Appendix 3 – Ecological Assessment of Significance

Appendix 3.1 - Threatened Species, Endangered Populations, TECs and Migratory Species and their Potential to occur within the Study Area

The following tables identified the threatened flora and fauna species, endangered populations, threatened ecological communities (TECs) and migratory species that have a potential to occur within a 10 kilometre radius of the Study Area. This information was obtained from searches undertaken of the DECCW Atlas of NSW Wildlife (2010) and the DEWHA Protected Matters database (2010).

For each species, population or community identified in these searches; the status, specific habitat requirements, distribution, source of information, potential for occurrence in the study area and the requirement for an 'assessment of significance' is stated.

Table 1 - Threatened Flora Species Recorded or with Potential to Occur within in the Study Area

Species	Legal Status	Specific Habitat	Distribution in Relation to Study Area	Reservation in the Region	DECCW 10km	DEWHA 10km	Recorded in Study Area	Other	Occurrence in Study Area and Potential for Significant Impact	Assessment of Significance required?
dense cord-rush *Baloskion longipes*	V (TSC) V (EPBC)	The species is commonly found in swamps or depressions in sandy alluvium, sometimes growing with sphagnum moss. It also occurs in swales within tall forest, and in Black Gum (*Eucalyptus aggregata*) Woodland.	The species has been recorded from the Kanangra-Boyd area to the Southern Tablelands.	Kanangra-Boyd NP Penrose State Forest Morton NP	✓				There is no appropriate habitat present in the Study Area for this species. There is no potential for an impact on this species.	No
few-seeded bossiaea *Bossiaea oligosperma*	V (TSC) V (EPBC)	The species occurs on stony slopes or ridges on sandstone in the Yerranderie area and in low woodland on loamy soil in the Windellama area.	The species is known from two disjunct areas - the lower Blue Mountains in the Warragamba area and the Windellama area in Goulburn Mulwaree Shire.	This species is not known to occur in any reserves in the region.	✓				There is no appropriate habitat present in the Study Area for this species. There is no potential for an impact on this species.	No
thick-lipped spider-orchid *Caladenia tessellata*	E (TSC) V (EPBC)	The species grows on clay loam or sandy soils.	The species is known from the Sydney area (old records), Wyong, Ulladulla and Braidwood in NSW. Populations in Kiama and Queanbeyan are presumed extinct.	This species is not known to occur in any reserves in the region.		✓			There is no appropriate habitat present in the Study Area for this species. There is no potential for an impact on this species.	No

Species	Legal Status	Specific Habitat	Distribution in Relation to Study Area	Reservation in the Region	DECCW 10km	DEWHA 10km	Recorded in Study Area	Other	Occurrence in Study Area and Potential for Significant Impact	Assessment of Significance required?
Camden woollybutt *Eucalyptus macarthurii*	V (TSC)	The species occurs on grassy woodland on relatively fertile soils on broad cold flats.	The species has a moderately restricted distribution. It is currently recorded from the Moss Vale District to Kanangra Boyd National Park.	Kanangra-Boyd NP	✓			✓	The species was previously recorded within the Project Area, however it was not identified during the field surveys within the Study Area.	No
Tallong midge orchid *Genoplesium plumosum*	CE (TSC) E (EPBC)	The species occurs exclusively in heathland and grows on very shallow soils or within mosses on sandstone conglomerate shelves.	The species is highly restricted to two areas, the village of Tallong and its surrounds and a site in Morton National Park.	Morton NP	✓				There is no appropriate habitat present in the Study Area for this species. There is no potential for an impact on this species.	No
Wingecarribee gentian *Gentiana wingecarribiensis*	E (TSC) E (EPBC)	The species grows in bogs, in sphagnum moss humps and in sedge communities.	The species is known only from Hanging Rock Swamp and Wingecarribee Swamp on the Southern Highlands.	This species is not known to occur in any reserves in the region.	✓				There is no appropriate habitat present in the Study Area for this species. There is no potential for an impact on this species.	No
square raspwort *Haloragis exalata subsp. exalata*	V (TSC) V (EPBC)	The species appears to require protected and shaded damp situations in riparian habitats.	The species occurs in 4 widely scattered localities in eastern NSW. It is disjunctly distributed in the central coast, south coast and north-western slopes botanical subdivisions of NSW.	This species is not known to occur in any reserves in the region.	✓				There is no appropriate habitat present in the Study Area for this species. There is no potential for an impact on this species.	No

Species	Legal Status	Specific Habitat	Distribution in Relation to Study Area	Reservation in the Region	DECCW 10km	DEWHA 10km	Recorded in Study Area	Other	Occurrence in Study Area and Potential for Significant Impact	Assessment of Significance required?
Cambage kunzea *Kunzea cambagei*	V (TSC) V (EPBC)	The species is restricted to damp, sandy soils in wet heath or mallee open scrub at higher altitudes on sandstone outcrops or Silurian group sediments.	The species occurs mainly in the Yerranderie / Mt Werong area in the Blue Mountains but has also been collected on the Wanganderry Plateau, and at Medway and along the Wingecarribee River.	Kanangra-Boyd NP Nattai NP	✓	✓			There is no appropriate habitat present in the Study Area for this species. There is no potential for an impact on this species.	No
hoary sunray *Leucochrysum albicans* var. *tricolor*	E (EPBC)	In NSW, the species occurs in grasslands, grassy areas in woodlands and dry open forests, and modified habitats, on a variety of soil types including clays, clay loams, stony and gravely soil.	Te species occurs on the Southern Tablelands in an area roughly bounded by Albury, Bega and Goulburn, in the South Eastern Highlands, Australian Alps and Sydney Basin bioregions.	This species is not known to occur in any reserves in the region.		✓			There is no appropriate habitat present in the Study Area for this species. There is no potential for an impact on this species.	No
cotoneaster pomaderris *Pomaderris cotoneaster*	E (TSC) E (EPBC)	The species can occur in forests with deep, friable soil, amongst rock beside a creek, on rocky forested slopes and in steep gullies between sandstone cliffs.	The species has a very disjunct distribution, known from the Nungatta area south into Victoria.	Morton NP	✓				There is no appropriate habitat present in the Study Area for this species. There is no potential for an impact on this species.	No

Species	Legal Status	Specific Habitat	Distribution in Relation to Study Area	Reservation in the Region	DECCW 10km	DEWHA 10km	Recorded in Study Area	Other	Occurrence in Study Area and Potential for Significant Impact	Assessment of Significance required?
pale pomaderris *Pomaderris pallida*	V (TSC) V (EPBC)	The species usually grows in shrub communities surrounded by brittle gum (*Eucalyptus mannifera*) and red stringybark (*E. macrorhynca*) or *Callitris* spp. woodland.	The species has been recorded from near Kydra Trig, north-west of Nimmitabel, and the Murrumbidgee River west of the ACT.	This species is not known to occur in any reserves in the region.	✓				There is no appropriate habitat present in the Study Area for this species. There is no potential for an impact on this species.	No
Solanum celatum	E (TSC)	The species occurs in rainforest clearings, or in wet sclerophyll forests.	The species is restricted to an area from Wollongong to just south of Nowra, and west to Bungonia.	This species is not known to occur in any reserves in the region.	✓				There is no appropriate habitat present in the Study Area for this species. There is no potential for an impact on this species.	No
Kangaloon sun-orchid *Thelymitra* sp. Kangaloon (D.L.Jones 18108)	CE (EPBC)	The species grows in seasonally swampy sedgeland on grey silty clay loam at 600–700 m above sea level.	The species occurs in NSW and is known from three locations near Robertson in the Southern Highlands.	This species is not known to occur in any reserves in the region.		✓			There is no appropriate habitat present in the Study Area for this species. There is no potential for an impact on this species.	No
austral toadflax *Thesium australe*	V (TSC) V (EPBC)	The species occurs in grassland or grassy woodland and is often found in damp sites in association with kangaroo grass (*Themeda australis*).	The species is found in very small populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands.	This species is not known to occur in any reserves in the region.		✓			There is no appropriate habitat present in the Study Area for this species. There is no potential for an impact on this species.	No

Note

CE:	critically endangered
DECCW 10km:	identified on the DECCW Atlas of NSW Wildlife as previously recorded within 10km of the Study Area
DEWHA 10km:	identified on the DEWHA Protected Matters Database as previously recorded within 10km of the Study Area
E:	endangered
EPBC:	*Environment Protection and Biodiversity Conservation Act 1999*
NP:	National Park
NR:	Nature Reserve
Other:	identified in other literature or previous surveys of the Study Area
SF:	State Forest
TSC:	*Threatened Species Conservation Act 1995*
V:	vulnerable

Table 2 - Threatened Ecological Communities Recorded or with Potential to Occur within in the Study Area

Species	Legal Status	Specific Habitat	Distribution in Relation to Study Area	Reservation in the Region	DECCW 10km	DEWHA 10km	Recorded in Study Area	Other	Occurrence in Study Area and Potential for Significant Impact	Assessment of Significance required?
Natural Temperate Grassland of the Southern Tablelands of NSW and the Australian Capital Territory	EEC (EPBC)	This community occurs in a variety of landforms, but generally on the fertile lower parts of the landscape (flats, drainage lines, frost hollow valleys, foothills) where resources such as water and nutrients are abundant, but tree growth is restricted by periodic drying or waterlogging, frosting, or exposure to westerly winds.	This community occurs within the South Eastern Highlands bioregion and within an altitude range of between 560 and 1200 metres.	This community is not known to occur in any reserves in the region.		✓			This EEC was not recorded within in the Study Area during the field surveys.	No
White Box-Yellow Box-Blakely's Red Gum Woodland (TSC) and White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (EPBC)	EEC (TSC) CEEC (EPBC)	The community generally occurs on fertile lower parts of the landscape where resources such as water and nutrients are abundant.	This community 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.	This community is not known to occur in any reserves in the region.	✓	✓			This EEC and CEEC were not recorded within in the Study Area during the field surveys.	No

Species	Legal Status	Specific Habitat	Distribution in Relation to Study Area	Reservation in the Region	DECCW 10km	DEWHA 10km	Recorded in Study Area	Other	Occurrence in Study Area and Potential for Significant Impact	Assessment of Significance required?
Tableland Basalt Forest in the Sydney Basin and South Eastern Highlands Bioregions	EEC (TSC)	This community occurs on loam or clay soils associated with basalt or, less commonly, alluvium, fine-grained sedimentary rocks, granites and similar substrates that produce relatively fertile soils.	This community is found in the Eastern Highlands and Southern and Central Tablelands, covering the local government areas of Bathurst Regional, Goulburn Mulwaree, Oberon, Palerang, Shoalhaven, Upper Lachlan and Wingecarribee.	This community is not known to occur in any reserves in the region.	✓				This EEC was not recorded within in the Study Area during the field surveys.	No
Tablelands Frost Hollow Grassy Woodlands in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South western Slopes Bioregions	PD EEC (TSC)	This community mainly occurs on valley floors, margins of frost hollows, footslopes and undulating terrain approximately between 600 and 1400 m in altitude. It occurs on a variety of substrates including granite, basalt, metasediments and Quaternary alluvium.	This community has been recorded within the South Eastern Highlands, Sydney Basin, South East Corner, and NSW South western Slopes Bioregions.	This community is not known to occur in any reserves in the region.	✓				This PD EEC was not recorded within in the Study Area during the field surveys.	No

Note

CEEC:	critically endangered ecological community
DECCW 10km:	identified on the DECCW Atlas of NSW Wildlife as previously recorded within 10km of the Study Area
DEWHA 10km:	identified on the DEWHA Protected Matters Database as previously recorded within 10km of the Study Area
E:	endangered
EEC:	endangered ecological community
EPBC:	*Environment Protection and Biodiversity Conservation Act 1999*
Other:	identified in other literature or previous surveys of the Study Area
PD:	preliminary determination
TSC:	*Threatened Species Conservation Act 1995*

Table 3 - Threatened Fauna Species Recorded or with Potential to Occur within in the Study Area

Species	Legal Status	Specific Habitat	Distribution in Relation to Study Area	Reservation in the Region	DECCW 10km	DEWHA 10km	Recorded in Study Area	Other	Occurrence in Study Area and Potential for Significant Impact	Assessment of Significance required?
Littlejohn's tree frog *Litoria littlejohni*	V (TSC) V (EPBC)	This species habitat includes heath based forests and woodlands where it shelters under leaf litter and low vegetation.	The species has a distribution that includes the plateaus and eastern slopes of the Great Dividing Range from Watagan State Forest south to Buchan in Victoria.	This species is not known to occur in any reserves in the region		✓			There is no appropriate habitat present in the Study Area for this species. There is no potential for an impact on this species.	No
striped legless lizard *Delma impar*	V (TSC) V (EPBC)	This species is mainly in natural temperate grassland, but also in secondary grassland near natural temperate grassland and occasionally in open box-gum woodland.	This species occurs in the Southern Tablelands, the South West Slopes and possibly on the Riverina. Populations are known in the Goulburn, Yass, Queanbeyan, Cooma and Tumut areas.	This species is not known to occur in any reserves in the region		✓			The species was not recorded during the field surveys, however the Study Area supports potential habitat for the species.	Yes
broad-headed snake *Hoplocephalus bungaroides*	E (TSC) V (EPBC)	This species 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 m 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 km of Sydney.	This species is not known to occur in any reserves in the region		✓			There is no appropriate habitat present in the Study Area for this species. There is no potential for an impact on this species.	No

Species	Legal Status	Specific Habitat	Distribution in Relation to Study Area	Reservation in the Region	DECCW 10km	DEWHA 10km	Recorded in Study Area	Other	Occurrence in Study Area and Potential for Significant Impact	Assessment of Significance required?
Australian painted snipe *Rostratula australis*	E (TSC) V (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.		✓			There is no appropriate habitat present in the Study Area for this species. There is no potential for an impact on this species.	No
Australasian bittern *Botaurus poiciloptilus*	V (TSC)	This species favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (*Typha* spp.) and spikerushes (*Eleoacharis* spp.).	This species is widespread but uncommon over south-eastern Australia. In NSW it 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.	✓				There is no appropriate habitat present in the Study Area for this species. There is no potential for an impact on this species.	No
little eagle *Hieraaetus morphnoides*	V (TSC)	This species occurs in open eucalypt forest, woodland or open woodland. Sheoak or acacia woodlands and riparian woodlands of interior NSW are also used.	This species is found throughout the Australian mainland excepting the most densely forested parts of the Great Dividing Range escarpment. It occurs as a single population throughout NSW.	This species is not known to occur in any reserves in the region.	✓				There is no appropriate habitat present in the Study Area for this species. There is no potential for an impact on this species.	No

Species	Legal Status	Specific Habitat	Distribution in Relation to Study Area	Reservation in the Region	DECCW 10km	DEWHA 10km	Recorded in Study Area	Other	Occurrence in Study Area and Potential for Significant Impact	Assessment of Significance required?
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 this species moves to drier more open eucalypt forests and woodlands. It favours old growth trees 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.	This species is not known to occur in any reserves in the region.	✓				There is no appropriate habitat present in the Study Area for this species. There is no potential for an impact on this species.	No
swift parrot *Lathamus discolor*	E (TSC) E (EPBC) MIG (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 project area is within the known distribution of this species.	This species is not known to occur in any reserves in the region.	✓				Although marginal habitat is present within the Tableland Low Woodland, the eucalypts within this community would not be impacted by the Project. There is no potential for an impact on this species.	No

Species	Legal Status	Specific Habitat	Distribution in Relation to Study Area	Reservation in the Region	DECCW 10km	DEWHA 10km	Recorded in Study Area	Other	Occurrence in Study Area and Potential for Significant Impact	Assessment of Significance required?
regent honeyeater *Anthochaera phrygia*	E (TSC) PD 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. 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, its range has contracted dramatically in the last 30 years to between north-eastern Victoria and south-eastern Queensland.	Morton NP Nattai NP	✓				Although marginal habitat is present within the Tableland Low Woodland, the eucalypts within this community would not be impacted by the Project. There is no potential for an impact on this species.	No
speckled warbler *Chthonicola sagittata*	V (TSC)	Typical habitat for the species includes scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy.	The species has a patchy distribution throughout south-eastern Queensland, the eastern half of NSW and into Victoria, as far west as the Grampians. The species is most frequently reported from the hills and tablelands of the Great Dividing Range, and rarely from the coast.	This species is not known to occur in any reserves in the region.	✓			✓	The species was recorded during the previous field survey (Umwelt 2005b), and the Study Area supports potential habitat for the species.	Yes

Species	Legal Status	Specific Habitat	Distribution in Relation to Study Area	Reservation in the Region	DECCW 10km	DEWHA 10km	Recorded in Study Area	Other	Occurrence in Study Area and Potential for Significant Impact	Assessment of Significance required?
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.	Morton NP			✓		The species was recorded within the Study Area during the field surveys.	Yes
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.	This species is not known to occur in any reserves in the region.	✓				There is no appropriate habitat present in the Study Area for this species. There is no potential for an impact on this species.	No

Species	Legal Status	Specific Habitat	Distribution in Relation to Study Area	Reservation in the Region	DECCW 10km	DEWHA 10km	Recorded in Study Area	Other	Occurrence in Study Area and Potential for Significant Impact	Assessment of Significance required?
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 south SA. In NSW it is found throughout the eastern areas of the state, no further than 500 km from the coast.	This species is not known to occur in any reserves in the region.	✓				There is no appropriate habitat present in the Study Area for this species. There is no potential for an impact on this species.	No
hooded robin *Melanodryas cucullata cucullata*	V (TSC)	This species prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. They require structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses.	This species is found from Brisbane to Adelaide and throughout much of inland NSW.	This species is not known to occur in any reserves in the region.	✓				There is no appropriate habitat present in the Study Area for this species. There is no potential for an impact on this species.	No

Species	Legal Status	Specific Habitat	Distribution in Relation to Study Area	Reservation in the Region	DECCW 10km	DEWHA 10km	Recorded in Study Area	Other	Occurrence in Study Area and Potential for Significant Impact	Assessment of Significance required?
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 project area is within the known distribution of this species.	This species is not known to occur in any reserves in the region.	✓				There is no appropriate habitat present in the Study Area for this species. There is no potential for an impact on this species.	No
diamond firetail *Stagonopleura guttata*	V (TSC)	This species occurs in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum *Eucalyptus pauciflora* Woodlands.	This species extends from central Queensland to the Eyre Peninsula in South Australia. It is widely distributed in NSW, with a concentration of records from the Northern, Central and Southern Tablelands, the Northern, Central and South Western Slopes and the North West Plains and Riverina.	This species is not known to occur in any reserves in the region.	✓				There is no appropriate habitat present in the Study Area for this species. There is no potential for an impact on this species.	No

Species	Legal Status	Specific Habitat	Distribution in Relation to Study Area	Reservation in the Region	DECCW 10km	DEWHA 10km	Recorded in Study Area	Other	Occurrence in Study Area and Potential for Significant Impact	Assessment of Significance required?
spotted-tailed quoll *Dasyurus maculatus*	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.	This species is not known to occur in any reserves in the region.	✓	✓			There is no appropriate habitat present in the Study Area for this species. There is no potential for an impact on this species.	No
koala *Phascolarctos cinereus*	V (TSC)	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.	Bargo State Conservation Area Thirlmere Lakes NP Tarlo River NP Nattai NP	✓				There is no appropriate habitat present in the Study Area for this species. There is no potential for an impact on this species.	No

Species	Legal Status	Specific Habitat	Distribution in Relation to Study Area	Reservation in the Region	DECCW 10km	DEWHA 10km	Recorded in Study Area	Other	Occurrence in Study Area and Potential for Significant Impact	Assessment of 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 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 bask 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 2500km 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 (500km NW of Brisbane) in Queensland.	Thirlmere Lakes NP Nattai NP		✓			There is no appropriate habitat present in the Study Area for this species. There is no potential for an impact on this species.	No
long-nosed potoroo (south east mainland) *Potorous tridactylus tridactylus*	V (TSC) V (EPBC)	Inhabits coastal heaths and dry and wet sclerophyll forests. Dense understorey with occasional open areas is an essential part of habitat, and may consist of grass-trees, sedges, ferns or heath, or of low shrubs of tea-trees or melaleucas. A sandy loam soil is also a	This species is found on the south-eastern coast of Australia, from Queensland to eastern Victoria and Tasmania, including some of the Bass Strait islands. In NSW it is generally restricted to coastal heaths and forests east of the Great	Nattai NP		✓			There is no appropriate habitat present in the Study Area for this species. There is no potential for an impact on this species.	No

Species	Legal Status	Specific Habitat	Distribution in Relation to Study Area	Reservation in the Region	DECCW 10km	DEWHA 10km	Recorded in Study Area	Other	Occurrence in Study Area and Potential for Significant Impact	Assessment of Significance required?
		common feature.	Dividing Range.							
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.	Tarlo River NP	✓			✓	The species was recorded in the previous field survey (Umwelt 2005b) north of the Study Area. However no appropriate habitat is present in the Study Area for this species.	No
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 km 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 km of the eastern coast of Australia, from Bundaberg in Queensland to Melbourne in Victoria.	This species is not known to occur in any reserves in the region.		✓			There is no appropriate habitat present in the Study Area for this species. There is no potential for an impact on this species.	No

Species	Legal Status	Specific Habitat	Distribution in Relation to Study Area	Reservation in the Region	DECCW 10km	DEWHA 10km	Recorded in Study Area	Other	Occurrence in Study Area and Potential for Significant Impact	Assessment of 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.	This species is not known to occur in any reserves in the region.		✓			There is no appropriate habitat present in the Study Area for this species. There is no potential for an impact on this species.	No
eastern freetail-bat *Mormopterus norfolkensis*	V (TSC)	This species occurs in dry sclerophyll forest and woodland east of the Great Dividing Range. It roosts mainly in tree hollows but will also roost under bark or in man-made structures.	The eastern freetail-bat is found along the east coast from south Queensland to southern NSW.		✓			✓	The species was recorded in the previous field survey However no appropriate roosting or foraging habitat is present in the Study Area for this species.	No
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.	This species is not known to occur in any reserves in the region.	✓			✓	The species was recorded in the previous field survey However no appropriate roosting or foraging habitat is present in the Study Area for this species.	No

Species	Legal Status	Specific Habitat	Distribution in Relation to Study Area	Reservation in the Region	DECCW 10km	DEWHA 10km	Recorded in Study Area	Other	Occurrence in Study Area and Potential for Significant Impact	Assessment of Significance required?
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, 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 km from the coast.	This species is not known to occur in any reserves in the region.	✓			✓	The species was recorded in the previous field survey However no appropriate roosting or foraging habitat is present in the Study Area for this species.	No

Note

CEEC:	critically endangered ecological community
DECCW 10km:	identified on the DECCW Atlas of NSW Wildlife as previously recorded within 10km of the Study Area
DEWHA 10km:	identified on the DEWHA Protected Matters Database as previously recorded within 10km of the Study Area
E:	endangered
EEC:	endangered ecological community
EP:	endangered population
EPBC:	*Environment Protection and Biodiversity Conservation Act 1999*
LGA:	Local Government Area
NP:	National Park
NR:	Nature Reserve
Other:	identified in other literature or previous surveys of the Study Area
PD:	Preliminary determination
ROTAP:	Rare or Threatened Australian Plants
SCA:	State Conservation Area
SF:	State Forest
TSC:	*Threatened Species Conservation Act 1995*
V:	vulnerable

Appendix 3.2
Assessment of Significance
Environmental Planning & Assessment Act 1979

Part 3A of the EP&A Act requires an assessment of significance relating to the potential impacts of project on listed threatened species, endangered populations or TECs. As a formal assessment method is yet to be established by the relevant government authorities for Part 3A projects, an assessment that applies the key principles of the Section 5A assessment is used here to assess the potential for the project to impact on threatened species, endangered populations or TECs within the study area.

An assessment of significance is provided below for those identified threatened species or recorded in the Study Area or considered likely to occur based on the identification of suitable habitat. The following species are assessed:

Threatened Fauna Species

- striped legless lizard (*Delma impar*)
- speckled warbler *(Chthonicola sagittata*)
- brown treecreeper (eastern subspecies) (*Climacteris picumnus victoriae*)

Striped legless lizard (*Delma impar)*

The striped legless lizard is listed as Vulnerable under the TSC Act.

The striped legless lizard was not recorded within the Study Area during the field surveys undertaken for this assessment. However, it is considered that the Study Area supports potential habitat for the species in the form of widespread grasslands dominated by tussock grasses.

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 project is expected to clear 10.5 hectares of primarily derived exotic pastureland, which is considered suitable habitat for the striped legless lizard. Given that no individuals were recorded within the study area and the minimal amount of poor quality potential habitat to be cleared it is considered unlikely to affect the life cycle of striped legless lizard, such that the 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 Study Area is not known habitat for the striped legless lizard. The study area contains pastureland which is considered suitable habitat for the species. The project is expected to clear 10.5 hectares of poor quality habitat dominated by exotic grass species. It is considered that a significant area of known habitat for striped legless lizard will not be modified or removed, or isolated from currently interconnecting or proximate areas in a regional context.

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

The striped legless lizard is not known to occur in any conservation reserves within the region. It is considered that the species is not adequately represented in conservation reserves in the region.

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

The striped legless lizard occurs in the Southern Tablelands, the South West Slopes and possibly on the Riverina. Populations are known in the Goulburn, Yass, Queanbeyan, Cooma and Tumut areas. Also occurs in the ACT, Victoria and south-eastern South Australia. The Study Area is not at the limit of the known distribution for this species.

Speckled warbler *(Chthonicola sagittata)*

The speckled warbler is listed as Vulnerable under the TSC Act.

The speckled warbler was not recorded within the Study Area during the field surveys undertaken for this assessment. However, it is considered that the Study Area supports potential habitat for the species in the form of fallen timber in grassy landscapes.

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 project is expected to clear 10.5 hectares of primarily derived exotic pastureland. Scattered eucalypt species that occur in the open woodland community within and surrounding the Study Area, but will not be impacted by the proposed modified disturbance footprint. Given that no individuals were recorded within the study area and the minimal amount of poor quality potential habitat to be cleared it is considered unlikely to affect the life cycle of speckled warbler, such that the 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 Study Area is not known habitat for the speckled warbler. The species was not recorded during the field surveys. The study area contains pastureland which is considered poor quality habitat dominated by exotic grass species. No eucalypt trees would be disturbed by the modified disturbance footprint. It is considered that a significant area of known habitat for the speckled warbler will not be modified or removed, or isolated from currently interconnecting or proximate areas in a regional context.

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

The speckled warbler is not known to occur in any conservation reserves within the region. It is considered that the species is not adequately represented in conservation reserves in the region.

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

The speckled warbler has a distribution from south-eastern Queensland, through to central and eastern NSW to Victoria. The Study Area is not at the limit of the known distribution of the species.

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

The brown treecreeper is listed as Vulnerable under the TSC Act.

The brown treecreeper was recorded within the Study Area during the field surveys undertaken for this assessment. It is also considered that the Study Area supports marginal habitat for the species in the form of fallen timber in grassy landscapes.

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 brown treecreeper was recorded perching and foraging around fallen logs within the Study Area. The project is expected to clear 10.5 hectares of primarily derived exotic pastureland. Scattered eucalypt species that occur in the open woodland community within and surrounding the Study Area, but will not be impacted by the proposed modified disturbance footprint. No hollow-bearing trees that would provide potential nesting habitat were recorded within or around the Study Area. Given the minimal amount of poor quality exotic grassland habitat to be cleared it is considered unlikely to affect the life cycle of the brown treecreeper, such that the 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 brown treecreeper was recorded within the Study Area during the field surveys undertaken for this assessment. The study area contains pastureland which is considered poor quality habitat dominated by exotic grass species. No eucalypt trees would be disturbed by the modified disturbance footprint. Further higher quality habitat occurs outside the Study Area. It is considered that a significant area of known habitat for the brown treecreeper will not be modified or removed, or isolated from currently interconnecting or proximate areas in a regional context.

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

The brown treecreeper has been previously recorded within Morton National Park. It is considered that neither the species, nor its habitat is adequately represented in conservation reserves in the region.

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

The brown treecreeper occurs across central NSW, west of the Great Dividing Range and sparsely scattered to the east of the divide. The Study Area is not at the limit of the known distribution of the species.

Conclusion

The proposed modification to the disturbance footprint to the Lynwood Quarry Project Area is not likely to result in a significant impact on striped legless lizard, speckled warbler or brown treecreeper.

The proposed modification, which involves the disturbance of an additional 10.5 hectares for the project, is not expected to result in the substantial alteration to habitat such that threatened species are significantly impacted.

Appendix 3.3
Assessment of Significance *Environment Protection and Biodiversity Conservation Act 1999*

A search of the Department of the Environment, Heritage, Water and the Arts (DEWHA) Protected Matters Database (1 July 2010) identified (discounting fishes, marine and migratory wetland species) 16 EPBC Act listed threatened species, seven migratory species and one threatened ecological community (TEC) known to occur or considered likely to occur, on the basis of habitat modelling, within 10 kilometres of the Study Area.

Of the 16 threatened species identified from the DEWHA database search, one was found to have potential to occur within the Study Area. Other species were discounted due to the area's very minimal size, highly disturbed nature and lack of quality foraging or roosting habitat.

No migratory species were recorded during the field surveys however, one migratory species identified from the DEWHA database search was found to have potential to occur within the study area. This was the rainbow bee-eater (*Merops ornatus*).

An assessment of the potential impacts of the proposed modification is provided below for threatened and migratory species identified from the DEWHA database search. The assessment is based on the disturbance of 10.5 hectares disturbed habitat.

The aim of this assessment is to determine whether the proposed modification to the Lynwood Quarry Project Area north of Marulan NSW, is likely to have a significant impact on EPBC Act matters of national environmental significance (MNES). In this instance, MNES with potential to occur within the study area include:

Vulnerable Species

- striped legless lizard (*Delma impar*)

Migratory Species

- rainbow bee-eater *(Merops ornatus)*

Vulnerable Species

The following EPBC Act listed vulnerable species is considered in this assessment:

- striped legless lizard (*Delma impar*).

An assessment in accordance with the DEWHA principal significant impact guidelines is provided below for this species.

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.**

The striped legless lizard was not recorded within the Study Area during the field surveys undertaken for this assessment, however it is considered that suitable habitat occurs in the Study Area for the species. It is not considered that the striped legless lizard comprise part of an *important population* (according to the above criterion) within the Study Area, due to minimal amount of poor quality potential habitat to be cleared.

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

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

The proposed modifications to the disturbance footprint of the Lynwood Quarry Project Area will result in the disturbance of approximately 10.5 hectares of potential habitat for the striped legless lizard. No records of the species occur within or around the Study Area and it is unlikely that the Study Area supports an important population for the species. Therefore, it is not considered likely that the modifications to the disturbance footprint would lead to a long-term decrease in the size of an important population of striped legless lizard.

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

The proposed modifications to the disturbance footprint of the Lynwood Quarry Project Area will result in the disturbance of approximately 10.5 hectares of potential habitat for the striped legless lizard. No records of the species occur within or around the Study Area and it is unlikely that the Study Area supports an important population for the species. Therefore, it is not considered likely that the modifications to the disturbance footprint would reduce the area of occupancy for an important population of striped legless lizard.

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

The proposed modifications to the disturbance footprint of the Lynwood Quarry Project Area will result in the disturbance of approximately 10.5 hectares of potential habitat for the striped legless lizard. No records of the species occur within or around the Study Area and it is unlikely that the Study Area supports an important population for the species. Therefore, it is not considered likely that the modifications to the disturbance footprint would fragment an important population of striped legless lizard into two or more populations.

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

The Study Area does not contain habitats that are critical to the survival of the striped legless lizard. The surrounding area consists of similar habitats to those present within the Study Area.

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

The proposed modifications to the disturbance footprint do not comprise actions that would disrupt the breeding cycle of the striped legless lizard. The Study Area does not support an *important population* for the striped legless lizard.

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

Considering the high level of disturbance in the Study Area, the proposed modifications to the disturbance footprint is not likely to modify, destroy, remove, isolate, or decrease the availability or quality of habitat to the extent that the striped legless lizard is likely to decline

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

There are high numbers of invasive species within the study area. The species of most potential to become invasive is serrated tussock (*Nassella trichotoma*). The proposed modifications to the disturbance footprint are not likely to result in significant increase in the extent of this species. Recommendations have been made to undertake rehabilitation of disturbed areas with native species (Umwelt 2005) to create native vegetation communities similar in composition to those found within the Project Area to ensure that no invasive species become established to the detriment of native species.

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

Considering the high level of disturbance in the Study Area, the proposed modifications to the disturbance footprint is not likely to interfere with the recovery of the striped legless lizard.

Migratory Species

The following EPBC Act listed migratory species are considered in this assessment:

- rainbow bee-eater *(Merops ornatus)*

An assessment in accordance with the DEWHA principal significant impact guidelines is provided below for these species.

An area of *important habitat* is:

- **habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species; and/or**

- **habitat that is of critical importance to the species at particular life-cycle stages; and/or**

- **habitat utilised by a migratory species which is at the limit of the species range; and/or**

- **habitat within an area where the species is declining.**

The rainbow bee-eater was not recorded during the field surveys, however it has potential to occur within the study area. The Study Area is not considered to comprise *important habitat* for the listed migratory species, based on the DEWHA criteria described above.

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 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 modifications in the Study Area will require disturbance of a very small area of potential habitat for migratory species, approximately 10.5 hectares. Large areas of similar habitats are present within the surrounding local reserves.

Given the poor quality potential habitat to be removed, the highly mobile nature of this species and the significant area of habitat within the locality, the proposed modifications would 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**

There are high numbers of invasive species within the study area. The species of most potential to become invasive is serrated tussock (*Nassella trichotoma*). The proposed modifications to the disturbance footprint are not likely to result in significant increase in the extent of this species. Recommendations have been made to undertake rehabilitation of disturbed areas with native species (Umwelt 2005) to create native vegetation communities similar in composition to those found within the Project Area to ensure that no invasive species become established to the detriment of native species. The Study Area is not considered to comprise *important habitat* for the rainbow bee-eater.

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

The proposed modifications to the disturbance footprint will require the disturbance of approximately 10.5 hectares of potential migratory species habitat. The study area is not considered to comprise *important habitat* for the rainbow bee-eater. The disturbance of the highly degraded area of habitat will not interfere substantially with the lifecycle of an ecologically significant proportion of the population of these migratory species.

Conclusion

The proposed modifications to the disturbance footprint to the Lynwood Quarry Project Area will not result in a significant impact on recorded or potential EPBC Act listed migratory species.