APPENDIX A DIRECTOR-GENERAL'S REQUIREMENTS

Director-General's Requirements

Section 75F of the *Environmental Planning and Assessment Act 1979*

Project	Construction and operation of an approximately 160 megawatt wind farm including up to 60-80 wind turbines and associated infrastructure including access roads, internal and underground cabling, control buildings, substation, grid connection, monitoring masts and temporary construction facilities.
Site	Approximately 55 kilometres north-east of Canberra and 35km south west of Goulburn within Upper Lachlan Shire Council between the Hume Highway, Collector Road and Collector Creek
Proponent	Transfield Services
Date of Issue	15 October 2010
Date of Expiration	15 October 2012
General Requirements	The Environmental Assessment (EA) must include: • an **executive summary**; • a **detailed description** of the project including: → construction and operation details; → the location and dimensions of all project components including the wind turbines (including exact coordinates and AHD heights of each turbine), underground transmission and communications cabling between turbines, transformers, electrical sub station, transmission line linking the wind farm to the grid, on site control room and equipment storage, switchgear, temporary concrete batching plant(s), construction compounds, access roads, road upgrades, crown roads and any obstacle lighting; → a timeline identifying the proposed construction and operation of project components, their envisaged lifespan and arrangements for decommissioning and staging; → supporting maps/plans clearly identifying existing environmental features (e.g. watercourses, vegetation), infrastructure and landuse (including nearby residences and approved residential developments or subdivisions) and the location/ siting of the project (including associated infrastructure) in the context of this existing environment; → resourcing requirements (including, but not limited to, water supply and gravel); and • consideration of any **relevant statutory provisions** including the consistency of the project with the objects of the *Environmental Planning and Assessment Act 1979* and any relevant development control plans*;* • an **assessment of the key issues** outlined below, during construction, operation and decommissioning (as relevant). The EA must assess the worst case as well as representative impact for all key issues taking into account cumulative impacts from nearby approved or operational windfarms (Cullerin and Capital Wind Farms); • a **draft Statement of Commitments** detailing measures for environmental mitigation, management and monitoring for the project; • a **conclusion justifying the project** taking into consideration the environmental, social and economic impacts of the project; the suitability of the site; and the public interest; and • **certification by the author** of the EA that the information contained in the assessment is neither false nor misleading.
Key Assessment Requirements	The EA must include assessment of the following key issues: • **Strategic Justification** - the EA must: → include a strategic assessment of the need, scale, scope and location for

	the project in relation to predicted electricity demand, predicted transmission constraints and the strategic direction of the region and the State in relation to electricity supply, demand and electricity generation technologies; and its role within the Commonwealth's Renewable Energy Target Scheme; → include a clear demonstration of quantified and substantiated greenhouse gas benefits, taking into consideration sources of electricity that could realistically be replaced and the extent of their replacement; Reference should be made to *Estimating Greenhouse Gas Emissions Abatement from Wind Farms in NSW*, McLennan Magasanik Associates, July 2010, Report to the Department of Environment, Climate Change and Water (DECCW) and the associated *NSW Wind Farm Greenhouse Gas Savings Tool* developed by DECCW; → include an analysis of the suitability of the project with respect to potential land use conflicts with existing and future land uses (including existing and approved rural-residential development, known development proposals in the surrounding area, building entitlement and subdivision potential, land of significant scenic or visual value, impacts on trigonometrical reserves in particular reserve 198 and 530137, land of high agricultural value, other water users, mineral reserves, forestry, conservation areas and crown land), taking into account local and strategic landuse objectives and the potential for cumulative social and economic impacts on the local community; and → describe the alternatives considered (location and/or design) for all project components, and provide justification for the preferred project demonstrating its benefits including community benefits on a local and strategic scale and how it achieves stated objectives and any measures to offset residual impacts. • **Visual Impacts** - the EA must: → provide a comprehensive assessment of the landscape character and values and any scenic or significant vistas of the area potentially affected by the project taking into consideration cumulative impacts from surrounding approved or operational wind farms in the locality (in particular Cullerin and Capital Wind Farms). This should describe community and stakeholder values of the local and regional visual amenity and quality, and perceptions of the project based on surveys and consultation; → assess the impact of shadow "flicker", blade "glint" and night lighting from the wind farm on residents and road users; → identify the zone of visual influence (no less than 10 kilometres) and assess the visual impact of all project components on this landscape; → include an assessment of visual impacts from transmission line infrastructure including any cumulative impacts; → include photomontages of the project taken from potentially affected neighbouring residences (including approved but not yet developed dwellings or subdivisions with residential rights) where the occupant is assessed as likely to experience a high level of visual impact as well as from settlements and significant public view points. The photomontages must take into account cumulative impacts from surrounding approved or operational wind farms in the locality and include representative views of turbine night lighting if proposed; and → provide a clear description of proposed visual amenity mitigation and management measures and provide an assessment of the feasibility, effectiveness and reliability of proposed mitigation measures and any residual impacts after these measures have been implemented. • **Noise Impacts** - the EA must: → Include a comprehensive noise assessment of all phases and components of the project taking into account cumulative impacts from surrounding approved or operational wind farms in the locality including: turbine operation, the operation of the transformer and electrical substation, corona and/or aeolian noise from the transmission line, construction noise, traffic noise during construction and operation, and vibration generating activities

during construction and/or operation. The assessment must identify noise/vibration sensitive locations (including approved but not yet developed dwellings), baseline conditions based on monitoring results, the levels and character of noise (e.g. tonality, impulsiveness, low frequency etc) generated by noise sources, noise/vibration criteria, modelling assumptions and worst 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 van den Berg effect). 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 higher than 30 dB(A);

→ identify any risks with respect to tonal, low frequency or infra-noise;

→ 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;

→ 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; 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 (or as otherwise agreed with the DECCW):

→ Wind Turbines - the South Australian Environment Protection Authority's *Wind Farms - Environmental Noise Guidelines*, 2003;

→ Electrical Substation – *NSW Industrial Noise Policy* (EPA, 2000);

→ Traffic Noise – *Environmental Criteria for Road Traffic Noise* (NSW EPA, 1999);

→ Site Establishment and Construction - Interim Construction Noise Guidelines (DECC 2009);

→ Blasting – *Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration* (ANZECC 1990).and

→ Vibration – *Assessing Vibration: A Technical Guideline* (DECC, 2006).

- **Flora and Fauna** - the EA must:

→ include an cumulative assessment of all project components on flora and fauna and their habitat consistent with the *Draft Guidelines for Threatened Species Assessment* (DEC, 2005), including identifying the condition and extent of existing vegetation (including whether the vegetation comprises a highly modified landscape) and habitat on site and the likely extent of disturbance associated with the project (including quantification of impacts on a local and regional context and worst case extent of impact on the basis of vegetation type and total native vegetation disturbed (ha of clearing));

→ specifically consider impacts to: threatened species and communities listed under both State and Commonwealth legislation that have been recorded on the site and surrounding land including but not necessarily limited to: Natural Temperate Grasslands, Box Gum Woodland, Tableland Basalt Forest, Snow Gum Grassy Woodland, Gang Gang Cockatoo, Superb Parrot, Diamond Firetail, Brown Treecreeper, Varied Sitella and Eastern Bentwing-Bat, demonstrating that impacts to these species and communities have been minimised as far as reasonable and feasible. The EA must provide details of the survey methodology employed including survey effort and representativeness for species targeted;

→ specifically consider impacts to native vegetation (including fragmentation and impacts to biodiversity corridors) and to significant habitat (including riparian and/or instream habitat in the case of disturbance of waterways);

→ specifically assess the impact of the project on birds and bats from blade strikes, low air pressure zones at the blade tips (barotrauma, the layout of the turbines, including the potential nature/extent of impacts, significance of such impacts on threatened species and mitigation measures), and alteration to movement patterns, roost sites and nesting areas resulting from the turbines, including demonstration of how the project has been sited to avoid and/or minimise such impacts. If any of the bat and bird species likely to be impacted by the wind turbines are also listed species under State and Commonwealth legislation, then the significance assessment for each of these species must consider impacts from the wind turbines as well as impacts from habitat loss. The cumulative impacts from Cullerin and Capital wind farms are to be identified;

→ provide details of how flora and fauna impacts would be managed during construction and operation of all project components, including adaptive management and maintenance protocols and monitoring programs; and

→ include measures to avoid, mitigate or offset impacts associated with the construction and operation of all project components consistent with "improve or maintain" principles. Sufficient details must be provided to demonstrate the availability of viable and achievable options to offset the impacts of the project (including in relation to water quality, salinity, soils and biodiversity).

- **Indigenous Heritage** - the EA must include an assessment of the potential impact of the project components on indigenous heritage values (archaeological and cultural). The EA must demonstrate effective consultation with indigenous stakeholders during the assessment and in developing mitigation options (including the final recommended measures) consistent with the draft *Guidelines for Aboriginal Cultural Impact Assessment and Community Consultation* (DEC, July 2005). . The EA must describe the actions that will be taken to avoid, mitigate or offset impacts.

- **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 (including site access and temporary access/egress routes) during construction and operation and impacts on local and regional roads and bridges;
  → 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 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; and
  → details of site access roads including how these would connect to the existing road network and any operational maintenance or handover requirements.

- **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, radar interference, communication systems, and navigation aids. Aerodromes within 30km of the turbines should be identified and impacts on obstacle limitation surfaces addressed. 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. Possible effects on telecommunications systems must be identified. Potential hazards and risks associated with electric and magnetic fields and bushfires must also be

assessed. The EA must also detail measures to contain any hazardous substances to prevent the contamination of pastures and dams;

- **Water Quality**– the EA must identify water demands and assess the availability of construction water sources for the project and their statutory (licensing/future sharing plan) context, and assess potential environmental impacts associated with the identified sources including impacts on groundwater. Where the project would cross significant waterways, the EA must identify likely impacts to the waterways and measures to minimise impacts on hydrological, water quality, aquatic and riparian impacts. Details of the design of waterway crossings where such crossings are to be located in third order or higher streams are to be provided. The EA must also address soil erosion issues, the potential for clearing to create a salinity risk and the potential for accidental spills to affect water quality.

- **General Environmental Risk Analysis** – notwithstanding the above key assessment requirements, the EA must include an environmental risk analysis to identify potential environmental impacts associated with the project, proposed mitigation measures and potentially significant residual environmental impacts after the application of proposed mitigation measures. Where additional key environmental impacts are identified through this environmental risk analysis, an appropriately detailed impact assessment of the additional key environmental impact(s) must be included in the EA.

- **Consultation** – the Proponent must undertake a consultation program as part of the environmental assessment process, including consultation with, but not necessarily limited to, the following parties:
  - → Upper Lachlan Council;
  - → Yass Valley Council
  - → Goulburn Mulwaree Council
  - → NSW Department of Environment, Climate Change and Water;
  - → NSW Office of Water;
  - → Department of Industry and Investment;
  - → NSW Roads and Traffic Authority;
  - → TransGrid
  - → NSW Rural Fire Service;
  - → Land and Property Management Authority
  - → Murrumbidgee Catchment Management Authority;
  - → Lachlan Catchment Management Authority;
  - → Commonwealth Department of Defence;
  - → Civil Aviation Safety Authority;
  - → Airservices Australia;
  - → Aerial Agricultural Society of Australia;
  - → titleholders of mineral exploration leases and mining licences within the project area; and
  - → the local community and landowners.

The consultation process shall include measures for disseminating information to increase awareness of the project as well as methods for actively engaging stakeholders on issues that would be of interest/concern to them. The EA must:

- → demonstrate effective consultation with stakeholders, and that the level of consultation with each stakeholder is commensurate with their degree of interest/concern or likely impact;
- → clearly describe the consultation process undertaken for each stakeholder/group including details of the dates of consultation and copies of any information disseminated as part of the consultation process (subject to confidentiality); and
- → describe the issues raised during consultation and how and where these have been addressed in the EA.

Relevant Guidelines - For Reference

General

Wind Energy Facilities draft Environmental Impact Assessment Guidelines (Planning NSW, June 2002).

Draft EIS Guideline "Network Electricity Systems and Related Facilities" (Planning NSW, February 2002)

Best Practice Guidelines for Implementation of Wind Energy Projects in Australia (Auswind, 2006).

Visual

Wind Farms and Landscape Values: National Assessment Framework (Australian Wind Energy Association and Australian Council of National Trust, June 2007).

Ecology

Cumulative Risk for Threatened and Migratory Species (Commonwealth Department of Environment and Heritage, March 2006).

Wind Farms and Birds: Interim Standards for Risk Assessment, (Auswind, July 2005).

Assessing the Impacts on Birds – Protocols and Data Set Standards (Australian Wind Energy Association).

Threatened Biodiversity Survey and Assessment – Guidelines for Developments and Activities (Working Document) (DEC, 2004).

Threatened Species Assessment Guidelines (DECC 2007)

Aviation Hazard

Advisory Circular 139-18(0) Obstacle Marking and Lighting of Wind Farms (Civil Aviation Safety Authority, July 2007). Note: this advisory is currently withdrawn however a replacement has to date not been issued.

Windfarm Policy (Aerial Agricultural Association of Australia, December 2009)

Powerlines Policy (Aerial Agricultural Association of Australia, December 2009)

Information Sheet – Airport Related Development (AirServices Australia)

Water Quality

National Water Quality Management Strategy: Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC 2000).

The NSW State Groundwater Quality Protection Policy (DLWC, 1998).

The NSW State Groundwater Dependent Ecosystems Policy (DLWC, 2002).

Department of Water and Energy's Guidelines for Controlled Activities (February 2008):

- → Watercourse Crossings;
- → Instream Works;
- → Laying Pipes and Cables in Watercourses;
- → Outlet Structures; and
- → Riparian Corridors.

Managing Urban Stormwater: Soils and Construction, Volume 1,4th edition (Landcom, 2004)

Managing Urban Stormwater: Soils and Construction, Volume 2A, Installation of Services & 2C Unsealed roads (DECC)..

APPENDIX B THREATENED SPECIES EVALUATIONS

The tables below evaluate the potential for threatened species, ecological communities and endangered populations that occur or have the potential to occur within or near the study area to be adversely affected by the works. Threatened entities with potential to occur were identified by the following searches (undertaken on 23 November 2010);

- **Murrumbidgee CMA Region – Monaro (MON) and Murrumbateman (MUR1) sub-regions (OEH threatened species tool)**
- **Lachlan CMA Region – Crookwell (CRO) and Murrumbateman (MUR2) sub-regions (OEH threatened species tool)**
- **EPBC Act Matters of National Significance search tool - 25 kilometre radius**
- **Atlas of NSW Wildlife – additional records for the local region**

Species ecology and presence of habitat has been determined using the DSEWPC and OEH species habitat profiles, including vegetation types, for the Central West Bioregion. The likelihood of occurrence is based on presence of habitat, proximity of nearest records and mobility of the species (where relevant). Whether there may be a potential impact is based on the nature of the Proposal, the ecology of the species and whether it is likely to occur. Species with the potential to be impacted are highlighted.

NB Marine and migratory wetland species were not included as the Proposal is unlikely to impact on these species.

B.1 FLORA EVALUATION – THREATENED SPECIES AND COMMUNITIES

Species and status	Ecology and distribution	Vegetation community	Presence of habitat	Sub-region and EPBC search presence type	Likelihood of occurrence	Recorded during survey?	Potential to be impacted
TREES							
Eucalyptus aggregata Black Gum Myrtaceae TSC – nominated V	A medium tree to 18 metres with persistent fibrous-flaky grey-black bark inhabiting grassy woodland on alluvium on broad cold flats.	• Not indicated	Nil	MUR1 - predicted	Low	No	Nil
Eucalyptus parvula Small-leaved Gum Myrtaceae TSC - V EPBC - V	A distinctive small tree with small, dark leaves and smooth bark. Has a very limited distribution in a narrow 100km strip from Big Badja Mountain to Nunnock Swamp. Grows at and above an elevation of 1100 m in acidic soil on cold wet grassy flats.	• Montane Bogs and Fens • Subalpine Woodlands	Nil	MON - known EPBC – not indicated	Nil	No	Nil
Eucalyptus pulverulenta Silver-leafed Gum Myrtaceae TSC - V EPBC - V	A mallee or small tree with smooth grey or bronze bark, shedding in long strips, and round, sessile, glaucous juvenile leaves retained on mature plants. Found in the Lithgow to Bathurst area and the Bredbo-Bombala areas. Grows in shallow soils, typically with *E. mannifera, E. macrorhyncha, E. dives, E. sieberi* and *E. bridgesiana*.	• Upper Riverina Dry Sclerophyll Forests • Southern Tableland Dry Sclerophyll Forests	Yes	MON - known EPBC – not indicated	Low-moderate	No	Low
Eucalyptus robertsonii spp *hemisphaerica* Robertson's Peppermint Myrtaceae TSC - V	Tree with peppermint-type bark shedding from upper branches in long ribbons. Found only in the central tablelands, E and SE of Bathurst and Orange. Locally frequent in grassy or dry sclerophyll woodland or forest, on lighter soils and	• Southern Tableland Dry Sclerophyll Forests • Southern Tableland Wet Sclerophyll Forests	Yes	CRO - known EPBC – not indicated	Low	No	Nil

Species and status	Ecology and distribution	Vegetation community	Presence of habitat	Sub-region and EPBC search presence type	Likelihood of occurrence	Recorded during survey?	Potential to be impacted
EPBC - V	often on granite, with *E. piperita, E. goniocalyx, E. dalrympleana, E. dives, E. mannifera* and *E. rossii.*						
SHRUBS							
Bossiaea oligosperma Few-seeded Bossiaea Fabaceae TSC - V EPBC - V	An erect shrub to 2 metres high with small, circular, bright-green leaves. Bright yellow flowers appear in late spring. Known from two disjunct areas - the lower Blue Mountains and the Windellama area. Occurs in open *E. mannifera* forest on loamy soil at Windellama.	• Southern Tableland Dry Sclerophyll Forests • Central Gorge Dry Sclerophyll Forests	Yes	TSC – not indicated EPBC – not indicated	Low	No	Nil
Dillwynia glaucula Michelago Parrot-pea Fabaceae TSC -E	An erect shrub to 2.5m recorded from three areas; near Windellama, at Michelago and at Numeralla. Occurs on exposed clay or rocky outcrops in woodland often dominated by *E. rossii, E. pauciflora, E. dives* and *E. macrorhyncha*. Grows adjacent to Natural Temperate Grassland at Michelago.	• Southern Tableland Dry Sclerophyll Forests • Temperate Montane Grasslands • Southern Montane Heaths	Yes	MON - known	Low-moderate	No	Nil
Dodonaea procumbens Creeping Hop-bush Sapindaceae TSC - V EPBC - V	A prostrate shrub recorded on shallow sedimentary soil in *Eucalyptus pauciflora, E. dives* or *E. rubida* woodland between Michelago and Dalgety, and at Lake Bathurst. Tolerates some degree of disturbance and sometimes occurs on roadside cuttings but is seldom seen in grazed sites.	• Southern Tableland Dry Sclerophyll Forests • Southern Tableland Grassy Woodlands	Yes	MON - known EPBC – not indicated	Low-moderate	No	Nil

Species and status	Ecology and distribution	Vegetation community	Presence of habitat	Sub-region and EPBC search presence type	Likelihood of occurrence	Recorded during survey?	Potential to be impacted
Grevillea jaspicula Wee Jasper Grevillea Proteaceae TSC – CE EPBC - E	An erect shrub growing to 2.5m tall recorded only from the Wee Jasper area and on the shores of Lake Burrunjuck. Grow on rocky outcrops, cave entrances and cliff bases in limestone country	• Upper Riverina Dry Sclerophyll Forest • Southern Tableland and Western Slopes Dry Sclerophyll Forests • Southern Tableland and Western Slopes Grassy Woodlands	No	MUR1 - known	Nil	No	Nil
Monotoca rotundifolia Trailing Monotoca Ericaceae TSC -E	A low shrub, less than 30 cm tall with round leaves bluish with three obvious ridges below, and red stems. Known only from Big Badja Hill and Wadbilliga Trig and an unconfirmed record from west of Kybean SCA. In NSW, occurs in shrubland or Snow Gum woodland from 1250 to 1360m ASL.	• Subalpine Woodlands • Tableland Clay Grassy Woodlands	No	MON - known	Nil	No	Nil
Pomaderris delicata Delicate Pomaderris Rhamnaceae TSC - E	A 1-2 m shrub with yellow, petalled flowers growing in dry open *E. sieberi* forest dominated by a dense she-oak understorey, on shallow sedimentary soils. Recorded from between Goulburn and Bungonia and south of Windellama.	• South East Dry Sclerophyll Forests	No	Not indicated	Nil	No	Nil
Pomaderris pallida Pale Pomaderris Rhamnaceae TSC - V EPBC - V	This shrub grows in rocky sites in open forest or shrubland near rivers. Recorded from north-west of Nimmitabel, Tinderry Nature Reserve, and the Queanbeyan River. Flowers mid Sept - Dec.	• Southern Tableland Dry Sclerophyll Forests • Eastern Riverine Forests	Yes (marginal)	MON – known MUR1 - known EPBC – not indicated	Low	No	Nil

Species and status	Ecology and distribution	Vegetation community	Presence of habitat	Sub-region and EPBC search presence type	Likelihood of occurrence	Recorded during survey?	Potential to be impacted
Pultenaea pedunculata Matted Bush-pea Fabaceae TSC - E	The mat-forming shrub with small leaves growing generally in woodland vegetation but also on road batters and coastal cliffs. Grows in loamy soils in dry gullies at Windellama. Flowers Aug-Dec.	• Southern Tableland Dry Sclerophyll Forests	Yes	Not indicated	Low-moderate	No	Nil
Rulingia prostrata Dwarf Kerrawang Sterculiaceae TSC - E	A mat-forming shrub with white to pink flowers produced mainly Oct-Nov. At Penrose State Forest occurs in *E. mannifera* woodland, and in *E. pauciflora* woodland at Rose Lagoon. Grows in sandy, sometimes peaty soils, with *Imperata cylindrica, Empodisma minus* and *Leptospermum continentale*. Closest record is c. 75km E of the Collector site.	• Subalpine Woodlands	Yes (marginal)	MON - known	Low	No	Nil
Westringia kydrensis Kydra Westringia Lamiaceae TSC - E	An erect shrub to 40 cm with leaves in whorls of three and white flowers Occurs on shallow rocky granite or quartzite soils in *Allocasuarina nana* and *Banksia canei* heath on rocky areas at Kydra Reefs, south-east of Cooma.	• Southern Montane Heaths	No	MON - known	Nil	No	Nil
Wilsonia rotundifolia Round-leafed Wilsonia Convolvulaceae TSC - E	A hairy, prostrate, perennial subshrub with broad succulent sessile leaves. Grows in coastal salt marsh and inland saline lakes. Known from coast NSW, Deniliquin and in Lake George (locally extensive) and Lake Bathurst. Flowers in spring and summer.	• Montane Lakes	No	Not indicated	Nil	No	Nil
Zieria adenophora Araluen Zieria	A shrub or small tree with warty branches and clover like (trifoliate) leaves. Currently	• Coastal Valley Grassy Woodlands	No	MON - predicted	Nil	No	Nil

Species and status	Ecology and distribution	Vegetation community	Presence of habitat	Sub-region and EPBC search presence type	Likelihood of occurrence	Recorded during survey?	Potential to be impacted
Rutaceae TSC – CE EPBC - E	known from a single population of less than 200 plants near Araluen. Grows in shrubland on a rocky granite hillside.	• Rocky cliffs, major rock outcrops					
Zieria citriodora Lemon Zieria Rutaceae TSC - E	A low lemon-scented shrub to 15 cm tall with small hairy leaflets and one to three, pink or white flowers. Flowers late winter to summer. Known from two sites in NSW - Numeralla and Kybean Trig - east of Cooma. Grows in low shrubby *E. mannifera - E. macrorhyncha - E. dives* woodland.	• Southern Tableland Dry Sclerophyll Forests	Yes (marginal)	MON - known	Low	No	Nil
FORBS							
Ammobium craspedioides Yass Daisy Asteraceae TSC - V EPBC - V	Perennial daisy growing in sclerophyll woodland, forest and roadsides, in Yass district and near Wagga Wagga. Flowers spring-early summer. Closest record is c. 50km NW of the Collector site.	• Southern Tableland Dry Sclerophyll Forests • Southern Tableland Grassy Woodlands • Upper Riverina Dry Sclerophyll Forests • Western Slopes Dry Sclerophyll Forests • Western Slopes Grassy Woodlands	Yes	CRO, MUR1 and MUR2 - known EPBC – not indicated	Moderate	No	**Low**
Caladenia concolor Crimson Spider	A terrestrial orchid with deep purplish-red flowers. Prefers regrowth woodland on granite ridges with a high diversity of plant species, including other orchids. Dominant	• Southern Tablelands Dry Sclerophyll Forests	Yes	MUR1 - predicted	Low	No	**Nil**

Species and status	Ecology and distribution	Vegetation community	Presence of habitat	Sub-region and EPBC search presence type	Likelihood of occurrence	Recorded during survey?	Potential to be impacted
Orchid Orchidaceae TSC – E EPBC - E	trees are *E. blakelyi, E. macrorhyncha, E. polyanthemos* and *E. albens.*						
Caladenia tessellata Tessellated Spider Orchid Orchidaceae TSC - E EPBC - V	A terrestrial orchid with cream petals with reddish stripes recorded from coastal NSW and Braidwood. A population in Queanbeyan is presumed extinct. The Braidwood population is on stony soil, in woodland with little understorey, dominated by *E. dives* and *E. macrorhyncha* (K. McDougall, pers. comm.). Flowers Sept-Nov (late Sept or early Oct in southern populations).	• Southern Tableland Dry Sclerophyll Forests	Yes	Not indicated	Low	No	**Nil**
Calotis glandulosa Mauve Burr-daisy Asteraceae TSC - V EPBC - V	A sprawling perennial daisy to 20 cm tall with soft bright green, hairy, toothed leaves and 2 cm wide solitary flowers, mauve with yellow centres. Flowers in spring and summer. Recorded mainly from the Monaro and Kosciuszko, in montane grasslands, subalpine grassland (dominated by *Poa* spp.), Natural	• Temperate Montane Grasslands • Subalpine Woodlands • Tableland Clay Grassy Woodlands • Highly disturbed areas with no or limited	Yes	MON - known EPBC – not indicated	Moderate	No	**Low - Nil**

Species and status	Ecology and distribution	Vegetation community	Presence of habitat	Sub-region and EPBC search presence type	Likelihood of occurrence	Recorded during survey?	Potential to be impacted
	Temperate Grassland (*Themeda triandra*) and Snow Gum Woodlands on the Monaro. Colonises roadsides, but does not persist in heavily-grazed pastures. Closest record c. 110km SW of Collector site.	native vegetation • Southern Tableland Wet Sclerophyll Forests					
Diuris aequalis Buttercup Double-tails Orchidaceae TSC - E EPBC - V	At Braidwood, found in dry woodland dominated by *Eucalyptus dives* and *E. mannifera*, although further north it may occur in association with snow gum, *E. pauciflora* (R Rehwinkel, pers. comm.). North of Goulburn (Mt Rae area) it occurs in moist forest dominated by *E. radiata* or *E. fastigata* (J. Miles, pers. obs.). Mimics and always grows with *Gompholobium* sp. Flowers mid-October and mid-November in the southern part of its range. Closest record is c. 10km E of the Collector site.	• South East Dry Sclerophyll Forests • Southern Escarpment Wet Sclerophyll Forests • Temperate Montane Grasslands • Southern Tableland Grassy Woodlands • Tableland Clay Grassy Woodlands • Southern Tableland Wet Sclerophyll Forests	Yes	MON and CRO - known EPBC – not indicated	Moderate	No	**Low**
Lepidium ginninderrense Ginninderra	A perennial herb to about 20cm, flowering in late spring. Occurs on a single site on Belconnen Naval Transmission Station, in natural grassland dominated by *Austrodanthonia* spp and *Bothriochloa*	• Natural Temperate Grassland	Unlikely	TSC – not indicated EPBC – not	Low	No	Nil

Species and status	Ecology and distribution	Vegetation community	Presence of habitat	Sub-region and EPBC search presence type	Likelihood of occurrence	Recorded during survey?	Potential to be impacted
Peppercress Brassicaceae EPBC - V	*macra*.			indicated			
Lepidium hyssopifolium Aromatic Peppercress Brassicaceae TSC - E EPBC - E	An erect perennial herb to 50 cm tall with variable leaves and small flowers. Recorded in grassy woodland and grassland near Bathurst, and near Bungendore and Crookwell. (A specimen collected in the Cooma area about 100 years ago may also be this species.) Closest record is c. 90km N of the Collector site.	• Temperate Montane Grasslands • Southern Tableland Grassy Woodlands • Western Slopes Grassy Woodlands	Yes	CRO - known	Low	No	Nil
Leucochrysum albicans ssp *albicans* var *tricolor* Hoary Sunray Asteraceae 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).	• Temperate Montane Grasslands • Southern Tableland Subalpine Woodlands • Southern Tableland Grassy Woodlands	Yes	EPBC - likely to occur.	Moderate	Recorded off site Not recorded on site	**Low**

Species and status	Ecology and distribution	Vegetation community	Presence of habitat	Sub-region and EPBC search presence type	Likelihood of occurrence	Recorded during survey?	Potential to be impacted
Prasophyllum petilum Tarengo Leek Orchid Orchidaceae 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.	• Temperate Montane Grasslands • Southern Tableland Subalpine Woodlands	Yes	MON and MUR1 - predicted EPBC – not indicated	Low-moderate	No	**Low-Nil**
Rutidosis leiolepis Monaro Golden Daisy Asteraceae TSC - V EPBC - V	A low, tufted perennial with a woody root-stock, and narrow dark green leaves woolly underneath. Has solitary, slightly domed bright yellow flower-heads surrounded by pale brown papery bracts on numerous 25 cm tall woolly stems. Occurs in sub-alpine grasslands at Kosciuszko and Natural Temperate Grassland on the Monaro, on basalt, granite and sedimentary substrates. Apparently highly sensitive to grazing. Closest record is near Braidwood, c. 70km S of Collector site.	• Temperate Montane Grasslands	Unlikely	MON – known EPBC – not indicated	Low	No	**Nil**

Species and status	Ecology and distribution	Vegetation community	Presence of habitat	Sub-region and EPBC search presence type	Likelihood of occurrence	Recorded during survey?	Potential to be impacted
Rutidosis leptorrhynchoides Button Wrinklewort Asteraceae TSC - E EPBC - E	A perennial, multi-stemmed daisy sometimes with narrow basal leaves and with leafy flower stems to 35 cm tall. Flower-heads are bright yellow, slightly domed and button-like, to 2 cm wide. Recorded at Goulburn, Canberra-Queanbeyan area and Michelago, in Box-Gum Woodland and natural grassland on shallow, stony clay loams, including disturbed areas. Flowers Dec-Mar. Does not resprout from underground structures. The stems usually die back in late summer or autumn and new basal leaves are evident by early winter. Sensitive to grazing. Nearest records c. 50km south of the site.	• Temperate Montane Grasslands • Southern Tableland Grassy Woodlands • Subalpine Woodlands	Yes	MON – known EPBC – not indicated	Moderate	No	**Low**
Senecio garlandii Woolly Ragwort Asteraceae TSC – V EPBC - V	A many-branched perennial herb or shrub growing to 1.2m tall. Found between Temora, Bethungra and Albury and possibly near Burrinjuck. Occurs on sheltered slopes of Rocky outcrops, flowering during spring. Nearest record c. 70km west of the site	• Southern Tablelands and Western Slopes Dry Sclerophyll Forest • Western Slopes Grassy Woodlands • Inland Rocky Hill Woodlands	No	MUR1 - known	Nil	No	**Nil**

Species and status	Ecology and distribution	Vegetation community	Presence of habitat	Sub-region and EPBC search presence type	Likelihood of occurrence	Recorded during survey?	Potential to be impacted
Swainsona recta Mountain Swainson-pea Fabaceae 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. Flowers late Sept-early Nov, peaking Oct. Closest Bionet record is in ACT –Queanbeyan area, c. 45km SW of Collector site. Fallding (2002) has a record near Bungendore, c. 34km S of the site.	• Temperate Montane Grasslands • Southern Tableland Grassy Woodlands • Western Slopes Grassy Woodlands	Yes	MON – known MUR1 - predicted EPBC – not indicated	Moderate	No	**Low**
Swainsona sericea Silky Swainson-pea Fabaceae TSC - V	A pinnate leaved perennial pea growing to 10 cm tall. Recorded in Natural Temperate Grassland, Snow Gum Woodland and Box-Gum Woodland. Closest record is near Queanbeyan, c. 60km SW of Collector site.	• Floodplain Transition Woodlands • Southern Tableland Dry Sclerophyll Forests • Southern Tableland Grassy Woodlands • Subalpine Woodlands • Tableland Clay Grassy Woodlands • Temperate Montane Grasslands • Upper Riverina Dry	Yes	MON and MUR1 – known MUR2 - predicted	Low-moderate	No	**Low**

Species and status	Ecology and distribution	Vegetation community	Presence of habitat	Sub-region and EPBC search presence type	Likelihood of occurrence	Recorded during survey?	Potential to be impacted
		Sclerophyll Forests • Western Peneplain Woodlands • Western Slopes Dry Sclerophyll Forests • Western Slopes Grassy Woodlands					
Thesium australe Austral Toadflax Santalaceae TSC - V EPBC - V	A small, straggling herb to 40 cm tall with narrow pale green to yellow-green, somewhat succulent leaves, minute white flowers appearing in spring. Grows in grassland and woodland, semi-parasitic on grasses, particularly kangaroo grass. Closest populations to Collector site are at Canberra (c. 57km SW of site) and at Bundanoon to the east. Shows a preference for moist areas.	• Temperate Montane Grasslands • Subalpine Woodlands	Yes	MON – known MUR1 - predicted EPBC – not indicated	Moderate	No	**Low**

Ecological community and status	**Sub-region and EPBC search presence type**	**Likelihood of occurrence**	**Recorded during survey?**	**Potential to be impacted**
ECOLOGICAL COMMUNITIES				
Montane Peatlands and Swamps (EPBC and TSC)	MON - known	Low	No	Nil
Natural Temperate Grassland of the Southern Tablelands of NSW and the ACT (EPBC)	Known all 4	Low-moderate	No	Nil
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (EPBC and TSC)	Known all 4	High	Yes	High
Upland Wetlands (EPBC)	MON - known	Nil	No	Nil
Tablelands Snow Gum Grassy Woodland (TSC)	Not indicated	Moderate	Yes	High
Tablelands Basalt Forest (TSC)	CRO, MON - known	Moderate	Yes	Low

B.2 FAUNA EVALUATION – THREATENED SPECIES

Name	Ecology/Habitat requirements (source: DECCW 2010 unless otherwise noted)	Threats (source: DECCW 2010 unless otherwise noted)	Habitat in project area? Potential utilisation of habitat in project area?	Potential impact type?
Fish				
Murray Cod *Maccullochella peelii peelii* V EPBC	The Murray Cod has the ability to live in a diverse range of habitats, including clear rocky streams (such as those found in the upper western slopes of NSW), to slow flowing, turbid rivers and billabongs. Within the large range of habitats, the Murray Cod is usually found near complex structural cover such as large rocks, snags, overhanging vegetation and other woody structures. The Murray Cod is considered a main channel specialist as it is frequently found in the main river channel and larger tributaries. It is found in floodplain channels when they contain water; although this usage appears limited. Juveniles are most commonly found in the main river channel until about one year of age, after which they branch out. The Murray Cod is found in a wide range of warm water habitats, from clear, rocky streams to slow-flowing turbid rivers and billabongs. Generally, they are found in waters up to 5 m deep and in sheltered areas with cover from rocks, timber or overhanging banks. The species is highly dependant on wood debris for habitat, using it to shelter from fast-flowing water. Source: Department of Sustainability, Environment, Water, Population and Communities Species Profile and Threats	Flow regulation, habitat degradation, lowered water quality, barriers to spawning movement, introduced species, diseases, climate change and overfishing. Source: NSW Department of Industry and Investment (Fishing and Aquaculture) (2011) http://pas.dpi.nsw.gov.au/Species/Species_Profile.aspx?SpeciesListingID=16	No – this species is found in main channels.	Unlikely

Name	Ecology/Habitat requirements (source: DECCW 2010 unless otherwise noted)	Threats (source: DECCW 2010 unless otherwise noted)	Habitat in project area? Potential utilisation of habitat in project area?	Potential impact type?
	Database 2011			
Macquarie Perch *Macquaria australasica* E FM E EPBC	Macquarie perch are found in the Murray-Darling Basin (particularly upstream reaches) of the Lachlan, Murrumbidgee and Murray rivers, and parts of south-eastern coastal NSW, including the Hawkesbury and Shoalhaven catchments. The conservation status of the different populations is not well known, but there have been long-term declines in their abundance. Macquarie perch are found in both river and lake habitats, especially the upper reaches of rivers and their tributaries. They are quiet, furtive fish that feed on aquatic insects, crustaceans and molluscs. Sexual maturity occurs at two years for males and three years for females. Macquarie perch spawn in spring or summer in shallow upland streams or flowing parts of rivers. Females produce around 50,000-100,000 eggs which settle among stones and gravel of the stream or river bed. Source: NSW Department of Industry and Investment (Fishing and Aquaculture) (2011) http://pas.dpi.nsw.gov.au/Species/Species_Profile.aspx?SpeciesListingID=16	Changes in water quality, modification of natural river flows and temperatures as a result of river regulation, spawning failures from cold water release from dams, competition from introduced species, diseases and overfishing. Source: NSW Department of Industry and Investment (Fishing and Aquaculture) (2011) http://pas.dpi.nsw.gov.au/Species/Species_Profile.aspx?SpeciesListingID=16	Absent – this species prefers deep water and upper reaches of river systems	Unlikely
Amphibians				
Booroolong Frog	Lives along permanent streams with some fringing vegetation cover such as ferns, sedges or grasses. It	Modification of stream channels, loss of streamside vegetation, damage to	No	n/a

Name	Ecology/Habitat requirements (source: DECCW 2010 unless otherwise noted)	Threats (source: DECCW 2010 unless otherwise noted)	Habitat in project area? Potential utilisation of habitat in project area?	Potential impact type?
Litoria booroolongensis E TSC E EPBC	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. .	stream margins by stock, changes to water quality from sedimentations, weed invasion		
Alpine Tree Frog *Litoria verreauxii alpine* E TSC	The Alpine Tree Frog occurs in the south-eastern NSW and Victorian high country (alpine and sub-alpine zones) generally above 1100 m asl. Most locations are within National Park and some are close to alpine resorts. Found in a wide variety of habitats including woodland, heath, grassland and herb fields where it breeds in natural and artificial wetlands including ponds, bogs, fens, streamside pools, stock dams and drainage channels that are still or slow flowing.	Loss or modification of habitat, changes to natural water flows and quality, disease (chytrid fungus) and climate change	No	n/a
Green and Gold Bell Frog *Litoria aurea* E TSC	Formerly, this species had a wide distribution across most of NSW, although since 1990 recorded populations have become largely isolated and separated, restricted to small, coastal or near coastal populations. It is known to inhabit marshes, dams and stream-sides, particularly those containing bulrushes (*Typha* spp.) or spikerushes (*Eleocharis* spp.) (Daly and Senior, 2003). Optimum habitat includes water-bodies that are unshaded, free of predatory fish such as the Plague Minnow or Mosquito Fish (*Gambusia holbrooki*), have a grassy area nearby and	Predation by exotic fish and foxes, destruction of wetlands, alteration of drainage, disease, herbicide and pesticide application, road mortality and loss of suitable breeding habitat.	Yes – some farm dams present, Low potential to utilise habitat in project area due to prolonged dry weather, marginal habitat condition (disturbance includes clearing and sheep grazing). Further the most recent record in the 15km buffer	Unlikely

Name	Ecology/Habitat requirements (source: DECCW 2010 unless otherwise noted)	Threats (source: DECCW 2010 unless otherwise noted)	Habitat in project area? Potential utilisation of habitat in project area?	Potential impact type?
	diurnal sheltering sites available.		dates from 1985.	
Yellow-spotted Bell Frog *Litoria castanea* CE TSC E EPBC	The Yellow-spotted Bell Frog had not been recorded in the wild since the 1970s. It has two separate highland ranges, on the New England Tableland and on the southern highlands from Lake George to Bombala. This species require large permanent ponds or slow flowing streams with plenty of emergent vegetation such as bullrushes. Shelter during autumn and winter under fallen timber, rocks, other debris or thick vegetation.	Loss or modification of habitat, water flow and quality, application of herbicides and pesticides, removal of microhabitat components, predation by *Gambusia*, cats and foxes and disease.	No	n/a
Southern Bell Frog *Litoria raniformis* E TSC V EPBC	It is currently widespread throughout the Murray River valley but appears to have disappeared along the Murrumbidgee River and the Monaro district. This species is found mostly amongst emergent vegetation, including *Typha sp.*, *Phragmites sp.* and *Eleocharis sp.*, in or at the edges of still or slow-flowing water bodies such as lagoons, swamps, lakes, ponds and farm dams. Also occurs in clays or well-watered sandy soils; open grassland, open forest, and ephemeral and permanent non-saline marshes and swamps; montane eucalypt forest, dry sclerophyll forest in coastal Victoria; steep-banked water edges (like ditches and drains) and gently graded edges containing fringing plants; and formerly, areas of high altitudes. Highly mobile species capable of travelling up to 1 km in 24 hours (DEWHA 2009).	Removal of habitat and components (including leaf litter and fallen timber), inappropriate flooding regime, alteration to natural flows, predator from exotic fish, disease, chemicals in the water (e.g. herbicide), road kill.	Yes – some farm dams present, streams in proposal area are ephemeral. Low potential to utilise habitat in project area due to marginal habitat condition (disturbance includes clearing and sheep grazing). There are no records of the species within the 15km buffer.	Unlikely

Name	Ecology/Habitat requirements (source: DECCW 2010 unless otherwise noted)	Threats (source: DECCW 2010 unless otherwise noted)	Habitat in project area? Potential utilisation of habitat in project area?	Potential impact type?
Sloane's Froglet *Crinia sloanei* V TSC	A small ground-dwelling frog typically associated with periodically inundated areas in grassland, woodland and disturbed habitats: similar to habitats occupied by the related *Crinia parasignifera* (NSW Scientific Committee Determination).	Not well understood but likely to be habitat degradation, changes in flooding regimes, climate change. May also be related to chytrid fungus and predation of tadpoles by *Gambusia.*	Yes , also *C. parasignifera* is present	Unlikely
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.	Drainage of swamps, dams and wetlands, degradation and modification of habitat	No – dams present not suitable. They have been recorded between the proposal area and Lake George, within 15km from the proposal area.	n/a
Magpie Goose *Anseranas semipalmate* V TSC	A wetland species, only vagrant in southern NSW.	Drainage of swamps, dams and wetlands, degradation and modification of habitat	No – suitable habitat not present in the proposal area. However, records exist within 15km and there may be potential for through travel.	Blade-strike
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	Inappropriate fire regime, destruction and degradation of breeding habitat, modification of water flows, clearing and overgrazing of aquatic vegetation, illegal hunting, pollution of waterways,	No - suitable habitat not present in the proposal area. However, records exist at Lake George and Rowes Lagoon within 15km. Last Bathurst IBA established for	Blade-strike

Name	Ecology/Habitat requirements (source: DECCW 2010 unless otherwise noted)	Threats (source: DECCW 2010 unless otherwise noted)	Habitat in project area? Potential utilisation of habitat in project area?	Potential impact type?
	drought. Feeding occurs in permanent freshwater wetlands and swamps with deep water and dense aquatic vegetation. Nesting occurs in *Cumbungi* over deep water or in dense wetland vegetation.	changes in water salinity	this species.	
Gang-gang Cockatoo *Callocephalon fimbriatum* V TSC	Feeds in pairs or small flocks on seeds of eucalypts and wattles, primarily in forest, but occasionally towns and farming areas for artificial food resources such as berry-bearing exotic shrubs. It is a seasonal altitudinal migrant. Nesting is in large tree hollows.	Loss and degradation of habitat including loss of nesting trees	Yes – was recorded during survey and several records in area. Likely to use areas of well connected woodland, although records indicate they are unlikely to breed in area.	Habitat loss and blade-strike **7-part test undertaken**
Glossy Black-cockatoo *Calyptorhynchus lathami* V TSC	A species of open forests and woodland, dependent mainly on the seeds of Allocasuarina trees as a food source (Blakers *et al.* 1984). Large trees with hollows are required for breeding sites (Emison *et al.* 1987). Competition for hollows increases with openness of habitat and can be a threat to this species. May prefer to travel long distances over treed rather than open landscapes.	Loss and degradation of habitat including loss of nesting trees	No – Habitat unlikely to be suitable for species as very little casuarina species are present in the remnant and regrowth vegetation. However, there are records for the species in the area, therefore there is some potential for through travel.	Blade-strike
Brown Treecreeper (eastern subspecies) *Climacteris*	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	Loss, degradation and fragmentation of habitat including loss of tree hollows and fallen timber, loss of ground litter and regeneration from	Yes– (recorded) small areas of woodland and dry forest in proposal area provide habitat.	Habitat loss **7-part test undertaken**

Name	Ecology/Habitat requirements (source: DECCW 2010 unless otherwise noted)	Threats (source: DECCW 2010 unless otherwise noted)	Habitat in project area? Potential utilisation of habitat in project area?	Potential impact type?
picumnus victoriae V TSC	relatively intact woodland areas, nesting in a tree hollow.	grazing.		
Hooded Robin (south-eastern form) *Melanodryas cucullata cucullate* V TSC	Widespread, occurring in pairs or solitary in lightly timbered country (Schodde and Tidemann 2007). Spends much of its time on the ground in woodland foraging for insects. It frequents places with dead trees and fallen timber (Schodde and Tidemann 2007), nesting on dead limbs or stumps. Populations are unable to survive in remnants smaller than 100-200 hectares.	Loss, degradation and fragmentation of habitat including loss of tree hollows and fallen timber, loss of ground litter and regeneration from grazing	Yes– small areas of woodland and dry forest in proposal area may provide habitat. There are numerous records of this species within remnant vegetation toward the Mundoonen Nature Reserve (20km west).	Habitat loss
Pink Robin *Petroica rodinogaster* V TSC	The Pink Robin is found in Tasmania and the uplands of eastern Victoria and far south-eastern NSW, almost as far north as Bombala. On the mainland, the species disperses north and west and into more open habitats in winter, regularly as far north as the ACT area, and sometimes being found as far north as the central coast of NSW. Inhabits rainforest and tall, open eucalypt forest, particularly in densely vegetated gullies	Clearing of rainforest, and tall wet forest habitat, particularly near gullies	No - suitable habitat does not occur in proposal area	n/a
Flame Robin *Petroica phoenicea* V TSC	In NSW, it breeds in upland areas and in winter, many birds move to the inland slopes and plains. It is likely that there are two separate populations in NSW, one in the Northern Tablelands, and another ranging from the Central to Southern Tablelands. Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and	Abundance is positively associated with native vegetation cover Clearing and degradation of breeding habitat, and degradation of wintering habitat are key threats (NSW Scientific	Yes – overwintering habitat.	Habitat loss

Name	Ecology/Habitat requirements (source: DECCW 2010 unless otherwise noted)	Threats (source: DECCW 2010 unless otherwise noted)	Habitat in project area? Potential utilisation of habitat in project area?	Potential impact type?
	slopes. In winter lives in dry forests, open woodlands and in pastures and native grasslands, heathland and coastal shrubland. Prefers clearings or areas with open understoreys	Committee 2010)		
Scarlet Robin *Petroica boodang* V TSC	The Scarlet Robin lives in dry eucalypt forests and woodlands from the coast to the inland slopes. The understorey is usually open and grassy with few scattered shrubs. Habitat usually contains abundant logs and fallen timber. This species lives in both mature and regrowth vegetation.	Sensitive to habitat degradation, and overgrazing, fragmentation and clearing	Yes	Habitat loss
White-fronted Chat *Epthianura albifrons* V TSC	The White-fronted Chat is found mostly in temperate to arid climates occupying foothills and lowlands up to 1000 m above sea level. In NSW, 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. It is usually found foraging on bare or grassy ground in wetland areas, singly or in pairs. The species has been observed breeding from late July through to early March, with 'open-cup' nests built in low vegetation. Nests are usually built about 23 cm above the ground.	Sensitive to human disturbance. Other threats include reduction in habitat size and quality and nest predation.	Yes (recorded by **ngh**environmental)	Habitat loss **7-part test undertaken**
Varied Sittella *Daphoenositta chrysoptera*	An arboreal bird that inhabits dry forest and woodlands (Schodde and Tidemann 2007). They breed and roost communally in family groups using dead wood or dead branches in mature trees (Noske 1984). They are sedentary with a large home range (up to 200ha) and	Fragmentation, degradation, isolation: declining habitat cover and quality. Cleared agricultural land a potential barrier to movement.	Yes (recorded by **ngh**environmental)	Habitat loss **7-part test undertaken**

Name	Ecology/Habitat requirements (source: DECCW 2010 unless otherwise noted)	Threats (source: DECCW 2010 unless otherwise noted)	Habitat in project area? Potential utilisation of habitat in project area?	Potential impact type?
V TSC	forage for invertebrates in bark along tree branches (Paton et al. 2010; Noske 1984)			
Olive Whistler *Pachycephala olivacea* V TSC	The Olive Whistler inhabits the wet forests on the ranges of the east coast. It has a disjunct distribution in NSW chiefly occupying the beech forests around Barrington Tops and the MacPherson Ranges in the north and wet forests from Illawarra south to Victoria. In the south it is found inland to the Snowy Mountains and the Brindabella Range. Mostly inhabit wet forests above about 500m. During the winter months they may move to lower altitudes. It forages in trees and shrubs and on the ground, feeding on berries and insects	Clearing and fragmentation of habitat, inappropriate fire regimes, predation by foxes and cats	No - suitable habitat does not occur in proposal area	n/a
Gilbert's Whistler *Pachycephala inornata* V TSC	This species is sparsely distributed from the western slopes of NSW to the Western Australian. Occurs in a range of habitats; key feature seems to be dense shrub layer. In woodland habitats, the understorey comprises dense patches of shrubs, particularly thickets of regrowth *Callitris* pine, native cherry' (*Exocarpus* species) appear to be an important habitat component. Forages on or near the ground in shrub thickets and in tops of small trees. Pairs may hold and defend territories all year round	Clearing, degradation and fragmentation	Yes Unlikely – no nearby records; usually occurs further west	n/a
Square-tailed Kite *Lophoictinia isura*	This species has a large and sparsely populated range throughout mainland Australia and is a breeding migrant to the south east from July to December. It occurs primarily in coastal and sub-coastal open forest,	Clearing, burning and grazing of habitat resulting in a reduction in nesting and foraging resources, disturbance to or removal of potential	Yes – suitable habitat occurs along better condition woodland remnants as well	Habitat loss and blade-strike

Name	Ecology/Habitat requirements (source: DECCW 2010 unless otherwise noted)	Threats (source: DECCW 2010 unless otherwise noted)	Habitat in project area? Potential utilisation of habitat in project area?	Potential impact type?
V TSC	woodlands and mallee. It has been recorded inland along timbered watercourses and adjacent areas. The species hunts small passerines, especially honeyeaters in the tree canopy. Resident pairs have large hunting ranges of greater than 100 km². Nests are a platform of sticks up to 90cm in diameter in a fork of a tall tree in forest or woodland (Schodde & Tidemann 2007).	nest trees near watercourses, illegal egg collection and shooting	as areas of dry forest.	
Little Eagle *Hieraaetus morphnoides* V TSC	The Little Eagle is found throughout the Australian mainland except the most densely forested parts of the Dividing Range escarpment. It occurs as a single population throughout NSW in habitats rich in prey within open eucalypt forest, woodland or open woodland. formerly heavily dependent on rabbits, now eats more native prey (NSW Scientific Committee 2010)	Clearing and degradation of its foraging and breeding habitat. Direct human threats to habitat are most evident around expanding provincial cities, where urbanisation and rural-residential expansion are displacing breeding pairs (NSW Scientific Committee 2010)	Yes – breeding recorded along escarpment of Lake George basin	Habitat loss Habitat alienation Blade-strike **7-part test undertaken**
Black Breasted Buzzard *Hamirostra melanosternon* V TSC	Found sparsely in areas of less than 500mm rainfall; in NSW found inland. Lives in a range of inland habitats, especially along timbered watercourses which is the preferred breeding habitat. Also hunts over grasslands and sparsely timbered woodlands. Breeds from August to October near water in a tall tree. The stick nest is large and flat and lined with green leaves. Normally two eggs are laid.	Clearing of trees along inland watercourses, degradation of foraging habitat through overgrazing and tree clearing	No – the study area is not in this rainfall bracket	n/a
Grey Falcon	Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is	Grazing and clearing of arid and semi-arid zone rangelands. Secondary	No – the study area is not in	n/a

Name	Ecology/Habitat requirements (source: DECCW 2010 unless otherwise noted)	Threats (source: DECCW 2010 unless otherwise noted)	Habitat in project area? Potential utilisation of habitat in project area?	Potential impact type?
Falco hypoleucos V TSC	occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey. Preys primarily on birds, especially parrots and pigeons, using high-speed chases and stoops; reptiles and mammals are also taken.	poisoning through mouse and locust control programs	arid lands	
Spotted Harrier *Circus assimilis* V TSC	The Spotted Harrier occurs throughout the Australian mainland, except in densely forested or wooded habitats of the coast, escarpment and ranges, including highly disturbed areas. Individuals disperse widely in NSW and comprise a single population. Prey includes rabbits, rodents and terrestrial grassland birds (NSW Scientific Committee 2010)	Clearing and degradation of foraging and breeding habitat, particularly that which affects prey densities (NSW Scientific Committee 2010).	Yes	Habitat alienation Blade-strike **7-part test undertaken**
White-bellied Sea-eagle *Haliaeetus leucogaster* M EPBC	Soars on air currents, hovers low over prey, makes angled power dives, travels large distances overland. While inland lakes and other large water bodies would be targeted for foraging and nests would be constructed near water, this species may move over the site.	Thought to be declining in NSW (Kavanagh personal communication 2009), but this is debateable (Olsen personal communication 2010).	No Yes - Lake George is within 15km; old records of breeding along escarpment, but not for some time (COG personal communication 2010).	Habitat alienation Blade-strike **7-part test undertaken**
Powerful Owl *Ninox strenua* V TSC	Breeding pairs defend large (up to 1000 ha), permanent territories (Blakers *et al.* 1984), usually centred around gullies (Fleay 1968). Nests in large tree hollows (Emison *et al.* 1987). Arboreal mammals form about 80% of the diet of this species (birds form most of the rest), with the	Loss, degradation and fragmentation of habitat including loss of tree hollows. Disturbance during breeding, predation and road kill.	Yes – suitable habitat occurs along better condition woodland remnants as well as areas of dry forest. Several records occur a few	Habitat loss **7-part test undertaken**

Name	Ecology/Habitat requirements (source: DECCW 2010 unless otherwise noted)	Threats (source: DECCW 2010 unless otherwise noted)	Habitat in project area? Potential utilisation of habitat in project area?	Potential impact type?
	Common Ringtail Possum, Greater Glider and Sugar Glider being the most favoured species (Blakers *et al.* 1984).		kilometres east from the township of Collector in a forest remnant (c.1000ha size).	
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 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).	Clearing and degradation of habitat, mostly through cultivation, intense grazing and pasture conversion, firewood harvesting resulting in the removal of old trees, management involving simplification of forest structure and loss of mature hollow-bearing trees, inappropriate fire regime	Yes	Habitat loss
Masked Owl *Tyto novaehollandiae* V TSC	Lives in dry eucalypt forests and woodlands from sea level to 1100 m. Pairs have a large home-range of 500 to 1000 hectares. A forest owl, but often hunts along the edges of forests, including roadsides. The typical diet consists of tree-dwelling and ground mammals, especially rats. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting.	Loss of mature hollow-bearing trees and changes to forest and woodland structure, which leads to fewer such trees in the future. Clearing of habitat for grazing, agriculture, forestry or other development. Road kill.	Yes	Habitat loss

Name	Ecology/Habitat requirements (source: DECCW 2010 unless otherwise noted)	Threats (source: DECCW 2010 unless otherwise noted)	Habitat in project area? Potential utilisation of habitat in project area?	Potential impact type?
Superb Parrot *Polytelis swainsonii* V TSC V EPBC	Nesting habitat on SW Slopes is often open Yellow Box, Blakely's Red Gum Woodland or isolated paddock trees. Nest in small colonies, often with more than one nest in a single tree. May forage up to 10 km from nesting sites. Feed in trees and understorey shrubs and on the ground and their diet consists mainly of grass seeds and herbaceous plants	Loss and degradation of habitat including loss of tree hollows and little regeneration from grazing. Road kill.	Yes (recorded). There are records scattered throughout the local area.	Habitat loss and blade-strike **7-part test undertaken**
Turquoise Parrot *Neophema pulchella* V TSC	Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. Usually seen in pairs or small, possibly family, groups and have also been reported in flocks of up to thirty individuals. Prefers to feed in the shade of a tree and spends most of the day on the ground searching for the seeds or grasses and herbaceous plants, or browsing on vegetable matter. Nests in tree hollows, logs or posts, from August to December.	Clearing of grassy-woodland and open forest habitat, loss of hollow-bearing trees, and degradation of habitat.	Yes Unlikely – no nearby records	Habitat loss and blade-strike
Little Lorikeet *Glossopsitta pusilla* V TSC	In New South Wales Little Lorikeets are distributed in forests and woodlands from the coast to the western slopes of the Great Dividing Range. Mostly occur in dry, open eucalypt forests and woodlands. They have been recorded from both old-growth and logged forests in the eastern part of their range, and in remnant woodland patches and roadside vegetation on the western slopes. Generally considered to be nomadic, with irregular large or small influxes of individuals occurring at any time of year, apparently related to food availability (NSW	Loss of breeding sites and food resources from ongoing land clearing. Most breeding records come from the western slopes, where there has been extensive loss of the woodland habitat. 'White Box, Yellow Box, Blakely's Red Gum Woodland', an important habitat for the Little Lorikeet (NSW Scientific Committee	Yes Unlikely – no nearby records	Habitat loss and blade-strike

Name	Ecology/Habitat requirements (source: DECCW 2010 unless otherwise noted)	Threats (source: DECCW 2010 unless otherwise noted)	Habitat in project area? Potential utilisation of habitat in project area?	Potential impact type?
	Scientific Committee 2010)	2010)		
Speckled Warbler *Pyrrholaemus saggitatus* V TSC	Inhabits woodlands and dry forests, generally in inland Australia, particularly those with grassy understorey, often on ridges or gullies. Sedentary, living in pairs or trios and nests on the ground in grass tussocks, dense litter and fallen branches. Forages on the ground and in the understorey for arthropods and seeds. Occupy small remnants, but are yet to be recorded breeding in revegetated areas. Requires relatively intact woodland areas with litter and fallen timber.	Loss, degradation and fragmentation of habitat including loss of tree hollows and fallen timber, loss of ground litter and regeneration from grazing. Susceptible to localised extinction - nest predation problem where there are small fragmented populations	Yes - habitat occurs where there is native ground cover, although most of such patches are small and isolated. Numerous records to west near Mundoonen Nature Reserve.	Habitat loss
Grey-crowned Babbler (eastern subspecies) *Pomatostomus temporalis temporalis* V TSC	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 lands, even farmlands and suburbs (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.	Loss, degradation and fragmentation of habitat including loss of tree hollows and fallen timber, loss of ground litter and regeneration from grazing.	Yes– small areas of woodland and dry forest in proposal area may provide habitat.	Habitat loss
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 (Pizzey et al., 2003).	Loss and degradation of habitat including loss of large old trees with heavy mistletoe infestations and heavy grazing of woodlands	Yes Several records west near Mundoonen NR.	Habitat loss and blade-strike

Name	Ecology/Habitat requirements (source: DECCW 2010 unless otherwise noted)	Threats (source: DECCW 2010 unless otherwise noted)	Habitat in project area? Potential utilisation of habitat in project area?	Potential impact type?
	It is a specialist feeder on mistletoe, particularly of genus *Amyema*, and generally requires 5 or more mistletoes per hectare. Seasonal migrant, movements are linked to the fruiting of mistletoe.			
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).	Loss, degradation and fragmentation of habitat including loss of tree hollows and fallen timber, loss of ground litter and regeneration from grazing	Yes There are no records for this species in the area.	Habitat loss and blade-strike
Pied Honeyeater *Certhionyx variegates* V TSC	Widespread throughout acacia, mallee and spinifex scrubs of arid and semi-arid Australia. Occasionally occurs further east, on the slopes and plains and the Hunter Valley, typically during periods of drought. Inhabits wattle shrub (primarily Mulga, *Acacia aneura*), mallee, spinifex and eucalypt woodlands, usually when shrubs are flowering. Highly nomadic.	Clearing of nectar-producing shrubs (*Eremophila* spp.; *Grevillea* spp.; *Brachysema* spp.) reduces food supplies and may interrupt broadscale nomadic movements; grazing has a similar but less immediate impact compared to clearing, although many of the preferred food shrubs appear immune to grazing effects.	Yes May utilise during droughts	Habitat loss and blade-strike

Name	Ecology/Habitat requirements (source: DECCW 2010 unless otherwise noted)	Threats (source: DECCW 2010 unless otherwise noted)	Habitat in project area? Potential utilisation of habitat in project area?	Potential impact type?
Painted Snipe *Rostratula benghalensis/australis* E TSC V 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. 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.	Drainage of swamps, dams and wetlands, degradation and modification of habitat	No May utilise Lake George	n/a
Diamond Firetail *Stagonopleura guttata* V TSC	Occurs predominantly west of the Great Dividing Range (Blakers *et al.* 1984) although local populations are Kn. 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 and Snow Gum Woodlands, and grassland and riparian areas, and sometimes lightly wooded farmland. May form large flocks during winter and autumn.	Loss, degradation and fragmentation of habitat including loss of tree hollows and fallen timber, loss of ground litter and regeneration from grazing. Susceptible to localised extinction - nest predation problem where there are small fragmented populations	Yes (recorded)	Habitat loss **7-part test undertaken**
Freckled Duck *Stictonetta naevosa*	Requires wetland habitats, preferring large permanent swamps. Endemic to south eastern and south western Australia. It inhabits plankton rich wetlands, and is	Drainage of swamps, dams and wetlands, degradation and modification of habitat	No – suitable habitat is not present in the proposal area. There are records for this species at Lake George,	Blade-strike

Name	Ecology/Habitat requirements (source: DECCW 2010 unless otherwise noted)	Threats (source: DECCW 2010 unless otherwise noted)	Habitat in project area? Potential utilisation of habitat in project area?	Potential impact type?
V TSC	typically gregarious.		around 15km south of the proposal area.	
Swift Parrot *Lathamus discolor* E TSC V EPBC	A non-breeding winter migrant to southern and eastern NSW, where it inhabits eucalypt forests and woodlands (Blakers *et al.* 1984). Feeds on eucalypt blossom and psyllids.	Loss of habitat, collision with wire netting fence, windows and cars especially when such obstacles are in close proximity to suitable habitat	Yes – woodland and forest present, including some favoured feed species (box species). However, there are no records in the local area so it would appear to be a vagrant in the area.	Habitat loss and blade-strike
Regent Honeyeater *Xanthomyza phrygia* E TSC E/M EPBC	Distributed through the eastern third of New South Wales, where it inhabits eucalypt forests and woodlands (Blakers *et al.* 1984). A generalist forager, feeding mainly on the nectar from a wide range of eucalypts (particularly prolifically flowering box and ironbark species) and mistletoes but also eats invertebrates and exotic fruits (Blakers *et al.* 1984). Large numbers can appear in an area to take advantage of a food source. Key eucalypt species include Yellow Box and Blakely's Red Gum and Red Stringybark.	Loss, degradation and fragmentation of habitat including key feed species, loss of ground litter and regeneration from grazing. Susceptible to competition from aggressive honeyeaters	Yes – key feed species are present in the proposal area in the Box-Gum Woodland vegetation community. There are numerous records of the species, mostly to the west near Mundoonen NR.	Habitat loss and blade-strike
White-throated Needletail *Hirundapus caudacutus*	High-flying, vertical flight and diving displays. May form large flocks. Occurring in Australia in large numbers during the non-breeding season (October – August) they roost in trees and forage on flying insects, commonly in thermals associated with storm fronts or bush fires (DEWHA 2009).		Yes – habitat for this species occurs mostly over woodland and forest areas. Several records are scattered through the area.	Habitat alienation and blade strike

Name	Ecology/Habitat requirements (source: DECCW 2010 unless otherwise noted)	Threats (source: DECCW 2010 unless otherwise noted)	Habitat in project area? Potential utilisation of habitat in project area?	Potential impact type?
M EPBC				
Rainbow Bee-eater *Merops ornatus* M EPBC	May form large flocks. Occurring in Australia in large numbers during the non-breeding season (October – August) they roost in trees and forage on flying insects, commonly in thermals associated with storm fronts or bush fires (DEWHA 2009).		Yes (recorded) – habitat for this species occurs mostly over woodland and forest areas. Several records are scattered through the area.	Habitat loss **7-part test undertaken**
Satin Flycatcher *Myiagra cyanoleuca* M EPBC	Typically a species of densely vegetative gullies in tall forests (Pizzey and Knight 2003).		No – there are no damp dense areas of vegetation in the project area	n/a
Fork-tailed Swift *Apus pacificus* M EPBC	This species breeds from central Siberia eastwards through Asia and winters south to Australia. Uncommon in eastern Australia. It spends most of its time in the air feeding on insects, occasionally roosting on cliffs or in large trees (Pizzey and Knight 2003). It spends most of its life in the air feeding on insects. It occurs throughout mainland Australia, mostly west of the divide.		No – there are no large trees or cliffs in the proposal area. While the species could occur high in the air column, there are no records in the local area	n/a
Cattle Egret *Ardea ibis* M EPBC	Migratory / dispersive, suitable habitat nearby. Primarily inhabits wetlands and paddocks (Pizzey and Knight 2003).		Yes	Blade-strike

Name	Ecology/Habitat requirements (source: DECCW 2010 unless otherwise noted)	Threats (source: DECCW 2010 unless otherwise noted)	Habitat in project area? Potential utilisation of habitat in project area?	Potential impact type?
Great Egret *Ardea alba* M EPBC	Migratory / dispersive, suitable habitat nearby. Primarily inhabits wetlands and paddocks (Pizzey and Knight 2003).		No Is recorded around Lake George	Blade-strike
Latham's Snipe, Japanese Snipe *Gallinago hardwickii* M EPBC	Occurs in permanent and ephemeral wetlands up to 2000 m above sea-level. They usually inhabit open, freshwater wetlands with low, dense vegetation. Can also occur in habitats with saline or brackish water, in modified or artificial habitats, and in habitats located close to humans or human activity. Could also occur in natural temperate grasslands if prone to flooding. Foraging habitat characterised by areas of mud (either exposed or beneath a very shallow covering of water) and some form of cover. The snipe roost on the ground near (or sometimes in) their foraging areas (DEWHA 2009)	Drainage and modification of wetlands, hunting (DEWHA 2010).	Yes	Unlikely
Mammals - Marsupials				
Eastern Pygmy-possum *Cercartetus nanus* V TSC	Occurs at elevations of 300m to above 1,000m. In southern NSW, this species is principally recorded in drier forest and heath, often with a diverse shrubby ground cover. Myrtaceous trees, Banksia and hollows are potential resources for this species.	Loss, fragmentation and degradation of habitat, including from stock grazing. Predation and firewood removal.	No – ground cover is limited to grass, and in most places this is grazed. There are very few patches of vegetation with a midstorey layer present. There are no records in the local area.	n/a

Name	Ecology/Habitat requirements (source: DECCW 2010 unless otherwise noted)	Threats (source: DECCW 2010 unless otherwise noted)	Habitat in project area? Potential utilisation of habitat in project area?	Potential impact type?
Spotted-tailed Quoll *Dasyurus maculatus* V TSC E EPBC	Found in a variety of forest types, although generally preferring moister environments such as rainforest and wet sclerophyll forest. Large areas of undisturbed habitat which provide a variety of key food and other resources such as large hollow logs, or small caves at ground level for dens are required.	Loss, fragmentation and degradation of habitat, poisoning and shooting	No – the entire proposal area is highly disturbed and remaining vegetation is mostly in small patches and dry with little structural complexity. No substantial rocky outcrops, caves or fallen timber piles were observed. There are no records in the local area.	n/a
Squirrel Glider *Petaurus norfolcensis* V TSC	Inhabits dry sclerophyll forest and woodland, distributed largely along the east coast and immediate inland districts. Feeds on insects, nectar and exudates from leaves and trees (*Eucalyptus* and *Acacia*).	Loss and fragmentation of habitat, especially loss of hollow-bearing trees and loss of flowering understorey and midstorey shrubs in forest. Hung up while gliding (fences)	Yes – marginal: areas of dry forest with HBT and regeneration of eucalypts and wattles as a small tree or shrub layer. This occurs in Cluster 3 and 4.	Habitat loss
Yellow-bellied Glider *Petaurus australis* V TSC	Restricted to tall mature eucalypt forest (Van Dyck and Strahan 2008), where it uses tree hollows for shelter and feeds on plant and insect exudates and arthropods, collected mostly under exfoliating bark. It may prefer forest of high species diversity. Eucalypts that provide hollows, sap flow and that flower in winter are preferred by this species. These include ribbon gum and bloodwood (*Eucalyptus viminalis* and *Corymbia gummifera)* and winter flowering ironbarks. It is principally distributed on	Loss and fragmentation of habitat, especially loss of hollow-bearing trees and feed trees	No There are no records in the local area.	n/a

Name	Ecology/Habitat requirements (source: DECCW 2010 unless otherwise noted)	Threats (source: DECCW 2010 unless otherwise noted)	Habitat in project area? Potential utilisation of habitat in project area?	Potential impact type?
	the coast although several inland records exist.			
Koala *Phascolarctos cinereus* V TSC	Solitary with distinct home ranges. Consumes a diverse range of eucalypts (Van dyck and Strahan 2008) typically present on high nutrient soils (Klippel, 1992). Large areas of continuous forest or woodland are required by this species.	Loss, modification and fragmentation of habitat, predation by dogs, road kill	Yes – dry forest may provide habitat for this species, although it seems unlikely given the small size and youth of patches. Two records occur in the local area, both in remnant vegetation near the Collector township.	Habitat loss
Mammals - bats				
Eastern False Pipistrelle *Falsistrellus tasmaniensis* V TSC	It is widely distributed in eastern NSW from the Dividing Ranges through to the coast (Van Dyck and Strahan 2008). It is found in a variety of forest types including wet sclerophyll forest and coastal mallee. It appears to prefer wet sclerophyll forest although also utilises open forest at lower altitudes (Churchill 2008; Hall and Richards 1979). Absent from small patches of remnant forest, preferring continuous forest, although have been recorded foraging or moving through open/cleared landscapes (Churchill 2008).This species roosts in tree hollows (Phillips & Inwards 1985).	Disturbance during winter roosting and breeding, loss of habitat including hollow-bearing trees	Yes – dry forest may provide habitat for this species. There is one record about 35km east of the proposal area. In general, there has been little survey for bats undertaken in the local area and therefore analysis of existing records is insufficient to determine likelihood of presence. Anabat data from field surveys shows no records for	Habitat loss, blade strike and barotrauma

Name	Ecology/Habitat requirements (source: DECCW 2010 unless otherwise noted)	Threats (source: DECCW 2010 unless otherwise noted)	Habitat in project area? Potential utilisation of habitat in project area?	Potential impact type?
			this species.	
Eastern Bentwing-bat *Miniopterus schreibersii 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 (Van Dyck and Strahan 2008). The species appears to forage above the forest canopy in a diverse range of forest types (Van Dyck and Strahan 2008). Females undertake annual migration to congregate at maternity caves, via staging caves. Mt Fairy Staging Cave is nearby to site.	Disturbance during winter roosting and breeding, loss of habitat and predation	Yes – dry forest may provide foraging habitat for this species. There is one record about 35km east of the proposal area. Recorded during field surveys.	Habitat loss, blade strike and barotrauma **7-part test undertaken**
Large-eared Pied Bat *Chalinolobus dwyeri* V TSC	This species occurs in areas with extensive cliffs and caves (Churchill 2008). It roosts and breeds in caves and disused mines (DECC, 2009). Known to forage in dry, wet and tall open sclerophyll forests as well as woodlands and along rainforest margins (Churchill 1998). Females gather in maternity caves from November to March (Churchill 2008).		Yes – dry forest may provide foraging habitat for this species. May roost in caves around Mt Fairy/ Bungedore. Anabat data from field surveys shows no records for this species.	Habitat loss, blade strike and barotrauma
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 inland, except along major rivers (DECCW 2009). 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 near water (Churchill 2008; Hall & Richards 1979)	Reduction in stream water quality, loss or disturbance of roosting sites, clearing adjacent to foraging areas, application of pesticides in or adjacent to foraging areas	Yes – there are dams in the proposal area. Recorded during field surveys.	Habitat loss, blade strike and barotraumas **7-part test undertaken**

Name	Ecology/Habitat requirements (source: DECCW 2010 unless otherwise noted)	Threats (source: DECCW 2010 unless otherwise noted)	Habitat in project area? Potential utilisation of habitat in project area?	Potential impact type?
Greater 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 2009). This species inhabits a variety of vegetation types, including mallee, bulloke but more commonly box/ironbark/cypress-pine communities (DECC 2008). 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.		No – there is little to no understorey and midstorey in the vegetation communities in the proposal area. Anabat data from field surveys shows no records for this species.	Habitat loss, blade strike and barotrauma
Yellow-bellied Sheathtail-bat *Saccolaimus flaviventris* V TSC	This species roosts singly or in groups of up to six, in tree hollows and buildings. In treeless areas they are known to utilise mammal burrows. When foraging for insects, flies high and fast over the forest canopy, but lower in more open country. The Yellow-bellied Sheathtail-bat forages in most habitats across its very wide range, with and without trees and appears to defend an aerial territory. Breeding has been recorded from December to mid-March, when a single young is born. Seasonal movements are unknown; there is speculation about a migration to southern Australia in late summer and autumn.	Disturbance to roosting and summer breeding sites, loss of hollow-bearing trees, clearing and fragmentation of forest and woodland habitat including foraging habitat and pesticide and herbicide use.	Yes Recorded during field surveys.	Habitat loss, blade strike and barotraumas **7-part test undertaken**
Greater Broad-nosed Bat *Scoteanax rueppellii*	This species is recorded from a range of habitats, from woodland to rainforest (Hall & Richards 1979), including cleared paddocks with remnant trees (Churchill 2008). It is known to roost in tree hollows (Van Dyck & Strahan 2008) but has also been found in roof spaces. Its diet includes	Disturbance during roosting and breeding, loss of habitat including hollow-bearing trees, changes to water regimes	Yes – this species may utilise woodland and dry forest, as well as remnant trees in paddocks in the proposal area. There are no historical	Habitat loss, blade strike and barotrauma

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V TSC	slow-flying insects. It may prefer riparian areas adjacent to cleared areas in which to forage due to slow flight characteristics. Strongly associated with areas with mild winters and annual rainfall greater than 600mm (Churchill 2008). females annually congregate in maternity caves over summer (Churchill 2008)		records for this species in the local area. Not recorded during field surveys and site is on outskirts of this species distribution.	
Grey-headed Flying-fox *Pteropus poliocephalus* V TSC V EPBC	This species roosts in large camps, generally in wetter vegetation such as rainforest or swamp forest. Groups fly out at night to feed on fruit, nectar and blossom, particularly of *Eucalyptus, Melaleuca* and *Banksia*. This species shows fidelity to roosting areas but may feed in orchards. It appears to be showing increasing tolerance to human disturbance.	Shooting by farmers, habitat loss, disturbance of roost camps	No – suitable habitat is not present in the proposal area.	n/a
Reptiles				
Pink-tailed Worm-lizard *Aprasia parapulchella* V TSC	Inhabits open grassland habitats that have a substantial cover of small rocks (Osborne and Jones 1995). Show a preference for sunny aspects, avoiding south facing slopes, only at sites with good numbers of invertebrates under rocks. Favoured sites have relatively open vegetation, including grassland sites supporting no native grasses. Shelters under small rocks which are exposed to sunlight and shallowly embedded in the soil.	Habitat loss and fragmentation, removal of rocks, degradation by stock and rabbits, weed invasion and exotic pasture species, modification of habitat including tree planting in native grasslands	No – lack of suitable rocks within project area. Habitat was searched thoroughly. There are no local records for this species in the area.	Habitat loss

Name	Ecology/Habitat requirements (source: DECCW 2010 unless otherwise noted)	Threats (source: DECCW 2010 unless otherwise noted)	Habitat in project area? Potential utilisation of habitat in project area?	Potential impact type?
Little Whip Snake *Suta flagellum* V TSC	This species is found within an area bounded by Crookwell in the north, Bombala in the south, Tumbarumba to the west and Braidwood to the east. It occurs in Natural Temperate Grasslands and grassy woodlands, including those dominated by Snow Gum or Yellow Box as well as secondary grasslands derived from clearing of woodlands. It is commonly found on well-drained hillsides with loose scattered rocks.	Habitat loss and fragmentation, removal of rocks, degradation by stock and rabbits, weed invasion and exotic pasture species, predation by dogs and cats	Yes – Cluster 6 There are no records for this species in the area. Habitat was searched thoroughly.	Habitat loss
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.	Habitat loss and fragmentation, removal of termite mounds and fallen timber, road kills including upgrading of roads especially to tar which increases speed travelled, predation by dogs and cats	Yes There are no records for this species in the area.	Habitat loss
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	Clearing and conversion of grasslands to other uses such as vineyards, urban development, bushrock collection, habitat degradation through slashing, ploughing, stock trampling, invasion of weeds or exotic pasture, predation by cats and dogs.	Yes – native grassland and secondary grassland in Clusters 4, 6. There are no records in the area.	Habitat loss

Name	Ecology/Habitat requirements (source: DECCW 2010 unless otherwise noted)	Threats (source: DECCW 2010 unless otherwise noted)	Habitat in project area? Potential utilisation of habitat in project area?	Potential impact type?
	shelter during disturbance events (Smith and Robertson 1999).			
Grassland Earless Dragon *Tympanocryptis Pinguicolla* E TSC E EPBC	Preferred habitat is naturally treeless grasslands on black clay, brown clay loams and podzolic soils, particularly those containing *Themeda*, *Austrodanthonia* and *Austrostipa* spp. that have not been extensively grazed. Threats include habitat clearing, grazing, rock removal, changed fire regimes and weed invasion.	Habitat loss and degradation from clearing, ploughing, grazing, trampling, exotic pasture cultivation, collection of bushrock, predation by cats and dogs, erection of fencing providing increased perching opportunities for predatory birds, changed hydrology, changes to historical grazing regimes, modification of habitat through tree planting in natural grasslands.	No – there are no naturally treeless grasslands in the proposal area	n/a
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. 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*).	Loss and degradation of habitat by urban, residential, infrastructure and agricultural development, modification of agricultural practices, overstocking, weed invasion (particularly exotic pasture), invasion of wallaby grassland by kangaroo grass tussocks, fragmentation	Yes Wallaby grass occurs in low to high density (including in association with spear and kangaroo grass) in Box-Gum Woodland including secondary derived grasslands. It also occurs to a less extent in the other vegetation communities in	Habitat loss and blade-strike

Name	Ecology/Habitat requirements (source: DECCW 2010 unless otherwise noted)	Threats (source: DECCW 2010 unless otherwise noted)	Habitat in project area? Potential utilisation of habitat in project area?	Potential impact type?
			the project area.	

APPENDIX C ASSESSMENTS OF SIGNIFICANCE

C.1 ASSESSMENTS UNDER THE TSC ACT

Section 5A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) specifies seven factors to be taken into account in deciding whether a development is likely to significantly affect threatened species, populations or ecological communities, or their habitats.

Although not a legal requirement of a Part 3A development, Assessments of Significance provide a transparent and systematic characterisation of impact for listed entities.

Potential impacts to the following species and communities listed on the NSW *Threatened Species Conservation Act* have been characterised (in the groups below) pursuant to the provisions of the TSC Act:

Endangered Ecological Communities:

- White Box Yellow Box Blakely's Red Gum Woodland (Box-Gum Woodland).
- Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland (Tablelands Snow Gum Grassy Woodland).

Fauna

- Raptors: Little Eagle, Spotter Harrier, Square-tailed Kite.
- Small diurnal dry forest/woodland birds: Brown Treecreeper, Diamond Firetail, Varied Sittella, White-fronted Chat.
- Larger diurnal forest/woodland birds: Gang-gang Cockatoo, Superb Parrot, Powerful Owl.
- Microbats: Eastern Bentwing Bat, Yellow-bellied Sheathtail Bat, Large-footed Myotis, East Coast Freetail-bat.

  These species are all listed as Vulnerable under the TSC Act.

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 the 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

Approximately 648.5 hectares of the Endangered Ecological Community White Box- Yellow Box - Blakely's Red Gum Grassy Woodland (including derived grassland) occurs within the DE. Approximately 252.9 hectares of this total is considered to be in moderate or good condition (high constraint) and includes native grassland derived from this community. The remainder is considered to be in poor condition and includes treed areas over an exotic understorey and low diversity native pasture.

The proposal would result in the permanent loss of up to 8.2 hectares of moderate and good condition Box-Gum Woodland EEC across the site and up to 13.7 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.

Predominately, these areas 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 (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.

Several areas within the DE consist of higher diversity Box-Gum woodland and would be directly impacted by the proposal. These areas have high conservation value and also qualify as a Commonwealth listed entity. Up to 8.2 hectares of high conservation value Box-Gum Woodland would be permanently lost as a result of the proposal. Based on field observations, large extents of this vegetation occur within the proposal site. Approximately 114 hectares is known to occur in the north of the site and approximately 200 hectares may potentially occur in the central east of the

site. The area to the east is proposed to be managed as offset area to maintain and improve biodiversity outcomes. Considering the potential gains for this community and the small amount of clearing proposed relative to the extent 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.

Small treed remnants (but larger than 0.25 hectares) in exotic dominated pasture must also be regarded as belonging to the EEC under NSW legislation. They are considered to be in poor condition (moderate constraint) and of relatively low conservation significance due to the highly degraded nature of the groundcover and very limited recovery potential and therefore their removal is not considered likely to result in significant impacts on the extent or composition of the community such that its occurrence is likely to 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 areas 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)

No areas of critical habitat have been declared within the district.

f) whether the action proposed is consistent with the objectives or action 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 net loss of approximately 22 hectares of this community. However, as discussed above, in considering the bulk 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 off setting, 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

Two identified Key Threatening Processes are relevant to this proposal.

- 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 bulk of the subject site is already cleared and highly modified by agricultural practices. The Proposal would remove up to 22 hectares of predominately low quality Box-Gum Woodland and derived grassland, an endangered ecological community. The significance of this clearing has been discussed above.

- The 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. Several infestations of Serrated Tussock were observed across the site (although much appeared to have been sprayed at the time of the November survey. Dense patches of Yorkshire Fog occurred in wetter areas but this was generally localised. Most exotic grasses were annuals, such as Barley Grass (*Hordeum leporinum) and Wild Oats (**Avena sp.*).

  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 7 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.

Tablelands Snow Gum Grassy 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:

iii) 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 the risk of extinction, or

iv) 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

Approximately 37.7 hectares of the Endangered Ecological Community Tablelands Snow Gum Grassy Woodland occurs within the DE. The entire extent of this community within the DE carried a relatively diverse understorey and was in good condition. Overstorey ranged from moderately dense to sparse. In sparse situations grassland between overstorey trees in the right landscape position was also considered to comprise the community. The extent of Tablelands Snow Gum Grassy Woodland within the entire 6,215 hectare proposal site boundary approximates an additional 67.6 hectares.

The current proposal would result in the permanent loss of up to 1.6 hectares of good condition Tablelands Snow Gum Grassy Woodland across the site. 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.

Given broad distribution of the community across the site it is likely that it was once more abundant within the proposal site boundary and potentially currently extends further east from the larger area on the southern ridge in Cluster 5. Impacts from the development are likely to be confined to this larger area. Two other areas of this community exist on the site as small isolated remnants and should be able to be avoided by the proposal. The remnant in the north of the site adjoins more extensive areas of good quality Box-Gum Woodland and it is recommended that it be included within the offset plan for the site.

Tree density is sparse within the remnant in Cluster 5 and the proposal would likely be able to avoid

tree removal in this area. Impacts are likely to be restricted to the removal of good condition grassy ground cover. Given the ability to avoid overstorey trees and the relatively small amount (1.6 hectares) of clearing proposed, it is considered unlikely that the proposal would impact upon the extent or modify the community to a degree such that it would place the local occurrence of the community 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 Tablelands Snow Gum Grassy 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 areas not suitable for Tablelands Snow Gum Grassy 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 good condition however, it is widespread, has been degraded by agricultural practices and given the small amount to be removed is 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)

No areas of critical habitat have been declared within the district.

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

No recovery or threat abatement plan currently exists for this community.

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

Two identified Key Threatening Processes are relevant to this proposal.

- 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 bulk of the subject site is already cleared and highly modified by agricultural practices. The proposal would remove up to 1.6 hectares of good quality Tablelands Snow Gum Grassy Woodland, an endangered ecological community. The significance of this clearing has been discussed above.

- The 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. Tablelands Snow Gum Grassy Woodland is vulnerable to the introduction and spread of perennial grasses such as African Love Grass, Serrated Tussock, Phalaris, Cocksfoot, Yorkshire Fog, and Paspalum. Several infestations of Serrated Tussock were observed across the site (although much appeared to have been sprayed at the time of the November survey. Dense patches of Yorkshire Fog occurred in wetter areas but this was generally localised. Most exotic grasses were annuals, such as Barley Grass (*Hordeum leporinum) and Wild Oats (**Avena sp.*).

  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 7 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.

EEC Conclusion

The majority of the vegetation on the site is in a degraded state due to past and present agricultural practices. The proposal would result in the removal of up to 22 hectares of Box-Gum Woodland EEC that is predominately in poor condition with little chance of recovery. Higher quality remnants will be affected by the proposal however, extensive areas of these higher quality remnants exist within the site boundary and provide good opportunities for offsetting and maintaining or improving biodiversity values of these areas. The removal of up to 22 hectares of this community is not considered to be significant with respect to its generally degraded state and the extent of similar vegetation in the locality.

Up to 1.6 hectares of Tablelands Snow Gum Grassy Woodland will be removed as a result of the proposal. This is likely to be limited to the clearing of grassy understorey in good condition with areas with a more intact overstorey being retained. Given the extent of similar vegetation in the locality, the retention of areas with a more intact overstorey and the occurrence of approximately 37 hectares of this community within the DE, the removal of 1.6 hectares of understorey vegetation is not considered to be significant.

Little Eagle, Spotted Harrier, Square-tailed Kite (habitat loss and blade-strike)

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 Eagle breeding has been recorded along the escarpment of the Lake George basin, approximately eight kilometres south of the proposal site. Potential habitat occurs for Square-tailed Kite and Spotted Harrier, and these species are assumed to occur infrequently. Potential lifecycle impacts could result due to the infrastructure interfering with foraging opportunities and breeding success.

The key area of concern for breeding Little Eagles is close to the Lake George escarpment. Turbine layout avoids known breeding habitat. The southern end of Cluster 5 is closest to the breeding area (nest is approximately eight kilometres south). Cluster 4 is the most easterly and closest to the slope north of the escarpment. This hill may be used by the species while foraging.

The proposal could affect potential breeding habitat for all three species (woodland, forest), reducing the amount of large trees for nesting. If turbines were in or near breeding areas, this could affect juvenile survival rates. However, nests for threatened raptors were not detected during surveys. Furthermore, none of these species were recorded during field surveys. The Little Eagle and Spotted Harrier may use the site from time to time and the Square-tailed Kite is unlikely to breed locally (most breeding records for this species are along the coast). Given that no nests were detected within the project area and that suitable habitat available would be offset somewhat by regeneration and protection of good-quality vegetation on the site, locality impacts for these species are not considered likely. Further, Little Eagles would be a key species for monitoring in the operational phase of the wind farm.

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:

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 the risk of extinction, or

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) The entire site represents potential raptor breeding and foraging habitat. Spotted Harrier is more likely to utilise open pasture, Square-tailed Kite the forest and Little Eagle would utilise all the identified habitats. In terms of loss of habitat, across the 813 hectare development envelope, approximately 6.12% of habitat would be affected (total area 49.7 ha) by construction. Total permanent habitat loss would be less than 4% of that available across the development envelope. In terms of the volume of air space to be affected, 68 turbines are proposed and these would have a blade-sweep area of up to 110m diameter, at a height above the ground of approximately 30m, reaching a maximum of 140m. All areas of habitat loss are for potential habitat; no known habitat would be lost or affected.

ii) Actual vegetation clearing would be very small in relation to the amount available locally of similar or better quality. While it is likely that Clusters of operational turbines would reduce the use of habitat within the vicinity, it seems unlikely that they would present a barrier to movement or cause isolation or fragmentation of habitat for these highly mobile species. In the case of Spotted Harrier, they are likely to forage lower than the blade-sweep height (lowest point c.35-50m above ground level), the Square-tailed Kite and Little Eagle may both soar higher than and within the blade-sweep zone (maximum of 140m above ground) and raptors have been shown to be able to negotiate movements around turbines (Brett Lane & Associates 2005).

iii) Habitat within the development envelope does not appear to be of high importance to any of the three raptor species in comparison to the nearby Lake George and the escarpment. Raptor nests were not observed at the site. Historical records of the Spotted Harrier and Little Eagle are largely within Lake George. The closest record for the Square-tailed Kite is at Mundoonan Nature Reserve, some 30km west of the site. It is unlikely that the species rely on resources at the site given the lack of evidence of usage, however, the proposal site does contain some habitat features of importance to the species. Farm dams, creeks and farmland/open habitats present foraging opportunities for these species and drought refuges. Forest and woodland provide nesting opportunities.

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

No areas of critical habitat have been declared within the district.

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

There are no recovery plans for these species.

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 following KTPS are relevant to this proposal:

- Clearing of native vegetation (minor potential impact considering the pattern and extent with respect to these wide ranging species).
- Loss of dead wood and dead trees (may affect perching and hunting by raptors).
- Loss of hollow-bearing trees (may affect the abundance of raptors' prey species).

Measures to address these KTPs have been recommended by this report and include minimising habitat loss by:

- Retaining hollow-bearing trees and stags where possible.
- Retaining fallen timber.
- Placing turbines, roads, circuits and crane hard-stand areas to avoid removal of native vegetation.

Conclusion

Whilst the proposal would reduce vegetated habitat for nesting for these three raptors, nesting opportunities would not be lost as much of the vegetation throughout the site would be retained. Little Eagle nesting habitat on the escarpment, south of the site, would not be impacted. The Spotted Harrier is unlikely to be impacted by turbine collision as they generally fly below the sweep zone. There is little evidence to suggest the Square-tailed Kite utilises the site. The Square-tailed Kite and Little Eagle could be impacted by collision as they both forage in the sweep zone however, as raptors are known to avoid turbines, it is likely that mortality rates would be minimal. The proposed wind farm at Collector would not significantly impact on the Square-tailed Kite or Spotted Harrier. It is unlikely that the proposal would significantly impact on the Little Eagle, however, this species is considered to be a key species and would be monitored as part of the bird and bat monitoring program.

Brown Treecreeper, Diamond Firetail, Varied Sittella, White-fronted Chat (habitat loss)

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

All these species were recorded in the study area, although the Brown Treecreeper and White-fronted Chat were recorded outside of the development envelope, in nearby areas. It can be expected however, that these relatively wide ranging species could also utilise the current development envelope. Lifecycle impacts could potentially result from adverse effects on foraging or breeding success. The proposal has potential to affect the breeding, dispersal and foraging behaviour of the above species through habitat loss (vegetation clearing). Blade-strike is unlikely to affect these species due to their pattern of flight and foraging/nesting movements are largely within the limits of the tree canopy. The main impacts for three of the species would be to habitat connectivity and loss of hollow-bearing trees/fallen timber. However, the proposal would seek to minimise loss of, and impacts upon, woodland vegetation such as Box-Gum Woodland and Tablelands Snow Gum Grassy Woodland EECs which the Brown Treecreeper, Diamond Firetail and Varied Sittella are likely to inhabit. Therefore, protection of EECs would maintain the habitat values of the proposal area for Brown Treecreeper, Diamond Firetail, and Varied Sittella, and significant lifecycle impacts are considered unlikely.

Impacts to breeding and foraging habitat for the White-fronted Chat are likely to be from disturbance to cleared/grassy areas. Retention of native pasture throughout the development envelope and minimising disturbance in general would likely result in a minimal impact to the life cycle of this species.

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 the 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) Using vegetation community figures, approximately 220 ha of woodland is present within the development envelope. The maximum permanent habitat loss of woodland habitat across the site is 22 ha. Permanent loss of forest habitat is <2 ha over a total of >35ha within the development envelope. There may be some loss of hollow-bearing trees, dead branches and litter, although this would be minimised to protect the assessed species. White-fronted Chats typically inhabit cleared grassy areas or low shrubs. Approximately 37 hollow-bearing trees would be removed within the development envelope. Vegetation and hollow-bearing tree loss would be offset with protection and regeneration of remnant woodland patches where hollows are larger and of higher value to minimise impacts to these species.

ii) Woodland and forest is already fragmented and there is a potential to increase fragmentation of this habitat under the proposal. However, there is flexibility to site turbines to avoid patches of vegetation and retain some level of connectivity.

iii) The study area is largely modified and cleared, and the main woodland community, Box-Gum Woodland, is an over-cleared community. The species assessed here are sedentary and therefore likely to breed in the area. Therefore, the importance of the habitat to be affected would be moderate to high.

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

No areas of critical habitat have been declared within the district.

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

There are no recovery plans for these species.

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

The following KTP are relevant:

- Loss of hollow-bearing trees (HBT).
- Clearing of native vegetation.
- Loss of standing dead timber and dead wood.
- Bushrock removal.

Recommendations in this report ensure that their operation is minimised by:

- Retaining HBT, dead timber and native vegetation by avoiding woodland and forest patches (with tree cover) and micrositing through sparse woodland.
- Requiring offsets for all areas of native vegetation to be cleared.
- Retaining timber and rock on-site.

Conclusion

The proposal would not significantly impact on the Brown Treecreeper, Diamond Firetail, Varied Sittella or White-fronted Chat. Habitat loss for these species would constitute disturbance to pasture and pasture with trees, which White-fronted Chat inhabits, and a small amount of woodland and forest, which the other three species inhabit. Hollow-bearing trees and fallen timber would be retained where possible to mitigate impacts. Furthermore, habitat loss would be offset by preserving and improving large areas of woodland that are in moderate to good condition.

Gang-gang Cockatoo, Superb Parrot, Powerful Owl (habitat loss)

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

Gang-gang Cockatoo and Superb Parrot were recorded in the project area. Powerful Owl has potential to occur with several records nearby. This species has a large home range. The breeding and foraging activities of these species may be affected by the proposal. All three species rely on tree hollows for breeding and may be affected by clearing of woodland.

The proposal's affect on foraging is likely to be minor, with the proposed mitigation of impacts to Box-Gum Woodland and Tablelands Snow Gum Grassy Woodland in the proposal area. The key potential impact is to breeding resources, namely hollow-bearing trees.

The recommendations of this report to minimise the loss of hollow-bearing trees and standing dead timber through micrositing and avoiding woodland with tree cover would retain the breeding resources. Additionally, hollows that must be removed should be replaced with artificial hollows to replace this limiting resource. Thus, local populations of Gang-gang Cockatoo, Superb Parrot and Powerful Owl would not be placed at the 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 the 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) Using vegetation community figures, approximately 220 ha of woodland is present within the development envelope. The maximum permanent habitat loss of woodland habitat across the site is 22 ha. Permanent loss of forest habitat is <2 ha over a total of >35ha within the development envelope. There may be some loss of hollow-bearing trees, dead branches and litter, although this would be minimised to protect the assessed species. Approximately 37 hollow-bearing trees would be removed within the development envelope. Vegetation and hollow-bearing tree loss would be offset with protection and regeneration of remnant woodland patches where hollows are larger and of higher value to minimise impacts to these species.

iv) Woodland and forest is already fragmented and there is a potential to increase fragmentation of this habitat under the proposal. However, there is flexibility to site turbines to avoid patches of vegetation and retain some level of connectivity.

ii) The locality is largely modified and cleared, and the main woodland community, Box-Gum Woodland, is an over-cleared community. The Superb Parrot appears to favour Blakely's red gum, which is scattered throughout the site (Manning *et.al* 2006). Loss of Box-Gum Woodland would be of some concern to this species, however, there is little known about how much the Superb Parrot would rely on the site without further targeted surveys. Retention of a maximum amount of Box-Gum Woodland would reduce the potential for impact to Superb Parrot habitat. Some hollows identified at the site are large enough for breeding Powerful Owls. Larger tracts of forest and woodland in nearby areas such as the southwest and south east of the site, where records of these species exist, are likely to be of greater importance to the Powerful Owl in terms of prey abundance than the proposal site where potential habitat is largely fragmented. The Gang-gang Cockatoo was observed at the site and there is a record to the southwest of the site. It is unlikely that this species would breed at the site as they prefer habitat with tall, mature vegetation and a dense understorey (NSW Scientific Committee 2008b). Vegetation within the study area is generally not tall (less than 30m) and has very little understorey. It is likely that the Gang-gang Cockatoo uses the site for foraging.

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

No areas of critical habitat have been declared within the district.

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

There are no recovery plans for the species assessed 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 following KTP are relevant:

- Loss of hollow-bearing trees (HBT).

- Clearing of native vegetation.
- Loss of standing dead timber and dead wood.

Recommendations in this report ensure that their operation is minimised by:

- Retaining HBT, dead timber and native vegetation by avoiding woodland and forest patches (with tree cover) and micrositing through sparse woodland.
- Native vegetation offsets such as protection of good quality Box-Gum Woodland.

Conclusion

The proposal would not significantly impact on the Gang-gang Cockatoo, Superb Parrot or Powerful Owl provided mitigation measures are implemented. Habitat loss for these species is largely through loss of hollow-bearing trees and stags as breeding resources. Hollow-bearing trees and stags would be retained where possible to mitigate impacts. Artificial hollows would replace hollow-bearing trees that are removed. Furthermore, habitat loss would be offset by preserving and improving large areas of woodland that are in moderate to good condition.

Eastern Bentwing Bat, Yellow-bellied Sheathtail Bat, Large-footed Myotis and East Coast Freetail-bat (blade-strike, habitat loss)

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

All of the listed bats were recorded in the development envelope during Anabat surveys. Calls from each bat were as follows:

- Eastern Bentwing Bat (EBB) - 19 calls were recorded at eight different locations.
- Yellow-bellied Sheathtail Bat (YSB) – 18 calls, two locations.
- Large-footed Myotis (LM) – two calls, one location.
- East Coast Freetail-bat (ECF) – 11 calls, two locations.

The EBB and YSB are at highest risk of impact due to their migratory behaviour and the fact that their flight height is within the blade sweep zone.

A staging cave of the EBB is located in Mt Fairy, 35km southeast of the proposal site. The species are known to congregate in this cave in transit to Church Cave, a maternity cave located near Wee Jasper located approximately 60 kilometres south west of the proposal area. The proposal site presents a possible migration route to the Mt Fairy cave which the species inhabits between mid-February and mid-March (Richards 2005). The most direct route between Mount Fairy and Church Cave is south of the site. By removing turbines from near to the escarpment and within the wooded corridor south of the site, the proposal has mitigated the risk to migrating Eastern Bentwing Bats. Anabat surveys were undertaken in March when migration to the Mt Fairy cave would be occurring. It would be anticipated that recorded calls for this species would be significantly higher during this period if migrating bats are using the site as foraging habitat while at the staging cave or while migrating. However, bat activity overall was highest in November 2010 where number of calls averaged at 608 per night (averages for March 2010 and December 2009 were 347 and 20, respectively). Bat calls for EBB was recorded at Cluster 4 for both survey nights during November 2010 and two out of the three survey nights during December 2009 surveys. Furthermore, EBB calls EBB averaged 0.6 calls per hour during November 2010 surveys, 0.25 calls per hour for March 2010 surveys and 0.05 calls per hour for December 2009 surveys. It is therefore not likely that the species relies heavily on the proposal site as foraging habitat when roosting at the staging cave (Mt Fairy) given that calls did not spike in the March survey period. The proposal is not likely to impact on the local population of EBB such that it is likely to be placed at risk of extinction.

YSB were recorded in Cluster 4 and south of the site on the escarpment where turbines have been removed from the concept plan. It was only recorded during March surveys and there are few records in the area. While it may breed locally, it is probably in small numbers. Thus, collision fatalities are likely to be rare, and while this may cause significant changes to local abundance of the species, it would be unlikely to be significant at a population scale.

Risks to other species are likely to be from loss of habitat. Most species are found in a range of habitats and utilise hollow-bearing trees and fissures for roosting. LM is associated with vegetated areas near permanent waterways and will also roost in caves (Churchill 2008). It is unlikely that the

proposed works would impact a local population of any of these species such that they are placed at risk of extinction. Vegetation removal would be minimised and hollow-bearing trees would be retained where possible.

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 the 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) Sixty-nine turbines are proposed and these would have a blade-sweep area of up to 110m diameter, at a height above the ground of approximately 30m, reaching a maximum of 140m. Most bat species recorded are expected to forage below or in the lower part of the blade-sweep area, however, the EBB and YSB are known to fly at higher altitudes and may be impacted. Because bats detect objects using echolocation, it seems unlikely that they would have such high fatalities around wind farms. One study in Canada found that 90% of bat fatalities at wind farms had internal haemorrhaging consistent with barotraumas (Baerwald et al 2008). It is likely that air pressure changes at wind turbines are undetectable by bats and barotrauma is the greatest threat to this species from wind farm developments.

Habitat loss includes reduction in forest and woodland and a loss of hollow-bearing trees. Infrastructure would be microsited to avoid hollow-bearing trees and retain as much vegetation as possible. The maximum permanent habitat loss of woodland habitat across the site is 22 ha. Permanent loss of forest habitat is <2 ha over a total of >35ha within the

development envelope. Approximately 37 hollow-bearing trees would be removed within the development envelope. Vegetation and hollow-bearing tree loss would be offset with protection and regeneration of remnant woodland patches where hollows are larger and of higher value to minimise impacts to these species.

Impacts to waterways are likely to be minimal with turbines sited to avoid waterways and minor riparian vegetation removal required where circuits are crossing creeks.

ii) Woodland and forest is already fragmented and there is a potential to increase fragmentation of this habitat under the proposal. However, there is flexibility to site turbines to avoid patches of vegetation and retain some level of connectivity.

iii) All of the species utilise a range of habitats such as woodland, forest, mallee and shrubland. The importance of local habitat to most of the bats is likely to be low. Small farm dams and ephemeral creeks are the only waterways at the site. Lake George lies to the south and would be preferential for bats such as EFB and LM than waterways at the proposal site.

There is no strong evidence to suggest that the EBB relies on the site heavily during migratory times. It is unlikely that the site is of great importance as large colonies of this species usually forage within 25km of maternity caves. The closest maternity staging cave is located 35km away.

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

No areas of critical habitat have been declared within the district.

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

There are no recovery plans in place for any of the species.

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

Loss of Hollow-bearing trees and clearing of native vegetation are KTPs relevant to the proposal. Recommendations in this report ensure that their operation is minimised by:

- Retaining HBT, dead timber and native vegetation by avoiding woodland and forest patches (with tree cover) and micrositing through sparse woodland.
- Requiring offsets for all areas of native vegetation to be cleared.

Conclusion

Whilst the proposal would reduce potential roosting and foraging habitat for all bat species, the loss of habitat would be offset through an offset plan and impacts to vegetation avoided through micrositing infrastructure. Potential impacts to the Large Myotis and East Coast Freetail-bat would

not be significant as these species were recorded in low numbers and are unlikely to be impacted by collision. The Yellow-bellied Sheathtail Bat and Eastern Bentwing Bat could be impacted by turbine collision/barotrauma as they fly in the sweep zone. Yellow-bellied Sheathtail Bat is likely to occur in low numbers and therefore unlikely to be impacted at a population level. Potential impacts to this species are not likely to be significant. Impacts to the Eastern Bentwing Bat could occur as this species was recorded across the site. However, there is no evidence to suggest this species utilises the site heavily for foraging from a known nearby maternity cave. It is therefore unlikely that the proposal would significantly impact on the Eastern Bentwing Bat, however, this species is considered to be a key species and would be monitored as part of the bird and bat monitoring program.

C.2 ASSESSMENTS UNDER THE EPBC ACT

Potential impacts to the following species have been characterised pursuant to the provisions of the EPBC Act:

- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered Ecological Community; CEEC).

Potential impacts to the following species have been characterised pursuant to the provisions of the EPBC Act:

- Superb Parrot (Vulnerable under the EPBC Act).
- White-bellied Sea-eagle (Migratory under the EPBC Act**).**

Critically Endangered Ecological Community (CEEC) White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland ('Box-Gum woodland')

Will the action...

a) 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 2.99 hectares would be permanently removed as a result of the proposal. Large extents of this vegetation occur within the proposal site. Approximately 114 hectares is known to occur in the north of the site and up to 341 hectares may potentially occur in the central east of the site. Two hundred hectares of this area in the east of the site is proposed to be managed as an offset area to maintain and improve biodiversity outcomes.

The proposal will reduce the net amount of Box-Gum Woodland within the DE for the purposes of constructing infrastructure however, its overall extent within the site boundary is unlikely to be effected. Large areas of the CEEC are likely 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 (2.99 hectares) to be removed by the proposal is not considered to be significant when compared to the large areas (potentially up to 200 hectares) that will be retained and managed for its improvement.

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 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.

b) 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 2.99 hectares of predominately ground cover vegetation associated with the CEEC. Considering the large extents of similar habitat within the proposal site (potentially >400 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.

c) 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. The proposal is unlikely to further modify these factors.

Transmission lines associated with the proposal are intended to be sub-surface within 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.

***d)* 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.

***e)* 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. Perennial exotic grasses appeared to be relatively uncommon at the subject site during the surveys although localised patches of Serrated Tussock and Yorkshire Fog where observed. 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.

f) 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 an offset plan is likely to assist with the recovery of the broader extent of the community within the proposal site.

Flora conclusion

The proposal will result in the permanent removal of up to 2.99 hectares of the Box-Gum Woodland CEEC causing a localised reduction in the occurrence of this community. 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 will result from the proposal but are not considered 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 7 of this report are adhered to.

Offset plans are recommended by this report to maintain and improve the biodiversity values associated with the CEEC within the proposal site. Large areas exist within the site boundary that if properly managed can assist with the recovery of this community.

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.

Fauna

Vulnerable species – Superb Parrot *(habitat loss)*

a) Lead to a long-term decrease in the size of an important population?

The Superb Parrot was recorded in the project area. The proposal would have a direct impact on Superb Parrot foraging and breeding habitat through the removal of hollow-bearing trees and Box-gum Woodland, which this species favours. The recommendations of this report to minimise the loss of hollow-bearing trees and standing dead timber through micrositing and avoiding woodland with tree cover would retain breeding and foraging resources. Additionally, hollows that must be removed should be replaced with artificial hollows to replace this limiting resource. Thus, local populations of Superb Parrot are not likely to notably decrease in size.

b) Reduce the area of occupancy of an important population?

Using vegetation community figures, approximately 220 ha of woodland is present within the development envelope. The maximum permanent habitat loss of woodland habitat across the site is 22 ha. Approximately 37 hollow-bearing trees would be removed within the development envelope. Vegetation and hollow-bearing tree loss would be offset with protection and regeneration of remnant woodland patches where hollows are larger and of higher value to minimise impacts to these species. Vegetation loss would be offset with protection and regeneration of remnant woodland patches to the minimise impacts to this species.

c) Fragment an existing population into two or more populations?

The proposal is not expected to fragment the local population. The proposal site is already fragmented to an extent, and though vegetation removal and placement of turbines would increase fragmentation, it is unlikely to be to such that an existing population of Superb Parrots would break into two. The Superb Parrot is not considered highly sensitive to fragmentation.

d) Adversely affect habitat critical to the survival of a species?

There is no critical habitat in the study area.

e) Disrupt the breeding cycle of an important population?

Recommendations have been made to ensure the proposal does not affect the breeding of the local Superb Parrot population. These include:

- Retain mature and hollow-bearing trees (including micro-siting infrastructure to avoid these features).
- Where removal cannot be avoided, follow guidelines to minimise the impact on resident fauna.

f) Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?

The proposal is unlikely to cause decline of Superb Parrot due to habitat effects based on the following recommendations:

- Retain Box-gum Woodland with understorey floristic diversity and tree cover, and avoid hollow-bearing trees (or where not possible, replace with artificial hollows).
- Offset native vegetation clearance.

g) Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?

Any loss of hollow-bearing trees could increase competition for this limiting resource between species, including invasive species such as Common Starling. This species has already been recorded at the proposal site, and their presence is not the result of or likely to be exacerbated by the proposal.

h) Introduce disease that may cause the species to decline?

Psittacine Circoviral (beak and feather) Disease could affect the species, but is not known to currently affect Superb Parrots or occur in the region. The proposal is unlikely to introduce the disease.

i) Interfere substantially with the recovery of the species?

By implementing the recommendations made in this report (including those listed in this assessment), the proposal is not considered likely to interfere with the recovery of the species.

Migratory species – White-bellied Sea-eagle (collision)

Will the action ...

a) Substantially modify, destroy or isolate an area of important habitat for a migratory species?

The local area may be important habitat for the species which have previously been recorded breeding on the escarpment 2km south of the proposal site. However, this has not occurred for many years (COG personal communication 2010). The proposed turbines would be located at least 2km from the escarpment, reducing the chance of impacting this species. Aerially, 68 turbines are proposed and these would have a blade-sweep area of up to 110m diameter, at a height above the ground of approximately 30m reaching to a maximum of 140m. While the works would not modify the habitat along the escarpment, there could be impacts to White-bellied Sea-eagles flying to and from this area, if they return to breed in future.

b) Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species?

There are no harmful invasive species known to the White-bellied Sea-eagle.

c) Seriously disrupt the lifecycle (breeding, feeding, migration or resting) of an ecologically significant proportion of the population of a migratory species?

The species is considered at risk of collision impacts, which have potential to disrupt the lifecycle of the species including breeding, fledging, juvenile dispersal and migration. However, based on the estimated territory size of the eagles (DEWHA 2010) and the lack of use of the escarpment for breeding in recent years, such potential affects are unlikely to affect an ecologically significant proportion of the population.

Fauna conclusion

The following are recommendations that would minimise impacts to threatened species:

- Minimise unnecessary disturbance to groundcover.

- Retain hollow-bearing trees where possible. Replace losses with artificial hollows.
- Fallen timber would be left in place or moved to a nearby area to retain fauna habitat.
- Turbines, roads and circuits would be located such that habitat removal is minimised.
- Monitor Little Eagles and Eastern Bentwing Bats as part of a bird and bat monitoring program.
- Consider connectivity of woodland and forest habitat in an offset plan.

These actions have been incorporated into recommendations for the proposal. The assessments of significance consider the effects of terrestrial habitat loss from the proposal on three listed raptors, seven listed woodland birds and five listed microbats. They also consider the effect of blade strike for the raptors, one migratory seabird and two listed microbat species.

Terrestrial habitat loss will occur as a result of the development, but is not considered likely to be significant in the local context. The maximum permanent habitat loss of woodland habitat across the site is 22 ha. Permanent loss of forest habitat is <2 ha over a total of >35ha within the development envelope. Approximately eight hectares of native pasture would be affected. Stands of Box-Gum Woodland and Tablelands Snow Gum Grassy Woodland would be avoided and protected from direct and indirect impacts during the works. The protection of this better quality habitat and tree cover will also have benefits for woodland birds and bats, minimising impacts on habitat for these species. Furthermore, during operation, some of these areas would be protected and regenerated as part of an offset strategy.

Aerial habitat loss and modification, and the risk of collision for Little Eagles and Eastern Bentwing Bats (EBBs) could lead to impacts to these species Turbines have been removed from the escarpment area where Little Eagles are known to breed, to mitigate risk to this species. Evidence does not suggest that the EBB uses the site as a main migration route from the nearby maternity cave at Mt Fairy. Monitoring of both of these species would occur to verify any unanticipated impacts to these species from collision with turbines/barotraumas and develop further safeguards if required.

Providing recommendations given in this report are followed, significant impacts are not expected to the threatened species assessed herein.

APPENDIX D FLORA RESULTS

D.1 COMPOSITE SPECIES LISTS FOR EACH VEGETATION TYPE

The survey area was stratified into 6 relatively homogeneous survey zones based on broad vegetation types:

WT Box-Gum Woodland with tree cover
WGH Box-Gum Woodland without tree cover, high diversity
WGL Box-Gum Woodland without tree cover, low diversity (native pasture)
DFR Dry forest (*E. rossii*)
DFD Dry forest (*E. dives, E. mannifera*)
TBF Tableland Basalt Forest (*E. viminalis, E. pauciflora*)
FHW Tablelands Snow Gum Grassy Woodland (*E. pauciflora*)

Cover/abundance assessments are based on visual estimates of foliage cover (after Carnahan 1997), scored using a modified Braun-Blanquet 6-point scale:

1 1 to a few individuals present, less than 5% cover
2 many individuals present, but still less than 5% cover
3 5 - <20% cover
4 20 - <50% cover
5 50 - <75% cover
6 75 - 100% cover

Where the cover/abundance of a particular species varies markedly over the random meander survey area, a range of values is provided. In these cases, abundance is based on a standard 20 metre x 20 metre quadrat scale.

Species of conservation significance are bolded. Introduced species are denoted by an asterisk. Noxious weeds declared for the Southern Slopes County Council control area under the *Noxious Weeds Act 1993* are indicated with a 'Δ' symbol. Where uncertainty exists due to the unavailability of mature reproductive material, the taxon is preceded by a question mark, or plants are identified to genus level only. Botanical nomenclature follows G.J. Harden (ed) (1990-2002) *Flora of New South Wales*, UNSW Press, except where recent changes have occurred.

Scientific name	Common name	Family	Abundance						
			WT	WGH	WGL	DFR	DFD	TBF	FHW
TREES									
Acacia dealbata	silver wattle	Fabaceae	0-2	0-1			0-1	0-3	
Acacia deanei ssp *paucijuga*		Fabaceae						1-3	
Acacia falciformis	broad-leaved hickory	Fabaceae				0-1			
Acacia melanoxylon	blackwood	Fabaceae						0-3	
Eucalyptus blakelyi	blakely's red gum	Myrtaceae	0-3	0-1					
Eucalyptus bridgesiana	apple box	Myrtaceae	0-3	0-1		?0-1			
Eucalyptus dives	broad-leaved peppermint	Myrtaceae	0-1	0-1			3	0-3	
Eucalyptus macrorhyncha	red stringybark	Myrtaceae	0-3	0-1		0-1	0-3		
Eucalyptus mannifera	brittle or red spotted gum	Myrtaceae				0-3	0-3		
Eucalyptus melliodora	yellow box	Myrtaceae	0-3	0-1			0-1		
Eucalyptus pauciflora	snow gum	Myrtaceae	0-3					0-3	0-2
Eucalyptus rossii	white or scribbly gum	Myrtaceae				3			
Eucalyptus viminalis	ribbon or manna gum	Myrtaceae		0-1				0-3	0-2
Exocarpos cupressiformis	native cherry	Santalaceae						1-3	
SHRUBS, SUB-SHRUBS									
Acrotriche serrulata	honeypots	Ericaceae		0-1					
Astroloma humifusum	cranberry heath	Ericaceae	0-1	0-1					1
Amyema ?pendulum	mistletoe	Loranthaceae	0-1				0-1	0-1	
Bossiaea buxifolia		Fabaceae	0-1			1			
Bossiaea prostrata		Fabaceae	0-2			1			1
Brachyloma daphnoides	daphne heath	Ericaceae				1			
Cassinia arcuata		Asteraceae	0-1	0-1					
**Crataegus monogynus*	hawthorn	Malaceae						0-3	
Hibbertia obtusifolia	guineaflower	Dilleniaceae	0-2	0-2		0-2	0-1		
Hovea heterophylla	variable hovea	Fabaceae				1			
Indigofera australis	australian indigo	Fabaceae				1			
Lissanthe strigosa	peach heath	Ericaceae		0-1		1			
Melichrus urceolatus	urn heath	Ericaceae	0-2	1-2		1	0-1		1
Pimelea curviflora var *?sericea*	curved rice flower	Thymeleaceae				0-2			
Δ**Rosa rubiginosa*	briar rose, sweet briar	Rosaceae	0-3	0-2			0-1	0-2	
Δ**Rubus fruticosus* sp. agg.	blackberry	Rosaceae						0-5	
Rubus parviflora	native bramble	Rosaceae						0-3	
Xanthorrhoea glauca ssp *angustifolia*	grass tree	Xanthorrhoeaceae			0-3				
VINES AND TWINERS									
Billardiera scandens	appleberry	Convolvulaceae						0-1	
Convolvulus angustissimus	australian bindweed	Convolvulaceae	0-1						0-1
Glycine clandestina	twining glycine	Fabaceae	0-1					0-1	

Scientific name	Common name	Family	Abundance						
			WT	WGH	WGL	DFR	DFD	TBF	FHW
Thysanotus pattersonii	twining fringe-lily	Anthericaceae		1					
FORBS									
Acaena echinata		Rosaceae	1-2	1			0-1	0-2	1
Acaena novae-zelandiae	bidgee-widgee	Rosaceae		0-1				0-5	
Acaena sp		Rosaceae				1			
**Acetosella vulgaris*	sheep sorrel	Polygonaceae	0-2	0-2	2	0-2	0-2	1-2	
Alternanthera sp A	joyweed	Amaranthaceae	0-1				0-1		
Ajuga australis	austral bugle	Lamiaceae		0-1		0-1			
**Anagallis arvensis*	scarlet pimpernel	Myrsinaceae			1		0-1		
**Arctotheca calendula*	capeweed	Asteraceae	0-3		1-2		0-3		
Arthopodium milleflorum	vanilla lily	Anthericaceae	0-1						
Arthropodium minus		Antheriaceae		1					
Asperula conferta	common woodruff	Rubiaceae	0-2	0-2		0-1	0-2	0-2	0-2
Bulbine bulbosa	bulbine lily	Asphodelaceae		0-2					
Burchadia umbellata	milkmaids	Colchicaceae		1					
**Capsella bursa-pastoris*	shepherd's purse	Brassicaceae	0-1						
**Carthamus lanatus*	saffron thistle	Asteraceae		0-3					
**Centaurium erythraea*	centaury	Gentianaceae		0-2					
Chaerophyllum eriopodum	native carraway	Apiaceae	0-1				0-1	0-2	
Chamaescyce drummondii	caustic weed	Euphorbiaceae	0-1						
**Chenopodium album*	fat hen	Chenopodiaceae	0-1						
Chenopodium pumilio	crumbweed	Chenopodiaceae	0-5	0-2	1-4	1	0-4		
**Chondrilla juncea*	skeleton weed	Asteraceae	0-1	0-1					
Chrysocephalum apiculatum	yellow buttons	Asteraceae	0-3	0-3		0-1	0-2		0-2
**Cirsium vulgare*	black or spear thistle	Asteraceae	0-1			0-1	1	0-2	
**Conyza* sp	fleabane	Asteraceae		0-1					
Coronidium scorpioides	button everlasting	Asteraceae				0-1			
Cotula australis	carrot weed	Asteraceae	0-1			0-1			
Craspedia variabilis		Asteraceae		1					1
**Cucumis myriocarpus*	paddy melon	Cucurbitaceae	0-1						
Cymbonotus priessianus	bear's ear	Asteraceae				0-1			
Cymbonotus lawsonianus	bear's ear	Asteraceae	1	1					1
Cynoglossum suaveolens	hound's tongue	Boraginaceae	0-2	0-2		1	1	0-1	1
Daucus glochidiatus	native carrot	Apiaceae	0-1			0-1			
Desmodium varians	slender tick trefoil	Fabaceae	0-2	1-2		0-1	0-2		1
Dichondra repens	kidney weed	Convolvulaceae		1			0-2	0-2	
Drosera peltata		Droseraceae	0-1	0-3	0-1				0-3
Einadia nutans	climbing saltbush	Chenopodiaceae	0-1			0-1	0-2	0-3	
Eriochilus cucullatus	parson's bands	Orchidaceae	0-1			0-1			
**Erodium cicutarium*	common	Geraniaceae	0-2	0-2			0-1		

Scientific name	Common name	Family	Abundance						
			WT	WGH	WGL	DFR	DFD	TBF	FHW
	storksbill								
**Erodium moschatum*	musky storksbill	Geraniaceae	0-2				0-1		
Eryngium rostratum	blue devil	Apiaceae	0-2	0-2					1
Euchiton gymnocephalus	slender cudweed	Asteraceae	0-2	0-2				0-1	2
Euchiton involucratus	star cudweed	Asteraceae	0-1	0-1					
Euchiton sp.	cudweed	Asteraceae		0-2					
Galium aparine	cleavers	Rubiaceae	0-1			2	0-1	0-2	
Geranium solanderi var. *solanderi*		Geraniaceae	1-2			2	0-2	2	
Gonocarpus tetragynus	raspwort	Haloragaceae	0-2	0-2		2	0-2	0-2	0-2
Goodenia hederacea	ivy-leaved goodenia	Goodeniaceae		1		2			
Haloragis heterophylla		Haloragaceae		0-2					1
Helichrysum rutidolepis	pale everlasting	Asteraceae		0-3					0-2
Hydrocotyle laxiflora	stinking pennywort	Apiaceae	0-2	0-2		2	1-2	2	0-2
Hydrocotyle peduncularis	shining pennywort	Apiaceae		0-2					
Hydrocotyle sp	pennywort	Apiaceae		0-2					
Hypericum gramineum	native st johns wort	Clusiaceae	0-1	1-2		1	0-1	0-1	0-2
**Hypochaeris radicata*	cat's ear, flatweed	Asteraceae	0-2	1-2	1	1	1-2	0-2	
Hypoxis hygrometrica	golden weather grass	Hypoxidaceae	0-2	0-2	0-2				0-2
Isotoma fluviatilis	swamp isotome	Lobeliaceae		0-2					0-2
**Lactuca serriola*	prickly lettuce	Asteraceae	0-1						
Leptorhyncus squamatus	scaly buttons	Asteraceae		2	0-1				2
**Malva parviflora*	small-flowered mallow	Malvaceae	0-1				0-1		
Δ**Marrubium vulgare*	horehound	Lamiaceae	0-1						
**?Medicago arabica*	spotted burr-medic	Fabaceae	0-2				0-2		
Mentha diemenica	slender mint	Lamiaceae	0-2	0-3			0-1	0-1	
Microtis unifolia	common onion orchid	Orchidaceae		0-2					0-2
Δ**Onopordum acanthium*	scotch thistle	Asteraceae	0-3	0-1	1	0-1		0-3	
Opercularia aspera		Rubiaceae				0-1			
Oxalis ?perennans	oxalis	Oxalidaceae	1-2	1		2	0-2	0-2	
**Parentucellia latifolia*	red bartsia	Scrophulariaceae	0-2	0-1	0-2				
Plantago varia	variable plantain	Plantaginaceae	1-3	1-2		1-3	0-3	0-2	0-2
**Plantago lanceolata*	ribbed plantain	Plantaginaceae		0-2					
Poranthera microphylla		Euphorbiaceae				1			
Ranunculus ?lappaceus	common buttercup	Ranunculaceae				0-1			
Rumex brownii	native dock	Polygonaceae	0-2	1-2		1-2	1-2	1	
Sebaea ovata	yellow centaury	Gentianaceae		0-2					0-2
Scleranthus fasciculatus	knawel	Caryophyllaceae			1	1			
Scutellaria humilis	dwarf skullcap	Scrophulariaceae	0-2				0-2	0-1	

Scientific name	Common name	Family	Abundance						
			WT	WGH	WGL	DFR	DFD	TBF	FHW
Senecio ?tenuiflorus		Asteraceae					0-1		
**Solanum nigrum*	black nightshade	Solanaceae	0-3						
Solenogyne dominii	smooth solenogyne	Asteraceae	0-2	1-2		1	0-1	0-2	1
Solenogyne gunnii	hairy solenogyne	Asteraceae						0-2	
**Sonchus asper*	prickly sow thistle	Asteraceae	0-2						
**Sonchus oleraceus*	sow thistle	Asteraceae	0-1						
Stackhousia monogyna	creamy candles	Stackhousiaceae		1					
**Stellaria media*	common chickweed	Caryophyllaceae	0-2			1	1		
Stellaria pungens	prickly starwort	Caryophyllaceae		0-2			0-3	0-2	
Stuartina muelleri	spoon cudweed	Asteraceae		2					
**Taraxacum officinale*	dandelion	Asteraceae	0-1			1	1		
Thelymitra sp.	sun orchid	Orchidaceae		1					1
**Tolpis barbarta*	yellow hawkweed	Asteraceae		1-2	0-1				
Tricoryne elatior	yellow autumn lily	Anthericaceae	1-2	1-2		0-1	0-1		
**Trifolium arvense*	hare's foot clover	Fabaceae	0-2						
**Trifolium campestre*	hop clover	Fabaceae			1				
**Trifolium repens*	white clover	Fabaceae	0-1				0-2		
**Trifolium* sp.	clover	Fabaceae	0-3	0-3	1-2	0-1	0-2	0-2	
Triptilodiscus pygmaeus	common sunray	Asteraceae	0-2	2-3	0-2				2-3
Urtica incisa	stinging nettle	Urticaceae	0-1						
Veronica gracilis		Plantaginaceae							0-2
Veronica plebeia	common speedwell	Plantaginaceae				0-1			
Viola betonicifolia	narrow-leaved violet	Violaceae	0-2			0-1		0-2	1
Vittadinia cuneata	new holland daisy	Asteraceae		2					
Vittadinia muelleri		Asteraceae		2					1
Wahlenbergia communis	tufted bluebell	Campanulaceae		0-1			0-1		
Wahlenbergia gracilis	sprawling bluebell	Campanulaceae	0-1	0-2		0-1			
Wahlenbergia luteola	bluebell	Campanulaceae	0-2	0-2			0-2		
Wahlenbergia multicaulis	tadgell's bluebell	Campanulaceae		0-2					1
Wahlenbergia stricta	tall bluebell	Campanulaceae		0-1		0-1	0-1		
Wurmbea sp.		Colchicaceae		1					
GRASSES									
**Airo caryophyllea*	silvery hairgrass	Poaceae		2	2				
**Anthoxanthum odoratum*	sweet vernal grass	Poaceae	0-1					0-1	
Aristida ramosa	wiregrass	Poaceae	0-3	0-3		0-1	0-2		
Austrodanthonia auriculata	wallaby grass	Poaceae					0-2		

Scientific name	Common name	Family	Abundance						
			WT	WGH	WGL	DFR	DFD	TBF	FHW
Austrodanthonia caespitosa	wallaby grass	Poaceae		0-2					
Austrodanthonia carphoides	wallaby grass	Poaceae		4-5					
Austrodanthonia duttoniana	wallaby grass	Poaceae	0-3	0-4					
Austrodanthonia eriantha	wallaby grass	Poaceae		3					
Austrodanthonia laevis	wallaby grass	Poaceae		0-2					
Austrodanthonia pilosa	smooth-flowered wallaby grass	Poaceae	1-3	0-2	2-4	0-4	0-3	0-3	0-3
Austrodanthonia tenuior	wallaby grass	Poaceae		0-3					
Austrodanthonia racemosa var. *racemosa*	wallaby grass	Poaceae	0-3				0-2		
Austrostipa bigeniculata	spear grass	Poaceae		0-3					
Austrostipa scabra ssp *falcata*	corkscrew grass	Poaceae	0-4	0-2	0-2		0-2		
Bothriochloa macra	red grass	Poaceae	0-5	0-3					
**Briza maxima*	quaking grass	Poaceae	0-2						
**Bromus diandrus*	giant brome	Poaceae	0-4						
Chloris truncata	windmill grass	Poaceae	0-1	0-3					
Cynodon dactylon	couch	Poaceae	0-1		0-3				
**Cynosurus echinatus*	dog's tail grass	Poaceae	0-1	0-2					
**Dactylis glomerata*	cocksfoot	Poaceae	0-1						
Dichelachne inaequiglumis	plume grass	Poaceae		0-1					
Echinopogon ovatus	hedgehog grass	Poaceae					0-1		
**Eleusine tristachya*	goose grass	Poaceae	0-1						
Elymus scaber	common wheat grass	Poaceae	0-2	0-2			0-2	0-1	
Enneapogon nigricans	niggerheads	Poaceae	0-2						
Eragrostis brownii	brown's lovegrass	Poaceae	0-1	0-1			0-1		
Eragrostis parviflora	weeping lovegrass	Poaceae		0-1					
**Holcus lanatus*	yorkshire fog	Poaceae	0-3			1	0-1		
**Hordeum leporinum*	barley grass	Poaceae	0-2		0-2		0-4		
Lachnagrostis filiformis	blown grass	Poaceae	0-1	0-2			0-2		
**Lolium perenne*	perennial ryegrass	Poaceae	0-2				0-6		
Microlaena stipoides	weeping grass	Poaceae	1-6	0-6	1-5	0-3	0-6	1-4	
Δ**Nassella trichotoma*	serrated tussock	Poaceae	0-1	0-2	1		0-3		
Panicum effusum	hairy panic	Poaceae	0-1	0-1			0-1		
**Phalaris aquatica*	phalaris	Poaceae	0-1						
Poa labillardieri	silver tussock	Poaceae		0-3					
Poa sieberiana var. *sieberiana*		Poaceae	0-5	0-3		0-2		2-6	
Poa sieberiana var. *cyanophylla*		Poaceae				0-2			
** Setaria* sp.	pigeon grass	Poaceae	0-2						
Themeda australis	kangaroo grass	Poaceae	0-4	1-6			0-1		

Scientific name	Common name	Family	Abundance						
			WT	WGH	WGL	DFR	DFD	TBF	FHW
**Vulpia bromoides*	squirrel-tail fescue	Poaceae						0-2	
GRAMINOIDS									
Carex inversa	knob sedge	Cyperaceae	0-1	0-1			0-1		1
Carex tereticaulis		Cyperaceae		1					1
Juncus australis	rush	Juncaceae		0-2	0-2				
Juncus filicaulis	pinrush	Juncaceae	0-1	0-1		0-1			
Lepidosperma laterale	sword sedge	Cyperaceae						0-1	
Lomandra filiformis ssp *coriacea*	wattle mat-rush	Lomandraceae	0-2			1-2	0-1	0-1	
Lomandra longifolia	spiny matrush	Lomandraceae						0-1	
Luzula flaccida	woodrush	Juncaceae	0-1		0-1				
Schoenus apogon	common bog-rush	Cyperaceae		0-2					0-2
FERNS									
Asplenium flabellifolium	necklace fern	Aspleniaceae		0-1				0-2	
Cheilanthes austrotenuifolia	rock or mulga fern	Sinopteridaceae	0-1						
Cheilanthes sieberi ssp *sieberi*	rock or mulga fern	Sinopteridaceae	0-1			0-1		0-1	
Ophioglossum lusitanicum	adder's tongue	Ophioglossaceae		0-1					
Pteridium esculentum	bracken	Dennstaedtiaceae						0-5	

D.2 REPRESENTATIVE QUADRAT RESULTS FOR VEGETATION TYPES AND TYPE VARIANTS

Vegetation types

Box-Gum woodland with tree cover
Box-Gum woodland without tree cover, high diversity
Box-Gum woodland without tree cover, low diversity (native pasture)
Dry forest (*E. rossii*)
Dry forest (*E. dives, E. mannifera*)
Tableland Basalt Forest (*E. viminalis, E. pauciflora*)

Condition classes:

Exotic	Groundlayer dominated by exotics
Poor	Groundlayer dominated by one or two native grass species, <5 non grass species
Moderate	Groundlayer dominated by native grasses 5 – 11 non grass species
Good	Groundlayer dominated by native grasses at least 12 non grass species

Cover/abundance assessments are based on visual estimates of foliage cover (after Carnahan 1997), scored using a modified Braun-Blanquet 6-point scale:

1	1 to a few individuals present, less than 5% cover
2	many individuals present, but still less than 5% cover
3	5 - <20% cover
4	20 - <50% cover
5	50 - <75% cover
6	75 - 100% cover

Where the cover/abundance of a particular species varies markedly over the random meander survey area, a range of values is provided. In these cases, abundance is based on a standard 20 metre x 20 metre quadrat scale.

Species of conservation significance are bolded. Introduced species are denoted by an asterisk. Noxious weeds declared for the Southern Slopes County Council control area under the *Noxious Weeds Act 1993* are indicated with a 'Δ' symbol. Where uncertainty exists due to the unavailability of mature reproductive material, the taxon is preceded by a question mark, or plants are identified to genus level only. Botanical nomenclature follows G.J. Harden (ed) (1990-2002) Flora of New South Wales, UNSW Press, except where recent changes have occurred.

Box-Gum woodland with tree cover

Condition: Good

Location			
Property	**Turbine Cluster**	**GDA map reference (centre of quadrat)**	**Quadrat size**
'Poile'	8	MGA 717670 6130135 **Zone:** 55	20m x 20m

Physical environment				
Topographic position	**Geology**	**Elevation (m AHD)**	**Slope**	**Aspect**
Upper slope	Metasediments	875	5°	NW

Vegetation structure and dominants					
Stratum	**Height**	**Cover**[1]	**Dominant 1**	**Dominant 2**	**Dominant 3**
Tree	10-12m	10%	*Eucalyptus melliodora*		
Small tree	4-6m	5%	*Acacia dealbata*		
Shrub	0.1-0.3m	5%	*Melichrus urceolata*	*Hibbertia obtusifolia*	
Groundcover	0-0.5m	70%	*Microlaena stipoides*	*Bothriochloa macra*	*Themeda australis*

[1] non-opaque, foliage and branches

Scientific name	Common name	Family	Cover/abundance
TREES			
Eucalyptus melliodora	yellow box	Myrtaceae	3
SHRUBS, SUB-SHRUBS			
Astroloma humifusum	native cranberry	Ericaceae	1
Bossiaea buxifolia		Fabaceae	1
Cassinia arcuata	sifton bush	Asteraceae	1
Hibbertia obtusifolia	hoary guinea flower	Dilleniaceae	1
Melichrus urceolata	urn Heath	Ericaceae	2
VINES AND TWINERS			
Glycine clandestina	twining glycine	Fabaceae	1
FORBS			
Acaena echinata		Rosaceae	2
Acetosella vulgaris	sheep sorrel	Polygonaceae	0-2
Asperula conferta	common woodruff	Rubiaceae	1
Chrysocephalum apiculatum	yellow buttons	Asteraceae	1
Cymbonotus sp.	bear's ear	Asteraceae	1
Desmodium varians	slender tick-trefoil	Fabaceae	2
Euchiton involucratus	star cudweed	Asteraceae	1
Geranium solanderi var. *solanderi*		Geraniaceae	1
Gonocarpus tetragynus	raspwort	Haloragaceae	2
Hydrocotyle laxiflora	stinking Pennywort	Apiaceae	2
Hypericum gramineum	native St Johns wort	Clusiaceae	1
Oxalis ?perennans	oxalis	Oxalidaceae	1

Scientific name	Common name	Family	Cover/abundance
Plantago varia	variable plantain	Plantaginaceae	2
Solenogyne dominii	smooth solenogyne	Asteraceae	0-2
**Trifolium* sp.	clover	Fabaceae	0-2
Wahlenbergia gracilis	sprawling bluebell	Campanulaceae	1
GRASSES			
Aristida ramosa	wiregrass	Poaceae	3
Austrodanthonia duttoniana	wallaby grass	Poaceae	3
Austrodanthonia racemosa var. *racemosa*	wallaby grass	Poaceae	0-2
Austrostipa scabra ssp *falcata*	corkscrew grass	Poaceae	3
Bothriochloa macra	red grass	Poaceae	4
Chloris truncata	windmill grass	Poaceae	1
**Cynosurus echinatus*	dog's tail grass	Poaceae	1
Elymus scaber	common wheat grass	Poaceae	1
Eragrostis brownii	Brown's lovegrass	Poaceae	1
Microlaena stipoides	weeping grass	Poaceae	5
Δ**Nassella trichotoma*	serrated tussock	Poaceae	1
Panicum effusum	hairy panic	Poaceae	1
Themeda australis	kangaroo grass	Poaceae	4
GRAMINOIDS			
Juncus filicaulis	pinrush	Juncaceae	1
Lomandra filiformis ssp *coriacea*	wattle mat-rush	Lomandraceae	1

Box-Gum woodland with tree cover

Condition: Moderate

Location				
Property	**Turbine Cluster**	**GDA map reference (centre of quadrat)**		**Quadrat size**
'Clarke'	4	MGA 721521 6140972	**Zone:** 55	20m x 20m

Physical environment				
Topographic position	**Geology**	**Elevation (m AHD)**	**Slope**	**Aspect**
Upper slope	Granitic	763	<5°	S

Vegetation structure and dominants					
Stratum	**Height**	**Cover[1]**	**Dominant 1**	**Dominant 2**	**Dominant 3**
Tree	15m	10%	*Eucalyptus melliodora*		
Small tree					
Shrub					
Groundcover	0.4-0.5m	95%	*Austrodanthonia pilosa*		

[1] non-opaque, foliage and branches

Scientific name	Common name	Family	Cover/abundance
TREES			
Eucalyptus melliodora	yellow box	Myrtaceae	3
FORBS			
Acaena echinata		Rosaceae	1
Acetosella vulgaris	sheep sorrel	Polygonaceae	2
Asperula conferta	common woodruff	Rubiaceae	2
Chenopodium pumilio	crumbweed	Chenopodiaceae	1
Geranium solanderi var. *solanderi*		Geraniaceae	2
Hydrocotyle laxiflora	stinking Pennywort	Apiaceae	2
**?Medicago arabica*	spotted burr-medic	Fabaceae	1
Δ**Onopordum acanthium*	Scotch thistle	Asteraceae	1
Oxalis ?perennans	oxalis	Oxalidaceae	2
Plantago varia	variable plantain	Plantaginaceae	1
GRASSES			
Austrodanthonia pilosa	smooth-flowered wallaby grass	Poaceae	4
Austrostipa scabra ssp *falcata*	corkscrew grass	Poaceae	2
Bothriochloa macra	red grass	Poaceae	1
**Cynosurus echinatus*	dog's tail grass	Poaceae	2
**Holcus lanatus*	Yorkshire fog	Poaceae	1

Scientific name	Common name	Family	Cover/abundance
Lachnagrostis filiformis	blown grass	Poaceae	2
**Lolium perenne*	perennial ryegrass	Poaceae	1
Microlaena stipoides	weeping grass	Poaceae	2
Poa sieberiana var. *sieberiana*		Poaceae	2
Themeda australis	kangaroo grass	Poaceae	1

Box-Gum woodland with tree cover

Condition: Poor

Location				
Property	**Turbine Cluster**	**GDA map reference (centre of quadrat)**		**Quadrat size**
'Clarke'	2	MGA 714129 6138755	**Zone:** 55	20m x 20m

Physical environment				
Topographic position	**Geology**	**Elevation (m AHD)**	**Slope**	**Aspect**
Upper slope	Granitic	775	5-10°	NNW

Vegetation structure and dominants					
Stratum	**Height**	**Cover[1]**	**Dominant 1**	**Dominant 2**	**Dominant 3**
Tree	15m	15%	*Eucalyptus melliodora*		
Small tree					
Shrub					
Groundcover	0.2-0.4m	60%	*Chenopodium pumilio*	**Bromus diandrus*	

[1] non-opaque, foliage and branches

Scientific name	Common name	Family	Cover/abundance
TREES			
Eucalyptus melliodora	yellow box	Myrtaceae	3
FORBS			
**Arctotheca calendula*	capeweed	Asteraceae	2
Chenopodium pumilio	crumbweed	Chenopodiaceae	3
Einadia nutans	climbing saltbush	Chenopodiaceae	1
**Malva parviflora*	small-flowered mallow	Malvaceae	1
**Solanum nigrum*	black nightshade	Solanaceae	2
**Stellaria media*	common chickweed	Caryophyllaceae	1
**Trifolium* sp.	clover	Fabaceae	2
GRASSES			
**Bromus diandrus*	giant brome	Poaceae	3
**Dactylis glomerata*	cocksfoot	Poaceae	2
**Phalaris aquatica*	phalaris	Poaceae	2

Box-Gum woodland without tree cover, high diversit

Condition: Good

Location			
Property	**Turbine Cluster**	**GDA map reference (centre of quadrat)**	**Quadrat size**
'Poile'	6	MGA 719522 6138243 **Zone:** 55	20m x 20m

Physical environment				
Topographic position	**Geology**	**Elevation (m AHD)**	**Slope**	**Aspect**
Upper slope	Metasediments	791	5°	NE

Vegetation structure and dominants					
Stratum	**Height**	**Cover[1]**	**Dominant 1**	**Dominant 2**	**Dominant 3**
Tree					
Small tree					
Shrub					
Groundcover	0-0.5m	90%	*Themeda australis*		

[1] non-opaque, foliage and branches

Scientific name	Common name	Family	Cover/abundance
FORBS			
Asperula conferta	common woodruff	Rubiaceae	2
**Centaurium erythraea*	centaury	Gentianaceae	1
Chrysocephalum apiculatum	yellow buttons	Asteraceae	2
Cymbonotus sp.	bear's ear	Asteraceae	1
Cynoglossum suaveolens	hound's tongue	Boraginaceae	1
Desmodium varians	slender tick trefoil	Fabaceae	1
**Erodium cicutarium*	common storksbill	Geraniaceae	2
Eryngium rostratum	blue devil	Apiaceae	1
Euchiton sp.	cudweed	Asteraceae	1
Gonocarpus tetragynus	raspwort	Haloragaceae	2
Haloragis heterophylla		Haloragaceae	2
Hydrocotyle laxiflora	stinking pennywort	Apiaceae	2
Hypericum gramineum	native St Johns wort	Clusiaceae	2
**Hypochaeris radicata*	cat's ear, flatweed	Asteraceae	1
Hypoxis hygrometrica	golden weather grass	Hypoxidaceae	1
Oxalis ?perennans	oxalis	Oxalidaceae	1
Plantago varia	variable plantain	Plantaginaceae	1
Tricoryne elatior	yellow autumn lily	Anthericaceae	2

Scientific name	Common name	Family	Cover/abundance
Vittadinia cuneata	New Holland daisy	Asteraceae	2
Vittadinia muelleri		Asteraceae	2
Wahlenbergia gracilis	sprawling bluebell	Campanulaceae	1
Wahlenbergia luteola	bluebell	Campanulaceae	1
GRASSES			
Austrodanthonia caespitosa	wallaby grass	Poaceae	1
Austrodanthonia pilosa	smooth-flowered wallaby grass	Poaceae	1
Austrodanthonia tenuior	wallaby grass	Poaceae	1
Austrostipa scabra ssp *falcata*	corkscrew grass	Poaceae	2
Bothriochloa macra	red grass	Poaceae	2
Lachnagrostis filiformis	blown grass	Poaceae	2
Themeda australis	kangaroo grass	Poaceae	4

Box-Gum woodland without tree cover, low diversity

Condition: Poor

Location				
Property	**Turbine Cluster**	**GDA map reference (centre of quadrat)**		**Quadrat size**
'Clarke'	3	MGA 7177126138337	**Zone:** 55	Random meander

Physical environment				
Topographic position	**Geology**	**Elevation (m AHD)**	**Slope**	**Aspect**
Ridge crest	Granitic	803	<5°	-

Vegetation structure and dominants					
Stratum	**Height**	**Cover[1]**	**Dominant 1**	**Dominant 2**	**Dominant 3**
Tree					
Small tree					
Shrub					
Groundcover	0-0.3m	90%	*Microlaena stipoides*	*Austrodanthonia pilosa*	*Chenopodium pumilio*

[1] non-opaque, foliage and branches

Scientific name	Common name	Family	Cover/abundance
FORBS			
**Acetosella vulgaris*	sheep sorrel	Polygonaceae	2
**Arctotheca calendula*	capeweed	Asteraceae	1
Chenopodium pumilio	crumbweed	Chenopodiaceae	2-4
**Hypochaeris radicata*	cat's ear, flatweed	Asteraceae	1
Δ**Onopordum acanthium*	Scotch thistle	Asteraceae	1
Rumex brownii	native dock	Polygonaceae	1
**Trifolium* sp.	clover	Fabaceae	2
GRASSES			
Austrodanthonia pilosa	smooth-flowered wallaby grass	Poaceae	2-4
Austrostipa scabra ssp *falcata*	corkscrew grass	Poaceae	0-2
Cynodon dactylon	couch	Poaceae	0-3
**Hordeum leporinum*	barley grass	Poaceae	1
Microlaena stipoides	weeping grass	Poaceae	1-4
Δ**Nassella trichotoma*	serrated tussock	Poaceae	1
GRAMINOIDS			
Juncus australis	rush	Juncaceae	1

Dry Forest (*E. rossii*)

Condition: Good

Location				
Property	**Turbine Cluster**	**GDA map reference (centre of quadrat)**		**Quadrat size**
'Clarke'	4	MGA 721147 6141545	**Zone:** 55	20m x 20m

Physical environment				
Topographic position	**Geology**	**Elevation (m AHD)**	**Slope**	**Aspect**
Hill crest	Metasediments	762	<5°	-

Vegetation structure and dominants					
Stratum	**Height**	**Cover[1]**	**Dominant 1**	**Dominant 2**	**Dominant 3**
Tree	12m	15%	*Eucalyptus rossii*		
Small tree					
Shrub					
Groundcover	0.1-0.3m	60%	*Austrodanthonia pilosa*		

[1] non-opaque, foliage and branches

Scientific name	Common name	Family	Cover/abundance
TREES			
Eucalyptus rossii	white or scribbly gum	Myrtaceae	3
Eucalyptus macrorhyncha	red stringybark	Myrtaceae	1
SHRUBS, SUB-SHRUBS			
Pimelea curviflora var ?*sericea*	curved rice flower	Thymeleaceae	2
FORBS			
Acaena sp		Rosaceae	1
**Acetosella vulgaris*	sheep sorrel	Polygonaceae	1
Chenopodium pumilio	crumbweed	Chenopodiaceae	1
Cynoglossum suaveolens	hound's tongue	Boraginaceae	1
Galium aparine	cleavers	Rubiaceae	2
Geranium solanderi var. *solanderi*		Geraniaceae	2
Gonocarpus tetragynus	raspwort	Haloragaceae	2
Goodenia hederacea	ivy-leaved goodenia	Goodeniaceae	2
Hydrocotyle laxiflora	stinking pennywort	Apiaceae	2
Δ**Onopordum acanthium*	Scotch thistle	Asteraceae	1
Oxalis ?perennans	oxalis	Oxalidaceae	2
Rumex brownii	native dock	Polygonaceae	2
Scleranthus fasciculatus	knawel	Caryophyllaceae	1

Scientific name	Common name	Family	Cover/abundance
Solenogyne dominii	smooth solenogyne	Asteraceae	1
**Taraxacum officinale*	dandelion	Asteraceae	1
**Trifolium* sp.	clover	Fabaceae	1
GRASSES			
Austrodanthonia pilosa	smooth-flowered wallaby grass	Poaceae	3
**Holcus lanatus*	Yorkshire fog	Poaceae	1
Microlaena stipoides	weeping grass	Poaceae	3
Poa sieberiana var. *sieberiana*		Poaceae	2
GRAMINOIDS			
Lomandra filiformis ssp *coriacea*	wattle mat-rush	Lomandraceae	2

Dry Forest (*E. rossii*)

Condition: Moderate

Location				
Property	**Turbine Cluster**	**GDA map reference (centre of quadrat)**		**Quadrat size**
'Byrnes'	1	MGA 717916 6142514	**Zone:** 55	Random meander

Physical environment				
Topographic position	**Geology**	**Elevation (m AHD)**	**Slope**	**Aspect**
Hill crest	Metasediments	813	0-10°	E&W

Vegetation structure and dominants					
Stratum	**Height**	**Cover[1]**	**Dominant 1**	**Dominant 2**	**Dominant 3**
Tree	12m	15%	*Eucalyptus rossii*		
Small tree					
Shrub					
Groundcover	0-0.3m	0-15%	*Microlaena stipoides*		

[1] non-opaque, foliage and branches

Scientific name	Common name	Family	Cover/abundance
TREES			
Acacia falciformis	broad-leaved hickory	Fabaceae	1
Eucalyptus macrorhyncha	red stringybark	Myrtaceae	1
Eucalyptus mannifera	brittle or red spotted gum	Myrtaceae	1-3
Eucalyptus rossii	white or scribbly gum	Myrtaceae	3
SHRUBS, SUB-SHRUBS			
Hibbertia obtusifolia	guineaflower	Dilleniaceae	1
Hovea heterophylla	variable hovea	Fabaceae	1
FORBS			
**Acetosella vulgaris*	sheep sorrel	Polygonaceae	0-2
Ajuga australis	Austral bugle	Lamiaceae	1
Gonocarpus tetragynus	raspwort	Haloragaceae	2
Goodenia hederacea	ivy-leaved goodenia	Goodeniaceae	2
Poranthera microphylla		Euphorbiaceae	1
Solenogyne dominii	smooth solenogyne	Asteraceae	1
Veronica plebeia	common speedwell	Plantaginaceae	1
Wahlenbergia gracilis	sprawling bluebell	Campanulaceae	1
GRASSES			
Aristida ramosa	wiregrass	Poaceae	1

Scientific name	Common name	Family	Cover/abundance
Austrodanthonia pilosa	smooth-flowered wallaby grass	Poaceae	0-2
Microlaena stipoides	weeping grass	Poaceae	3
Poa sieberiana var. *cyanophylla*		Poaceae	2-3
GRAMINOIDS			
Lomandra filiformis ssp *coriacea*	wattle mat-rush	Lomandraceae	2

Dry Forest (*E. dives, E. mannifera*)

Condition: Good

Location				
Property	**Turbine Cluster**	**GDA map reference (centre of quadrat)**		**Quadrat size**
'Byrnes'	1	MGA 717348 6140644	**Zone:** 55	20m x 20m

Physical environment				
Topographic position	**Geology**	**Elevation (m AHD)**	**Slope**	**Aspect**
Upper slope	Metasediments	782	<5°	SSW

Vegetation structure and dominants					
Stratum	**Height**	**Cover**[1]	**Dominant 1**	**Dominant 2**	**Dominant 3**
Tree	8m	20%	*Eucalyptus dives*		
Small tree					
Shrub	0.3m	<1%	*Melichrus urceolata*	*Hibbertia obtusifolia*	
Groundcover	0.1-0.4m	90%	No single species dominant		

[1] non-opaque, foliage and branches

Scientific name	Common name	Family	Cover/abundance
TREES			
Eucalyptus dives	broad-leaved peppermint	Myrtaceae	3
SHRUBS, SUB-SHRUBS			
Hibbertia obtusifolia	hoary guinea flower	Dilleniaceae	1
Melichrus urceolata	urn Heath	Ericaceae	2
FORBS			
Asperula conferta	common woodruff	Rubiaceae	2
Chaerophyllum eriopodum	native carraway	Apiaceae	1
Chenopodium pumilio	crumbweed	Chenopodiaceae	2
Chrysocephalum apiculatum	yellow buttons	Asteraceae	2
Gonocarpus tetragynus	raspwort	Haloragaceae	2
Hydrocotyle laxiflora	stinking pennywort	Apiaceae	2
Hypericum gramineum	native St Johns wort	Clusiaceae	1
**Hypochaeris radicata*	cat's ear, flatweed	Asteraceae	2
**?Medicago arabica*	spotted burr-medic	Fabaceae	2
Oxalis ?perennans	oxalis	Oxalidaceae	2
Plantago varia	variable plantain	Plantaginaceae	2
Solenogyne dominii	smooth solenogyne	Asteraceae	1
**Taraxacum officinale*	dandelion	Asteraceae	1
Tricoryne elatior	yellow autumn lily	Anthericaceae	1
**Trifolium repens*	white clover	Fabaceae	1
**Trifolium* sp.	clover	Fabaceae	1

Scientific name	Common name	Family	Cover/abundance
Wahlenbergia luteola	bluebell	Campanulaceae	1
Wahlenbergia sp.	bluebell	Campanulaceae	1
GRASSES			
Austrodanthonia pilosa	smooth-flowered wallaby grass	Poaceae	2
Austrostipa scabra ssp *falcata*	corkscrew grass	Poaceae	2
Lachnagrostis filiformis	blown grass	Poaceae	2
Microlaena stipoides	weeping grass	Poaceae	2
Δ**Nassella trichotoma*	serrated tussock	Poaceae	1
Panicum effusum	hairy panic	Poaceae	1
GRAMINOIDS			
Lomandra filiformis ssp *coriacea*	wattle mat-rush	Lomandraceae	1

Dry Forest (*E. dives, E. mannifera*)

Condition: Moderate

Location				
Property	**Turbine Cluster**	**GDA map reference (centre of quadrat)**		**Quadrat size**
'Clarke'	4	MGA 720685 6139130	**Zone:** 55	20m x 20m

Physical environment				
Topographic position	**Geology**	**Elevation (m AHD)**	**Slope**	**Aspect**
Upper slope	Metasediments	783	5°	WSW

Vegetation structure and dominants					
Stratum	**Height**	**Cover**[1]	**Dominant 1**	**Dominant 2**	**Dominant 3**
Tree	10m	5%	*Eucalyptus dives*	*Eucalyptus mannifera*	
Small tree					
Shrub					
Groundcover	0.1-0.3m	90%	*Microlaena stipoides*	*Chenopodium pumilio*	

[1] non-opaque, foliage and branches

Scientific name	Common name	Family	Cover/abundance
TREES			
Eucalyptus dives	broad-leaved peppermint	Myrtaceae	1
Eucalyptus mannifera	brittle or red spotted gum	Myrtaceae	1
FORBS			
**Acetosella vulgaris*	sheep sorrel	Polygonaceae	2
**Arctotheca calendula*	capeweed	Asteraceae	3
Chenopodium pumilio	crumbweed	Chenopodiaceae	4
Einadia nutans	climbing saltbush	Chenopodiaceae	1
Hydrocotyle laxiflora	stinking pennywort	Apiaceae	2
**Hypochaeris radicata*	cat's ear, flatweed	Asteraceae	1
Oxalis ?perennans	oxalis	Oxalidaceae	1
Rumex brownii	native dock	Polygonaceae	1
**Stellaria media*	common chickweed	Caryophyllaceae	2
**Trifolium repens*	white clover	Fabaceae	2
GRASSES			
Austrodanthonia pilosa	smooth-flowered wallaby grass	Poaceae	3
Austrostipa scabra ssp *falcata*	corkscrew grass	Poaceae	2
Elymus scaber	common wheat grass	Poaceae	1
Microlaena stipoides	weeping grass	Poaceae	4

Tableland Basalt Forest (*E. viminalis, E. pauciflora*)

Condition: Good

Location			
Property	**Turbine Cluster**	**GDA map reference (centre of quadrat)**	**Quadrat size**
'Granger'	7	MGA 717064 6131559 **Zone:** 55	20m x 20m

Physical environment				
Topographic position	**Geology**	**Elevation (m AHD)**	**Slope**	**Aspect**
Mid slope	Granitic	936	5-10°	NW

Vegetation structure and dominants					
Stratum	**Height**	**Cover[1]**	**Dominant 1**	**Dominant 2**	**Dominant 3**
Tree	17m	10%	*Eucalyptus viminalis*		
Small tree					
Shrub	0.2-1m	2%	*Rubus parviflora*		
Groundcover	0-0.2m	90%	*Acaena novae-zelandiae*		

[1] non-opaque, foliage and branches

Scientific name	Common name	Family	Cover/abundance
TREES			
Eucalyptus viminalis	ribbon or manna gum	Myrtaceae	1
Eucalyptus pauciflora	snow gum	Myrtaceae	1
SHRUBS, SUB-SHRUBS			
**Crataegus monogynus*	hawthorn	Malaceae	1
Δ**Rosa rubiginosa*	briar rose, sweet briar	Rosaceae	1
Rubus parviflora	native bramble	Rosaceae	2
VINES AND TWINERS			
Glycine clandestina	twining glycine	Fabaceae	2
FORBS			
Acaena novae-zelandiae	bidgee-widgee	Rosaceae	4
**Acetosella vulgaris*	sheep sorrel	Polygonaceae	2
Asperula conferta	common woodruff	Rubiaceae	2
Chaerophyllum eriopodum	native carraway	Apiaceae	2
Cynoglossum suaveolens	hound's tongue	Boraginaceae	1
Dichondra repens	kidney weed	Convolvulaceae	2
Euchiton gymnocephalus	slender cudweed	Asteraceae	1
Galium aparine	cleavers	Rubiaceae	2
Geranium solanderi var. *solanderi*		Geraniaceae	2
Hydrocotyle laxiflora	stinking pennywort	Apiaceae	2

Scientific name	Common name	Family	Cover/abundance
**Hypochaeris radicata*	cat's ear, flatweed	Asteraceae	1
Oxalis ?perennans	oxalis	Oxalidaceae	2
Plantago varia	variable plantain	Plantaginaceae	2
Scutellaria humilis	dwarf skullcap	Scrophulariaceae	1
Stellaria pungens	prickly starwort	Caryophyllaceae	2
Viola betonicifolia	narrow-leaved violet	Violaceae	2
GRASSES			
**Anthoxanthum odoratum*	sweet vernal grass	Poaceae	1
Austrodanthonia pilosa	smooth-flowered wallaby grass	Poaceae	2
Elymus scaber	common wheat grass	Poaceae	2
Poa sieberiana var. *sieberiana*		Poaceae	3
FERNS			
Asplenium flabellifolium	necklace fern	Aspleniaceae	2

APPENDIX E FAUNA SURVEY DATA

E.1 FAUNA HABITAT DESCRIPTIONS

HBT = hollow-bearing tree

Survey	Cluster	Habitat type	Description	Features
Diurnal 1	1	Forest	*E. rossi* dry forest , no understorey other than leaf litter, some scattered shale outcrops - embedded with very few surface rocks (mostly <A4)	HBT
Diurnal 2	1	Pasture with trees	Groundcover of native grasses, heavily grazed. Embedded rocks, fallen timber, sheep camp. Poor matrix and connectivity.	HBT, fallen timber
Diurnal 3	1	Pasture with trees	Groundcover native/exotic grasses, heavy grazing, virtually no reptile habitat, no rocks, very little fallen timber	HBT
Diurnal 4	1 - creek	Woodland	Linear riparian remnant. Creek line, granite rocks/outcrops, small rocky pools, native grass slopes - red grass and wire grass, rocks largely embedded - fox seen hunting in the creek line.	water, HBT, fallen timber
Diurnal 5	1	Pasture with trees	Exotic pasture, small amount of rock cover, some fallen timber around trees but connectivity poor for reptiles. For mobile species, there are woodland and riparian remnants not too far away. There is a dam close to the ridge with small amount of fringing vegetation.	HBT, dam, fallen timber
Habitat only 1	1	Pasture/Woodland	Mixture of exotic and native grasses, low and sparse. Remnant woodland close to riparian zone. A few scattered embedded granite rocks and high volumes of fallen timber. HBT in low to moderate abundances. Creek flowing in parts.	HBT, fallen timber, creek
Diurnal 6	2	Woodland/Pasture with trees	Degraded native/exotic pasture (crumb weed, some stipa), lots of small to med outcrops, granite. Rough bark trees, part of a stepping stone/ landscape matrix via paddock trees. Trees in poor condition - lots of dieback.	HBT
Habitat only 2	2	Pasture with trees	Exotic grassland with remnant mostly isolated trees. Drainage line that runs into a dam. HBT present. Some embedded rocks.	HBT, dam, rocks
Habitat only 3	2	Woodland	Mixture of native and exotic groundcover in box-gum woodland. Rocky outcrops, HBT. Patch of regenerating eucalypts near paddock boundary.	HBT, rocks
Diurnal 7	3	Pasture/Woodland	Birding in remnant woodland with regeneration patches, native grasses (*Themeda*, red grass, stipa) with some serrated tussock - grazed. No rocks some fallen timber. Reptile and HBT in	HBT, fallen timber

			native pasture (microlena), fairly heavy grazing. Few small and buried rock outcrops, some fallen timber under trees. Reptile connectivity poor. Birds: good stepping stone/ matrix with regrowth forest around 200m away. HBT present.	
Diurnal 8	3	Pasture with trees	Open pasture with moderate - heavy grazing, native/exotic pasture (stipa, danthonia), and small outcrops of granite with embedded rocks. Very few HBT, some fallen timber.	HBT
Habitat only 4	3	Pasture with trees	Open pasture with exotic dominated grasses. No rocky outcrops. Some fallen timber. HBT present. A few tussocks.	HBT, tussocks, fallen timber
Habitat only 5	3	Pasture with trees	Open pasture with exotic dominated grasses. One small rocky outcrop. Some fallen timber. HBT present, observed nesting Tree Martins in small hollow. Several large E. blakelyi and stags. One stag with nesting Nankeen Kestrels.	HBT, rocks, fallen timber
Habitat only 6	3	Pasture with trees	Open pasture with exotic dominated grasses with tussocks and very few trees. Some fallen timber and HBT present.	HBT, tussocks, fallen timber
Habitat only 7	3	Woodland/pasture with trees	Section of this part of the site is fenced as a rehabilitation/regeneration area. Mixture of regenerating eucalypts and mature trees including exotic pine. Native grasses dominate and some fallen timber is present. A den of fox cubs was observed under a large HBT. HBT in moderate density.	HBT, fallen timber, native grassland
Habitat only 8	Proposed road east of 3	Pasture	Exotic pasture, heavily grazed, cleared with a few remnant trees nearby (not on the proposed alignment).	
Habitat only 9	3	Pasture with trees	Native dominated groundcover, low and sparse, very few trees. Some stringybarks are showing signs of dieback. Fallen timber is piled, likely to be burnt. HBTs present.	HBT, fallen timber, native grassland
Habitat only 10	3		Native dominated groundcover, low and sparse, very few trees. Some stringybarks are showing signs of dieback. Fallen timber is piled, likely to be burnt. HBTs present. Creekline, shallow dam with aquatic vegetation, occasional stags.	HBT, creek, fallen timber, native grassland
Diurnal 9	4	Forest	Dry forest (gum), lots of fallen timber, very little groundcover other than leaf litter and timber. Forest/pasture edge has grassy (native) with light grazing. Very few rocks, lots of fallen timber.	HBT, fallen timber
Diurnal 10	4	Pasture with trees	Open paddock with dry forest c.500m west and BGW paddock with lots of trees c.200m south. To east, ridge drops gently to Lake George Basin. Long native grass (*Themeda*), light grazing sheep, Patchy rocks and woody debris only under remnant trees. Rocks mostly embedded	HBT
Diurnal 11	4	Pasture with trees	Mixed exotic/native grazed grass and scattered trees. Reptile habitat very poor, few rocks, plenty of fallen timber but no connectivity due to grazing impacts. Birds and bats - excellent habitat matrix with scattered trees connecting to woodland and forest patches. Lots of HBT.	HBT, fallen timber

			Lots of fallen timber, dead branches, etc.	
Diurnal 12	4	Pasture with trees	Small patch of forest regeneration with pasture with trees. Fallen timber, no rocks, very little groundcover other than leaf litter. Lots of the trees senescing, lots of dead timber, no regeneration, heavily grazed.	HBT, fallen timber
Diurnal 13	4	Woodland	Good patch of woodland for birds and bats, plenty of connectivity, decent size, lots of fallen timber, dead branches, HBT. Some shrubs, lightly grazed native grasses. Many birds active. Reptile habitat also good - quite shady, although not suitable for threatened species.	HBT, fallen timber, connectivity, good size, threatened species
		Forest	Some grass understorey, no mid storey, some fallen logs.	HBT
Habitat only 11	6	Pasture with trees	Diverse native groundcover. Scattered mature and immature trees and rare shrubs. Several dry creeklines, one with snow gums on the banks. Some fallen timber but no surface rocks. Secondary grassland, unlikely for Delma impar to be present.	HBT, fallen timber, native groundcover
Diurnal 14	6	Woodland	Numerous medium broken outcrops, moderately grazed native (red grass, stipa) and exotic (serrated tussock) pasture (cattle). Rocks large and embedded, moderate no. of logs.	HBT, rocks
Diurnal 15	South of site (previously Cluster 7)	Forest	Granite outcrops on the edge/within dry forest (*E. Viminalis*, native cherry and black wattle), logs and loose bark present, undulating country N-W aspect, native grass understorey - grazed - sheep	HBT, rocks
		Pasture with trees	Peeling granite boulders both embedded and loose, quite a lot of woody debris	HBT, rocks, fallen timber
Diurnal 16	South of site (previously 8)	Pasture with trees	Outcrops/ logs in native pasture with remnant woodland stands, undulating westerly aspect. Small broken outcrops with rock on rock, surface and embedded rocks ranging to >A3, light grazing	HBT, rocks, fallen timber
Diurnal 17	6	Woodland	Patch of woodland with paddock to west and trees scattered to east. Trees mostly regrowth. Groundcover grazed. Rocky outcrops almost all are embedded, few embedded, some loose. Some woody debris.	HBT
Diurnal 18	6	Woodland	*Themeda* grassland, light grazing, logs present - no rocks, slight slope - northern aspect	HBT

Diurnal 19	3	Woodland	Linear roadside remnant - woodland along road verge - no grazing so long grass, many logs - native and exotic, no rocks, shady	HBT
Habitat only 12	Proposed southernmost substation	Pasture	Mixture of native and exotic grassland. Piled timber, likely for burning. Scattered trees in northern section, none in southern section. Small pond in south of site.	
Habitat only 13	Proposed circuit at Cluster 2 creekline	Pasture with trees	Exotic dominated grassland. Vegetated creek banks, mixture of mature and immature eucalypts. Dry creekline, gully erosion on creekbanks.	HBT
Habitat only 14	Double circuit between Clusters 1 and 3	Pasture with trees	Moderate density of trees in exotic dominated pasture. Some stags and mature eucalypts likely to be HBT.	Possible HBT
Habitat only 15	Circuit between Clusters 3 and 4	Pasture with trees	Regenerating and mature eucalypts amongst pasture. The circuit corridor appears to largely avoid treed areas.	Possible HBT
Habitat only 16	Granger property	Pasture with trees	There are some hollow-baring trees (HBTs) which may be able to be avoided. Ridge lines - There is a strong updraught zone to the west - good for raptors. Upper strata - Some dead timber including HBT. Wattle in flower. Quite open. Some nests in trees probably magpies or ravens. Some hollows appear used - probably by parrots. Midstorey - Very little mid or understorey, no shrubs or regeneration. Unlikely to be suitable for threatened mammals (ground and arboreal). Lower strata - Dry grass with some dead timber on ground. Large granite boulders with cracks and onion skin peeling. Very few surface rocks - mostly embedded. Unlikely to be suitable for threatened reptiles.	HBT, rocks, fallen timber
Habitat only 17	Poile property	Native pasture	Direct line of site to Lake George and wind turbines on other side. Lower strata - Grassy areas with some natives including a regenerating shrubs layer (patchy) and *Xanthorrea*. Few scattered granite boulders - no threatened reptile habitat. No HBT in this area. Unlikely to provide habitat for threatened mammals.	Native grass
Habitat only 18	Poile property	Pasture with trees	Upper strata - Some wattle and moderate potential for HBT. Mistletoe present. Midstorey - wattle and regrowth eucalypts. Lower strata - Some fallen timber, native grasses. Scattered small surface rock (sedimentary) and few small outcrops of granite. Maybe low potential for	Potential HBT, rocks

			Delma impar. Would be suitable spot for reptile survey. No nearby water sources observed.	
Habitat only 19	4	Woodland	Upper strata - BGW, some mature trees with low to moderate potential for HBT to be present. Mistletoe present. There is connectivity through site via the matrix of paddock tree Clusters. Mid storey - Some shrub present (gorse?). Lower strata - Low to moderate level of fallen timber, native understorey. No surface rock apparent. There is a dam c.1km away.	Potential HBT, fallen timber
Habitat only 20	6 (south)	Pasture	Upper strata - almost entirely cleared. Few young planted shelter belts present - important for bird connectivity. No mature trees around. Midstorey - none present (except young shelterbelt). Lower strata - mostly exotic and weedy ground cover with moderate grazing intensity. No further survey work would be required in this area.	
Habitat only 21	4 (mid)	Woodland	Upper strata - Mod potential for HBT. Mid storey - No shrub or small tree layer. Unlikely to provide habitat for threatened mammals. Lower strata - high amount of fallen timber, no rock outcrop. Unlikely to provide habitat for threatened reptiles. Moderate grazing intensity. Surrounding matrix is paddock with scattered trees and another woodland patch c.500m away.	Fallen timber, potential HBT
Habitat only 22	4 (n-e)	Woodland/ pasture with trees	Upper strata - some mature trees likely to be HBT. Midstorey - none present. Lower strata - grassy exotic/native mixed ground cover. Low to moderate level of fallen timber. Very little to no surface rock. Unsuitable for threatened reptiles or mammals. Some dams are in area.	Fallen timber, potential HBT
Habitat only 23	2	Pasture with trees	Upper strata - Trees mostly dying - moderate HBT potential. Midstorey - none present. Lower strata - Exotic? Grasses with moderate grazing intensity. No rock visible. Low habitat potential. Surrounding matrix all the same.	Potential HBT
Habitat only 24	3 (north)	Pasture with trees	Upper strata - low potential for HBT. Midstorey - none present. Lower strata - Mix of exotic and native ground cover with light grazing intensity. No rocks visible. Low level of fallen timber and debris. No suitable for threatened mammals or reptiles.	Fallen timber
Habitat only 25	1	Pasture	No stratum, heavily grazed ground cover of grasses. Adjacent to a nice patch of woodland.	
Habitat only 26	3	Woodland/ pasture with trees	Upper strata - low potential for HBT, no regeneration, BGW, mistletoe not evident. Midstorey - none present. Lower stratum - medium level of fallen timber, no rocks visible	Fallen timber
Habitat only 27	5 (north)	Pasture with trees	Upper strata - very open, trees in poor condition. Low potential for HBT. Midstorey - none present. Lower strata - moderate level of dead wood on ground, exotic and native grass mix with moderate grazing intensity. No rocks visible, although some are nearby. Little to have	Fallen timber

			little habitat value.	
Habitat only 28	5 (north)	Pasture	Upper strata - none present. Midstorey - planted shelterbelt (young) right on hilltop including casuarina, eucalypts and native shrubs - will be good bird corridor. Lower strata - large granite tors, very little surface rock. Not good for threatened reptiles but skinks present. Pasture appears to be mixed exotic and native. Surrounding matrix is paddock.	Rocks
Habitat only 29	5 (south)	Pasture	Open paddock with some large granite boulder outcrops. Unlikely to be suitable for threatened species.	Rocks
Rep only 1	3	Native pasture	Small scattered granite outcrop mostly embedded, with some loose rocks including broken and peeling. Mostly native grasses with moderate grazing pressure, but isolated outcrop (poor connectivity)	Native grassland, shelter
Rep only 2	5	Native pasture	Long native grasses (shot up since rain - appeared very degraded during PEI), with mostly buried granite outcrops.	Native grassland, shelter
Rep only 3	5	Native pasture	Native/exotic grass paddocks (shot up since rain) including stipa, serrated tussock and red grass. Mostly embedded granite outcrops. Probably quite isolated from other areas.	Native grassland, shelter
Rep only 4	6	Native pasture	Mostly logs in native grasses just outside of Clusters 4 and 6.	Native grassland, shelter
Rep only 5	6	Native pasture	Large area of outcropping, almost all buried and very few cracks. Some woodland or forest remnants around, but mostly grazed grassland.	Native grassland, shelter
Rep only 6	6	Native pasture	Large area of lightly grazed themeda grassland. Could be good Delma impar habitat, scattered cover including loose rocks and logs.	Native grassland, shelter
Rep only 7	5	Woodland	Snow gum woodland, native pasture and rocks.	Native grassland, shelter
Rep only 8	4	Pasture with trees	Native pasture, surface rocks, snow gums.	Native grassland, shelter
Rep only 9	2	Pasture with trees	Exotic grassland with remnant, mostly isolated trees. Drainage line that runs into a dam. HBT present. Some embedded rocks.	shelter
Rep only 10	6	Native pasture	Native pasture, fallen timber, no surface rocks.	Native grassland, shelter

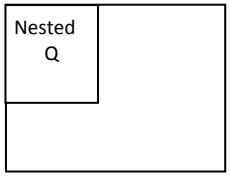
Rep only 11	1	Pasture/Woodland	Mixture of exotic and native grasses, low and sparse. Remnant woodland. A few scattered embedded granite rocks and high volumes of fallen timber.	Native/exotic grassland, shelter
Rep only 12	2	Pasture with trees	Exotic grassland with remnant trees. Some embedded rocks.	shelter
Bird 1	6	Woodland	Remnant woodland along creek, with dense areas of shrubs and long grasses. Good for small birds. Connectivity via creekline.	water, HBT, fallen timber, midstorey
Bird 2	Lerida	Pasture with trees	Paddocks around farm buildings, with lightly grazed long grasses, some shrubbery including exotic berry producing shrubs (briar), scattered trees (not bad stepping stone), dam nearby.	HBT, shrubs, dam
Bird 3	4	Woodland	Remnant patch of woodland, lots of fallen timber, low density of HBT.	HBT, fallen timber
Bird 4 and 5	Poile south (outside DE)	Pasture with trees/forest	Grassy areas with some natives including a regenerating shrubs layer (patchy) and *Xanthorrea*. Few scattered granite boulders. No HBT in this area.	Native grasses
Bird 6, 7, 8, 9, 10 and 11	Granger (outside DE)	Pasture with trees/forest	Dry forest near gully/saddle with pasture and scattered trees approximately 30 metres away. Potential HBT, fallen timber, embedded rocks and very little mid or understorey.	HBT, fallen timber,
Bird 12 and 13	Poile/Lerida	Woodland/ pasture	Low potential for HBT, no regeneration, BGW, mistletoe not evident. No midstorey present. Medium level of fallen timber, no rocks visible.	Fallen timber
Bird 14, 15, 16 and 17	Lerida	Forest/ woodland	Dry forest and open woodland with some mature trees likely to be HBT. Grassy exotic/native mixed ground cover. Low to moderate level of fallen timber. Very little to no surface rock. Some dams are in area.	HBT, dams, fallen timber
Bird 18, 19, 20, 21, 22 and 23	2	Woodland/ pasture with trees	Trees mostly dying - moderate HBT potential. Exotic grasses with moderate grazing intensity. No rock visible.	HBT
Bird 24, 25, 26 and 27	1	Pasture with trees/forest	Exotic pasture, dam with scattered trees adjacent to dry forest.	Dam
Bird 28, 29, 30 and 31	5	Woodland/ pasture	Cleared pasture with rocky outcrop near an open woodland patch.	Rocks

Bird 32, 33, 34, 35, 36 and 37	Lerida Rd (outside of DE)	Woodland/pasture with trees	Woodland in good condition adjacent to exotic pasture with trees.	
Frog 1	South of site (previously 8)	Dam	Small dam in pastured paddock with little fringing vegetation	Dam
Frog 2	6	Dam	Large dam in cropped paddock with some fringing vegetation including reeds. Very isolated by ploughed paddock.	Dam, aquatic vegetation
Frog 3	3	Dam	Medium sized dam along track, with lots of fringing vegetation including trees, shrubs, reeds and grasses.	Dam, aquatic vegetation

E.2 RAW SURVEY DATA

Hollow-bearing tree survey

Nested quadrats are often used in forestry surveys as they allow greater detail to be gathered in small survey area nested within a larger area, where biological units can be surveyed at a coarser level of detail. An example of a nested quadrat is given below.



A nested quadrat approach was used to survey for all trees (in nested Q) and HBT (in larger quadrat) in forest areas

Name	Cluster	Unit	Av. DBH	Quadrat length[1] – all trees	m^2	Number of trees	Quadrat length – HBT[2]	m^2	Number of HBT	Number of hollows[3]			
										Small	Med	Lge	X-l
Diurnal 01	1	Dry forest	40	20	400	59	50	2500	5	3	2	0	0
Diurnal 02	1	Pasture	50	50	2500	34			1	1			
	1	Pasture	80	100	10000	2	100		0	0	0	0	0
Diurnal 03	1	Pasture	80	100	10000	12	100		4	1	2	1	0
Diurnal 04	1/2 creek	Woodland/ riparian	60	20m wide	400	75			10	7	11	2	
	1	Woodland/ riparian	60	20m wide	400	24			8	2	5	1	0
Diurnal 05	1	Pasture	80	100	10000	21	100		4	4	3	1	2
Diurnal 06	2 west	Pasture	80	100	10000	1	100		3	6	3	3	
	2	Woodland	50	20	400	13	50	2500	10	5	5	0	0
Diurnal 07	3	Pasture	90	100	10000	9	100		4	1	1	1	1
Diurnal 08	3	Pasture	65	100	10000	20	100		2	2	0	0	0
Diurnal 09	4	Dry forest	20	25	625	63	25		11	11	2		
Diurnal 10	4	Pasture	60	100	10000	3	100		2	1	1	0	0

[1] Refers to the side length of a square quadrat. i.e. a value of 20 indicates the quadrat was 20 metres by 20 metres. This column refers to the quadrat that may have been nested inside the HBT quadrat, as was used to count the total number of all trees, both hollow-bearing and not.

[2] Only the hollow-bearing trees were counted within this quadrat.

[3] Small = <10cm, medium = 10-20cm, large = 20-30cm, X-large = >30cm entrance diameters

Name	Cluster	Unit	Av. DBH	Quadrat length[1] – all trees	m^2	Number of trees	Quadrat length – HBT[2]	m^2	Number of HBT	Number of hollows[3]			
										Small	Med	Lge	X-l
Diurnal 11	4	Pasture	70	100	10000	10	100		4	2	2	0	0
Diurnal 12	4 east (south)	Pasture	50	50	2500	17	50		5	3	2		
Diurnal 13	4	Woodland	50	20	400	70	50	2500	22	8	8	3	3
	4	Dry forest	35	25	625	10	25		20	6	10	3	
Diurnal 14	6	Woodland	70	20	400	20	50	2500	10	0	2	4	4
Diurnal 15	7	Forest	70	50	2500	27	50		2	3	3	1	
	7	Pasture	70	100	10000	3	100		1	0	1	0	0
Diurnal 16	8	Pasture	60		10000	34	100		1		2		
	8	Woodland	40	20	400	45	50	2500	0	0	0	0	0
Diurnal 17	6	Woodland	40	20	400	6	50	2500	5	4	1	0	0
Diurnal 18	6 east	Woodland	40	100	10000	50	100		3	2	1	1	1
Diurnal 19	0	Woodland/ roadside	50			7	20m wide	400	8	4	4	0	0

Bird utilisation survey results

Key to results table

Height class:	L	Low - from ground to canopy
	M	Medium - upper canopy
	H	High - above canopy height
Activity class:	F	Foraging
	T	Travel
	R	Rest
	S	Soar
	H	Heard calling
	O	Other (e.g. display, chase, social)
Juv?	Y	Juveniles amongst those seen
	N	Juveniles not amongst those seen
	nd	No data – not able to be determined
Distance		From observer – mostly used for open areas

Bird Utilisation Survey	No Replicates	1 1	Cluster	Poile south		
Habitat type 1 - Paddock with scattered trees in distance Habitat type 2 - Dry forest remnant						
Replicate 1 Paddock	Observer: BH			9-Dec		
Survey conditions	mild, overcast					
Start time	0845					
End time	0905					
Name	**Height**	**No.**	**Activity**	**Juv?**	**Distance**	**comment**
Richard's Pipit	L	4	F/O (social)	N	10m	
Sulphur-crested Cockatoo	M	4	T	nd	50m	
Common Bronzewing	L	1	R	N	15m	
Sulphur-crested Cockatoo	H	1	T	nd	100m	
Australian Magpie	-	-	heard	nd	100m	
Little Raven	-	-	heard	nd	100m	
Replicate 1 Dry forest remnant	Observer: AM			9-Dec		
Survey conditions	mild, overcast					
Start time	0845					
End time	0905					
Name	**Height**	**No.**	**Activity**	**Juveniles**	**Distance**	**comment**
Pallid Cuckoo	L	1	F	N	30	
Laughing Kookaburra	L	3	F, H	N	70	
Australian Raven	L,M	4	T	N	60	
Noisy Friarbird	L	2	F	N	50	
White-throated Treecreeper	L	1	F	N	70	
Australian Magpie	L	3	F	Y	50	
Crimson Rosella	L	4	F,R	Y	80	
Grey Fantail	L	3	F	Y	40	
Grey Shrike-thrush	-	-	H	nd	-	
Leaden Flycatcher	L	2	F	N	80	
Rufous Whistler	-	-	H	nd	-	
Pied Currawong	-	-	H	nd	-	
Black-faced Cuckoo-shrike	L,M	1	F,T	N	40	
Striated Pardalote	L	1	F	N	50	
Yellow-faced Honeyeater	-		H		100	
Red Wattlebird	-		H		100	
Magpie Lark	-		H		100	

Bird Utilisation Survey	No Replicates	2 3	Cluster	Granger		
Habitat type 1 - Dry forest near gully/saddle						

Habitat type 2 - Pasture with scattered trees c.30m away						
Replicate 1 Dry forest	Observer: BH				9-Dec	
Survey conditions	mild, overcast					
Start time	1035					
End time	110					
Name	**Height**	**No.**	**Activity**	**Juveniles**	**Distance**	**comment**
Noisy Friarbird	L	1	T	N	10	
Superb Fairywren	L	1	F	N	20	
Crimson Rosella	L	6	R	Y	-	
A. Magpie	-	2	H	nd	-	
Laughing Kookaburra	-	-	H	nd	-	
Yellow-faced Honeyeater	-	-	H	nd	-	
Red Wattlebird	-	-	H	nd	-	
Sulphur-crested Cockatoo	L	3	F/R	N	10	
Thornbill sp.	L	2	F	N	10	
Yellow-faced Honeyeater	L	2	T/R	Y	15	
Yellow-rumped Thornbill	L	4	T	N	3	
White-browed Scrubwren	L	1	O (display)	N	10	
A. Raven	M	1	T	N	40	
Grey Fantail	L	1	F/T	N	10	
Spotted Pardalote	L	1	F	N	10	
Replicate 2 Dry forest	Observer: AM				10-Dec	
Survey conditions	mild, slight breeze					
Start time	1500					
End time	1520					
Name	**Height**	**No.**	**Activity**	**Juveniles**	**Distance**	**comment**
Red Wattlebird	L	8	F/T	N	30-100	
Sulphur-crested Cockatoo	M	1	T	N	0	
Yellow-faced Honeyeater	L	2	F	N	100	
Grey Fantail	L	1	F/T	N	100	
Australian Magpie			H	N		
Crimson Rosella	L	2	R/T	N	70	
White-browed Scrubwren	L	4	F/C	N	40	
Common Starling	M		T	N		
Silvereye	L	2	F	N	50	
Noisy Friarbird	L	1	F	N	70	
Spotted Pardalote	L	2	F	N	90	
Superb Fairy-wren	L	4	F	N	50	
Laughing Kookaburra	-	-	H	N	400	
Grey Shrike-thrush	-	-	H	N	200	
Replicate 3 Dry forest	Observer: BH				11-Dec	
Survey conditions	warm, very windy					
Start time	1040					

End time	1100					
Name	**Height**	**No.**	**Activity**	**Juveniles**	**Distance**	**comment**
Superb Fairywren	L	2	F	nd		
Sulphur-crested Cockatoo	L	2	T	N		
Noisy Friarbird	L	1	T	nd		
Striated Pardalote	-	2	H	nd		
Yellow-faced Honeyeater	L	2	R/F	Y		
Red Wattlebird	L	4	F	nd		
Crimson Rosella	L	3	T	Y		
A. Raven	m/h	2	T	nd		
Welcome Swallow	L	1	F	N		
Rufous Whistler?	L	1	F	nd		
A. Magpie	L	2	F	nd		
White-browed Scrubwren	L	1	T	N		
European Goldfinch	L	1	F	N		
Replicate 1 Pasture	Observer: AM				9-Dec	
Survey conditions	mild, overcast					
Start time	1035					
End time	1055					
Name	**Height**	**No.**	**Activity**	**Juveniles**	**Distance**	**comment**
Fairy Martin	L,M	5	F	N	80	
Crimson Rosella	L	6	F	N	200	in trees
Australian Magpie	L	6	F	N	200	in trees
Magpie-lark			H	nd	200	in trees
Noisy Miner			H	nd	200	in trees
Striated Pardalote			H	nd	200	in trees
Common Starling	L	15	T,R	Y	200	in trees
Pied Currawong			H	nd	200	in trees
European Goldfinch	L	3	F,T	N	40	
Sulphur-crested Cockatoo	L	3	T,R	N	200	in trees
Little Raven	L,M,H	8	T	N	100	
Galah			H	nd	200	in trees
Spotted Pardalote			H	nd	200	
Little Raven	H	2	T	N	200	
Richard's Pipit	L	1	F	N	150	
Yellow-tailed Black-Cockatoo	H	12	T	N	300	
Replicate 2 Pasture	Observer: BH				10-Dec	
Survey conditions	mild, slight breeze					
Start time	1500					
End time	1520					
Name	**Height**	**No.**	**Activity**	**Juveniles**	**Distance**	**comment**
A.Magpie	M	1	T	N	50	
Red Wattlebird	M	1	T	nd	100	
Crimson Rosella	L	2	T	nd	50	

Striated Pardalote	-	-	H	nd	30	
Sulphur-crested Cockatoo	-	-	H	nd	200	in trees
Noisy Miner	L	2	H/T	nd	200	in trees
Magpie-lark	L	2	T	N	30	
Nankeen Kestrel	M	1	T	N	70	
Fairy Martin	H	1	S	nd	50	
Red Wattlebird	L	3	T	nd	100	in trees
Replicate 3 Pasture	Observer: AM				11-Dec	
Survey conditions	warm, very windy					
Start time	1040					
End time	1100					
Name	**Height**	**No.**	**Activity**	**Juveniles**	**Distance**	**comment**
Sulphur-crested Cockatoo	M	1	T	nd	200	
Australian Magpie	L	2	F/T	nd	100	
Little Raven	L,M,H	6	T	nd	200	
Crimson Rosella	L	2	T	nd	70	
Fairy Martin	L,M	8	F/T	nd	150	
Striated Pardalote	L	2	C/F	nd	200	in trees
Common Starling	L	1	T	nd	80	
Willie Wagtail			H	nd		
Little Raven	M	2	T	nd	100	
Common Starling	L	1	F/T	nd	200	
Fairy Martin	L	4	F/T	nd	70	
Nankeen Kestrel	M	1	S	nd	100	
Australian Wood Duck	L	15	R	nd	200	at dam

Bird Utilisation Survey	No	3	Cluster	yellow Poile/Lerida	9-Dec
	Replicates	1			
Habitat type 1 - Very open woodland small patch					
Habitat type 2 - Pasture (sprayed out)					
Replicate 1 Woodland	Observer: BH				
Survey conditions	warm				
Start time	1245				
End time	1305				
Name	**Height**	**No.**	**Activity**	**Juveniles**	**Distance**	**comment**
Yellow-rumped Thorbill	L	1	F	N	5	
Yellow-rumped Thorbill	L	1	F	N	10	
Australian Magpie	L	1	T	N	30	
Striated Pardalote	-	1	H	nd	30	
*Yellow-rumped Thorbill	L	2	T	N	10	
Eastern Rosella	-	-	H	nd	150	
Australian Raven	L	2	T	N	50	
Common Starling	M	4	T	N	15	
Red-rumped Parrot	L	4	T	nd	20	

Noisy Miner	-	-	H	nd	60	
Replicate 1 Pasture	Observer: AM					
Survey conditions	warm					
Start time	1245					
End time	1305					
Name	**Height**	**No.**	**Activity**	**Juveniles**	**Distance**	**comment**
Richard's Pipit	L	1	F	N	50	
Brown Falcon	H	1	S	N	100	
Fairy Martin	H	4	F	nd	0	
Skylark	H	2	0 - DISPLA Y	N	100	
Red-rumped Parrot	L	6	T	N	150	
Australian Raven	M	2	T	N	200	
Fairy Martin	H	>30	F	nd	300	

Bird Utilisation Survey	No Replicates	4 2	Cluster	Blue (Lerinda)		9-Dec
Habitat type 1 - Dry forest						
Habitat type 2 - Open woodland						
Replicate 1 Woodland	Observer: AM					
Survey conditions	warm					
Start time	1600					
End time	1620					
Name	**Height**	**No.**	**Activity**	**Juveniles**	**Distance**	**comment**
Striated Pardalote	L	2	F,C			
Australian Magpie	L	3	T	Y	100	
Australian Raven			H			
Noisy Miner			H			
Crimson Rosella	L	2	R		60	
Crimson Rosella	L	5	T		70	
Magpie-lark	L	1	R		60	
Grey Butcherbird			H			
Black-faced Cuckoo-shrike	L,M,H	2	T/R		50	
Crimson Rosella	L	1	T		70	
Magpie-lark	M,H	2	O		0	Chasing Goshawk
Brown Goshawk	M,H	1	S		0	
Wedge-tailed Eagle	H	1	S		0	
Sulphur-crested Cockatoo			H			
Eastern Rosella	L	1	T		70	
Replicate 2 Woodland	Observer: BH				10-Dec	
Survey conditions	hot, windy, overcast					
Start time	1135					
End time	1155					

Name	Height	No.	Activity	Juveniles	Distance	comment
Wedge-tailed Eagle	H	2	S	N	10m	
Australian Magpie	L	2	T	N		
Australian Magpie	M	3	T	Y		
Eastern Rosella	L	2	T	nd	30m	
Crimson Rosella	M	5	T	Y	30m	
Striated Pardalote	L	2	H	nd		
Sulphur-crested Cockatoo	H	3	T	N	100m	
Australian Raven	M/L	1	T	N		
Nankeen Kestrel	H	1	S	N		
Magpie-lark	M	1	T	N		
Red Wattlebird	M	2	T	nd		
Crimson Rosella	L	2	R	Y		
White-faced Heron	H	3	S	Y?		
Noisy Miner	-	>2	H	nd	50m	
*Nankeen Kestrel	L	2	R/F	N		
Laughing Kookaburra	-	2	H	nd	150m	
Yellow-rumped Thorbill	L	1	F	N		after time
Crested Pigeon	M	1	R	N		after time
Replicate 1 Dry forest	Observer: BH				9-Dec	
Survey conditions	warm					
Start time	1600					
End time	1620					
Name	**Height**	**No.**	**Activity**	**Juveniles**	**Distance**	**comment**
Galah	L	2	R	N		
Australian Magpie	L	3	R	Y		
Striated Pardalote	-	2	H	nd		
Crimson Rosella	L	4	R/T	N		
Grey Butcherbird	L	1	H	nd	30m	
Black-faced Cuckoo-shrike	-	1	H	nd		
Pied Kurrawong	-	1	H	nd	30m	
Red Wattlebird	L	1	F	N		
Noisy Miner	-	1	H	nd	50m	
White-throated Treecreeper	-	2	H	nd	30m	
Magpie-lark	-	1	H	nd	40m	
Eastern Rosella	L	2	F	Y		
Noisy Friarbird	L	2	T/R	N		
Australian Magpie	M	2	T	N		
Galah	-	1	H	nd	50m	
Red Wattlebird	L	1	T	N		
Striated Thornbill	L	2	F	Y?		
Willie Wagtail	L	1	O	N		Display
Eastern Rosella	M	4	T	Y		
Replicate 2 Dry forest	Observer: AM				10-Dec	

Survey conditions	hot, windy, overcast					
Start time	1135					
End time	1155					
Name	**Height**	**No.**	**Activity**	**Juveniles**	**Distance**	**comment**
Pied Currawong	L	1	C		70	
Crimson Rosella	L	3	R/C		50	
White-throated Treecreeper	L	1	F		80	
Australian Magpie	L	3	R/C		80	
Striated Pardalote	L	2	F/C		60	
Noisy Miner	-		H	-	-	
Wedge-tailed Eagle	M,H	1	S		50	Carrying prey
Australian Magpie	L	4	T/R		60	
Australian Magpie	L	1	T		150	
Red-rumped Parrot			H			
Grey Currawong	L	1	T/C		100	

Bird Utilisation Survey	No	5	Cluster	Pink		9-Dec
	Replicates	3				
Habitat type 1 - Pasture with trees (along dry gully) Habitat type 2 - Very open woodland, small patch						
Replicate 1 Pasture	Observer: AM				9-Dec	
Survey conditions	very windy, warm					
Start time	1740					
End time	1800					
Name	**Height**	**No.**	**Activity**	**Juveniles**	**Distance**	**comment**
Yellow-faced Honeyeater	L	1	F	N	40	
Yellow-rumped Thornbill	L	8	F	N	50	
Striated Pardalote	L	3	F/C	N	60	
Eastern Rosella	L	5	T/R/F	N	40	
Common Starling	L	6	T/F	N	50	
Red-rumped Parrot	L	2	T	N	30	
Red Wattlebird	L	1	F	N	60	
Crimson Rosella	L	2	F	N	80	
Australian Magpie			H	N		
Fairy Martin	H	5	F	N	80	
Brown Thornbill	L	4	F	N	40	
Replicate 2 Pasture	Observer: BH				10-Dec	
Survey conditions	Light wind, mild, cloudy					
Start time	0915					
End time	0935					
Name	**Height**	**No.**	**Activity**	**Juveniles**	**Distance**	**comment**
Crimson Rosella	L	2	T	Y	15	

Grey Shrike-thrush	-	1	H	nd	40	
Yellow-faced Honeyeater	L	1	T	nd	40	
Australian Magpie	-	2+	H	nd	40	
Striated Pardalote	L	2	H	nd	10	
Common Starling	M	2	T	nd		
Nankeen Kestrel	M	1	T	N		
Sulphur-crested Cockatoo	-	1	H	nd	70	
Fairy Martin	H	2	F	N		
Crimson Rosella	M	1	T	nd		
Replicate 3 Pasture	Observer: AM				11-Dec	
Survey conditions	very windy, cool and sunny					
Start time	0910					
End time	0930					
Name	**Height**	**No.**	**Activity**	**Juveniles**	**Distance**	**comment**
Red-rumped Parrot	L	2	T/F		70	
Sulphur-crested Cockatoo	M	1	T		100	
Striated Pardalote	L	2	C/F		70	
Australian Magpie			H			
Common Starling	L	3	T		100	
Crimson Rosella	L	2	T/F		150	
Galah			H			
Richard's Pipit	L	1	F		150	
Striated Pardalote	M	1	T		50-150	
Red Wattlebird	L	2	T		50	
Common Starling	L	1	T		50-150	
Common Starling	L	1	T/F		80	
Fairy Martin	L,M,H	2	F		40	
Crimson Rosella	L	4	R		50	
Red Wattlebird	L	2	F/T		70	
Crimson Rosella	L	2	F		100	
Common Starling	L	12	T/F		50	
Fairy Martin	H	1	F		0	
Replicate 1 Woodland	Observer: BH				9-Dec	
Survey conditions	very windy, warm					
Start time	1740					
End time	1800					
Name	**Height**	**No.**	**Activity**	**Juveniles**	**Distance**	**comment**
Fairy Martin	M	1	T	nd		
Red-rumped Parrot	L/M	6	R/T	nd		
Eastern Rosella	L	2	T	N		
Fairy Martin	L/M	4	R/F	nd		
Crimson Rosella	L	2	T	Y		
Skylark	M/H	1	O	N	100	Display
Common Starling	L	1	F	N		
Replicate 2 Woodland	Observer: AM				10-Dec	

Survey conditions	Light wind, mild, cloudy					
Start time	0915					
End time	0935					
Name	**Height**	**No.**	**Activity**	**Juveniles**	**Distance**	**comment**
Striated Pardalote	L	2	F/C		70	
Crimson Rosella	L	2	F/C		50	
Red-rumped Parrot	L	2	T		60	
Australian Magpie	L	2	F/C		200	
Common Starling	L	4	F/T	Y	70	
Skylark	H	1	C		100	
Common Starling	L	2	T/O		70	
Sulphur-crested Cockatoo	M,H	2	T		100	Feeding young
Fairy Martin	L,M,H	1	F		70	
Crimson Rosella	L	2	T		60	
Richard's Pipit	L	1	R/C		60	
Red-rumped Parrot	L	2	T		60	
Yellow-faced Honeyeater	M,H	1	T		0	
Red-rumped Parrot	L	2	T		40	
Nankeen Kestrel	H	1	S		100	
Replicate 3 Woodland	Observer: BH				11-Dec	
Survey conditions	very windy, cool and sunny					
Start time	0910					
End time	0930					
Name	**Height**	**No.**	**Activity**	**Juveniles**	**Distance**	**comment**
Red-rumped Parrot	L	4	T/R		20	
Striated Pardalote	L	1	H		15	
Australian Magpie	L	1	T		50	
Welcome Swallow	M	1	S		100	
Australian Magpie	M	3	S		150	

Bird Utilisation Survey	No	6	Cluster	Red		10-Dec
	Replicates	2				
Habitat type 1 - Cleared pasture with 2 trees, dam down hill c.200m						
Habitat type 2 - Dry forest						
Replicate 1 Pasture	Observer: BH				10-Dec	
Survey conditions	Sunny and windy					
Start time	1010					
End time	1030					
Name	**Height**	**No.**	**Activity**	**Juveniles**	**Distance**	**comment**
Nankeen Kestrel	M	1	F	N	20	
Australian Magpie	L/M/H	2	T	N	70	
*Australian Magpie	M	2	O	N	20	
Little Raven	Height	3	S	N	15	
Replicate 2 Pasture	Observer: AM				11-Dec	
Survey conditions	Sunny, cold, very windy					

Start time	0815					
End time	0835					
Name	**Height**	**No.**	**Activity**	**Juveniles**	**Distance**	**comment**
Australian Magpie	L	6	F		60	
Australian Magpie	L	8	T/F		100	
Australasian Grebe	L	1	F (DAM)		150	
Black-faced Cuckoo-shrike	M,H	2	T		200	
Common Starling	L,M	6	T/R		200	
Magpie-lark			H		200	
Common Starling	L	9	F		150	
Australian Magpie	L,M,H	2	T/R		20	
Nankeen Kestrel	L,M	1	T/R		300	
Australian Magpie	L,M	5	T		60	
Common Starling	L	1	T		150	
Replicate 1 Dry forest	Observer: AM				10-Dec	
Survey conditions	Sunny and windy					
Start time	1010					
End time	1030					
Name	**Height**	**No.**	**Activity**	**Juveniles**	**Distance**	**comment**
Australian Magpie	L	3	F/R		40	
Crimson Rosella	L	2	T		50	
Crimson Rosella			H		200	
Striated Pardalote	L	2	C/F		80	
Leaden Flycatcher	L	2	F		100	
White-browed Woodswallow	H	1	S		50	
Replicate 2 Dry forest	Observer: BH				11-Dec	
Survey conditions	Sunny, cold, very windy					
Start time	0815					
End time	0835					
Name	**Height**	**No.**	**Activity**	**Juveniles**	**Distance**	**comment**
Crimson Rosella	L	8	T/R	Y		
Australian Magpie	L	3	R			
Buff-rumped Thornbill	M	4	T			
Black-faced Cuckoo-shrike	L	5	H/R			
Leaden Flycatcher	L	1	F			
Australian Magpie	M	2	T			
Magpie-lark	-	1	H			
White-winged Triller	L	1	F			
Red Wattlebird	-	nd	H			
Willie Wagtail	L	1	R			
Pied Kurrawong	L	-	H			
Noisy Friarbird	L	2	R			
Yellow-rumped Thornbill	L	8	F	Y?		After time
Brown Thornbill	L	2	F			After time

Bird Utilisation Survey	No Replicates	7 2	Cluster	Orange		10-Dec
Habitat type 1 - Cleared pasture with rock outcrop Habitat type 2 - Open woodland patch						
Replicate 1 Pasture	Observer: BH				10-Dec	
Survey conditions	hot and windy					
Start time	1405					
End time	1425					
Name	**Height**	**No.**	**Activity**	**Juveniles**	**Distance**	**comment**
Australian Magpie	H/L	5	T/O	Y?	30	socialising
Australian Raven	M/H	2	s	A	10	
Replicate 2 Pasture	Observer: AM				11-Dec	
Survey conditions	cool and windy					
Start time	1135					
End time	1155					
Name	**Height**	**No.**	**Activity**	**Juveniles**	**Distance**	**comment**
Richard's Pipit	L	1	F		20	
Common Starling	M	3	T		50	
Australian Magpie	-	-	H		150	
Fairy Martin	L	1	F		50	
Common Starling	L	30	F		200	
Common Starling	L	1	T		50	
Replicate 1 Woodland	Observer: AM				10-Dec	
Survey conditions	hot and windy					
Start time	1405					
End time	1425					
Name	**Height**	**No.**	**Activity**	**Juveniles**	**Distance**	**comment**
Yellow-rumped Thornbill	L	8	F/T		60	
Australian Magpie	L,M	2	T/R		80	
Striated Pardalote	L	2	F/C		50	
Wedge-tailed Eagle	H (>500M)	1	S		200	
Australian Raven			H		200	
Common Starling	L	2	O	Y	70	Feeding young
White-browed Woodswallow	H (>500M)	50	T		0	
Fairy Martin	M	1	F		50	
Australian Raven	M	1	T		100	
Nankeen Kestrel	L,M	1	T		50	
Replicate 2 Woodland	Observer: BH				11-Dec	
Survey conditions	cool and very windy					
Start time	1135					

End time	1155					
Name	**Height**	**No.**	**Activity**	**Juveniles**	**Distance**	**comment**
Crimson Rosella	L	3	R	Y	20	
White-browed Woodswallow	L/M	7	R/S		5	
Yellow-rumped Thornbill	L	6	R/F		10	
Buff-rumped Thornbill	L	2	R/F		10	

Bird Utilisation Survey	No	control	Cluster	Lerida Rd St		9-Dec
	Replicates	3				
Habitat type 1 - Woodland in good condition						
Habitat type 2 - Pasture with trees						
Replicate 1 Woodland	Observer: AM				9-Dec	
Survey conditions	warm and windy					
Start time	1820					
End time	1840					
Name	**Height**	**No.**	**Activity**	**Juveniles**	**Distance**	**comment**
Noisy Miner	L	15	F,T,C		0-150	
Crimson Rosella	L	4	F,T		80	
Sulphur-crested Cockatoo	H	4	T		50	
Striated Pardalote	L	3	C,F		70	
Australian Magpie	L	4	F	Y	100	
Sulphur-crested Cockatoo	H	8	T		50	
Eastern Rosella	L	4	F		40	
Replicate 2 Woodland	Observer: BH				10-Dec	
Survey conditions	warm and still					
Start time	0810					
End time	0830					
Name	**Height**	**No.**	**Activity**	**Juveniles**	**Distance**	**comment**
Laughing Kookaburra	5	L	R/T	N		
Crimson Rosella	2	L	T			
Grey Shrike-thrush	1	-	H			
Australian Raven	-	-	H			
Australian Magpie	1	L	T	Y		
White-winged Chough	6	L/M	F/T			
Spotted Pardalote	-	-	H			
Striated Pardalote	-	-	H			
Noisy Miner	18	L/M	T/O			Chase
Gang-gang Cockatoo	2	L	H/F			
Eastern Rosella	1	L	T			
Pied Kurrawong	1	L	T			
Galah	3	M	R/F			
Magpie-lark	2	-	H			
Grey Butcherbird	1	-	H			

Sulphur-crested Cockatoo	2	H	T			
Replicate 3 Woodland	Observer: AM				12-Dec	
Survey conditions	Windy, sunny, cool					
Start time	0955					
End time	1015					
Name	**Height**	**No.**	**Activity**	**Juveniles**	**Distance**	**comment**
Noisy Miner	L	13	F/T		60	
Striated Pardalote	L	3	F/C		50-100	
Eastern Rosella	L	3	F/T		60	
Crimson Rosella	L	2	T		100	
Sulphur-crested Cockatoo	M/L	3	T/C		50	
Australian Magpie			H		300	
Laughing Kookaburra	L	2	C/R		100	
Pied Currawong			H			
Galah	M	2	T		100	
Australian Pelican	H	1	T		50	
Replicate 1 Pasture	Observer: BH				9-Dec	
Survey conditions	warm and windy					
Start time	1820					
End time	1840					
Name	**Height**	**No.**	**Activity**	**Juveniles**	**Distance**	**comment**
Australian Magpie	L	4	F/O	Y	20	Feeding young
Noisy Miner	L/M	2	T/F		5	
Red Wattlebird	M/L	3	T		20	
Striated Pardalote	-	1	H		-	
Crimson Rosella	L	1	T		50	
Magpie-lark	-	1	H		40	
Grey Shrike-thrush	L	1	T		20	
Sulphur-crested Cockatoo	L/M	3	T		30	
Replicate 2 Pasture	Observer: AM				10-Dec	
Survey conditions	warm and still					
Start time	0810					
End time	0830					
Name	**Height**	**No.**	**Activity**	**Juveniles**	**Distance**	**comment**
Australian Magpie	L	7	C/F		80	
Striated Pardalote			H			
Crimson Rosella	L	5	F/T		60	
Little Raven			H		500	
Noisy Miner			H			
Yellow-faced Honeyeater	L/M	3	C/T		80	
Grey Shrike-thrush	L	1	F		100	
Galah	L	1	T		70	
Sulphur-crested Cockatoo	H	1	T		100	
European Goldfinch	M	3	T		100	

Australian Raven			H			
Laughing Kookaburra			H			
White-browed Woodswallow	H	26	T		50	
Replicate 3 Pasture	Observer: BH				12-Dec	
Survey conditions	Windy, sunny, cool					
Start time	0955					
End time	1015					
Name	**Height**	**No.**	**Activity**	**Juveniles**	**Distance**	**comment**
Nankeen Kestrel	M	1	T/F		50	
Brown Falcon	H	1	S		10	
Pied Kurrawong	-	-	H		-	
Australian Magpie	L	2	T		15	
Sulphur-crested Cockatoo	L	1	R		50	
Striated Pardalote	-	1	H		15	
Noisy Miner	M	1	T		15	
Eastern Rosella	L	1	T		5	
Crimson Rosella	L	2	T	Y	10	

Bird survey species results

* threatened species

Name	Common name	Species
Diurnal 1	Striated Pardalote	*Pardalotus striatus*
	Crimson Rosella	*Platycercus elegans*
	Spotted Pardalote	*Pardalotus punctatus*
	Australian Magpie	*Gymnorhina tibicen*
	White-throated Treecreeper	*Cormobates leucophaeus*
	Yellow-faced Honeyeater	*Lichenostomus chrysops*
	Grey Fantail	*Rhipidura fuliginosa*
	Brown Thornbill	*Acanthiza pusilla*
	Galah	*Cacatua roseicapilla*
	Golden Whistler	*Pachycephala pectoralis*
	Grey Shrike-thrush	*Colluricincla harmonica*
	Magpie-lark	*Grallina cyanoleuca*
	Red Wattlebird	*Anthochaera carunculata*
	Noisy Friarbird	*Philemon corniculatus*
	Australian Raven	*Corvus coronoides*
	Pied Currawong	*Strepera graculina*
	Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*
	Striated Thornbill	*Acanthiza lineata*
	Red Fox	*Vulpes vulpes*
	Eastern Grey Kangaroo	*Macropus giganteus*
Diurnal 2	Australian Magpie	Gymnorhina tibicen
Diurnal 3	White-winged Chough	*Corcorax melanorhamphos*
	Australian Magpie	*Gymnorhina tibicen*
	Black-faced Cuckoo-shrike	*Coracina novaehollandiae*
	Common Starling	*Sturnus vulgaris*
	Noisy Friarbird	*Philemon corniculatus*
Diurnal 4	Grey Shrike-thrush	*Colluricincla harmonica*
	Grey Butcherbird	*Cracticus torquatus*
	Noisy Friarbird	*Philemon corniculatus*
	Red Wattlebird	*Anthochaera carunculata*
	Yellow-faced Honeyeater	*Lichenostomus chrysops*
	Noisy Miner	*Manorina melanocephala*
	Australian Raven	*Corvus coronoides*

	Spotted Pardalote	*Pardalotus punctatus*
	White-throated Treecreeper	*Cormobates leucophaeus*
	Grey Fantail	*Rhipidura fuliginosa*
	Australian Magpie	*Gymnorhina tibicen*
	Galah	*Cacatua roseicapilla*
	Brown-headed Honeyeater	*Melithreptus brevirostris*
	Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*
	Striated Thornbill	*Acanthiza lineata*
	White-winged Chough	*Corcorax melanorhamphos*
	Laughing Kookaburra	*Dacelo novaeguineae*
	Red Wattlebird	*Anthochaera carunculata*
	Grey Fantail	*Rhipidura fuliginosa*
	Noisy Miner	*Manorina melanocephala*
	Grey Shrike-thrush	*Colluricincla harmonica*
	Yellow-faced Honeyeater	*Lichenostomus chrysops*
	Crimson Rosella	*Platycercus elegans*
	White-winged Chough	*Corcorax melanorhamphos*
	Australian Raven	*Corvus coronoides*
	Galah	*Cacatua roseicapilla*
	Noisy Friarbird	*Philemon corniculatus*
	Australian Magpie	*Gymnorhina tibicen*
	Spotted Pardalote	*Pardalotus punctatus*
	Striated Pardalote	*Pardalotus striatus*
	Pied Currawong	*Strepera graculina*
Diurnal 5	Galah	*Cacatua roseicapilla*
	Red-rumped Parrot	*Psephotus haematonotus*
	Sulphur-crested Cockatoo	*Cacatua galerita*
	Australian Magpie	*Gymnorhina tibicen*
	Grey Butcherbird	*Cracticus torquatus*
	White-throated Treecreeper	*Cormobates leucophaeus*
Diurnal 6	Striated Pardalote	*Pardalotus striatus*
	Australian Magpie	*Gymnorhina tibicen*
	Red Wattlebird	*Anthochaera carunculata*
	Crimson Rosella	*Platycercus elegans*
	Eastern Rosella	*Platycercus eximius*
Diurnal 7	Noisy Miner	*Manorina melanocephala*
	Crimson Rosella	*Platycercus elegans*

	Eastern Rosella	*Platycercus eximius*
	Galah	*Cacatua roseicapilla*
	Golden Whistler	*Pachycephala pectoralis*
	Striated Pardalote	*Pardalotus striatus*
	Spotted Pardalote	*Pardalotus punctatus*
	Grey Fantail	*Rhipidura fuliginosa*
	White-throated Gerygone	*Gerygone olivacea*
	Rufous Whistler	*Pachycephala rufiventris*
	Striated Thornbill	*Acanthiza lineata*
	Buff-rumped Thornbill	*Acanthiza reguloides*
	Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*
	European Rabbit	*Oryctolagus cuniculus*
Diurnal 8	Crimson Rosella	*Platycercus elegans*
	Southern Whiteface	*Aphelocephala leucopsis*
Diurnal 9	Grey Fantail	*Rhipidura fuliginosa*
	Australian Magpie	*Gymnorhina tibicen*
	Red Wattlebird	*Anthochaera carunculata*
	Rufous Whistler	*Pachycephala rufiventris*
	Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*
	Crimson Rosella	*Platycercus elegans*
	Striated Pardalote	*Pardalotus striatus*
	Spotted Pardalote	*Pardalotus punctatus*
	Golden Whistler	*Pachycephala pectoralis*
	Willie Wagtail	*Rhipidura leucophrys*
	Black-faced Cuckoo-shrike	*Coracina novaehollandiae*
	White-eared Honeyeater	*Lichenostomus leucotis*
	Noisy Miner	*Manorina melanocephala*
	White-throated Gerygone	*Gerygone olivacea*
	Scarlet Honeyeater	*Myzomela sanguinolenta*
Diurnal 10	Striated Pardalote	*Pardalotus striatus*
	Australian Magpie	*Gymnorhina tibicen*
	Red Wattlebird	*Anthochaera carunculata*
	Crimson Rosella	*Platycercus elegans*
	Eastern Rosella	*Platycercus eximius*
	Black-faced Cuckoo-shrike	*Coracina novaehollandiae*
	Australian Raven	*Corvus coronoides*
	Magpie-lark	*Grallina cyanoleuca*

	Galah	*Cacatua roseicapilla*
	Noisy Miner	*Manorina melanocephala*
	Eastern Grey Kangaroo	*Macropus giganteus*
Diurnal 11	Grey Shrike-thrush	*Colluricincla harmonica*
	Red-rumped Parrot	*Psephotus haematonotus*
	Australian Raven	*Corvus coronoides*
	Magpie-lark	*Grallina cyanoleuca*
	Galah	*Cacatua roseicapilla*
	Grey Butcherbird	*Cracticus torquatus*
	Crimson Rosella	*Platycercus elegans*
	Noisy Friarbird	*Philemon corniculatus*
	Australian Magpie	*Gymnorhina tibicen*
	Noisy Miner	*Manorina melanocephala*
	Common Starling	*Sturnus vulgaris*
	Striated Pardalote	*Pardalotus striatus*
	European Rabbit	*Oryctolagus cuniculus*
Diurnal 12	Common Starling	*Sturnus vulgaris*
	Crimson Rosella	*Platycercus elegans*
	Striated Pardalote	*Pardalotus striatus*
	Spotted Pardalote	*Pardalotus punctatus*
	Australian Magpie	*Gymnorhina tibicen*
	Red Wattlebird	*Anthochaera carunculata*
	Galah	*Cacatua roseicapilla*
	Noisy Miner	*Manorina melanocephala*
Diurnal 13	Brown Treecreeper	*Climacteris picumnus*
	Noisy Miner	*Manorina melanocephala*
	Striated Pardalote	*Pardalotus striatus*
	Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*
	Willie Wagtail	*Rhipidura leucophrys*
	Grey Fantail	*Rhipidura fuliginosa*
	White-throated Treecreeper	*Cormobates leucophaeus*
	Crimson Rosella	*Platycercus elegans*
	Australian Magpie	*Gymnorhina tibicen*
	Laughing Kookaburra	*Dacelo novaeguineae*
	Golden Whistler	*Pachycephala pectoralis*
	Red-rumped Parrot	*Psephotus haematonotus*
	Double-barred Finch	*Taeniopygia bichenovii*

	Black-faced Cuckoo-shrike	*Coracina novaehollandiae*
	Striated Pardalote	*Pardalotus striatus*
	Spotted Pardalote	*Pardalotus punctatus*
	Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*
	Galah	*Cacatua roseicapilla*
	Australian Magpie	*Gymnorhina tibicen*
	Crimson Rosella	*Platycercus elegans*
	Golden Whistler	*Pachycephala pectoralis*
Diurnal 14	Australian Magpie	*Gymnorhina tibicen*
	Noisy Miner	*Manorina melanocephala*
	Yellow-faced Honeyeater	*Lichenostomus chrysops*
	Striated Pardalote	*Pardalotus striatus*
	Laughing Kookaburra	*Dacelo novaeguineae*
	Black-faced Cuckoo-shrike	*Coracina novaehollandiae*
	Common Starling	*Sturnus vulgaris*
	White-winged Chough	*Corcorax melanorhamphos*
	Galah	*Cacatua roseicapilla*
	Eastern Rosella	*Platycercus eximius*
	Pied Currawong	*Strepera graculina*
Diurnal 15	Spotted Pardalote	*Pardalotus punctatus*
	Pied Currawong	*Strepera graculina*
	Sulphur-crested Cockatoo	*Cacatua galerita*
	Grey Fantail	*Rhipidura fuliginosa*
	Crimson Rosella	*Platycercus elegans*
	Leaden Flycatcher	*Myiagra rubecula*
	Yellow-faced Honeyeater	*Lichenostomus chrysops*
	Red Wattlebird	*Anthochaera carunculata*
	Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*
	Australian Raven	*Corvus coronoides*
	White-browed Scrubwren	*Sericornis frontalis*
	Striated Thornbill	*Acanthiza lineata*
	Laughing Kookaburra	*Dacelo novaeguineae*
	Galah	*Cacatua roseicapilla*
	Swamp Wallaby	*Wallabia bicolor*
Diurnal 16		
Diurnal 17	Striated Pardalote	*Pardalotus striatus*
	Spotted Pardalote	*Pardalotus punctatus*

	Little Raven	*Corvus mellori*
	Australian Magpie	*Gymnorhina tibicen*
	Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*
	Willie Wagtail	*Rhipidura leucophrys*
	White-throated Treecreeper	*Cormobates leucophaeus*
	Dusky Woodswallow	*Artamus cyanopterus*
	Diamond Firetail	*Stagonopleura guttata*
	Black-faced Cuckoo-shrike	*Coracina novaehollandiae*
	Grey Shrike-thrush	*Colluricincla harmonica*
	Galah	*Cacatua roseicapilla*
	Golden Whistler	*Pachycephala pectoralis*
	Red Wattlebird	*Anthochaera carunculata*
	Welcome Swallow	*Hirundo neoxena*
	White-winged Chough	*Corcorax melanorhamphos*
	Grey Fantail	*Rhipidura fuliginosa*
	Southern Whiteface	*Aphelocephala leucopsis*
	Brown Falcon	*Falco berigora*
	Noisy Miner	*Manorina melanocephala*
	Buff-rumped Thornbill	*Acanthiza reguloides*
	Red-rumped Parrot	*Psephotus haematonotus*
	Silvereye	*Zosterops lateralis*
Diurnal 18	White-winged Chough	*Corcorax melanorhamphos*
	Grey Fantail	*Rhipidura fuliginosa*
	Common Starling	*Sturnus vulgaris*
	Crimson Rosella	*Platycercus elegans*
	Eastern Rosella	*Platycercus eximius*
	Noisy Miner	*Manorina melanocephala*
	Striated Pardalote	*Pardalotus striatus*
	Willie Wagtail	*Rhipidura leucophrys*
	Golden Whistler	*Pachycephala pectoralis*
	Jacky Winter	*Microeca fascinans*
Diurnal 19	Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*
	Little Raven	*Corvus mellori*
	Striated Thornbill	*Acanthiza lineata*
	Buff-rumped Thornbill	*Acanthiza reguloides*
	Grey Fantail	*Rhipidura fuliginosa*
	Australian Magpie	*Gymnorhina tibicen*

	Splendid Fairy-wren	*Malurus splendens*
	Magpie-lark	*Grallina cyanoleuca*
	Galah	*Cacatua roseicapilla*
	Common Starling	*Sturnus vulgaris*
	Crimson Rosella	*Platycercus elegans*
	Sulphur-crested Cockatoo	*Cacatua galerita*
	Red Wattlebird	*Anthochaera carunculata*
	Red-rumped Parrot	*Psephotus haematonotus*
	* Varied Sittella	*Daphoenositta chrysoptera*
Bird 2	White-faced Heron	*Egretta novaehollandiae*
	* Rainbow Bee-eater	*Merops ornatus*
	Sulphur-crested Cockatoo	*Cacatua galerita*
	Australian Magpie	*Gymnorhina tibicen*
	Common Starling	*Sturnus vulgaris*
	Red-rumped Parrot	*Psephotus haematonotus*
	Red Wattlebird	*Anthochaera carunculata*
	Welcome Swallow	*Hirundo neoxena*
	Dusky Woodswallow	*Artamus cyanopterus*
	Nankeen Kestrel	*Falco cenchroides*
	Striated Pardalote	*Pardalotus striatus*
	Crested Pigeon	*Ocyphaps lophotes*
	House Sparrow	*Passer domesticus*
Bird 1	Australian Magpie	*Gymnorhina tibicen*
	Noisy Miner	*Manorina melanocephala*
	Yellow-faced Honeyeater	*Lichenostomus chrysops*
	Black-faced Cuckoo-shrike	*Coracina novaehollandiae*
	White-winged Chough	*Corcorax melanorhamphos*
	White-throated Treereeper	*Cormobates leucophaeus*
	Grey Fantail	*Rhipidura fuliginosa*
	Crimson Rosella	*Platycercus elegans*
	Striated Pardalote	*Pardalotus striatus*
	White-throated Gerygone	*Gerygone olivacea*
	Rufous Whistler	*Pachycephala rufiventris*
	Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*
	Superb Fairy-wren	*Malurus cyaneus*
	Welcome Swallow	*Hirundo neoxena*
	Dusky Woodswallow	*Artamus cyanopterus*

	Brown Falcon	*Falco berigora*
Bird 3	Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*
	Sulphur-crested Cockatoo	*Cacatua galerita*
	Red Wattlebird	*Anthochaera carunculata*
	Noisy Friarbird	*Philemon corniculatus*
	Striated Pardalote	*Pardalotus striatus*
	Noisy Miner	*Manorina melanocephala*
	Eastern Rosella	*Platycercus eximius*
	Striated Thornbill	*Acanthiza lineata*
	Common Starling	*Sturnus vulgaris*
	Australian Magpie	*Gymnorhina tibicen*
	Crimson Rosella	*Platycercus elegans*
	White-winged Chough	*Corcorax melanorhamphos*
	Galah	*Cacatua roseicapilla*
	Australian Wood Duck	*Chenonetta jubata*
	Pied Currawong	*Strepera graculina*
	White-throated Gerygone	*Gerygone olivacea*
	White-throated Treecreeper	*Cormobates leucophaeus*
	Buff-rumped Thornbill	*Acanthiza reguloides*
	Rufous Whistler	*Pachycephala rufiventris*
	Silvereye	*Zosterops lateralis*
	Willie Wagtail	*Rhipidura leucophrys*
	Black-faced Cuckoo-shrike	*Coracina novaehollandiae*
	Mistletoebird	*Dicaeum hirundinaceum*
Bird 4	Richard's Pipit	*Anthus novaeseelandiae*
	Sulphur-crested Cockatoo	*Cacatua galerita*
	Common Bronzewing	*Phaps chalcoptera*
	Sulphur-crested Cockatoo	*Cacatua galerita*
	Australian Magpie	*Gymnorhina tibicen*
	Little Raven	*Corvus mellori*
Bird 5	Pallid Cuckoo	*Cuculus pallidus*
	Laughing Kookaburra	*Dacelo novaeguineae*
	Australian Raven	*Corvus coronoides*
	Noisy Friarbird	*Philemon corniculatus*
	White-throated Treecreeper	*Cormobates leucophaeus*
	Australian Magpie	*Gymnorhina tibicen*
	Crimson Rosella	*Platycercus elegans*

	Grey Fantail	*Rhipidura fuliginosa*
	Grey Shrike-thrush	*Colluricincla harmonica*
	Leaden Flycatcher	*Myiagra rubecula*
	Rufous Whistler	*Pachycephala rufiventris*
	Pied Currawong	*Strepera graculina*
	Black-faced Cuckoo-shrike	*Coracina novaehollandiae*
	Striated Pardalote	*Pardalotus striatus*
	Yellow-faced Honeyeater	*Lichenostomus chrysops*
	Red Wattlebird	*Anthochaera carunculata*
	Magpie Lark	*Grallina cyanoleuca*
Bird 6	Noisy Friarbird	*Philemon corniculatus*
	Superb Fairy-wren	*Malurus cyaneus*
	Australian Magpie	*Gymnorhina tibicen*
	Crimson Rosella	*Platycercus elegans*
	Laughing Kookaburra	*Dacelo novaeguineae*
	Yellow-faced Honeyeater	*Lichenostomus chrysops*
	Red Wattlebird	*Anthochaera carunculata*
	Sulphur-crested Cockatoo	*Cacatua galerita*
	Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*
	White-browed Scrubwren	*Sericornis frontalis*
	Australian Raven	*Corvus coronoides*
	Grey Fantail	*Rhipidura fuliginosa*
	Spotted Pardalote	*Pardalotus punctatus*
Bird 7	Red Wattlebird	*Anthochaera carunculata*
	Sulphur-crested Cockatoo	*Cacatua galerita*
	Yellow-faced Honeyeater	*Lichenostomus chrysops*
	Grey Fantail	*Rhipidura fuliginosa*
	Australian Magpie	*Gymnorhina tibicen*
	Crimson Rosella	*Platycercus elegans*
	White-browed Scrubwren	*Sericornis frontalis*
	Common Starling	*Sturnus vulgaris*
	Silvereye	*Zosterops lateralis*
	Noisy Friarbird	*Philemon corniculatus*
	Spotted Pardalote	*Pardalotus punctatus*
	Superb Fairy-wren	*Malurus cyaneus*
	Laughing Kookaburra	*Dacelo novaeguineae*
	Grey Shrike-thrush	*Colluricincla harmonica*

Bird 8	Superb Fairy-wren	*Malurus cyaneus*
	Sulphur-crested Cockatoo	*Cacatua galerita*
	Noisy Friarbird	*Philemon corniculatus*
	Striated Pardalote	*Pardalotus striatus*
	Yellow-faced Honeyeater	*Lichenostomus chrysops*
	Red Wattlebird	*Anthochaera carunculata*
	Crimson Rosella	*Platycercus elegans*
	Australian Raven	*Corvus coronoides*
	Welcome Swallow	*Hirundo neoxena*
	Rufous Whistler?	*Pachycephala rufiventris*
	Australian Magpie	*Gymnorhina tibicen*
	White-browed Scrubwren	*Sericornis frontalis*
	European Goldfinch	*Carduelis carduelis*
Bird 9	Fairy Martin	*Hirundo ariel*
	Crimson Rosella	*Platycercus elegans*
	Australian Magpie	*Gymnorhina tibicen*
	Magpie Lark	*Grallina cyanoleuca*
	Noisy Miner	*Manorina melanocephala*
	Striated Pardalote	*Pardalotus striatus*
	Common Starling	*Sturnus vulgaris*
	Pied Currawong	*Strepera graculina*
	European Goldfinch	*Carduelis carduelis*
	Sulphur-crested Cockatoo	*Cacatua galerita*
	Little Raven	*Corvus mellori*
	Galah	*Cacatua roseicapilla*
	Spotted Pardalote	*Pardalotus punctatus*
	Little Raven	*Corvus mellori*
	Richard's Pipit	*Anthus novaeseelandiae*
	Yellow-tailed Black-Cockatoo	*Calyptorhynchus funereus*
Bird 10	Australian Magpie	*Gymnorhina tibicen*
	Red Wattlebird	*Anthochaera carunculata*
	Crimson Rosella	*Platycercus elegans*
	Striated Pardalote	*Pardalotus striatus*
	Sulphur-crested Cockatoo	*Cacatua galerita*
	Noisy Miner	*Manorina melanocephala*
	Magpie Lark	*Grallina cyanoleuca*
	Nankeen Kestrel	*Falco cenchroides*

	Fairy Martin	*Hirundo ariel*
	Red Wattlebird	*Anthochaera carunculata*
Bird 11	Sulphur-crested Cockatoo	*Cacatua galerita*
	Australian Magpie	*Gymnorhina tibicen*
	Little Raven	*Corvus mellori*
	Crimson Rosella	*Platycercus elegans*
	Striated Pardalote	*Pardalotus striatus*
	Common Starling	*Sturnus vulgaris*
	Willie Wagtail	*Rhipidura leucophrys*
	Little Raven	*Corvus mellori*
	Common Starling	*Sturnus vulgaris*
	Fairy Martin	*Hirundo ariel*
	Nankeen Kestrel	*Falco cenchroides*
	Australian Wood Duck	*Chenonetta jubata*
Bird 12	Australian Magpie	*Gymnorhina tibicen*
	Striated Pardalote	*Pardalotus striatus*
	Yellow-rumped Thorbill	*Acanthiza chrysorrhoa*
	Eastern Rosella	*Platycercus eximius*
	Australian Raven	*Corvus coronoides*
	Common Starling	*Sturnus vulgaris*
	Red-rumped Parrot	*Psephotus haematonotus*
	Noisy Miner	*Manorina melanocephala*
Bird 13	Richard's Pipit	*Anthus novaeseelandiae*
	Brown Falcon	*Falco berigora*
	Fairy Martin	*Hirundo ariel*
	Skylark	*Alauda arvensis*
	Red-rumped Parrot	*Psephotus haematonotus*
	Australian Raven	*Corvus coronoides*
	Fairy Martin	*Hirundo ariel*
Bird 14	Australian Magpie	*Gymnorhina tibicen*
	Striated Pardalote	*Pardalotus striatus*
	Australian Raven	*Corvus coronoides*
	Noisy Miner	*Manorina melanocephala*
	Crimson Rosella	*Platycercus elegans*
	Brown Goshawk	*Accipiter fasciatus*
	Magpie-lark	*Grallina cyanoleuca*
	Grey Butcherbird	*Cracticus torquatus*

	Black-faced Cuckoo-shrike	*Coracina novaehollandiae*
	Wedge-tailed Eagle	*Aquila audax*
	Sulphur-crested Cockatoo	*Cacatua galerita*
	Eastern Rosella	*Platycercus eximius*
Bird 15	Wedge-tailed Eagle	*Aquila audax*
	Australian Magpie	*Gymnorhina tibicen*
	Eastern Rosella	*Platycercus eximius*
	Crimson Rosella	*Platycercus elegans*
	Striated Pardalote	*Pardalotus striatus*
	Sulphur-crested Cockatoo	*Cacatua galerita*
	Australian Raven	*Corvus coronoides*
	Nankeen Kestrel	*Falco cenchroides*
	White-faced Heron	*Egretta novaehollandiae*
	Magpie-lark	*Grallina cyanoleuca*
	Red Wattlebird	*Anthochaera carunculata*
	Noisy Miner	*Manorina melanocephala*
	Laughing Kookaburra	*Dacelo novaeguineae*
	Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*
	Crested Pigeon	*Ocyphaps lophotes*
Bird 16	Galah	*Cacatua roseicapilla*
	Australian Magpie	*Gymnorhina tibicen*
	Striated Pardalote	*Pardalotus striatus*
	Crimson Rosella	*Platycercus elegans*
	Grey Butcherbird	*Cracticus torquatus*
	Black-faced Cuckoo-shrike	*Coracina novaehollandiae*
	Pied Currawong	*Strepera graculina*
	Red Wattlebird	*Anthochaera carunculata*
	Noisy Miner	*Manorina melanocephala*
	White-throated Treecreeper	*Cormobates leucophaeus*
	Magpie-lark	*Grallina cyanoleuca*
	Eastern Rosella	*Platycercus eximius*
	Noisy Friarbird	*Philemon corniculatus*
	Australian Magpie	*Gymnorhina tibicen*
	Red Wattlebird	*Anthochaera carunculata*
	Striated Thornbill	*Acanthiza lineata*
	Willie Wagtail	*Rhipidura leucophrys*
Bird 17	Pied Currawong	*Strepera graculina*

	Crimson Rosella	*Platycercus elegans*
	White-throated Treecreeper	*Cormobates leucophaeus*
	Australian Magpie	*Gymnorhina tibicen*
	Striated Pardalote	*Pardalotus striatus*
	Noisy Miner	*Manorina melanocephala*
	Wedge-tailed Eagle	*Aquila audax*
	Red-rumped Parrot	*Psephotus haematonotus*
	Grey Currawong	*Strepera versicolor*
Bird 18	Yellow-faced Honeyeater	*Lichenostomus chrysops*
	Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*
	Striated Pardalote	*Pardalotus striatus*
	Eastern Rosella	*Platycercus eximius*
	Common Starling	*Sturnus vulgaris*
	Red-rumped Parrot	*Psephotus haematonotus*
	Red Wattlebird	*Anthochaera carunculata*
	Crimson Rosella	*Platycercus elegans*
	Australian Magpie	*Gymnorhina tibicen*
	Fairy Martin	*Hirundo ariel*
	Brown Thornbill	*Acanthiza pusilla*
Bird 19	Nankeen Kestrel	*Falco cenchroides*
	Sulphur-crested Cockatoo	*Cacatua galerita*
	Grey Shrike-thrush	*Colluricincla harmonica*
	Crimson Rosella	*Platycercus elegans*
	Yellow-faced Honeyeater	*Lichenostomus chrysops*
	Australian Magpie	*Gymnorhina tibicen*
	Striated Pardalote	*Pardalotus striatus*
	Common Starling	*Sturnus vulgaris*
	Fairy Martin	*Hirundo ariel*
Bird 20	Red-rumped Parrot	*Psephotus haematonotus*
	Sulphur-crested Cockatoo	*Cacatua galerita*
	Striated Pardalote	*Pardalotus striatus*
	Australian Magpie	*Gymnorhina tibicen*
	Common Starling	*Sturnus vulgaris*
	Crimson Rosella	*Platycercus elegans*
	Galah	*Cacatua roseicapilla*
	Richard's Pipit	*Anthus novaeseelandiae*
	Red Wattlebird	*Anthochaera carunculata*

	Fairy Martin	*Hirundo ariel*
Bird 21	Fairy Martin	*Hirundo ariel*
	Red-rumped Parrot	*Psephotus haematonotus*
	Eastern Rosella	*Platycercus eximius*
	Crimson Rosella	*Platycercus elegans*
	Skylark	*Alauda arvensis*
	Common Starling	*Sturnus vulgaris*
Bird 22	Striated Pardalote	*Pardalotus striatus*
	Crimson Rosella	*Platycercus elegans*
	Red-rumped Parrot	*Psephotus haematonotus*
	Australian Magpie	*Gymnorhina tibicen*
	Common Starling	*Sturnus vulgaris*
	Skylark	*Alauda arvensis*
	Sulphur-crested Cockatoo	*Cacatua galerita*
	Fairy Martin	*Hirundo ariel*
	Richard's Pipit	*Anthus novaeseelandiae*
	Yellow-faced Honeyeater	*Lichenostomus chrysops*
	Nankeen Kestrel	*Falco cenchroides*
Bird 23	Red-rumped Parrot	*Psephotus haematonotus*
	Striated Pardalote	*Pardalotus striatus*
	Australian Magpie	*Gymnorhina tibicen*
	Welcome Swallow	*Hirundo neoxena*
Bird 24	Nankeen Kestrel	*Falco cenchroides*
	Australian Magpie	*Gymnorhina tibicen*
	Little Raven	*Corvus mellori*
Bird 25	Australian Magpie	*Gymnorhina tibicen*
	Magpie-lark	*Grallina cyanoleuca*
	Australasian Grebe	*Tachybaptus novaehollandiae*
	Black-faced Cuckoo-shrike	*Coracina novaehollandiae*
	Common Starling	*Sturnus vulgaris*
	Nankeen Kestrel	*Falco cenchroides*
Bird 26	Australian Magpie	*Gymnorhina tibicen*
	Crimson Rosella	*Platycercus elegans*
	Striated Pardalote	*Pardalotus striatus*
	Leaden Flycatcher	*Myiagra rubecula*
	White-browed Woodswallow	*Artamus superciliosus*
Bird 27	Buff-rumped Thornbill	*Acanthiza reguloides*

	Crimson Rosella	*Platycercus elegans*
	Black-faced Cuckoo-shrike	*Coracina novaehollandiae*
	Leaden Flycatcher	*Myiagra rubecula*
	Australian Magpie	*Gymnorhina tibicen*
	Magpie-lark	*Grallina cyanoleuca*
	White-winged Triller	*Lalage sueurii*
	Red Wattlebird	*Anthochaera carunculata*
	Willie Wagtail	*Rhipidura leucophrys*
	Pied Currawong	*Strepera graculina*
	Noisy Friarbird	*Philemon corniculatus*
	Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*
	Brown Thornbill	*Acanthiza pusilla*
Bird 28	Australian Magpie	*Gymnorhina tibicen*
	Australian Raven	*Corvus coronoides*
Bird 29	Richard's Pipit	*Anthus novaeseelandiae*
	Common Starling	*Sturnus vulgaris*
	Australian Magpie	*Gymnorhina tibicen*
	Fairy Martin	*Hirundo ariel*
Bird 30	Australian Magpie	*Gymnorhina tibicen*
	Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*
	Striated Pardalote	*Pardalotus striatus*
	Wedge-tailed Eagle	*Aquila audax*
	Australian Raven	*Corvus coronoides*
	Common Starling	*Sturnus vulgaris*
	White-browed Woodswallow	*Artamus superciliosus*
	Fairy Martin	*Hirundo ariel*
	Nankeen Kestrel	*Falco cenchroides*
Bird 31	Crimson Rosella	*Platycercus elegans*
	White-browed Woodswallow	*Artamus superciliosus*
	Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*
	Buff-rumped Thornbill	*Acanthiza reguloides*
Bird 32	Noisy Miner	*Manorina melanocephala*
	Crimson Rosella	*Platycercus elegans*
	Sulphur-crested Cockatoo	*Cacatua galerita*
	Striated Pardalote	*Pardalotus striatus*
	Australian Magpie	*Gymnorhina tibicen*
	Eastern Rosella	*Platycercus eximius*

Bird 33	Laughing Kookaburra	*Dacelo novaeguineae*
	Crimson Rosella	*Platycercus elegans*
	Grey Shrike-thrush	*Colluricincla harmonica*
	Australian Raven	*Corvus coronoides*
	Australian Magpie	*Gymnorhina tibicen*
	White-winged Chough	*Corcorax melanorhamphos*
	Spotted Pardalote	*Pardalotus punctatus*
	Striated Pardalote	*Pardalotus striatus*
	Noisy Miner	*Manorina melanocephala*
	*Gang-gang Cockatoo	*Callocephalon fimbriatum*
	Eastern Rosella	*Platycercus eximius*
	Pied Currawong	*Strepera graculina*
	Galah	*Cacatua roseicapilla*
	Magpie-lark	*Grallina cyanoleuca*
	Grey Butcherbird	*Cracticus torquatus*
	Sulphur-crested Cockatoo	*Cacatua galerita*
Bird 34	Noisy Miner	*Manorina melanocephala*
	Striated Pardalote	*Pardalotus striatus*
	Eastern Rosella	*Platycercus eximius*
	Crimson Rosella	*Platycercus elegans*
	Sulphur-crested Cockatoo	*Cacatua galerita*
	Australian Magpie	*Gymnorhina tibicen*
	Laughing Kookaburra	*Dacelo novaeguineae*
	Pied Currawong	*Strepera graculina*
	Galah	*Cacatua roseicapilla*
	Australian Pelican	*Pelecanus conspicillatus*
Bird 35	Australian Magpie	*Gymnorhina tibicen*
	Noisy Miner	*Manorina melanocephala*
	Red Wattlebird	*Anthochaera carunculata*
	Striated Pardalote	*Pardalotus striatus*
	Crimson Rosella	*Platycercus elegans*
	Magpie-lark	*Grallina cyanoleuca*
	Grey Shrike-thrush	*Colluricincla harmonica*
	Sulphur-crested Cockatoo	*Cacatua galerita*
Bird 36	Australian Magpie	*Gymnorhina tibicen*
	Striated Pardalote	*Pardalotus striatus*
	Crimson Rosella	*Platycercus elegans*

	Little Raven	*Corvus mellori*
	Noisy Miner	*Manorina melanocephala*
	Yellow-faced Honeyeater	*Lichenostomus chrysops*
	Grey Shrike-thrush	*Colluricincla harmonica*
	Galah	*Cacatua roseicapilla*
	Sulphur-crested Cockatoo	*Cacatua galerita*
	European Goldfinch	*Carduelis carduelis*
	Australian Raven	*Corvus coronoides*
	Laughing Kookaburra	*Dacelo novaeguineae*
	White-browed Woodswallow	*Artamus superciliosus*
Bird 37	Nankeen Kestrel	*Falco cenchroides*
	Brown Falcon	*Falco berigora*
	Pied Currawong	*Strepera graculina*
	Australian Magpie	*Gymnorhina tibicen*
	Sulphur-crested Cockatoo	*Cacatua galerita*
	Striated Pardalote	*Pardalotus striatus*
	Noisy Miner	*Manorina melanocephala*
	Eastern Rosella	*Platycercus eximius*
	Crimson Rosella	*Platycercus elegans*

Reptile surveys

Survey	Cluster	Date	Survey effort	Rocks	Ants	Logs	Common name	Species	No
Diurnal 1	1	23/03/2010	15	20	1	15	.	.	
Diurnal 1			15	112	10	17	-	-	
Diurnal 2			15	0	0	40	-	-	
Diurnal 3			15	0	0	2			
Diurnal 4 (track)	1/2 creek	23/03/2010	20	25	2	5	.	.	
Diurnal 4 (track)			N/A	2	0	9			
Diurnal 5	1		20	11	31	5	-		
Diurnal 6	2 west (HBT 5)	23/03/2010	25	71	5	5	Three-toed Skink	*Hemiergis decresiensis*	3
Diurnal 6	2 west (HBT 5)	23/03/2010		51	16		Cunningham's Skink	*Egernia cunninghami*	1
Diurnal 7	3 north	26/03/2010	15	-	-	10	Stumpy-tailed Lizard	*Tiliqua rugosa*	1
Diurnal 8	3 (east of)	24/03/2010	25	34	6	4	Three-toed Skink	*Hemiergis decresiensis*	1
							Cunningham's Skink	*Egernia cunninghami*	1
Diurnal 9	4 north (HBT 6)	24/03/2010	20			34	.	.	
Diurnal 9	4 nth	24/03/2010	25	5	9	18	Three-toed Skink	*Hemiergis decresiensis*	
Diurnal 10	4	24/03/2010	15	32	19	17	-	-	
Diurnal 11	4	24/03/2010	15	0	0	6	-	-	
Diurnal 12	4 south (HBT 8)	24/03/2010	15			15	.	.	
Diurnal 13	4	24-Mar	30	0	0	23	-	-	
Diurnal 14	6 south (Poile)	25/03/2010	40	84	7	10	Three-toed Skink	*Hemiergis decresiensis*	7
							Stumpy-tailed Lizard	*Tiliqua rugosa*	1
							Cunningham's Skink	*Egernia cunninghami*	3

Survey	Cluster	Date	Survey effort	Rocks	Ants	Logs	Common name	Species	No
Diurnal 15	Granger	22/03/2010	30	123	19	35	White's Skink	*Egernia whitii*	2
							Three-toed Skink	*Hemiergis decresiensis*	1
							Eastern Three-lined Skink	*Bassiana duperreyi*	3
							Cunningham's Skink	*Egernia cunninghami*	1
Diurnal 15	Granger	22/03/2010	15	60	9		Cunningham's Skink	*Egernia cunninghami*	2
							Stumpy-tailed Lizard	*Tiliqua rugosa*	1
Diurnal 16	Poile	22/03/2010	30	133	38	37	Stumpy-tailed Lizard	*Tiliqua rugosa*	1
							Jacky Lizard	*Amphibolurus muricatus*	2
							Garden Skink	*Lampropholis guichenoti*	1
Diurnal 17	6	240/3/2010	20	15	4	10	-	-	
Diurnal 18	6 (HBT 9 AM)	25/03/2010	40	19	-	40	Blotched Blue-tongued Lizard	*Tiliqua nigrolutea*	1
Diurnal 19	road verge nth	25/03/2010	15			23	.	.	
Reptile 1	3	23/03/2010	20						
Reptile 2	shearers quarters	23/03/2010	20			21	Tyler's Toadlet	*Uperoleia tyleri*	1
							Three-toed Skink	*Hemiergis decresiensis*	1
							Cunningham's Skink	*Egernia cunninghami*	1
Reptile 3	5	23/03/2010	20	152	33	20	Stumpy-tailed Lizard	*Tiliqua rugosa*	1
							Spotted Marsh Frog	*Limnodynastes tasmaniensis*	1

Survey	Cluster	Date	Survey effort	Rocks	Ants	Logs	Common name	Species	No
Reptile 4	Themeda tracks	25/03/2010	45	12		35	Stumpy-tailed Lizard	*Tiliqua rugosa*	
Reptile 5	6	23/03/2010	20						
Reptile 6	6	24/03/2010	30	49	4	10	-	-	
Reptile 7	5	12/11/2010	60	108	20		Blotched Blue-tongued Lizard	*Tiliqua nigrolutea*	1
							Cunningham's Skink	*Egernia cunninghami*	1
Reptile 8	4	11/11/2010	20	34	7				
Reptile 9	2	11/11/2010	30	57	5				
Reptile 10	6	11/11/2010	30			10			
Reptile 11	1	11/11/2010	15	6	1		Cunningham's Skink	*Egernia cunninghami*	4
Reptile 12	2	11/11/2010	15	16	5				

Amphibians

Survey	Cluster	Date	Survey effort	Common name	Species
Frog 1	8 (poile)	22/03/2010	0:25	Common Froglet	*Crinia signifera*
				Plains Froglet	*Crinia parasignifera*
Frog 2	6	23/03/2010	0:25	Plains Froglet	*Crinia parasignifera*
Frog 3	3	24/03/2010	0:25	Common Froglet	*Crinia signifera*
				Plains Froglet	*Crinia parasignifera*

Nocturnal

Survey	Date	Type	Start time	End time	People	Survey effort	Common name	Species	No.	Observation type[4]
Nocturnal 1	22/03/2010	stag watch	19:10	20:10	2	2:00				
		foot spotlight	20:10	20:30	2	0:40	Rabbit		1	O
							Southern Boobook		1	W
		call playback	19:30	20:00	1	0:30	-			
		vehicle spotlight	20:40	21:20	2	1:20	Hare		2	O
							Brushtail Possum		2	O
							Eastern Grey Kangaroo		7	O
							Fox		2	O
							Rabbit		2	O
Nocturnal 2	23/03/2010	stag watch	19:00	20:00	2	2:00	-			
		call playback	19:30	20:00	1	0:30	-			
		foot spotlight	20:10	21:00	2	1:40	Brushtail Possum		8	O
							Sugar Glider		2	O
							Southern Boobook		1	W
							Swamp Wallaby		1	O

[4] Observation types = information provided to DECCW under scientific licence. O = observed, W = heard call

Survey	Date	Type	Start time	End time	People	Survey effort	Common name	Species	No.	Observation type[4]
		vehicle spotlight	21:05	21:30	2	0:50	Brushtail Possum		1	O
Nocturnal 3	24/03/2010	stag watch	19:00	20:00	2	2:00	Microbats (Tadarida?)		10+	W/O
		call playback	19:30	20:00	1	0:30	-			
		foot spotlight	20:00	20:40	2	1:20	Ringtail Possum		5	O
							Southern Boobook		1	O
							Brushtail Possum		2	O
							Sugar Glider		1	O
							Rabbit		2	O
							Fox		2	O
		vehicle spotlight	20:40	21:45	2	2:10	Brushtail Possum		1	O
							Fox		5	O
							Eastern Grey Kangaroo		8	O
Nocturnal 4	25/03/2010	stag watch	19:15	20:00	2	1:30	-			
		call playback	20:30	21:00	1	0:30	-			
		foot spotlight	20:00	20:30	2	1:00	Rabbit		2	O
		foot spotlight	20:30	21:00	1	0:30	Fox		1	O
								Limnodynastes tasmaniensis		W
		vehicle	21:10	21:40	2	1:00	Brushtail Possum		2	O

Survey	Date	Type	Start time	End time	People	Survey effort	Common name	Species	No.	Observation type[4]
		spotlight								
							Rabbit		3	O
							Eastern Grey Kangaroo		2	O
Nocturnal 5	25/03/2010	call playback	21:45	22:15	1	0:30	-			
		foot spotlight	21:55	22:15	2	0:40	Sugar Glider		1	O

Anabat

Date	Survey	Cluster	No files	Total no. calls	Threatened species recorded - common name	Species name	No. calls	Anabat location description
22/03/2010	Nocturnal 1	Previously Cluster 7 (south)	84	52	Yellow-bellied Sheathtail-bat Eastern Bentwing-Bat Forest Bat/ Bentwing complex	*Saccolaimus flaviventris* *Miniopterus orianae oceanensis* *Vespadelus/ Miniopterus complex*	1 1 3	Edge of forest/pasture on ridge including HBT
23/03/2010	Nocturnal 2	1	210	131	Eastern Bentwing-Bat Large-footed Myotis Forest Bat/ Bentwing complex	*Miniopterus orianae oceanensis* *Myotis macropus* *Vespadelus/ Miniopterus complex*	4 2 7	Along creek with riparian woodland including HBT
24/03/2010	Nocturnal 3	4	583	510	Eastern Bentwing-Bat East Coast Freetail-Bat	*Miniopterus orianae oceanensis* *Mormopterus norfolkensis* *Saccolaimus flaviventris*	7 10	In saddle with pasture and scattered trees, between two woodland patches with lots of HBT, and dam nearby

Date	Survey	Cluster	No files	Total no. calls	Threatened species recorded - common name	Species name	No. calls	Anabat location description
					Yellow-bellied Sheathtail-bat Forest Bat/ Bentwing complex	*Vespadelus/ Miniopterus complex*	17 15	
25/03/2010	Nocturnal 5	3	79	66	Eastern Bentwing-Bat Forest Bat/ Bentwing complex	*Miniopterus orianae oceanensis* *Vespadelus/ Miniopterus complex*	2 3	In saddle with woodland patch with HBT not far from pasture
10/11/2010	Anabat 1	4	413	394	Eastern Bentwing-Bat East Coast Freetail-Bat Yellow-bellied Sheathtail-bat	*Miniopterus orianae oceanensis* *Mormopterus norfolkensis* *Saccolaimus flaviventris*	6 8 2	Exotic pasture near woodland, at dam
10/11/2010	Anabat 2	4	1167	822	Eastern Bentwing-Bat East Coast Freetail-Bat Yellow-bellied Sheathtail-bat	*Miniopterus orianae oceanensis* *Mormopterus norfolkensis* *Saccolaimus flaviventris*	6 10 1	Exotic pasture with scattered trees near farm dam
8/12/2009	Anabat 3	6	70	9	-	-		
8/12/2009	Anabat 4	4	30	13	Eastern Bentwing-Bat	*Miniopterus orianae oceanensis*	1	Near farm dam
9/12/2009	Anabat 5	4	64	30	Eastern Bentwing-Bat	*Miniopterus orianae oceanensis*	2	Near farm dam
9/12/2009	Anabat 6	4	249	20	-	-		
10/12/2009	Anabat 7	Granger	37	28	-	-		
10/12/2009	Anabat 8	Granger	71	17	-	-		

Incidental observations

Common name	Species	No.	Habitat	Observation type	Observer
Varied Sittella	*Daphoenositta chrysoptera*	5	see HBT 7	O	AM
Wedge-tailed Eagle	*Aquila audax*	2	see HBT 5	O	AM
Common Long-necked Tortoise	*Chelodina longicollis*	1	dam	O	AM
Common Froglet	*Crinia signifera*	4	dam	W	AM
Spotted Marsh Frog	*Limnodynastes tasmaniensis*	10	Shearers quarters dam	W	AM
Southern Brown Tree Frog	*Litoria ewingii*	3	Shearers quarters dam	W/O	AM
Plains Froglet	*Crinia parinsignifera*	10	Shearers quarters dam	W	AM
Common Froglet	*Crinia signifera*	15	Shearers quarters dam	W	AM
Common Long-necked Tortoise	*Chelodina longicollis*	1	Shearers quarters dam	O	AM
Tiger Snake	*Notechis scutatus*	1	road	O	AM
Diamond Firetail	*Stagonopleura guttata*	2	Shrubbery near house	O	AM
Brown Falcon	*Falco berigora*	1		O	BH
Peregrine Falcon	*Falco peregrinus*	1		O	BH
Grey Butcherbird	*Cracticus torquatus*	2		O	BH
Grey Fantail	*Rhipidura fuliginosa*	5		O	BH
Striated Pardalote	*Pardalotus striatus*	2		O	BH
Black-faced Cuckoo-shrike	*Coracina novaehollandiae*	2		O	BH
Spotted Pardalote	*Pardalotus punctatus*	?		W	BH
White-throated Treecreeper	*Cormobates leucophaeus*	?		W	BH
Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*	8		O	BH
Australian Magpie	*Gymnorhina tibicen*	5		W	BH

Common name	Species	No.	Habitat	Observation type	Observer
Crimson Rosella	*Platycercus roseicapilla*	3		O	BH
Rose Robin	*Petroica rosea*	1		O	BH
Red Wattlebird	*Anthochaera carunculata*	1		O	BH
Nankeen Kestrel	*Falco cenchroides*	1		O	BH
House Mouse	*Mus musculus*				
Diamond Firetail	*Stagonopleura guttata*	2	Cluster 6 in woodland	O	KC
White-fronted Chat	*Epthianura albifrons*	3	Paddock south of proposed substation (southernmost)	O	AM
Brown Treecreeper	*Climacteris picumnus*	2	Shearers quarters (west of proposal site)	O	AM

FAUNA SPECIES LIST

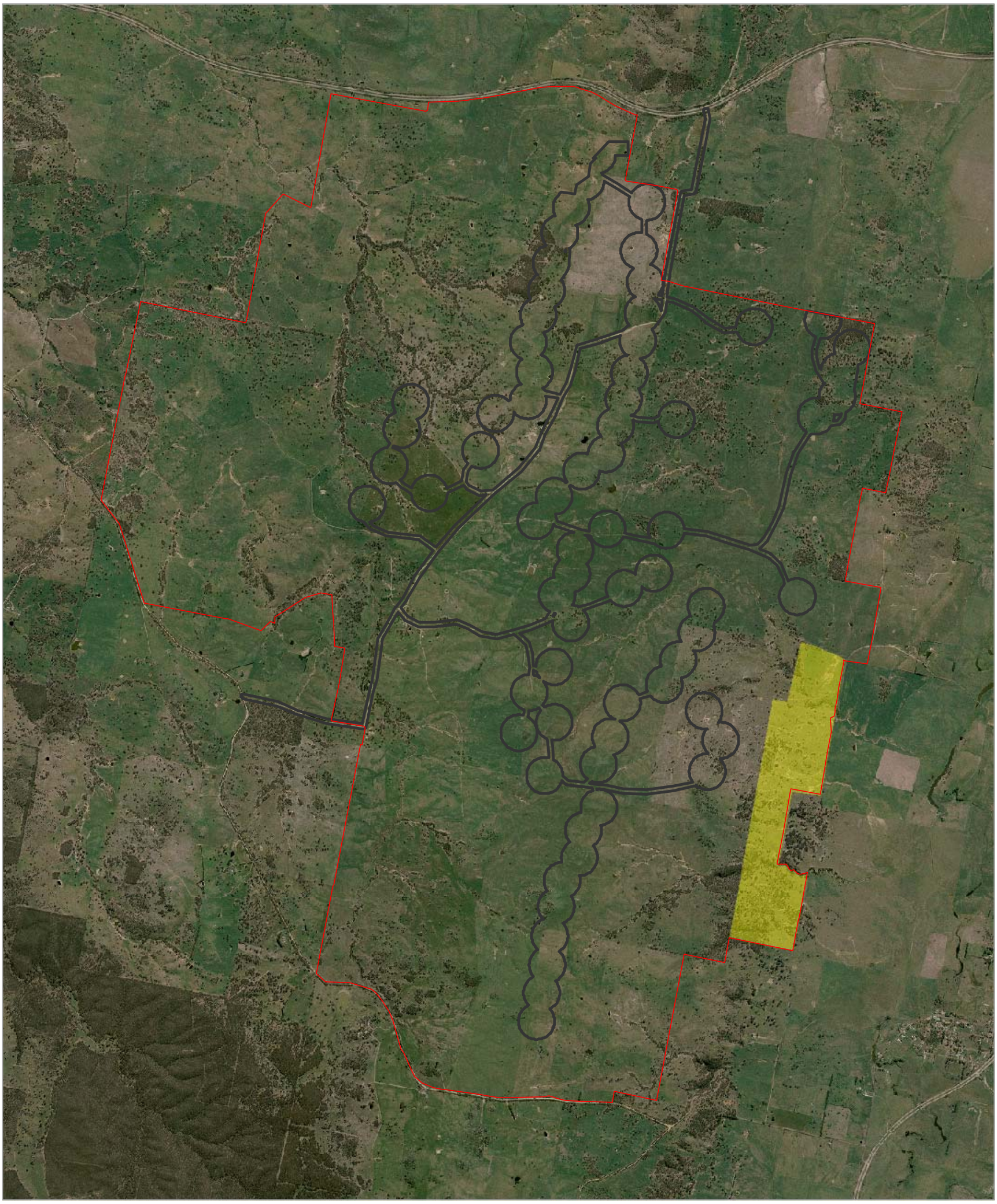
Scientific	Common	Scientific	Common
Birds			
Tachybaptus novaehollandiae	Australasian Grebe	*Manorina melanocephala*	Noisy Miner
Falco longipennis	Australian Hobby	*Anas superciliosa*	Pacific Black Duck
Gymnorhina tibicen	Australian Magpie	*Cuculus pallidus*	Pallid Cuckoo
Pelecanus conspicillatus	Australian Pelican	*Falco peregrinus*	Peregrine Falcon
Corvus coronoides	Australian Raven	*Phalacrocorax varius*	Pied Cormorant
Threskiornis molucca	Australian White Ibis	*Strepera graculina*	Pied Currawong
Chenonetta jubata	Australian Wood Duck	*Merops ornatus*	Rainbow Bee-eater
Coracina novaehollandiae	Black-faced Cuckoo-shrike	*Anthochaera carunculata*	Red Wattlebird
Falco berigora	Brown Falcon	*Psephotus haematonotus*	Red-rumped Parrot

Scientific	Common	Scientific	Common
Accipiter fasciatus	Brown Goshawk	*Anthus novaeseelandiae*	Richard's Pipit
Acanthiza pusilla	Brown Thornbill	*Petroica rosea*	Rose Robin
Climacteris picumnus	Brown Treecreeper	*Pachycephala rufiventris*	Rufous Whistler
Melithreptus brevirostris	Brown-headed Honeyeater	*Myzomela sanguinolenta*	Scarlet Honeyeater
Acanthiza reguloides	Buff-rumped Thornbill	*Zosterops lateralis*	Silvereye
Phaps chalcoptera	Common Bronzewing	*Alauda arvensis*	Skylark
Acridotheres tristis	Common Myna	*Ninox novaeseelandiae*	Southern Boobook
Sturnus vulgaris	Common Starling	*Aphelocephala leucopsis*	Southern Whiteface
Ocyphaps lophotes	Crested Pigeon	*Malurus splendens*	Splendid Fairy-wren
Platycercus elegans	Crimson Rosella	*Pardalotus punctatus*	Spotted Pardalote
Stagonopleura guttata	Diamond Firetail	*Threskiornis spinicollis*	Straw-necked Ibis
Taeniopygia bichenovii	Double-barred Finch	*Pardalotus striatus*	Striated Pardalote
Artamus cyanopterus	Dusky Woodswallow	*Acanthiza lineata*	Striated Thornbill
Platycercus eximius	Eastern Rosella	*Cacatua galerita*	Sulphur-crested Cockatoo
Carduelis carduelis	European Goldfinch	*Malurus cyaneus*	Superb Fairy-wren
Hirundo ariel	Fairy Martin	*Polytelis swainsonii*	Superb Parrot
Cacatua roseicapilla	Galah	*Daphoenositta chrysoptera*	Varied Sittella
Callocephalon fimbriatum	Gang-gang Cockatoo	*Aquila audax*	Wedge-tailed Eagle
Pachycephala pectoralis	Golden Whistler	*Hirundo neoxena*	Welcome Swallow
Phalacrocorax carbo	Great Cormorant	*Sericornis frontalis*	White-browed Scrubwren
Cracticus torquatus	Grey Butcherbird	*Artamus superciliosus*	White-browed Woodswallow
Strepera versicolor	Grey Currawong	*Lichenostomus leucotis*	White-eared Honeyeater
Rhipidura fuliginosa	Grey Fantail	*Egretta novaehollandiae*	White-faced Heron

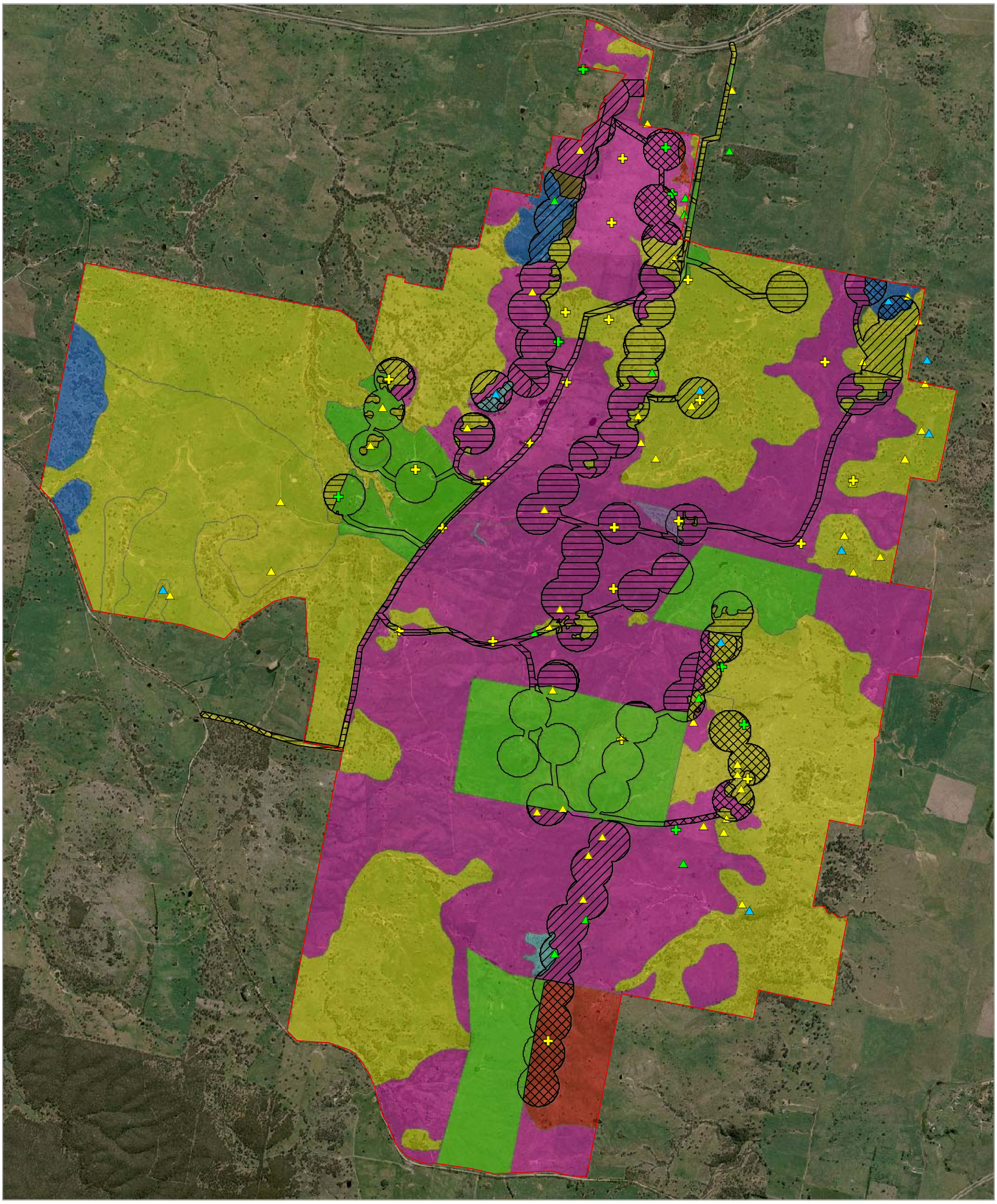
Scientific	Common	Scientific	Common
Colluricincla harmonica	Grey Shrike-thrush	*Epthianura albifrons*	White-fronted Chat
Passer domesticus	House Sparrow	*Melithreptus lunatus*	White-naped Honeyeater
Microeca fascinans	Jacky Winter	*Gerygone olivacea*	White-throated Gerygone
Dacelo novaeguineae	Laughing Kookaburra	*Cormobates leucophaeus*	White-throated Treecreeper
Myiagra rubecula	Leaden Flycatcher	*Corcorax melanorhamphos*	White-winged Chough
Corvus mellori	Little Raven	*Lalage sueurii*	White-winged Triller
Grallina cyanoleuca	Magpie-lark	*Rhipidura leucophrys*	Willie Wagtail
Artamus personatus	Masked Woodswallow	*Lichenostomus chrysops*	Yellow-faced Honeyeater
Dicaeum hirundinaceum	Mistletoebird	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill
Falco cenchroides	Nankeen Kestrel	*Calyptorhynchus funereus*	Yellow-tailed Black-Cockatoo
Philemon corniculatus	Noisy Friarbird		
Mammals			
Lepus capensis	Brown Hare	*Oryctolagus cuniculus*	European Rabbit
Trichosurus vulpecula	Common Brushtail Possum	*Mus musculus*	House Mouse
Pseudocheirus peregrinus	Common Ringtail Possum	*Vulpes vulpes*	Red Fox
Vombatus ursinus	Common Wombat	*Tachyglossus aculeatus*	Short-beaked Echidna
Macropus giganteus	Eastern Grey Kangaroo	*Petaurus breviceps*	Sugar Glider
Wallabia bicolor	Swamp Wallaby	*Chalinolobus morio*	Chocolate Wattle Bat
Reptiles			
Acritoscincus duperreyi	Eastern Three-lined Skink	*Delma inornata*	Olive Legless Lizard

APPENDIX F ADDITIONAL MAPS

COLLECTOR WINDFARM - PROPOSED OFFSET AREA



COLLECTOR WINDFARM: COMBINED FLORA SURVEY EFFORT AND VEGETATION TYPES



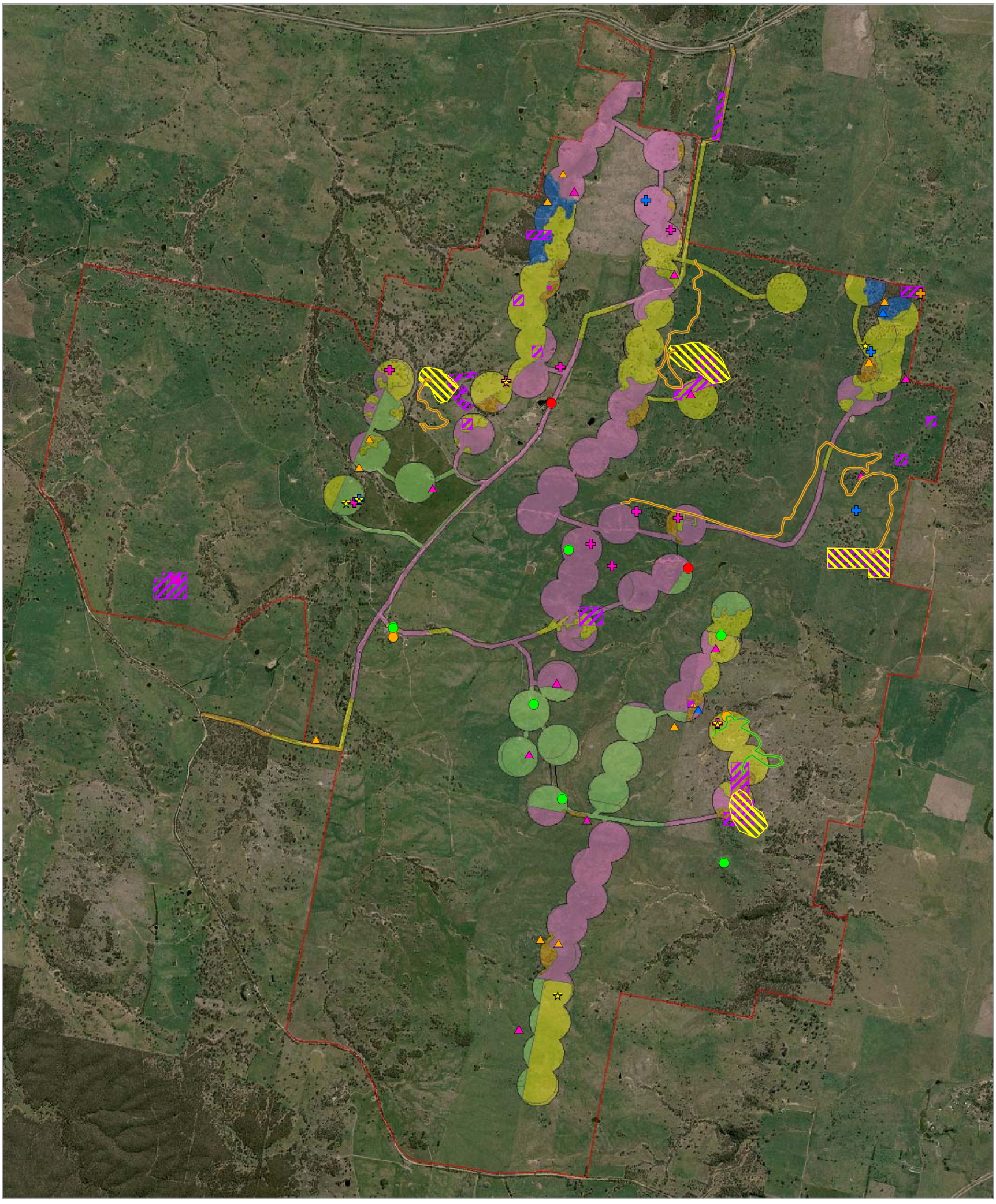
Site boundary
Development envelope
Nov 2010 survey points
Random meander
Inspection point
Mar 2009 survey points
Quadrat and Random Meander
Random Meander only
Inspection point

Vegetation type
Box-Gum Woodland (tree cover)
Box-Gum Woodland Secondary Grassland
Brittle Gum - Broad Leaved Peppermint Dry Forest
White Gum Forest
Snow Gum Grassy Woodland
Native dominated pasture
Exotic dominated pasture
Planted non local vegetation

Vegetation condition
Good
Moderate
Poor

0 0.5 1 Kilometres
1:35000 @ A3
Reference: 1523-4
Prepared by: ngh environmental
www.nghenvironmental.com.au

COLLECTOR WINDFARM: FAUNA SURVEY EFFORT AND HABITAT TYPES



APPENDIX G HOLLOW-BEARING TREE REMOVAL PROTOCOL

Prior to clearing

- Clearly mark all trees containing hollows which are to be removed. Features that are useful for identifying HBTs include:
    - Senescent trees.
    - Snapped off branches that have potential to develop into spout hollows.
    - Broken off canopies (leaving 'pipe' trees) that have potential to develop into trunk spouts.
    - Damage to trunk such as disease, areas of rot, etc. that have potential to develop into trunk or branch hollows.
    - Apparent depressions or cavities where hollows may form such as at trunk/branch joints or at the fork of the trunk above the bole.
- Check for animals in the zone of disturbance before clearing and scare them away or remove them before beginning operations where possible. Re-check after clearing to ensure no animals have become trapped or injured during clearing operations.

Clearing hollow-bearing trees

- Clear surrounding native vegetation first and allow hollow-bearing trees to remain standing overnight. After at least 1 night, hollow-bearing trees can be removed in accordance with the steps below.
- When removing hollow-bearing trees, a spotter should be present at each tree to be removed to look for signs of animal movement in the tree to be cleared. The spotter should be able to communicate directly with plant operators.
- Prior to clearing hollow-bearing trees, use an excavator or loader to hit the trunk as high up the tree as possible several times. Wait at least 30 seconds. Repeat this process several times.
- Once the hollow-bearing limbs or hollow-bearing tree are on the ground, the spotter must check each hollow for signs of wildlife before the next limb/tree is removed.
- If taking the tree down in stages, remove non-hollow-bearing limbs first. Then remove hollow-bearing limbs.

Handling wildlife

- Direct contact with any wildlife should be avoided wherever possible.
- Any uninjured wildlife must be encouraged to leave the site.

If wildlife is injured, WIRES or similarly-qualified and licensed personnel should be contacted to collect and treat any injured individuals.