandy soils. Typically found in communities containing <i>Eucalyptus haemastoma</i> , <i>E. capitellata</i> and <i>Corymbia gummifera</i> .	This species is known to occur in the Karuah Manning and Wyong CMA sub-regions in the Hunter Central Rivers region.	This species is not known to occur in any conservation reserves in the region.	The Referral Area does not provide suitable habitat for this species and it has not been recorded in the Referral Area. There is no potential for a significant impact on this species.	No

Species	Legal Status	Specific Habitat	Distribution in Relation to the Referral Area	Reservation Within the Region ¹ (Bionet 2013)	Occurrence in Referral Area and Potential for Significant Impact	Detailed Assessment of Significance Completed?
Finger panic grass <i>Digitaria porrecta</i>	E (TSC) E (EPBC) 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 the North-west Slopes and Plains, from near Moree south to Tambar Springs and from Tamworth to Coonabarabran.	This species is not known to occur in any reserves in the region.	The Referral Area does not provide suitable habitat for this species and it has not been recorded in the Referral Area or within 80km of the Referral Area. There is no potential for a significant impact on this species.	No
Slaty red gum <i>Eucalyptus glaucina</i>	V (TSC) V (EPBC) 3VCa (ROTAP)	This species grows in grassy woodland and dry eucalypt forest on deep, moderately fertile and well-watered soils.	Found in the Hunter Valley and North Coast from near Cessnock to Taree. There are records extending west to near Denman, Dungog and Gloucester. There is an outlying record near Gosford on the Central Coast. A separate population of the species also occurs from south of Grafton north to the Queensland border (OEH 2012).	Belford NP Singleton Military Training Area (ERM 2004)	The Referral Area provides suitable habitat for this species, although it has not been recorded there. One record of this species was gained from nearby Mt Owen, however this was in 1998 and only one specimen. There is no potential for a significant impact on this species.	No

Species	Legal Status	Specific Habitat	Distribution in Relation to the Referral Area	Reservation Within the Region ¹ (Bionet 2013)	Occurrence in Referral Area and Potential for Significant Impact	Detailed Assessment of Significance Completed?
<i>Euphrasia arguta</i>	X (TSC) PD CE (TSC) CE (EPBC) 3X (ROTAP)	This species grows in grassy areas near rivers (Botanic Gardens Trust 2013).	This species is presumed to be extinct. When present, it was recorded from as far south as Bathurst and as far north as Walcha. It was believed to occur in the botanical subdivisions of the North Coast, Northern Tablelands, Central Tablelands, North Western Slopes and Central Western Slopes (Botanic Gardens Trust 2013).	This species is not known to occur in any reserves in the region.	The Referral Area does not provide suitable habitat for this species and it has not been recorded in the Referral Area. There is no potential for a significant impact on this species.	No
<i>Ozothamnus tessellatus</i>	V (TSC) V (EPBC) 2VC- (ROTAP)	Dry sclerophyll forest and woodlands.	Restricted to a few locations north of Rylstone. Unconfirmed recording exists near Mt Owen.	Goulburn River NP	The Referral Area provides suitable habitat for this species, although it has not been recorded there. It has been recorded nearby in Ravensworth State Forest within Mt Owen. This species is potentially sensitive to the Proposed Action.	Yes

Species	Legal Status	Specific Habitat	Distribution in Relation to the Referral Area	Reservation Within the Region ¹ (Bionet 2013)	Occurrence in Referral Area and Potential for Significant Impact	Detailed Assessment of Significance Completed?
Leek orchid <i>Prasophyllum</i> sp. Wybong (C.Phelps ORG 5269)	CE (EPBC)	This species generally occurs in grassy and scrubby habitats in open eucalypt woodland and grasslands.	This species is endemic to NSW, from which there are only seven known populations from near NSW near Ilford, Premer, Muswellbrook, Wybong, Yeoval, Inverell and Tenterfield. It is not known to occur outside the Sydney Basin, New England Tablelands, Brigalow Belt South and NSW South Western Slopes bioregions. Its area of occupancy is estimated at 1500 m ² .	This species is not known from any conservation reserves in the region.	The Referral Area does not provide suitable habitat for this species and it has not been recorded in the Referral Area. It is not considered likely to occur given its restricted distribution. There is no potential for a significant impact on this species.	No
Illawarra greenhood <i>Pterostylis gibbosa</i>	E (TSC) E (EPBC) 2E (ROTAP)	All known populations grow in open forest or woodland, on flat or gently sloping land with poor drainage. At Milbrodale, the only known population in the Hunter, it occurs on soils derived from Triassic sandstone. It is found in association with narrow-leaved ironbark (<i>Eucalyptus crebra</i>), grey box (<i>E. moluccana</i>), black cypress pine (<i>Callitris endlicheri</i>) and a dense shrub layer.	Known from a small number of populations in the Hunter region (Milbrodale), the Illawarra region (Albion Park and Yallah) and the Shoalhaven region (near Nowra).	This species is not known to occur in any reserves in the region.	The Referral Area does not provide suitable habitat for this species and it has not been recorded in the Referral Area. There is no potential for a significant impact on this species.	No

Species	Legal Status	Specific Habitat	Distribution in Relation to the Referral Area	Reservation Within the Region ¹ (Bionet 2013)	Occurrence in Referral Area and Potential for Significant Impact	Detailed Assessment of Significance Completed?
Siah's backbone <i>Streblus pendulinus</i>	E (EPBC)	This species occurs in warmer rainforest, mostly along watercourses, north from Milton. Listing advice for this species indicates that the species is endangered on Norfolk Island and taxonomic revisions may have unintentionally included mainland occurrences of the species. For the purposes of this assessment it is assumed that the listing relates only to the Norfolk Island population of the species.	There are a number of known records of this species occurring in the Muswellbrook and Singleton areas. The closest records occur approximately 15 kilometres north-east of the Referral Area.	Barrington Tops NP Yengo NP	The Referral Area does not provide suitable habitat for this species and it has not been recorded in the Referral Area. There is no potential for a significant impact on this species.	No
Austral toadflax <i>Thesium australe</i>	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 (<i>Themeda australis</i>). This species is a root parasite that takes water and some nutrients 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 Referral Area does not provide suitable habitat for this species with very low levels of <i>Themeda australis</i> recorded during flora surveys. The species has not been recorded in the Referral Area. There is no potential for a significant impact on this species.	No

Species	Legal Status	Specific Habitat	Distribution in Relation to the Referral Area	Reservation Within the Region ¹ (Bionet 2013)	Occurrence in Referral Area and Potential for Significant Impact	Detailed Assessment of Significance Completed?
THREATENED ECOLOGICAL COMMUNITIES						
Lowland Rainforest of Subtropical Australia	CEEC (EPBC)	Occurs on basalt and alluvial soils, including sand and old or elevated alluvial soils as well as floodplain alluvia. Mostly occurs in areas <300 m above sea level, typically in areas with high annual rainfall (>1300 mm).	Occurs from Maryborough in Queensland to the Clarence River (near Grafton) in New South Wales (NSW). Also includes isolated areas between the Clarence River and Hunter River such as the Bellinger and Hastings valleys.	This species is not known to occur in any reserves in the region.	The Referral Area does not provide suitable habitat for this community and it has not been recorded within the Referral Area. There is no potential for a significant impact on this community.	No
White Box – Yellow Box – Blakelys Red Gum Grassy Woodland and Derived Native Grasslands	CEEC (EPBC)	This EEC can occur as either woodland or derived grassland (grassy woodland from which trees have been removed). Groundlayer consists of native tussock grasses and herbs, and a sparse, scattered shrub layer. White box (<i>Eucalyptus albens</i>), yellow box (<i>E. melliodora</i>), or Blakelys red gum (<i>E. blakelyi</i>), dominate, where trees remain.	This EEC occurs along the western slopes and tablelands of the Great Dividing Range from southern Queensland through NSW to central Victoria.	This species is not known to occur in any reserves in the region.	Field surveys have targeted the presence of this community in the Referral Area; however no evidence of its presence in the Referral Area has been obtained. There is no potential for a significant impact on this community.	No

Species	Legal Status	Specific Habitat	Distribution in Relation to the Referral Area	Reservation Within the Region ¹ (Bionet 2013)	Occurrence in Referral Area and Potential for Significant Impact	Detailed Assessment of Significance Completed?
Weeping Myall – Coobah – Scrub Wilga Shrubland	CEEC (EPBC)	This TEC consists of weeping myall (<i>Acacia pendula</i>) with coobah (<i>Acacia salicina</i>) and scrub wilga (<i>Geijera salicifolia</i>). Yarran (<i>Acacia omalophylla</i>) and stiff canthium (<i>Canthium buxifolium</i>) are also present in the small tree/shrub layer. The ground stratum is dense and primarily grassy. Grasses include kangaroo grass (<i>Themeda triandra/australis</i>), wallaby grass (<i>Austrodanthonia</i> spp.), snow grass (<i>Poa sieberiana</i>) and barbed wire grass (<i>Cymbopogon refractus</i>).	The TEC occurs in a small stand on heavy, brown clay soil at Jerrys Plains in the Hunter Valley, in the South Hunter Province of the Sydney Basin Bioregion.	This TEC is not known to occur in any conservation reserves in the region.	Field surveys have targeted the presence of this community in the Referral Area; however no evidence of its presence in the Referral Area has been obtained. There is no potential for a significant impact on this community.	No

Notes:

- CE Critically endangered
- CEEC Critically endangered ecological community
- E Endangered
- EPBC Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
- NP National Park
- PD preliminary determination
- ROTAP Rare or Threatened Australian Plants
- TSC: NSW *Threatened Species Conservation Act 1995*
- V Vulnerable
- X Extinct

¹ The following conservation area were searched for record at each species, population or community: Belford NP, Goulburn River NP, Manobalai NR, Singleton Military Area (ERM 2004), Towarri NP, Watagans NP, Werakata NP, Werakata SCA, Wingen Maid NR, Wollemi NP, Yengo NP

ROTAP Codes:

a	Adequately reserved
C	In a conservation reserve
E	Endangered
V	Vulnerable
X	Extinct
2	Found over < 100 kilometres
3	Found over > 100 kilometres
-	Species recorded from a reserve but population size unknown
+	Taxon has a natural occurrence overseas

Table 2 – Threatened and Migratory Fauna Assessment

Species	Legal Status	Specific Habitat	Distribution in Relation to Referral Area	Reservation in the Region ¹ (Bionet 2013)	Occurrence in Referral Area and Potential for Significant Impact	Detailed Assessment of Significance Required?
THREATENED FAUNA SPECIES						
AMPHIBIANS						
Stuttering frog <i>Mixophyes balbus</i>	E (TSC) V (EPBC)	Occurs in naturally vegetated streams typically in hilly or mountainous country, between elevations of 20 metres and 1420 metres, in a wide range of vegetation types, including: subtropical, warm and cool temperate rainforest, and wet and dry sclerophyll forest.	Occurs in eastern-flowing streams of the Great Dividing Range, between the Cann River Catchment in Gippsland, Victoria, and the Clarence River catchment in north-eastern NSW, in the NSW North Coast, New England Tableland, Sydney Basin, and South Eastern Highlands.	Barrington Tops NP	The Referral Area does not provide suitable habitat for this species and it has not been recorded there. There is no potential for a significant impact on this species.	No
Giant barred frog <i>Mixophyes iteratus</i>	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 1000 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 a stronghold.	This species is not known to occur in conservation reserves in the region.	The Referral Area does not provide suitable habitat for this species and it has not been recorded there. There is no potential for a significant impact on this species.	No

Species	Legal Status	Specific Habitat	Distribution in Relation to Referral Area	Reservation in the Region ¹ (Bionet 2013)	Occurrence in Referral Area and Potential for Significant Impact	Detailed Assessment of Significance Required?
Green and golden bell frog <i>Litoria aurea</i>	E (TSC) V (EPBC)	Occurs amongst emergent aquatic or riparian vegetation and amongst vegetation, fallen timber, including grassland, cropland and modified pastures. Breeds in still or slow flowing waterbodies with some vegetation such as <i>Typha</i> spp. and <i>Eleocharis</i> spp.	NSW North Coast near Brunswick Heads, southwards along the NSW Coast to Victoria where this species extends into east Gippsland. The Referral Area is close to the inland limit of this species' known distribution.	This species is not known to occur in any reserves in the region.	The Referral Area provides suitable habitat for this species, however it has not been recorded there. It has been recorded previously in the nearby Mt Owen (last confirmed record in 1999). This species is potentially sensitive to the Proposed Action.	Yes
Booroolong frog <i>Litoria booroolongensis</i>	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.	Mt Royal NP	The Referral Area or its surrounds do not provide suitable habitat for this species and it has not been recorded in the Referral Area. There is no potential for a significant impact on this species.	No

Species	Legal Status	Specific Habitat	Distribution in Relation to Referral Area	Reservation in the Region ¹ (Bionet 2013)	Occurrence in Referral Area and Potential for Significant Impact	Detailed Assessment of Significance Required?
REPTILES						
Broad-headed snake <i>Hoplocephalus bungaroides</i>	E (TSC) V (EPBC)	The broad-headed snake is nocturnal, and 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.	Wollemi NP Yengo NP	The Referral Area or its surrounds do not provide suitable habitat for this species and it has not been recorded in the Referral Area. There is no potential for a significant impact on this species.	No
BIRDS						
Australasian bittern <i>Botaurus poiciloptilus</i>	E (TSC) E (EPBC)	Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (<i>Typha</i> spp.) and spikerushes (<i>Eleocharis</i> spp.).	This species may be found over most of NSW except for the far north-west.	This species is not known to occur in any reserves in the region.	The Referral Area or its surrounds do not provide suitable habitat for this species and it has not been recorded in the Referral Area. There is no potential for a significant impact on this species.	No

Species	Legal Status	Specific Habitat	Distribution in Relation to Referral Area	Reservation in the Region ¹ (Bionet 2013)	Occurrence in Referral Area and Potential for Significant Impact	Detailed Assessment of Significance Required?
Malleefowl <i>Leipoa ocellata</i>	E (TSC) V (EPBC) MIG (EPBC)	The malleefowl 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 malleefowl has been known to forage in open grassland and farmland areas; and breeds in areas with plentiful leaf litter.	The malleefowl 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.	This species is not known to occur in any reserves in the region.	The Referral Area or its surrounds do not provide suitable habitat for this species and it has not been recorded in the Referral Area. There is no potential for a significant impact on this species.	No
Australian painted snipe <i>Rostratula benghalensis australis</i>	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 Cowal, Macquarie Marshes and Hexham Swamp. Most common in the Murray-Darling Basin.	This species is not known to occur in any reserves in the region.	The Referral Area is not considered to provide suitable habitat for this species and it has not been recorded within the Referral Area. It has, however been recently recorded along Bowmans Creek. This species is potentially sensitive to the Proposed Action.	Yes

Species	Legal Status	Specific Habitat	Distribution in Relation to Referral Area	Reservation in the Region ¹ (Bionet 2013)	Occurrence in Referral Area and Potential for Significant Impact	Detailed Assessment of Significance Required?
Red goshawk <i>Erythrotriorchis radiatus</i>	CE (TSC) V (EPBC)	In NSW, this species is mainly found along or near watercourses, in swamp forest and woodlands on the coastal plain. This species favours patches of dense forest interspersed with open woodland or cleared land and often frequents forest edges.	This species is found across northern Australian south through eastern Queensland to far north-east NSW. This species is very rare in NSW. Most records are from the Clarence River Catchment, with a few about the lower Richmond and Tweed Rivers.	This species is not known to occur in any reserves in the region.	The Referral Area does not provide suitable habitat for this species and it has not been recorded in the Referral Area. There is no potential for a significant impact on this species.	No

Species	Legal Status	Specific Habitat	Distribution in Relation to Referral Area	Reservation in the Region ¹ (Bionet 2013)	Occurrence in Referral Area and Potential for Significant Impact	Detailed Assessment of Significance Required?
Swift parrot <i>Lathamus discolor</i>	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 this species forages include mugga ironbark (<i>Eucalyptus sideroxylon</i>), grey box (<i>E. moluccana</i>), swamp mahogany (<i>E. robusta</i>), spotted gum (<i>Corymbia maculata</i>), red bloodwood (<i>C. gummifera</i>), narrow-leaved red ironbark (<i>E. crebra</i>), forest red gum (<i>E. tereticornis</i>) and yellow box (<i>E. melliodora</i>). This species 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 Referral Area is within the known distribution of this species.	Wollemi NP	The Referral Area provides suitable habitat for this species, however it has not been recorded there. This species has been recorded within the nearby Mt Owen in 2005 and 2007. This species is potentially sensitive to the Proposed Action.	Yes

Species	Legal Status	Specific Habitat	Distribution in Relation to Referral Area	Reservation in the Region ¹ (Bionet 2013)	Occurrence in Referral Area and Potential for Significant Impact	Detailed Assessment of Significance Required?
Regent honeyeater <i>Anthochaera phrygia</i>	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 <i>Casuarina</i> woodlands. An apparent preference exists for the wettest, most fertile sites within these associations, such as creek flats, river valleys and foothills.	Once recorded between Adelaide and the central coast of Queensland, this species range has contracted dramatically in the last 30 years to between north-eastern Victoria and south-eastern Queensland.	Wollemi NP Yengo NP	The Referral Area provides suitable habitat for this species, however it has not been recorded there. This species is potentially sensitive to the Proposed Action.	Yes

Species	Legal Status	Specific Habitat	Distribution in Relation to Referral Area	Reservation in the Region (Bionet 2013)	Occurrence in Referral Area and Potential for Significant Impact	Detailed Assessment of Significance Required?
MAMMALS						
Spotted-tailed quoll (SE mainland population) <i>Dasyurus maculatus maculatus</i>	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 include hollow logs, tree hollows, rocky outcrops and caves.	In NSW this species occurs on both sides of the Great Dividing Range, with the highest densities occurring in the north east of the state. This species occurs from the coast to the snowline and inland to the Murray River.	Wollemi NP Yengo NP Mt Royal NP Belford NP Barrington Tops NP	There is potential habitat for this species within the Referral Area, however it has not been recorded in the Referral Area, despite targeted surveys. This species has been recorded regularly from the Liddell Colliery and nearby Mt Owen. The nearest records to the Referral Area are within 200 m along Bowmans Creek and a breeding den within 2 km along Bowmans Creek. This species is potentially sensitive to the Proposed Action.	Yes

Species	Legal Status	Specific Habitat	Distribution in Relation to Referral Area	Reservation in the Region (Bionet 2013)	Occurrence in Referral Area and Potential for Significant Impact	Detailed Assessment of Significance Required?
Koala <i>Phascolarctos cinereus</i>	V (TSC) V (EPBC)	This species inhabits eucalypt forests and woodlands. The species is known to feed on a large number of eucalypt species; however it tends to specialise on a small number in different areas. <i>Eucalyptus tereticornis</i> , <i>E. punctata</i> , <i>E. cypellocarpa</i> , <i>E. viminalis</i> , <i>E. microcorys</i> , <i>E. robusta</i> , <i>E. albens</i> , <i>E. camaldulensis</i> and <i>E. populnea</i> are some preferred species.	This species 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. This species is known to occur along inland rivers on the western side of the Great Dividing Range.	Wollemi NP Yengo NP Mt Royal NP Manobalai NR Barrington Tops NP	The Referral Area does not provide suitable habitat for this species and it has not been recorded in the Referral Area. This species has been previously recorded within Mt Owen, but not since possible scats were found in 1994. There is no potential for a significant impact on this species.	No

Species	Legal Status	Specific Habitat	Distribution in Relation to Referral Area	Reservation in the Region (Bionet 2013)	Occurrence in Referral Area and Potential for Significant Impact	Detailed Assessment of Significance Required?
Brush-tailed rock-wallaby <i>Petrogale penicillata</i>	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. This species browses on vegetation in and adjacent to rocky areas eating grasses and forbs as well as the foliage and fruits of shrubs and trees. 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. This species distribution roughly followed the Great Dividing Range for 2500 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.	Wollemi NP Yengo NP Manobalai NR Barrington Tops NP Watagans NP	The Referral Area does not provide suitable habitat for this species and it has not been recorded in the Referral Area. There is no potential for a significant impact on this species.	No
Grey-headed flying-fox <i>Pteropus poliocephalus</i>	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.	This species is found within 200 kilometres of the eastern coast of Australia, from Bundaberg in Queensland to Melbourne in Victoria.	Yengo NP Wollemi NP Barrington Tops NP	The Referral Area provides suitable habitat for this species, although it has not been recorded there. It has been recorded within Mt Owen (most recently recorded 2010). Limited foraging habitat occurs in the Referral Area, but no camp sites have been identified. There is potential for a significant impact on this species.	Yes

Species	Legal Status	Specific Habitat	Distribution in Relation to Referral Area	Reservation in the Region (Bionet 2013)	Occurrence in Referral Area and Potential for Significant Impact	Detailed Assessment of Significance Required?
Eastern long-eared bat (SE form) , greater long-eared bat <i>Nyctophilus timoriensis</i>	V (TSC) V (EPBC)	This species inhabits a variety of vegetation types, including mallee, bulloak (<i>Allocasuarina luehmanni</i>) 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. This species roosts in tree hollows, crevices, and under loose bark.	The distribution of the south eastern form of this species coincides approximately with the Murray Darling Basin with the Pilliga Scrub region a 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).	Manobalai NR Wollemi NP	The Referral Area provides suitable habitat for this species, although it has not been recorded there. There is no potential for a significant impact on this species.	No
Large-eared pied bat <i>Chalinolobus dwyeri</i>	V (TSC) V (EPBC)	This species is generally found in a variety of drier habitats, including dry sclerophyll forests and woodlands however, it probably tolerates a wide range of habitats. This species 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.	Wollemi NP Yengo NP Manobalai NR Watagans NP	The Referral Area provides suitable habitat for this species, although it has not been recorded there. The species has been previously recorded within Mt Owen. There is a potential for a significant impact on this species.	Yes

Species	Legal Status	Specific Habitat	Distribution in Relation to Referral Area	Reservation in the Region (Bionet 2013)	Occurrence in Referral Area and Potential for Significant Impact	Detailed Assessment of Significance Required?
New Holland mouse <i>Pseudomys novaehollandiae</i>	V (EPBC)	This species inhabits a range of habitats from open heathlands, open woodlands with a heath understorey, as well as vegetated dunes. This species lives in a burrow which is shared with other individuals.	This species has a disjunct distribution across Tasmania, Victoria, Queensland and NSW.	This species is not known to occur in any reserves in the region.	This species has previously been recorded nearby at Mt Owen. Rehabilitation and early phase natural regeneration may provide habitat for this species in the Liddell Colliery. There is potential for a significant impact on this species.	Yes
Hastings River mouse <i>Pseudomys oralis</i>	E (TSC) E (EPBC)	This species is known to inhabit a variety of dry open forest types with dense, low ground cover and a diverse mixture of ferns, grass, sedges and herbs. Access to seepage zones, creeks and gullies is important, as is permanent shelter such as rocky outcrops. Nests may be in gully areas or ridges and slopes.	This species has a patchy distribution along the east side of the Northern Tablelands and great escarpment of north-east NSW, usually but not always at elevations between 500 metres and 1100 metres above sea level.	Mt Royal NP Barrington Tops NP	The Referral Area does not provide suitable habitat for this species and it has not been recorded in the Referral Area. There is no potential for a significant impact on this species.	No

Species	Legal Status	Specific Habitat	Distribution in Relation to Referral Area	Reservation in the Region (Bionet 2013)	Occurrence in Referral Area and Potential for Significant Impact	Detailed Assessment of Significance Required?
MIGRATORY SPECIES						
Malleefowl <i>Leipoa ocellata</i>	E (TSC) V (EPBC) MIG (EPBC)	The malleefowl 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 malleefowl has been known to forage in open grassland and farmland areas; and breeds in areas with plentiful leaf litter.	The malleefowl 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.	This species is not known to occur in any reserves in the region.	The Referral Area or its surrounds do not provide suitable habitat for this species and it has not been recorded in the Referral Area. There is no potential for a significant impact on this species.	No
Eastern great egret <i>Ardea modesta</i>	MAR (EPBC) MIG (EPBC) CAMBA JAMBA	This species typically inhabits areas of shallow, flowing waters, but also uses damp grasslands and other watered areas. This species can be observed both in flocks and on its own, and roosts during the night in groups.	This species is distributed throughout the world, and is common throughout most areas of Australia, with the exception of extremely arid areas.	Goulburn River NP	Although it has not been recorded, there is potential habitat in the Referral Area for this species to occur. There is a potential for a significant impact on this species.	Yes

Species	Legal Status	Specific Habitat	Distribution in Relation to Referral Area	Reservation in the Region (Bionet 2013)	Occurrence in Referral Area and Potential for Significant Impact	Detailed Assessment of Significance Required?
Cattle egret <i>Ardea ibis</i>	MIG (EPBC)	The cattle egret can be found in grasslands, wetlands and woodlands. This species is commonly sighted at garbage dumps, pastures and croplands (especially where poor drainage is present).	This species 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 SA.	This species is not known to occur in any reserves in the region.	Although it has not been recorded, there is potential habitat in the Referral Area for this species to occur. There is a potential for a significant impact on this species.	Yes
Australian painted snipe <i>Rostratula benghalensis australis</i>	E (TSC) E (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 Cowal, Macquarie Marshes and Hexham Swamp. Most common in the Murray-Darling Basin.	This species is not known to occur in any reserves in the region.	The Referral Area is not considered to provide suitable habitat for this species and it has not been recorded within the Referral Area. It has, however been recently recorded along Bowmans Creek. This species is potentially sensitive to the Proposed Action.	Yes

Species	Legal Status	Specific Habitat	Distribution in Relation to Referral Area	Reservation in the Region (Bionet 2013)	Occurrence in Referral Area and Potential for Significant Impact	Detailed Assessment of Significance Required?
White-bellied sea-eagle <i>Haliaeetus leucogaster</i>	MIG (EPBC)	This species is typically sighted perched in tall trees and soaring above water bodies and land. This species is territorial and forms permanent breeding pairs.	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.	Goulburn River NP	The Referral Area provides suitable habitat for this species, however it has not been recorded there. The species is regularly recorded at Mt Owen during annual monitoring surveys. This species is potentially sensitive to the Proposed Action.	Yes
Regent honeyeater <i>Anthochaera phrygia</i>	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 <i>Casuarina</i> woodlands. An apparent preference exists for the wettest, most fertile sites within these associations, such as creek flats, river valleys and foothills.	Once recorded between Adelaide and the central coast of Queensland, this species range has contracted dramatically in the last 30 years to between north-eastern Victoria and south-eastern Queensland.	Wollemi NP Yengo NP	The Referral Area provides suitable habitat for this species, however it has not been recorded there. This species is potentially sensitive to the Proposed Action.	Yes

Species	Legal Status	Specific Habitat	Distribution in Relation to Referral Area	Reservation in the Region (Bionet 2013)	Occurrence in Referral Area and Potential for Significant Impact	Detailed Assessment of Significance Required?
White-throated needletail <i>Hirundapus caudacutus</i>	MIG (EPBC)	This species is only in Australia approximately between the months of October and May. This species forages upon flying insects and drinks whilst in flight. Feeding is typically associated with rising thermal currents typical with storm fronts and bushfires.	This species is distributed over eastern and northern Australia.	Manobalai NR Mt Royal NP Yengo NP Wollemi NP Ravensworth SF	The Referral Area provides suitable habitat for this species, however it has not been recorded there. The species is regularly recorded at Mt Owen during annual monitoring surveys. This species is potentially sensitive to the Proposed Action.	Yes
Fork-tailed swift <i>Apus pacificus</i>	MIG (EPBC)	This species is mostly found in Australia through the months of October through to April. This species spends most of its time when in flight ahead of storm fronts and updraughts.	This species can be found throughout Australia during October to April. In Australia this species is most common west of the Great Dividing Range. This species is uncommon in Tasmania.	This species is not known to occur in any reserves in the region.	The Referral Area or its surrounds do not provide suitable habitat for this species and it has not been recorded in the Referral Area. There is no potential for a significant impact on this species.	Yes

Species	Legal Status	Specific Habitat	Distribution in Relation to Referral Area	Reservation in the Region (Bionet 2013)	Occurrence in Referral Area and Potential for Significant Impact	Detailed Assessment of Significance Required?
Latham's snipe, Japanese snipe <i>Gallinago hardwickii</i>	MIG (EPBC)	This species can be found in permanent and ephemeral wetlands up to 2000 metres above sea level. These water bodies are usually freshwater with low, dense vegetation. This species forages in areas of mud with some vegetation cover and roosts nearby to these areas. This species does not breed in Australia.	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.	This species is not known to occur in any reserves in the region.	The Referral Area does not provide suitable habitat for this species and it has not been recorded in the Referral Area. There is no potential for a significant impact on this species.	No
Rainbow bee-eater <i>Merops ornatus</i>	MIG (EPBC)	The preferred habitat of this species 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.	Manobalai NR Wollemi NP Yengo NP Ravensworth SF	The Referral Area provides suitable habitat for this species, and it has been recorded in the Referral Area. The species is regularly recorded at Mt Owen during annual monitoring surveys. This species is potentially sensitive to the Proposed Action.	Yes

Species	Legal Status	Specific Habitat	Distribution in Relation to Referral Area	Reservation in the Region (Bionet 2013)	Occurrence in Referral Area and Potential for Significant Impact	Detailed Assessment of Significance Required?
Spectacled monarch <i>Symposiachris trivirgatus</i>	MIG (EPBC)	The spectacle monarch typically inhabits the thick understorey of rainforests, wet gullies, riparian vegetation and mangroves.	Primarily found in coastal north-eastern and eastern Australia, including coastal islands, from Cape York, Queensland to Port Stephens, New South Wales. Outside of Australia it is known from Papua new Guinea, Moluccas and Timor.	This species is not known to occur in any conservation reserves in the region.	The Referral Area does not provide suitable habitat for this species and it has not been recorded in the Referral Area. There is no potential for a significant impact on this species.	No
Black-faced monarch <i>Monarcha melanopsis</i>	MIG (EPBC)	This species can be identified in coastal scrub, damp gullies, eucalypt woodlands and rainforests. This species can be seen foraging for insects amongst foliage, and builds a deep, cup-shaped nest in a tree fork which is made of cobwebs, casuarinas needles, bark, moss and roots.	This species is distributed along the eastern coast of Australia, gradually becoming less common towards the south.	Wollemi NP Yengo NP Mt Royal NP Belford NP	The Referral Area does provide suitable habitat for this species however it has not been recorded in the Referral Area. There is no potential for a significant impact on this species.	No
Satin flycatcher <i>Myiagra cyanoleuca</i>	MIG (EPBC)	This species typically inhabits wet areas of tall forests, particularly in gullies. This species moves north in the winter and is seldom seen in NSW, Tasmania, Victoria or SA during these times.	This species 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.	Mt Royal NP	The Referral Area does provide suitable habitat for this species however it has not been recorded in the Referral Area. There is no potential for a significant impact on this species.	No

Species	Legal Status	Specific Habitat	Distribution in Relation to Referral Area	Reservation in the Region (Bionet 2013)	Occurrence in Referral Area and Potential for Significant Impact	Detailed Assessment of Significance Required?
Clamorous reed warbler <i>Acrocephalus stentoreus</i>	MIG (EPBC)	This species prefers dense vegetation, particularly alongside water, particularly in thick reed beds as well as tall crops, bamboo thickets and lantana.	The clamorous reed warbler is found throughout Australia in area of suitable habitat. It is also found from New Guinea to south-eastern Africa.	Goulburn River NP	This species has been recorded in the wider LCO however not within the Referral Area. This species is potentially sensitive to the Project.	Yes
Rufous fantail <i>Rhipidura rufifrons</i>	MIG (EPBC)	This species typically inhabits areas of dense wet forest, mangrove, rainforest or swamp woodlands. This species 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.	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.	Wollemi NP Mt Royal NP Belford NP Yengo NP	The Referral Area does not provide suitable habitat for this species and it has not been recorded in the Referral Area. There is no potential for a significant impact on this species.	No

Notes:

- CE: Critically endangered
E: Endangered
EPBC: Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
MIG: Migratory
NP: National Park
NR: Nature Reserve
SF: State Forest
SCA: State Conservation Area
TSC: NSW *Threatened Species Conservation Act 1995*
V: Vulnerable

1 The following conservation area were searched for record at each species, population or community: Belford NP, Goulburn River NP, Manobalai NR, Singleton Military Area (ERM 2004), Towarri NP, Watagans NP, Werakata NP, Werakata SCA, Wingen Maid NR, Wollemi NP, Yengo NP