Lot 5 DP 838497 Sutton Road, Sutton

Ecological Constraints Assessment

Prepared for
Paul Cartwright

7 July 2016

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1 Introduction

1.1 Background

Eco Logical Australia Pty Ltd (ELA) was engaged by Tony Carey Consulting on behalf of Paul Cartwright to undertake an ecological constraints assessment for a property located on Lot 5 DP 838497 Sutton Road, Sutton. Recent broad scale, regional vegetation mapping that included the study area showed that the threatened ecological community White Box, Yellow Box, Blakely's Red Gum woodland (Box-Gum woodland) was present. A site specific survey was warranted to validate the vegetation map, and identify other ecological values that may affect future subdivision of the study area.

1.2 Description of the study area

The study area is approximately 185 ha and located south of Sutton, approximately 25 kilometres (km) north-east of the Canberra Central Business District. It is bound by Sutton Road, Guise Street, the Federal Highway and the Old Federal Highway, within the Yass Valley Local Government Area (LGA). The study area has had a long history of agricultural use (>150 years) that has simplified the original woodland vegetation through successive years of cropping, pasture improvement, and livestock grazing.

1.2.1 Objectives of this study

The key objectives of the ecological constraints assessment are to:

- Validate vegetation mapping of the study area.
- Identify ecological values on the study area that may affect future subdivision and development.
- Recommend measures to avoid, reduce or mitigate the impacts of future subdivision on native flora and fauna and their habitats.

2 Methodology

2.1 Data audit

The following information and databases were reviewed prior to field survey:

- Aerial photographs and topographic maps of the study area.
- Atlas of NSW Wildlife (OEH 2016a).
- EPBC Act Protected Matters Search Tool (DotE 2016).
- Office of Environment and Heritage (2015) *Improving the accuracy of the Yass Valley Local Environmental Plan Terrestrial Biodiversity Map.* Report for Yass Council Terrestrial Biodiversity Map update 2015.
- Office of Environment and Heritage (2011) *Plant communities of the South Eastern Highlands and Australian Alps within the Murrumbidgee Catchment of New South Wales. Version 1.1.* Technical report. A report to Catchment Action NSW. NSW Office of Environment and Heritage; Department of Premier and Cabinet, Queanbeyan.

A search of the Atlas of NSW Wildlife and the EPBC Protected Matters Search Tool was performed on 4 July 2016, using a radius of 10 km around the coordinates easting 706032 northing 6105359 (Datum GDA94). Species from the database searches were combined to produce a list of threatened fauna and flora species that may potentially use the study area, with an assessment of the likelihood of occurrence for each species included in **Appendix A**. The likely occurrence of each species was determined by reviewing records in the area, considering the habitat available and using expert knowledge of the ecology of each species.

Five terms for the likelihood of occurrence of species are used in this report, as defined below:

- "known" = the species was or has been observed on the site
- "likely" = a medium to high probability that a species uses the site
- "potential" = suitable habitat for a species occurs on the site, but there is insufficient information to categorise the species as likely, or unlikely to occur
- "unlikely" = a very low to low probability that a species uses the site
- "no" = habitat on site and in the vicinity is unsuitable for the species.

2.2 Field survey

A rapid site assessment across the study area was undertaken by senior ecologist Bruce Mullins on 9 June 2016 for a period of approximately 4 person hours. Temperature ranged from 9.2 – 15.9°C during the day of survey and conditions were cloudy, with wind around 30 km/hr. Light rain fell during the morning of the survey, with heavy falls (>90 mm) earlier in the week of the survey (BOM 2016).

The study area was assessed paddock by paddock both on foot and in a vehicle, which included searches through different habitat niches. A list of visible flora species and their relative abundance was collated for paddocks 1 to 5 (**Figure 1**), and vegetation boundaries were marked on field maps for the entire study area. Other ecological values were also noted, such as rock outcrops and surface rock.

Vegetation communities on site were mapped according to OEH (2011). The vegetation communities of OEH (2011) were further analysed to determine whether any conformed with threated ecological communities (TECs) listed under the NSW *Threatened Species Conservation Act 1995* (TSC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Fauna habitat features were noted during the survey, however, given the size of the site and the rapid survey approach, habitat features were not recorded with a hand held GPS.

2.2.1 Limitations

Field survey was limited to a rapid assessment, and the data in this report should be viewed acknowledging that more detailed survey is required and may further refine vegetation mapping, and identify other ecological values on the study area. This may flow on to affect the ecological constraints map.

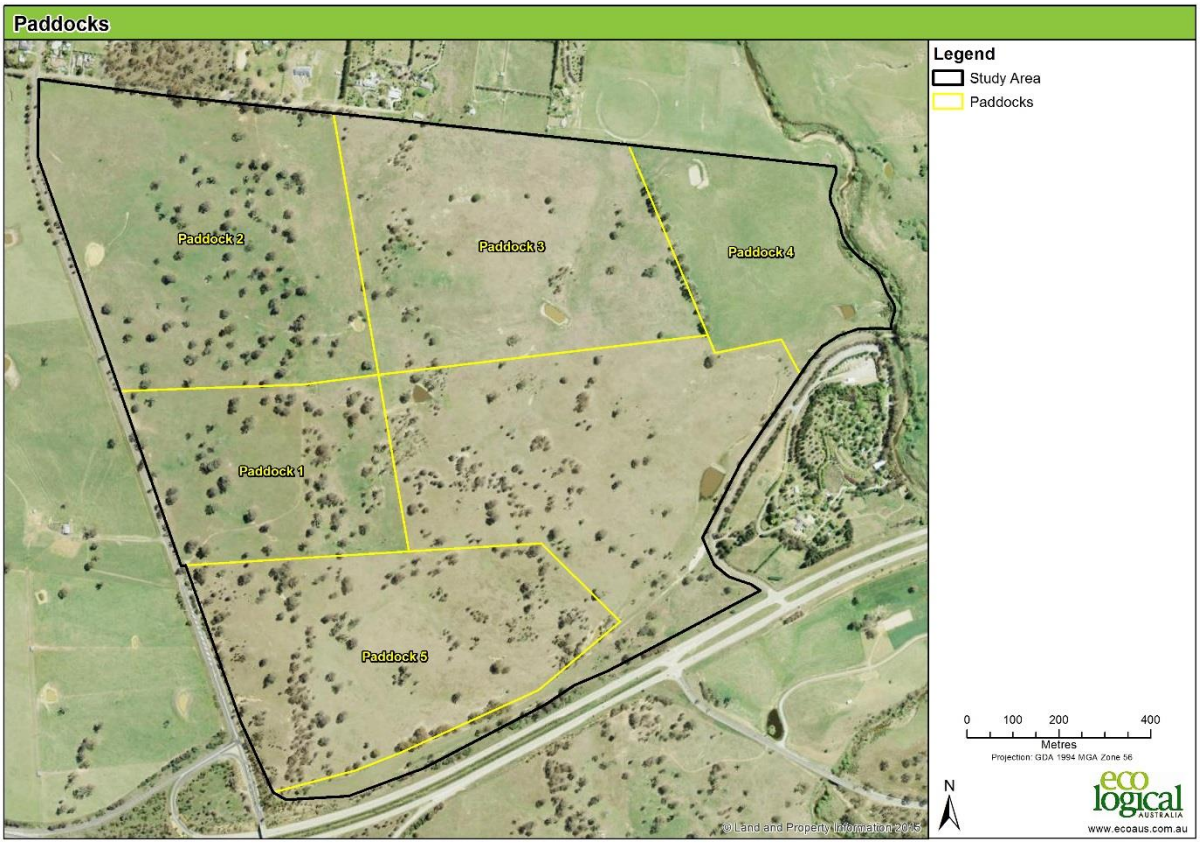

Figure 1: Floristic data was collected from paddocks 1 to 5, while vegetation mapping was only undertaken in the remainder of the study area.

2.3 Ecological constraints

Following field survey, ecological attributes within the study area were ranked to identify areas of high, moderate and low constraint. The purpose of ranking ecological constraints is to guide future potential land use and the possible controls needed to avoid and mitigate impacts on areas with higher ecological values.

Factors that are typically associated with high ecological constraint are TECs in good condition, and potentially important fauna habitat resources such as hollow bearing trees. Areas of low ecological constraint include improved pastures and degraded lower conservation value vegetation communities. The criteria applied to land with high, moderate and low ecological constraint for this study area are included in **Section 3.3** (**Table 3**).

3 Results

3.1 Database and literature review

Three endangered ecological communities (EEC), 18 threatened flora species, 41 threatened and/or migratory species fauna species listed under either the TSC Act and/or EPBC Act were identified by the data audit. The likelihood of these species occurring on site is presented in **Appendix A**.

OEH (2015) includes a map of the site, indicating that the majority of the site is Yellow Box, White Box, Blakely's Red Gum Woodland (Box-Gum Woodland). The scanned field notes in Appendix 2 of the report illustrate that most areas of Box-Gum Woodland were trees in paddocks, in low to moderate condition, with some canopy regeneration and hollow bearing trees. The ground cover had "some native cover" (i.e. the lowest condition class), and contained coarse woody debris. A patch of secondary (or derived) grassland was mapped in the east adjacent to the Old Federal Hwy, which had > 50% native ground cover. This data was cross referenced with the TSC Act scientific determination for the community. The scientific determination considers this vegetation to be part of the community, but a "degraded" example.

3.2 Field survey

The study area has a canopy dominated by *Eucalyptus melliodora* (Yellow Box), with *E. rossii* (Scribbly Gum) dominant on the ridge crests. *E. blakelyi* (Blakely's Red Gum) occurred in the open drainage lines with *E. bridgesiana* (Apple Box), *E. dives* (Broad-leaved Peppermint) and *E. mannifera* (Brittle Gum) occurring infrequently.

Agricultural use of the site over 150 years has reduced the structural complexity of the site, removing the native shrub layer and simplifying the ground layer. Some paddocks in the northwest that have a history of cropping are dominated by exotic species in the ground layer. They greatest diversity in the ground layer occurs in the southern parts of the site.

3.2.1 Vegetation communities

Validation of vegetation community mapping (OEH 2015) and analysis of vegetation community types and descriptions in OEH 2011 determined that there are likely to be two vegetation communities on site:

- Red Stringybark – Scribbly Gum – Red-anthered Wallaby Grass tall grass-shrub dry sclerophyll open forest on loamy ridges of the central South Eastern Highlands Bioregion (P14) (Red Stringybark – Scribbly Gum open forest)
- Yellow Box $\pm$ Apple Box tall grassy woodland of the South Eastern Highlands (U178) (Yellow Box $\pm$ Apple Box woodland).

Yellow Box $\pm$ Apple Box Woodland is the dominant vegetation community on the study area. *E. melliodora* is the dominant canopy species in this community. It occurs in three main condition states:

- a highly modified open woodland with a high cover of native species
- an open woodland with a high cover of exotic species
- derived grassland where the canopy has been removed but the ground layer contains greater than 50% cover of native species (predominantly grass).

In the northwest of the study area, the community has a history of pasture improvement and cropping, and currently has a high cover of *Avena* sp. (Oats), with few natives, such as the grasses *Austrostipa*

scabra and *Rytidosperma* sp. (Wallaby Grass). In the south, native ground covers were dominant. Common native species were *Aristida ramosa* (Purple Wiregrass), *Austrostipa scabra* (Speargrass), *Rytidosperma* sp., *Lomandra filiformis* and *Microlaena stipoides* (Weeping Grass).

Red Stringybark – Scribbly Gum open forest is restricted in its extent to the ridge tops in the central and southern parts of the study area. *E. rossii* is the dominant canopy species in this community, and the shrub layer is absent except for scattered *Kunzea ericoides* in the south and low growing shrubs such as *Melichrus urceolatus*. The ground cover varies from native dominated to exotic dominated throughout the community. Common species include the natives *Austrostipa scabra, Austrostipa bigeniculata, Microlaena stipoides, Rytidosperma* sp. and *Bothriochloa macra*. Common exotic species include *Avena* sp., *Hypochaeris radicata* and *Trifolium* sp.

Yellow Box $\pm$ Apple Box Woodland within the study area comprises the TSC Act listed Yellow Box, White Box, Blakely's Red Gum Woodland (Box-Gum Woodland) EEC, including patches that have a ground cover of greater than 50% exotic cover. These patches, where the shrub layer has been altered through grazing and pasture improvement, are referred to as "degraded" in the scientific determination.

Yellow Box $\pm$ Apple Box Woodland also comprises, in part, the EPBC Act listed Yellow Box, White Box, Blakely's Red Gum grassy woodland and derived native grassland EEC. To be considered part of the Commonwealth listed EEC, a patch must meet one of the following criteria:

- The patch must have a predominantly native understorey and have "at least 12 native, non-grass understorey species" (Threatened Species Scientific Committee 2006). Further, at least one of the understorey species "should be an important species. An important species are typically grazing-sensitive, regionally significant or uncommon species (such as Kangaroo Grass or orchids)".
- The patch must have a predominantly native understorey, be greater than 2ha and have either natural regeneration of the overstorey or 20 or more mature trees present per hectare.

Further investigations may alter the extent of the EPBC Act listed community in the study area.

The vegetation map according to vegetation communities described in OEH 2011 is in **Figure 2**, while the extent of Box-Gum Woodland under the TSC Act and EPBC Act is in **Figure 3**.

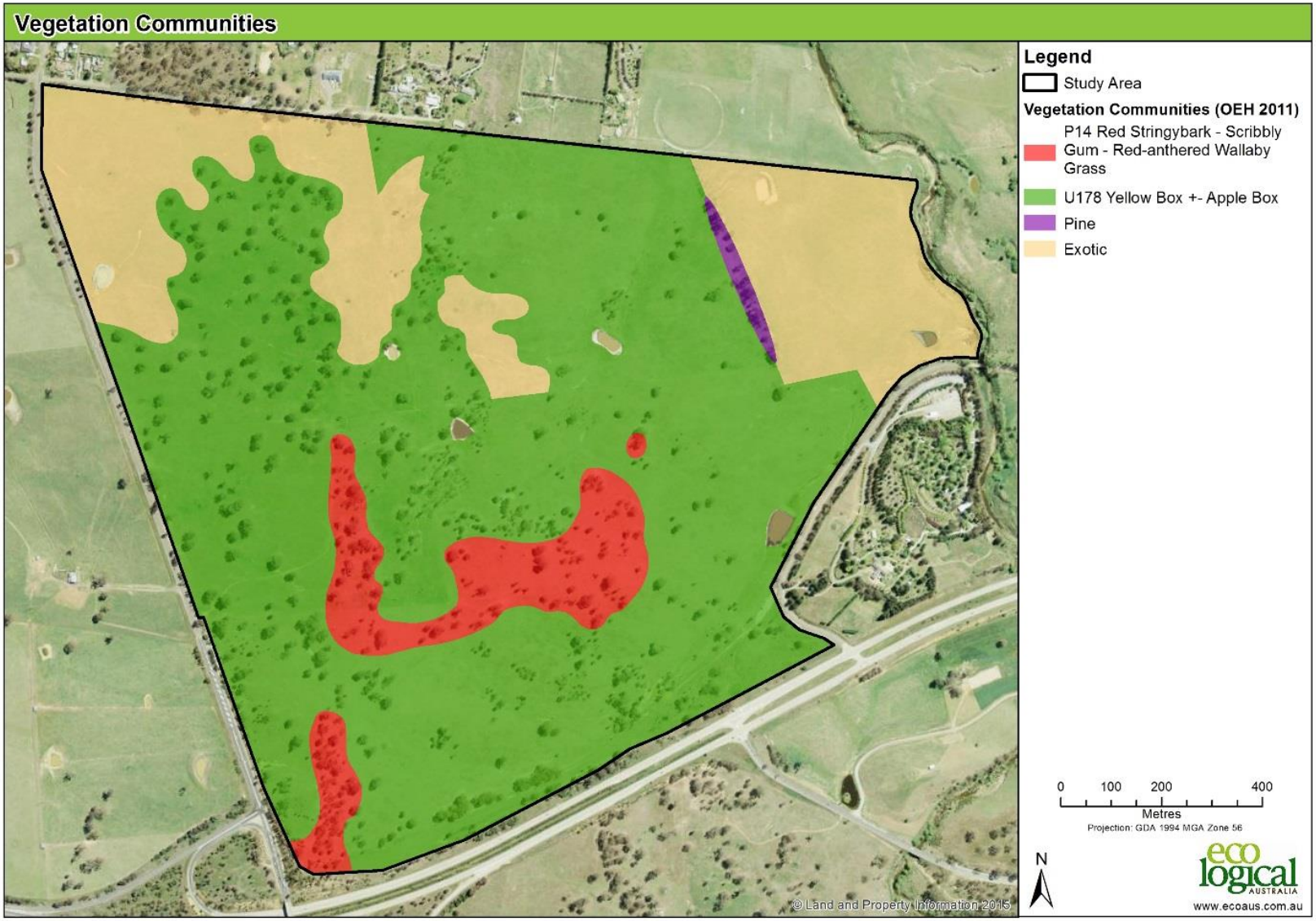

Figure 2: Vegetation communities on the study area according to community description in OEH 2011.

Figure 3: Box-Gum Woodland EEC within the study area

3.2.2 Flora species

A total of 77 flora species were identified within the study area during field investigations, of which 33 are exotic species (**Appendix B**). Five declared noxious weeds in NSW, including three Weeds of National Significance (WoNS) were also recorded within the study area (**Table 1**).

Table 1: Declared noxious weed species recorded within the study area

Scientific name	Common name	Noxious weed class	WoNS
Eragrostis curvula	African Lovegrass	4 - Locally Controlled Weed	
Hypericum perforatum	St John's Wort	4 - Locally Controlled Weed	
Nassella trichotoma	Serrated Tussock	4 - Locally Controlled Weed	Y
Rubus fruticosus sp. agg	Blackberry	4 - Locally Controlled Weed	Y
Ulex europaeus	Gorse	3 - Regionally Controlled Weed	Y

No threatened flora species were recorded within the study area during the survey.

3.2.3 Fauna and fauna habitats

No threatened fauna species were observed within the study area during the rapid assessment. **Appendix A** identifies threatened species recorded in the region or predicted to occur and assesses their likely occurrence on site.

Despite the long agricultural use of the study area, a range of fauna habitat features are present. **Table 2** lists these features and the fauna likely to use them. Most rock on site is deeply embedded granites with few surface rocks. It is unlikely that the history of the site and size and dimensions of the surface rock provides suitable habitat for threatened reptiles, such as the Pink-tailed Worm Lizard.

Woodland and open forest may provide habitat for threatened woodland birds, and hollow bearing trees may provide suitable nest sites.

Table 2: Key fauna habitat features present across the study area

Habitat features	Relative distribution	Fauna species
Vegetated areas of tall open woodland/forest	Widespread	Birds, arboreal mammals, microchiropteran bats and owls
Hollow bearing trees	Widespread	Birds, reptiles, microchiropteran bats and marsupials
Farm dams / watercourse	Isolated to drainage lines	Amphibians, birds, microchiropteran bats, reptiles and marsupials
Rock outcrop comprising deeply embedded granites and with limited surface rock	Isolated to the central-northern parts of the site	Reptiles and small mammals
Pasture	Widespread	Birds, amphibians and reptiles

3.2.4 Riparian areas

A detailed assessment of streams was not undertaken during the field survey. Stream data was taken from the 1:25,000 topographic map sheet.

Two first order (Strahler order) streams occur within the study area, as does the Yass River, which bounds the north-eastern side of the study area. The Yass River is a fifth order stream. Department of Primary Industries – Water require setbacks from streams according to their Strahler order. First order streams require a 10 m setback, either side of the top of bank, while fifth order streams require a 40 m setback either side of the top of bank (**Figure 4**).

3.3 Ecological constraints

Following field survey, the study area was ranked to identify areas of high, moderate and low constraint. Ranks were based on criteria including the presence and condition of native vegetation communities, conservation significance, and potential habitat for threatened flora and fauna species. **Table 3** summarises the constraint ranking and associated criteria. The relative level of ecological constraint across the study area is identified in **Figure 4**.

Note that hollow bearing trees are considered a high ecological constraint. While hollow bearing trees were noted on site, hollow bearing trees were not mapped during the rapid field survey. It is possible that areas mapped as low and moderate ecological constraint may contain hollow bearing trees.

Known occurrences of threatened flora and known habitat for threatened fauna would also represent a high ecological constraint. However, the rapid field survey did not identify any threatened flora or fauna within the study area.

Table 3: Ecological constraint criteria

Ecological constraint level	Criteria
High	Areas of EPBC Act listed Box-Gum Woodland Areas of TSC Act listed Box-Gum Woodland in good condition Riparian corridors as required by DPI – Water Hollow bearing trees (not mapped during this survey)
Moderate	Areas of “degraded” TSC Act listed Box-Gum Woodland Rock outcrops
Low	Areas that contain open exotic grassland or non-listed vegetation communities

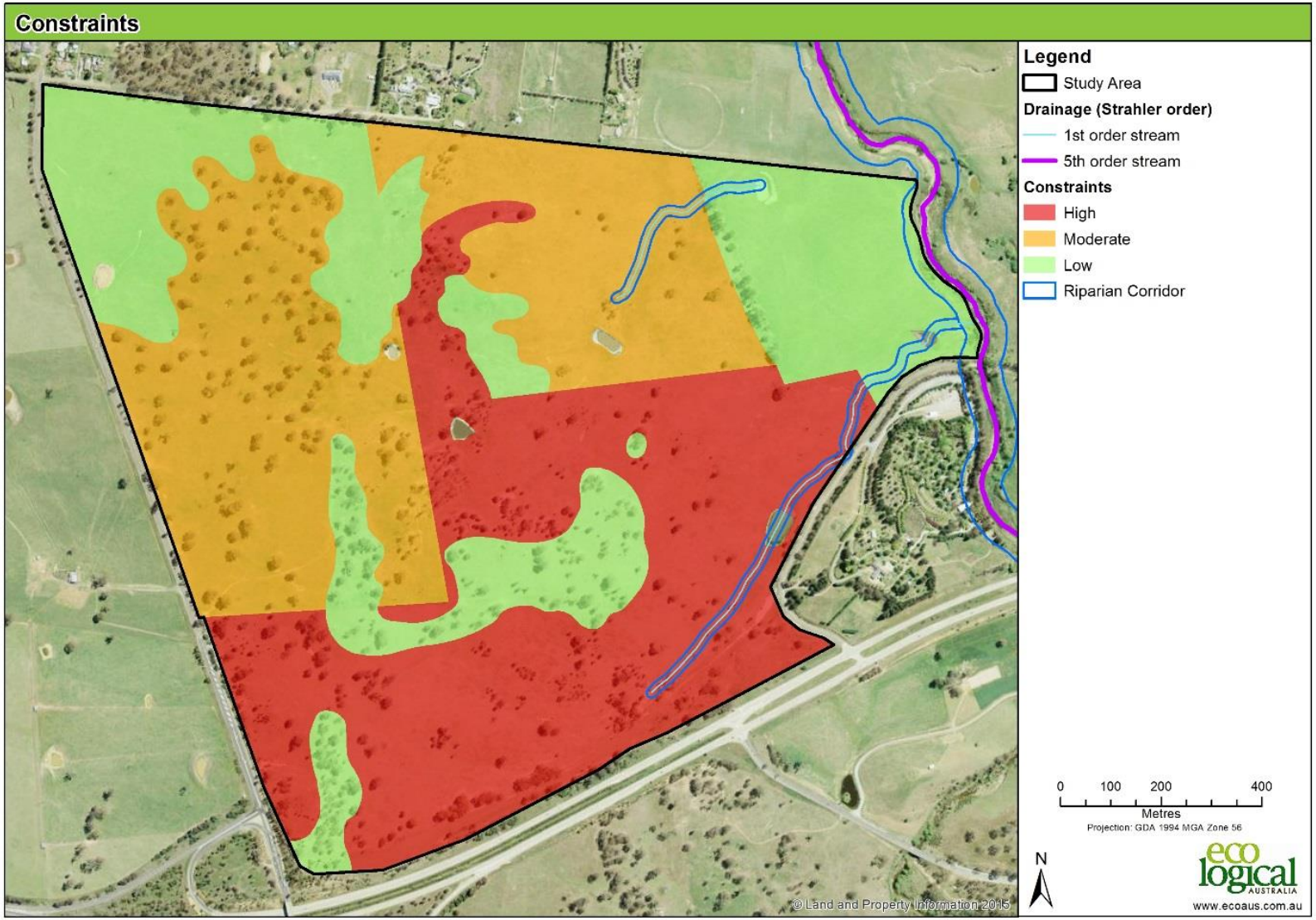

Figure 4: Relative ecological constraint within the study area.

4 Recommendations and conclusions

A rapid field survey was undertaken within the study area to refine vegetation mapping by OEH 2015, and provided more data relating to the condition and extent of Box-Gum Woodland within the study area. While the study area contains known and potential ecological constraints, subdivision of the study area could be achieved that is sympathetic to the sites ecological constraints. However, more detailed assessment of the study area is required to confirm the boundaries of EPBC Act listed Box-Gum Woodland, which comprises a high constraint to any future development, and the presence of threatened flora and fauna or their habitat. This should be done during spring, which is the optimum time to survey for most threatened species in the region.

Future subdivision should situate higher density development in areas of low constraint, with larger lots in areas of moderate to high constraint. It is intended that a large undeveloped lot be retained in the southern parts of the site in an area of high ecological constraint.

A conceptual subdivision plan has been drawn based on preliminary ecological constraints (**Figure 5**).

The following recommendations aim to avoid and minimise the impact of a subdivision on ecological constraints.

- Undertake more detailed assessment of the sites flora and fauna based on a preliminary subdivision layout. Targeted threatened species surveys may be required for species considered likely or to have the potential to occur within the study area in (**Appendix A**).
- Plan higher density housing in areas of low constraint.
- Undertake a survey to map hollow bearing trees and retain large and hollow bearing trees in the future subdivision, wherever possible.
- Locate building envelopes in currently open spaces to minimise tree removal
- Retain the area of higher floristic diversity in the south of the site as an undeveloped lot.
- Confirm that first order streams within the study area still function as streams and require protection of the riparian corridor. Any development within 40 m of a stream will require a controlled activity approval from DPI – Water.
- Protect ecological values in the long term through measures such as:
    - Tree preservation orders – for large trees and hollow bearing trees
    - Planning agreement/Voluntary conservation agreement /Section 88b instrument/Biobanking Agreement – for the large retained area in the south. These protection measures have different requirements, durations and security. However, changes to threatened species legislation and the Native Vegetation Act (refer to the Biodiversity Conservation Bill 2016) mean that new protection measures may be available in the next 12 months. These include Biodiversity Stewardship Agreements (formerly a Biobanking Agreement), Conservation Agreements and Wildlife Refuge Agreement. Voluntary Conservation Agreements will no longer be available, and are currently being discouraged. The relevant regulations have not been released for the Bill, which will contain important information relating to these agreements.
    - A management plan would be required for the retained lot to maintain and improve biodiversity values. A management plan would relate to the protection measure selected.

- Section 88b or other instrument restricting pasture improvement and stocking rates on larger lots in areas of moderate to high ecological constraint.

Figure 5: Subdivision concept plan

References

NSW Scientific Committee (2002) White Box – Yellow Box – Blakely's Red Gum Woodland. Endangered Ecological Community Final Determination. NSW Department of Environment and Climate Change

Office of Environment and Heritage (2011) Plant communities of the South Eastern Highlands and Australian Alps within the Murrumbidgee Catchment of New South Wales. Version 1.1. Technical report. A report to Catchment Action NSW. NSW Office of Environment and Heritage; Department of Premier and Cabinet, Queanbeyan.

Office of Environment and Heritage (2015) Improving the accuracy of the Yass Valley Local Environmental Plan Terrestrial Biodiversity Map. Report for Yass Council Terrestrial Biodiversity Map update 2015.

Threatened Species Scientific Committee (2006) Advice to the Minister for the Environment and Heritage from the Threatened Species Scientific Committee (TSSC) on Amendments to the List of Ecological Communities under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) Department of the Environment.

Appendix A Likelihood of occurrence

Scientific Name	Common Name	TSC Act	EPBC Act	Habitat Associations	Likelihood of Occurrence
Flora					
Ammobium craspedioides	Yass Daisy	V	V	*Ammobium craspedioides* is found from near Crookwell on the Southern Tablelands to near Wagga Wagga on the South Western Slopes, where it is apparently unaffected by light grazing, as populations persist in some grazed sites (DECC 2007). Found in moist or dry forest communities, Box-Gum Woodland and secondary grassland derived from clearing of these communities. It grows in association with a large range of eucalypts (*Eucalyptus blakelyi, E. bridgesiana, E. dives, E. goniocalyx, E. macrorhyncha, E. mannifera, E. melliodora, E. polyanthemos, E. rubida*) (DECC 2007).	No
Caladenia actensis	Canberra Spider Orchid	-	CE	*Caladenia actensis* is known from two extant populations totalling approximately 250 plants with an area of occupancy of approximately five hectares on the lower western slope of Mt Ainslie (approximately 30 plants) and Mt Majura (approximately 220 plants), in the Canberra Nature Park. The species was previously recorded at a site that has now been developed as the suburb of Aranda, and at a second site on Mt Ainslie in the suburb of Campbell. It no longer exists at either of these locations.	No
Caladenia concolor	Crimson Spider Orchid	E	V	Following recent taxonomic changes, *Caladenia concolor* is now thought to only occur in NSW in Nail Can Hill Crown Reserve near Albury. Previous records of the species from near Bethungra and Yass now refer to other recently described species. The only NSW population near Albury occurs in shrubby woodland over granite.	No

Scientific Name	Common Name	TSC Act	EPBC Act	Habitat Associations	Likelihood of Occurrence
Eucalyptus aggregata	Black Gum	V	V	*Eucalyptus aggregata* is found in the NSW Central and Southern Tablelands. It grows on alluvial soils on cold, poorly-drained flats and hollows adjacent to creeks and small rivers. Can occur as isolated paddock trees (DECC 2007).	No
Grevillea iaspicula	Wee Jasper Grevillea	E	E	*Grevillea iaspicula* is only found in the Wee Jasper area and on the shores of Lake Burrinjuck near Burrinjuck village, on the border of the Southern Tablelands and South Western Slopes. It grows on rocky outcrops, near cave entrances and at cliff bases in areas of limestone substrate (DECC 2007).	No
Lepidium hyssopifolium	Basalt Pepper-cress; Aromatic Peppercress	E	E	*Lepidium hyssopifolium* occurs near Bathurst, near Bungendore, near Crookwell and near Armidale, occurring in a variety of habitats including woodland with a grassy understorey and grassland (DECC 2007).	Unlikely
Lepidium pseudopapillosum	Formbe Peppercress	E	V	*Lepidium pseudopapillosum* is been recorded from central and north-western Victoria, the Flinders Ranges of South Australia. There no confirmed records in NSW (DECC 2007) although records from the ACT do exist (ALA 2016). Victorian collections, where the species is considered to be rare, have been made in Bulloak/Black Box woodland and open forest of Grey Box (DECC 2007). ACT Specimens are noted as Floodplain of Ginninderra Creek. Brown clay loam over Quaternary alluvium. Grassland: *Danthonia* spp. and *Bothriochloa macra* dominant with *Plantago gaudichaudii*, *Juncus filicaulis*, *Triptilodiscus pygmea*, **Parentucellia latifolia* and *Calocephalus citreus*" (NSW509462) and "In depression with little vegetation in grassland" (NSW414870).	No
Leucochrysum albicans var. *tricolor*	Hoary Sunray	-	E	*Leucochrysum albicans* var. tricolor occurs in a wide range of habitats from peaty uplands to stony plains, and has been associated with the Western (Basalt) Plains Natural Temperate Grasslands (DECC 2007). Generally on relatively heavy soils, and will occur in semi-modified habitats such as roadsides and semi-urban areas. It is dependent on bare ground for germination, and in some areas disturbance is identified for successful recruitment (OEH 2016).	Potential
Pelargonium sp. *striatellum*	Omeo Stork's-bill	E	E	In NSW, *Pelargonium* sp. '*striatellum*' (G.W. Carr 10345) is known from the Southern Tablelands (PlantNet 2011). Otherwise, only known from the shores of	No

Scientific Name	Common Name	TSC Act	EPBC Act	Habitat Associations	Likelihood of Occurrence
				Lake Omeo near Benambra in Victoria where it grows in cracking clay soil that is probably occasionally flooded (Walsh & Entwisle 1999). It has a narrow habitat that is usually just above the high-water level of irregularly inundated or ephemeral lakes, in the transition zone between surrounding grasslands or pasture and the wetland or aquatic communities. On or adjacent to the Monaro lakes it occurs either in grassland on basaltic soils and among basalt boulders, and associates either with Curly Sedge (*Carex bichenoviana*), Tall Speargrass (*Austrostipa bigeniculata*), Corkscrew Grass (*A. scabra*), Windmill Grass (Chloris truncata) and a variety of forbs, or on freshwater sedge-herb marsh communities dominated by sedges and other aquatics, including Curly Sedge, *Lepilaena bilocularis*, a buttercup (*Ranunculus diminutus*), a milfoil (*Myriophyllum simulans*), a pondweed (*Potamogeton tricarinatus*), a mud-mat (*Glossostigma elatinoides*) and Swamp Wallaby-grass (*Amphibromus nervosus*) (OEH 2016).	
Pomaderris pallida	Pale Pomaderris	V	V	In NSW, Pomaderris pallida has been recorded from near Kydra Trig north-west of Nimmitabel, Tinderry Nature Reserve, the Queanbeyan River, the Murrumbidgee River west of the ACT and Byadbo in Kosciuszko National Park. It usually grows in shrub communities surrounded open forest or woodland (DECC 2007).	No
Prasophyllum petilum	Tarengo Leek Orchid	E	E	Known with certainty from two populations in central and southern NSW (near Boorowa and Delegate) plus a third population in the ACT. Plants previously referred to by this name at Ilford and Captains Flat are likely to be different, undescribed species. The populations at Boorowa and Delegate occur in open grassy areas on fertile soils. Natural populations are known from a total of five sites in NSW. These area at Boorowa, Captains Flat, Ilford, Delegate and a newly recognised population c.10 k SE of Muswellbrook. It also occurs at Hall in the Australian Capital Territory. This species has also been recorded at Bowning Cemetery where it was experimentally introduced, though it is not known whether this population has persisted. Susceptible to grazing. Favours box-gum grassy woodland and black gum grassy woodland and temperate grassland.	No
Prasophyllum sp. Wybong	A leek-orchid	-	CE	*Prasophyllum* sp. Wybong is endemic to NSW. It is known from approximately 10 populations on the Central and North Western Slopes of NSW from near Ilford	No

Scientific Name	Common Name	TSC Act	EPBC Act	Habitat Associations	Likelihood of Occurrence
				north to the Tenterfield district. Plants grow in grassland and grassy woodlands on a range of soil types.	
Rutidosis leptorrhynchoides	Button Wrinklewort	E	E	In NSW, *Rutidosis leptorrhynchoides* is known from populations near Goulburn, Queanbeyan and Michelago on the Southern Tablelands. It grows in box-gum woodland, secondary grassland derived from box-gum woodland, natural temperate grassland or the ecotone between these communities (DECC 2007).	No
Senecio garlandii	Woolly Ragwort	V	-	*Senecio garlandii* occurs between Temora, Bethungra and Albury and possibly in the Burrinjuck area near Yass. It grows on sheltered slopes of rocky outcrops (DECC 2007).	No
Swainsona recta	Small Purple-pea	E	E	Populations of *Swainsona recta* still exist in the Queanbeyan and Wellington-Mudgee areas of NSW. Over 80% of the southern population grows on a railway easement. It occurs in the grassy understorey of box/gum woodlands and open forests (DECC 2007).	Unlikely
Swainsona sericea	Silky Swainson-pea	V	-	*Swainsona sericea* is widespread on the tablelands, western slopes and western plains of NSW. It grows in a wide variety of habitats from Snow Gum woodland to box/gum woodlands and Callitris communities (DECC 2007).	Unlikely
Thesium australe	Austral Toadflax	V	V	Widespread throughout the eastern third of NSW but most common on the North Western Slopes, Northern Tablelands and North Coast. Occurs in grassland or grassy woodland. Often found in damp sites in association with Kangaroo Grass (*Themeda triandra*) (DECC 2007). The preferred soil type is a fertile loam derived from basalt or shale although it occasionally occurs on metasediments and granite.	No
Wilsonia rotundifolia	Round-leafed Wilsonia	E	-	In NSW, *Wilsonia rotundifolia* is known from several sites in the Jervis Bay area, Royal National Park, near Deniliquin and on the lakebeds of Lake George and Lake Bathurst when these are exposed. Grows in mud in coastal saltmarsh and inland saline or brackish lake beds (DECC 2007).	No

TECs

Scientific Name	Common Name	TSC Act	EPBC Act	Habitat Associations	Likelihood of Occurrence
Natural Temperate Grassland of the South Eastern Highlands		-	CE	Natural Temperate Grassland of the South Eastern Highlands is a naturally treeless or sparsely treed community characterised by a dominance of native perennial tussock grasses, the tallest stratum of which is typically up to 1.0 m in height, when present (Environment ACT, 2005). There is usually a second, lower stratum of shorter perennial and annual grasses and forbs growing between the taller tussocks, and there may be a third discontinuous stratum of even smaller forbs, grasses and cryptogams (Environment ACT, 2005). Sedges and rushes may also occur (Benson, 1994; Environment ACT, 2005; SEWPAC, 2012a), particularly in seasonally wet areas. NTG–SEH may contain a tree and shrub stratum, with up to 10% projective foliage cover of each being present (Environment ACT, 2005).	No
Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregions		E		Commonly referred to as Tablelands Snow Gum Grassy Woodland, this community occurs as an open-forest, woodland or open woodland. This community may also occur as a secondary grassland where the trees have been removed, but the groundlayer remains. The main tree species are *Eucalyptus pauciflora* (Snow Gum), *E. rubida* (Candlebark), *E. stellulata* (Back Sallee) and *E. viminalis* (Ribbon Gum), either alone or in various combinations. Other eucalypt species may occur. A shrub layer may be present and sub-shrubs are common. The most common shrubs include *Melicytus* sp. 'Snowfields' (Gruggly-bush) and *Melichrus urceolatus* (Urn Heath). The ground layer is grassy, with the most common species including *Themeda* triandra (= *T.* australis) (Kangaroo Grass), *Poa* spp. (snow-grasses), *Austrostipa* spp. (spear-grasses) and *Rytidosperma* spp. (wallaby-grasses). Sites in high condition have a range of forb (wildflower) species, including *Leptorhynchos squamatus* (Scaly-buttons), *Chrysocephalum apiculatum* (Common Everlastings) and *Asperula conferta* (Native Woodruff). Many threatened flora and fauna species have been recorded in this community. The community commonly occurs on valley floors, margins of frost hollows and on footslopes and undulating hills. It occurs between approximately 600 and 1400 m in altitude on a variety of substrates, including basalt, sediments, granite, colluvium and alluvium.	No
		-	CE		Known

Scientific Name	Common Name	TSC Act	EPBC Act	Habitat Associations	Likelihood of Occurrence
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland White Box Yellow Box Blakely's Red Gum Woodland		E	CE	Commonly referred to as Box-Gum Woodland, this is an open woodland community (sometimes occurring as a forest formation), in which the most obvious species are one or more of the following: White Box *Eucalyptus albens*, Yellow Box *E. melliodora* and Blakely's Red Gum *E. blakelyi*. Intact sites contain a high diversity of plant species, including the main tree species, additional tree species, some shrub species, several climbing plant species, many grasses and a very high diversity of herbs. The community also includes a range of mammal, bird, reptile, frog and invertebrate fauna species. Intact stands that contain diverse upper and mid-storeys and groundlayers are rare. Modified sites include the following: - Areas where the main tree species are present ranging from an open woodland formation to a forest structure, and the groundlayer is predominantly composed of exotic species; and - Sites where the trees have been removed and only the grassy groundlayer and some herbs remain. The Australian Government listing of White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland is slightly different to the NSW listing. Areas that are part of the Australian Government listed ecological community must have either: - An intact tree layer and predominately native ground layer; or - An intact native ground layer with a high diversity of native plant species but no remaining tree layer.	Known
Ray-finned fish (Actinopterygii)					
Maccullochella peelii	Murray Cod	-	V	Widespread throughout the Murray-Darling system originally being found in virtually all waterways of that system. Habitat varies greatly, from quite small clear, rocky, upland streams with riffle and pool structure on the upper western slopes of the Great Dividing Range to large, meandering, slow-flowing, often silty rivers in the alluvial lowland reaches of the Murray-Darling Basin. Prefer deep holes with	No

Scientific Name	Common Name	TSC Act	EPBC Act	Habitat Associations	Likelihood of Occurrence
				cover in the form of large rocks, fallen trees, stumps, clay banks and overhanging vegetation.	
Macquaria australasica	Macquarie Perch	E	E	Habitat for the Macquarie perch is on the bottom or mid-water in slow-flowing rivers with deep holes, typically in the upper reaches of forested catchments with intact riparian vegetation. Macquarie perch also do well in some upper catchment lakes. In some parts of its range, the species is reduced to taking refuge in small pools which persist in midland–upland areas through the drier summer periods.	No
Amphibia					
Litoria aurea	Green and Golden Bell Frog	E	V	This species has been observed utilising a variety of natural and man-made waterbodies (Pyke & White 1996; Pyke and White 1996) such as coastal swamps, marshes, dune swales, lagoons, lakes, other estuary wetlands, riverine floodplain wetlands and billabongs, stormwater detention basins, farm dams, bunded areas, drains, ditches and any other structure capable of storing water (DECC 2009). Fast flowing streams are not utilised for breeding purposes by this species (Mahony 1999). Preferable habitat for this species includes attributes such as shallow, still or slow flowing, permanent and/or widely fluctuating water bodies that are unpolluted and without heavy shading (DEC 2005). Large permanent swamps and ponds exhibiting well-established fringing vegetation (especially bulrushes–*Typha* sp. and spikerushes–*Eleocharis* sp.) adjacent to open grassland areas for foraging are preferable (Ehmann 1997; Robinson 2004). Ponds that are typically inhabited tend to be free from predatory fish such as *Gambusia holbrooki* (Mosquito Fish) (DEC 2005; NPWS 2003). Formerly distributed from the NSW north coast near Brunswick Heads, southwards along the NSW coast to Victoria where it extends into east Gippsland. Records from west to Bathurst, Tumut and the ACT region. There is only one known population on the NSW Southern Tablelands.	No
Litoria castanea	Yellow-spotted Tree Frog, Yellow-spotted Bell Frog	CE	E	Ponds, wetlands and slowly moving streams with abundant marginal growth of bulrushes and other vegetation (DECC 2007). The southern population has been noted to occur in both woodland and improved pastoral areas (DECC 2007).	No

Scientific Name	Common Name	TSC Act	EPBC Act	Habitat Associations	Likelihood of Occurrence
Litoria raniformis	Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog	E	V	Relatively still or slow-flowing sites such as billabongs, ponds, lakes or farm dams, especially where Typha sp., Eleocharis sp. and Phragmites sp. (Bulrushes) are present (DECC 2007; Ehmann 1997). This species is common in lignum shrublands, black box and River Red Gum woodlands, irrigation channels and at the periphery of rivers in the southern parts of NSW (DECC 2007). This species occurs in vegetation types such as open grassland, open forest and ephemeral and permanent non-saline marshes and swamps (DECC 2007). Open grassland and ephemeral permanent non-saline marshes and swamps have also been associated with this species (Ehmann 1997).	No
Reptilia					
Aprasia parapulchella	Pink-tailed Worm-lizard, Pink-tailed Legless Lizard	V	V	This lizard is known from four sites in eastern Australia: near Canberra in the ACT, Tarcutta and Bathurst in NSW, and near Bendigo in Vic. In general, lizards occur in open grassland habitats that have a substantial cover of small rocks. Lizards also show a preference for sunny aspects, avoiding S facing slopes. The species is only found at sites with good numbers of invertebrates under rocks. Most sites occur in relatively open vegetation (SEWPAC 2010).	Unlikely
Delma impar	Striped Legless Lizard	V	V	The Striped Legless Lizard was formerly distributed throughout temperate lowland grasslands in the Australian Capital Territory (ACT), the south-western slopes and southern tablelands of New South Wales (NSW), central and southern Victoria, and the south-eastern corner of South Australia (SA) (SEWPAC 2010).	No
Varanus rosenbergi	Rosenberg's Goanna	V		Associated with Sydney sandstone woodland and heath land. Rocks, hollow logs and burrows are utilised for shelter (Environment Australia 2000). Terrestrial termitaria are required for reproduction (King and Green 1999).	No
Suta flagellum	Little Whip Snake	V		Occurs in Natural Temperate Grasslands and grassy woodlands, including those dominated by *Eucalyptus pauciflora* (Snow Gum) or *E. melliodora* (Yellow Box). Also occurs in secondary grasslands derived from clearing of woodlands. Found on well drained hillsides, mostly associated with scattered loose rocks. Most	No

Scientific Name	Common Name	TSC Act	EPBC Act	Habitat Associations	Likelihood of Occurrence
				specimens have been found under rocks or logs lying on, or partially embedded in the soil (DECC 2007)	
Tympanocryptis pinguicolla	Grassland Earless Dragon	E	E	Historically, the Grassland Earless Dragon ranged from Bathurst to Cooma, including the ACT region. The only populations now known are in the ACT and adjacent NSW at Queanbeyan, and on the Monaro Basalt Plains between Cooma and south-west of Nimmitabel. Formerly known from Victoria, though no recent records. Restricted to a small number of Natural Temperate Grassland sites dominated by *Rytidosperma* spp. (Wallaby grasses), *Austrostipa* spp. (Spear grasses), *Poa sieberiana* (Poa Tussock), *Bothriochloa macra* (Red Grass), and occasionally *Themeda triandra* (Kangaroo Grass). Introduced pasture grasses occur at many of the sites supporting this species, which has also been captured in secondary grassland (DEC 2005).	No
Aves (Diurnal Birds)					
Anthochaera phrygia	Regent Honeyeater	E	CE	Regent Honeyeaters mostly occur in dry box-ironbark eucalypt woodland and dry sclerophyll forest associations, wherein they prefer the most fertile sites available, e.g. along creek flats, or in broad river valleys and foothills. In NSW, riparian forests containing *Casuarina cunninghamiana* (River Oak), and with *Amyema cambagei* (Needle-leaf Mistletoe), are also important for feeding and breeding. They have been recorded in open forest including forest edges, wooded farmland and urban areas with mature eucalypts (Garnett 1993). The Regent Honeyeater primarily feeds on nectar from box and ironbark eucalypts and occasionally from banksias and mistletoes (NPWS 1995). As such it is reliant on locally abundant nectar sources with different flowering times to provide reliable supply of nectar (Environment Australia 2000). In NSW, most records are scattered on and around the Great Dividing Range, mainly on the North-West Plains, North-West Slopes and adjacent Northern Tablelands, to west of Armidale; the Central Tablelands and Southern Tablelands regions; and the Central Coast and Hunter Valley regions. The species is concentrated around two main locations, the Capertee Valley and the Bundarra-Barraba area, but Honeyeaters are also recorded along the coast in the Northern Rivers and Mid-North Coast Regions, and in the Illawarra and South Coast Regions, from Nowra south to Moruya, where small numbers are recorded	No

Scientific Name	Common Name	TSC Act	EPBC Act	Habitat Associations	Likelihood of Occurrence
				in most years (D. Geering 1997, unpublished data; Higgins et al. 2001; Webster & Menkhorst 1992).	
Grantiella picta	Painted Honeyeater	V	V	A nomadic species that typically inhabits Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests with abundant mistletoe (DECC 2007). It is a specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias, preferring Amyema sp. mistletoe (DECC 2007).	No
Lathamus discolor	Swift Parrot	E	CE	Breeds in Tasmania between September and January. Feeds mostly on nectar, mainly from eucalypts, but also eats psyllid insects and lerps, seeds and fruit. Migrates to mainland in autumn, where it forages on profuse flowering Eucalypts. Favoured feed trees include winter flowering species such as Swamp Mahogany (*Eucalyptus robusta*), Spotted Gum (*Corymbia maculata*), Red Bloodwood (*C. gummifera*), Mugga Ironbark (*E. sideroxylon*), White Box (*E. albens*) and Forest Red Gum (*E. tereticornis*) (DECC 2007). Box-ironbark habitat in drainage lines, and coastal forest in NSW is thought to provide critical food resources during periods of drought or low food abundance elsewhere (Mac Nally et al. 2000).	No
Polytelis swainsonii	Superb Parrot	V	V	The Superb Parrot is found throughout eastern inland NSW. On the South-western Slopes their core breeding area is roughly bounded by Cowra and Yass in the east, and Grenfell, Cootamundra and Coolac in the west. Birds breeding in this region are mainly absent during winter, when they migrate north to the region of the upper Namoi and Gwydir Rivers. The other main breeding sites are in the Riverina along the corridors of the Murray, Edward and Murrumbidgee Rivers where birds are present all year round. Mainly inhabits forests and woodlands dominated by eucalypts, especially River Red Gums (*Eucalyptus camaldulensis*) and box eucalypts such as Yellow Box (*Eucalyptus melliodora*) or Grey Box (*E. microcarpa*). The species also seasonally occurs in box-pine (*Callitris*) and Boree (*Acacia pendula*) woodlands (Webster 1988, 1998). They forage at or near the ground. Nest in hollows.	Potential
Hieraaetus morphnoides	Little Eagle	V		The Little Eagle is widespread in mainland Australia, central and eastern New Guinea. The Little Eagle is seen over woodland and forested The population of Little Eagle in NSW is considered to be a single population (DECCW 2010). This	Potential

Scientific Name	Common Name	TSC Act	EPBC Act	Habitat Associations	Likelihood of Occurrence
				species was recently listed as vulnerable due to a moderate reduction in population size based on geographic distribution and habitat quality (NSWSC 2010).lands and open country, extending into the arid zone. It tends to avoid rainforest and heavy forest (BIB, 2006).	
Callocephalon fimbriatum	Gang-gang Cockatoo	V		During summer in dense, tall, wet forests of mountains and gullies, alpine woodlands (Morcombe 2004). In winter they occur at lower altitudes in drier more open forests and woodlands, particularly box-ironbark assemblages (Shields & Chrome 1992). They sometimes inhabit woodland, farms and suburbs in autumn/winter (Simpson & Day 2004).	Unlikely
Glossopsitta pusilla	Little Lorikeet	V		In New South Wales Little Lorikeets are distributed in forests and woodlands from the coast to the western slopes of the Great Dividing Range, extending westwards to the vicinity of Albury, Parkes, Dubbo and Narrabri. Little Lorikeets 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. They feed primarily on nectar and pollen in the tree canopy, particularly on profusely-flowering eucalypts, but also on a variety of other species including melaleucas and mistletoes. On the western slopes and tablelands White Box *Eucalyptus albens* and Yellow Box *E. melliodora* are particularly important food sources for pollen and nectar respectively.	Potential
Ninox strenua	Powerful Owl	V		Powerful Owls are associated with a wide range of wet and dry forest types with a high density of prey, such as arboreal mammals, large birds and flying foxes (Environment Australia 2000, Debus & Chafer 1994). Large trees with hollows at least 0.5m deep are required for shelter and breeding (Environment Australia 2000).	Unlikely
Climacteris picumnus victoriae	Brown Treecreeper	V		Distributed through central NSW on the western side of the Great Dividing Range and sparsely scattered to the east of the Divide in drier areas such as the Cumberland Plain of Western Sydney, and in parts of the Hunter, Clarence, Richmond and Snowy River valleys. The Brown Treecreeper occupies eucalypt woodlands, particularly open woodland lacking a dense understorey. It is	Potential

Scientific Name	Common Name	TSC Act	EPBC Act	Habitat Associations	Likelihood of Occurrence
				sedentary and nests in tree hollows within permanent territories. (NSW Scientific Committee 2001).	
Chthonicola sagittata	Speckled Warbler	V		Occupies a wide range of eucalypt dominated communities with a grassy understorey, often on rocky ridges or in gullies (DECC 2007). Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy (DECC 2007). Large, relatively undisturbed remnants are required for the species to persist in an area (DECC 2007). Pairs are sedentary and occupy a breeding territory of about ten hectares, with a slightly larger home-range when not breeding (DECC 2007).	Unlikely
Daphoenositta chrysoptera	Varied Sittella	V		Varied Sitella are endemic and widespread in mainland Australia. Varied Sitella are found in eucalypt woodlands and forests throughout their range. They prefer rough-barked trees like stringybarks and ironbarks or mature trees with hollows or dead branches (BIB, 2006)	Potential
Pachycephala olivacea	Olive Whistler	V		Elevated (>500 MASL), cool temperate rainforest and moist eucalypt forest in the northern part of their range. This species appears to favour large tracts of undisturbed and densely vegetated forest (SFNSW 1995).	Unlikely
Melanodryas cucullata cucullata	Hooded Robin	V		Associated with a wide range of Eucalypt woodlands, Acacia shrubland and open forests (Blakers et al. 1984). In temperate woodlands, the species favours open areas adjoining large woodland blocks, with areas of dead timber and sparse shrub cover (NSW Scientific Committee 2001). Hooded Robin home ranges are relatively large, averaging 18ha for birds from the New England Tableland (NSW Scientific Committee 2001).	Potential
Petroica boodang	Scarlet Robin	V		The Scarlet Robin is found in south-eastern and south-western Australia, as well as on Norfolk Island. In Australia, it is found south of latitude 25°S, from south-eastern Queensland along the coast of New South Wales (and inland to western slopes of Great Dividing Range) to Victoria and Tasmania, and west to Eyre Peninsula, South Australia; it is also found in south-west Western Australia. The Scarlet Robin lives in open forests and woodlands in Australia, while it prefers rainforest habitats on Norfolk Island. During winter, it will visit more open habitats	Potential

Scientific Name	Common Name	TSC Act	EPBC Act	Habitat Associations	Likelihood of Occurrence
				such as grasslands and will be seen in farmland and urban parks and gardens at this time (BIB, 2006).	
Petroica phoenicea	Flame Robin	V		Flame Robins are found in a broad coastal band around the south-east corner of the Australian mainland, from southern Queensland to just west of the South Australian border. The species is also found in Tasmania. Flame Robins prefer forests and woodlands up to about 1800 m above sea level.	Potential
Stagonopleura guttata	Diamond Firetail	V		Typically found in grassy eucalypt woodlands, but also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities (DECC 2007). It is often found in riparian areas and sometimes in lightly wooded farmland (DECC 2007). Appears to be sedentary, though some populations move locally, especially those in the south (DECC 2007).	Unlikely
Rostratula australis	Australian Painted Snipe	E	E	Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber (DECC 2007). Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds (ibid.). Breeding is often in response to local conditions; generally occurs from September to December (DECC 2007). Roosts during the day in dense vegetation (NSW Scientific Committee 2004). Forages nocturnally on mud-flats and in shallow water (DECC 2007). Feeds on worms, molluscs, insects and some plant-matter (ibid.).	No
Mammalia – terrestrial (excluding bats)					
Dasyurus maculatus	Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (south-eastern mainland population)	V	E	The Spotted-tailed Quoll inhabits a range of forest communities including wet and dry sclerophyll forests, coastal heathlands and rainforests (Mansergh 1984; DECC 2007j), more frequently recorded near the ecotones of closed and open forest and in NSW within 200km of the coast. Preferred habitat is mature wet forest (Belcher 2000b; Green & Scarborough 1990; Watt 1993), especially in areas with rainfall 600 mm/year (Edgar & Belcher 2008; Mansergh 1984). Unlogged forest or forest that has been less disturbed by timber harvesting is also preferable (Catling et al. 1998, 2000). This species requires habitat features such as maternal den sites, an abundance of food (birds and small mammals) and large areas of relatively intact	No

Scientific Name	Common Name	TSC Act	EPBC Act	Habitat Associations	Likelihood of Occurrence
				vegetation to forage in (DECC 2007). Maternal den sites are logs with cryptic entrances; rock outcrops; windrows; burrows (Environment Australia 2000).	
Petauroides volans	Greater Glider	V	V	The greater glider is usually found in eucalypt forests and woodlands along the east coast of Australia from north-eastern Queensland to the Central Highlands of Victoria. There is an endangered population on the south coast of NSW, where they live within 6,000 hectares bounded by the Moruya River, Coila Lake and the Princes Highway.	No
Cercartetus nanus	Eastern Pygmy Possum	V		The Eastern Pygmy Possum occurs in wet and dry eucalypt forest, subalpine woodland, coastal banksia woodland and wet heath (Menkhorst & Knight 2004). Pygmy-Possums feed mostly on the pollen and nectar from banksias, eucalypts and understorey plants and will also eat insects, seeds and fruit (Turner & Ward 1995). The presence of Banksia sp. and Leptospermum sp. are an important habitat feature (DECC 2007). Small tree hollows are favoured as day nesting sites, but nests have also been found under bark, in old birds nests and in the branch forks of tea-trees (Turner & Ward 1995).	No
Phascolarctos cinereus	Koala	V	V	Associated with both wet and dry Eucalypt forest and woodland that contains a canopy cover of approximately 10 to 70% (Reed et al. 1990), with acceptable Eucalypt food trees. Some preferred Eucalyptus species are: *Eucalyptus tereticornis, E. punctata, E. cypellocarpa, E. viminalis*	No
Mammalia - terrestrial (Bats)					
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	Inhabits a wide range of habitats including rainforest, mangroves, paperbark forests, wet and dry sclerophyll forests and cultivated areas (Churchill 1998, Eby 1998). Camps are often located in gullies, typically close to water, in vegetation with a dense canopy (Churchill 1998).	Unlikely
Invertebrata					
Synemon plana	Golden Sun Moth	E	CE	It is found in native open temperate grasslands and open grassy woodlands dominated by wallaby grass tussocks (*Rytidosperma* spp). In the ACT the grasses	Unlikely

Scientific Name	Common Name	TSC Act	EPBC Act	Habitat Associations	Likelihood of Occurrence
				present are predominantly Silvertop Wallaby Grass (*R. carphoides*), in Vic. the grass species are A. auriculata, A. carphoides, A. pilosa, A. eriantha and A. setacea, while in NSW the species are *R. carphoides, R. setaceum and A. auriculatum*. Other native grasses such as *Bothriochloa macra*, *Themeda triandra* and *Austrostipa bigeniculata*, plus herbs such as *Wahlenbergia* spp, *Chrysocephalum apiculatum* and *Lomandra filiformis* may also be present. At least a 40% cover of Austrodanthonia species is optimal for the species (O'Dwyer 1999; O'Dwyer & Attiwill 1999).	
Migratory Marine Birds					
Apus pacificus	Fork-tailed Swift	-	M	A strictly aerial bird which forages over a wide range of habitats, but mostly inland plains or dry, open habitats in northern Australia during the austral summer (Morcombe 2004). In the south this species is sometimes found in association with larger flocks of White-throated Needletail (Morcombe 2004). This species sleeps on the wing and is not known to willingly descend to land (including trees) in southern Australia (Morcombe 2004).	Unlikely
Migratory terrestrial species					
Hirundapus caudacutus	White-throated Needle tail	-	M	Forages aerially over a variety of habitats usually over coastal and mountain areas, most likely with a preference for wooded areas (Marchant & Higgins 1993; Simpson & Day 1999). Has been observed roosting in dense foliage of canopy trees, and may seek refuge in tree hollows in inclement weather (Marchant & Higgins 1993).	Unlikely
Monarcha melanopsis	Black-faced Monarch	-	M	The Black-faced Monarch is found along the coast of eastern Australia, becoming less common further south. This species is found in rainforest and eucalypt forests, feeding in tangled understorey (Morcombe, 2004).	No
Motacilla flava	Yellow Wagtail	-	M	Increasing records in NSW suggest this species is an occasional but regular summer visitor to the Hunter River region. Habitat requirements are highly variable, but typically include open grassy flats near water (DotE, 2016).	No

Scientific Name	Common Name	TSC Act	EPBC Act	Habitat Associations	Likelihood of Occurrence
Myiagra cyanoleuca	Satin Flycatcher	-	M	Heavily vegetated gullies in forests, and taller woodlands of coastal south-east Australia. Also occurs in various sites during migration including farms and parks (Morcombe, 2004).	Unlikely
Rhipidura rufifrons	Rufous Fantail	-	M	The Rufous Fantail is a summer breeding migrant to south-eastern Australia. The Rufous Fantail is found in rainforest, dense wet eucalypt and monsoon forests, paperbark and mangrove swamps and riverside vegetation. Open country may be used by the Rufous Fantail during migration (Morcombe, 2004).	No
Migratory Wetland species					
Gallinago hardwickii	Latham's Snipe, Japanese Snipe	-	M	A variety of permanent and ephemeral wetlands, preferring open fresh water wetlands with nearby cover. Occupies a variety of vegetation around wetlands (Marchant and Higgins, 1999) including wetland grasses and open wooded swamps (Simpson and Day, 1999).	Unlikely
Pandion haliaetus	Eastern Osprey	V	M	The Eastern Osprey favours coastal areas, especially the mouths of large rivers, lagoons and lakes. They feed on fish over clear, open water. The Eastern Osprey breeds from July to September in NSW. Nests are made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea (OEH, 2016)	No

Appendix B Flora species list

Scientific name	Common name	Paddock				
		1	2	3	4	5
Acacia pravissima	Wedge-leaved Wattle					X
Acaena sp.				X		
Acetosella vulgaris *	Sheep Sorrel			X		
Amaranthus sp. *					X	
Arctotheca calendula *	Capeweed	X	X	X		
Aristida ramosa	Purple Wiregrass			X		X
Austrostipa bigeniculata		X	X			X
Austrostipa scabra	Speargrass	X				X
Avena sp. *	Oats		X	X	X	X
Bothriochloa macra	Red Leg Grass	X	X	X	X	X
Brachyloma daphnoides				X		
Carex inversa	Knob Sedge					X
Carthamus lanatus *	Saffron Thistle		X	X		X
Cheilanthes sieberi	Rock Fern			X		
Chenopodium pumilio	Small Crumbweed	X	X	X	X	
Chloris truncata	Windmill Grass				X	
Chondrilla juncea *	Skeleton Weed		X	X		
Chrysocephalum apiculatum	Common everlasting			X	X	X
Cirsium vulgare *	Spear Thistle		X	X	X	X
Conyza sp. *	Fleabane		X			X
Cymbonotus lawsonianus	Bears Ear					X
Cynosurus echinatus *	Rough Dog's Tail			X	X	
Dianella revoluta	Blueberry Lily					X
Dillwynia sericea						X
Echium plantagineum *	Patterson's Curse			X	X	
Einadia nutans	Climbing Saltbush			X	X	
Eragrostis cilianensis *	Lovegrass			X		
Eragrostis curvula * #	African Lovegrass				X	
Erodium botrys *	Long Storksbill	X	X	X		
Erodium cicutarium *	Common Storksbill			X		
Eucalyptus blakelyi	Blakely's Red Gum	X	X	X		X
Eucalyptus bridgesiana	Apple Box			X		X
Eucalyptus dives	Broad-leaved Peppermint					X
Eucalyptus goniocalyx	Long-leaved Box					X
Eucalyptus mannifera	Brittle Gum					X
Eucalyptus melliodora	Yellow Box	X	X	X		X
Eucalyptus rossii	Scribbly Gum	X				X
Geranium solanderi	Native Geranium	X				
Hibbertia obtusifolia	Hoary Guinea Flower			X		X
Hirschfeldia incana *	Buchan Weed				X	
Hordeum leporinum *	Barley Grass	X			X	
Hypericum perforatum * #	St Johns Wort			X	X	X
Hypochaeris radicata *	Catsear	X	X	X	X	X

Scientific name	Common name	Paddock				
		1	2	3	4	5
Juncus sp.						X
Kunzea ericoides	Burgan					X
Lepidium africanum *	Peppercress	X	X		X	
Lissanthe strigosa	Cranberry Heath					X
Lomandra filiformis		X		X		X
Lomandra multiflora	Many-flowered Mat-rush					X
Malva parviflora *	Marshmallow			X	X	
Melichrus urceolatus	Urn Heath			X		X
Microlaena stipoides	Weeping Grass	X				X
Nassella trichotoma * # **w**	Serrated Tussock		X	X	X	X
Onopordum acanthium *	Scotch Thistle		X	X	X	
Oxalis perennans				X		
Panicum effusum *	Hairy Panic			X		X
Paronychia brasiliana *	Chilean Needle Wort	X	X	X	X	
Paspalum dilatatum *	Paspalum			X		X
Phalaris aquatica *	Phalaris	X	X		X	
Plantago lanceolata *	Plantain			X	X	
Poa labillardieri	Poa			X		
Portulaca oleraceus	Pigweed			X		
Pterostylis sp.						X
Rosa rubiginosa *	Sweet Briar			X	X	X
Rubus fruticosus sp agg * # **w**	Blackberry		X	X	X	
Rumex brownii	Brown Dock	X			X	
Rytidosperma pallidum	Red-anthered Wallaby Grass					X
Rytidosperma sp.		X	X	X	X	X
Salvia verbenaca *	Wild Sage				X	
Solanum nigrum *	Blackberry Nightshade			X		
Stackhousia monogyna	Creamy Candles			X		
Themeda triandra	Kangaroo Grass			X		X
Tricoryne elatior	Yellow Autumn-lily			X		
Trifolium sp. *		X	X	X	X	X
Ulex europaeus * # **w**	Gorse				X	
Vittadinia gracilis				X		
Wahlenbergia sp.				X		

* = exotic species. # = noxious weeds in NSW. **w** = Weed of National Significance

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