APPENDICES

APPENDIX A SPECIES LISTS AND TREE PLOT DATA

A.1 FLORA

*Introduced species are preceded by an asterisk.

Where uncertainty exists, the taxon name is preceded by a question mark (?).

Species name	Common name	Family
TREES		
Acacia dealbata ssp *dealbata*	Silver Wattle	Fabaceae
Acacia implexa	Lightwood or Hickory	Fabaceae
Acacia parramattensis		Fabaceae
Allocasuarina littoralis	Black Sheoak	Casuarinaceae
Callitris endlicheri	Black Cypress Pine	Cupressaceae
Eucalyptus blakelyi	Blakely's Red Gum	Myrtaceae
Eucalyptus bridgesiana	Apple Box	Myrtaceae
Eucalyptus cinerea	Argyle Apple	Myrtaceae
Eucalyptus dives	Broad-leaved Peppermint	Myrtaceae
Eucalyptus goniocalyx	Bundy, Long-leaved Box	Myrtaceae
Eucalyptus macrorhyncha	Red Stringybark	Myrtaceae
Eucalyptus mannifera	Brittle Gum	Myrtaceae
Eucalyptus melliodora	Yellow Box	Myrtaceae
Eucalyptus polyanthemos ssp *polyanthemos*	Red Box	Myrtaceae
Eucalyptus rossii	Scribbly Gum	Myrtaceae
Eucalyptus rubida ssp. *rubida*	Candlebark	Myrtaceae
Eucalyptus sideroxylon	Red Ironbark	Myrtaceae
Eucalyptus viminalis	Ribbon or Manna Gum	Myrtaceae
Exocarpos cupressiformis	Native Cherry	Santalaceae
SHRUBS, SUB-SHRUBS		
Acacia genistifolia	Early Wattle	Fabaceae
Acacia gunnii	Ploughshare Wattle	Fabaceae
Acacia rubida	Red-stem Wattle	Fabaceae
Amyema miquelii	a mistletoe	Loranthaceae
Amyema pendulum	a mistletoe	Loranthaceae
Billardiera scandens	Hairy Apple-berry	Pittosporaceae
Boronia algida		Rutaceae
Boronia nana var. *hyssopifolia*		Rutaceae
Brachyloma daphnoides	Daphne Heath	Epacridaceae
Cassinia aculeata	Dolly Bush	Asteraceae

Species name	Common name	Family
Cassinia arcuata	Sifton Bush	Asteraceae
Cassinia laevis	Cough Bush	Asteraceae
Cassinia longifolia	Dogwood	Asteraceae
Comesperma sphaerocarpum		Polygalaceae
Daviesia leptophylla		Fabaceae
Dillwynia phylicoides		Fabaceae
Dillwynia sericea		Fabaceae
Gompholobium huegelii	Pale Wedge Pea	Fabaceae
Gompholobium minus	Small Gompholobium	Fabaceae
Grevillea lanigera	Woolly Grevillea	Proteaceae
Hibbertia obtusifolia	Guineaflower	Dilleniaceae
Hibbertia riparia	Guineaflower	Dilleniaceae
Hovea heterophylla		Fabaceae
Indigofera australis	Austral Indigo	Fabaceae
Kunzea parvifolia	Violet Kunzea	Myrtaceae
Leptospermum multicaule		Myrtaceae
Melichrus urceolatus	Urn Heath	Epacridaceae
Monotoca scoparia	Prickly Broom Heath	Epacridaceae
Muellerina eucalyptoides	a mistletoe	Loranthaceae
Persoonia chamaepeuce		Proteaceae
Pimelea glauca	Shrubby Rice-flower	Thymeleaceae
Pimelea linifolia ssp *caesia*		Thymeleaceae
Platylobium formosum ssp *formosum*	Handsome Flat-pea	Fabaceae
Pultenaea subspicata		Fabaceae
**Rosa rubiginosa*	Sweet Briar	Rosaceae
**Solanum ?nigrum*	Black-berry Nightshade	Solanaceae
Tetratheca bauerifolia		Tremandraceae
FERNS		
Cheilanthes austrotenuifolia		Sinopteridaceae
Cheilanthes sieberi ssp *sieberi*	Rock or Mulga Fern	Sinopteridaceae
Pteridium esculentum	Bracken	Dennstaedtiaceae
VINES AND TWINERS		
Convolvulus angustissimus ssp. *angustissimus*	Bindweed	Convolvulaceae
Hardenbergia violacea	Native Sarsaparilla	Fabaceae
Thysanotus patersonii	Twining Fringe Lily	Anthericaceae
FORBS		
**Acetosella vulgaris*	Sheep Sorrel	Polygonaceae

Species name	Common name	Family
**Anagallis arvensis*	Scarlet Pimpernel	Primulaceae
**Arctotheca calendula*	Capeweed	Asteraceae
Arthropodium minus	Small Vanilla Lily	Anthericaceae
Brachyscome spathulata		Asteraceae
Brachyscome ptychocarpa		Asteraceae
Burchardia umbellata	Milkmaids	Colchicaceae
Caleana major	Flying Duck Orchid	Orchidaceae
Calochilus robertsonii	Purplish Beard Orchid	Orchidaceae
**Centaurium* sp.	Centaury	Gentianaceae
**Cerastium glomeratum*	Chickweed	Caryophyllaceae
Cheiranthera cyanea	Finger Flower	Pittosporaceae
Chrysocephalum apiculatum	Yellow Buttons	Asteraceae
**Cirsium vulgare*	Black or Spear Thistle	Asteraceae
Coronidium oxylepis ssp. *lanatum (Helichrysum collinum)*		Asteraceae
Cotula australis	Carrot Weed	Apiaceae
Crassula sieberiana	Australian Stonecrop	Crassulaceae
Cymbonotus ?lawsonianus	Bears Ear	Asteraceae
Daucus glochidiatus		Apiaceae
Dianella longifolia	Blue Flax Lily	Phormiaceae
Dianella revoluta	Black-anther Flax Lily	Phormiaceae
Dichondra repens	Kidney Weed	Convolvulaceae
Diuris maculata s. lat.	Leopard Orchid	Orchidaceae
Diuris sulphurea	Tiger Orchid	Orchidaceae
Drosera auriculata		Droseraceae
Drosera peltata	Sundew	Droseraceae
**Echium plantagineum*	Patterson's Curse	Boraginaceae
Euchiton gymnocephalus	Slender Cudweed	Asteraceae
Euchiton sphaericus	Common Cudweed	Asteraceae
Galium gaudichaudii		Rubiaceae
?Geranium potentilloides var. *abditum*		Geraniaceae
Geranium retrorsum		Geraniaceae
Geranium solanderi var. *solanderi*		Geraniaceae
Gonocarpus tetragynus	Raspwort	Haloragaceae
Goodenia bellidifolia ssp. *bellidifolia*		Goodeniaceae
Goodenia hederacea ssp *hederacea*		Goodeniaceae
Haloragis heterophylla	Variable Raspwort	Haloragaceae
Hydrocotyle laxiflora	Stinking Pennywort	Apiaceae

Species name	Common name	Family
Hypericum gramineum	Native St John's Wort	Clusiaceae
**Hypochaeris glabra*		Asteraceae
**Hypochaeris radicata*	Cat's Ear, Flatweed	Asteraceae
Isotoma fluviatilis		Lobeliaceae
**Leontodon taraxacoides*	Lesser Hawkbit	Asteraceae
Leptorhynchos squamatus ssp *squamatus*	Scaly Buttons	Asteraceae
**Linaria pelisseriana*	Pelisser's Toadflax	Scrophulariaceae
**Marrubium vulgare*	Horehound	Lamiaceae
Microseris lanceolata s. lat. (or sp. 3)	Murnong, Yam Daisy	Asteraceae
Microtis unifolia	Common Onion Orchid	Orchidaceae
**Onopordum acanthium*	Scotch Thistle	Asteraceae
Opercularia aspera	Stinkweed	Rubiaceae
Oxalis perennans	Native Oxalis	Oxalidaceae
**Parentucellia latifolia*	Red Bartsia	Scrophulariaceae
Patersonia sericea		Iridaceae
**Petrorhagia nanteuilii*	Proliferous Pink	Caryophyllaceae
Phyllanthus hirtellus	Thyme Spurge	Phyllanthaceae
Poranthera microphylla		Euphorbiaceae
Ranunculus lappaceus	Common Buttercup	Ranunculaceae
Rumex brownii	Native Dock	Polygonaceae
**Salvia verbenaca*	Wild Sage	Lamiaceae
Scutellaria humilis	Dwarf Skullcap	Lamiaceae
Senecio tenuiflorus		Asteraceae
**Sherardia arvensis*	Field Madder	Rubiaceae
Solenogyne dominii		Asteraceae
Solenogyne gunnii		Asteraceae
**Sonchus oleraceus*	Sow Thistle	Asteraceae
**Spergularia rubra*	Sandspurry	Caryophyllaceae
Stackhousia monogyna	Creamy Candles	Stackhousiaceae
Stackhousia viminea		Stackhousiaceae
Stellaria pungens	Prickly Starwort	Caryophyllaceae
Stuartina muelleri	Spoon Cudweed	Asteraceae
Stylidium graminifolium s. str.	Trigger Plant	Stylidiaceae
Stypandra glauca	Nodding Blue Lily	Anthericaceae
**Taraxacum officinale*	Dandelion	Asteraceae
Thelymitra carnea	Pink Sun Orchid	Orchidaceae
Thelymitra ixioides ssp. *ixioides*	Spotted Sun Orchid	Orchidaceae
Thelymitra nuda	Plain Sun Orchid	Orchidaceae

Species name	Common name	Family
Thelymitra ? X truncata		Orchidaceae
Thysanotus tuberosus	Fringe Lily	Anthericaceae
**Tolpis umbellata*		Asteraceae
Tricoryne elatior	Yellow Autumn Lily	Anthericaceae
**Trifolium arvense*	Hare's Foot Clover	Fabaceae
**Trifolium campestre*	Hop Clover	Fabaceae
**Trifolium dubium*	Suckling Clover	Fabaceae
**Trifolium glomeratum*	Ball Clover	Fabaceae
**Trifolium repens*	White Clover	Fabaceae
**Trifolium subterraneum*	Sub Clover	Fabaceae
Triptilodiscus pygmaeus		Asteraceae
**Urtica urens*	Stinging Nettle	Urticaceae
**Verbascum virgatum*	Twiggy Mullein	Scrophulariaceae
Veronica perfoliata	Diggers Speedwell	Plantaginaceae
Veronica plebeia	Common Speedwell	Scrophulariaceae
Viola betonicifolia	Narrow-leaved Violet	Violaceae
Wahlenbergia communis	Tufted Bluebell	Campanulaceae
Wahlenbergia gracilis	Sprawling Bluebell	Campanulaceae
Wahlenbergia multicaulis	Tadgell's Bluebell	Campanulaceae
Wahlenbergia stricta	Tall Bluebell	Campanulaceae
Wurmbea sp.	Early Nancy	Colchicaceae
Xerochrysum viscosum	Sticky Everlasting	Asteraceae
GRASSES		
**Aira caryophyllea*	Hair Grass	Poaceae
**Aira elegantissima*	Hair Grass	Poaceae
**Anthoxanthum odoratum*	Sweet Vernal Grass	Poaceae
Aristida ramosa var. *ramosa*		Poaceae
Austrodanthonia auriculata	Wallaby Grass	Poaceae
Austrodanthonia carphoides		Poaceae
Austrodanthonia eriantha	Wallaby Grass	Poaceae
Austrodanthonia laevis	Wallaby Grass	Poaceae
Austrodanthonia monticola	Wallaby Grass	Poaceae
Austrodanthonia pilosa var. *pilosa*	Wallaby Grass	Poaceae
Austrodanthonia racemosa var. *racemosa*	Wallaby Grass	Poaceae
Austrostipa densiflora		Poaceae
Austrostipa scabra ssp *falcata*	Corkscrew Grass	Poaceae
Austrostipa sp.		Poaceae
**Avena fatua*	Wild Oats	Poaceae

Species name	Common name	Family
**Briza maxima*	Quaking Grass	Poaceae
**Briza minor*	Shivery Grass	Poaceae
**Bromus diandrus*	Giant Brome	Poaceae
**Bromus hordaceus*	Soft Brome	Poaceae
**Bromus molliformis*	Soft Brome	Poaceae
**Bromus racemosus*		Poaceae
**Bromus rubens*	Red Brome	Poaceae
**Cynosurus echinatus*	Dog's Tail Grass	Poaceae
**Dactylis glomerata*	Cocksfoot	Poaceae
Dichelachne micrantha	Common Plume Grass	Poaceae
Echinopogon ovatus	Hedgehog Grass	Poaceae
Elymus scaber	Common Wheat Grass	Poaceae
**Holcus lanatus*	Yorkshire Fog	Poaceae
**Hordeum leporinum*	Barley Grass	Poaceae
Joycea pallida	Robust Wallaby Grass	Poaceae
Lachnagrostis filiformis	Blown Grass	Poaceae
**Lolium perenne*	Perennial Ryegrass	Poaceae
Microlaena stipoides	Weeping Grass	Poaceae
**Nassella trichotoma*	Serrated Tussock	Poaceae
Panicum effusum	Hairy Panic	Poaceae
**Phalaris aquatica*	Phalaris	Poaceae
Phragmites australis	Common Reed	Poaceae
Poa labillardierei	Silver or Poa Tussock	Poaceae
Poa meionectes		Poaceae
Poa sieberiana var. *cyanophylla*		Poaceae
Poa sieberiana var. *sieberiana*		Poaceae
Themeda australis	Kangaroo Grass	Poaceae
**Vulpia bromoides*	Squirrel Tail Fescue	Poaceae
**Vulpia muralis*	Rat's Tail Fescue	Poaceae
**Vulpia myuros*	Rat's Tail Fescue	Poaceae
GRAMINOIDS		
Carex appressa	Tall Sedge	Cyperaceae
Carex inversa	Knob Sedge	Cyperaceae
**Juncus acutus*	Sharp Rush	Juncaceae
Juncus filicaulis		Juncaceae
Juncus remotiflorus		Juncaceae
Juncus usitatus	Common Rush	Juncaceae
Juncus sp.		Juncaceae
Lepidosperma laterale	Variable Sword-sedge	Cyperaceae

Species name	Common name	Family
Lomandra filiformis ssp *coriacea*		Lomandraceae
Lomandra filiformis ssp *filiformis*		Lomandraceae
Lomandra longifolia	Spiny Matrush	Lomandraceae
Lomandra multiflora ssp *multiflora*		Lomandraceae
Luzula meridionalis var. *densiflora*		Juncaceae
Schoenus apogon	Common Bog-rush	Cyperaceae
Xanthorrhoea glauca subsp. *angustifolia*	Grass Tree	Xanthorrhoeaceae

A.2 FAUNA

Where uncertainty exists, the taxon name is preceded by a question mark (?).

Threatened species are highlighted in bold text.

Species name	Common name
Herpetofauna	
Amphibolurus muricatus	Jacky Lizard
Carlia tetradactyla	Southern Rainbow Skink
Crinia signifera	Common Froglet
Delma impar	Striped Legless Lizard
Delma inornata	Common Delma
Diplodactylus spp.	Gecko
Diplodactylus vittatus	Eastern Stone Gecko
Egernia cunninghami	Cunningham's Skink
Lampropholis delicata	Delicate Skink
Lampropholis guichenotti	Garden Skink
Litoria peronii	Peron's Treefrog
Morethia boulengeri	Boulenger's Skink
Pogona barbata	Eastern Bearded Dragon
Pseudechis porphyriacus	Red Belly Black Snake
Tiliqua rugosa	Shingleback
Tiliqua scincoides scincoides	Blue-tongue Lizard
Mammals	
Capra hircus	Goat (feral)
Hydromys chrysogaster	Water Rat
Lepus capensis	Brown Hare
Macropus giganteus	Eastern Grey Kangaroo
Macropus robustus robustus	Eastern Wallaroo
Macropus rufogriseus	Red-necked Wallaby
Oryctolagus cuniculus	European Rabbit
Petaurus breviceps	Sugar Glider
Pseudocheirus peregrinus	Common Ringtail Possum
Sus scrofa	Feral Pig
Tachyglossus aculeatus	Short-beaked Echidna
Trichosurus vulpecula	Common Brushtail Possum
Vombatus ursinus	Common Wombat
Vulpes vulpes	Red Fox
Wallabia bicolor	Black Wallaby
Microbats	
Austronomus australis	White-striped Freetail Bat

Species name	Common name
Chalinolobus gouldii	Gould's Wattled Bat
Chalinolobus morio	Chocolate Wattled Bat
Falsistrellus tasmaniensis	**Eastern False Pipistrelle**
Miniopterus oriane (schreibersii) oceansis	**Eastern Bentwing Bat**
Mormopterus planiceps (sp.4)	Southern Freetail Bat
Mormopterus ridei	Eastern Freetail Bat
Nyctophilus spp	Long-eared Bat species
Vespadelus darlingtoni	Large Forest Bat
Vespadelus regulus	Southern Forest Bat
Vespadelus vulturnus	Little Forest Bat
Saccolaimus flaviventris	**Yellow-bellied Sheath-tail Bat**
Birds	
Acanthagenys rufogularis	Spiny-cheeked Honeyeater
Acanthiza chrysorrhoa	Yellow-rumped Thornbill
Acanthiza lineata	Striated Thornbill
Acanthiza pusilla	Brown Thornbill
Acanthiza reguloides	Buff-rumped Thornbill
Acanthiza spp.	Thornbill spp.
Acanthorhynchus tenuirostris	Eastern Spinebill
Accipiter fasciatus	Brown Goshawk
Acrocephalus stentoreus	Clamorous Reed Warbler
Alisterus scapularis	King Parrot
Anas superciliosa	Pacific Black Duck
Anthochaera carunculata	Red Wattlebird
Anthus novaeseelandiae	Richard's Pipit
Aphelocephala leucopsis	Southern Whiteface
Aquila audax	Wedge-tailed Eagle
Ardea pacifica	White-necked Heron
Artamus cyanopterus	Dusky Woodswallow
Artamus personatus	Masked Woodswallow
Artamus superciliosus	White-browed Woodswallow
Cacatua galerita	Sulphur-crested Cockatoo
Cacatua roseicapilla	Galah
Cacomantis flabelliformis	Fan-tailed Cuckoo
Chenonetta jubata	Australian Wood Duck
Cincloramphus mathewsi	Rufous Songlark
Cisticola exilis	Golden-headed Cisticola
Climacteris picumnus	Brown Treecreeper
Colluricincla harmonica	Grey Shrike-thrush

Species name	Common name
Coracina maxima	Ground Cuckoo-shrike
Coracina novaehollandiae	Black-faced Cuckoo-shrike
Corcorax melanorhamphos	White-winged Chough
Cormobates leucophaeus	White-throated Treecreeper
Corvus coronoides	Australian Raven
?Coturnix australis	Brown Quail
Coturnix pectoralis	Stubble Quail
Cracticus torquatus	Grey Butcherbird
Cuculus pallidus	Pallid Cuckoo
Dacelo novaeguineae	Laughing Kookaburra
Daphoenositta chrysoptera	**Varied Sittella**
Dicaeum hirundinaceum	Mistletoebird
Egretta novaehollandiae	White-faced Heron
Elanus axillaris	Black-shouldered Kite
Eopsaltria australis	Eastern Yellow Robin
Epthianura albifrons	**White-fronted Chat**
Eurystomus orientalis	Dollarbird?
Falco berigora	Brown Falcon
Falco cenchroides	Nankeen Kestrel
Gerygone fusca	Western Gerygone
Gerygone olivacea	White-throated Gerygone
Grallina cyanoleuca	Magpie-lark
Grantiella picta	**Painted Honeyeater**
Gymnorhina tibicen	Australian Magpie
Hirundo ariel	Fairy Martin
Hirundo neoxena	Welcome Swallow
Hylacola pyrrhopygia	Chestnut-rumped Heathwren
Lalage sueurii	White-winged Triller?
Lichenostomus chrysops	Yellow-faced Honeyeater
Lichenostomus leucotis	White-eared Honeyeater
Lichenostomus penicillatus	White-plumed Honeyeater
Malurus cyaneus	Superb Fairy-wren
Manorina melanocephala	Noisy Miner
Melanodryas cucullata	**Hooded Robin**
Melithreptus brevirostris	Brown-headed Honeyeater
Microcarbo niger	Little Comorant
Microeca fascinans	Jacky Winter
Myiagra cyanoleuca	Satin Flycatcher
Myiagra rubecula	Leaden Flycatcher
Neochmia temporalis	Red-browed Finch

Species name	Common name
Ninox novaeseelandiae	Southern Boobook
Ocyphaps lophotes	Crested Pigeon
Oriolus sagittatus	Olive-backed Oriole
Pachycephala pectoralis	Golden Whistler
Pachycephala rufiventris	Rufous Whistler
Pardalotus punctatus	Spotted Pardalote
Pardalotus striatus	Striated Pardalote
Passer domesticus	House Sparrow
Petroica boodang	**Scarlet Robin**
Petroica goodenovii	Red-capped Robin
Petroica phoenicea	**Flame Robin**
Phaps chalcoptera	Common Bronzewing
Philemon corniculatus	Noisy Friarbird
Platycercus elegans	Crimson Rosella
Platycercus eximius	Eastern Rosella
Polytelis swainsonii	**Superb Parrot**
Psephotus haematonotus	Red-rumped Parrot
Pyrrholaemus sagittatus	**Speckled Warbler**
Rhipidura fuliginosa	Grey Fantail
Rhipidura leucophrys	Willie Wagtail
Sericornis frontalis	White-browed Scrubwren
Stagonopleura guttata	**Diamond Firetail**
Strepera graculina	Pied Currawong
Strepera versicolor	Grey Currawong
Sturnus vulgaris	Common Starling
Tachybaptus novaehollandiae	Australasian Grebe
Taeniopygia bichenovii	Double-barred Finch
Threskiornis spinicollis	Straw-necked Ibis
Todiramphus sanctus	Sacred Kingfisher
Turdus merula	Blackbird
Vanellus miles	Masked Lapwing
Zosterops lateralis	Silvereye

A.3 HOLLOW-BEARING TREE DATA

Plot data from quadrat assessments

Report_ID	_ID	Habitat ass	Zone	H	Easting	Northing	Tree_plot	HBT_plot	No_tree	No_HBT	Av_DBH_cm	Max_DBH_cm
1	HBT 9	H01	55	H	681569.2	6167438	100x100	100x100	11	1		
2	HBT 27	HA37	55	H	676524	6186430		100x100		1	10	60
3	HBT 1	H13	55	H	686435	6154142	10x10	25x25	40	4		
4	HBT 14	H22	55	H	686294	6155183	10x10	25x25	9	1	20	60
5	HBT 15	H22a	55	H	686294	6155183	10x10	25x25	11	1	20	60
6	HBT 16	H22b	55	H	686221	6154920	10x10	25x25	15	5	20	60
7	HBT 17	H24	55	H	686314	6157983	10x10	25x25	8	6	40	70
8	HBT 18	H26	55	H	686330	6159099	10x10	25x25	18	11		
9	HBT 19	H26a	55	H	686330	6159099	10x10	25x25	10	9		
10	HBT 2	H9	55	H	687109	6152561	10x10	25x25	32	9	20	50
11	HBT 20	H27	55	H	686367	6160007	10x10	25x25	5	2		80
12	HBT 21	H25	55	H	686354	6157241	10x10	25x25	13	4		
13	HBT 10	H10	55	H	687117	6152887	25x25	25x25	3	0		
14	HBT 11	H8	55	H	685437	6150843	25x25	25x25	35	2		
15	HBT 12	H2	55	H	682204	6162512	25x25	25x25	10	0	30	
16	HBT 13	H3	55	H	682228	6163318	25x25	25x25	45	5	20	60
17	HBT 4	H7	55	H	681599	6167466	25x25	25x25	25	0	10	
18	HBT 5	H03a	55	H	684240	6152153	25x25	25x25	32	1	40	
19	HBT 6	H03b	55	H	684240	6152153	25x25	25x25	56	5	50	

Report_ID	_ID	Habitat ass	Zone	H	Easting	Northing	Tree_plot	HBT_plot	No_tree	No_HBT	Av_DBH_cm	Max_DBH_cm
20	HBT 7	H6	55	H	681565	6167428	25x25	25x25	75	0	15	
21	HBT 8	H12	55	H	686834	6153086	25x25	25x25	25	0	20	
22	HBT 22	Ha 20	55	H	681944	6170732		25x25		1	20	70
23	HBT 23	HA19	55	H	682051	6169756		25x25		0	20	60
24	HBT 24	Ha 34	55	H	677200	6184072		25x25		12	20	60
25	HBT 25	HA 28	55	H	681054	6182345		25x25		0	20	40
26	HBT 26	HA27	55	H	680614	6181015		25x25		4	20	60
27	HBT 28	HA33a	55	H	677202	6183439		25x25		4	15	70
28	HBT 29	HA	55	H	683973	6176690		25x25		1	15	40
29	HBT 30	HA23b	55	H	681075	6176442		25x25		5	20	50
30	HBT 31	HA32a	55	H	678018	6182673		25x25		0	20	60
31	HBT 32	HA23	55	H	680920	6176329		25x25		6	10	90
32	HBT 33	Roadside	55	H	687580	6160450		50x10		6	40	100
33	HBT 34	HB3	55	H	680915.1	6164725	100x100	100x100	26	4		
34	HBT 35	H19	55	H	685327	6154635	100x100	100x100	19	1		
35	HBT 36	H2B	55	H	684486.2	6152081		25x25		3		

Hollow-bearing tree data from search areas (i.e. surveys within 100 m of infrastructure in moderate-good condition woodland/forest or within Superb Parrot foraging area)

Hollow-bearing tree ID	Tree Data			Hollow Size			Comment	Quality	Easting	Northing
	Tree	DBH	Height	Small	Medium	Large				
H1	Stag	50	6	1			bats	0	6182534	681305
H2	Scribbly Gum	60	12	2	1		small bird, bats	0	6182528	681301
H3	Stag	20	8	1			bats	0	6182532	681275
H4	Scribbly Gum	120	12	1 branch	1 branch		Jagged - exposed, No to parrots	0	6170388	682064
H5	Scribbly Gum	100	15	1			Potential hollow - not obvious	0	6170685	682022
H6	Stag	40	4			1 trunk	bats, open	0	6170720	681948
H7	Stag	20	5		1		bats, open	0	6170728	681874
H8	Stag	50	6		2 branch	1 basal	bats, open	0	6170701	681893
H9	Stag	80	4			1 spout	bats, open	0	6170687	681911
H10	Stag	50	3		2	1	bats, open	0	6170607	681911
H11	Stag	100	5		1	2	bats, maybe parrots - lge but bit jagged	0	6170607	681885
H12	Stringybark	30	12	2			small bird	0	6170580	681920
H13	Yellow Box				1 trunk		Ok for parrots	1	6152914	685298
H14	Yellow Box				3 branch		not great for parrots	1	6153023	685147
H15	Yellow Box				1 branch		Ok for parrots	1	6156980	685129
H16	Box				1 branch	1 trunk	No for parrots	0	6157002	685118
H17	Box			2 branch			No for parrots	0	6156932	685125
H18	Box				1 tunk		Gd for parrots	2	6156896	685074
H19	Box			1 branch			No for parrots	0	6156866	685086
H20	Stag					3 branch, 1 trunk	Gd for bats, maybe branch for parrots	1	6156814	685164
H21	Stag			1 branch	1 branch		No for parrots	0	6156870	685162
H22	Stag					1 branch	Gd for parrots	2	6156853	685163

Hollow-bearing tree ID	Tree Data			Hollow Size			Comment	Quality	Easting	Northing
	Tree	DBH	Height	Small	Medium	Large				
H23	Box				1 branch		Ok for parrots	1	6156837	685169
H24	Box			2 branch			No for parrots	0	6156825	685171
H25	Box			1 branch			No for parrots	0	6156644	685167
H26	Scribbly Gum	50	12		1		Poor, jagged open	0	6165295	681314
H27	Scribbly Gum	60	10		1		Poor	0	6165286	681336
H28	Scribbly Gum	70	13	1		1 trunk	Poor, trunk long and skinny	0	6165306	681338
H29	Scribbly Gum	80	12	2	1		Bats	0	6165331	681353
H30	Stag	90	4	2			Poor, bats	0	6165332	681330
H31	Scribbly Gum	110	6			2	Ok - open trunk hollow - exposed	1	6165464	681352
H32	Scribbly Gum	120	12			1 basal	Good for bats, open for birds	0	6165467	681362
H33	Scribbly Gum	110	12		1	1 basal, 1 trunk	Gd for parrots, gliders	2	6165467	681372
H34	Scribbly Gum	90	14		2	1	Gd for parrots, gliders	2	6165481	681383
H35	Scribbly Gum	40	14	1			bats	0	6165446	681374
H36	Scribbly Gum	40	12	1 branch	1 branch		Jagged - exposed, No to parrots	0	6165453	681360
H37	Stag	40	12	1		1	Jagged - exposed, No to parrots	0	6165453	681360
H38	Scribbly Gum	60	12		1 branch, 1 trunk		Parrots, bats	2	6167313	681691
H39	Stag	40	5	1 branch, 1 trunk			Bats	0	6167327	681680
H40	Stringybark	40	8	1	1	1	bats - poor, open, jagged	0	6167338	681680
H41	Scribbly Gum	50	10			2 trunk	maybe ok for bats	0	6167335	681673
H42	Scribbly Gum	50	11	1	1		bats, open and exposed	0	6167333	681672
H43	Scribbly Gum	90	10			1 branch, 1 trunk	Gd hollow, deep and good perch	2	6167322	681704
H44	Stag	50	8		1 trunk		bats - poor, open	0	6167279	681733
H45	Stag	100	4		1		bats - poor, pot possum drey	0	6167258	681748

Hollow-bearing tree ID	Tree Data			Hollow Size			Comment	Quality	Easting	Northing
	Tree	DBH	Height	Small	Medium	Large				
H46	Scribbly Gum	130	15	2			Potential - not obvious hollow. Small bird.	1	6167453	681567
H47	Stag	100	12			1 trunk	bats - poor, open	0	6167494	681530
H48	Scribbly Gum	90	16	1		1 branch	Gd for parrots, gliders	2	6167489	681560
H49	Scribbly Gum	90	10			2 branch	Ok - jagged, exposed, no perch	0	6167516	681563
H50	Scribbly Gum	80	12			1 trunk, 1 branch	parrots, bats	2	6167544	681555
H51	Scribbly Gum	90	15			1 trunk	Long hollow, gliders, bats	2	6167537	681573
H52	Scribbly Gum	60	15			1 trunk	Gd for parrots, gliders	2	6167538	681558
H53	Scribbly Gum	80	12			1 trunk	Gd for parrots, gliders	2	6167529	681538
H54	Scribbly Gum	70	9			1 trunk	bats, hollow open	0	6167574	681538
H55	Scribbly Gum	110	12			1 trunk, 1 branch	Ok - a little open. Potential for gliders	1	6167632	681515
H56	Scribbly Gum	40	9		1 trunk, 1 branch		bats, open and exposed	0	6167602	681510
H57	Scribbly Gum	60	8	1 trunk	1 trunk		bats, open, exposed, jagged	0	6167599	681458
H58	Scribbly Gum	60	10		2 branch		poor, bats	0	6167713	681452
H59	Scribbly Gum	60	11		1	1 basal	poor, bats, open	0	6167726	681464
H60	Scribbly Gum	50	11		2	1 trunk	2 med hollows gd for parrots, gliders	2	6167727	681509
H61	Scribbly Gum	45	12		2 branch		Gd for parrots, gliders	2	6167703	681503
H62	Scribbly Gum	40	15		1 trunk		poor, bats, open	0	6167701	681521
H63	Scribbly Gum	40	15		1 trunk		poor, bats, open	0	6167736	681520
H64	Scribbly Gum	50	15	1	1 trunk		potential glider, parrot - ok	2	6167795	681506
H65	Scribbly Gum	45	12	1	1	1	potential glider, parrot - ok	2	6167821	681527
H66	Scribbly Gum	60	9		2		bats, jagged, not great	0	6167827	681530
H67	Scribbly Gum	60	10			1 trunk	poor, at head height	0	6167836	681517
H68	Scribbly Gum	40	12		1 trunk, 1 branch		ok for bats and parrots	1	6167830	681536

Hollow-bearing tree ID	Tree Data			Hollow Size			Comment	Quality	Easting	Northing
	Tree	DBH	Height	Small	Medium	Large				
H69	Scribbly Gum	110	16	1	1	1 trunk, 1 branch	Gd for parrots, gliders	2	6167886	681571
H70	Scribbly Gum	80	12		1	1 branch	Gd for parrots, gliders	2	6167889	681593
H71	Scribbly Gum	50	8	1	2		Poor, jagged open	0	6167927	681501
H72	Scribbly Gum	40	9		1 trunk		potential, poor - open	0	6167937	681490
H73	Scribbly Gum	50	10	1	1		potential, poor	0	6167960	681538
H74	Scribbly Gum	70	10		1 trunk		bats - long skinny hollow	0	6167945	681547
H75	Scribbly Gum	70	12	1 branch	1 branch		bats, poor - open	0	6167930	681548
H76	Stringybark	50	10		1 trunk		ok - bats, gliders	1	6167935	681558
H77	Scribbly Gum	60	11	1 branch	1 branch	1 trunk	Trunk - long skinny hollow, branch - poor, bats	0	6167897	681513
H78	Stringybark	60	10			1 trunk	Trunk long, exposed and open, bats	0	6167883	681512
H79	Scribbly Gum	40	11	1 trunk	1 trunk		ok for parrots, gliders	1	6167807	681566
H80	Scribbly Gum	60	6		1	1	poor, bats	0	6167787	681576
H81	Scribbly Gum	60	11			1 trunk	poor, shallow, bats	0	6167758	681524
H82	Box	130			1		Shallow - pot. For parrots?	1	6155241	684306
H83	Stringybark	110		1			Ok for small bird	0	6155049	684329
H84	Stringybark	90			1 trunk		Potential for parrots	1	6154964	684335
H85	Stringybark	130			1		No to parrots	0	6155255	684433
H86	Stringybark	130			2		Potenital. Jagged hollows - no to parrots	0	6155366	684230
H87	Stag	80	6			1 trunk	Poor - open. Ok Bats	0	6154254	684507
H88	Stringybark	90	8			1 trunk	Poor - open. Ok Bats	0	6154266	684507
H89	Stag	80	7	1	1		bats, small bird	0	6154225	684642
H90	Yellow Box	160	12	1	1	1	Gd for parrots / bats	2	6154006	684658
H91	Stingybark	130	15		1		Gd for parrots - looks worn, blue feather at base	2	6153708	684598
H92	Box	210	14			1 branch	Bit jagged, maybe ok for parrots	1	6153543	684430

Hollow-bearing tree ID	Tree Data			Hollow Size			Comment	Quality	Easting	Northing
	Tree	DBH	Height	Small	Medium	Large				
H93	Stringybark	90	12	1			Poor - open. Ok Bats	0	6154263	684547
H94	Stag	60	9	2			Poor - Ok Bats	0	6154290	684524
H95	Yellow Box	130		1			No to parrots	0	6156321	685234
H96	Stingybark	140		1	1	1	Gd for parrots	2	6156391	685202
H97	Stag	60			2		Gd for parrots	2	6156506	685212
H98	Red Box	90		1			No to parrots	0	6156542	685234
H99	Stringybark	150		several	2		Jagged - exposed, No to parrots	0	6155638	684393
H100	Stag	100		1	1		Upward spout - No to parrots	0	6155433	684368
H101	Yellow Box	100		2 spouts			Upward spout - No to parrots	0	6155437	684287
H102	Stag	110			1 trunk		Gd - in use - wear around entrance	2	6155400	684351
H103	Stag	50			1		In use by Crimson Rosella	2	6157166	684949
H104	Stag	100	10		3	1	Dead.	1	6152730	684370
H105	Stag	50	5			1 spout	Dead	1	6152817	684436
H106	Stag	50	5		1 branch		Dead	1	6153106	684322
H107	Stag	80	5	1		1	Dead	1	6152717	684447
H108	Stag	40	5			1 spout	Dead	0	6153130	684549
H109	Stag	60	10	3	1 branch		Dead	0	6153099	684445
H110 / Potential Nest tree	Stag	5	10	1	1 branch		Dead (Superb Parrot in spout?)	2	6153141	684872
H111	Box	120	10		1 branch		Live	1	6152752	684866
H112	Box	120	12		1		Live	1	6152781	684853
H113	Stringybark	100	10			1 spout	Live	0	6153283	684389
H114	Stag	40	10	1			Dead	1	6153672	684970
H115	Stag	120	10			1 spout	Dead	2	6153967	684716
H116	Stag	110	10		2 spout		Dead	1	6153743	684634
H117	Stag	40	10			1 spout	Dead	2	6153546	684866
H118	Box	140	15		2 spout		Live	1	6153254	685027

Hollow-bearing tree ID	Tree Data			Hollow Size			Comment	Quality	Easting	Northing
	Tree	DBH	Height	Small	Medium	Large				
H119 / Superb Parrot Nest	Box	120	15	1 branch			Live. 2 Superb Parrots in nest (m & f)	2	680988	6168066
H120 / Potential Nest tree	Box	100	15		1 branch	1 branch	Live. Male & Female Superb Parrots hanging around hollow	2	685038	6153631
H121 / Potential Nest tree	?						Obs Superb Parrot during flight path mapping.	2	679937	6168777

A.4 BIRD UTILISATION RAW DATA

Species	Survey Site Number																													
	1						2						3						4						5					
	<10	0-20	21-40	41-140	>140	Total	<10	0-20	21-40	41-140	>140	Total	<10	0-20	21-40	41-140	>140	Total	<10	0-20	21-40	41-140	>140	Total	<10	0-20	21-40	41-140	>140	Total
Australian Magpie	0	2	0	0	0	2	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
Australian Raven	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Australian Wood Duck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackbird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Black-faced Cuckoo-shrike	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
Brown Falcon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brown Goshawk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brown Quail	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brown Thornbill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brown Treecreeper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buff-rumped Thornbill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common Bronzewing	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common Starling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crimson Rosella	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0
Dusky Woodswallow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Rosella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Spinebill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Yellow Robin	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fan-tailed Cuckoo	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Flame Robin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
Galah	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Golden Whistler	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grey Butcherbird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grey Fantail	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grey Shrike-thrush	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
House Sparrow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laughing Kookaburra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leaden Flycatcher	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magpie-lark	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0
Mistletoebird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nankeen Kestrel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Noisy Friarbird	0	2	0	0	0	2	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Noisy Miner	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0
Olive-backed Oriole	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Painted Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pallid Cuckoo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pied Currawong	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
Red Wattlebird	0	2	0	0	0	2	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red-capped Robin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red-rumped Parrot	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Richard's Pipit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rufous Songlark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rufous Whistler	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
Sacred Kingfisher	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Satin Flycatcher	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
Scarlet Robin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Silvereye	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Southern Boobook	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Southern Whiteface	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiny-cheeked Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotted Pardalote	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Striated Pardalote	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0
Striated Thornbill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	5	0	0	0	0	0	0
Sulphur-crested Cockatoo	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Superb Fairy-wren	0	1	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Varied Sittella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wedge-tailed Eagle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Welcome Swallow	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-browed Scrubwren	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-browed Woodswallow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-eared Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-faced Heron	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-plumed Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-throated Gerygone	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
White-throated Treecreeper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
White-winged Chough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-winged Triller	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Willie Wagtail	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-faced Honeyeater	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-rumped Thornbill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2
Total	**0**	**24**	**0**	**2**	**0**	**26**	**0**	**4**	**3**	**0**	**0**	**7**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**19**	**0**	**0**	**0**	**21**	**0**	**4**	**0**	**0**	**0**	**4**

Species	**Survey Site Number**																													
	6						**7**						**8**						**9**						**10**					
	<10	**0-20**	**21-40**	**41-140**	**>140**	**Total**	**<10**	**0-20**	**21-40**	**41-140**	**>140**	**Total**	**<10**	**0-20**	**21-40**	**41-140**	**>140**	**Total**	**<10**	**0-20**	**21-40**	**41-140**	**>140**	**Total**	**<10**	**0-20**	**21-40**	**41-140**	**>140**	**Total**
Australian Magpie	0	2	0	0	0	2	0	1	0	0	0	1	0	1	0	0	0	1	0	6	0	0	0	6	0	0	1	0	0	1
Australian Raven	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Australian Wood Duck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackbird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Black-faced Cuckoo-shrike	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brown Falcon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brown Goshawk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brown Quail	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brown Thornbill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brown Treecreeper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	4	0	0	0	0	0	0
Buff-rumped Thornbill	0	0	0	0	0	0	0	6	0	0	0	6	0	6	0	0	0	6	0	0	0	0	0	0	0	2	0	0	0	2
Common Bronzewing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common Starling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crimson Rosella	0	4	0	0	0	4	0	2	0	0	0	2	0	2	0	0	0	2	0	1	0	0	0	1	0	4	0	0	0	4
Dusky Woodswallow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Rosella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Spinebill	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Yellow Robin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fan-tailed Cuckoo	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Flame Robin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Galah	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Golden Whistler	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grey Butcherbird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grey Fantail	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Grey Shrike-thrush	0	1	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
House Sparrow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laughing Kookaburra	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	
Leaden Flycatcher	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	3	0	0	0	3	
Magpie-lark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mistletoebird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nankeen Kestrel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Noisy Friarbird	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0
Noisy Miner	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Olive-backed Oriole	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Painted Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pallid Cuckoo	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pied Currawong	0	0	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Red Wattlebird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red-capped Robin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red-rumped Parrot	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Richard's Pipit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rufous Songlark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rufous Whistler	0	0	0	0	0	0	0	2	0	0	0	2	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Sacred Kingfisher	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	
Satin Flycatcher	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scarlet Robin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Silvereye	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Southern Boobook	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Southern Whiteface	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiny-cheeked Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotted Pardalote	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Striated Pardalote	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Striated Thornbill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sulphur-crested Cockatoo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Superb Fairy-wren	0	4	0	0	0	4	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Varied Sittella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wedge-tailed Eagle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Welcome Swallow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-browed Scrubwren	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-browed Woodswallow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-eared Honeyeater	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-faced Heron	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-plumed Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-throated Gerygone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-throated Treecreeper	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1
White-winged Chough	0	8	0	0	0	8	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
White-winged Triller	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Willie Wagtail	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-faced Honeyeater	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-rumped Thornbill	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Total	**0**	**27**	**1**	**0**	**0**	**28**	**0**	**21**	**0**	**0**	**0**	**21**	**1**	**17**	**0**	**0**	**0**	**18**	**0**	**12**	**0**	**0**	**0**	**12**	**0**	**12**	**1**	**0**	**0**	**13**

Species	**Survey Site Number**																													
	11						**12**						**13**						**14**						**15**					
	<10	**0-20**	**21-40**	**41-140**	**>140**	**Total**	**<10**	**0-20**	**21-40**	**41-140**	**>140**	**Total**	**<10**	**0-20**	**21-40**	**41-140**	**>140**	**Total**	**<10**	**0-20**	**21-40**	**41-140**	**>140**	**Total**	**<10**	**0-20**	**21-40**	**41-140**	**>140**	**Total**
Australian Magpie	0	0	0	0	0	0	3	0	0			3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Australian Raven	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Australian Wood Duck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackbird	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Black-faced Cuckoo-shrike	0	0	0	0	0	0	0	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brown Falcon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brown Goshawk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brown Quail	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brown Thornbill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brown Treecreeper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buff-rumped Thornbill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	3	0	0	0	0	0	0
Common Bronzewing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common Starling	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crimson Rosella	2	0	0	0	0	2	4	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dusky Woodswallow	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Rosella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Spinebill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Yellow Robin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fan-tailed Cuckoo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Flame Robin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Galah	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Golden Whistler	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grey Butcherbird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grey Fantail	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0
Grey Shrike-thrush	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
House Sparrow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laughing Kookaburra	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Leaden Flycatcher	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magpie-lark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mistletoebird	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nankeen Kestrel	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Noisy Friarbird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Noisy Miner	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Olive-backed Oriole	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Painted Honeyeater	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pallid Cuckoo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pied Currawong	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red Wattlebird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red-capped Robin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red-rumped Parrot	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Richard's Pipit	2	0	0	0	0	2	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rufous Songlark	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rufous Whistler	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0
Sacred Kingfisher	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Satin Flycatcher	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scarlet Robin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Silvereye	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	0
Southern Boobook	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
Southern Whiteface	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiny-cheeked Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotted Pardalote	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
Striated Pardalote	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Striated Thornbill	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	6	0	0	0	0	0	0	0	4	0	0	0	4
Sulphur-crested Cockatoo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Superb Fairy-wren	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	6	0	0	0	0	0	0
Varied Sittella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	4

Wedge-tailed Eagle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Welcome Swallow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-browed Scrubwren	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-browed Woodswallow	0	6	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-eared Honeyeater	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-faced Heron	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-plumed Honeyeater	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-throated Gerygone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-throated Treecreeper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	1
White-winged Chough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-winged Triller	4	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Willie Wagtail	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-faced Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	0	0	0	0	0	0	0
Yellow-rumped Thornbill	3	0	0	0	0	3	6	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**35**	**7**	**0**	**0**	**0**	**42**	**17**	**4**	**0**	**1**	**0**	**22**	**7**	**0**	**0**	**0**	**0**	**7**	**12**	**10**	**0**	**0**	**0**	**22**	**0**	**10**	**0**	**0**	**0**	**10**

Species	**Survey Site Number**																													
	16						**17**						**18**						**19**						**20**					
	<10	**0-20**	**21-40**	**41-140**	**>140**	**Total**	**<10**	**0-20**	**21-40**	**41-140**	**>140**	**Total**	**<10**	**0-20**	**21-40**	**41-140**	**>140**	**Total**	**<10**	**0-20**	**21-40**	**41-140**	**>140**	**Total**	**<10**	**0-20**	**21-40**	**41-140**	**>140**	**Total**
Australian Magpie	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	2	0	0	2	0	7	0	0	0	7
Australian Raven	0	0	0	0	0	0	2	0	0	0	0	2	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Australian Wood Duck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	8	0	0	0	0	0	0
Blackbird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0
Black-faced Cuckoo-shrike	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Brown Falcon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brown Goshawk	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brown Quail	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	0
Brown Thornbill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brown Treecreeper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
Buff-rumped Thornbill	0	0	0	0	0	0	6	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	4
Common Bronzewing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	5	0	0	0	0	0	0
Common Starling	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0
Crimson Rosella	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	5	0	0	11	0	0	11	0	5	0	0	0	5
Dusky Woodswallow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Rosella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	4	0	10	0	0	0	10
Eastern Spinebill	2	0	0	0	0	2	2	0	0	0	0	2	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0
Eastern Yellow Robin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fan-tailed Cuckoo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Flame Robin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Galah	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	0	0	0	13	5	0	0	0	0	5
Golden Whistler	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grey Butcherbird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grey Fantail	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0
Grey Shrike-thrush	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
House Sparrow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laughing Kookaburra	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leaden Flycatcher	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magpie-lark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mistletoebird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nankeen Kestrel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Noisy Friarbird	0	1	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Noisy Miner	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Olive-backed Oriole	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0

Painted Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pallid Cuckoo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pied Currawong	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red Wattlebird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0
Red-capped Robin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red-rumped Parrot	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2
Richard's Pipit	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	2	0	0	0	0	2	0	0	0	0	0	0
Rufous Songlark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rufous Whistler	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sacred Kingfisher	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Satin Flycatcher	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scarlet Robin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	0
Silvereye	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Southern Boobook	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Southern Whiteface	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	4	0	0	0	0	0	0
Spiny-cheeked Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotted Pardalote	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Striated Pardalote	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Striated Thornbill	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sulphur-crested Cockatoo	0	0	0	0	0	0	0	3	0	0	0	3	0	0	2	0	0	2	0	0	18	0	0	18	0	0	0	5	0	5
Superb Fairy-wren	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	12	2	0	0	0	0	2
Varied Sittella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wedge-tailed Eagle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Welcome Swallow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-browed Scrubwren	0	0	0	0	0	0	6	0	0	0	0	6	0	0	0	0	0	0	14	0	0	0	0	14	0	0	0	0	0	0
White-browed Woodswallow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-eared Honeyeater	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	4	0	0	0	4	0	0	0	0	0	0
White-faced Heron	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
White-plumed Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-throated Gerygone	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	0
White-throated Treecreeper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-winged Chough	3	0	0	0	0	3	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-winged Triller	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Willie Wagtail	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-faced Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-rumped Thornbill	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	4	6	0	0	0	0	6	0	0	0	0	0	0
Total	**6**	**2**	**0**	**0**	**0**	**8**	**19**	**10**	**0**	**0**	**0**	**29**	**6**	**13**	**2**	**0**	**0**	**21**	**46**	**42**	**31**	**0**	**0**	**119**	**11**	**24**	**0**	**5**	**0**	**40**

Species	**Survey Site Number**																												
	21						**22**						**23**						**24**						**25**					
	<10	**0-20**	**21-40**	**41-140**	**>140**	**Total**	**<10**	**0-20**	**21-40**	**41-140**	**>140**	**Total**	**<10**	**0-20**	**21-40**	**41-140**	**>140**	**Total**	**<10**	**0-20**	**21-40**	**41-140**	**>140**	**Total**	**<10**	**0-20**	**21-40**	**41-140**	**>140**	**Total**
Australian Magpie	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	1	0	3	0	0	0	3
Australian Raven	0	0	2	0	0	2	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
Australian Wood Duck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackbird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Black-faced Cuckoo-shrike	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brown Falcon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brown Goshawk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brown Quail	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brown Thornbill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brown Treecreeper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0
Buff-rumped Thornbill	0	0	0	0	0	0	6	0	0	0	0	6	4	0	0	0	0	4	0	0	0	0	0	0	4	0	0	0	0	4
Common Bronzewing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Common Starling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crimson Rosella	0	4	0	0	0	4	0	0	14	0	0	14	3	0	0	0	0	3	0	0	0	0	0	0	0	3	0	0	0	3
Dusky Woodswallow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Rosella	0	2	0	0	0	2	0	3	0	0	0	3	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Spinebill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Yellow Robin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fan-tailed Cuckoo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Flame Robin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0
Galah	0	0	3	0	0	3	0	3	0	0	0	3	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0
Golden Whistler	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grey Butcherbird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grey Fantail	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grey Shrike-thrush	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
House Sparrow	3	0	0	0	0	3	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laughing Kookaburra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	2	0	0	0	2
Leaden Flycatcher	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magpie-lark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mistletoebird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nankeen Kestrel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Noisy Friarbird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Noisy Miner	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Olive-backed Oriole	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Painted Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pallid Cuckoo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pied Currawong	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red Wattlebird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red-capped Robin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Red-rumped Parrot	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Richard's Pipit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rufous Songlark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rufous Whistler	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1
Sacred Kingfisher	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Satin Flycatcher	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scarlet Robin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Silvereye	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Southern Boobook	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Southern Whiteface	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiny-cheeked Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Spotted Pardalote	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Striated Pardalote	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Striated Thornbill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	5
Sulphur-crested Cockatoo	0	0	5	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Superb Fairy-wren	0	0	0	0	0	0	1	0	0	0	0	1	5	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0
Varied Sittella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wedge-tailed Eagle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Welcome Swallow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-browed Scrubwren	0	0	0	0	0	0	0	0	0	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-browed Woodswallow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-eared Honeyeater	0	0	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
White-faced Heron	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-plumed Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-throated Gerygone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-throated Treecreeper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

White-winged Chough	0	0	0	0	0	0	0	4	0	0	0	4	8	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0
White-winged Triller	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Willie Wagtail	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-faced Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-rumped Thornbill	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	0
Total	**3**	**7**	**10**	**0**	**0**	**20**	**12**	**15**	**14**	**3**	**0**	**44**	**26**	**2**	**0**	**0**	**0**	**28**	**4**	**3**	**0**	**0**	**0**	**7**	**10**	**10**	**2**	**0**	**0**	**22**
Species	**Survey Site Number**																													
	26						**27**	**2**					**28**						**29**						**30**					
	<10	**0-20**	**21-40**	**41-140**	**>140**	**Total**	**<10**	**0-20**	**21-40**	**41-140**	**>140**	**Total**	**<10**	**0-20**	**21-40**	**41-140**	**>140**	**Total**	**<10**	**0-20**	**21-40**	**41-140**	**>140**	**Total**	**<10**	**0-20**	**21-40**	**41-140**	**>140**	**Total**
Australian Magpie	0	2	0	0	0	2	0	3	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2
Australian Raven	0	0	0	0	0	0	0	2	0	0	0	2	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1
Australian Wood Duck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackbird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Black-faced Cuckoo-shrike	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brown Falcon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brown Goshawk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brown Quail	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brown Thornbill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brown Treecreeper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buff-rumped Thornbill	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	5	0	6	0	0	0	6	0	0	0	0	0	0
Common Bronzewing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common Starling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crimson Rosella	0	3	0	0	0	3	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Dusky Woodswallow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Rosella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Spinebill	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Yellow Robin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fan-tailed Cuckoo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Flame Robin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Galah	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Golden Whistler	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grey Butcherbird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grey Fantail	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grey Shrike-thrush	0	0	0	0	0	0	0	1	0	0	0	1	2	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	1
House Sparrow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laughing Kookaburra	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	2	0	0	0	2	0	0	0	0	0	0
Leaden Flycatcher	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magpie-lark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mistletoebird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nankeen Kestrel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Noisy Friarbird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Noisy Miner	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Olive-backed Oriole	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Painted Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pallid Cuckoo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pied Currawong	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red Wattlebird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red-capped Robin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
Red-rumped Parrot	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Richard's Pipit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rufous Songlark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rufous Whistler	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0

Sacred Kingfisher	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Satin Flycatcher	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scarlet Robin	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Silvereye	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Southern Boobook	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Southern Whiteface	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiny-cheeked Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotted Pardalote	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Striated Pardalote	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Striated Thornbill	4	0	0	0	0	4	0	0	0	0	0	0	3	0	0	0	0	3	0	4	0	0	0	4	0	0	0	0	0	0
Sulphur-crested Cockatoo	0	0	3	0	0	3	0	4	0	0	0	4	0	4	0	0	0	4	0	0	0	0	0	0	0	1	0	0	0	1
Superb Fairy-wren	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Varied Sittella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wedge-tailed Eagle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Welcome Swallow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-browed Scrubwren	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0
White-browed Woodswallow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-eared Honeyeater	0	0	0	0	0	0	0	1	0	0	0	1	0	2	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	2
White-faced Heron	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-plumed Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-throated Gerygone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-throated Treecreeper	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-winged Chough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-winged Triller	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Willie Wagtail	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-faced Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-rumped Thornbill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**4**	**9**	**3**	**0**	**0**	**16**	**0**	**13**	**0**	**0**	**0**	**13**	**15**	**11**	**0**	**0**	**0**	**26**	**0**	**14**	**0**	**0**	**0**	**14**	**0**	**10**	**0**	**0**	**0**	**10**

Species	**Survey Site Number**																													
	31						**32**						**33**						**34**						**35**					
	<10	**0-20**	**21-40**	**41-140**	**>140**	**Total**	**<10**	**0-20**	**21-40**	**41-140**	**>140**	**Total**	**<10**	**0-20**	**21-40**	**41-140**	**>140**	**Total**	**<10**	**0-20**	**21-40**	**41-140**	**>140**	**Total**	**<10**	**0-20**	**21-40**	**41-140**	**>140**	**Total**
Australian Magpie	0	3	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Australian Raven	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Australian Wood Duck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackbird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Black-faced Cuckoo-shrike	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
Brown Falcon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brown Goshawk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brown Quail	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brown Thornbill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	5
Brown Treecreeper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buff-rumped Thornbill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common Bronzewing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common Starling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crimson Rosella	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Dusky Woodswallow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Rosella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Spinebill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Yellow Robin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fan-tailed Cuckoo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Flame Robin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Galah	0	1	0	0	0	1	0	2	0	0	0	2	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0

Golden Whistler	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grey Butcherbird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grey Fantail	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Grey Shrike-thrush	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	1	0	0	0	1	0	0	0	0	0	0
House Sparrow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laughing Kookaburra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Leaden Flycatcher	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magpie-lark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mistletoebird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nankeen Kestrel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Noisy Friarbird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	0	0	1
Noisy Miner	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Olive-backed Oriole	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Painted Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pallid Cuckoo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pied Currawong	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red Wattlebird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red-capped Robin	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red-rumped Parrot	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Richard's Pipit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rufous Songlark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rufous Whistler	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
Sacred Kingfisher	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Satin Flycatcher	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scarlet Robin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Silvereye	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Southern Boobook	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Southern Whiteface	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiny-cheeked Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotted Pardalote	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	1
Striated Pardalote	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Striated Thornbill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	4
Sulphur-crested Cockatoo	0	3	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Superb Fairy-wren	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	10
Varied Sittella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wedge-tailed Eagle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
Welcome Swallow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	0	0	0	0	0	0
White-browed Scrubwren	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-browed Woodswallow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-eared Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
White-faced Heron	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-plumed Honeyeater	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-throated Gerygone	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-throated Treecreeper	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
White-winged Chough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-winged Triller	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Willie Wagtail	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-faced Honeyeater	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-rumped Thornbill	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**0**	**16**	**0**	**0**	**0**	**16**	**0**	**6**	**0**	**0**	**0**	**6**	**0**	**4**	**1**	**0**	**0**	**5**	**0**	**8**	**2**	**0**	**1**	**11**	**0**	**27**	**0**	**0**	**0**	**27**

Species	Survey Site Number					
	36					
	<10	0-20	21-40	41-140	>140	Total
Australian Magpie	0	12	0	0	0	12
Australian Raven	0	0	0	0	0	0
Australian Wood Duck	0	0	0	0	0	0
Blackbird	0	0	0	0	0	0
Black-faced Cuckoo-shrike	0	0	0	0	0	0
Brown Falcon	0	1	0	0	0	1
Brown Goshawk	0	0	0	0	0	0
Brown Quail	0	0	0	0	0	0
Brown Thornbill	0	0	0	0	0	0
Brown Treecreeper	0	0	0	0	0	0
Buff-rumped Thornbill	0	0	0	0	0	0
Common Bronzewing	0	0	0	0	0	0
Common Starling	0	0	0	0	0	0
Crimson Rosella	0	0	0	0	0	0
Dusky Woodswallow	0	0	0	0	0	0
Eastern Rosella	0	0	0	0	0	0
Eastern Spinebill	0	0	0	0	0	0
Eastern Yellow Robin	0	0	0	0	0	0
Fan-tailed Cuckoo	0	0	0	0	0	0
Flame Robin	0	0	0	0	0	0
Galah	0	2	0	0	0	2
Golden Whistler	0	0	0	0	0	0
Grey Butcherbird	0	0	0	0	0	0
Grey Fantail	0	0	0	0	0	0
Grey Shrike-thrush	0	0	0	0	0	0
House Sparrow	0	0	0	0	0	0
Laughing Kookaburra	0	0	0	0	0	0
Leaden Flycatcher	0	0	0	0	0	0
Magpie-lark	0	0	0	0	0	0
Mistletoebird	0	0	0	0	0	0
Nankeen Kestrel	0	0	0	0	0	0
Noisy Friarbird	0	0	0	0	0	0
Noisy Miner	0	0	0	0	0	0
Olive-backed Oriole	0	0	0	0	0	0
Painted Honeyeater	0	0	0	0	0	0
Pallid Cuckoo	0	0	0	0	0	0
Pied Currawong	0	6	0	0	0	6
Red Wattlebird	0	0	0	0	0	0
Red-capped Robin	0	0	0	0	0	0
Red-rumped Parrot	0	0	0	0	0	0
Richard's Pipit	0	0	0	0	0	0
Rufous Songlark	0	0	0	0	0	0
Rufous Whistler	0	0	0	0	0	0
Sacred Kingfisher	0	0	0	0	0	0
Satin Flycatcher	0	0	0	0	0	0
Scarlet Robin	0	0	0	0	0	0
Silvereye	0	0	0	0	0	0
Southern Boobook	0	0	0	0	0	0
Southern Whiteface	0	0	0	0	0	0
Spiny-cheeked Honeyeater	0	0	0	0	0	0

Spotted Pardalote	0	0	0	0	0	0
Striated Pardalote	0	0	0	0	0	0
Striated Thornbill	0	0	0	0	0	0
Sulphur-crested Cockatoo	0	0	0	0	0	0
Superb Fairy-wren	0	0	0	0	0	0
Varied Sittella	0	0	0	0	0	0
Wedge-tailed Eagle	0	0	0	0	0	0
Welcome Swallow	0	0	0	0	0	0
White-browed Scrubwren	0	0	0	0	0	0
White-browed Woodswallow	0	0	0	0	0	0
White-eared Honeyeater	0	0	0	0	0	0
White-faced Heron	0	0	0	0	0	0
White-plumed Honeyeater	0	0	0	0	0	0
White-throated Gerygone	0	0	0	0	0	0
White-throated Treecreeper	0	0	0	0	0	0
White-winged Chough	0	0	0	0	0	0
White-winged Triller	0	0	0	0	0	0
Willie Wagtail	0	0	0	0	0	0
Yellow-faced Honeyeater	0	0	0	0	0	0
Yellow-rumped Thornbill	0	0	0	0	0	0
Total	**0**	**21**	**0**	**0**	**0**	**21**

Species	**Total of observation in each height class for all survey sites**						**Percentage of all observation for all species**
	<10	**0-20**	**21-40**	**41-140**	**>140**	**Total**	
Australian Magpie	3	52	3	0	0	58	**7.67**
Australian Raven	2	10	4	0	0	16	**2.12**
Australian Wood Duck	0	8	0	0	0	8	**1.06**
Blackbird	1	2	0	0	0	3	**0.40**
Black-faced Cuckoo-shrike	0	12	0	0	0	12	**1.59**
Brown Falcon	0	1	0	0	0	1	**0.13**
Brown Goshawk	0	1	0	0	0	1	**0.13**
Brown Quail	2	0	0	0	0	2	**0.26**
Brown Thornbill	0	5	0	0	0	5	**0.66**
Brown Treecreeper	1	5	0	0	0	6	**0.79**
Buff-rumped Thornbill	32	20	0	0	0	52	**6.88**
Common Bronzewing	0	6	0	0	0	6	**0.79**
Common Starling	3	1	0	0	0	4	**0.53**
Crimson Rosella	9	41	25	0	0	75	**9.92**
Dusky Woodswallow	3	0	0	0	0	3	**0.40**
Eastern Rosella	2	19	0	0	0	21	**2.78**
Eastern Spinebill	5	2	1	0	0	8	**1.06**
Eastern Yellow Robin	0	1	0	0	0	1	**0.13**
Fan-tailed Cuckoo	0	3	0	0	0	3	**0.40**
Flame Robin	1	1	0	0	0	2	**0.26**
Galah	8	21	7	0	0	36	**4.76**
Golden Whistler	0	1	0	0	0	1	**0.13**
Grey Butcherbird	0	0	0	0	0	0	**0.00**
Grey Fantail	4	7	0	0	0	11	**1.46**
Grey Shrike-thrush	2	9	0	0	0	11	**1.46**

Species	Total of observation in each height class for all survey sites						Percentage of all observation for all species
	<10	0-20	21-40	41-140	>140	Total	
House Sparrow	5	0	0	0	0	5	**0.66**
Laughing Kookaburra	1	13	0	0	0	14	**1.85**
Leaden Flycatcher	1	4	0	0	0	5	**0.66**
Magpie-lark	2	1	0	0	0	3	**0.40**
Mistletoebird	1	0	0	0	0	1	**0.13**
Nankeen Kestrel	0	0	0	1	0	1	**0.13**
Noisy Friarbird	0	12	1	0	0	13	**1.72**
Noisy Miner	0	4	0	0	0	4	**0.53**
Olive-backed Oriole	0	1	0	0	0	1	**0.13**
Painted Honeyeater	2	0	0	0	0	2	**0.26**
Pallid Cuckoo	0	1	0	0	0	1	**0.13**
Pied Currawong	0	10	1	0	0	11	**1.46**
Red Wattlebird	0	6	0	0	0	6	**0.79**
Red-capped Robin	1	2	0	0	0	3	**0.40**
Red-rumped Parrot	0	2	0	0	0	2	**0.26**
Richard's Pipit	7	0	0	0	0	7	**0.93**
Rufous Songlark	2	0	0	0	0	2	**0.26**
Rufous Whistler	3	14	0	0	0	17	**2.25**
Sacred Kingfisher	0	3	0	0	0	3	**0.40**
Satin Flycatcher	0	1	0	0	0	1	**0.13**
Scarlet Robin	3	0	0	0	0	3	**0.40**
Silvereye	2	2	0	0	0	4	**0.53**
Southern Boobook	0	1	0	0	0	1	**0.13**
Southern Whiteface	4	0	0	0	0	4	**0.53**
Spiny-cheeked Honeyeater	0	1	0	0	0	1	**0.13**
Spotted Pardalote	0	4	0	0	0	4	**0.53**
Striated Pardalote	2	6	0	0	0	8	**1.06**
Striated Thornbill	20	17	0	0	0	37	**4.89**
Sulphur-crested Cockatoo	0	17	28	5	0	50	**6.61**
Superb Fairy-wren	30	19	0	0	0	49	**6.48**
Varied Sittella	0	4	0	0	0	4	**0.53**
Wedge-tailed Eagle	0	0	0	0	1	1	**0.13**
Welcome Swallow	0	3	0	2	0	5	**0.66**
White-browed Scrubwren	27	0	0	3	0	30	**3.97**
White-browed Woodswallow	0	6	0	0	0	6	**0.79**
White-eared Honeyeater	2	14	0	0	0	16	**2.12**
White-faced Heron	0	1	0	0	0	1	**0.13**
White-plumed Honeyeater	0	1	0	0	0	1	**0.13**
White-throated Gerygone	2	4	0	0	0	6	**0.79**
White-throated Treecreeper	1	8	0	0	0	9	**1.19**
White-winged Chough	11	15	0	0	0	26	**3.44**
White-winged Triller	4	0	0	0	0	4	**0.53**
Willie Wagtail	3	0	0	0	0	3	**0.40**
Yellow-faced Honeyeater	0	8	0	0	0	8	**1.06**
Yellow-rumped Thornbill	22	5	0	0	0	27	**3.57**

A.5 SUPERB PARROT RAW DATA (TRANSECTS AND FLIGHT PATH MAPPING)

Raw data for each transect surveyed and each viewing station where Superb Parrot observations recorded.

Site ID	Date	SP Observed	No.	Habitat	Flight Path Mapping	Time	Temp	Cloud	Wind
Transects									
SP1	6/11/2013	No		BGW, Brittle Gum Forest and open paddock.		8.15am	2	1	1
SP2	4/11/2013	No		BGW, derived grassland and Scribbly Gum Forest.		7.44am	2	1	2
SP3	4/11/2013	Yes (at 250 m)	2 (m), 2 (f), 3 (juv)	Rd reserve and paddock with scattered trees. Grass in groundlayer. BGW.	Stayed in general area, local movements below canopy < 10m). Significant activity at HBT. Flying wtihin canopy, perching, calling.	8.59am	2	1	2
SP4	4/11/2013	No		BGW. Generally scattered trees within paddock.		7.20am	2	1	2
SP5	4/11/2013	No		Derived grassland. Some scattered trees.		8.35am	2	1	3
SP6	4/11/2013	No		Derived grassland. Some scattered trees.		6.51am	2	1	3
SP7	4/11/2013	No		BGW. Generally scattered trees within paddock.		7.00am	2	1	2
SP8	6/11/2013	No		Scribbly Gum Forest and BGW.		10.20am	3	2	1
SP9	5/11/2013	No		BGW. Generally scattered trees within paddock.		7.04am	2	1	2
SP10	5/11/2013	No		BGW. Generally scattered trees within paddock.		9.45am	2	1	1
SP11	5/11/2013	No		BGW. Generally scattered trees within paddock.		8.20am	2	1	1

Site ID	Date	SP Observed	No.	Habitat	Flight Path Mapping	Time	Temp	Cloud	Wind
SP12	6/11/2013	No		Paddock on edge of Scribbly Gum Forest.		7.00am	2	1	1
SP13 (couldn't access)									
SP14	5/11/2013	No		BGW. Generally scattered trees within paddock.		8.30am	2	1	2
SP15	6/11/2013	No		Scribbly Gum Forest and BGW.		8.30am	2	1	1
SP16 (couldn't access)									
SP17	5/11/2013	Yes	1 (f)	Scattered trees, No shrubs, Grass, Paddock	Flew overhead landed in Yellow Box. Flying south toward Rye Park rd. (<15m)	7.21am	1	1	2
SP18	5/11/2013	Yes	3 (m), 2 (f)	Scattered trees, No shrubs, Grass, Paddock	3 in tree, 2 flying south toward Rye Park rd (< 10m)				
SP19	6/11/2013	No		Paddock on edge of Scribbly Gum Forest.		8.30am	2	1	1
SP20	6/11/2013	No		BGW. Generally scattered trees within paddock.		7.50am	1	1	2
SP21	6/11/2013	No		BGW. Generally scattered trees within paddock.		7.10am	2	1	1
SP22	6/11/2013	No		Derived grassland. Some scattered trees within paddock.		6.59am	1	1	1
SP23	5/11/2013	No		BGW. Generally scattered trees within paddock.		8.15am	1	1	2
SP24	5/11/2013	No		BGW. Generally scattered trees within paddock.		10.30am	2	1	2
SP25	6/11/2013	Yes (4 ~ 150m, 3 at 950 m)	2 (m), 1 (f), 4 (?)	Predominantly scattered trees in paddock with grass, no shrubs.	5 foraging in tree; 1 flying north (~ 15m), 1 flying south ~ 20 m)	7.30am	1	1	2

Site ID	Date	SP Observed	No.	Habitat	Flight Path Mapping	Time	Temp	Cloud	Wind
SP26	22/11/2013	Yes	5 (f), 3 (m), 4 (?)	Gully with BGW and scattered trees. Grassland. Dense Shrubs. Nest tree.	Flying locally (i.e. within 100m). Flying < 15m.	9.30am	1	3	3
SP27	5/11/2013	No				9.15am	2	1	3
Sites were observations made at viewing stations for flight path mapping									
Site 8	7-9 Nov 2013	Yes	17 obs	BGW and scattered trees over pasture	See flight path mapping datasheet	7.15am	Cool	Overcast	Breeze
Site 9	9/11/2013	Yes	1 obs	Rye Pk - Dalton Rd. BGW along rd reserve with paddocks adjoining rd.	See flight path mapping datasheet	6.30am	Cool	Overcast	Breeze
Site 1	7-8 Nov 2013	Yes	10 obs	Frogmore Rd. Scattered trees in paddock.	See flight path mapping datasheet	7.15am	Cool	Nil	Nil
Site 6	7-9 Nov 2013	Yes	1 obs	High Rock Rd. Scattered trees in paddock. Adjacent treed rd reserve.	See flight path mapping datasheet	7.11am	Cool	Nil	Nil
Site 3	7-9 Nov 2013	Yes	1 obs	Top of low ridge W of High Rock Rd. Within paddock.	See flight path mapping datasheet	6.50 am	Cool	Nil	Nil
Site 4	7-9 Nov 2013	Yes	18 obs	Flakney Ck Rd. Scattered trees in open paddock.	See flight path mapping datasheet	6.31am	Cool	Nil	Nil

Raw data for each flight observation at each viewing station where Superb Parrot observations recorded.

Site ID	Date	Time First Observed	Time Last Observed	Direction of flight	No. Individuals	Height above ground (m)	Fly over bare ground / ridge tops (Y/N)	Accuracy	General behaviour & habitat
Site 3	7/11/2013	8.30am	8.31am	Seen landing in stag 400m SW of site then flew ~500m to patch of forest in south	1	15	Yes. Flew ~500m over paddock along sloping ridge to crest of hill.	400m	Tree hopping
Site 6	7/11/2013	8.12am	9.12am	Flew over dam to SW to tree on lower slope.	1 (m), 1 (f)	20	Flew over bare ground, but not over ridge.	<50m	Local movements between trees. NW to SW in Valley.
Site 1 (1)	7/11/2013	7.30am	7.35am	Flying SE over Frogmore Rd to north	2	15	Flew over bare ground.		Flying at canopy level. Stopped to forage in trees.
Site 1 (2)	7/11/2013	7.55am	7.55am	Flew east from tree ~ 100m	1	25	Flew over bare ground.		Local movements. Foraging in tree then flew east.
Site 1 (3)	7/11/2013	8.00am	8.00am	Flew SW from tree towards ridge	1	20	Flew over bare ground.		Local movements. Foraging in tree then flew SW away from project site.
Site 1 (4)	7/11/2013	8.10am	8.12am	Local movements ~ 50m	2	<15m	Flew over bare ground.		Foraging in tree, then to woodland, then back to same tree.
Site 1 (5)	7/11/2013	8.20am	8.20am	Flew from woodland near trees SW towards Boorowa	3	30	Flew over bare ground.		Flying away from project site.
Site 1 (6)	7/11/2013	8.25am	9.11am	Flew from woodland NE of Frogmore Rd across paddock to south.	7	20	Tree hopping		Flying and stopping in trees to forage. Stayed in one tree for 1.2 hr.
Site 1 (7)	8/11/2013	6.30am	6.40am	Observed in trees south of Frogmore Rd, then flew north to woodland.	2	15	Flew over bare ground and tree canopy.		Forgaging in tree until flew north. Did not see them land.

Site ID	Date	Time First Observed	Time Last Observed	Direction of flight	No. Individuals	Height above ground (m)	Fly over bare ground / ridge tops (Y/N)	Accuracy	General behaviour & habitat
Site 1 (8)	8/11/2013	6.40am	7.20am	In tree south of Frogmore Rd and flew SE direction out of sight.	7	20	Flew over bare ground and tree canopy.		Perched in tree and still for almost 40 mins then flew away as a flock.
Site 1 (9)	8/11/2013	7.50am	7.53am	In tree south of Frogmore Rd and flew SE direction out of sight.	6	20	Flew over bare ground and tree canopy.		Perched in tree, circled local area and then flew SE of site.
Site 1 (10)	8/11/2013	8.00am	8.00am	Flew overhead from west to east.	1	15	Flew over bare ground.		Flying. Did not see them land.
Site 10	9/11/2012	8.15am	8.15am	First seen on Dalton Rye Pk Rd. Flying along road in north - south direction.	3	30	Along treed rd reserve.		Flying parrallel to Dalton - Rye Pk Rd.
Site 8 (1)	7/11/2013	7.42am	7.42am	Flying South from the north along TL west of RYP_10. Heading SW.	1 (m), 2 (f)	15	Flew over bare ground.	10	Flying over paddock in open from the north to south west away from site. No trees.
Site 8 (2)	7/11/2013	7.51am	7.51am	From NE heading south along TL	1 (f)	50	Flew over bare ground.	10	Flying above canopy level over open ground.
Site 8 (3)	7/11/2013	8.18am	8.18am	From NW to east flying south of the hills and then east over ridge	2 (m), 1 (f)	25	Flew over bare ground, then over ridge.	20	Flying just above tree line. Stopped at a 20m tall dead stag.
Site 8 (4)	7/11/2013	8.20am	8.20am	From south to north and veered NE over hill.	1	20	Edge of tree line, then over hill.	20	Flying along edge of remnant scattered tree line. Dissappeared east over ridge.
Site 8 (5)	7/11/2013	8.36am	8.36am	From NE between hill and low rise then due south.	1 (m)	40	Flew over bare ground.	20	Flew over trees and south away from turbines.
Site 8 (6)	7/11/2013	8.37am	8.37am	From NE between hill and low rise then flew west.	1 (f)	40	Flew over bare ground and tree canopy.	10	Initially flew over bare ground then skirted tree line in the west and flew over gully.
Site 8 (7)	7/11/2013	8.40am	8.40am	Flew from east of hill then flew due south.	1	40	Flew over bare ground.	20	Flew over trees and south away from turbines.

Site ID	Date	Time First Observed	Time Last Observed	Direction of flight	No. Individuals	Height above ground (m)	Fly over bare ground / ridge tops (Y/N)	Accuracy	General behaviour & habitat
Site 8 (8)	7/11/2013	8.57am	8.57am	Flew south to north to top of ridge.	1 (f)	40	Flew over bare ground.	20	Flying to ridge, circled stag and landed in it.
Site 8 (9)	8/11/2013	7.50am	7.52am	Flew south along east side of tree line then flew west.	2 (f), 1 (juv)	15	Flew over bare ground.	10	Circled tree, landed, called then flew west away from project site.
Site 8 (10)	8/11/2013	8.25am	8.25am	Flew north over scattered trees.	1	15	Flew over bare ground and tree canopy.	10	Flying slightly above canopy in a direct north path.
Site 8 (11)	8/11/2013	8.36am	8.36am	Flew NE from south	1	20	Flew over bare ground and tree canopy.	10	First observed over paddock from the south, then veered NE over scattered trees.
Site 8 (12)	8/11/2013	8.40am	8.43am	Flew from south flying north	1	20	Flew over bare ground.	10	Landed in 2 trees for 2 mins and flew north.
Site 8 (13)	8/11/2013	8.46am	8.46am	Flew from NE and headed south	1	40	Over trees then open paddock.	10	Came from over rise in NE then headed due south away from turbines.
Site 8 (14)	8/11/2013	8.52am	8.52am	Flew from NE and headed south	1 (m)	25	Over trees then open paddock.	10	Appeared from over hill in NE. Flew over scattered patach of trees then over paddock to south.
Site 8 (15)	9/11/2013	8.15am	8.15am	From west to east.	1 (m)	50	Flew over bare ground.	10	Flying over paddock.
Site 8 (16)	9/11/2013	8.28am	8.28am	From east to west.	1 (f)	50	Flew over bare ground.	10	Flying over paddock away from project site.
Site 8 (17)	9/11/2013	8.29am	8.29am	From over rise in east then flew south.	1	50	Flew over bare ground and tree canopy.	10	Flying from over rise in east then veered sharply south along edge of trees.

Site ID	Date	Time First Observed	Time Last Observed	Direction of flight	No. Individuals	Height above ground (m)	Fly over bare ground / ridge tops (Y/N)	Accuracy	General behaviour & habitat
Site 4 (1)	7/11/2013	6.50am	7.50am	On red gum then flew 100m ESE then south down rd corridor.	4	<10	Flew over small ridge.	10	Tree hopping and foraging. Feeding on ground, then flew 100m into a vegetated corridor before heading south.
Site 4 (2)	7/11/2013	7.42am	7.52am	First seen in Red Gum, flew south before feeding on ground 500m.	2	<10	Flew over small ridge.	5	Tree hopping and feeding.
Site 4 (3)	7/11/2013	7.53am	7.53am	1 female landed in tree and into hollow (possible nest?)	1	<10	Flew over small ridge.	10	Possible nesting 679937, 6168777 (mapped with HBTs)
Site 4 (5)	7/11/2013	8.09am	8.09am	Flew north into large Eucalypt and landed.	1 (f)	20	Flew into tree.	10	Flying and perching in tree.
Site 4 (6)	7/11/2013	8.42am	8.43am	Making small, local movements over Eucalypt.	1 (f)	20	Flew into tree.	10	Circling tree and landing.
Site 4 (7)	7/11/2013	8.48am	8.50am	Making small, local movements over Eucalypt.	1 (m)	<10	Flew into tree.	5	Flying and perching in tree.
Site 4 (8)	8/11/2013	6.51am	8.52am	Flying north and landed in Eucalypt ~ 1 km west.	1 (m), 1 (f)	15	Over paddock and trees.		Flying and perching in tree.
Site 4 (9)	8/11/2013	7.01am	7.13am	Flew 100m north then south along road reserve.	2 (f)	20	Along tree line.		Flying.
Site 4 (10)	8/11/2013	7.06am	7.16am	Flew south into Eucalypt for 10 mins then flew east.	1 (f), 1 (m)	15	Flew over small ridge.		Flying.
Site 4 (11)	8/11/2013	7.28am	7.28am	Flew south along veg corridor	1	15	Along tree line.		Flying and perching in tree.
Site 4 (12)	8/11/2013	7.38am	7.38am	Flew north along veg corridor	1	10	Along tree line.		Flying and perching in tree.
Site 4 (13)	8/11/2013	7.42am	7.47am	Flew in tree in road reserve and flew south along road.	2	<10	Along tree line.		Flying and perching in tree.
Site 4 (14)	8/11/2013	7.49am	7.50am	Flew north along corridor	1	10	Along tree line.		Flying and perching in tree.
Site 4 (15)	8/11/2013	7.58am	7.59am	Flew to ground, headed east	1 (m)	<10	Over paddock.		On ground, then flying.

Site ID	Date	Time First Observed	Time Last Observed	Direction of flight	No. Individuals	Height above ground (m)	Fly over bare ground / ridge tops (Y/N)	Accuracy	General behaviour & habitat
Site 4 (16)	8/11/2013	8.34am	8.35am	Flying from east to west and landed in tree plantation.	1 (m)	<10	Over paddock.		Flew to trees.
Site 4 (17)	9/11/2013	6.36am	6.37am	Flew from east to west for 500m.	2	10	Over paddock and trees.	100	Flying west away from project site towards Boorowa.
Site 4 (18)	9/11/2013	7.01am	7.02am	Flew from NW to SE	2	10	Over paddock and trees.	25	Flying.
Site 4 (19)	9/11/2013	7.28am	7.30am	Flew north along veg corridor and landed in Eucalypt in paddock.	3	6	Flew over small ridge.	5	Flying and landed in tree.
Site 4 (20)	9/11/2013	7.40am	7.41am	Flew south along veg corridor landed in tree.	1	6	Flew over small ridge.	5	Flying and landed in tree.
Site 4 (21)	9/11/2013	7.55am	7.55am	Flew from south into potential nest tree? (refer site 4 (3))	1	5	Flew over small ridge.	5	Flew into hollow.
Site 4 (22)	9/11/2013	7.56am	7.56am	Flew south and landed in Eucalypt in paddock.	1 (m)	5	Flew over small ridge.	5	Flew and landed in tree.
Site 4 (23)	9/11/2013	7.59am	8.11am	Flew 100 m west then flew ~1km north.	1 (m)	3	Flew over small ridge.	5	Flew and landed in tree.
Site 4 (24)	9/11/2013	8.17am	8.19am	Local movements in paddock and into top of potential nest tree.	2	15	Over paddock.	20	Landed, flying, tree hopping.

A.6 MICROBAT RISK ASSESSMENT

Scientific name	Common name	Conservation status		Seasonal Risk (eg. Migration)		Flight character		Roosting	Foraging dispersal		Breeding season	Likelihood of species behaviour resulting in collisions	Risk score
		0 = None; 1 = Threatened		0 = doesn't migrate; 1 = migrates		0 = below canopy; 1 = above canopy			0 = small foraging range, or forage low not in open areas; 1 = forage high in open areas or over large distances				
Chalinolobus gouldii	Gould's Wattled Bat		0	No	0	Above canopy & sub canopy	1	Tree hollows, buildings	Forages up to 11 km from roost sites. Will pass through open paddocks	1	Mating in late autumn / winter Juveniles fly December or January	Mod	2
Chalinolobus morio	Chocolate Wattled Bat		0	No - individuals in southern Australia do not migrate	0	Mid canopy to below canopy	0	Tree hollows, buildings and caves	Range of habitats including treeless regions	0	Birth in November	Low	0
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	1	No	0	Below or near the canopy and along tracks	0	Tree hollows and sometimes buildings	Highly mobile, with large foraging range; uncommon on ridgetop forests where soil fertility is low.	1	Females pregnant late spring to early summer Lactation December to mid-January	Moderate	2
Miniopterus schreibersii oceanensis	Eastern Bentwing Bat	V	1	Yes - travel up to several hundred kilometres to over-wintering roosts	1	Above canopy and open areas	1	Caves, disused mines	Fast and direct flight Forested areas, open areas, waterways, street lights and tracks	1	Mating in early winter Birth in spring / Summer Juveniles leave cave in march	**High**	4
Mormopterus planiceps (sp.4)	Southern Freetail Bat		0	No	0	Above canopy, below canopy, on edge of forest, and on ground.	1	Tree hollows and buildings	Capable of foraging up to 12 km from their roost - when commuting flight is rapid and direct	0	Birth December – January Young fly by March	Low	1

Scientific name	Common name	Conservation status		Seasonal Risk (eg. Migration)		Flight character		Roosting	Foraging dispersal		Breeding season	Likelihood of species behaviour resulting in collisions	Risk score
		0 = None; 1 = Threatened		0 = doesn't migrate; 1 = migrates		0 = below canopy; 1 = above canopy			0 = small foraging range, or forage low not in open areas; 1 = forage high in open areas or over large distances				
Mormopterus ridei	Eastern Freetail Bat		0	No	0	Below canopy in spaced between trees.	0	Tree hollows or under bark	Can forage in open areas but most is in reported in forested areas. Foraging range unknown.	0	Birth approximately in November - December Young fly by January to March	Low	0
Nyctophilus spp.	A Long-eared Bat		0	No	0	Below canopy and often fly close to the ground	0	Dead trees, exfoliating bark or hollows	Slow, manoeuvrable, undulating flight through dense canopy Can forage in open areas but most is in dense areas Capable of foraging up to 12 km from their roost - when commuting flight is rapid and direct	0	Birth October - November Young fly in December or January	Low	0
Tadarida australis	White-striped Freetail Bat		0	Y - migrate to northern regions during winter (non-hibernating species)	1	Above canopy	1	Large eucalypts (often in their hollows) Roosts in trees in a range of habitats from forest to open parklands	Fast and direct path High altitude feeding Can commute 50 km between roost and feeding	1	Birth mid-December to end of January Juveniles weaned by mid- February	Moderate - High	3
Vespadelus darlingtoni	Large Forest Bat		0	N	0	Below canopy, within canopy and forest floor	0	Tree hollows	Cluttered vegetation avoided. Foraging and commuting focused along trails and streams	0	Birth November – December Juveniles fly from mid- January.	Low	0

Scientific name	Common name	Conservation status		Seasonal Risk (eg. Migration)		Flight character		Roosting	Foraging dispersal		Breeding season	Likelihood of species behaviour resulting in collisions	Risk score
		0 = None; 1 = Threatened		0 = doesn't migrate; 1 = migrates		0 = below canopy; 1 = above canopy			0 = small foraging range, or forage low not in open areas; 1 = forage high in open areas or over large distances				
Vespadelus regulus	Southern Forest Bat		0	N	0	Below canopy & within canopy	0	Tree hollows and roof cavities	Agile, fluttery flight	0	Birth early summer	Low	0
Vespadelus vulturnus	Little Forest Bat		0	N	0	Below canopy	0	Roof cavities and hollows in dead timber	Agile, fluttery flight	0	Birth early summer	Low	0
Saccolaimus flaviventris	Yellow-bellied sheathtail- bat**	V	1	Unlikely	0	Above canopy but lower in open area	1	Tree hollows and buildings	High and fast over forest canopy	1	December to mid-March	Moderate - High	3

A.7 THREATENED SPECIES RECORDS

Common Name	Species Name	Date	Easting	Northing
Brown Treecreeper	*Climacteris picumnus*	04-NOV-11 9:02:57AM	686068	6156387
Brown Treecreeper	*Climacteris picumnus*	12/07/2013	684977	6157224
Brown Treecreeper	*Climacteris picumnus*	12/07/2013	686102	6156162
Brown Treecreeper	*Climacteris picumnus*	5/11/2013	676586	6178103
Brown Treecreeper	*Climacteris picumnus*	7/11/2013	686076	6156369
Brown Treecreeper	*Climacteris picumnus*	9/11/2013	677648	6168581
Diamond Firetail	*Stagonopleura guttata*	03-NOV-11 8:38:30AM	687080	6158513
Diamond Firetail	*Stagonopleura guttata*	5/11/2013	684262	6155476
Diamond Firetail	*Stagonopleura guttata*	5/11/2013	684222	6155959
Diamond Firetail	*Stagonopleura guttata*	5/11/2013	684237	6155787
Flame Robin	*Petroica phoenicea*	02-NOV-11 9:23:17AM	681550	6163834
Flame Robin	*Petroica phoenicea*	12/07/2013	686102	6156162
Flame Robin	*Petroica phoenicea*	8/07/2013	685877	6156362
Flame Robin	*Petroica phoenicea*	8/11/2013	686016	6156369
Hooded Robin	*Melanodryas cucullata cucullata*	10/07/2013	681390	6167591
Hooded Robin	*Melanodryas cucullata cucullata*	10/07/2013	684500	6154700
Hooded Robin	*Melanodryas cucullata cucullata*	7/11/2013	686016	6156369
Hooded Robin	*Melanodryas cucullata cucullata*	5/11/2013	684993	6153728
Hooded Robin	*Melanodryas cucullata cucullata*	22/11/2013	685039	6153631
Painted Honeyeater	*Grantiella picta*	5/11/2013	684294	6155482
Painted Honeyeater	*Grantiella picta*	5/11/2013	684353	6155092
Painted Honeyeater	*Grantiella picta*	6/11/2013	676121	6185520
Painted Honeyeater	*Grantiella picta*	5/11/2013	681234	6168811
Painted Honeyeater	*Grantiella picta*	5/11/2013	684821	6153750
Painted Honeyeater	*Grantiella picta*	6/11/2013	676121	6185520
Painted Honeyeater	*Grantiella picta*	7/11/2013	684527	6154269
Rainbow Bee-eater	*Merops ornatus*	9/11/2013	677648	6168581
Scarlet Robin	*Petroica multicolor*	04-NOV-11 10:50:51AM	686294	6155219
Scarlet Robin	*Petroica multicolor*	10/07/2013	685128	6156909
Scarlet Robin	*Petroica multicolor*	9/07/2013	681305	6182534
Scarlet Robin	*Petroica multicolor*	5/11/2013	685990	6155526
Scarlet Robin	*Petroica multicolor*	5/11/2013	685555	6152643
Scarlet Robin	*Petroica multicolor*	22/11/2013	685056	6153653
Speckled Warbler	*Pyrrholaemus saggitatus*	7/11/2013	681560	6179043
Speckled Warbler	*Pyrrholaemus saggitatus*	22/11/2003	685362	6153114
Superb Parrot	*Polytelis swainsonii*	01-NOV-11 5:56:59PM	677938	6148984
Superb Parrot	*Polytelis swainsonii*	03-NOV-11 8:15:50AM	683418	6159188
Superb Parrot	*Polytelis swainsonii*	02-NOV-11 8:23:03AM	679382	6168635
Superb Parrot	*Polytelis swainsonii*	31-OCT-11 6:32:09PM	675104	6183374

Common Name	Species Name	Date	Easting	Northing
Superb Parrot	*Polytelis swainsonii*	3-Nov-11	678508	6164702
Superb Parrot	*Polytelis swainsonii*	3-Nov-11	676177	6146804
Superb Parrot	*Polytelis swainsonii*	31-Oct-11	674556	6183950
Superb Parrot	*Polytelis swainsonii*	3-Nov-11	683804	6159884
Superb Parrot	*Polytelis swainsonii*	3-Nov-11	678872	6163406
Superb Parrot	*Polytelis swainsonii*	6/11/2013	676493	6177183
Superb Parrot	*Polytelis swainsonii*	6/11/2013	676404	6177568
Superb Parrot	*Polytelis swainsonii*	4/11/2013	675060	6182972
Superb Parrot	*Polytelis swainsonii*	4/11/2013	672853	6186926
Superb Parrot	*Polytelis swainsonii*	4/11/2013	673100	6186325
Superb Parrot	*Polytelis swainsonii*	4/11/2013	674506	6184099
Superb Parrot	*Polytelis swainsonii*	5/11/2013	684506	6154462
Superb Parrot	*Polytelis swainsonii*	5/11/2013	684340	6152700
Superb Parrot	*Polytelis swainsonii*	5/11/2013	684537	6154394
Superb Parrot	*Polytelis swainsonii*	5/11/2013	680881	6168686
Superb Parrot	*Polytelis swainsonii*	5/11/2013	671270	6180119
Superb Parrot	*Polytelis swainsonii*	6/11/2013	673871	6184961
Superb Parrot	*Polytelis swainsonii*	6/11/2013	676594	6176208
Superb Parrot	*Polytelis swainsonii*	6/11/2013	677668	6176208
Superb Parrot	*Polytelis swainsonii*	7/11/2013	678785	6175208
Superb Parrot	*Polytelis swainsonii*	8/11/2013	677480	6176941
Superb Parrot	*Polytelis swainsonii*	8/11/2013	676591	6176557
Superb Parrot	*Polytelis swainsonii*	8/11/2013	685170	6153365
Superb Parrot	*Polytelis swainsonii*	4/11/2013	675271	6179176
Superb Parrot	*Polytelis swainsonii*	6/11/2013	676381	6178142
Superb Parrot	*Polytelis swainsonii*	4/11/2013	678826	6163733
Superb Parrot	*Polytelis swainsonii*	5/11/2013	679261	6167934
Superb Parrot	*Polytelis swainsonii*	4/11/2013	677043	6175170
Superb Parrot	*Polytelis swainsonii*	6/11/2013	680977	6168816
Superb Parrot	*Polytelis swainsonii*	6/11/2013	676895	6176326
Superb Parrot	*Polytelis swainsonii*	6/11/2013	675259	6179183
Superb Parrot	*Polytelis swainsonii*	7/11/2013	677645	6170243
Superb Parrot	*Polytelis swainsonii*	7/11/2013	677226	6173493
Superb Parrot	*Polytelis swainsonii*	7/11/2013	675259	6179183
Superb Parrot	*Polytelis swainsonii*	4/11/2013	679781	6168640
Superb Parrot	*Polytelis swainsonii*	21/11/2013	684872	6153141
Superb Parrot / Nest	*Polytelis swainsonii*	22/11/2013	680988	6168066
Superb Parrot / Nest	*Polytelis swainsonii*	22/11/2013	685280	6153593
Varied Sittella	*Daphoenositta chrysoptera*	6/11/2013	682728	6175800
Varied Sittella	*Daphoenositta chrysoptera*	8/11/2013	686342	6155645
White-fronted Chat	*Epthianura albifrons*	4/11/2013	676270	6183177
White-fronted Chat	*Epthianura albifrons*	5/11/2013	6181565	679405
White-fronted Chat	*Epthianura albifrons*	21/11/2013	684556	6153135

Common Name	Species Name	Date	Easting	Northing
White-fronted Chat (pair)	*Epthianura albifrons*	11/10/2013	679491	6181820

APPENDIX B THREATENED SPECIES EVALUATIONS

The tables in this appendix present the habitat evaluation for threatened species, ecological communities and endangered populations returned from database searches undertaken as described in Section 3. The likelihood of occurrence is based on presence of habitat, proximity of nearest records and mobility of the species (where relevant). The assessment of potential impact is based on the nature of the proposal, the ecology of the species and its likelihood of occurrence. The following classifications are used:

Presence of habitat

Present:	Potential or known habitat is present within the project area
Marginal:	Habitat present is not typical but may be suitable, or habitat type is suitable but condition and microhabitat requirements of species are not present
Absent:	No potential or known habitat is present within the project area

Likelihood of occurrence

None:	Species known or predicted within the locality but no suitable habitat present within the study area
Unlikely:	Species known or predicted within the locality. Suitable habitat may be present in the study area but the proximity of nearest records suggest it is unlikely to occur
Possible:	Suitable habitat present and the species could occur in the study area based on the proximity of nearest records
Present:	Species was recorded during the field investigations

Potential for impact

No:	The proposal would not result in an impact to this species. No Assessment of Significance (AoS) is necessary for this species
Low:	The proposal is unlikely to result in an impact to this species. No Assessment of Significance (AoS) is necessary for this species
Moderate:	The proposal could impact this species or its habitats. This species is considered further in this assessment. The risk to this species is considered manageable and an AoS is not considered necessary
High:	The proposal is likely to impact this species or its habitats. An AOS has been applied to these entities

Information on habitat is sourced from species profiles on the NSW OEH threatened species database or the Australian Government's Species Profiles and Threats database (SPRAT) unless otherwise stated.

Grey shading indicates species for which an Assessment of Significance was undertaken (Appendix C).

B.1 FLORA

Species and Status	Ecology and distribution	Presence of habitat	Likelihood of occurrence	Potential to be impacted?	AoS?
Trees					
Black Gum ***Eucalyptus aggregata*** **V TSC**	Black Gum has a moderately narrow distribution, occurring mainly in the wetter, cooler and higher parts of the tablelands, for example in the Blayney, Crookwell, Goulburn, Braidwood and Bungendore districts. Grows in the lowest parts of the landscape. Grows on alluvial soils, on cold, poorly-drained flats and hollows adjacent to creeks and small rivers. Often grows with other cold-adapted eucalypts, such as Snow Gum or White Sallee (*Eucalyptus pauciflora*), Manna or Ribbon Gum (*E. viminalis*), Candlebark (*E. rubida*), Black Sallee (*E. stellulata*) and Swamp Gum (*E. ovata*). Black Gum usually occurs in an open woodland formation with a grassy groundlayer dominated either by River Tussock (*Poa labillardierei*) or Kangaroo Grass (*Themeda australis*), but with few shrubs.	Absent	None	No	×
Shrubs					
Bossiaea fragrans **TSC - CE**	Currently only known from the Abercrombie Karst Conservation Reserve, south of Bathurst on the NSW central tablelands. It is highly restricted with only two known populations. Occurs on slate and volcanic substrates within open White Box (Eucalyptus albens) Woodland.	Absent	None	No	×
Cotoneaster Pomaderris	A shrub growing to 4 m tall. Has a very disjunct distribution, being known from the Nungatta area, northern Kosciuszko National Park (near Tumut), the	Absent	None	No	×

Species and Status	Ecology and distribution	Presence of habitat	Likelihood of occurrence	Potential to be impacted?	AoS?
Pomaderris cotoneaster **TSC - E** **EPBC - E**	Tantawangalo area in South-East Forests National Park and adjoining freehold land, Badgery's Lookout near Tallong, the Yerranderie area, the Canyonleigh area and Ettrema Gorge in Morton National Park. The species has also been recorded along the Genoa River in Victoria. Has been recorded in a range of habitats in predominantly forested country. The habitats include dry, shrubby open forest with deep, friable soil, amongst rock beside a creek, on rocky forested slopes and in steep gullies between sandstone cliffs. Has been associated with *Westringia sp. aff. longifolia, Grevillea lanigera, Prostanthera sp. nov., Eucalyptus radiata, Olearia sp., Kunzea ericoides* and *Acacia pravissima*.				
Dwarf Bush-pea ***Pultenaea humilis*** **TSC - V**	Rare in New South Wales and Tasmania, but relatively common in Victoria. In NSW, *Pultenaea humilis* is currently known from three confirmed localities in the NSW South Western Slopes bioregion: Woomargama National Park, Wereboldera State Conservation Area, and Murraguldrie State Forest. The extent of occurrence of *Pultenaea humilis* in NSW is estimated to be approximately 6000 km^2. However the total population of *Pultenaea humilis* in NSW is not known. *Pultenaea humilis* is found in isolated remnants of native woodland and forest communities that occur in extensively cleared agricultural landscapes. Occurs on a variety of soils ranging from sandy loams to clays.	Present	Unlikely – no records within 50km of the site	Low	×
Pale Pomaderris ***Pomaderris pallida*** **TSC - V** **EPBC - V**	A compact, rounded shrub to 1.5 m tall. Has been recorded from near Kydra Trig, north-west of Nimmitabel, Tinderry Nature Reserve, the Queanbeyan River and the Murrumbidgee River west of the ACT. A record from Byadbo in Kosciuszko National Park has not been relocated. It is also found along the Murrumbidgee River in the ACT and has been recently	Marginal	Unlikely – no records within 50km of the site	Low	×

Species and Status	Ecology and distribution	Presence of habitat	Likelihood of occurrence	Potential to be impacted?	AoS?
	recorded in eastern Victoria. This species usually grows in dry open forests and shrub communities surrounded by Brittle Gum (*Eucalyptus mannifera*) and Red Stringybark (*E. macrorhynca*) or *Callitris spp*. woodland. The mid-stratum often has *Grevillea juniperina*, *Bursaria spinosa*, *Acacia rubida*, and *Kunzea ericoides.* Found at numerous small sites along the plateau edge and very steep upper slopes and cliffs of river valleys at 480-600 m asl.				
Philotheca ericifolia **V TSC**	Known only from the upper Hunter Valley and Pilliga to Peak Hill districts of NSW. The records are scattered over a range of over 400 km between West Wyalong and the Pilliga Scrub. Grows chiefly in dry sclerophyll forest and heath on damp sandy flats and gullies. It has been collected from a variety of habitats including heath, open woodland, dry sandy creek beds, and rocky ridge and cliff tops.	Absent	None	No	×
Tumut Grevillea ***Grevillea wilkinsonii*** **TSC – E** **EPBC - E**	Has a highly restricted distribution on the NSW south-west slopes. Its main occurrence is along a 6 km stretch of the Goobarragandra River approximately 20 km east of Tumut where about 800 plants are known. The other site is a small population on private land near Gundagai where only seven mature plants survive. At the Goobarragandra River sites, it grows close to the water, at altitudes between 310 and 340 m. The majority of plants occur on steep rocky slopes less than 10m from the edge of the river. Grows in shallow crevices of granite or serpentine rock, sometimes in deeper brown loam overlying rock. The associated native vegetation includes remnant riverine shrub communities adjacent to open-forest, with the most common tree species being Blakely's Red Gum (*Eucalyptus blakelyi*), Apple Box (*E. bridgesiana*), Yellow Box (*E. melliodora*), and	Present	Unlikely – nearest records 80km south-west of the site	Low	×

Species and Status	Ecology and distribution	Presence of habitat	Likelihood of occurrence	Potential to be impacted?	AoS?
	Red Stringybark (*E. macrorhyncha*) and with Kurrajongs (*Brachychiton populneus*) growing in nearby paddocks.				
Wee Jasper Grevillea ***Grevillea iaspicula*** **TSC - E** **EPBC - E**	Found only in the Wee Jasper area, along the steep cliffs of the Goodradigbee River, and on the shores of Lake Burrinjuck near Burrinjuck village on the border of the Southern Tablelands and South Western Slopes. Although there is no evidence that the Grevillea was widespread in the recent past, it is possible that some of its original population was submerged following the damming of Lake Burrinjuck. Grows only on rocky outcrops, cave entrances, sinkholes, and cliff bases in limestone country. It occurs in *Eucalyptus* and *Brachychiton* low woodland with a generally open shrub and grass understorey. Flowering is mostly in spring, with some flowers also produced in autumn. A high proportion of the remnant populations are on private land. The distribution of this species overlaps with the "Natural Temperate Grassland of the Southern Tablelands of NSW and the Australian Capital Territory" EPBC Act-listed threatened ecological community.	Absent	None	No	×
Wollemi Mint-bush ***Prostanthera cryptandroides* subsp. *cryptandroides*** **TSC - V**	Occurs in restricted areas but over a fairly broad range from the Lithgow and Sandy Hollow Districts into the Border Rivers/Gwydir Catchment and up into Queensland. It has been collected at Mt Gundangaroo near Glen Davis, on a walking track to Newnes, and on the upper Hunter River. Occurs in the Wollemi National Park and is likely to also occur within the Goulburn River National Park. Found in dry sclerophyll forested slopes and gullies, in rocky areas, especially at the base of scree slopes and sandstone boulders, and in shallow sandy loam. Associated communities include: Narrabeen Rocky Heath, Narrabeen Acacia Woodland, Narrabeen Exposed Woodland; Open Heath of *Calytrix*	Absent	None	No	×

Species and Status	Ecology and distribution	Presence of habitat	Likelihood of occurrence	Potential to be impacted?	AoS?
	tetragona, Leptospermum parviflorum, Isopogon dawsonii; and Open Scrubland of *Eucalyptus dwyeri, Baeckea densifolia, Dillwynia floribunda, Aotus ericoides* and *Hemigenia cuneifolia*.				
Ferns					
Austral Pillwort ***Pilularia novae-hollandiae*** **TSC - E**	A semi-aquatic fern, resembling a small fine grass. In NSW, Austral Pilwort has been recorded from suburban Sydney, Khancoban, the Riverina between Albury and Urana (including Henty, Walbundrie, Balldale and Howlong), Oolambeyan National Park near Carathool and at Lake Cowal near West Wyalong. The populations at Lake Cowal and Oolambeyan NP are the only known extant populations in NSW, although the species is obscure and has possibly been overlooked elsewhere. The species has also been recorded in the Australian Capital Territory, Victoria, Tasmania, South Australia and Western Australia. Most of the records in the Albury-Urana area were from table drains on the sides of roads. The ACT record was from a subalpine grassy plain. This species is probably ephemeral (especially in the drier parts of its range), appearing when soils are moistened by rain. Grows in shallow swamps and waterways, often among grasses and sedges. It is most often recorded in drying mud as this is when it is most conspicuous.	Absent	None	No	×
Forbs					
Austral Toadflax ***Thesium australe*** **TSC - V**	An erect perennial herb to 40 cm high. 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 and Queensland	Absent	None	No	×

Species and Status	Ecology and distribution	Presence of habitat	Likelihood of occurrence	Potential to be impacted?	AoS?
EPBC - V	and in eastern Asia. Occurs in grassland or grassy woodland, often found in damp sites in association with Kangaroo Grass (*Themeda australis*). A root parasite that takes water and some nutrients from other plants, especially Kangaroo Grass. Flowering is predominantly in spring and summer.				
Button Wrinklewort ***Rutidosis leptorrhynchoides*** **TSC - E** **EPBC - E**	Known from 17 populations in the ACT region (ten within the ACT, six near Queanbeyan and one near Goulburn (NSW)) and nine in Victoria. Occurs in box-gum woodland, secondary grassland derived from box-gum woodland or in natural temperate grassland; and often in the ecotone between the two communities. In the ACT and NSW, topography is undulating, 570–780 m above sea level and soils are red-brown clays to clay loams, shallow and stony. Tends to occupy areas where there is less competition from other plants and less shading from woodland trees. Exhibits an ability to colonise disturbed areas (eg. vehicle tracks, bulldozer scrapings and areas of soil erosion). It grows best where the grass and herb cover is relatively low, these sites usually occur on low rises with shallow soil and low moisture status. Associated eucalypts at NSW and ACT sites include Blakely's Red Gum (*Eucalyptus blakelyi*), Long-leaved Box (*E. goniocalyx*), Yellow Box (*E. melliodora*), Red Box (*E. polyanthemos*) and Apple Box (*E. bridgesiana*). Many sites are associated with Kangaroo Grass (*Themeda triandra*).	Present	Unlikely – No records within 50km of the site	Low	×
Claypan Daisy ***Brachyscome muelleroides***	The Claypan Daisy is an annual herb that grows to 14 cm tall. Occurs in the Wagga Wagga, Narranderra, Tocumwal and Walbundrie areas. Also occurs in north-central Victoria (only along the Murray from Tocumwal to the Ovens River). Only five sites have precise locality	Absent	None	No	×

Species and Status	Ecology and distribution	Presence of habitat	Likelihood of occurrence	Potential to be impacted?	AoS?
TSC – V **EPBC - V**	details, and four of these are on Morundah Station in NSW. Occurs in seasonally damp situations such as shallow depressions and around the margins of swamps, lagoons and claypans, on heavy grey cracking clays to lighter clay loam soils, in grassland, grassy woodland and open forest habitats, growing in association with various grasses and seasonal aquatic plants such as *Marsilea* species. Associated species include *Pycnosorus globosus, Agrostis avenacea, Austrodanthonia duttoniana*, and *Calotis anthemoides*.				
Hoary Sunray ***Leucochrysum albicans*** **ssp *albicans* var *tricolor*** **EPBC - E**	Perennial daisy growing in grasslands and grassy woodlands, often colonising disturbed sites such as road verges, but does not persist well in grazed situations. Flowers spring-summer. May be locally common, and is not listed as threatened in NSW. Recorded around Goulburn. (Var albicans recorded at Lake Bathurst).	Present	Possible – recorded 2.5km west of the site, but not recorded during targeted surveys for the species	No	×
Narrow Goodenia ***Goodenia macbarronii*** **V TSC**	Narrow Goodenia grows on the western slopes of the Great Dividing Range in NSW, south from the Guyra and Inverell districts. It is widely distributed throughout the tablelands, western slopes and western plains. Narrow Goodenia is an annual which appears seasonally and opportunistically in ephemerally damp or wet sites and is often common at sites after good winter-rainfall periods. It favours moist, shaded, sandy sites, soils with impeded drainage, damp muddy areas of winter inundation, spring-fed paddocks and open areas where water is more available. Often found in sites with some form of recent disturbance, such as depressions and clearings made by grading and excavation along roadsides, open grazing land and paddocks inundated	Absent	None	No	×

Species and Status	Ecology and distribution	Presence of habitat	Likelihood of occurrence	Potential to be impacted?	AoS?
	by weed species and areas previously cleared and grazed by cattle.				
Mountain Swainson-pea ***Swainsona recta*** **TSC - E** **EPBC - E**	A slender, erect pinnate perennial pea growing to 30 cm tall. Recorded near Queanbeyan and Wellington-Mudgee area on undulating terrain, often stony hillsides. Natural habitat is Box-Gum Woodland. Plants die back in summer, surviving as rootstock until they shoot again in autumn..	Present	Unlikely – nearest record over 40km south-west of the site	Low	×
Mueller's Eyebright ***Euphrasia collina*** **subsp. *muelleri*** **TSC - E** **EPBC - E**	A perennial, parasitic herb or subshrub, which grows to about 50 cm tall. Once widespread in south-eastern Australia, Mueller's Eyebright is now known only from the Mornington Peninsula near Melbourne. It has been recorded in NSW in the upper Murray and McIntyre Rivers and was last recorded in NSW near Dorrigo in 1904 and near Cootamundra in 1887. Little is known about the habitat this species preferred, although there is a reference to "damp places" in an early von Mueller collection. At McKellar Flora Reserve, associated species include *Eucalyptus cephalocarpa, Hakea ulicina, Epacris impressa, Pultenaea dentata, Austrostipa muelleri*. At Greens Bush, associated species include *Leptospermum myrsinoides, Xanthorrhoea australis, Banksia marginata, Leucopogon virgatus, Monotoca scoparia*. At Wrens Flat the vegetation is open forest dominated by *Eucalyptus rubida, E. radiata, Acacia dealbata, A. melanoxylon, Bursaria spinosa, Poa sieberiana, Themeda triandra.*	Absent	None	No	×
Silky Swainson-pea		Present	Unlikely – nearest record	Low	×

Species and Status	Ecology and distribution	Presence of habitat	Likelihood of occurrence	Potential to be impacted?	AoS?
Swainsona sericea **TSC - V**	The Silky Swainson-pea is found in grassy woodland and secondary grassland in areas with low grazing pressure. As this species is a prostrate or erect perennial, growing to 10 cm tall and the stems and leaves are densely hairy the species is readily identifiable in the field and surveys can be conducted at most times of the year (excluding winter) to detect the presence of this species. It has been recorded from the Northern Tablelands to the Southern Tablelands and further inland on the slopes and plains. There is one isolated record from the far north-west of NSW. Its stronghold is on the Monaro in Natural Temperate Grassland and Snow Gum *Eucalyptus pauciflora* Woodland. It is found in Box-Gum Woodland in the Southern Tablelands and South West Slopes and sometimes found in association with cypress-pines *Callitris* spp. Habitat on plains is unknown.		over 40km south-east of the site.		
		Note: As many areas of the site have been extensively cleared or have been grazed a lot of remnant wooded areas now support a low diversity of native pasture species and forbs. Additionally, common weeds associated with grazing have invaded areas of more intact woodland and forest vegetation. As a consequence the primary habitat for this species is largely absent from the project site. Box Gum Woodland in moderate or good condition is considered to be the most likely habitat this species would be found. Potential to be impacted is low given that this species was detectable during the surveys and not recorded, much of its habitat on site is primarily degraded, good condition Box Gum Woodland has been largely avoided, and the nearest record of this species occurs 40 km from the project site, the proposal is not considered to adversely affect a viable population of this species such that is would be placed at risk of extinction. This species was therefore considered a low risk species.			
Small Pale Grass-lily ***Caesia parviflora* var. *minor*** **TSC - E**	The Small Pale Grass-lily is an inconspicuous herb. Occurs uncommonly in Tasmania, southern Victoria and south-east South Australia with an outlying population in NSW, in Barcoongere State Forest, between Grafton and Coffs Harbour. This variety may be more common than currently known, as Pale Grass-lilies are often not identified to variety level. Found in damp places in open forest on sandstone. Flowers spring to summer.	Absent	None	No	×
Small Scurf-pea ***Cullen parvum***	Known in NSW from only two herbarium collections; one from Wagga Wagga in 1884 and the other from Jindera (near Albury) in 1967. A small population was	Absent	None	No	×

Species and Status	Ecology and distribution	Presence of habitat	Likelihood of occurrence	Potential to be impacted?	AoS?
TSC - E	recently reported from near Jerilderie (although it has not been relocated). In recent years, two populations have been recorded in travelling stock reserves south-west of Wagga Wagga, and a population reputedly exists on a roadside near Galong. Large populations have been recorded in grassy gaps in the Red Gum Woodlands of Barmah State Park, just across the border in Victoria. Extensive suitable habitat probably occurs across the border in NSW. In known populations in Victoria and NSW, plants are found in grassland, River Red Gum (*Eucalyptus camaldulensis*) Woodland and even grazing country and table drains, in areas with rainfall of between 450 and 700 mm. Plants often occur near watercourses.				
Woolly Ragwort ***Senecio garlandii*** **TSC - V** **EPBC - V**	Almost entirely known from the western slopes of the Great Dividing Range in southern NSW. In NSW known from a very localised strip from West Wyalong to the Albury district, in the Central Western Slopes and South Western Slopes regions. The site of greatest abundance appears to be The Rock NR, over 340 ha, about 30 km SE of Wagga Wagga. Has also been collected at Tabletop Range, a site "15 miles ESE of The Rock", Gidginbung, "near Albury", Flowerpot Hill (4 km S of The Rock NR), Ulandra NR (7 km SE of Bethungra), Benambra SF (20 km W of Holbrook), Burrinjuck and near Temora. Occurs in dry sclerophyll forest and open woodland in association with *Eucalyptus macrorhyncha, E. goniocalyx, Acacia doratoxylon, A. implexa* and *Brachychiton populneus*. Grows on the sheltered lower slopes or upper parts of south to east-facing slopes of isolated rocky outcrops.	Marginal	Unlikely – no records within 50km of the site	Low	×

Species and Status	Ecology and distribution	Presence of habitat	Likelihood of occurrence	Potential to be impacted?	AoS?
Yass Daisy ***Ammobium craspedioides*** **TSC - V** **EPBC - V**	Found from near Crookwell on the Southern Tablelands to near Wagga Wagga on the South Western Slopes. Most populations are in the Yass region, at Lake Burrinjuck, Bookham, Rye Park and Dalton. Found in moist or dry forest communities, Box-Gum Woodland and secondary grassland derived from clearing of these communities. Grows in association with a large range of eucalypts (*Eucalyptus blakelyi*, *E. bridgesiana*, *E. dives*, *E. goniocalyx*, *E. macrorhyncha*, *E. mannifera*, *E. melliodora*, *E. polyanthemos*, *E. rubida*). Apparently unaffected by light grazing, as populations persist in some grazed sites.	Present	Possible – multiple records within 2.5km of the site	High	✓
Orchids					
Crimson Spider Orchid ***Caladenia concolor*** **TSC – E** **EPBC - E**	Crimson Spider Orchid is deciduous; producing a leaf during autumn or winter and after flowering in spring survives the dry summer and early autumn as a dormant tuber. It prefers regrowth woodland on granite ridges with a high diversity of plant species, including other orchids. Dominant trees are *E. blakelyi, E. macrorhyncha, E. polyanthemos* and *E. albens.*	Absent	None	No	×
		NOTE: High diversity woodland occurs only in the south of the site however, the dominant tree species (Yellow Box) is not typically associated with this species. **T**his species prefers better quality habitat than that available within the project site. Typical habitat for this species was not found within the project site. Further, the nearest records for this species are approximately 95km west of the site. It is considered highly unlikely that the species occurs within the project site and as such the proposal is not considered to adversely affect a viable population of this species such that is would be placed at risk of extinction. It is considered that there is no potential for impact to this species and further surveys are not required.			
Pine Donkey Orchid ***Diuris tricolor*** **TSC - V** **EPBC - V**	The Pine Donkey Orchid (formerly known as *Diuris sheaffiana*) is a terrestrial species that has a flower stalk 20-40 cm high. It is sporadically distributed on the western slopes of NSW, extending from south of Narrandera all the way to the far north of NSW.	Absent	None	No	×

Species and Status	Ecology and distribution	Presence of habitat	Likelihood of occurrence	Potential to be impacted?	AoS?
	Localities include the Condobolin-Nymagee road, Wattamondara towards Cowra, Cooyal, Adelong, Red Hill north of Narrandera, Coolamon, near Darlington Point, Eugowra, Girilambone, Dubbo, Muswellbrook, and several sites west of Wagga Wagga. Disturbance regimes are not known, although the species is usually recorded from disturbed habitats. Associated species include *Callitris glaucophylla, Eucalyptus populnea, Eucalyptus intertexta*, Ironbark and *Acacia* shrubland. The understorey is often grassy with herbaceous plants such as *Bulbine* speciesIt is found in sandy soils, either on flats or small rises. Also recorded from a red earth soil in a Bimble Box community in western NSW. Usually recorded as common and locally frequent in populations, however only one or two plants have also been observed at sites. The species has been noted as growing in large colonies.				
Sand-hill Spider Orchid ***Caladenia arenaria*** **TSC - E** **EPBC - E**	The Sand-hill Spider Orchid is currently only known to occur in the Riverina between Urana and Narranderra. Occurs in woodland with sandy soil, especially that's dominated by White Cypress Pine (*Callitris glaucophylla*). Many of the associated species in the understorey are different at each of the populations, or are species that are widespread and occur in a range of habitats. It is apparent that *C. arenaria* has fairly broad habitat tolerances, occurring in *Callitris glaucophylla - Eucalyptus melliodora* (Yellow Box) woodlands, *Callitris glaucophylla – Allocasuarina luehmannii* woodlands and woodlands dominated by a mixture of *Callitris glaucophylla, E. dwyeri* (Dwyer's Redgum) and *Acacia doratoxylon* (Currawang). Soils vary from skeletal soils over sandstone to clay loams.	Absent	None	No	×

Species and Status	Ecology and distribution	Presence of habitat	Likelihood of occurrence	Potential to be impacted?	AoS?
Tarengo Leek Orchid ***Prasophyllum petilum*** **TSC - E** **EPBC - E**	Small leek orchid with white-green flower spike to 12cm tall. Recorded from Box-Gum Woodland in Hall cemetery, and in Natural Temperate Grassland at Captains Flat and Boorowa. Appears highly sensitive to grazing. Higher densities at Boorowa in Wallaby Grass. Flowers Oct at Boorowa and Dec at Captains Flat. The Hall and Captains Flat populations occur in areas with high watertables. Flowers Oct-Nov.	Present	Possible – recorded 20kms west of the site	Moderate	×
Graminoids and grasses					
A spear-grass ***Austrostipa wakoolica*** **E TSC**	Confined to the floodplains of the Murray River tributaries of central-western and south-western NSW. Grows on floodplains of the Murray River tributaries, in open woodland on grey, silty clay or sandy loam soils; habitats include the edges of a lignum swamp with box and mallee; creek banks in grey, silty clay; mallee and lignum sandy-loam flat; open Cypress Pine forest on low sandy range; and a low, rocky rise.	Absent	None	No	×
Raleigh Sedge ***Carex raleighii*** **TSC - E**	Raleigh Sedge is a small and inconspicuous perennial sedge that grows from underground stems (rhizomes) to 25 cm tall. In NSW Raleigh Sedge is found only in areas above 1200 metres on the Southern Tablelands. Most populations are in Kosciuzsko National Park (eg. Charlottes Pass area, Muellers Pass, Tantangara area and the upper Tooma and Tumut valleys). Also occurs in vicinity of Snowy Plain (private land and travelling stock reserve). The only population recently confirmed to be extant is that at Spencers Creek, below Charlottes Pass. Grows in sphagnum bogs and high mountain	Absent	None	No	×

Species and Status	Ecology and distribution	Presence of habitat	Likelihood of occurrence	Potential to be impacted?	AoS?
	wetlands, as well as damp grasslands and stream-edges of sub-alpine plains.				
Ecological communities					
White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and derived native grasslands **TSC – EEC** **EPBC - CEEC**	An open woodland community (sometimes occurring as a forest formation), in which the most obvious species are one or more of the following: White Box *Eucalyptus albens*, Yellow Box *E. melliodora* and Blakely's Red Gum *E. blakelyi*.	Present	Present	High	✓
Grey Box *(Eucalyptus microcarpta)* Grassy Woodlands and derived native grasslands **TSC - EEC**	Inland Grey Box Woodland includes those woodlands in which the most characteristic tree species, *Eucalyptus microcarpa* (Inland Grey Box), is often found in association with *E. populnea* subsp. *bimbil* (Bimble or Poplar Box), *Callitris glaucophylla* (White Cypress Pine), *Brachychiton populneus* (Kurrajong), *Allocasuarina luehmannii* (Bulloak) or *E. melliodora* (Yellow Box), and sometimes with *E. albens* (White Box).	Absent	None	No	×
Natural Temperature Grasslands of the Southern Tablelands **TSC - EEC**	Natural Temperate Grassland is a naturally treeless or sparsely-treed community, in which the most obvious components are various species of native grasses. Intact sites have a diversity of wildflowers (forbs) including lilies, orchids, peas, daisies and many more. Sites may contain a low density of trees or shrubs and may also contain wet areas that are habitat for wetland flora species.		None	No - There is no potential for impact to this community.	×
		NOTE: Habitat for this community does not occur within the areas to be impacted by the proposal. Treeless areas are almost certainly derived from the clearing of the woodland and forest communities that occur within the project boundaries. This is evidenced by the presence of remnant paddock trees and patches of trees within cleared areas that are associated with the surrounding woodland and forest			

Species and Status	Ecology and distribution	Presence of habitat	Likelihood of occurrence	Potential to be impacted?	AoS?
		communities and that woodland and forest occurs within similar topographic situations to the cleared areas.			
Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland **TSC - EEC**	An open woodland community (sometimes occurring as an open-forest formation), in which the most obvious species are one or more of the following: Snow Gum (Eucalyptus pauciflora), Black Sallee (E. stellulata), Candlebark (E. rubida) and Ribbon Gum (E. viminalis). Other tree species may occur, most frequently Swamp Gum (E. ovata), Black Gum (E. aggregata), Silver Wattle (Acacia dealbata) or Blackwood (A. melanoxylon).	Absent	None	No	×
Fuzzy Box Woodland on alluvial soils **TSC - EEC**	Tall woodland or open forest dominated by Fuzzy Box *Eucalyptus conica*, often with Grey Box *Eucalyptus microcarpa*, Yellow Box *Eucalyptus melliodora*, or Kurrajong *Brachychiton populneus*. Buloke *Allocasuarina luehmannii* is common in places. Shrubs are generally sparse, and the groundcover moderately dense, although this will vary with season.	Absent	None	No	×
Tableland Basalt Forest **TSC - EEC**	Tableland Basalt Forest is dominated by an open eucalypt canopy of variable composition. *Eucalyptus viminalis, E. radiata, E. dalrympleana* subsp. *dalrympleana* and *E. pauciflora* may occur in the community in pure stands or in varying combinations. Tableland Basalt Forest typically 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 vegetation community does not occur within the project site and the community was not returned on the Atlas of Wildlife search for the four CMA sub-regions that the project site spans. Additionally, the predicted and known occurrence of this community does not include that of the project site. Of the dominant Eucalypt	None	No - There is no potential for impact to this community.	×

Species and Status	Ecology and distribution	Presence of habitat	Likelihood of occurrence	Potential to be impacted?	AoS?
		species, only *Eucalyptus viminalis* was recorded on site.			

B.2 FAUNA

The following fauna were returned from database searches.

Species and Status	Ecology and distribution	Presence of habitat	Likelihood of occurrence	Potential to be impacted?	Aos?
Amphibians					
Booroolong Frog ***Litoria booroolongensis*** **E TSC** **E EPBC**	Lives along permanent streams with some fringing vegetation cover such as ferns, sedges or grasses. It typically inhabits rocky western-flowing creeks and their headwaters, although a small number of animals have also been recorded in eastern-flowing streams. Adults occur on or near cobble banks and other rock structures within stream margins. Shelters under rocks or amongst vegetation near the ground on the stream edge. .	Absent	None	No	×
Sloane's Froglet ***Crinia Sloanei*** **V TSC**	Sloane's Froglet has been recorded from widely scattered sites in the floodplains of the Murray-Darling Basin, with the majority of records in the Darling Riverine Plains, NSW South Western Slopes and Riverina bioregions in New South Wales. It has not been recorded recently in the northern part of its range and has only been recorded infrequently in the southern part of its range in NSW. It is typically associated with periodically inundated areas in grassland, woodland and disturbed habitats (DECCW 2009).	Present	Possible	Moderate Construction impacts	×
Birds					
Australasian Bittern ***Botaurus poiciloptilus*** **V TSC**	Little is known of the behaviour of this cryptic waterbird. May be nomadic as it has been observed occupying ephemeral wetlands. Seeds and invertebrates are foraged for on the water's edge.	Absent	Unlikely	Low	×
Barking Owl ***Ninox connivens*** **V TSC**	This species is found throughout Australia except for the central arid regions and Tasmania. It has declined across much of its range across NSW and is most frequently recorded on the western slopes and plain. It occurs in dry box-dominated	Present	Possible	Moderate habitat loss; blade-strike	×

Species and Status	Ecology and distribution	Presence of habitat	Likelihood of occurrence	Potential to be impacted?	Aos?
	forest and woodlands and roosts in dense foliage of *Acacia, Casuarina* or *Eucalyptus* species. It nests in large hollows (20-46 cm diameter) of large, old eucalypts including River Red Gum, White Box, Red Box and Blakely's Red Gum (NPWS 2003a). Nest and roost sites are usually near watercourses or wetlands (NPWS, 2003a). The species have also been recorded in remnants of forest and woodland and in clumps of trees at farms, towns and golf courses (NPWS, 2003a). Have large territories of 30 to more than 200 hectares (NPWS, 2003a).				
Black-chinned Honeyeater (eastern subspecies) ***Melithreptus gularis gularis*** **V TSC**	This species is widespread west of the Great Dividing Range, although has declined throughout its range due to removal and fragmentation of habitat. It inhabits the upper levels of drier open forests or woodlands most often dominated by box and ironbark eucalypts, particularly Mugga Ironbark, White Box, Grey Box, Yellow Box and Forest Red Gum. A gregarious species usually seen in pairs and small groups of up to 12 birds and occupies large home ranges of at least 5 hectares. Local populations appear not to persist in remnants less than 200 ha in area (NSW Scientific Committee, 2001).	Present	Possible	Moderate connectivity; blade-strike	×
Black-tailed Godwit ***Limosa limosa*** **V TSC**	Primarily a coastal species. Usually found in sheltered bays, estuaries and lagoons with large intertidal mudflats and/or sandflats. Further inland, it can also be found on mudflats and in water less than 10 cm deep, around muddy lakes and swamps	Absent	Unlikely	Low	×
Blue-billed Duck ***Oxyura australis*** **V TSC**	This species is widespread in NSW although is most common in the southern Murray-Darling Basin area. During spring and summer birds travel up to 300km from non-breeding areas on the Murray River system and coastal lakes to breed in deep swamps of inland NSW. They are often seen in coastal areas in summer and during drought. Feeding occurs in permanent freshwater wetlands and swamps with deep water and dense	Absent	Unlikely	Low	×

Species and Status	Ecology and distribution	Presence of habitat	Likelihood of occurrence	Potential to be impacted?	Aos?
	aquatic vegetation. Nesting occurs in *Cumbungi* over deep water or in dense wetland vegetation.				
Brown Treecreeper (eastern subspecies) ***Climacteris picumnus victoriae*** **V TSC**	Occurs in eucalypt woodlands, mallee and drier open forest of eastern Australia, preferring woodlands lacking dense understorey (Schodde and Tidemann 2007). Feeds on insects in the leaf litter and trunks of trees. Nests in tree hollows, stumps or rotted fence posts. Requires relatively intact woodland areas, nesting in a tree hollow.	Present	Present	Moderate habitat loss	×
Bush Stone-curlew ***Burhinus grallarius*** **E TSC**	In NSW, it is found on lower elevation grassy woodlands of the coast or west of the divide. The area bounded roughly by Albury, Wagga Wagga, Hay and Wentworth is regarded as the stronghold for the species in NSW (DEC NSW, 2006a). This species inhabits open forests and grassy woodlands where it builds nests directly on the ground (DECCW 2010). It requires logs, fallen trees and branches, course litter and some shrubs for shelter. Foraging may occur over large home range (250-600ha) including woodlands, paddocks, grasslands, residential gardens and saltmarsh (DEC NSW, 2006a).	Absent	Unlikely	Low	×
Brolga ***Grus rubicunda*** **E TSC**	This species was formally found across Australia, except for the south-east corner. It inhibits large open wetlands, grassy plains, coastal mudflats and irrigated croplands. Breeding and foraging habitat includes shallow (< 50 cm) wetlands, mudflats and margins of deeper water bodies with emergent vegetation (e.g. canegrass, lignum or sedges) (DECCW 2009).	Absent	Unlikely	Low	×
Diamond Firetail ***Stagonopleura guttata*** **V TSC**	Occurs predominantly west of the Great Dividing Range (Blakers *et al.* 1984) although local populations are known. Feeds predominantly on the ground on grass seeds, in groups from 5 to 150 individuals (Schodde and Tidemann 2007), nesting in pairs or communally in shrubs and small trees. Restricted largely to ungrazed or lightly grazed woodland remnants of grassy eucalypt woodlands, including Box-Gum	Present	Present	Moderate habitat loss	×

Species and Status	Ecology and distribution	Presence of habitat	Likelihood of occurrence	Potential to be impacted?	Aos?
	and Snow Gum Woodlands, and grassland and riparian areas, and sometimes lightly wooded farmland. May form large flocks during winter and autumn.				
Flame Robin ***Petroica phoenicea*** **V TSC**	Flame Robins are found throughout south-eastern Australia, associated with areas of native vegetation with an open understory. It breeds in upland forests and woodlands and migrates to more open lowland habitats in winter. The South Western Slopes bioregion is considered the core wintering region for this species (DECCW 2010).	Present	Present	Moderate habitat loss	×
Freckled Duck ***Stictonetta naevosa*** **V TSC**	This species occurs on wetlands of inland NSW. Large temporary swamps created by floods in the Bulloo and Lake Eyre basins and the Murray-Darling system, particularly along the Paroo and Lachlan Rivers, and other rivers within the Riverina are a breeding stronghold (DECCW 2010). The species is partially migratory and may move to coastal habitats during severe inland drought. The species inhabits a variety of plankton-rich wetland types, including swamps, lakes, farm dams, sewerage ponds and floodwaters that are heavily vegetated with Cumbungi, Lignum, Canegrass or Tea-tree (DECCW 2010).	Absent	Unlikely	Low	×
Gang-gang Cockatoo ***Callocephalon fimbriatum*** **V TSC**	In NSW, this species is distributed from the south-east coast to the Hunter region, and inland to the Central Tablelands and south-west slopes. It occurs regularly in the ACT. It feeds in pairs or small flocks on seeds of eucalypts and wattles, and occurs primarily in heavily timbered and mature wet forest, but occasionally in towns, farming areas (DECCW 2010). It is often a seasonal altitudinal migrant, moving to lower altitudes and more open forests and woodlands (particularly Box-Ironbark assemblages for winter. This species requires large hollows in which to breed (Gibbons and Lindenmayer, 2000)	Marginal	Possible	Moderate habitat loss; blade-strike	×

Species and Status	Ecology and distribution	Presence of habitat	Likelihood of occurrence	Potential to be impacted?	Aos?
Gilbert's Whistler ***Pachycephala inornata*** **V TSC**	This species is sparsely distributed over much of the arid and semi-arid zone of inland southern Australia, west of the western slopes of NSW (DECCW 2010). There are only three separate populations left in NSW. Most of the eastern population occurs in an area enclosed by a line joining Gilgandra to Cobar, then south to Narrandera, east to Wagga Wagga, north to Wellington and back to Gilgandra. In NSW the species occurs mostly in mallee shrubland in association with Spinifex and low shrubs. It also occurs in box-ironbark woodlands, Cypress Pine and Belah woodlands and River Red Gum forests. In woodland habitats, the species requires a dense shrubby understorey (DECCW 2010).	Absent	Unlikely	Low	×
Glossy Black-cockatoo ***Calyptorhynchus lathami*** **V TSC**	Inhabits open forest and woodlands of the coast and the Great Dividing Range up to 1000 m in which stands of She-oak species, particularly Black She-oak (*Allocasuarina littoralis*), Forest She-oak (*A. torulosa*) or Drooping She-oak (*A. verticillata*) occur. Feeds almost exclusively on the seeds of several species of she-oak (*Casuarina* and *Allocasuarina* species), shredding the cones with the massive bill.	Absent	Unlikely	Low	×
Grey Falcon ***Falco hypoleucos*** **E TSC**	The Grey Falcon is sparsely distributed in NSW, chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey. Utilises old nests of other birds of prey and ravens, usually high in a living eucalypt near water or a watercourse	Absent	Unlikely	Low	×
Grey-crowned Babbler (Eastern Subspecies)	This species. In NSW this species occurs west of the Great Dividing Range and on the coast near the Hunter Valley and several locations on the north coast of NSW. It prefers Box Gum Woodlands although also inhabits open forests, scrub	Present	Possible	Low	×

Species and Status	Ecology and distribution	Presence of habitat	Likelihood of occurrence	Potential to be impacted?	Aos?
Pomatostomus temporalis temporalis **V TSC**	lands, even farmlands and suburbs (DECCW 2010; Pizzey et al., 2003). The species is gregarious and forage on the ground on invertebrates on tree trunks and branches and by foraging amongst litter and tussocks. Territories of family groups range from one to fifty hectares (DECCW 2010).				
Hooded Robin (South eastern form) ***Melanodryas cucullata cucullata*** **V TSC**	This species is sparsely distributed throughout much of NSW, and is rarely found on the coast. It is sedentary and occurs in open eucalypt woodland and scrub, often in or near cleared areas (DECCW 2010). The species generally occurs in woodland remnants with high habitat complexity (Watson et al., 2001) and uses stumps, posts or fallen timber for nesting and locating prey on the ground. Territories range from 10 to 30ha (DECCW 2010).	Present	Present	Moderate habitat loss	×
Little Eagle ***Hieraaetus morphnoides*** **V TSC**	Occupies open eucalypt forest, woodland or open woodland. Sheoak or acacia woodlands and riparian woodlands of interior NSW are also used. Nests in tall living rees within a remnant patch, where pairs build a large stick nest in winter.	Present	Possible	High blade-strike	✓ Not recorded during surveys, but potential collision risk due to soaring characteristics.
Little Lorikeet ***Glossopsitta pusilla*** **V TSC**	Forages primarily in the canopy of open *Eucalyptus* forest and woodland, yet also finds food in *Angophoras*, *Melaleucas* and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. Isolated flowering trees in open country, e.g. paddocks, roadside remnants and urban trees also help sustain viable populations of the species.	Present	Possible	Moderate habitat loss; blade-strike	×
Major Mitchells' Cockatoo	Inhabits a wide range of treed and treeless inland habitats, always within easy reach of water. In NSW it is found regularly	Absent	Unlikely	Low	×

Species and Status	Ecology and distribution	Presence of habitat	Likelihood of occurrence	Potential to be impacted?	Aos?
Cacatua leadbeateri **V TSC**	as far east as about Bourke and Griffith, and sporadically further east than that. Feeds mostly on the ground, especially on the seeds of native and exotic melons and on the seeds of species of saltbush, wattles and cypress pines.				
Painted Honeyeater ***Grantiella picta*** **V TSC**	This species primarily occurs on the inland slopes of the Great Dividing Range, although is nomadic and may occur in low densities in other parts of NSW in suitable habitat. It inhabits dry open forests and woodland including Boree, Brigalow and Box Gum Woodlands and Box-Ironbark open forests, also paperbark and casuarinas (DECCW 2010; Pizzey et al., 2003). It is a specialist feeder on mistletoe, particularly of genus *Amyema*, and generally requires 5 or more mistletoes per hectare (DECCW 2010). Seasonal migrant, movements are linked to the fruiting of mistletoe.	Present Records in the locality	Present	High connectivity; blade-strike	✓ Recorded during surveys and foraging on mistletoe in southern section of project area.
Painted Snipe or Australian Painted Snipe ***Rostratula benghalensis*** **E TSC** **V EPBC** **M EPBC**	In NSW, this species has been recorded at the Paroo wetlands, Lake Cowell, Macquarie Marshes and Hexham Swamp. It is most common in the Murray-Darling Basin (DECCW 2010). It inhabits inland and coastal ephemeral and permanent freshwater wetlands, especially where there is a cover of vegetation. It has been recorded on the margins of wetlands, dams and even sewage ponds, also found in wet pastures, marshy areas, irrigation systems, tea tree scrub and adjacent open woodlands (Pizzey and Knight 2003). The species is likely to be nomadic in response to suitable conditions, such as floods (DECCW 2010).	Absent	Unlikely	Low	×
Pied Honeyeater ***Certhionyx variegates*** **V TSC**	Inhabits wattle shrub (primarily Mulga, *Acacia aneura*), mallee, spinifex and eucalypt woodlands, usually when shrubs are flowering; feeds on nectar, predominantly from various species of emu-bushes (*Eremophila* spp.); also from mistletoes and various other shrubs (e.g. *Brachysema* spp. and *Grevillea* spp.); also eats saltbush fruit, berries, seed, flowers and insects.	Marginal	Unlikely	Low	×

Species and Status	Ecology and distribution	Presence of habitat	Likelihood of occurrence	Potential to be impacted?	Aos?
Powerful Owl ***Ninox strenua*** **V TSC**	This species occurs primarily in tall, moist productive eucalypt forests of the eastern tableland edge and the mosaic of wet and dry sclerophyll forests occurring on undulating, gentle terrain nearer the coast (DEC NSW, 2006b). Only scattered, mainly historical records are from the western slopes and plains (DECCW 2010). The species requires old hollow eucalypts in unlogged, unburnt forests for nesting, and roosts in dense mid-canopy trees or tall shrubs (She-oaks, wattles or rainforest species). Nesting and roosting habitat occurs in sheltered gullies, or within 100m of streams, creekflats or minor drainage lines (DEC NSW, 2006b). Hollows greater than 45 cm diameter and greater than 100 cm deep are required. Breeding pairs of this species defend large (300-1500 hectare), permanent territories. Optimal habitat includes a tall shrub layer with abundant hollows and supporting high densities of arboreal marsupials (DEC NSW, 2006b).	Present Records in the locality	Possible	Moderate blade-strike	×
Regent Honeyeater ***Xanthomyza Phrygia*** **E TSC** **E EPBC** **M EPBC**	There are now only a small number of known breeding sites in NSW, the most important of which are: Warrumbungles NP, Pilliga NR, Barraba district, central coast around Gosford, Hunter Valley, and Capertee Valley (DECCW 2010). Most records are from box-ironbark eucalypt associations and it appears to prefer wetter fertile sites within these associations (Menkhorst et al., 1999). It is a generalist forager, which mainly feeds on the nectar from a wide range of eucalypts and mistletoes. Key eucalypt species include Mugga Ironbark, Yellow Box, Yellow Gum, Blakely's Red Gum and White Box (Menkhorst et al., 1999). It also occurs in riparian forests of River She-oak and wet lowland coastal forests dominated by Swamp Mahogony and Spotted Gum and (DECCW 2010). The species can undertake large-scale nomadic movements in the order of hundreds of kilometres.	Present Many records in the locality	Possible	High Habitat loss; connectivity; blade-strike	✓ Not recorded during surveys, but could forage in area on mistletoe, but most likely impact is from collision risk due to known location of records and migrating characteristics.

Species and Status	Ecology and distribution	Presence of habitat	Likelihood of occurrence	Potential to be impacted?	Aos?
Scarlet Robin ***Petroica boodang*** **V TSC**	The Scarlet Robin is found in south-eastern Australia and south-west Western Australia. In NSW it occupies open forests and woodlands from the coast to the inland slopes. Scarlet robins breed in dry eucalypt forests and temperate woodland. Fallen timber is an important habitat feature for this species.	Present	Present	Moderate Connectivity	×
Speckled Warbler ***Pyrrholaemus saggitatus*** **V TSC**	This species occurs in a wide range of eucalypt woodland communities in the hills and tablelands of the Great Dividing range. Habitats typically are structurally diverse with a grassy understorey, a sparse shrub layer and an open canopy (DECCW 2010; Watson et al., 2001). Declines have been linked to habitat fragmentation as the species appears to be locally extinct in districts where no habitat fragments larger than 100ha remain (Watson et al., 2001). Further, larger remnants (about 300ha) may be required for populations to be viable (Gardner, 2002). The species is sedentary and nests and forages on the ground. Nests are built directly on the ground amongst leaf litter and understorey vegetation and are vulnerable to predation by large birds such as Currawongs (Gardner, 2002).	Present Many records in locality	Present	Moderate Connectivity	×
Spotted Harrier ***Circus assimilis*** **V TSC**	The Spotted Harrier occurs in a variety of habitats including grassy open woodland and riparian woodland. They generally do not occur in densely forested or wooded habitats of the coast, escarpment and ranges. It is commonly associated with native grasslands.	Present Records in the locality	Possible	Low	×
Square-tailed Kite ***Lophoictinia isura*** **V TSC**	This species has a large and sparsely populated range throughout mainland Australia (Griffioen and Clarke, 2002) and is a breeding migrant to the south east from July to December. It occurs primarily in coastal and sub-coastal open forest, woodlands and mallee. It has been recorded inland along timbered watercourses and adjacent areas. The species hunts small passerines, especially honeyeaters in the tree	Present Records in the locality	Possible	Moderate blade-strike	×

Species and Status	Ecology and distribution	Presence of habitat	Likelihood of occurrence	Potential to be impacted?	Aos?
	canopy. Resident pairs have large hunting ranges of greater than 100 km² (DECCW 2010). Nests are a platform of sticks up to 90cm in diameter in a fork of a tall tree in forest or woodland (DEC NSW, 2004).				
Superb Parrot ***Polytelis swainsonii*** **V TSC** **V EPBC (Breeding likely to occur)**	This species is found throughout eastern inland NSW. On the South-western slopes the core breeding area is roughly bounded by Cowra and Yass in the east, and Grenfell, Cootamundra and Coolac in the west (DECCW 2010). It inhabits Box-Gum, Box-Cypress-pine and Boree Woodlands and River Red Gum Forest. The species nests in the hollows of large trees (dead or alive) in open Box Gum Woodland or isolated paddock trees. Species known to be for used for nesting are Blakely's Red Gum, Yellow Box, Apple Box and Red Box (DECCW 2010). It forages on the ground in grassy woodland, also on fruit, seeds and blossoms of acacias, eucalypts and mistletoes (Pizzey and Knight, 2003).	Present	Present	High habitat loss; blade-strike	✓ Recorded in the project area. Potential impact to breeding and foraging habitat within the southern section of project area.
Swift Parrot ***Lathamus discolour*** **E TSC** **E EPBC**	This species breeds in Tasmania, migrating to south and eastern NSW in autumn/winter where it inhabits eucalypt forests and woodlands, particularly Box-Ironbark Forests of central Victoria and southern NSW (DECCW 2010; Smales, 2005). Mostly occurs on the south-west slopes. It feeds on nectar flowers of eucalypts and lerp-insects, also soft fruits and berries sometimes foraging in grass (Pizzey and Knight 2003). Favoured feed trees include winter flowering species such as Swamp Mahogany, Spotted Gum, Red Bloodwood, Mugga Ironbark, and White Box (DECCW 2010).	Present Records in the locality	Possible, but targeted surveys during its known migration from Tasmania did not observe the species.	Moderate blade-strike, habitat loss	×
Turquoise Parrot ***Neophema pulchella*** **V TSC**	In NSW, this species is typically recorded west of the escarpment in the tablelands and on the western slopes, extending to the coastal districts through the Hunter Valley (DECCW 2010). It occurs in grassy woodland and open forest carrying a mixed assemblage of White Box, Yellow Box,	Present Records in the locality	Possible	Low Habitat loss	×

Species and Status	Ecology and distribution	Presence of habitat	Likelihood of occurrence	Potential to be impacted?	Aos?
	Blakely's Red Gum, Red Box and Red Stringybark (NPWS, 1999f). The species will also utilise the edges of woodland, timbered ridges and creeks in farmland and nests in tree hollows, logs or posts (DECCW 2010). The species lives in pairs or small groups and forages on the ground.				
White-fronted Chat ***Epthianura albifrons*** **V TSC**	It occurs mostly in the southern half of the state, in damp open habitats along the coast, and near waterways in the western part of the state. Along the coastline, it is found predominantly in saltmarsh vegetation but also in open grasslands and sometimes in low shrubs bordering wetland areas. Gregarious species, usually found foraging on bare or grassy ground in wetland areas, singly or in pairs.	Present	Present	Low	×
Fish					
Macquarie Perch ***Macquaria australasica*** **V TSC** **E EPBC**	The Macquarie Perch is a riverine, schooling species. It prefers deep, rocky holes with considerable cover and a substrate of small boulders, pebbles and gravel. Occurs within rivers, dams and tributaries in Southern NSW (Ecology Lab, 2003), but mainly in the upper reaches of rivers and streams where siltation levels are low. The species appears to prefer pools with cover.	Absent	Unlikely	Low	×
Murray Cod ***Maccullochella peelii peelii*** **V EPBC**	The Murray Cod is found throughout the Murray/Darling Basin system where it inhabits a wide range of warm water habitats, from clear, rocky streams to slow-flowing turbid rivers and billabongs (McDowall 1996). Generally, they are found in waters up to 5 m deep and in sheltered areas with cover from rocks, timber or overhanging banks (Kearney & Kildea 2001).The species is highly dependent on wood debris for habitat, using it to shelter from fast-flowing water (Koehn 1997).	Absent	Unlikely	Low	×

Species and Status	Ecology and distribution	Presence of habitat	Likelihood of occurrence	Potential to be impacted?	Aos?
Invertebrates					
Golden Sun Moth ***Synemon plana*** **E TSC** **CE EPBC**	This species is distributed in an area of NSW between Queanbeyan, Gunning, Young and Tumut (DECCW 2010). It occurs in grassy Box Gum Woodlands and natural temperate grasslands, typically low, open and dominated by several wallaby grass species. Also may be associated with spear-grasses (*Austrostipa* spp.) or Kangaroo Grass (*Themeda australis*).	Present (CEEC BGW) Records in the locality	Possible	High	✓ Recorded in the project area and likely to be more widespread.
Mammals (microbats)					
Eastern Bent-wing Bat ***Miniopterus orianae oceanensis*** **V TSC**	This species is a common although a vulnerable species that is likely to be widely distributed throughout the region. It roosts and raises its young in caves and mine tunnels (Strahan 1995). The species appears to forage above the forest canopy in a diverse range of forest types (Strahan 1995).	Present – foraging only	Present	High Blade-strike	✓ Recorded in project area and possible impact from collision risk, but not habitat loss.
Greater Long-eared bat (south-eastern form)/ Eastern Long-eared Bat ***Nyctophilus timoriensis*** **V TSC** **V EPBC**	The distribution of the south eastern form coincides approximately with the Murray Darling Basin with the Pilliga Scrub region being the distinct stronghold for this species (DECCW 2010). This species inhabits a variety of vegetation types, including mallee, bulloke but more commonly box/ironbark/cypress-pine communities that occurs in a north-south belt along the western slopes and plains of NSW and southern Queensland (DECCW 2010). It is a slow flying agile species and forages in the lower parts of the canopy, even amongst the shrub layers and on the ground (Menkhorst and Knight 2003). The species roosts in tree hollows, and under loose bark.	Absent (No records in locality)	Unlikely	Low	×

Species and Status	Ecology and distribution	Presence of habitat	Likelihood of occurrence	Potential to be impacted?	Aos?
Large-footed Myotis ***Myotis macropus*** **V TSC**	This species is found in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. It is rarely found more than 100 km inland, except along major rivers (DECCW 2010). It forages on the surface of water bodies such as rivers, lakes and swamps. It roosts in small groups in tree hollows, caves, mine, tunnels and old buildings (Hall & Richards 1979).	Marginal Records in the locality	Unlikely	Low	×
Little Pied Bat ***Chalinolobus picatus*** **V TSC**	This species occurs in dry open forest, open woodland, mulga woodlands, chenopod shrublands, cypress-pine forest, mallee, bimbil box (DECCW 2010). It roosts in caves, rock outcrops, mine shafts, tunnels, tree hollows and buildings. It often forages along watercourses (Menkhorst and Knight 2003) where it feeds on moths and possibly other flying invertebrates.	Present – foraging only One record in locality, 2000	Unlikely	Low	×
Yellow-bellied Sheathtail-bat ***Saccolaimus flaviventris*** **V TSC**	This species is a wide-ranging species across northern and eastern Australia. It roosts alone or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows (DECCW 2010). Seasonal movements are unknown, however the species may migrate to southern Australia in late summer and autumn.	Present Records in the locality	Present	High	✓ Recorded in project area and possible impact from collision risk, but not habitat loss.
Mammals (other)					
Brush-tailed Phascogale ***Phascogale tapoatafa*** **V TSC**	This species is found in a variety of forest types although prefers dry sclerophyll forest with a sparse groundcover (DECCW 2010). It generally occurs in areas where the annual rainfall exceeds 500mm. Have large overlapping territories between 20 – 100 hectares. It requires tree hollows with openings 25-40mm wide for nesting and utilises multiple trees throughout its lifetime. Prefer large trees and are most abundant where there are more than 2 trees per ha greater	Marginal No records in the locality	Unlikely	Low	×

Species and Status	Ecology and distribution	Presence of habitat	Likelihood of occurrence	Potential to be impacted?	Aos?
	than 60cm DBH. It requires remnants greater than 25ha in dry forests and ridges.				
Eastern Pygmy-possum ***Cercartetus nanus*** **V TSC**	In NSW this species is found from the coast inland as far as the Pillaga, Dubbo, Parkes and Wagga Wagga on the western slopes. It prefers woodland and heath although has been recorded in a broad range of habitats including rainforest and sclerophyll (including Box-Ironbark) forest (DECCW 2010). This species feeds largely on nectar and pollen from banksias or other proteaceous or myrtaceous shrubs incl. Melaleucas, Tea-trees & Callistomens (DECCW 2010). This species requires hollows, cracks or fissures > 2.0 cm diameter in trees, stumps or logs, bark or disused bird's nests for breeding (DECCW 2010).	Marginal	Unlikely	Low	×
Koala ***Phascolarctos cinereus*** **V TSC**	This species was historically abundant in the south of NSW, although now occurs in sparse and possibly disjunct populations. It occurs in woodland communities, coastal forests, woodlands of the tablelands and western slopes and the riparian communities of the western plains (NPWS, 2003b). May also utilise isolated paddock trees (NPWS, 2003b). Primary feed tree species listed for the central and southern tablelands are Ribbon Gum and River Red Gum, secondary species include Candle Bark, Blakely's Red Gum, White Box, Yellow Box and Brittle Gum (NPWS, 2003b).	Marginal (Recent) records in the locality	Possible, however not recorded during 33 RapSAT searches in the project area.	Low	×
Spotted-tailed Quoll ***Dasyurus maculatus*** **V TSC** **E EPBC**	This species is found in a variety of forest types such as rainforest, wet and dry sclerophyll forest, woodland, coastal heath and scrub, sometimes Red Gum forest along inland waterways (Menkhorst and Knight, 2004). It utilises hollow-bearing trees, fallen logs, rock caves and crevices as denning and breeding sites (DECCW 2010). Mostly nocturnal it hunts mammals, birds and large arthropods. Females occupy home ranges up to about 750 hectares and males up to 3500	Marginal, records in the locality	Unlikely	Low	×
		Rocky habitats (i.e. boulders and cliff faces) required for are not present at the site. While this species can also den in large logs and hollows these habitat features are absent from the impact area. This species usually traverses their range along densely vegetated creeklines with a preference for mature wet forest habitat, which is not present within the project site. This species consumes a variety of prey, including gliders,			

Species and Status	Ecology and distribution	Presence of habitat	Likelihood of occurrence	Potential to be impacted?	Aos?
	hectares; usually traverse their ranges along densely vegetated creeklines. Given that this species has a very large home range (females occupy home ranges up to about 750 ha and males up to 3500 ha), primary breeding habitat for this species is not present, and there is a paucity of prey species within the project are, the risk of the project resulting in a significant impact to a population is 'low'. In particular, the proposal will not affect any core breeding habitat.	possums, small wallabies, rats, birds, bandicoots, rabbits and insects. These prey species are absent or in low numbers in the majority of the impact area, i.e. within cleared and grazing land affected by the proposal			
Squirrel Glider ***Petaurus norfolcensis*** **V TSC**	This species inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas (DECCW 2010). It prefers mixed species stands with a shrub or Acacia understorey although will occur in areas where no understorey if there is more than one species of Eucalypt. Feeds on insects, nectar and exudates from leaves and trees (*Eucalyptus* and *Acacia*) and requires abundant tree hollows greater than 5cm diameter (DECCW 2010). It can use patches less than 1 ha & isolated trees if within 75 m of other patches (DECCW 2010). Has a mean home range of 1.4–9 ha (Ahern & van der Ree 2003; Quin, 1995; Ree and Bennett, 2003).	Marginal Records in the locality	Possible	Low	×
Reptiles					
Pink-tailed Legless or Worm Lizard ***Aprasia parapulchella*** **V TSC** **V EPBC**	This species is only known from the Central and Southern Tablelands, and the South Western Slopes (Osborne and Jones, 1995). It inhabits sloping, open woodland areas with predominantly native grass groundlayers, particularly those dominated by Kangaroo Grass (*Themeda australis*). Typically these areas are well-drained, with rocky outcrops or scattered, partially-buried rocks. Commonly found beneath small, partially-embedded rocks in burrows below these rocks; the burrows usually have been constructed by and are	Present (CEEC BGW) Records in the locality	Possible, but not recorded during targeted rock-rolling surveys for the species.	Low	×

Species and Status	Ecology and distribution	Presence of habitat	Likelihood of occurrence	Potential to be impacted?	Aos?
	often still inhabited by small black ants and termites (Osborne and Jones, 1995). This species feeds on the larvae and eggs of these ants (DECCW 2010).				
Rosenberg's Goanna ***Varanus rosenbergi*** **V TSC**	This species occurs on the Sydney Sandstone in Wollemi National Park to the north-west of Sydney, in the Goulburn and ACT regions and near Cooma in the south. It is found in heath, open forest and woodland. It is known to nest in termite mounds and feeds on carrion, birds, eggs, reptiles and small mammals. Individuals require large areas of habitat.	Present No records in the locality	Possible	Low	×
Striped Legless Lizard ***Delma impar*** **V TSC** **V EPBC**	Populations of this species are known in the Goulburn, Yass, Queanbeyan, Cooma and Tumut areas. It inhabits temperate lowland grasslands, secondary grasslands and occasionally in open Box Gum Woodland. It has been recorded at sites dominated by introduced species (such as *Phalaris aquatica, Nasella trichotoma* and *Hypocharis radicata*) and sites with a history of grazing and pasture improvement (Smith and Robertson, 1999). Shelters in grass tussocks, thick ground cover, soil cracks, under rocks, spider burrows, and ground debris such as timber. The key to their survival in rural areas may be the availability of shelter during disturbance events (Smith and Robertson, 1999).	Present	Present	High	✓ Recorded at one location, potential habitat in all grassland areas within the project area.

APPENDIX C ASSESSMENT OF SIGNIFICANCE

C.1 NEW SOUTH WALES

Assessments of significance pursuant to EP&A Act and the TSC Act have been undertaken for the following species, following *Threatened Species Assessment Guidelines* (DECC 2007):

Endangered Ecological Communities

- White Box Yellow Box Blakely's Red Gum Woodland

Flora

- Yass Daisy

Birds

- Superb Parrot
- Painted Honeyeater
- Regent Honeyeater
-

Raptors

- Little Eagle

Bats

- Eastern Bentwing-bat
- Yellow-bellied Sheathtail-bat

Reptiles

- Striped Legless Lizard

Invertebrates

- Golden Sun Moth

Endangered Ecological Communities - White Box Yellow Box Blakely's Red Gum Woodland (Box Gum Woodland)

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

Not applicable.

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

Not applicable.

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

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

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

Up to 3,068 hectares of the Endangered Ecological Community White Box- Yellow Box - Blakely's Red Gum Grassy Woodland (including derived grassland) occurs within the site boundary in varying condition. From the detailed surveys, approximately 380 hectares of this total is known to be in moderate or good condition and 357 ha in poor condition. The condition of the majority of this community at the site is unknown however it is likely that there are additional areas of the community in moderate and good condition that were not detected during the surveys.

The proposal would result in the permanent loss of up to 12 hectares of moderate and good condition Box Gum Woodland EEC across the site and up to 28 hectares in poor condition. In considering percent foliage cover of the overstorey and understorey composition, all these areas would qualify as moderate to good condition EEC under the Biometric Guidelines resulting in a total permanent loss of 40 ha. Much of this impact would result from the establishment of a 45m wide easement for the 132kV overhead power line. As a precautionary approach, this assessment has considered that the worst case scenario would be the total loss of this vegetation type within the easement; however in reality the vegetation is open woodland meaning that only scattered trees would need to be cleared. The understorey would also be mostly retained excluding small areas required for footings and a maintenance track. It is considered likely that the community would maintain its existing functionality following construction.

Predominately, the areas to be impacted contain a moderate to low tree density with an understorey of native grass dominated pasture with a relatively low native forb and shrub diversity (0 – 11 non-grass species in poor and moderate condition). This structural and understorey configuration is common and widespread within the locality and there are large expanses of this vegetation type with or without tree cover. The loss of this vegetation in the context of similar vegetation in the locality is not considered likely to substantially affect the extent or modify the community such that is would be placed at risk of extinction.

One area in the south of the Proposal site (in the vicinity of RYP_110 and RYP_120 and to the west of these) consists of higher diversity Box-Gum woodland and would be directly impacted by the proposal due to the construction of tracks and power lines. These areas have high conservation value and also qualify as a Commonwealth listed entity. Up to 10 hectares of high conservation value Box-Gum Woodland would be permanently lost as a result of the proposal. Based on field observations, large extents (approximately 353 ha) of this vegetation occur within the proposal site. It is not considered

likely that the proposal would affect the extent or modify the community such that it would be placed at risk of extinction.

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

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

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

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

The proposal will impact upon habitat for Box Gum Woodland in the form of direct clearing of this community and the extent of this impact is discussed in Section c) above. The areas of habitat within the site are already fragmented due to previous clearing, grazing pressure, the planting of exotic pastures, the ingress of weeds and the occurrence of other vegetation communities in habitats not suitable for Box-Gum Woodland. The proposal would not further fragment or isolate habitat for this community. The majority of suitable habitat likely to be removed by the proposal is in poor condition and not considered important habitat. The extent of clearing is not anticipated to impact the long-term survival of this ecological community in the locality.

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

There are no areas of declared critical habitat within the project area or greater locality.

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

A draft national recovery plan for this community has been prepared and is currently available for public comment. The proposal is inconsistent with the objective of the draft recovery plan that aims to '*achieve no net loss in extent and condition of the ecological community throughout its geographic distribution'.* The proposal would result in a worst case net loss of approximately 40 hectares of this community. However, as discussed above, in considering the majority is in poor condition, the extent of the community on site and within the locality and the potential to improve outcomes for this community through offsetting, this is not considered to be significant.

With the correct implementation and management of an offset plan the proposal has the potential to contribute to the following Recovery Plan Objectives;

- Increasing protection of sites in good condition;
- Increasing landscape functionality of the ecological community through management and restoration of degraded sites;
- Increasing transitional areas around remnants and linkages between remnants; and
- Bringing about enduring changes in participating land manager attitudes and behaviours towards environmental protection and sustainable land management practices to increase extent, integrity and function of Box-Gum Grassy Woodland.

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

The proposal may increase the impact of the following key threatening processes relevant to the species assessed herein:

- Clearing of native vegetation.

In the determination, the NSW Scientific Committee found that 'clearing of any area of native vegetation, including areas less than two hectares in extent, may have significant impacts on biological diversity'. Clearing can lead to direct habitat loss, habitat fragmentation and associated genetic impacts, habitat degradation, loss of the leaf litter layer, increased habitat for invasive species and off-site impacts such as downstream sedimentation.

While the proposal contributes to clearing of native vegetation, including the potential removal of 40 ha of threatened Box Gum Woodland (although approximately half of this is derived grassland and actual clearing extents will be much less), the majority of this will occur in historically cleared and fragmented areas that have been highly degraded through long-term grazing practices. Clearing of better quality vegetation is generally restricted to proposed access tracks and powerline easements where these intersect with more closed forest communities. As most of the overstorey and shrub clearing is expected to occur in common and well-conserved forest or shrub communities, and relatively little clearing in the historically cleared Box Gum Woodland environments, the proposal is expected to contribute minimally to this key threatening process with respect to EECs.

- The invasion of native vegetation by exotic perennial grasses

A number of exotic perennial grasses, including Serrated Tussock, Phalaris, Cocksfoot, Yorkshire Fog, Paspalum and African Lovegrass, were observed within the project area. The proposed development may contribute to the spread of these species within or between sites, although weed management recommendations and other mitigations have been suggested to prevent this from occurring. Recommendations have been given to reduce spread of invasive weeds into good quality woodland vegetation, including a vehicle hygiene protocol for cleaning of vehicles. The proposal is not expected to significantly increase the impact of this Key Threatening Process in the project area.

- Loss of hollow-bearing trees

Hollow-bearing trees will be removed during the vegetation clearing required for the proposed development. The majority of these will likely be in the patches of vegetation that the transmission line may pass through. Recommendations have been made to perform hollow-bearing tree targeted surveys prior to clearing to determine micrositing of infrastructure and minimise losses in Box Gum Woodland.

Flora – Yass Daisy

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

The Yass Daisy is a rare perennial herb, 30-60 centimetres high, inhabiting sclerophyll woodland, forest and roadsides (Harden 1992). It appears to be unaffected by light grazing, with some populations persisting in grazed sites (OEH 2011). In surveys conducted in the Boorowa Shire, all of the occurrences of this species were on land characterised by a light grazing regime (NPWS 2002). The Yass district is the centre of distribution for this species (Fallding 2002). Most populations occur in the Yass District, at Lake Burrinjuck, Bookham, Rye Park and Dalton (DSEWPC 2008). The Yass Daisy has been recorded within 2.5 kilometres west and south-east of the subject site. Current threats to the species include agricultural developments, intensification of grazing regimes, invasion of weeds, road works (particularly widening or re-routing) and inappropriate mowing or slashing in cemetery sites (OEH 2011).

The species was not recorded during targeted searches in higher quality areas of Box-Gum Woodland and derived grassland immediately north of RYP_120 and within the proposed overhead transmission line routes to the north-west of RYP_120 and south_west of RYP_110. These areas have a long and continuing grazing history and the Yass Daisy is considered unlikely to occur there. Considering this and the low likelihood of the species being present elsewhere at the site, the works are not expected to adversely affect the life cycle of the Yass Daisy such that a viable local population of the species is likely to be placed at risk of extinction.

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

Not applicable.

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

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

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

Not applicable

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

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

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

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

Yass Daisy

i. The proposal would result in the permanent loss of up to 12 hectares of moderate and good condition Box-Gum Woodland, which provides potential habitat for the threatened Yass Daisy. Targeted surveys were carried out in these areas and the species is considered

unlikely to occur there. Much of the total area of disturbance would involve tree clearing for a 45m wide easement for the 132kV overhead powerlines. The groundlayer habitat under the powerlines would be largely undisturbed, with the exception of small areas required for pole footings and a maintenance track.

ii. In view of the limited extent and pattern of clearing and the low impact on groundlayer vegetation within the ETL, the works are not expected to add to the existing level of fragmentation or isolation of potential Yass Daisy habitat.

iii. The potential habitat at the subject site is considered unlikely to support the species, considering land use history, condition assessments and the results of the targeted surveys. These areas are assessed as low importance for the Yass Daisy.

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

There are no areas of declared critical habitat within the project area or greater locality.

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

The principal recovery actions required cover:

- Protection of known populations from changes to land use, road works, pasture modification, grazing pressures, and inappropriate mowing regimes
- Pest plant and animal control
- Marking sites and potential habitat onto maps used for farm, development and conservation planning and management
- Searching for new populations in potential habitat (after OEH 2011, DSEWPC 2008).

The targeted surveys did not identify a population of the Yass Daisy within the site boundary. The proposal has satisfied the need to search for new populations and as none were found, no further actions are applicable.

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

The proposal may increase the impact of the following key threatening processes relevant to the species assessed herein:

- Clearing of native vegetation.

In the determination, the NSW Scientific Committee found that 'clearing of any area of native vegetation, including areas less than two hectares in extent, may have significant impacts on biological diversity'. Clearing can lead to direct habitat loss, habitat fragmentation and associated genetic impacts, habitat degradation, loss of the leaf litter layer increased habitat for invasive species and off-site impacts such as downstream sedimentation. The Proposal would not contribute significantly to the operation of clearing as a threatening process at the local or regional level, since the majority of the subject site is already cleared and highly modified by agricultural practices. The Proposal would remove up to 23 hectares of predominately low quality Box Gum Woodland and derived grassland, an endangered ecological community. The significance of this clearing has been discussed above.

While the proposal contributes to clearing of native vegetation, the majority of this is in historically cleared and fragmented areas that have been highly degraded through long-term grazing practices. Clearing of better quality vegetation is generally restricted to proposed access tracks and powerline easements where these intersect with more closed woodland or sandstone forest communities.

- The invasion of native vegetation by exotic perennial grasses

The invasion of native vegetation by exotic perennial grass is a further Key Threatening Process relevant to this proposal. The White Box - Yellow Box –Blakely's Red Gum Woodland EEC in particular is vulnerable to the introduction and spread of perennial grasses such as African Love Grass, Serrated Tussock, Phalaris, Cocksfoot, Yorkshire Fog, and Paspalum.

Unnecessary disturbance of areas containing exotic perennial grasses within and adjacent to the works should be avoided so as not to increase the impact of this Key Threatening Process in the area. Cleaning of vehicles and plant prior to arrival on the site (and departure if working in areas containing these species) would help to ameliorate this impact, by preventing the introduction and spread of additional weeds. Section 8 identifies further safeguards to minimise risks from weeds, and the proposal is not expected to significantly increase the impact of this Key Threatening Process in the study area.

Birds – Superb Parrot, Painted Honeyeater, Regent Honeyeater

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

Superb Parrot

The Superb Parrot forages in Box Eucalypt Woodland, particularly that dominated by Yellow Box (*E. melliodora*) or Grey Box (*E. microcarpa*). After breeding, Superb Parrots generally move away from their breeding habitat in mid-January (Webster 1988, 1997). Large flocks of adult and immature birds roam widely in search of food, and may be observed in various habitats at this time (Webster 1988). Superb Parrots were recorded during November 2011 and 2013 surveys at Rye Park; they were not recorded in April 2012 or July 2013. Thus, Superb Parrots were observed to use habitats in the project area and locality during their nesting season (September to January). It can be assumed that they disperse to other foraging grounds outside of nesting season.

The Superb Parrot was regularly observed during November 2011 and November 2013 surveys, but primarily outside of the project area to the west of the site along Rye Park road, Flakney Creek Road, or other roads west of the project area. The area the species was commonly observed within the project area is located to the south between RYP_110 and RYP_120 within Box Gum Woodland or native pasture habitat. Three nest trees were identified for this species: two north of RYP_120 within the same area birds were regularly recorded and the other nearby Flakney Creek Road along a proposed transmission line. Two potential nest trees were also identified north of RYP_120 in which individual birds were observed to be interested in a hollow, but did not appear to be nesting at the time. The Superb Parrot was not observed during April 2012 or July 2013 indicating the parrot moves away from the inland slopes during winter. Flight path mapping however, identified that the Superb Parrot is regularly observed in high numbers to the west of the project area, but less commonly within it.

However, one area was identified as being regularly utilised by the parrot which is a patch of Box Gum Woodland in the southern section of the project area. This habitat runs in a north to north-east direction and it is possible Superb Parrots are using it as a movement corridor for local movements to forage and breed in the southern section of the project area. This habitat coincides with proposed infrastructure of turbines RYP_106 to RYP_110 and an area proposed for a transmission line. However, a proposed transmission line that extended further west of the current transmission line in this area has been removed from the layout to avoid impact, as much as possible, to Box Gum Woodland habitat and a 100 m buffer has been applied to nest trees to further avoid impact. Impacts to known breeding resources of the Superb Parrot will therefore be avoided. The magnitude of impact for habitat loss for Superb Parrot is likely to be low to moderate (around 1% of available hollows to be cleared) and unlikely to lead to a long-term decrease in population size, reduce the area of occupancy or fragment the existing population.

The potential collision risk to this species overall is not considered to result in a significant impact to this species, as the majority of the population within the locality occurs outside the project area and was primarily observed flying within the tree canopy or below 20 m on most occasions.

The habitat to be affected by the proposal consists of scattered trees over pasture and given impact to all known nest trees will be avoided, the proposal is not considered to adversely affect the life cycle of this species such that it would be placed at risk of extinction.

Painted Honeyeater

The Painted Honeyeater is nomadic and occurs at low densities throughout its range. Some north-south migratory movements have been reported for the Painted Honeyeater in which the species moves north to Queensland in winter and is considered a breeding spring to summer visitor in NSW. Within NSW the greatest concentrations of the bird and almost all breeding occurs on the inland slopes of the Great Dividing Range. The species inhabits Boree, Brigalow and Box Gum Woodlands and Box-Ironbark Forests and is a specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias.

Painted Honeyeaters were predominantly observed west of RYP_106 to RYP_120 in the southern section of the project area within Box Gum Woodland in trees supporting flowering mistletoe in November 2013. Approximately 10-12 individuals were observed foraging in this area. A transmission line was proposed for this area but has been removed from the layout. Individuals of this species were also observed west of RYP_4 and along Flakney Creek Road. The species was not recorded within the project area during previous surveys and is not common to the area. No records for this species are known for the locality.

The area used by Painted Honeyeaters in the south of the project area also corresponds to the Box Gum Woodland habitat being used by Superb Parrots. As mentioned for Superb Parrots, a transmission line was proposed for this area but has been removed from the layout to avoid the better quality Box Gum Woodland within the site; most of the records observed for this species were in this area and consequently the majority of habitat utilised by this species has been avoided. The impact of the proposal to Box Gum Woodland habitat for this species is therefore considered low and the proposal is not considered to adversely affect the life cycle of this species such that it would be placed at risk of extinction.

Regent Honeyeater

The Regent Honeyeater primarily inhabits temperate woodland and open forest of the inland slopes of south-east Australia, particularly Box-Ironbox woodland. The species prefers the wettest, most fertile sites within these associations such as along creek flats, broad river valleys and foothills. The species is a generalist forager, which mainly feeds on the nectar from a wide range of eucalypts and mistletoes. Key eucalypt species include Mugga Ironbark, Yellow Box, Yellow Gum, Blakely's Red Gum and White Box (Menkhorst et al. 1999). Potential foraging habitat is primarily present within the Box Gum Woodland within the project area, which includes the feed tree Yellow Box.

The species was not recorded during surveys, but records of Regent Honeyeater are present within the locality and the species is known to utilise box-ironbark eucalypt associations. It is a generalist forager, which mainly feeds on the nectar from a wide range of eucalypts and mistletoes. Key eucalypt species include Mugga Ironbark, Yellow Box, Yellow Gum, Blakely's Red Gum and White Box. As the species can undertake large-scale nomadic movements in the order of hundreds of kilometres the species has the potential to occur within the project area. The species was not detected during bird surveys of the project area, but has potential to be impacted from the proposal from collision when it migrates.

As this species is nomadic and movement patterns are often linked to availability of resources, it can be assumed that they may travel through the project site to other foraging grounds. Therefore it is considered the proposal has the potential to result in loss of foraging habitat or risk of blade-strike to this species.

While records are noted for this species across eastern NSW, primary breeding and foraging habitat is not widely available within the project site (i.e. riparian areas of Red Ironbark, Red Gum and Casuarinas, or wetter areas supporting Box-ironbark Eucalypt associations). Two species of mistletoe were recorded on site, but are not widely distributed and occur in low densities. Casuarina and Red Gum are not recorded on site. Records across NSW indicate a strong presence of this species to the south, east and north-east of the project site in better quality habitat (i.e. National Parks) and could be considered an important landscape connection. This area traverses Namadgi NP, Morton NP, Nattai NP and Blue Mountains NP. It is expected the movement of this species would commonly occur through this connection where better quality foraging resources exist.

Given that core breeding habitat is not available on site, foraging resources are generally limited (i.e. not wetter more fertile areas), and known records indicate movement of the species east of the project site, the proposal is not considered to adversely affect the life cycle of this species such that it would be placed at risk of extinction.

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

Not applicable.

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

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

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

Not applicable.

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

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

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

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

Superb Parrot, Painted Honeyeater, and Regent Honeyeater

i) The total clearance impact to Box Gum Woodland habitat is 25 ha, with 1555 ha remaining within the project area; however, the greatest impact to these species is considered to occur in one area at the southern end of the project area. The proposal will not remove known nest trees for the Superb Parrot as these have been buffered by 100m from infrastructure.

ii) The Box Gum Woodland habitat is already fragmented in the project area and in the area of most interest to these species due to clearing associated with agricultural farming practices. The proposal will not contribute to further fragmentation of this habitat and will not isolate any areas of habitat.

iii) Areas of habitat to be removed for the transmission line and associated access tracks in the area of identified habitat for these will are well represented in the overall project area and surrounding locality, including within nature reserves such as Bango NR. The majority of the habitat to be removed in the project area is degraded and has been subject to ongoing disturbance from agricultural land use. However, impacts to this species have been largely avoided with the removal of part of a transmission line through the best quality Box Gum Woodland in the project area.

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

There are no areas of declared critical habitat within the project area or greater locality for the Painted Honeyeater or Regent Honeyeater.

According to the National Recovery Plan for the Superb Parrot, Box Gum Woodland on the inland slopes and tablelands is critical breeding habitat for the Superb Parrot. Therefore, critical breeding habitat occurs in the project area and would be cleared (Box Gum Woodland in the transmission line corridor). In particular, Blakely's Red Gum is the most commonly used nest tree in the locality, however Yellow Box is the most common tree within the Box Gum Woodland habitat on site, with some trees identified

as nests trees. Recommendations have been made to avoid impact to these nest trees, as described above. Therefore impact to breeding of this species will largely be avoided.

In general, further recommendations are given in this report to microsite turbines, roads and other infrastructure to avoid hollow-bearing trees. It is recommended that once the transmission line route through Box Gum Woodland is marked by surveyors, the route be thoroughly surveyed for hollow-bearing trees. Hollow-bearing tree details (e.g. number of hollows) should be recorded and standard pre-clearance protocols by undertaken. Clearing in Box Gum Woodland should not be undertaken during Superb Parrot breeding season. Where hollow-bearing trees cannot be avoided, it has been recommended that hollows be offset and/or replaced with artificial hollows.

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

Superb Parrot

Priority actions for this species include no loss of known or potential Box Gum Woodland foraging habitat and activities to assist Superb Parrot include retaining and protecting hollow-bearing trees and woodland remnants (OEH 2012). The *National Recovery Plan for Superb Parrot* (Baker-Gabb 2011) lists a number of objectives which relate mostly to research and management of the species; none are relevant here. The impact to breeding habitat is discussed in point e) above.

Painted Honeyeater

There is no recovery plan for the Painted Honeyeater, however priority actions for this species include:

- Manage grazing on sites where Painted Honeyeater habitat occurs.
- Encourage regeneration of habitat by fencing remnant stands and undertaking new plantings.
- Protect remnant woodland and open forest throughout the range of the species.
- Regenerate and replant local flora species to maintain breeding and foraging habitat.
- Conduct further research to increase understanding of habitat selection and nomadic movements of the Painted Honeyeater.

The proposal has avoided known foraging habitat where the species was identified within the project area and commits to offsetting habitat for this species, this will directly contribute to management of habitat in grazing lands and is consistent with the first priority action listed.

Regent Honeyeater

Priority actions for this species include no further loss of known woodland and forest habitat and protection of key breeding and foraging habitats (OEH 2012). The *National Recovery Plan for the Regent Honeyeater* (Menkhorst *et al.* 1999) lists a number of objectives which relate mostly to no loss of known or potential habitat, as well as activities to assist the species including monitoring and management of populations and collating data on dispersion of the species. This assessment concludes that the proposal will not result in loss of key breeding or foraging habitats.

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

The proposal may increase the impact of the following key threatening processes relevant to the species assessed:

- Clearing of native vegetation.

The clearing of potential habitat, especially Box Gum Woodland or Native Pasture habitat will lead to direct habitat loss for these species, however, the majority of this is in historically cleared and fragmented areas that have been highly degraded through long-term grazing practices. The proposal commits to offsetting all impact to Box Gum Woodland which is likely to have a positive effect on these

species given the offset site will require management and therefore halt the current impacts associated with grazing in the project area that continue to degrade the habitat of this species.

- Invasion of native vegetation by exotic perennial grass

The invasion of native vegetation by exotic perennial grass is a further Key Threatening Process relevant to this proposal. Box Gum Woodland in particular is vulnerable to the introduction and spread of perennial grasses such as African Love Grass, Serrated Tussock, Phalaris, Cocksfoot, Yorkshire Fog, and Paspalum. Recommendations for correct vehicle hygiene are prescribed and the proposal is not considered to significantly increase the impact of this Key Threatening Process.

- Loss of hollow-bearing trees

Hollow-bearing trees will be removed during the vegetation clearing required for the proposed development. The majority of these will likely be in the patches of vegetation that the transmission line may pass through. Recommendations have been made to the proposal in order to avoid impact upon hollow-bearing trees, where possible. These provisions include 100 m buffers to known nest sites, as well as 100 m buffer to potential nest sites for the Superb Parrot as a precautionary measure, pre-clearance surveys, and micrositing of infrastructure. Recommendations are also given to offset or replace (with artificial hollows) all hollows that are cleared during the construction phase. Thus, it seems unlikely that any threatened species will be significantly affected by the vegetation clearance associated with the proposed development.

- Removal of dead wood and dead trees

The removal of dead wood and dead trees from the landscape may occur as a result of the proposed development. Dead wood is likely to be used by some woodland bird species, such as threatened Robins. Dead standing trees may provide shelter for threatened bird and bat species, primarily bat species. It is unlikely that the removal of dead wood and trees will result in a significant impact to any threatened species in the region. However, recommendations are given for fallen timber greater than 50 cm to be left in place or moved to a nearby area to retain fauna habitat, where possible.

Raptors – Little Eagle

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

Little Eagles were not recorded during surveys but are known to occur in the locality. Should a Little Eagle forage or nest in the project area, the proposal has potential to affect the species during the operational phase; the turbine rotors present a collision risk to the species. As no Little Eagle nests were found within 100 metres of surveyed proposed turbine locations, the risk to fledging Little Eagles is considered low to moderate. Adult birds, including raptors, have generally shown an ability to habituate to the turbines by taking avoidance action around rotors or by modifying their behaviour (such as approach a root at the head of a gully from below rather than above – EBS Ecology 2012). Further, the carcass monitoring results reviewed (refer Table 7-1 in main report) suggest more common species are most at risk of colliding with turbines. Thus on the basis of probability it appears unlikely that a viable local population of Little Eagle within the Project Area would be placed at risk of extinction from the wind farm proposal. However, this species should be a focal species of an operational Bird and Bat Management Plan to confirm the assumptions of this assessment, addressing inherent uncertainty.

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

Not applicable.

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

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

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

Not applicable.

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

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

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

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

i) Section 7 of the report discuss the extent of native vegetation types to be removed or modified as a result of the proposal. In general, relatively small areas of good quality forest or woodland habitat would be removed or modified within project area, with most of the proposal affecting native pasture or Inland Scribbly Gum Forest.

ii) In the project area, turbines are located on ridges, often adjacent ridges, with a spacing of approximately 2 to 5 km between them. Spacing between turbines in the current layout is generally around 300-500 m. The distance between turbine clusters and also the distance between individual turbines is expected to allow for safe passage between turbines for birds and bats, without creating a

barrier effect. There may be some alteration to movement patterns for some species, but areas of habitat are unlikely to become isolated from each other.

iii) Areas of habitat to be removed for turbines, access tracks, power infrastructure, and transmission line associated with the proposal are well represented in the overall project area and surrounding locality, including within large areas of conservation reserves and state forests such as Bango NR. The majority of the habitat to be removed in the project area is degraded and has been subject to ongoing disturbance from agricultural land use. As a result, the majority of potential habitat within the project area is considered unlikely to support the fauna species assessed, considering land use history, condition assessments and the results of the field surveys.

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

There are no areas of declared critical habitat within the project area or greater locality.

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

OEH have not identified any relevant priority actions to help recover these species (OEH 2012).

In general, design measures to avoid and mitigate impacts have included avoiding areas of high conservation value fauna habitat and this is consistent with the actions and objectives of recovery plans and priority actions developed for species considered in this assessment.

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

The proposal may increase the impact of the following key threatening processes relevant to the species assessed:

- Clearing of native vegetation.

The clearing of potential habitat will lead to direct habitat loss for this species, however, the majority of this is in historically cleared and fragmented areas that have been highly degraded through long-term grazing practices. The proposal commits to offsetting all impact which is likely to have a positive effect on this species. Given the mobility of this species across the landscape, the discrete clearance footprint associated with this proposal will not limit the ability of the species to persist in the long-term.

- Removal of dead wood and dead trees

The removal of dead wood and dead trees from the landscape may occur as a result of the proposed development. Dead standing trees may provide shelter for the Little Eagle; however, it is unlikely that the removal of dead wood and trees will result in a significant impact to this species in the region given the discrete clearance footprint and the availability of resources remaining within the landscape.

Microbats – Eastern Bentwing Bat and Yellow-bellied Sheathtail-bat

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

Eastern Bentwing Bat

The Eastern Bentwing Bat inhabits a diverse range of forest types and roosts and raises its young in caves and mine tunnels. The species appears to be widely distributed throughout NSW. The Eastern Bentwing Bat is reported to be a fast and direct flier that forages above the canopy and in open areas and will travel up to several hundred kilometres to over-wintering roosts (Churchill 2008, Lloyd *et al.* 2006), which place it at risk of collisions. In overseas studies, the most affected group of microbats are migrating bats (Cryan and Barclay 2009).

Thirty-six calls of the Eastern Bentwing Bat were recorded within the project area primarily within Inland Scribbly Gum Forest along the ridgeline supporting turbines RYP_80 to RYP_143. This habitat type is considered the most suitable within the project area for temporary roosting sites and a total of 90 ha will be removed, with 3753 ha remaining within the site boundary. The proposal has the potential to affect the species during the operational phase as a result of collisions with infrastructure. Based on carcass search results reviewed for other projects, the risk to Eastern Bentwing Bat within general habitat appears low; however in overseas studies, migratory bats are considered at higher risk. The Eastern Bentwing Bat is known as a sub- and over-canopy feeder, so the majority of foraging is expected to be below the rotor-swept area.

The risk of the proposal impacting on breeding populations (i.e. maternity caves) is low as the nearest maternity cave is 40 km away. There is a staging area and maternity cave in the region (near Bungendore approximately 65 km away and Wee Jasper approximately 40 km away, respectively) for Eastern Bentwing Bat; these are used by a large proportion of the female and juvenile population. It is possible that the local population of Eastern Bentwing Bats may spike slightly when a large proportion of the female and juvenile population migrate to and from the maternity cave (November and February-March); however Anabat results were recorded within November 2011 and 2013 and suggest a relatively low abundance of this species within the project area at this time.

Given project area is not near a known maternity caves the proposal is unlikely to have an adverse impact on the lifecycle of this species so that it would be placed at risk of extinction; however given that the bat was recorded in several locations across the wind farm, there is potential for this species to be impacted as a result of collision with turbine blades during the operation life of the wind farm. This species should be a focal species of an operational Bird and Bat Management Plan to confirm the assumptions of this assessment, addressing inherent uncertainty.

Yellow-bellied Sheathtail Bat

Four calls of the Yellow-bellied Sheathtail Bat were recorded within the project area within one location. This species is known to roost in large hollow-bearing trees in a variety of habitats. They migrate into Southern Australia during the summer months (Jan – Apr). This species forages at canopy level, but lower over open spaces at forest edges. In pursuit of prey, this species is capable of tight lateral turns (Churchill 2008). This species is considered an occasional seasonal visitor that may roost temporarily in tree hollows within the project area.

The data suggests this species is not common in the area as only four calls of this species were recorded and in one location of the project area. The flight height of this species make it potentially vulnerable to turbine strike, however, given that the species is more likely to forage near the forest edge beneath the in open habitat it is not expected the proposal will have an adverse effect on this species such that it would be placed at risk of extinction from blade-strike. In practice, the project area will also continue to have foraging habitat value for this species during the operational phase of the development, where the existing vegetation cover will largely be retained within turbine envelopes. However, some habitat

removal is expected within the project area and there may be some loss of hollow-bearing trees (roost sites) for this species, primarily within the Inland Scribbly Gum Forest vegetation.

On the basis of the results of the site survey (low call recordings), it appears unlikely that the local population would be placed at risk of extinction. However, this species should be a focal species of an operational Bird and Bat Management Plan to confirm the assumptions of this assessment, addressing inherent uncertainty.

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

Not applicable.

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

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

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

Not applicable.

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

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

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

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

i) Section 7 of the report discuss the extent of native vegetation types to be removed or modified as a result of the proposal. In general, relatively small areas of good quality forest or woodland habitat would be removed or modified within the project area, with most of the proposal affecting native pasture or cleared scattered trees over pasture. Recommendations have also been provided to protect and microsite infrastructure to avoid hollows in the first instance and then survey to accurately quantify hollows to be removed in order to offset or replace all hollows that are cleared during construction.

ii) In the project area, turbines are located on ridges, often adjacent ridges, with a spacing of approximately 2 to 5 km between them. Spacing between turbines in the current layout is generally around 300-500m. The distance between turbine clusters and also the distance between individual turbines is expected to allow for safe passage between turbines for bats, without creating a barrier effect. There may be some alteration to movement patterns for some species, but areas of habitat are unlikely to become isolated from each other. Vegetation in the landscape is already very fragmented, and bats persist in that environment because of their mobility. The small amount of clearing for each turbine location is unlikely to increase fragmentation at a landscape level, particularly for mobile bat species. Additionally, the clearing of the transmission line easement is unlikely to create an impediment to movement for the microchiropteran bat species considered in this assessment.

iii) Types of habitat to be removed for turbines, access tracks, power infrastructure, and transmission line associated with the proposal are well represented in the overall project area and surrounding locality. The majority of the habitat to be removed in the project area is degraded and has been subject to ongoing disturbance from agricultural land use.

The presence of the wind farm has the potential to represent indirect habitat loss if bats avoid the entire area of the wind farm. However, research to date (summarised in the main report) suggests that bats readily fly among turbines with only a small percentage suffering mortality from collision with turbines. There is no evidence available to suggest that bat utilisation of remnant vegetation within the turbine envelope, decreases following wind farm construction. Regardless, microchiropteran bats (species diversity and activity levels) would be a focus of the Bird and Bat Adaptive Management Plan for the project.

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

There are no areas of declared critical habitat within the project area or greater locality.

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

Eastern Bentwing Bat

OEH have identified priority actions which relate to protection of roost sites; none are relevant to the proposal.

Yellow-bellied Sheathtail Bat

Of the identified priority actions for this species, the recommendation to *Ensure the largest hollow bearing trees (including dead trees and paddock trees) are given highest priority for retention in PVP assessments and or other land assessment tools* is relevant to this proposal. This assessment has identified mitigation measures to minimise the loss of hollow bearing trees and dead trees and offset hollow bearing trees that would be removed.

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

The proposal may increase the impact of the following key threatening processes relevant to the species assessed:

- Clearing of native vegetation.

The clearing of potential habitat will lead to direct habitat loss for these species, however, the majority of this is in historically cleared and fragmented areas that have been highly degraded through long-term grazing practices. The proposal commits to offsetting all impact to the vegetation that is cleared which is likely to have a positive effect on these species. Given bat species forage widely across the landscape and are highly mobile, the discrete clearance footprint is unlikely to lead to a long-term impact to these species.

- Loss of hollow-bearing trees

Hollow-bearing trees will be removed during the vegetation clearing required for the proposed development. The majority of these will likely be in the patches of vegetation that the transmission line may pass through. Recommendations have been made to the proposal in order to avoid impact upon hollow-bearing trees, where possible. These provisions include pre-clearance surveys, and micrositing of infrastructure. Recommendations are also given to offset or replace (with artificial hollows) all hollows that are cleared during the construction phase. Thus, it seems unlikely that any threatened species will be significantly affected by the vegetation clearance associated with the proposed development.

- Removal of dead wood and dead trees

The removal of dead wood and dead trees from the landscape may occur as a result of the proposed development. Dead standing trees may provide shelter bat species. It is unlikely that the removal of dead wood and trees will result in a significant impact to any threatened species in the region as the

scale of clearance of dead trees is likely to be low, with a substantial amount remaining within the project area. Especially within Inland Scribbly Gum Forest, of which a substantial amount of this vegetation type exists within the landscape.

Reptiles – Striped Legless Lizard

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

This species is typically said to inhabit temperate lowland grasslands, secondary grasslands and occasionally in open Box Gum Woodland. However, the species has also been recorded in degraded habitats such as sites dominated by introduced species (such as *Phalaris aquatica, Nasella trichotoma* and *Hypocharis radicata*) and sites with a history of grazing and pasture improvement (Smith and Robertson, 1999). This species is mostly associated with grasslands supporting a dense cover of perennial tussock grasses, particularly spear grass (*Stipa bigeniculata*) and Kangaroo Grass (*Themeda triandra*) (Kukolic 1991; Kukolic & Osborne 1993). The highest densities of the species have been reported from sites with a *Themeda* ground cover of more than 70 % (Kukolic 1991).

One individual of the Striped Legless Lizard was recorded at tile plot 10 (RYP_27) in the northern section of the project area. The species was located on a grazed ridge top supporting a predominantly exotic grassland, with some native species. Common species included: Spear grasses (*Austrostipa* sp.), Thistles (*Sonchus* sp.), Cat's Ear (*Hypochaeris radicata*), and Rye Grass (*Lolium perenne*), with some embedded rock consisting of approximately 10-15% cover. No Kangaroo Grass (*Themeda australis*) was observed in the area at the time the tiles were laid. The observation of the Striped Legless Lizard was made on the ninth check of the ten checks completed.

Given the species was detected once, it could occur in other areas of grassland habitat of the project area and impact to known habitat of this species could result from the proposal. To determine the extent of impact management measures have been prescribed to undertake more detailed micro-habitat survey of the site (referencing habitat attributes where the species was located) prior to the end of February 2014 to determine the extent of similar habitat within the project area and quantify the extent of clearance impact. These survey results would be used to minimise impacts and ensure offsetting requirements, where avoidance is not possible.

Assuming the Striped Legless Lizard could occur in all grassland habitats of the project area, the total impact to potential habitat of this species is 66 ha (including Box Gum Woodland Derived grassland and native pasture habitat). Of these habitat types, 5887 ha is available within the project area and therefore the ability to offset impact to this species within the immediate project area is achievable. The proposal commits to offsetting all impact to this species which is likely to have a positive effect on this species given the offset site will require management and therefore halt the current impacts associated with grazing in the project area that continue to degrade the habitat of this species.

As the species was not located at the other nine tile sites, the overall impact to this species is not expected to be significant especially when considering the amount of available habitat remaining within the project area. Furthermore, the ability to offset the impact will ensure the species is conserved in the locality. In light of this, the proposal is unlikely to have an adverse effect on the life cycle of the Striped Legless Lizard such that a viable local population of the species is likely to be placed at risk of extinction, however further survey work is required to confirm the assumptions of this assessment.

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

Not applicable.

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

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

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

Not applicable.

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

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

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

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

i) Up to 66 ha potential habitat would be affected with 5887 ha remaining within the project area. Management measures specifying further micro-habitat survey of the site (referencing habitat attributes where the species was located) prior to the end of February 2014 to determine the extent of similar habitat within the project area and quantify the extent of clearance impact is required to determine the total extent of habitat to be removed and therefore the potential fragmentation impacts. These survey results would be used to minimise impacts and ensure offsetting requirements, where avoidance is not possible.

ii) As above.

iii) The habitat to be removed is considered important habitat to the Striped Legless Lizard given the species would not be capable of moving large distances. However, the impact from the proposal will be confined to relatively discrete areas of clearance and a substantial amount of habitat will remain in the project area (> 5000 ha) of which areas will be designated as offset sites to ensure the species and its habitat is conserved within the project area. The results of further habitat survey will be required to determine the importance of the habitat to be removed.

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

There are no areas of declared critical habitat within the project area or greater locality.

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

The *National Recovery Plan for Striped Legless Lizard 1999 - 2003* (Smith & Robertson 1999) lists a number of objectives which relate mostly to research and management of known populations, establishing reserves to protect the species and understanding ecological requirements and threatened processes of the species further, as well as involve community in the conservation of the species; none are relevant here.

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

The proposal may increase the impact of the following key threatening processes relevant to the species assessed herein:

- Clearing of native vegetation.

The clearing of potential habitat, especially Native Pasture habitat will lead to direct habitat loss for this species, however, the majority of this is in historically cleared and fragmented areas that have been highly degraded through long-term grazing practices. The proposal commits to offsetting all impact to Box Gum Woodland which is likely to have a positive effect on this species given the offset site will require management and therefore halt the current impacts associated with grazing in the project area that continue to degrade the habitat of this species.

- Invasion of native vegetation by exotic perennial grass

The invasion of native vegetation by exotic perennial grass is a further Key Threatening Process relevant to this proposal. Box Gum Woodland EEC in particular is vulnerable to the introduction and spread of perennial grasses such as African Love Grass, Serrated Tussock, Phalaris, Cocksfoot, Yorkshire Fog, and Paspalum. Recommendations for correct vehicle hygiene are prescribed and the proposal is not considered to significantly increase the impact of this Key Threatening Process.

- Removal of dead wood and dead trees

The removal of dead wood and dead trees from the landscape may occur as a result of the proposed development. It is unlikely that any threatened reptiles are reliant on dead wood within the study area, however, recommendations are given for fallen timber greater than 50 cm to be left in place or moved to a nearby area to retain fauna habitat, where possible. The proposal is therefore not considered to significantly increase the impact of this Key Threatening Process.

Invertebrates – Golden Sun Moth

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

The Golden Sun Moth shows a preference for natural temperate grasslands or derived grasslands (derived from Box Gum Woodland) that are dominated by a low and open cover of native wallaby grasses (*Rytidosperma* spp., formerly *Austrodanthonia* spp.), spear grasses (*Austrostipa* spp.), and the introduced Chilean needle grass (*Nassella neesiana*) (Richter *et al.* 2013). Golden Sun Moths appear to favour slightly sloping, north facing sites with minimal shading. Areas of bare or sparsely covered ground between grass tussocks (inter-tussock space) are thought to be important in helping males locate females and therefore high biomass renders habitat less suitable. Sites that have been pasture improved, fertilised or ploughed are unlikely to provide habitat for Golden Sun Moth.

The Golden Sun Moth was observed at seven of the ten sites surveyed and approximately 200 moths were observed in total across the project area. In particular, the southern section of the site appears to support larger numbers of Golden Sun Moth, as well as the area surveyed east of RYP_72. Potential habitat was recorded to extend beyond the areas likely to be disturbed at most sites where Golden Sun Moths were observed.

The locations moths were observed are currently impacted by transmission lines, access tracks and substation infrastructure, but no turbine areas. Several concrete poles would need to be erected, requiring vegetation clearing and excavation within small discrete footprints. Spoil would be temporarily stockpiled next to each pole during excavation. Poles and transmission lines would be laid along the ground prior to being raised. During construction and operation, vehicles would travel underneath the lines. For these infrastructure types, the proposal has potential to directly impact either the underground or emerged phase of the Golden Sun Moth during habitat clearance (i.e. not below ground other than for pole excavation).

However, as the species was detected on site in variable quality habitats it is likely it could occur elsewhere not assessed during the November 2013 survey. Therefore, as a precautionary measure, the habitat in which the species was located and all contiguous habitat of similar structure and condition has been delineated as potential habitat. This includes all Box Gum Woodland, derived grassland and native pasture habitats across the project area. The current total impact to these habitat types for this species is 66 ha. Of these habitat types, 5887 ha is available within the project area and therefore the ability to offset impact to this species within the immediate area of proposed infrastructure is achievable.

There are 15 known populations of the Golden Sun Moth in the general area between Yass and Boorowa, including at Rye Park (DEWHA 2009) and this species has recently been shown to be more widespread than currently thought, particularly within the Yass Valley region. Recent survey results at another wind farm in the region (Yass Valley Wind Farm) have also shown the species to occur in high number (i.e. > 200 individuals).

To determine the extent of impact and specifically quantify habitat for this species within the project area, management measures have been prescribed to undertake further preconstruction surveys of the final infrastructure layout in accordance with the relevant survey guidelines (Significant Impact Guidelines for the critically endangered Golden Sun Moth *Synemon plana;* DEWHA 2009) for this species. The results of these surveys would be used to minimise impacts and ensure offsetting requirements, where avoidance is not possible. The management protocols for this species would be documented within a management plan, to be implemented as part of the construction process.

Given the most likely impact to this species will occur from overhead transmission lines which are generally limited to discrete impact from pole footings, a relatively large number of moths were observed across the project area, and the species is expected to be more widespread in other areas of the project area and broader locality, the action proposed is unlikely to have an adverse effect on the

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

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

Not applicable.

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

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

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

Not applicable.

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

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

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

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

i) Up to 66 ha of this community would be affected with 5887 ha remaining within the project area; within the 66 ha, several concrete poles would need to be erected, requiring vegetation clearing and excavation within small discrete footprints. Spoil would be temporarily stockpiled next to each pole during excavation. Poles and transmission lines would be laid along the ground prior to being raised.

ii) Management measures specifying timing of construction outside the emergence/breeding period (i.e. between 1 March and 30 September) are also specified. If works are carried out outside of the emergence/breeding season, habitat fragmentation is not anticipated as grassy vegetation would regrow underneath the 132 kV transmission line. This requirement is an assumption of this assessment and has been included in this report's recommendations.

iii) The habitat to be removed is considered important habitat to the Golden Sun Moth given the species does not generally move more than 100m. However, the species is expected to be relatively widespread over the project area and a substantial amount of habitat will remain in the project area (> 5000 ha) or which areas will be designated as offset sites to ensure the species and its habitat is conserved within the project area. Given the species has recently being detected in more areas than first thought across the Yass Valley region, the severity of impact to this species is not as severe as first anticipated.

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

There are no areas of declared critical habitat within the project area or greater locality.

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

There is no recovery plan for the Golden Sun Moth. OEH have not identified any relevant priority actions to help recover this species (OEH 2012). However, the following relevant activities have been listed to assist the species:

- Buffer habitat areas from impacts of other activities.
- Control invasions of weeds and pasture species (Golden Sun Moth).
- Protect known populations and areas of potential habitat from clearing, fragmentation or disturbance.
- Retain habitat connectivity between populations of Golden Sun Moth.

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

The proposal may increase the impact of the following key threatening processes relevant to the species assessed herein:

- Clearing of native vegetation.

The clearing of potential habitat, especially Box Gum Woodland habitat will lead to direct habitat loss for this species, however, the majority of this is in historically cleared and fragmented areas that have been highly degraded through long-term grazing practices. The proposal commits to offsetting all impact to Box Gum Woodland which is likely to have a positive effect on this species given the offset site will require management and therefore halt the current impacts associated with grazing in the project area that continue to degrade the habitat of this species.

- Invasion of native vegetation by exotic perennial grass

The invasion of native vegetation by exotic perennial grass is a further Key Threatening Process relevant to this proposal. The White Box - Yellow Box –Blakely's Red Gum Woodland EEC in particular is vulnerable to the introduction and spread of perennial grasses such as African Love Grass, Serrated Tussock, Phalaris, Cocksfoot, Yorkshire Fog, and Paspalum. Recommendations for correct vehicle hygiene are prescribed and the proposal is not considered to significantly increase the impact of this Key Threatening Process.

C.2 COMMONWEALTH

The following species listed under the EPBC Act are assessed in accordance with *EPBC Policy Statement 1.1, Significant Impact Guidelines*:

- Box Gum Woodland CEEC
- Yass Daisy (vulnerable)
- Superb Parrot (vulnerable)
- Striped Legless Lizard (vulnerable)
- Golden Sun Moth (critically endangered)
- Regent Honeyeater (endangered)
- White-throated Needletail (migratory)

Please note, as these species have been assessed above under the TSC Act Assessment of Significance, except for the White-throated Needletail, the impacts are summarised here to prevent duplication. It is considered the same information required for this Commonwealth assessment is also detailed in the NSW assessment.

Critically Endangered Ecological Community - Box Gum Woodland CEEC

a) Will the action reduce the extent of a community?

The proposal would result in the clearing of Box Gum woodland which forms part of the CEEC. Up to 10 hectares would be permanently removed as a result of the proposal. The majority of these impacts would result from the establishment of a 45m wide easement for the 132kV overhead power line. As a precautionary approach, this assessment has considered that the worst case scenario would be the total loss of this vegetation type within the easement; however in reality the vegetation is open woodland meaning that only scattered trees would need to be cleared. The understorey would also be mostly retained excluding small areas required for footings and a maintenance track. It is considered likely that the community would maintain its existing functionality following construction. Large extents of this vegetation occur within the proposal site. Approximately 69 hectares of this community potentially occurs in the vicinity of the area to be impacted. It is likely that additional areas occur nearby that have not been surveyed in detail.

The proposal will reduce the net amount of Box Gum Woodland for the purposes of constructing infrastructure however its overall extent within the site boundary is unlikely to be effected. Large areas of the CEEC have the potential to benefit from offsetting by the proposal resulting in long term gains in terms of the biodiversity values of this community at the site. The small amount (up to 6 hectares) to be removed by the proposal is not considered to be significant when compared to the large areas (potentially 69 hectares) that will not be impacted by the development.

b) Will the action fragment or increase fragmentation of the community, for example by clearing vegetation for roads or transmission lines?

The Box Gum Woodland CEEC community within the proposal site boundary has already been highly fragmented due to past clearing and agricultural practices. It is however, generally continuous within the existing paddock boundaries where it presently occurs. Permanent clearing will be limited to the removal of scattered trees and high diversity ground cover for the purposes of constructing access roads and turbine footings. This will result in localised fragmentation of the community. Fragmentation will not be increased at the broader scale across the proposal site.

c) Will the action adversely affect habitat critical to the survival of an ecological community which consists of, or includes, fauna species?

The proposal will permanently remove up to 10 hectares of predominately ground cover vegetation associated with the CEEC. Considering the large extents of similar habitat within the proposal site (potentially 69 hectares) the relatively small amount to be removed is not considered critical to the survival of the CEEC.

Assessments of significance have been carried out separately for fauna species with potential for significant impact, including species that are associated with this ecological community such as Superb Parrot.

d) Will the action modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for the community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns?

Soils and nutrient balance in parts of the subject site are already highly disturbed due to grazing and clearing impacts which have been widespread, insidious and long-term in nature. The proposal would have a short term gross impact upon soils and possibly surface water flow, within discreet areas. These impacts are manageable with the implementation of erosion and sediment controls and would be unlikely to further degrade the project area.

Transmission lines associated with the proposal are intended to be sub-surface adjacent to areas disturbed for the construction of internal roads. Roads will potentially cross a number of drainage lines including those within CEEC areas. The construction of roads may cause minor alterations to drainage patterns due to localised reduction in infiltration and runoff. However, the actions associated with the proposal are not considered likely to substantially alter hydrological patterns necessary for the community's survival.

e) Will the action cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting?

The development is unlikely to cause a substantial change in species composition in areas of CEEC, including through clearing, harvesting, disease infection, weed invasion or alteration to grazing, burning or flooding regimes. Management associated with offsetting has the potential to have a net gain in increasing the diversity of functionally important species within more extensive areas of the CEEC within the proposal site.

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

The construction phase of the proposal has the potential to introduce or assist the spread of invasive weed species. The invasion of native vegetation by exotic perennial grasses is a particular risk for the CEEC. These risks could be reduced to acceptable levels through weed hygiene protocols, pre and post works weed control, soil erosion and sedimentation control, effective and timely site rehabilitation and the avoidance of fertiliser use in areas within and adjacent to the CEEC.

Chemical pollution risks could be reduced using chemical spill kits, site sediment control structures and permanent bunding of the turbine sites. With controls in place, the works are not expected to result in significant impacts from weeds or pollutants.

g) Will the action interfere with the recovery of an ecological community?

The proposal is unlikely to interfere with the recovery of the CEEC and with the implementation of a suitable offset plan is likely to assist with the recovery of the broader extent of the community within the proposal site.

Conclusion

The proposal would result in the permanent removal of up to 10 hectares of the Box-Gum Woodland CEEC causing a localised reduction in the occurrence of this community. The majority of this impact would result from the establishment of a 45m wide easement for the 132kV overhead power line and as a precautionary approach, this assessment has considered that the worst case scenario would be the total loss of this vegetation type within the easement however, in reality, the actual impact is likely to be considerably less.The proposal will not impact on the broader extent of the CEEC within the proposal site. Localised disturbance to hydrological patterns that support the EEC may result from the proposal but are unlikely to be substantial. The risks associated with the ingress of invasive species and disease and potential impacts from chemicals and fertilizers are considered to be acceptable if the recommendations included within Section 8 of this report are adhered to.

Offsetting is recommended by this report to maintain and improve the biodiversity values associated with the CEEC within the proposal site. Large areas potentially exist within the site boundary that if properly managed can assist with the recovery of this community, arresting existing threats and managing the land for biodiversity outcomes.

With the implementation of the controls and recommendations of this report the proposal is considered unlikely to have a significant impact on the Box-Gum Woodland CEEC and would result in a net positive gain.

Critically Endangered and Endangered Species

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

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

What is a population of a species?

A 'population of a species' is defined under the EPBC Act as an occurrence of the species in a particular area. In relation to critically endangered, endangered or vulnerable threatened species, occurrences include but are not limited to:

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

Golden Sun Moth

The Golden Sun Moth was observed at seven of the ten sites surveyed and approximately 200 moths were observed in total across the project area. In particular, the southern section of the site appears to support larger numbers of Golden Sun Moth, as well as the area surveyed east of RYP_72. Potential habitat was recorded to extend beyond the areas likely to be disturbed at most sites where Golden Sun Moths were observed.

However, as the species was detected on site in variable quality habitats it is likely it could occur elsewhere not assessed during the November 2013 survey. Therefore, as a precautionary measure, the habitat in which the species was located and all contiguous habitat of similar structure and condition has been delineated as potential habitat. This includes all Box Gum Woodland, derived grassland and native pasture habitats across the

project area. The current total impact to these habitat types for this species is 66 ha. Of these habitat types, 5887 ha is available within the project area.

Recommendations have been made for this species to further preconstruction surveys of the final infrastructure layout in accordance with the relevant survey guidelines (Significant Impact Guidelines for the critically endangered Golden Sun Moth *Synemon plana;* DEWHA 2009) for this species. The results of these surveys would be used to minimise impacts and ensure offsetting requirements, where avoidance is not possible. The management protocols for this species would be documented within a management plan, to be implemented as part of the construction process. Offsetting for this species is considered achievable given 5887 ha of potential habitat is available within the project area.

The most likely impact to this species will occur from overhead transmission lines which are generally limited to discrete impact from pole footings, a relatively large number of moths were observed across the project area (> 200), and the species is expected to be more widespread in other areas of the project area and broader locality, the action proposed is therefore unlikely to long-term decrease in the size of population or fragment a population.

Weed invasion could be harmful to the Golden Sun Moth. Measures have been developed to minimise the spread of weeds in the impact footprint including noxious weed control before works commence, wash down of vehicles and machinery prior to site entry *and* prior to CEEC entry, ongoing weed monitoring and control after completion of construction works. There are no known diseases associated with human impacts that may cause the Golden Sun Moth to decline.

Regent Honeyeater

The species was not recorded during surveys, but records of Regent Honeyeater are present within the locality and the species is known to utilise box-ironbark eucalypt associations. As this species is nomadic and movement patterns are often linked to availability of resources, it can be assumed that they may travel through the project site to other foraging grounds. The project area is not considered a known or important foraging ground for this species given it was not detected during surveys, but there is potential for this species to be impacted from collision with turbines when it migrates.

Records across NSW indicate a strong presence of this species to the south, east and north-east of the project site in better quality habitat (i.e. National Parks) and could be considered an important landscape connection. This area traverses Namadgi NP, Morton NP, Nattai NP and Blue Mountains NP. It is expected the movement of this species would commonly occur through this connection where better quality foraging resources exist. On this basis, the proposal is not expected to significantly impact this species from collision risk. The fact the Regent Honeyeater was not observed during substantial bird survey indicates the species does not regularly forage or move through the project area. The action proposed is therefore unlikely to long-term decrease in the size of population or fragment a population. No invasive species are known to be harmful to the Regent Honeyeater and no diseases would occur to this species as a result of the proposal.

Vulnerable Species

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

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

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

What is an important population of a species?

An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

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

Yass Daisy

The proposal would result in the permanent loss of up to 12 hectares of moderate and good condition Box-Gum Woodland, which provides potential habitat for the threatened Yass Daisy. Targeted surveys were carried out in these areas and the species are considered unlikely to occur there. The majority of the total area of disturbance would involve tree clearing for a 45m wide easement for the 132kV overhead powerlines. The groundlayer habitat under the powerlines would be largely undisturbed, with the exception of small areas required for pole footings and a maintenance track.

In view of the limited extent and pattern of clearing and the low impact on groundlayer vegetation within the ETL, the works are not expected to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species are likely to decline.

As the Yass Daisy was not recorded at within project area it is not considered likely to occur there based on grazing history and survey results. The proposal would not therefore be likely to lead to a long-term decrease in the size of a population of these species and would not therefore affect areas of occupancy of these species.

Current threats to the Yass Daisy include agricultural developments, intensification of grazing regimes, invasion of weeds, road works (particularly widening or re-routing) and inappropriate mowing or slashing in cemetery sites (OEH 2011). The principal recovery actions required cover:

- Protection of known populations from changes to land use, road works, pasture modification, grazing pressures, and inappropriate mowing regimes
- Pest plant and animal control
- Marking sites and potential habitat onto maps used for farm, development and conservation planning and management
- Searching for new populations in potential habitat (OEH 2011, DSEWPC 2008).

Potential habitat within the project area has been subjected to targeted surveys, and the Yass Daisy is not considered likely to occur there. The proposal is not expected to affect the recovery of the Yass Daisy or exacerbate existing threatening processes.

Superb Parrot

Superb Parrots are commonly recorded to the west of the project area, especially along Rye Park Road, and are likely to utilise habitat outside or adjacent the western boundary of the project area within open grassland or Box Gum Woodland, except for a discrete area in the southern end of the project area where parrots were commonly recorded. Superb Parrots are not moving across the ridges proposed for turbines and are not undertaking large-scale movements at higher elevations (i.e. at rotor-swept-area height) in this direction and risk of collision impact is low overall. Rather, movement nearby the project area consists of local movements within discrete areas where foraging habitat is available. Superb Parrots generally followed corridors of vegetation and flew below canopy height (i.e. less than 20 m). The species was recorded in higher abundance along this road than anywhere else within the project area.

The total clearance impact to potential habitat (Box Gum Woodland) is 25 ha, with 1555 ha remaining within the project area; however, the greatest impact to this species is considered to occur where the Superb Parrot was observed regularly in one area at the southern end of the project area which also supported two identified nest trees.

According to the National Recovery Plan, Box Gum Woodland on the inland slopes and tablelands is critical breeding habitat for the Superb Parrot. Therefore, critical breeding habitat occurs in the project area and would be cleared; however as all known nest sites will be avoided and clearance of hollows as well as impact to Box Gum Woodland will be offset. Given these considerations, in terms of direct habitat loss, the magnitude of impact is estimated to be low and unlikely to lead to a long-term decrease in the habitat resources and therefore the size of the population.

Given the species is primarily occupying habitat outside the project area and occurs in regularly high numbers in those areas, the species is not making large-scale movements across the ridges proposed for turbines, and impact to all known nest trees will be avoided, the proposal is not considered to adversely affect breeding of the population, fragment a population or affect habitat critical to the survival of the species. Furthermore, no known diseases would be introduced as a result of the proposal.

Striped Legless Lizard

The Striped Legless Lizard was recorded in one location the project area out of the ten surveyed, near RYP_27. Given the targeted tile check surveys sampled areas of potential habitat for this species, it is assumed the lizard could occur in other locations of the project area. As a result all grassland habitat in all conditions (i.e. poor to good quality) have been assumed as potential habitat for this species. Under this assumption, the proposal would affect 66 ha of habitat, with 5887 ha remaining within the project area.

Recommendations have been made for this species to undertake microhabitat survey of the site (referencing habitat attributes where the species was located) prior to the end of February 2014 to determine the extent of similar habitat within the project area and quantify the extent of clearance impact. These survey results would be used to minimise impacts and ensure offsetting requirements, where avoidance is not possible. Offsetting for this species is considered achievable given 5887 ha of potential habitat is available within the project area.

As the species was not located at the other nine tile sites, the overall impact to this species is not expected to be significant especially when considering the amount of available habitat remaining within the project area. Furthermore, the ability to offset the impact will ensure the species is conserved in the locality. In light of this, the proposal is unlikely to have an adverse effect on an important population of the Striped Legless Lizard or fragment an important population, however further survey work is required to confirm the assumptions of this assessment.

Weed invasion could be harmful to the Striped Legless Lizard. Measures have been developed to minimise the spread of weeds in the impact footprint including noxious weed control before works commence, wash down of vehicles and machinery prior to site entry *and* prior to Box Gum Woodland entry, ongoing weed monitoring and control after completion of construction works. There are no known diseases associated with human impacts that may cause the Striped Legless Lizard to decline.

Migratory Species

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

- **substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species**
- **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**
- **seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.**

What is important habitat for a migratory species?

An area of 'important habitat' for a migratory species 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.**

White-throated Needletail

White-throated Needletail was not recorded during surveys, but based on records in the Atlas of Living Australia there is potential for the species to occur. The species is a seasonal migrant present in Australia outside of breeding season, and may occur in large flocks foraging aerially at heights of up to 1000 metres above the ground (SEWPAC 2012). As the species breeds overseas, the potential for impact would be upon migration resulting in potential collision risk during the operational phase of the wind farm. It appears to collide with wind turbines in some areas and the species has been affected at other wind farms around eastern Australia, with one Bird Monitoring Report recording that "no other non-raptor species had more than four mortality events over the 3 year period" (Roaring 40s Renewable Energy 2010).

The locations of turbines could coincide with areas utilised by White-throated Needletails when moving through the landscape or during aerial foraging, such as ridges with prominent updraughts. However, the species also forages along storm and wind fronts at heights of greater than 1000 metres above ground. Therefore, as a proportion of foraging habitat the turbines would not substantially modify the area of important habitat in the project area for the White-throated Needletail.

Although the species' total population is unknown, it is reported as being widespread and abundant in areas where it is found (SEWPAC 2012). Given the species does not breed in Australia and it has a huge area of occupancy and is widespread, the Rye Park wind farm is unlikely to affect an ecologically significant proportion of the population. The action proposed is therefore unlikely to long-term decrease in the size of population or fragment a population.

No invasive species are known to be harmful to the White-throated Needletail.

APPENDIX D SITE PHOTOS

Typical rocky habitat (grassed pasture, embedded rock)

Typical forest / woodland

Typical dry forest / paddock edge

Typical dry forest (moderate condition)

Typical dry forest with litter and loose rocks (moderate condition)

Typical young regrowth forest (low-moderate condition)

Typical dry forest (moderate-good condition)

Good quality roadside vegetation

Typical moderate quality pasture with scattered trees

Typical low-moderate quality grassland (pasture)

Typical shrubland in disturbed areas

Unusual large rocky features

Typical large embedded rocky outcrop

Typical low quality grassland with sparse scattered surface rocks

APPENDIX E MAPS

E.1 PROPOSED TURBINE AND INFRASTRUCTURE LAYOUT

E.2 FLORA SURVEY EFFORT AND RESULTS

E.3 FAUNA SURVEY EFFORT, RESULTS AND IMPACT

E.4 CONSTRAINT MAPS

APPENDIX F OFFSET OUTLINE

F.1 INTRODUCTION

The objective of offsetting is to ensure that an overall 'maintain or improve' outcome is met for the project; where impacts cannot be avoided, or sufficiently minimised, the residual impact will be offset in perpetuity.

The biodiversity offset principles developed by the former DECCW (now DOE) would guide the selection and management of the offset site, namely:

- Impacts must be avoided first by using prevention and mitigation measures.
- All regulatory requirements must be met.
- Offsets must never reward ongoing poor performance.
- Offsets will complement other government programs.
- Offsets must be underpinned by sound ecological principles.
- Offsets should aim to result in a net improvement in biodiversity over time.
- Offsets must be enduring - they must offset the impact of the development for the period that the impact occurs.
- Offsets should be agreed prior to the impact occurring.
- Offsets must be quantifiable - the impacts and benefits must be reliably estimated.
- Offsets must be targeted.
- Offsets must be located appropriately.
- Offsets must be supplementary.
- Offsets and their actions must be enforceable through development consent conditions, licence conditions, conservation agreements or a contract.

The proponent commits to the preparation of an Offset Strategy, developed with input from OEH and the CMA and finalised prior to any construction impacts.

Further, the proponent commits to the preparation of an Offset Plan, developed with input from OEH and the CMA prior to operation, demonstrating the suitability of the final offset site and providing detailed management actions specific to the site.

An Offset Strategy outline is provided below, to provide certainty around:

1. How offsets will be identified
2. How offsets will be managed
3. How offsets will be secured

These issues are outlined below.

F.1.1 Background

The DGRs for this proposal require that an Offset Package be developed where the proposal cannot adequately avoid or mitigate impacts on biodiversity. While measures have been taken to minimise impacts (refer to mitigation strategies set out in Section 8 of the main report), residual impacts remain and therefore an Offset Package is considered to be required.

The following commitments are made by the proponent to address this requirement:

1. **The proponent commits to the preparation of an Offset Strategy, developed with input from OEH and the CMA and finalised prior to any construction impacts.**
2. **Further, the proponent commits to the preparation of an Offset Plan, developed with input from OEH and the CMA prior to operation, demonstrating the suitability of the final offset site and providing detailed management actions specific to the site.**

The wording of the above commitments ensures that prior to any impact, the offset site, the offset ratios, the management measures in place and the means to secure the site have been developed with input from OEH and the CMA.

The strategy proposed in this document is based on similar strategies undertaken in consultation with OEH for renewable energy projects in NSW.

F.1.2 Scope and aim of this Draft Offset Strategy

The key aim of the provision of this information is to demonstrate, prior to project approval that the offsets required can be achieved and will be acceptable to the impact proposed. Furthermore, it sets out a clear pathway to implementation of the offsets, to provide certainty regarding the outcomes for all parties involved.

Offsets for the Rye Park wind farm project would:

• Be supported by a suitable metric.	*Standardised survey techniques used.*
• Addresses the Department's '*Principles for Biodiversity Offsets in NSW'.*	*These are addressed below.*
• Ensure that offset sites are located remote from the influence of wind turbines (and any habitat modification that could be expected in nearby habitat).	*Location criteria are included in the offset guidelines.*
• Be governed by conservation mechanisms to ensure long-term protection and management of the site, including funding arrangements.	*One Conservation Property Vegetation Plan (CPVP) proposed for each private property offset site.*
• Include a management plan to ensure management measures are appropriate.	*Guidance on development of appropriate management measures is provided below.*
• Be able to be demonstrated prior to the impact occurring (including precise quantification of impact vs offset lands and their locations).	*Commitment to upfront ratios put a limit on clearing allowed. Commitment to validate actual clearing and ensure this is offset is provided.*
• Be able to ensure a maintain or improve outcome.	*Ratios proposed are in line with guidance documents and consultants experience, as set out below.*

Specific to key components of this outline, it is noted that:

In advance of project approval, allowances have to be made for changes in the infrastructure layout. The movement of infrastructure within the development envelope is termed 'micro-siting'. Limits are placed on micro-siting by the draft standard conditions for wind farms developed by the NSW Department of Planning and Infrastructure (a location allowance of 100 metres radius for development components as long as impacts remain consistent with that assessed - http://www.planning.nsw.gov.au/standard-and-model-conditions). These changes may also affect the landowners involved in the project and therefore the ability to use suitable areas of their property in the Offset Package. In response to this issue, a 'criteria approach' has been adopted in the development of this offset outline. The criteria and methods set out

below are intended to guide the finalisation of the Offset Package whilst allowing the project the flexibility it requires to be developed.

While a Biobanking offset methodology is not proposed, the *Part 3A Transitional Project Biobanking Guidance for Offset Ratios* has been referenced where relevant below.

F.2 IMPLEMENTATION OVERVIEW

The following stages of implementing the Offset Package are proposed. These stages are detailed further in the sections below.

Stage	Timing
1. Offset Strategy	Draft Strategy pre project approval (this document). Final Strategy endorsed by agencies, prior to any impact.
a. Estimation of loss of habitat required for the project.	
b. Calculation of the required offsets, using predetermined offset ratios.	
c. Consultation and endorsement of CMA and OEH to finalise the Offset Strategy.	
2. Offset Plan	Prior to any impact.
a. Selection of offset sites	
b. For each offset site:	
○ Establishment of baseline data.	
○ Documentation of key biodiversity risks, opportunities and relevant local initiatives.	
○ Refinement of management actions specific to the site (with input from the landowner), including monitoring regime and reporting requirements.	
○ Consultation and endorsement of CMA and OEH to finalise the Offset Plan (could be documented separately for each site or in one combined document).	
3. Verification of the actual area of native vegetation clearing of the constructed wind farm and transmission line.	After construction.
4. Formalisation of the offset on the title of each involved property by way of a CPVP, including the inclusion of the management plan and its required management actions and land use restrictions.	Prior to operation.

F.3 OFFSET STRATEGY

F.3.1 Estimation of loss of habitat

The Biodiversity Assessment estimates the impact area for the proposal through calculation of habitat loss on a worst case scenario. This information is contained in Section 7 of the main report and provides an upper limit on the clearing proposed for the project and therefore required to be offset. Vegetation and habitat loss is currently grossly overestimated by the inclusion of large buffers around infrastructure and

tracks. In reality clearing for tracks will be much less and some tracks are already cleared. Similarly, where infrastructure is being placed in areas of degraded grassland/pasture these areas will not require clearing.

F.3.2 Calculation of required offsets

The proponent commits to determining an offset ratio with reference to:

- The conservation status of the vegetation (EECs would be offset at a higher ratio than common vegetation types)
- The condition of the vegetation (a standard metric has been used to collect condition data and would be used to ensure vegetation in better condition is offset at a higher ratio than degraded vegetation[1])
- Habitat values (important habitat elements or verified threatened species habitat would be offset at a higher ratio)

The offset ratios are proposed to be via negotiated agreement with OEH, rather than using the Biometric Assessment Methodology. A large amount of biodiversity survey work has been undertaken onsite. The intention is to supplement rather than redo this survey work in the calculation of offset areas. Using the Biometric Assessment Methodology at this time would duplicate survey effort.

The proposed ratios below have been developed based on **ngh**environmental's experience with the Biobanking calculator in similar vegetation types as well as in negotiations with OEH for similar renewable energy projects. They are proposed as a starting point for a negotiated agreement. They have the benefit of being transparent to the proponent and the consent authority, facilitating an upfront understanding of the offset requirements for the project in advance of impacts occurring. Where multiple factors apply and their ratios are contradictory (i.e. threatened species habitat and low condition vegetation) it is proposed that the highest offset ratio would apply. Hollow-bearing tree requirements (HBT) are supplementary to area offsets. While the Biometric Assessment Methodology has the advantage of being more clear cut, we propose a negotiated agreement that is flexible to achieving an overall beneficial outcome and is better suited to the many individual sites that are likely to be included in the final offset plan.

Proposed offset ratios

Condition class	Biometric condition[3]	Vegetation NOT OF conservation significance	Vegetation OF conservation significance	Threatened species habitat	HBT removed: nest box
Poor	Low	1 : 1	1 : 2	1 : 2	1 : 1
Moderate	Moderate- Good	1 : 1	1 : 5	1 : 5	1 : 1
Good	Moderate- Good	1 : 1	1 : 10	1 : 20	1 : 1

[1] This is a five class condition categorisation, documented within the BA and able to be easily related to the Biometric two-class condition categories.

Justification of these ratios is based on the following:

- In a recent project with Dubbo OEH office, a 1:5 ratio was endorsed by OEH for all native vegetation to be impacted; that being the ratio for the Grey –Crowned Babbler, considered to be the key significant species to be impacted. The ratios above are lower than this for degraded vegetation and higher than this for vegetation in moderate to good quality, achieving a comparative offset.
- In a recent project with Queanbeyan OEH office, a 1:10 ratio was suggested by OEH for Box Gum Woodland EEC with tree cover and 1: 5 ratio for EEC derived pasture. The ratios above are lower than this for degraded vegetation and higher than this for vegetation in good quality, achieving a comparative offset.
- In a recent project with South West OEH office, a 1:1 ratio was endorsed by OEH for a common vegetation type. The offset site included better habitat values than the development site. The ratios above include 1:1 for common vegetation types and higher ratios for threatened species habitat values, achieving a comparative offset.
- In several Biobanking Assessments undertaken using the BioBanking calculator, EECs in moderate to good biometric condition have returned ratios averaging 1:6. This can be verified as required.
- The Part 3A Transitional Project Biobanking Guidance for Offset Ratios allow a Tier 2 'no net loss' option rather than an 'maintain or improve' option, whereby lesser ratios are accepted if 'maintain or improve' cannot be achieved. This pathway must consider whether feasible alternatives to the clearing exist and the value of the resource (in this case wind energy). It is considered that the location of turbines and associated infrastructure is necessarily restricted to sites with suitable wind speed and that a lesser goal of 'no net loss' may be applicable to this project.

F.4 SELECTION OF OFFSET SITES

The proponent would establish offsets within the private land holdings of the project site.

Epuron have lease agreements with all involved landholders (where infrastructure is proposed to be located). These contracts stipulate that the land may be considered for biodiversity offsets. The intention is to select offset lands from within the project boundary in areas that will not be impacted. Broad scale mapping for the site identifies that the vegetation is representative of that that would be cleared and therefore allows a like for like offset criteria to be targeted. Additional criteria that would be used to select offset sites that will together make up the Offset Package include:

- Of sufficient combined size to achieve the set ratios above (or as negotiated with OEH)
- Complying with *Principles for the use of biodiversity offsets in NSW* guidance document (refer below for explicit reference to these principles)
- Will include provisions for offsetting Commonwealth listed EEC to demonstrate compliance with the Commonwealth offset policy.
- Selected to minimize:
    - Edge area
    - Number of land holdings
- Selected to maximize:
    - Landscape connectivity
    - Preservation of declining habitat types and resources
- Located no closer than 500 m from a wind turbine (to minimise any indirect impacts of the wind farm)

Any areas of ambiguity will be clearly stated so that a decision can be made about the overall suitability of the site. For example, it may be that exact ratios and types are not achieved but the overall package is still considered to achieve an overall neutral or beneficial outcome. If so, this will be identified and justified.

While specific sites have yet to be identified, there are large amounts of land of suitable type and condition within the project boundaries to demonstrate that offsets are achievable. In principle, agreements with landholders are in place.

F.5 FOR EACH OFFSET SITE:

F.5.1 Establishment of baseline data

The following baseline data would be collected for all sites within the Offset Package:

Desktop assessment

Evaluation of potential for threatened species to occur onsite, with reference to prior field work and database searches, below:

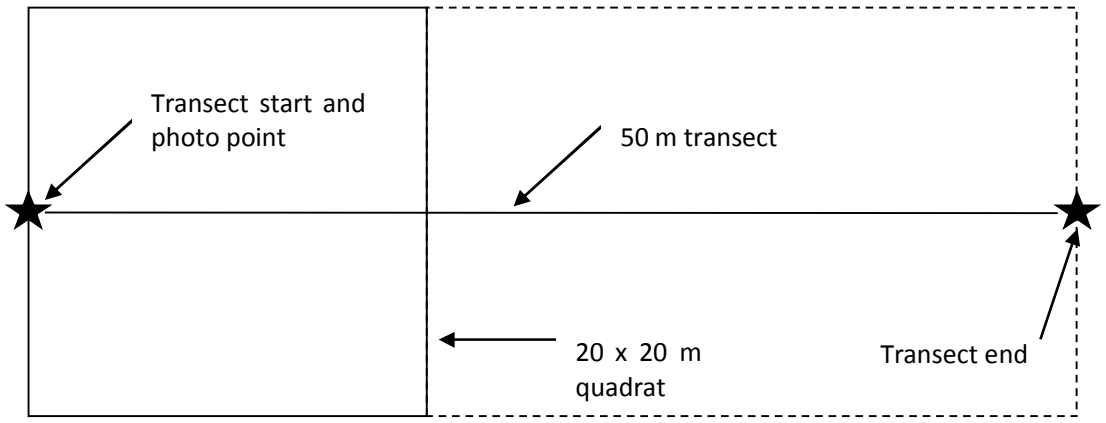
- The OEH threatened species database to identify species listed as threatened under the NSW *Threatened Species Conservation Act 1995* (TSC Act).
- The DSEWPC protected matters search tool to identify species listed as threatened or migratory under the Commonwealth *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act).

Field survey

A field survey would be undertaken by an ecologist. This would include:

- Mapping of vegetation types and condition
- Establishment of monitoring plots
- Onground validation / assessment of habitats for threatened species with the potential to occur at the site

BioBanking plots would be established in accordance with the BioBanking Assessment Methodology (BBAM, DECC 2009) to collect baseline data on vegetation structure and quality. The location of the plots would be marked using 1650 mm star pickets to facilitate the replication of the plots. The ends of the star pickets would be painted white to enable easy identification in the field. Star pickets would be placed at the start and end of the 50 metre transect required by the BBAM and their co-ordinates recorded. To delineate the start point of transects, orange flagging tape would be tied to the top of the appropriate picket. The 20 x 20 metre quadrat required by the BBAM would be conducted within an area bounded by the first 20 metres of the transect and extending 10 metres either side as shown below. Photo points would be established at each of the start points of the transects, with views along the length of the transect.



Monitoring plot layout

Data evaluation

Data recorded from the BioBanking monitoring plots would be compared with the benchmark data for the vegetation type as provided in the BioBanking vegetation types benchmark database (DECC 2008). Monitoring plot data would also be entered into the BioBanking Credit Calculator (BBCC) version 2 to obtain a baseline site value score for dominant vegetation formations at each site.

F.5.2 Key biodiversity risks, opportunities and relevant local initiatives

As a background to the development of appropriate management actions for the site, key biodiversity risks, opportunities and relevant local initiatives for each site would be documented.

F.5.3 Site specific management actions

Offset site management measures are required to be specific to each area in question. These measures aim to result in an improvement in the biodiversity values of the site and are designed to be adaptive (informed by a monitoring regime). These management measures would be incorporated into a detailed management plan for each offset site (one plan per landowner).

Management measures would be developed with reference to the Biobanking Management Plan template and with input from the CMA. Examples of likely measures are included below.

Example offset site management measures

Management measure	Objective	Justification	Action	Timing
Exclusion of stock	To prevent overgrazing and encourage regeneration of native vegetation. Any exclusion fencing must take into account access to macropods to enable natural levels of grazing to continue, requirements of threatened flora species and fire regimes.	Grazing would be likely to degrade habitat.	• Install stock proof fencing around the perimeter of the Offset Site (consider access for Macropods).	• At establishment of the Offset Site. • Ongoing repairs as required.
Weed control	To minimise the occurrence of weeds within the Offset Site particularly Weeds of National Significance (WoNS) and listed noxious weeds.	Weeds compete with native species and degrade habitats.	• Survey to identify target locations for weed control. • Weed control using appropriate methodologies considering target species and landscape context.	• At establishment of the Offset Site. • Ongoing as required.
Exclusion of feral pigs	To exclude feral pigs.	Feral species can degrade habitat, compete for resources with native fauna and introduce disease.	• Install and maintain preventative fencing suitable for the target species. • Remove pigs (by trapping or other means) if detected within the Offset Site.	• At establishment of the Offset Site. • Ongoing as required.
Rabbit control	To minimise the risk of the Offset Site becoming a refuge for rabbits.	Increased rabbit numbers can reduce native regeneration and support higher numbers of pest animals such as cats and foxes. Competition and grazing by the feral European rabbit is listed as a key threatening process (KTP) under the TSC Act and EPBC Act.	• Monitor for presence of rabbits. • Conduct baiting or controlled grazing to reduce the ability of the site to act as a refuge to rabbits. • Where possible, coordinate baiting with adjacent landowners to maximise effects	• Consideration given to action on the basis of monitoring results.

Management measure	Objective	Justification	Action	Timing
Fox control	To minimize the impacts of foxes on native fauna	Numerous native species are potentially at risk of becoming threatened as a result of fox predation. Predation by the European Red Fox is listed as a KTP under the TSC Act and EPBC Act.	• Conduct fox baiting in coordination and with the assistance of LHPA and/or CMA	• March and April are considered the most effective months in which to carry out control programs when foxes are dispersing and finding new territory (LHPA) • Ongoing as required
Goat control/exclusion	To exclude goats and/or control numbers	Feral species can degrade habitat, compete for resources with native fauna and introduce disease. Competition and habitat degradation by feral goats is listed as a KTP under the TSC Act and EPBC Act.	• Install and maintain preventative fencing suitable for the target species. • Control goat numbers in coordination and with the assistance of LHPA and/or CMA	• At establishment of the Offset Site. • Ongoing as required.
Monitoring	To determine the effectiveness of management measure	Monitoring is required to determine whether current management is effective and to inform ongoing management.	• Conduct monitoring as detailed for this site. • Adapt management measures where required	• Every two years

F.5.4 Requirement to monitor the offset site

In order to ensure that biodiversity improvement is occurring within the offset sites (and therefore that a 'maintain or improve outcome' can be met over time), monitoring is required.

Monitoring is recommended to be repeated initially, every two years. As a part of monitoring surveys, a report would be prepared to document the success or otherwise of management and adaptations required to obtain better results.

Reporting is proposed every two years to the Department of Planning and Infrastructure, until such time as this is deemed acceptable to cease. The reports would also be submitted to OEH for comment.

A decision to reduce or continue reporting every two years may also be made by DPI or OEH following submission of each report. A final report should be prepared prior to decommissioning of the project, to verify that a 'maintain or improve' outcome is being met and that residual management actions can largely coincide with routine agricultural land management.

F.6 VERIFICATION OF THE ACTUAL AREA OF NATIVE VEGETATION CLEARING

Verification of the actual area of impact of the constructed wind farm and transmission line is required to be verified, prior to finalising the CPVPs. This provides an incentive throughout construction to minimise impacts and thereby reduce the offset requirement for the project. It also verifies that the actual amount and type of clearing undertaken is offset, as required.

It is expected that a detailed Flora and Fauna Management Plan would be prepared to guide construction. This would contain updated vegetation mapping specific to the final infrastructure layout (refer to note on micrositing above). Verification of the actual area of native vegetation clearing can be undertaken as an audit after construction. (Incentives to minimize clearing would be an appropriate stipulation in EPC contracts).

F.7 FORMALISATION OF INDIVIDUAL CPVPS AND FUNDING ARRANGEMENTS

Offsets would be governed by conservation mechanisms to ensure long-term protection and management of the site, including funding arrangements.

A Conservation Property Vegetation Plan (CPVP) would be implemented on each involved private land holding. The process would be driven by Epuron, with input from each landholder. The CPVP would include management actions associated with the offset area that would apply in perpetuity.

To ensure that the CPVP is binding on successors in title, an abstract of the CPVP would be registered with the Land and Property Management Authority under the *Real Property Act 1900.* The CPVP would be a legally binding agreement under both the *Native Vegetation Act 2003* and the *Threatened Species Conservation Act 1995*. The terms of the CPVP would not be affected by any changes to local or state planning rules or new listings of threatened species. A CPVP can be varied at the landholder's request, provided the variation would still improve or maintain environmental outcomes.

As the CPVP is attached to the land title, the landowner is ultimately responsible for funding the management actions required at the Offset Site and monitoring the effectiveness of their implementation.

However the Proponent would take responsibility for management and would ensure the landowner has sufficient resources and information to implement the management actions for the operational life of the project, as management of offsets would form a condition of the project's consent.

Even though a CPVP is binding in perpetuity, it is acknowledged that there is less incentive to manage the offset site after the decommissioning of the wind farm. Therefore, it is proposed that the bulk of the management actions be focused in the early years of the project. Monitoring and reporting, as outlined above, would demonstrate whether this is being satisfactorily achieved and allow a point for the consent authority to intervene.

F.8 MAINTAIN OR IMPROVE

With the effective implementation of the stages outlined above, a 'maintain or improve' outcome would be achieved for the project. By the coordinated selection of offset sites over such a large area, and their management for biodiversity improvement, a regional scale beneficial biodiversity impact is anticipated. Benefits are expected to include:

- Incentive to minimize clearing during the detailed design and construction phases of the wind farm project
- Targeted and coordinated weed and feral animal management, informed by ecologists working with landowners
- Retention of declining habitat resources including hollows, fallen timber and logs, riparian habitats
- Protection of specific habitat linkages and wildlife corridors
- Improved infrastructure to assist management including fencing and access

F.9 'PRINCIPLES FOR BIODIVERSITY OFFSETS IN NSW'.

The biodiversity offset principles developed by the former DECCW (now OEH) would guide the selection and management of the offset site, namely:

Impacts must be avoided first by using prevention and mitigation measures.	*The BA sets out mitigation measure to minimse impacts. The aim of the offset package is to ensure that where impacts cannot be avoided, or sufficiently minimised, the residual impact would be offset in perpetuity.*
All regulatory requirements must be met.	*Offset land is required as part of the approval conditions for the project. The proposed offsets would not be used to satisfy approvals or assessments under other legislation.*
Offsets must never reward ongoing poor performance.	*Monitoring would be required as part of the implementation of management actions for the offset site.*
Offsets will complement other government programs.	*The Offset Package would be finalised in consultation with OEH and the CMA, allowing any local programs or initiatives to be considered and included.*
Offsets must be underpinned by sound ecological principles.	*Selection criteria have been developed to ensure the location of offset sites is appropriate. Management measures have been outlined by an ecologist. Specific management plans would accompany each CPVP,*

	developed in consultation with the CMA and the proponent.
Offsets should aim to result in a net improvement in biodiversity over time.	*Management actions would be developed specific to each offset site (one per private property).*
Offsets must be enduring - they must offset the impact of the development for the period that the impact occurs.	*Native vegetation clearing impacts are deemed permanent and therefore the offset sites would be preserved and managed in perpetuity.*
Offsets should be agreed prior to the impact occurring.	*The offset criteria set out in this document form part of the proposal. If approved, the commitment is carried over as a condition of consent. The commitment includes consultation with OEH and the CMA to ensure the final offset package is acceptable, prior to construction impacts.*
Offsets must be quantifiable - the impacts and benefits must be reliably estimated.	*An estimation of impact has been provided based on GIS mapping. Criteria have been proposed that provide clear quantification of offsets, based on the actual area cleared.*
Offsets must be targeted.	*Refer to selection criteria.*
Offsets must be located appropriately.	*Refer to selection criteria.*
Offsets must be supplementary.	*Offsets would be comprised of private land not currently under any form of biodiversity conservation protection. In this way the land would be additional to government reserves and programs. Refer to selection criteria.*
Offsets and their actions must be enforceable through development consent conditions, licence conditions, conservation agreements or a contract.	*A CPVP would be attached to the title of the offset land (one per landowner). To ensure that the CPVP is binding on successors in title, an abstract of the CPVP would be registered with the Land and Property Management Authority under the Real Property Act 1900. The CPVP would be a legally binding agreement under both the Native Vegetation Act 2003 and the Threatened Species Conservation Act 1995. The terms of the CPVP would not be affected by any changes to local or state planning rules or new listings of threatened species. A CPVP can be varied at the landholder's request, provided the variation would still improve or maintain environmental outcomes.*

APPENDIX G TEAM QUALIFICATIONS AND EXPERIENCE

Role, staff member	Pencil portrait
Authors	
Lead author Senior ecologist (fauna) **Bianca Heinze**	Bianca holds a bachelor degree in applied science and specialises in biodiversity assessment, particularly fauna surveys and habitat assessment. She has experience as Lead Zoologist in small and large scale projects. Bianca has been involved in fauna survey, assessment and fauna management planning for four years, including 15 wind farms in NSW and South Australia. Bianca has been involved in surveys for marine and terrestrial mammals, birds, amphibians, reptiles and microbats, including targeted species surveys such as Powerful Owl *Ninox strenua*. Bianca also has training and experience in Anabat microbat echolocation call analysis. Bianca brought with her a range of experience in the public and private sectors upon joining nghenvironmental in 2008. In addition to fauna survey, her field experience includes remote area fire fighting, park and state forest maintenance works, fuel load assessment, habitat assessment and water quality sampling. Other experience includes design and implementation of community engagement and education projects.
Co-author Ecologist (botany) **Dave Maynard**	Dave holds qualifications in science and engineering. He completed his Honours in plant systematics in conjunction with UNSW and the Botanic Gardens Trust, Sydney in 2004. Dave specialises in biodiversity assessment, particularly field based flora surveys and vegetation community mapping. He has experience as Lead Botanist in small and large scale projects for vegetation community mapping including identification and demarcation of endangered ecological communities. He has also led targeted threatened species surveys, such as Leafless Tongue Orchid *Cryptostylis hunteriana*. Prior to joining nghenvironmental, Dave held positions in government and private institutions including Botanist with the Department of Natural Resource, Environment and the Arts (NT) and Regional Manager, Horticulture with Department of Primary Industry, Fisheries and Mines (NT).
Validation Review Senior Ecologist **Deb Frazer**	Deb holds a bachelor degree in Applied Science (Biodiversity Management) and an honours degree. Deb has over 9 years' experience as an Ecologist and within biodiversity assessment, including several wind farm assessment. Deb's positions have included management and senior roles, as well as educational and research assistant positions (Bandicoot Recovery Program in SA). Deb has experience in impact assessment and fauna survey projects throughout southern NSW and South Australia. Deb has broad knowledge and demonstrated skills in environmental management; coordinating and delivering environmental programs / plans; assessment of development proposals; preparation of biodiversity and management plans and monitoring programs. She is particularly skilled in the design and execution of fauna field programs, especially monitoring programs which she has implemented in central SA.
Field team (botany)	
Ecologist **Jackie Miles**	Jackie holds bachelor degree in Zoology and has since gone on to specialise in botany. Jackie has worked on a number of large scale assessments involving botanical surveys for vegetation mapping and targeted species searches. Past projects include Comprehensive Region Assessment (CRA) full floristics surveys,

Role, staff member	Pencil portrait
	field validation for NPWS Vegetation Map for South East Forests, vegetation mapping for all NSW ski resort areas and surveys of significant remnant grassy vegetation in the Bega Valley. Jackie has co-authored a number of papers and factsheets on threatened species and ecological communities, regularly contributes information to the NSW Scientific Committee and has provided training for Council planning and works staff on conservation significant remnant vegetation. Jackie also has extensive experience in fauna surveys, including fauna surveys across the alpine region for the CRA. Jackie's expertise extends throughout south-eastern NSW.
Ecologist **Paul McPherson**	Paul holds a degree in Natural Resource Management. He has undertaken flora surveys and environmental assessments for a wide range of projects located in south coast and NSW alpine regions. Paul has lead full floristics flora surveys for a range of projects and was involved in the broadscale mapping of the vegetation of the Far South Coast region. He has authored a number of leaflet flora guides including for rainforests in south-east NSW, alpine wildflowers and coastal saltmarsh communities. Prior to joining nghenvironmental in 1996, Paul worked with the Commonwealth environment department and co-drafted the Commonwealth policy papers on the Regional Forest Agreement process and forest reserve criteria.
Ecologist **Chris Weston**	Chris holds a Bachelor of Science (Horticulture) and is currently completing an Honours project. Chris specialises in biodiversity assessment and has developed considerable knowledge of landscape and vegetation communities of inland NSW, particularly in riverine environments, south-western slopes and plains and semi-arid environments. Chris has strong interests in Botany providing teaching assistance for lectures in Botany and Plant Taxonomy at Charles Sturt University and has over 3 years experience working in Environmental Horticulture and Viticulture Research. Prior to joining **ngh**environmental Chris was working on research projects determining fire tolerance and adaptation of species within the Myrtaceae family.
Field team (fauna)	
Senior ecologist **Freya Gordon**	Freya holds a bachelor degree in environmental science and is a Senior Zoologist in our Sydney office. She has worked for the past 10 years for the Institute of Wildlife Research, The University of Sydney, designing, managing and implementing survey programs for a range of fauna species. She has conducted shorebird monitoring for Birds Australia, wildlife monitoring for Sydney Airport Corporation Limited, and managed large scale field programs in the Simpson Desert for the University of Sydney Desert Ecology Research Group.
Ecologist **Kate Carroll**	Kate holds a bachelor degree in environmental science and has a range of experience in environmental assessment and management including biodiversity assessments and Part 3A assessments. She has undertaken a variety of field surveys and assessments in the Sydney and NSW tablelands region. Kate has an ecological background with a strong focus on fauna. She has studied vertebrate biology and taxonomy. Her extensive field experience includes work with terrestrial and marine wildlife including bird watching, small mammal surveys, bat surveys, invertebrate sampling and fish surveys.
Ecologist **Bryson Lashbrook**	Bryson holds a bachelor degree in environmental science and has extensive experience in both environmental and agricultural consulting. Bryson specialises in biodiversity assessment with a focus on fauna issues. Bryson's experience with fauna includes as an assistant to the Johnstone Centre and the Institute for Land Water and Society, both at Charles Sturt University, in a number of ecology based research projects where he performed targeted reptile, mammal and bird surveys.

Role, staff member	Pencil portrait
	This includes targeted surveys in remote areas. Bryson is also highly skilled and experienced in spotlighting, bird monitoring, Elliot trapping and both harp and mist netting which he undertakes in his role with **ngh**environmental. Prior to joining **ngh**environmental in 2010, Bryson was involved with the International Centre of Water for Food Security, Environmental & Agriculture Systems, geotechnical and agricultural soil sampling, ground water and surface water monitoring, weather station supply, installation and weather station servicing and the service and repair of GPS devices and remote sensors.
Ecologist **Amy Evans**	Amy has over seven years' experience working in the environmental industry, with a focus on biodiversity assessment and approvals within NSW. Amy completed a double degree in BAppSc in Parks, Recreation and Heritage/Ecotourism, majoring in Wildlife Ecology and management in 2006. In 2010, Amy went on to complete a Grad Cert in Ornithology. Amy has experience in Review of Environmental Factors (REF's), 7 Part Tests, Environmental Impact Assessments (EIA), Flora and Fauna surveys and assessments, Anabat analysis and threatened species habitat assessments. Amy was recently seconded to the Roads and Maritime Services for three years, where she assisted in managing the implementation of the biodiversity commitments for the Hume Highway Upgrade project for NSW RMS. Prior to joining **ngh**environmental, Amy was a Ranger for the NSW National Parks and Wildlife Service. She was based at Forbes, Bathurst and the Pilliga regions for 18 months.
Ecologist **Nathaniel O'Rourke**	Nathaniel is an environmental professional with several years' professional experience. He has a bachelor degree in Environmental Science and is undertaking postgraduate studies in GIS. Nathaniel has particular interests in environmental management, grassland ecology, amphibian/reptile ecology and GIS. Nathaniel has been involved in numerous flora and fauna assessments including numerous targeted threatened reptile surveys within the ACT and surrounding region; which included wind farm and solar farm projects. He has demonstrated experience identifying and handling threatened reptiles found in this region.
Ecologist **Alana Gordijn**	Alana holds a bachelor degree in science (earth & environmental science), and has several years' experience working as an environmental professional. She has experience working on a numerous environmental planning and management projects for a range of public and private sector clients across southern NSW and the ACT. Her primary areas of practice are ecological surveying and environmental impact assessment and her most recent projects have involved renewable energy developments. She has prepared the flora and fauna sub-plan for the proposed Silverton Wind Farm and has also developed skills in the construction sector through undertaking environmental site inspections for civil contractors involved with the Gullen Range Wind Farm.
Ecologist (Fauna) **George Madani (sub-contractor)**	George Madani is a freelance wildlife ecologist and has an extensive background in wildlife ecology with ten years of field survey skills and practical research and applied management experience. He has conducted fauna surveys and field studies across various regions and habitats in Australia. His work has taken him into remote areas as the Kimberley, Cape York, Simpson and Strzlecki Deserts as well across a range of temperate sclerophyll woodlands and rainforests along the East Coast and inland into the WA Goldfields, Victorian Mallee Country and rangelands of Western NSW. He has comprehensive knowledge of and experience with the identification, distribution, habitat and ecology of terrestrial vertebrate fauna, especially reptiles, amphibians and avifauna. George has a Masters in Wildlife Health and Population Management from the University of Sydney. He has

Role, staff member	Pencil portrait
	worked with various State and Federal Government departments, universities, environmental consultancies and NGO's on projects ranging from wildlife monitoring, baseline inventory surveys to impact based assessments.
Ecologist **Rena Gaborov (sub-contractor)**	Rena holds a Bachelor of Arts (Geography) and a Master of Natural Resources. Rena has been working as a field ecologist with Wildlife Unlimited since 2008 while she concurrently completed a Master in Natural Resources. She has been involved with a number of management and conservation projects as part of her work with Wildlife Unlimited as well as with government, university and community groups. She has also led a number of projects. Her masters research involved a mark recapture population study on the threatened long-nosed potoroo and its reactions to fragmentation. Rena also coordinated a baseline vertebrate fauna survey of Palm Island, Northeast Queensland in 2009.
Ecologist **Rohan Bilney (sub-contractor)**	Rohan has over 10 years' experience in field ecology and holds a Bachelor of Environmental Science (Honours), and a PhD. His research for both Honours and PhD focused on the ecology of Sooty Owls and Powerful Owls and small mammal decline following European settlement in East Gippsland, Victoria. Through this research Rohan has become familiar with a diverse range of habitat types and regions throughout much of East Gippsland, having significant experience in remote and isolated fieldwork in both nocturnal and diurnal situations. Through a combination of his own research, recreational interest and numerous volunteer activities Rohan has trapped and handled most 'trappable' terrestrial small mammal species from forested ecosystems in south-eastern Australia, while also being familiar with all bird species. Rohan has a wide range of experience in wildlife surveys, primarily for birds and mammals in forested ecosystems in south-eastern Australia. Rohan has authored several published peer-reviewed scientific papers (including international journals) on a range of ecological aspects and individual species, particularly specializing in large forest owl ecology, small mammals and their decline, rainforest and deer. He also regularly presents talks at scientific conferences and to interest groups.
Ecologist **Kris Nash (Golden Sun Moth Survey)**	Kris Nash has been an environmental planner and ecologist since 2007, having previously worked in the field of education. She holds a bachelor degree in Education (Secondary) and a diploma in Environmental Science. Kris has worked for community groups, private consultancy firms and the ACT Government and has undertaken a broad range of ecological surveys and impact assessments for urban developments, extraction industries, industrial developments, ski field developments, roads and infrastructure projects. She has been involved in the implementation of monitoring programs for threatened fauna and native vegetation, and in collecting data for the management of kangaroos in ACT Nature Parks. Kris is an experienced field ecologist with particular expertise on the flora and fauna of box - gum woodlands and natural temperate grasslands, including Golden Sun Moth.
Senior review	
Field technician / Senior review **Brooke Marshall (CEnvP)**	Brooke has an honours degree in Natural Resources from the University of New England (UNE) where she specialised in wildlife management and ecosystem rehabilitation. Since joining nghenvironmental, Brooke has undertaken environmental impact assessment, biodiversity survey and assessment, environmental management documentation and community consultation. Brooke

Role, staff member	Pencil portrait
	has worked on large scale infrastructure projects and project managed the input of specialists, as required. She is a specialist in wind farm assessment. Brooke is an accredited Biobanking Assessor and Certified Environmental Practitioner.

APPENDIX H DEPARTMENT OF PLANNING AND INFRASTRUCTURE DIRECTOR GENERAL REQUIREMENTS

NSW GOVERNMENT | Planning

Contact: Neville Osborne
Phone: (02) 9228 6337
Fax: (02) 9228 6355
Email: neville.osborne@planning.nsw.gov.au

Our ref.: 10/23654

Mr Andrew Durran
Executive Director
Epuron Pty Ltd
Level 11
75 Miller Street
North Sydney NSW 2060

Dear Mr Durran

Subject: Director-General's Requirements for Rye Park Wind Farm (MP 10_0223)

The Department has received your application for the above project.

I have attached a copy of the Director-General's Requirements (DGRs) for the preparation of an Environmental Assessment for the project. These requirements have been prepared in consultation with relevant government authorities. I have attached a copy of the government authorities' comments for your information. I have also enclosed a list of relevant guidelines that you may wish to refer to during the preparation of the Environmental Assessment.

The DGRs have been prepared based on the information you have provided to date. Please note that under section 75F(3) of the *Environmental Planning and Assessment Act 1979*, the Director-General may alter these requirements at any time. If you do not submit an Environmental Assessment for the project within two years, the DGRs will expire.

Prior to exhibiting the Environmental Assessment that you submit for the project, the Department will review the document to determine if it adequately addresses the DGRs. The Department may consult with other relevant government authorities in making this decision. Please provide 4 hard copies and 5 CD copies of the Environmental Assessment to assist this review.

If the Director-General considers that the Environmental Assessment does not adequately address the DGRs, the Director-General may require you to revise the Environmental Assessment. Once the Director-General is satisfied that the DGRs have been adequately addressed, the Environmental Assessment will be made publicly available for at least 30 days.

If your project is likely to have a significant impact on matters of National Environmental Significance, it will require an approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). This approval would be in addition to any approvals required under NSW legislation and it is your responsibility to contact the Department of Sustainability, Environment, Water, Population and Communities to determine if an approval under the EPBC Act is required for your project (http://www.environment.gov.au or 6274 1111).

Your contact officer for this proposal, Neville Osborne, can be contacted on the above contact details. Please mark all correspondence regarding the proposal to the attention of the contact officer.

Yours sincerely

14/2/11

Daniel Keary
Director, Infrastructure Projects
as delegate of the Director-General

	case and representative noise/ vibration impacts; → in relation to wind turbine operation, determine the noise impacts under operating meteorological conditions (i.e. wind speeds from cut in to rated power), including impacts under meteorological conditions that exacerbate impacts (including varying atmospheric stability classes and the van den Berg effect for wind turbines). The probability of such occurrences must be quantified; → include monitoring to ensure that there is adequate wind speed/profile data and ambient background noise data that is representative for all sensitive receptors; → provide justification for the nominated average background noise level used in the assessment process, considering any significant difference between daytime and night time background noise levels at background noise levels higher than 30 dB(A); → identify any risks with respect to tonal, low frequency or infra-noise; → clearly outline the noise mitigation, monitoring and management measures that would be applied to the project. This must include an assessment of the feasibility, effectiveness and reliability of proposed measures and any residual impacts after these measures have been incorporated; → if any noise agreements with residents are proposed for areas where noise criteria cannot be met, provide sufficient information to enable a clear understanding of what has been agreed and what criteria have been used to frame any such agreements; and → include a contingency strategy that provides for additional noise attenuation should higher noise levels than those predicted result following commissioning and/or noise agreements with landowners not eventuate. The assessment must be undertaken consistent with the following guidelines: → Wind Turbines - the South Australian Environment Protection Authority's *Wind Farms - Environmental Noise Guidelines* (2003); → Substation – *NSW Industrial Noise Policy* (EPA, 2000); → Site Establishment and Construction – *Interim Construction Noise Guidelines* (DECC, 2009); → Traffic Noise – *Environmental Criteria for Road Traffic Noise* (NSW EPA, 1999); and → Vibration – *Assessing Vibration: A Technical Guideline* (DECC, 2006). • **Ecological Impacts** – the EA must include an ecological assessment considering terrestrial and aquatic ecosystems (as relevant), including groundwater dependent ecosystems, consistent with *Guidelines for Threatened Species Assessment* (DEC, 2005); The EA must: → identify threatened species, populations and communities listed under both State and Commonwealth legislation that have the potential to occur on site. In particular, the following must be addressed: box woodland, table basalt forest and natural temperature grassland communities, and crimson spider orchid, silky swainson-pea, Yass daisy, hoary sunray, small woodland birds, superb, turquoise & swift parrots, barking owl & powerful owl, raptors, squirrel glider, koala, spotted tailed quoll, bats and golden sun moth; → map existing vegetation by vegetation/ community type and include details on existing site conditions, including whether the vegetation comprises a highly modified or over-cleared landscape and the types and quality of habitat resources available. Vegetation mapping should consider any Environmentally Sensitive Area Mapping held by Boorowa Shire Council, Yass Valley Shire and the Upper Lachlan Shire Council; → provide details of the survey methodology employed including survey effort and representativeness for each species targeted and clear justification for species that were discounted from requiring field surveys or further assessment; → demonstrate a design philosophy of impact avoidance on ecological values, and in particular, ecological values of high significance;

	→ provide a worst case estimate of vegetation to be cleared (in hectares), including quantifying impacts (in hectares) by vegetation type and threatened species habitat (as relevant); → assess the significance of impacts to native vegetation, listed threatened species, populations and communities and their habitats with consideration to local and region-based ecological implications, including habitat connectivity and distribution of species. The assessment must consider impacts to in-stream and riparian ecology from works close to waterways and/ or waterway crossings. In addition, impact of the project on birds and bats from blade strikes, low air pressure zones at the blade tips (barotrauma), and alteration to movement patterns resulting from the turbines must be assessed, including demonstration of how the project has been sited to avoid and/ or minimise such impacts; → include details of how flora and fauna impacts would be managed during construction and operation including adaptive management, rehabilitation/ regeneration measures and maintenance protocols; → demonstrate how the project (with the incorporation of all proposed measures to avoid, mitigate and/ or offset impacts) achieves a biodiversity outcome consistent with "maintain or improve" principles. Sufficient details must be provided to demonstrate the availability of viable and achievable options to offset the impacts of the project and to secure these measures in perpetuity; and → address the risk of weed spread and identify mitigation measures. • **Heritage** - the EA must include an assessment of the potential impact of the project components on Aboriginal heritage values (archaeological and cultural). The EA must demonstrate effective consultation with Aboriginal stakeholders during the assessment and in developing mitigation options (including the final recommended measures) consistent with *Guidelines for Aboriginal Cultural Impact Assessment and Community Consultation* (DEC, July 2005). The EA must also consider impacts to historic (European) heritage values, as relevant. • **Traffic and Transport** – the EA must assess the construction and operational traffic impacts of the project including: → details of traffic volumes (both light and heavy vehicles) and transport routes during construction and operation; → assess the potential traffic impacts of the project on road network function (including intersection level of service) and safety; → assess the capacity of the existing road network to accommodate the type and volume of traffic generated by the project (including over-dimensional traffic) during construction and operation, including full details of any required upgrades to roads, bridges, site access provisions (for safe access to the public road network) or other road features; → details of measures to mitigate and/or manage potential impacts, including construction traffic control, road dilapidation surveys and measures to control soil erosion and dust generated by traffic volumes; → details of access roads within the site including how these would connect to the existing public road network (i.e. site access) and ongoing operational maintenance requirements for on-site roads; and → consideration of relevant Council traffic/road policies. • **Hazard/Risks**– the EA must include an assessment of the potential impacts on aviation safety, including the need for aviation hazard lighting, considering nearby aerodromes and aircraft landing areas, defined air traffic routes, aircraft operating heights, approach/departure procedures, radar interference, communication systems, and navigation aids. Aerodromes within 30km of the turbines should be identified and impacts on obstacle limitation surfaces addressed. Attention is drawn to Airservices Australia's specific requirements (attached). In addition, the EA must assess the impact of the turbines on the safe and efficient aerial application of agricultural fertilisers and pesticides in the vicinity of the turbines and transmission line. Possible effects on telecommunications systems must be