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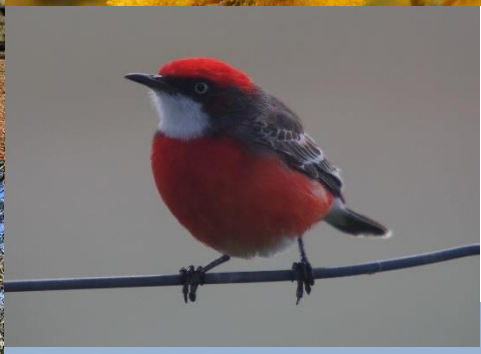
Ecological Assessment Report






Yathong Nature Reserve

Proposed construction and operation of conservation fencing and associated infrastructure for the purpose of reintroducing locally extinct species

Prepared for: NSW National Parks and Wildlife Service

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Glossary and abbreviations

Acronym	Description
AIS	Asset of Intergenerational Significance
BC Act	NSW *Biodiversity Conservation Act 2016*
CEMP	Construction Environmental Management Plan
DAWE	Commonwealth Department of Agriculture Water and the Environment
DBH	Diameter at breast height
DNG	Derived native grassland
DotE	Commonwealth Department of the Environment (now DAWE)
DotEE	Commonwealth Department of the Environment and Energy (now DAWE)
DPIE	NSW Department of Environment, Industry and Environment
EAR	Ecological Assessment Report
EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
ESCP	Erosion and Sedimentation Control Plan
ha	hectares
HBT	Hollow Bearing Tree
IBRA	Interim Biogeographic Regionalisation for Australia
KTP	Key threatening process
LGA	Local Government Area
MNES	Matters of National Environmental Significance
NPWS	National Parks and Wildlife Service
OEH	NSW Office of Environment and Heritage (now DPIE)

Acronym	Description
OEHMF	Overarching Ecological Health Monitoring Framework
PCT	Plant community type
REF	Review of Environmental Factors
TEC	Threatened Ecological Community, listed as vulnerable, endangered or critically endangered under either the BC Act and/or EPBC Act
The program	NSW Feral Predator-free Program
WoNS	Weeds of National Significance

1 Introduction

1.1 Purpose of report

This Ecological Assessment Report (EAR) has been prepared to accompany a Review of Environmental Factors (REF) relating to the construction of a predator proof fence around a selected area within Yathong Nature Reserve. The purpose of this report is to identify and assess the flora and fauna within the study area and to assess the likely impacts of the proposed activity.

1.2 Site description

Yathong Nature Reserve currently covers an area of 118,805 ha (1,156 km^2). An area of 41,160 ha was first established as Yathong Nature Reserve in November 1971 due to the areas significant habitat that supports a highly diverse assemblage of flora and fauna within the dry, semi-arid climatic zone of NSW. Adjoining parcels of land were added to the reserve up until 2020. The reserve provides a major area of habitat for a number of threatened plant and animal species and was formerly recognised as an International Biosphere Reserve. Yathong Nature Reserve, as well as Nombinnie Nature Reserve and State Conservation Area, and Round Hill Nature Reserve, form a large, contiguous area in central NSW that spans between Cobar and Griffith and are referred to as the Central Mallee Reserves. This area is composed of plain and ridge country with a variety of woodland communities and the largest continuous stand of mallee remaining in NSW.

The reserve is separated into two distinct bioregions; the Cobar Peneplain Interim Biogeographic Regionalisation for Australia (IBRA) Bioregion which occupies the eastern half of the reserve and the Murray Darling Depression Bioregion occupying the central and western areas. The Cobar Peneplain supports extensive areas of box woodland as well as Mugga Ironbark (*Eucalyptus sideroxylon*), Hill Red Gum (*E. dealbata*), Belah (*Casuarina cristata*) and White Cypress Pine (*Callitris glaucophylla*). The Murray Darling Depression Bioregion supports diverse areas of both new and old growth mallee communities which serves as vital habitat to an array of vulnerable fauna species. This continuous mallee stand is widespread across rocky ridges and sandplains, with typical species including Pointed Mallee (*Eucalyptus socialis*), Dwyer's Mallee Gum (*E. dwyeri*), Grey Mallee (*E. morrisii*), Green Mallee (*E. viridis*), Mallee Broombush (*Melaleuca uncinata*) and Hill Tea-tree (*Leptospermum trivalve*).

The Cobar Peneplain Bioregion is underlain by Palaeozoic rocks largely within the Lachlan Fold Belt. It is composed of Ordovician rocks in the eastern half of the bioregion which are older and more highly mineralised than the Devonian rocks to the west. Igneous rocks are more commonly observed in the southern part of the Peneplain and granites to the north. The Cobar Peneplain Bioregion is defined as a subdued bedrock-controlled landscape but is characterised by a prominent a topographical landscape of rolling downs and flat plains. The more elevated areas of the Peneplain are occupied by shallow, red soils and aeolian sands associated with sediment from the Darling River and the Murray Basin mantle in the lower areas in the west and south.

The Murray Darling Depression Bioregion lies in the Murray Basin, which is situated in a shallow crustal depression that has been infilled with marine sediments deposited from a

shallow sea, lakes, and rivers and also from terrestrial sediment deposition. Limestone sediment also occurs under the dunefields which supports the diverse mallee species.

Soils across the Cobar Peneplain are closely related to geologic and topographic factors. On ridges the soil is well-drained red loam. Downslope it begins to thicken with an increasing proportion of stones turning into a colluvial mantle red subsoil. On lower slopes the stoniness decreases, with red subsoils giving way to yellow subsoils.

On the dunefields of the Murray Darling Depression region red, brown, and yellow calcareous sands occur, becoming more clayey on the swales. Across the sandplains, soil tends to become heavier with mallee being found only on the sandy rises.

Keginni Creek is an ephemeral first order drainage line that crosses the site (west to east) in the northern half of the site. An unnamed second order drainage line is situated near the southern boundary flowing east to west. Other minor, unnamed drainage lines commence to flow within the site near the eastern boundary, flowing west to east (**Figure 1.1**).

The vegetation of the Central Mallee Reserves is diverse with 802 plant species recorded, which form part of several different plant communities in Yathong Nature Reserve. The native vegetation in parts of Yathong has been heavily modified by grazing and pastoral activities before the reserves' establishment, though other parts remain largely intact. Feral species such as cats, foxes, goats and rabbits, in conjunction with an overabundance of kangaroos, have all led to ongoing degrading effects on native vegetation and fauna habitat.

Species-specific habitat within Yathong supports a diverse range of animals, including micro-bats, 50 reptile species and other mallee specialists such as the Chestnut Quail-thrush (*Cinclosoma castanotum*). There have been 45 threatened fauna species recorded in the Central Mallee Reserves. The Central Mallee Reserves are also recognised as an important habitat zone for protecting declining populations of the Malleefowl (*Leipoa ocellata*) and Red-lored Whistler (*Pachycephala rufogularis*) amongst many others.

1.2.1 Subject site and study area

Following Threatened Species Test of Significance Guidelines (OEH 2018) the subject site is defined as the area 'directly impacted upon by the proposal', and includes all vegetation proposed to be removed or potentially impacted following approval of the works. The study area is defined as the subject site and all areas within the proposed fence that are indirectly impacted upon by the proposal.

The subject site is situated in the Cobar Local Government Area (LGA) on National Parks Estate. The subject site is approximately 170 ha with the study area being 39,230 ha. The subject site is composed of a mix of native and non-native vegetation within the fence and road corridor.

1.2.2 Surrounding area

The area surrounding the subject site is composed of private land with a high cover of native vegetation to the north, south and west. Yathong Nature Reserve extends further to the east of the subject site and beyond national parks estate there is private land.

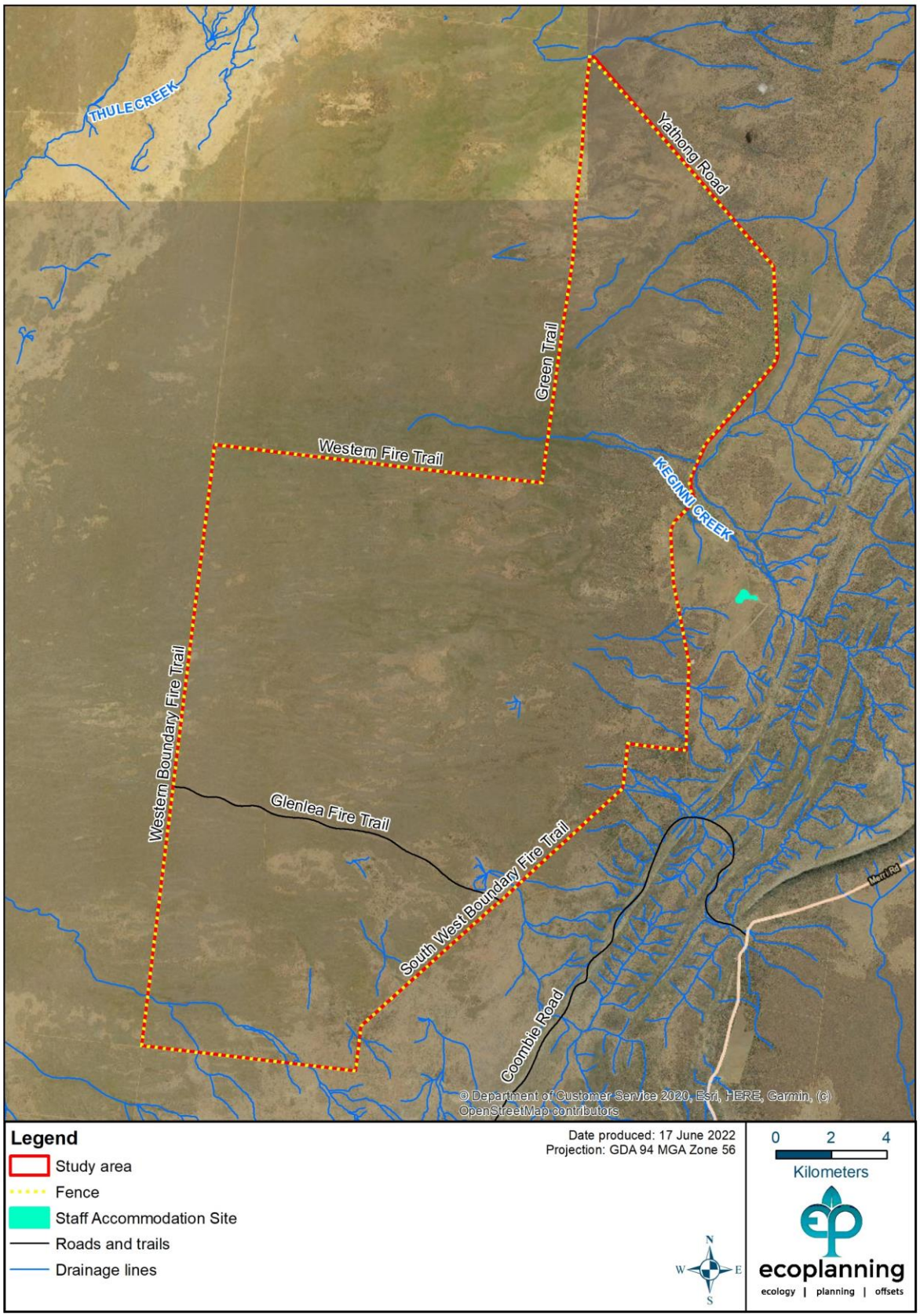

Figure 1.1: Drainage lines within the study area

2 Activity scope

2.1 Description of the proposed activity

The NSW National Parks and Wildlife Service (NPWS) is undertaking the NSW Feral Predator-free Program (hereafter referred to as "the program"). The program involves establishing feral predator-free areas at four locations in NSW, and reintroducing species currently listed as locally extinct or extinct in NSW. Yathong Nature Reserve is one of the four reserves in the program. This approach is one mechanism to remove the threat posed by feral animals, return and establish viable populations of fauna that are rare or extinct in NSW, and restore ecosystem function. It will also promote the recovery of threatened fauna that are known to occur in the reserve.

The feral proof fence at Yathong will enclose a 39,230 ha area within Yathong Nature Reserve (**Figure 2.4**). The total length of the fence is approximately 100 km long. Once completed, the area will be the largest feral predator-free area in NSW.

The fence line is shown in **Figure 1.1**, and is irregular in shape. The eastern boundary of the fence largely follows Yathong Road (approximately 30 m west of the centreline). The southern boundary is staggered heading west from Yathong Road along the South-west Boundary Trail to the western boundary of the reserve. The fence turns north along the Western Boundary Fire Trail to the Western Fire Trail. The fence then heads east along the Western Fire Trail to Green Trail. The fence follows Green Trail north for approximately 15.5 km almost to the Northern Boundary Fire Trail, however, a new track will be cut at the point where Green Trail and Yathong Road are closest.

The fence will be approximately 1.8 m high with a floppy top. Two electrified wires will be on the outer side of the fence at 1 m and 1.3 m above the ground to discourage fauna from entering the fence area. The base is composed of two skirts of wire mesh: one on the inside and the other on the outside of the fence. The inner skirt will extend 450 mm from the fence and the outer will extend 300 mm from the fence. The fence will be constructed from wire netting with at least 30 mm aperture. Strainers will be installed as required to sustain the required tension and integrity of the fence.

Vegetation will be cleared up to 7.5 m from either side of the proposed fence alignment. A considerable length of the fence will be constructed along existing and maintained trails and firebreaks (**Figure 2.1**) that will require limited clearing of native vegetation. However, Green Trail is narrow (**Figure 2.2**) and will require widening, and a small section at the northern tip between Green Trail and Yathong Road is not located along an existing trail. Some trails will require minor realignment to enable access for the construction and maintenance of conservation fencing and removal of vegetation. Positioning the fence 30 m from the centreline of Yathong Road will also require vegetation clearing.

Once the fence is erected, management of this area will include the removal of feral animals and other interventions such as dedicated fire management, habitat restoration and weed control.

The program will establish ancillary facilities to support the construction and operation, including staff accommodation, temporary on-site storage, connection to electrical and

communication services, installation of surveillance, and monitoring equipment in the reserve and outside the feral-free area.

It is anticipated that the program will provide a conservation benefit for at least 28 threatened animals species including re-establishment of nice species, eight of which are currently extinct in NSW. The species are:

- Burrowing Bettong (*Bettongia lesueur*) – extinct in NSW
- Brush-tailed Bettong (*Bettongia penicillata*) – extinct in NSW
- Western Quoll (*Dasyurus geoffroii*) – extinct in NSW
- Greater Stick-nest Rat (*Leporillus conditor*) – extinct in NSW
- Greater Bilby (*Macrotis lagotis*) – extinct in NSW
- Mitchell's Hopping Mouse (*Notomys mitchellii*) – extinct in NSW
- Bridled Nail-tail Wallaby (*Onychogalea fraenata*) – extinct in NSW
- Western Barred Bandicoot (*Perameles bougainville*) – extinct in NSW
- Desert Mouse (*Pseudomys desertor*)

The program will also benefit threatened species known from Yathong Nature Reserve, including Malleefowl (*Leipoa ocellata*), Kultarr (*Antechinomys laniger*), Mukarrthippi Grasswren (*Amytornis striatus striatus*) and Southern Ningaui (*Ningaui yvonneae*), by removing the threat posed by feral fauna and improving ecosystem function.

In addition to the fence, new accommodation and site facilities are required (**Figure 2.5**). These will be situated in derived grassland around the Shearers Quarters east of the proposed feral-free area (**Figure 2.3**). The exact location, size and layout of the new accommodation and site facilities is yet to be determined however it is expected to include:

- Three accommodation blocks, each being 600 m^2 surrounded by a 75 m Asset Protection Zone.
- Access roads (up to 500 m long x 12 m wide)
- Trenching for services (up to 1.3 km long x 10 m wide)

Figure 2.1: An example of wide, existing fire trails along which the fence will be constructed

Figure 2.2: An example of the width of Green Trail

Figure 2.3: The existing Shearer's Quarters and derived grassland characteristic of the area surround the Shearer's Quarters

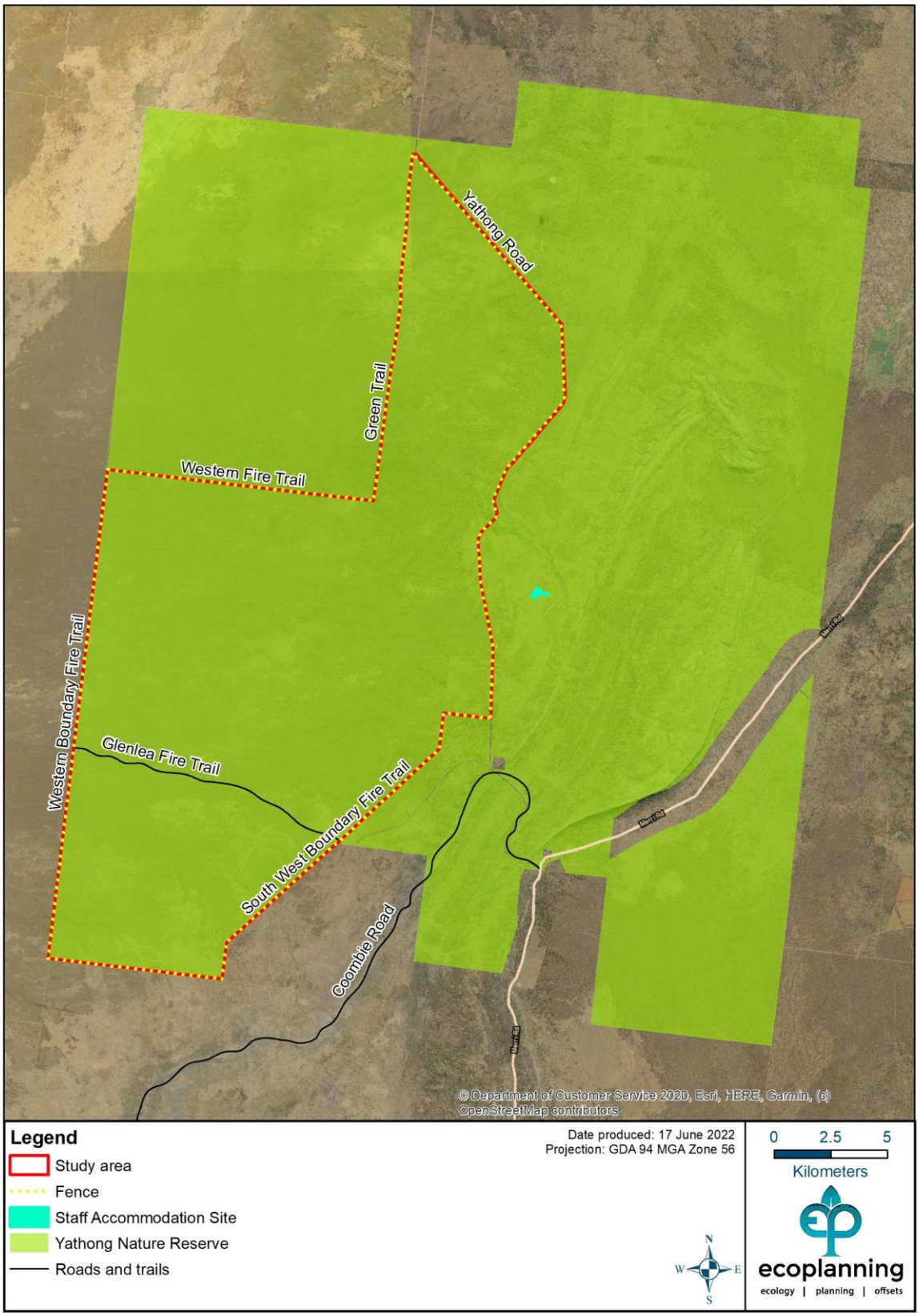

Figure 2.4: Location of the proposed feral predator-free area and accommodation block (study area) in Yathong Nature Reserve

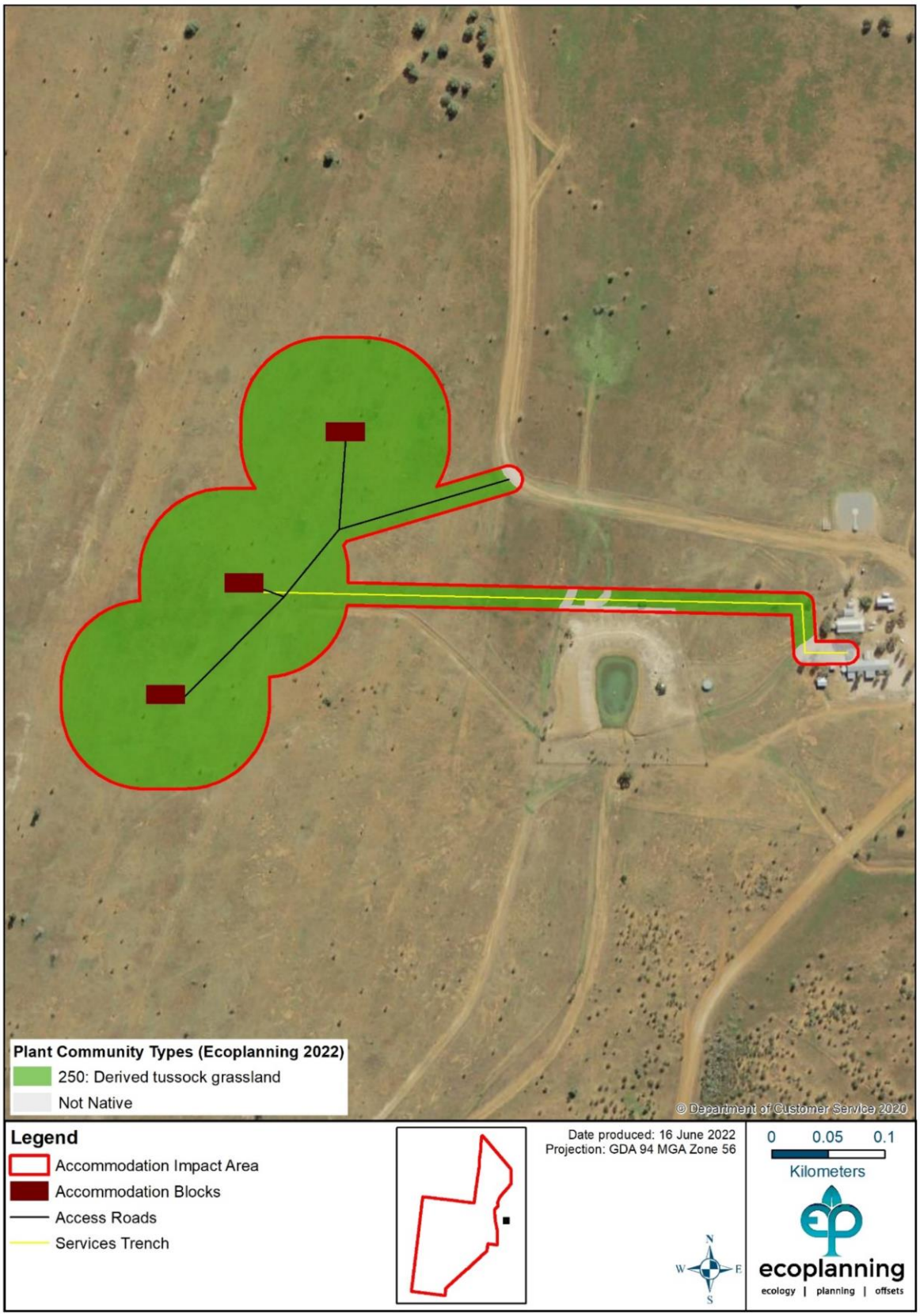

Figure 2.5: Location of the proposed accommodation and site facilities near the existing Shearer's Quarters.

3 Legislative context

This report addresses the legislative context provided in **Table 3.1**.

A Review of Environmental Factors (REF) is required to consider the potential environmental impact of constructing a feral proof fence at Yathong Nature Reserve. The project will be assessed under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

Table 3.1: Legislative framework addressed in this report.

Instrument	Considerations	Context
Commonwealth		
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	Matters of National Environmental Significance	An action will require approval from the Minister if the action will have, or is likely to have, a significant impact on a matter of national environmental significance (MNES). MNES include: • World heritage properties • National heritage places • Wetlands of international importance (listed under the Ramsar Convention) • Listed threatened species and ecological communities • Migratory species protected under international agreements • Commonwealth marine areas • Great Barrier Reef Marine Park • Nuclear actions (including uranium mines) • A water resource, in relation to coal seam gas development and large coal mining development.
State (New South Wales)		
National Parks & Wildlife Act 1974	Sections 30J	These sections outline the management principles for nature reserves, particularly the conservation of biodiversity, maintaining ecological function and integrity, and research and monitoring. These are outlined in the Central Mallee Reserves Plan of Management (DPIE 2021b).
Environmental Planning and Assessment Act 1979 (EP&A Act)	Part 5	Describes the planning context for public authorities for developments without consent, including the environmental assessment processes.
Biodiversity Conservation Act 2016 (BC Act)	Part 7	Part 7 of the BC Act provides the environmental assessment requirements for biodiversity and assessment under the EP&A Act to assess whether an activity is likely to significantly affect threatened species.

4 Natural values assessment

4.1 Desktop analysis

A site-specific literature and database review was undertaken in preparation of this report. This included desktop analysis of aerial photography and regional scale information from the following sources:

- BioNet Atlas (DPIE 2021e)
- Sixmaps (NSW Land and Property Information 2021)
- Draft Overarching Ecological Health Monitoring Framework (OEHMF) (DPIE 2021a)
- Yathong Nature Reserve Vegetation Survey (DPIE 2019)
- Central Mallee Reserves, Plan of Management, incorporating Yathong Nature Reserves, Nombinnie Nature Reserve, Nombinnie State Conservation Area and Round Hill Nature Reserve (NPWS 2021b)
- Central Mallee Reserves, Draft Planning Considerations, incorporating Yathong Nature Reserves, Nombinnie Nature Reserve, Nombinnie State Conservation Area and Round Hill Nature Reserve (NPWS 2021c)
- The vegetation of Nombinnie and Round Hill Nature Reserves, central-western New South Wales (Cohn 1995)
- DPIE (2015). State Vegetation Type Map: Central West / Lachlan Region Version 1.4 VIS_ID 4468.
- DPIE (2022). Asset of Intergenerational Significance Interactive Map.

Polices and Guidelines relating to the proposal are:

- Significant Impact Guidelines 1.1 - Matters of National Environmental Significance (DotE 2013)
- Threatened Species Test of Significance Guidelines (OEH 2018)

Threatened species, populations and migratory species recorded within 5 km of the study area in a search of the BioNet Atlas (DPIE 2021e) were consolidated and their likelihood of occurrence was assessed by:

- Review of location and date of recent (<5 years) and historical (>5-20 years) records,
- Review of available habitat within the study area and surrounding areas,
- Review of the scientific literature pertaining to each species and population, and
- Applying expert knowledge of each species.

The potential for threatened species, populations and/or migratory species to occur was then considered and the necessity for targeted field surveys was determined. Following field survey and review of available habitat within the study area, the potential for species to utilise the site and to be affected directly or indirectly by the proposal were considered as either:

- “Present” = recorded during the survey
- “Recent record” = species has been recorded in the study area within the past 5 years.
- “High” = species has previously been recorded in the study area (>5 years ago) or in proximity to (for mobile species), and/or habitat is present that is likely to be used by a local population.

- "Moderate" = suitable habitat for a species is present onsite but no evidence of a species detected and relatively high number of recent records (5-20 years) in the locality or species is highly mobile.
- "Low" = suitable habitat for a species is present on site but limited or highly degraded, no evidence of a species detected and relatively low number of recent records in the locality.
- "Not present" – suitable habitat for the species is not present onsite or adequate survey has determined species does not occur in the study area.

4.1.1 Native vegetation communities

State Vegetation Type Map: Central West / Lachlan Region Version 1.4 VIS_ID4468

The State Vegetation Type Map for Central West / Lachlan was used to stratify the study area and for site selection. The proposed fence line intersects 12 Plant Community Types (PCTs) identified on the vegetation map (**Table 4.1** and **Figure 4.1**).

Table 4.1: Plant community types (PCTs) in the study area

PCT	Area (ha)
PCT 10 River Red Gum – Black Box woodland wetland of the semi-arid (warm) climatic zone	0.80
PCT 23 Yarran tall open shrubland of the sandplains and plains of the semi-arid (warm) and arid climatic zones	0.19
PCT 57 Belah/Black Oak – Western Rosewood – Wilga woodland of central NSW including the Cobar Peneplain Bioregion	6.75
PCT 72 White Cypress Pine – Poplar Box woodland on footslopes and peneplains mainly in the Cobar Peneplain Bioregion	2.43
PCT 104 Gum Coolabah woodland on sedimentary substrates mainly in the Cobar Peneplain Bioregion	30.49
PCT 105 Poplar Box grassy woodland on flats mainly in the Cobar Peneplain Bioregion and Murray Darling Depression Bioregion	2.86
PCT 143 Narrow-leaved Hopbush – Scrub Turpentine – Senna shrubland on semi-arid and arid sandplains and dunes.	0.81
PCT 171 Spinifex linear dune mallee mainly of the Murray Darling Depression Bioregion	22.78
PCT 173 Sandplain mallee of central NSW	30.80
PCT 174 Mallee – Gum Coolabah woodland on red earths flats of the eastern Cobar Peneplain Bioregion	15.88
Derived grasslands PCT 49 Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion PCT 165 Derived corkscrew grass grassland/forbland on sandplains and plains in the semi-arid (warm) climate zone	 9.75 2.45

PCT	Area (ha)
PCT 250 Derived tussock grassland of the central western plains and lower slopes of NSW	8.19

Some of these PCTs are equivalent, in part, to threatened ecological communities (TEC) listed under the BC Act. However, none of the PCTs in the study area matched the equivalent TEC (**Table 4.2**). None of the PCTs are equivalent to a TEC listed under the EPBC Act.

Table 4.2: PCTs mapped in the Central West / Lachlan region vegetation map, their equivalent PCT and whether they were present in the study area.

PCT	TEC name	Presence in study area
PCT 23	Acacia melvillei Shrubland in the Riverina and Murray-Darling Depression bioregions	No. *Acacia melvillei* not recorded by DPIE (2019) or Ecoplanning
PCT 57	Acacia loderi shrublands (part)	No. *Acacia loderi* not recorded by DPIE (2019) or Ecoplanning
PCT 143	Acacia loderi shrublands (part)	No. *Acacia loderi* not recorded by DPIE (2019) or Ecoplanning
PCT 173	Acacia loderi shrublands (part) Acacia melvillei Shrubland in the Riverina and Murray-Darling Depression bioregions (part)	No. *Acacia loderi* and *A. melvillei* not recorded by DPIE (2019) or Ecoplanning
PCT 174	Acacia loderi shrublands (part)	No. *Acacia loderi* not recorded by DPIE (2019) or Ecoplanning

DPIE (2019) noted that vegetation mapping for Yathong Nature Reserve had some inaccuracies but did not include a validated version of the map. Similarly, Ecoplanning did not observe PCT 10, 23 or 143 during the field survey. Further, some areas mapped as cleared land or derived native grassland (DNG) seemed to have sufficient native species composition or upper and midstorey cover to be considered DNG or a PCT, respectively. While some notes were made about these areas to validate vegetation impacted by the fence, the outcome of the survey was not to prepare a validated vegetation map for the 39,230 ha feral predator-free area. However, validating vegetation mapping for the feral predator-free area will help to stratify sampling in future monitoring.

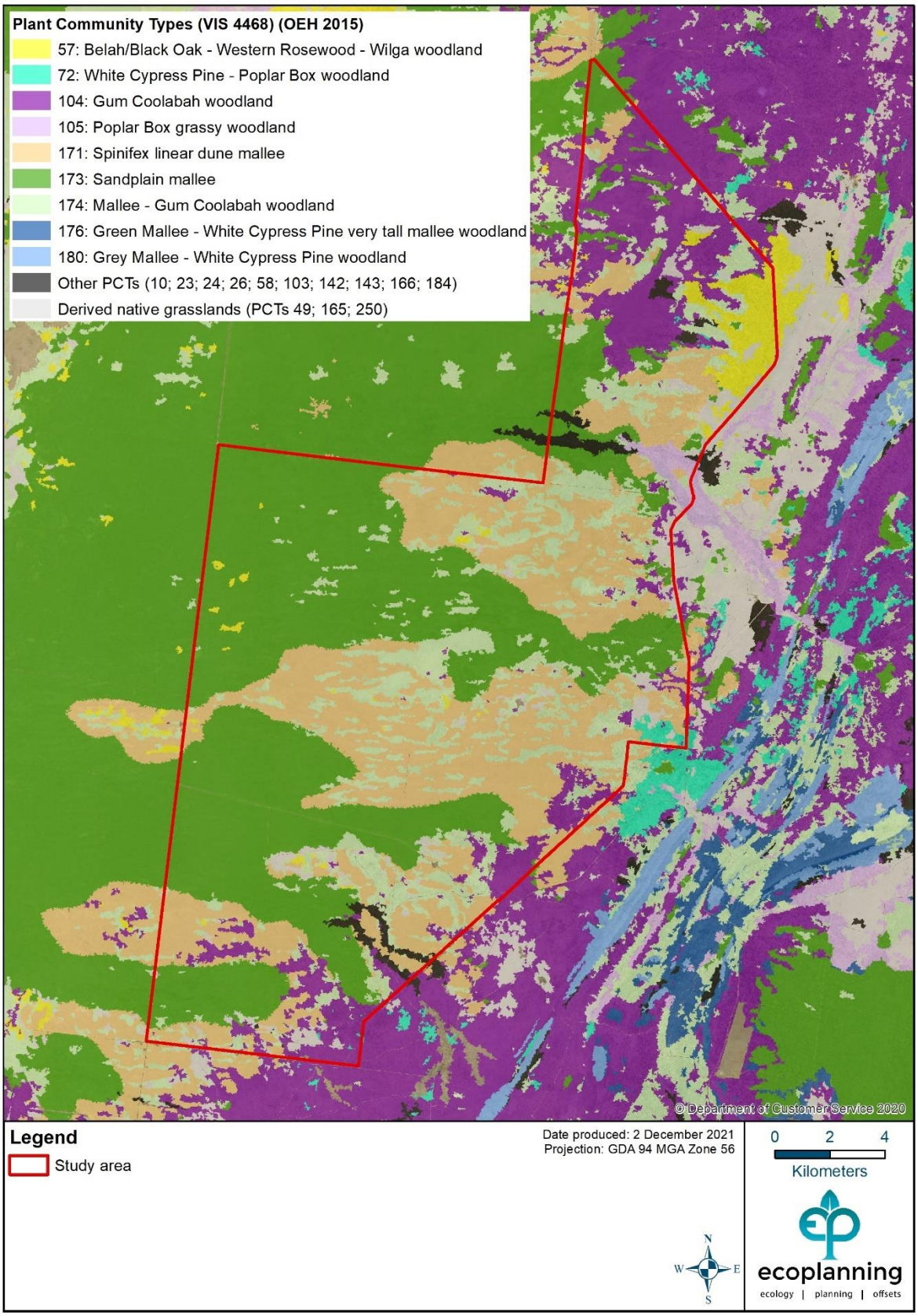

Figure 4.1: Vegetation community mapping for the study area.

4.1.2 Flora

BioNet Atlas records for Yathong Nature Reserve list 642 species, which includes 545 native species and 97 exotic species. DPIE (2019) noted the presence of other significant flora and flora of taxonomic interest in the reserve. Threatened flora are discussed in **Section 4.1.4**.

4.1.3 Fauna

Records in BioNet of fauna observed in Yathong Nature Reserve list six amphibians, 53 reptiles, 169 birds and 32 mammals (**Table 4.3** and **Appendix D**). Two birds and eight mammals are listed as introduced. Threatened fauna are discussed in **Section 4.1.4**.

Table 4.3: BioNet Atlas of fauna at Yathong Nature Reserve

Fauna class	Number of species	Introduced
Amphibians	6	
Reptiles	53	
Birds	169	2
Mammals	32	8

The activity of five of the introduced mammals previously recorded at Yathong Nature Reserve are recognised as Key Threatening Processes (KTP) under the BC Act. These KTP are:

- Competition and grazing by the feral European Rabbit (*Oryctolagus cuniculus*)
- Competition and habitat degradation by Feral Goats (*Capra hircus*)
- Predation by the European Red Fox (*Vulpes vulpes*)
- Predation by the Feral Cat (*Felis catus*)
- Predation, habitat degradation, competition and disease transmission by Feral Pigs (*Sus scrofa*).

4.1.4 Threatened species, populations and migratory species

A search of BioNet Atlas identified a potential 21 threatened or migratory species with 5 km of the study area, plus an additional 13 species that have previously been recorded in Yathong Nature Reserve (**Table 4.4**). Of these 34 species there are two threatened flora species, 31 threatened fauna and one migratory bird species (23 birds, four microbats, three mammals and two reptiles).

In addition, the endangered ecological community named the Mallee Bird Community of the Murray Darling Depression Bioregion was recently listed under the EPBC Act in late 2021.

Following the NSW Bushfire Inquiry, the NSW *National Parks and Wildlife Act 1974* was amended to allow the Minister for the Environment to declare an area to be an Asset of Intergenerational Significance (AIS) because of its natural or cultural significance. Habitat for the Mukarrthippi Grasswren (*Amytornis striatus striatus*) along the Western Boundary Trail has been declared an AIS (**Figure 4.3**). A conservation action plan will be prepared for the species to reduce threats and monitor the population. The proposed feral predator free fence is likely

to be compatible with these actions. Further, the proposed feral predator free fence and disturbance area is located outside the footprint of Mukarrthippi Grasswren (*Amytornis striatus striatus*) AIS, therefore, no impact is anticipated.

Table 4.4: Summary of threatened species groups and populations in the area.

Taxonomic group	Conservation status (BC Act / EPBC Act)			
	Migratory	Vulnerable	Endangered	Critical
Flora		1 / 1		1 / 0
Amphibians				
Reptiles		1 / 0	1 / 0	
Birds	0 / 1	20 / 2	2 / 0	1 / 0
Mammals		5 / 2	2 / 0	
Ecological community			0 / 1	

Many threatened species in Yathong Nature Reserve prefer habitat associated with mallee communities and sandy soils, therefore, Yathong Nature Reserve is likely to play an important role in the conservation and preservation of these species. These species are (and their BC Act conservation status):

- Marbled Delma (*Delma australis*) - endangered
- Western Blue-tongued Lizard (*Tiliqua occipitalis*) - vulnerable
- Malleefowl (*Leipoa ocellata*) - endangered
- Mukarrthippi Grasswren (*Amytornis striatus striatus*) – proposed critically endangered
- Shy Heathwren (*Hylacola cautus*) - vulnerable
- Chestnut Quail-thrush (*Cinclosoma castanotum*) - vulnerable
- Red-lored Whistler (*Pachycephala rufogularis*) – critically endangered
- Southern Scrub-robin (*Drymodes brunneopygia*) - vulnerable
- Southern Ningaui (*Ningaui yvonneae*) - vulnerable

The newly listed Mallee Bird Community of the Murray Darling Depression Bioregion endangered community under the EBPC Act includes the assemblage of birds in mallee communities at Yathong Nature Reserve.

A likelihood of occurrence analysis was undertaken following field survey to reduce the primary list to those species known or likely to use the study area, and thus may be impacted by the proposed works. This reduced the list to eleven species known to occur and five species that were previously recorded and deemed a “high” likelihood of occurrence (see **Appendix A**). These species are listed below:

Species known to occur in the study area:

- Western Blue-tongued Lizard (*Tiliqua occipitalis*)
- Malleefowl (*Leipoa ocellata*)
- Major Mitchell’s Cockatoo (*Lophochroa leadbeateri*) - vulnerable
- Shy Heathwren (*Hylacola cautus*)

- Chestnut Quail-thrush (*Cinclosoma castanotum*)
- Southern Scrub-robin (*Drymodes brunneopygia*)
- Pied Honeyeater (*Certhionyx variegatus*) - vulnerable
- Little Pied Bat (*Chalinolobus picatus*) – vulnerable
- Inland Forest Bat (*Vespadelus baverstocki*) – vulnerable

Species with a high likelihood of occurrence:

- Mukarrthippi Grasswren (*Amytornis striatus striatus*) – proposed critically endangered
- Red-lored Whistler (*Pachycephala rufogularis*) – critically endangered
- Dusky Woodswallow (*Artamus cyanopterus cyanopterus*) – vulnerable
- Hooded Robin (*Melanodryas cucullata cucullata*) – vulnerable
- Kultarr (*Antechinomys laniger*) - endangered

Of the species listed above that are known or highly likely to occur in the study area, Malleefowl and Red-lored Whistler are listed under the EPBC Act as vulnerable and the Mallee Bird Community of the Murray Darling Depression Bioregion is listed as endangered.

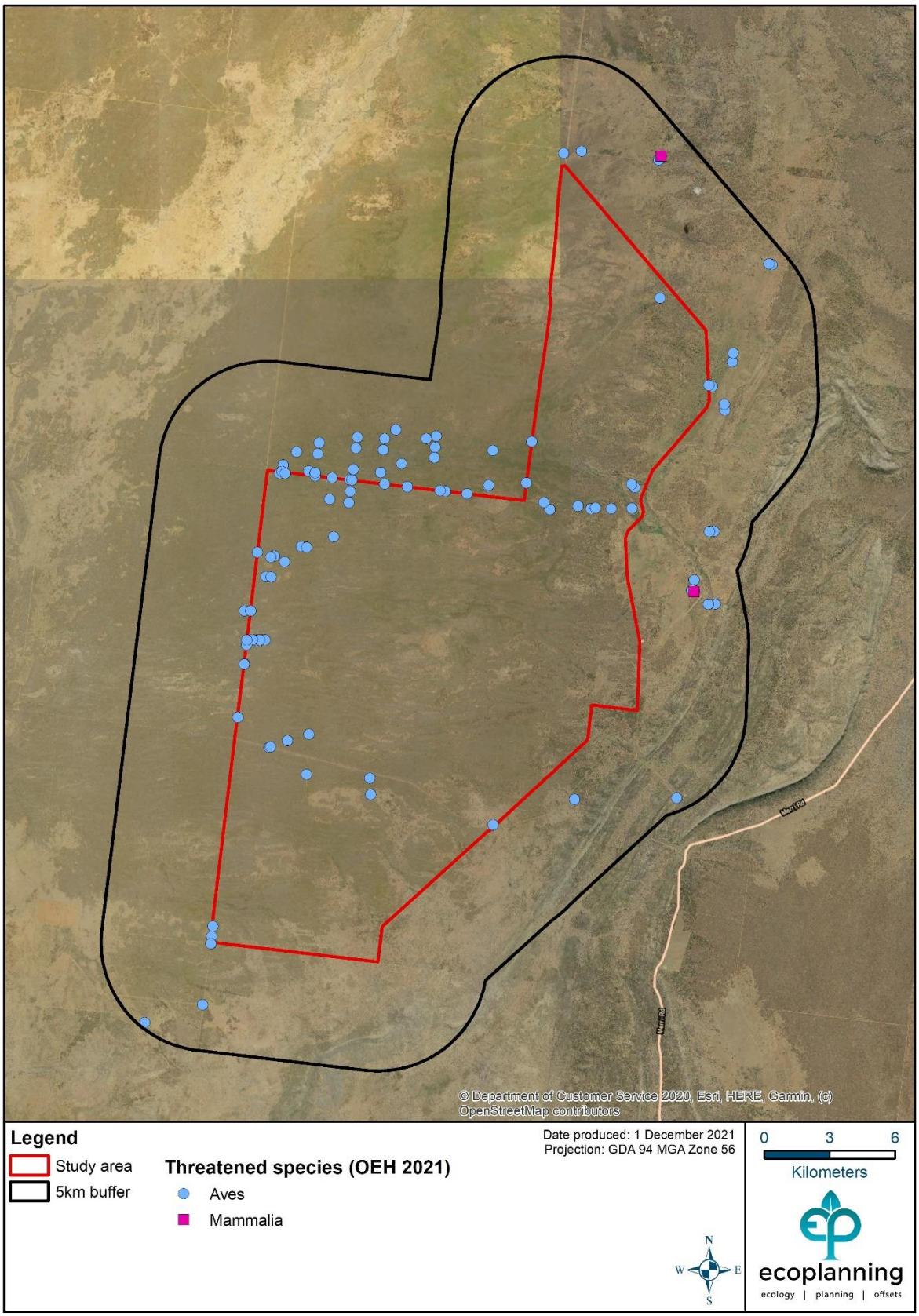

Figure 4.2: Threatened species recorded within 5 km of the study area (sensitive species records are denatured)

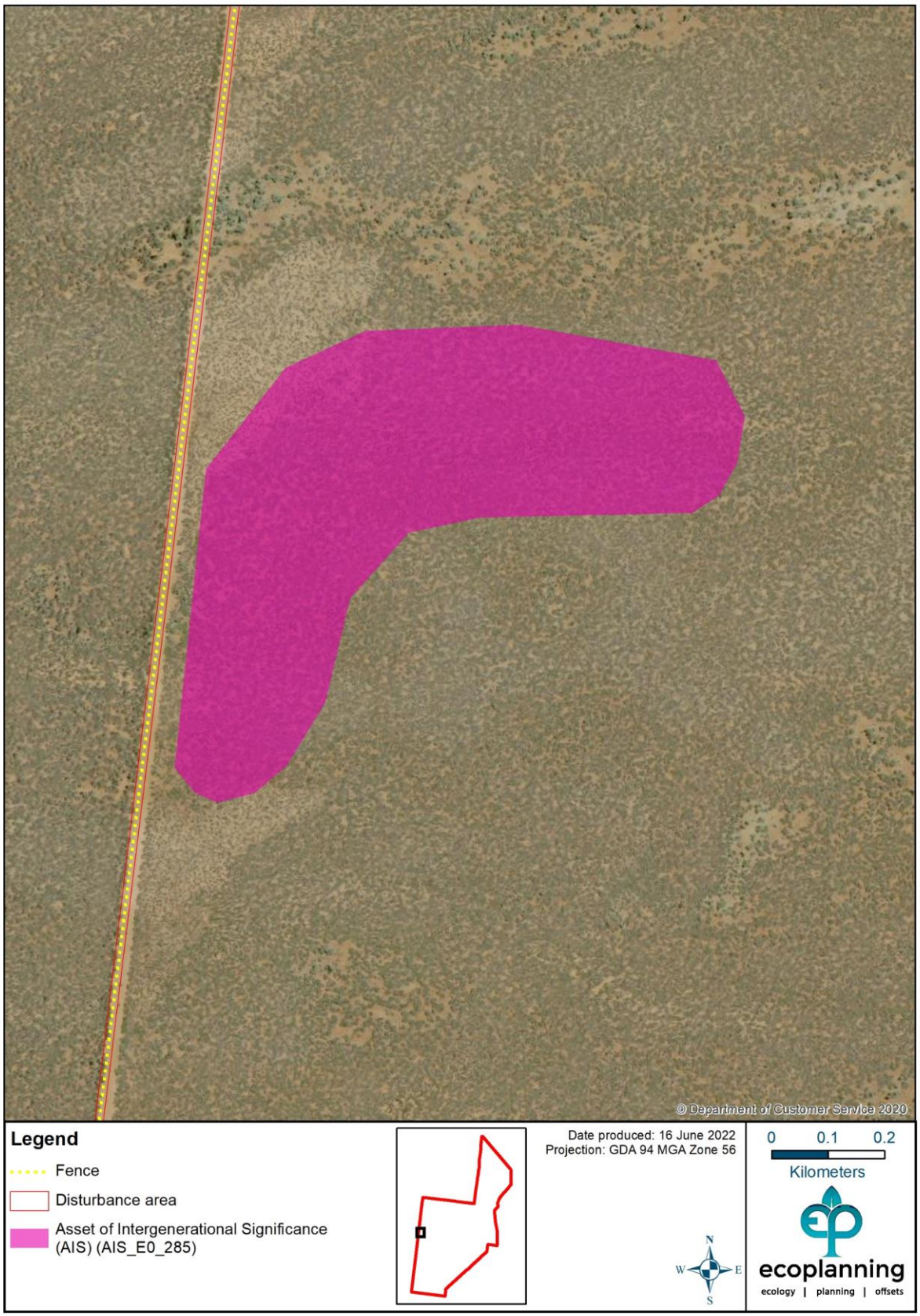

Figure 4.3: Asset of Intergenerational Significance for the Mukarrthippi Grasswren

4.2 Landscape values and land use history

Yathong Nature Reserve along with Nombinnie Nature Reserve and State Conservation Area, and Round Hill Nature Reserve form the largest continuous area of mallee communities in western NSW, supporting diverse wildlife communities and habitat for rare and endangered flora and fauna species (NPWS 1996). The reserve straddles the Cobar Peneplain and the Murray Darling Depression bioregions and is characterised east to west by ranges, rolling downs, plains and dunefields, respectively, supporting semi-arid woodlands.

The study area falls within the central to western portion of the reserve and traverses open plains country supporting a range of PCTs over landscapes dominated by plains, sand plains and dunefields of sedimentary and aeolian origin (NPWS 1996). The most common PCTs occurring within the study area are outlined below and described in more detail in **Section 4.5.1**.

PCT 104 (Gum Coolabah Woodland) is widespread within the east to south-eastern portion of the study area occurring on sandy loam to gravelly soils of low to moderate relief. Extensive areas of this community appear to have been historically cleared for grazing. Weed occurrence was most common in this PCT likely reflecting past grazing management.

Linear dune-swale rises support extensive mallee communities with *Triodia scariosa* and *Austrostipa scabra* subsp. *scabra* often a major component of the understorey. These communities showed little to no evidence of historic clearing, however, older growth mallee were rare in the central and southern portions of the study area, which may be attributed to fire management. Few weed species were recorded in the linear dune communities.

Sandplains were widespread and scattered throughout the study area with the majority occurring along the Western Fire Trail and the Western Boundary Trail. Native vegetation supports extensive mallee communities with a variable shrub and groundlayer diversity. Areas in the north of the study area in the vicinity of Coombie Road and Developmental Road were found to support a more diverse shrub layer compared to those sites along the Western Boundary Fire Trail where the shrub layer was sparse with groundlayer dominated by native grasses and forbs of varying cover. This could be a function of fire history and fire management. Few weed species were observed within sandplain vegetation communities.

A review of the Yathong Nature Reserve Fire Management Strategy indicates that a number of areas adjacent to the access fire trails underwent hazard reduction burns in 2013 (NPWS 2014).

Within the study area, such as along the Western Fire Trail, the mallee PCTs 171 and 173 show evidence of past disturbance through reduced canopy height, the presence of younger mallee individuals, a very sparse understorey and abundant scattered woody debris. This disturbance may indicate evidence of the 2013 hazard reduction strip burns and given the time since fire (8 years) and below average annual rainfall from 2017 to 2019, the recovery of these areas has been slow.

For the mallee communities (PCT 171 and PCT 173), it is considered that wildfire may occur every few decades, although more frequently (<10 years) on private land in order to stimulate herbaceous growth for stock (DPIE 2021f). Mallee species are resistant to wildfire, surviving and regenerating from lignotubers, however, wildfires in quick succession may cause

extensive mallee death (Noble 1989 in Keith 2004). Further, short inter-fire interval is considered to reduce plant diversity and food resources for native fauna, such as the Malleefowl.

Historically, for Gum Coolabah woodland (PCT 104), wildfire has been uncommon due to the lack of dense grass cover due to woody shrub growth. However, extensive areas of the community within the reserve are now more open following past clearing for grazing and, following above average annual rainfall in 2020 and 2021, the grass cover has formed continuous swards across the landscape posing a potential wildfire threat.

The proposed feral predator-free fence is primarily located along existing roads that traverses sand plains, sand dunes, ephemeral drainage lines and plains. There are few physical impediments to the installation of the fence with an ephemeral drainage line near the southern boundary that is slightly incised. Temporary high flows and woody debris could pose a risk to fence integrity during periods of high rainfall. Other ephemeral drainage lines are relatively open and rocky rises gentle such that they should not constrain construction of the fence.

The location of the proposed additional accommodation and site facilities has been subject to historic clearing. Trees and shrubs have largely been removed leaving a derived grassland community. This area is likely to have been subject to grazing when the property was freehold.

4.3 Ecological values

4.3.1 Field survey method

Site survey was conducted on 15 to 24 September 2021 by Elizabeth Norris (Senior Ecologist), Bruce Mullins (Principal Ecologist), Ross Wellington (Principal Ecologist, AES) and Rebecca O'Rourke (Ecologist, Molino Stewart). Weather conditions on the day were cold to warm with 6 mm of rainfall recorded during the field survey (**Table 4.5**). In the three months leading up to the survey, Mount Hope recorded above average rainfall, including 90.0 mm in June, 43.2 mm in July and 17.0 mm in August.

Table 4.5: Daily weather observations at Mount Hope (approximately 50 km east of the study area)

Date	Temperature (°C)		Rainfall (mm)	Maximum wind	
	Min	Max		Direction	Speed (km/h)
15/9/2021	-1.1	20.1	0	N/A	N/A
16/9/2021	-0.1	22.3	0	N/A	N/A
17/9/2021	4.4	25.1	0	N/A	N/A
18/9/2021	13.4	20.3	5.8.	N/A	N/A
19/9/2021	0.6	23	0.2	N/A	N/A
20/9/2021	1.0	21.7	0	N/A	N/A
21/9/2021	2.6	16.1	0	N/A	N/A
22/9/2021	-0.3	18.8	0	N/A	N/A
23/9/2021	1.0	24.3	0	N/A	N/A

Date	Temperature (°C)		Rainfall (mm)	Maximum wind	
	Min	Max		Direction	Speed (km/h)
24/9/2021	2.8	26.5	0	N/A	N/A

Field survey commenced with a vehicle based reconnaissance of the study area. During the reconnaissance, traverses of areas of interest and changes in vegetation and soil types were inspected by the survey team.

A description of the survey methods is provided in the following sections. A summary of survey effort is provided in **Table 4.6**. The location of flora survey points are shown in **Figure 4.4** and fauna survey points are shown in **Figure 4.5** to **Figure 4.9**. Coordinates for vegetation survey are provided in **Appendix B** and coordinates for fauna survey sites are provided in **Appendix C**.

Table 4.6: A summary of survey effort in the study area

Site name	Full floristic or rapid	Bird census	Bird songmeter	Bat	Reptile	RC
YNR048	✓	✓		✓		✓
YNR061	✓	✓	✓	✓	✓	✓
YNR080	✓	✓	✓	✓		
CWPT6732	✓	✓	✓	✓	✓	✓
CWPT6745	✓	✓		✓	✓	✓
YNR038	✓	✓	✓	✓	✓	✓
YNR011	✓	✓		✓		✓
YNR054	✓	✓		✓		
YNR055	✓	✓		✓	✓	✓
YNR074	✓	✓	✓	✓		
YNR079	✓	✓		✓		
New1	✓	✓	✓	✓		
New2	✓	✓		✓	✓	✓
New3	✓	✓	✓	✓	✓	✓
New4	✓	✓		✓	✓	✓
New5	✓	✓	✓	✓	✓	✓
YNR040	✓	✓				
Yathong1 (R1)	✓	✓			✓	✓
Yathong4	✓					
Yathong5	✓					
R2					✓	✓
R3					✓	✓

Site name	Full floristic or rapid	Bird census	Bird songmeter	Bat	Reptile	RC
R4					✓	✓
R5					✓	✓
R6					✓	✓
R7					✓	✓
R8					✓	✓
R9					✓	✓
R10					✓	✓
R11					✓	✓
R12					✓	✓
R13					✓	✓
R14					✓	✓
R15					✓	✓
R16					✓	✓
R17					✓	✓
R18					✓	✓
R19					✓	✓
R20					✓	✓
R21					✓	✓
R22					✓	✓
R23					✓	✓
R24					✓	✓
R25					✓	✓
R26					✓	✓
R27					✓	✓
R28					✓	✓
Cam025						✓
Cam026						✓
Cam028						✓
Cam029						✓
Cam001						✓
Cam002						✓
Cam004						✓
Cam005						✓
Cam007						✓
Cam008						✓

Site name	Full floristic or rapid	Bird census	Bird songmeter	Bat	Reptile	RC
Cam010						✓
Cam011						✓
Cam014						✓
Cam015						✓
Cam017						✓
Cam018						✓
Cam020						✓
Cam021						✓
Cam023						✓
Cam024						✓

RC = remote camera survey

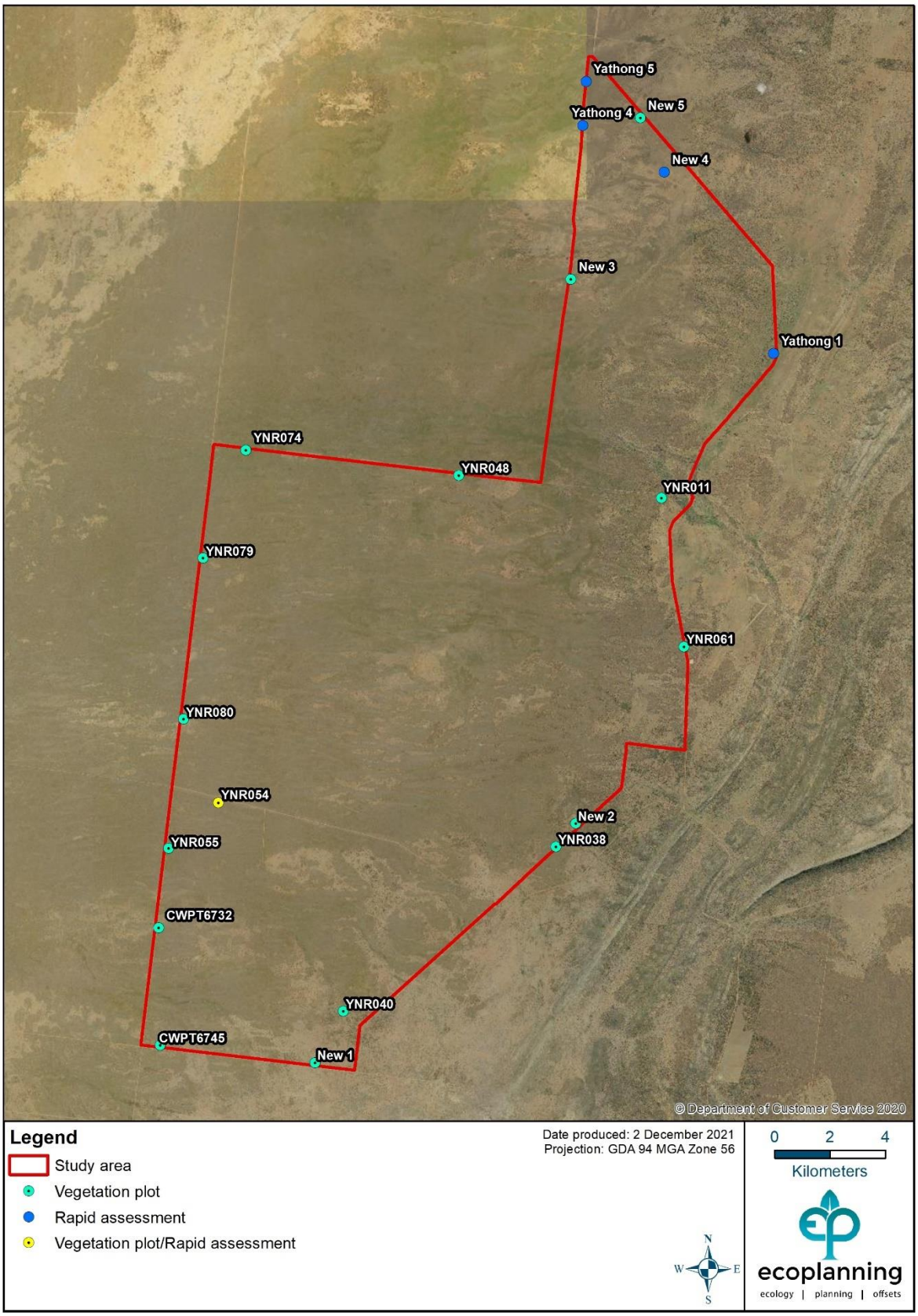

Figure 4.4: Vegetation survey points in the study area

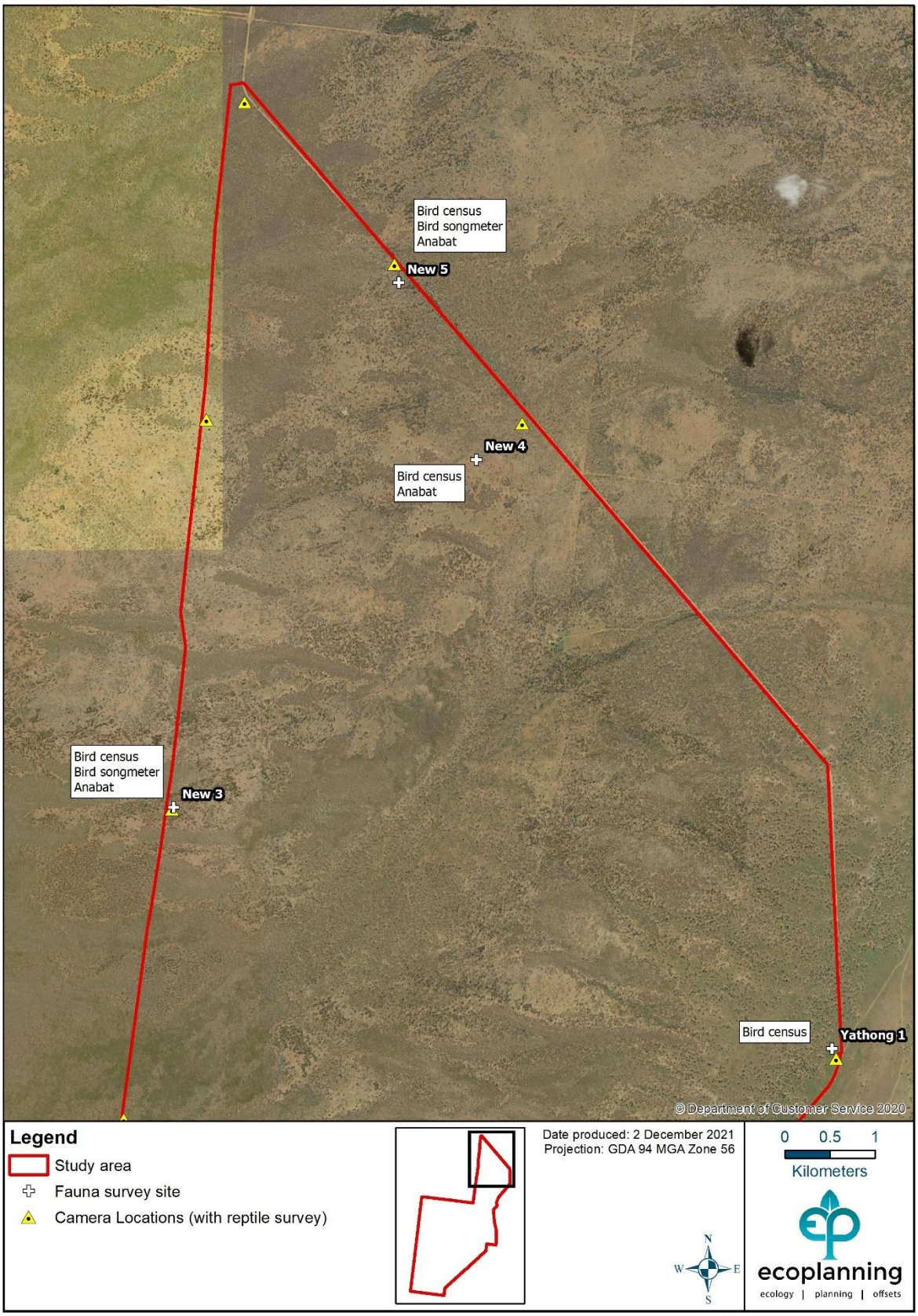

Figure 4.5: Fauna survey monitoring points in the northern parts of the study area

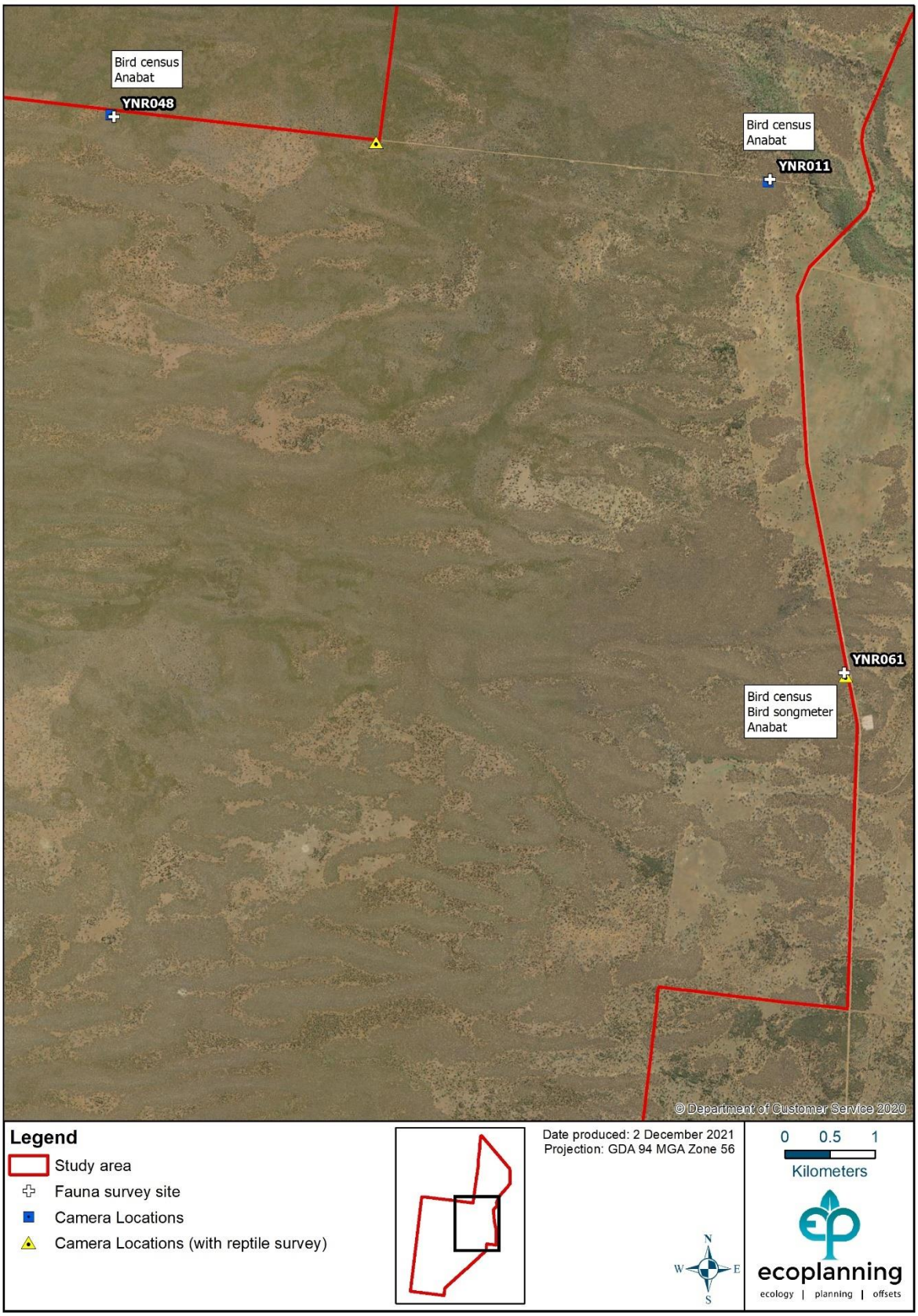

Figure 4.6: Fauna survey monitoring points in the central-eastern parts of the study area

Figure 4.7: Fauna survey monitoring points in the central-western parts of the study area

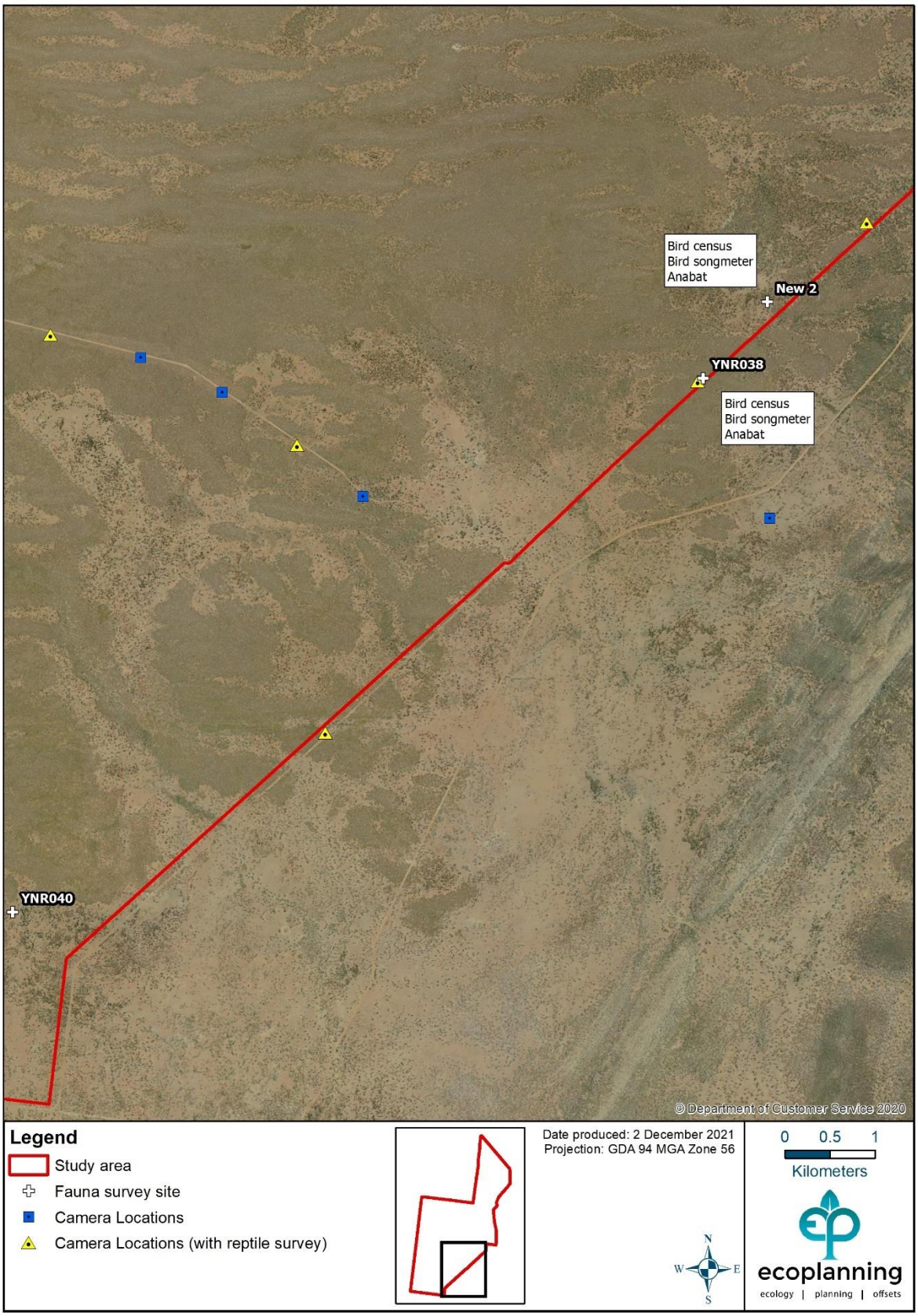

Figure 4.8: Fauna survey monitoring points in the south-eastern parts of the study area

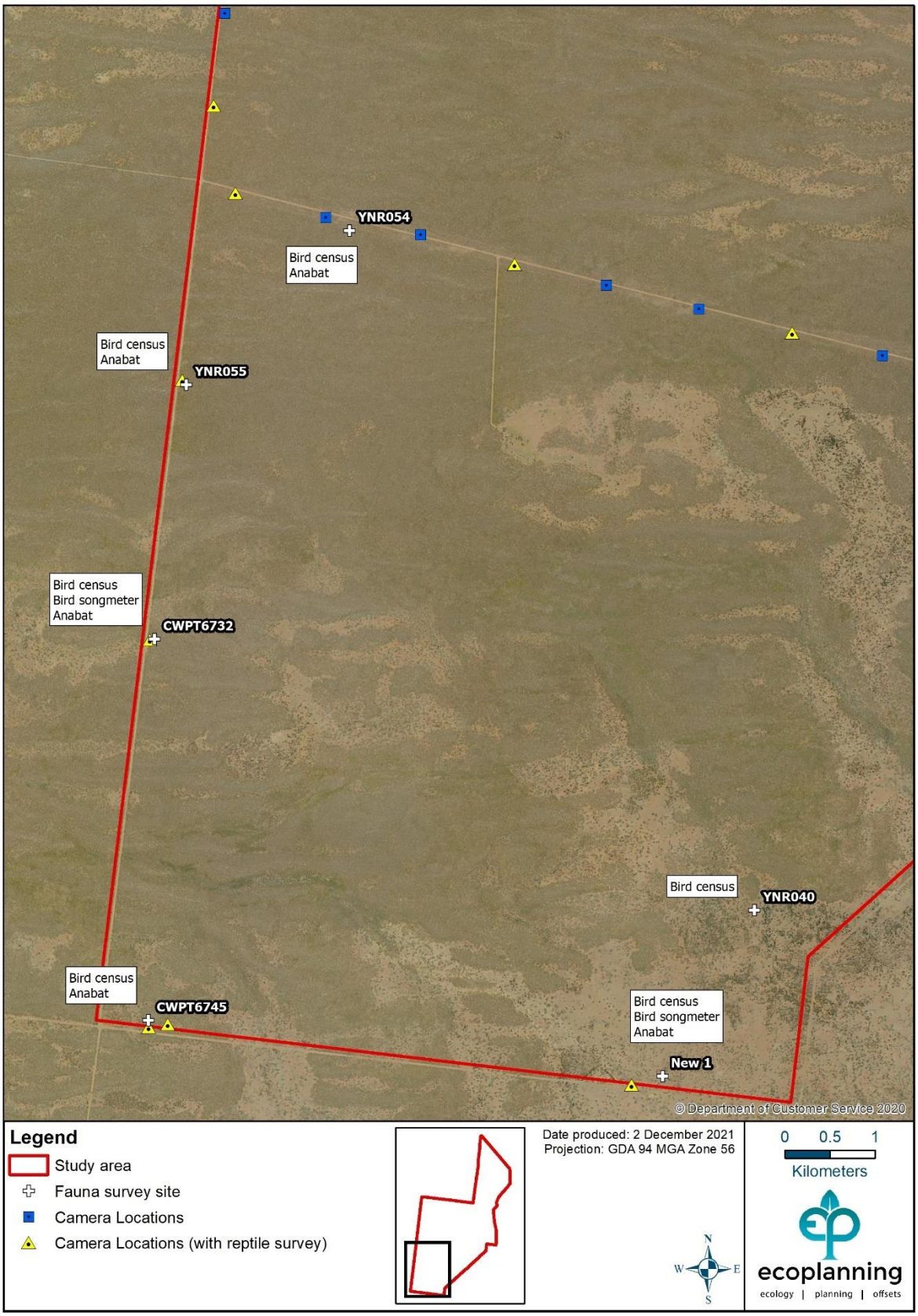

Figure 4.9: Fauna survey monitoring points in the south-western parts of the study area

4.3.2 Vegetation communities and flora

The time spent conducting field reconnaissance, plot-based surveys and rapid assessments were used to validate native vegetation communities within the subject land. Some errors were observed in regional mapping. These included:

- No evidence for PCT 10 within the subject site
- No evidence for PCT 23 within the subject site
- No evidence for PCT 143 within the subject site
- PCTs 49 and 165 are likely to be derived from PCTs 57, 72, 104 within the subject site.

In some instances, PCTs 49, 165 and 250 were retained in the validated vegetation map due to a lack of data to more accurately assign an alternative PCT due to the extent of clearing.

The areas of the validated PCTs is in **Table 4.7** and shown in **Figure 4.10** to **Figure 4.14**.

Table 4.7: Area of each PCT within the subject land in the validated vegetation map.

PCT	PCT name	Area (ha)
49	Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	5.54
57	Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including the Cobar Peneplain Bioregion	11.87
72	White Cypress Pine - Poplar Box woodland on footslopes and peneplains mainly in the Cobar Peneplain Bioregion	2.26
104	Gum Coolabah woodland on sedimentary substrates mainly in the Cobar Peneplain Bioregion	33.86
105	Poplar Box grassy woodland on flats mainly in the Cobar Peneplain Bioregion and Murray Darling Depression Bioregion	2.86
165	Derived corkscrew grass grassland/forbland on sandplains and plains in the semi-arid (warm) climate zone	2.45
171	Spinifex linear dune mallee mainly of the Murray Darling Depression Bioregion	24.12
173	Sandplain mallee of central NSW	30.52
174	Mallee - Gum Coolabah woodland on red earth flats of the eastern Cobar Peneplain Bioregion	15.73
250	Derived tussock grassland of the central western plains and lower slopes of NSW	8.19
TOTAL NATIVE VEGETATION		137.41
	Not native (includes roads)	26.73
TOTAL		164.14

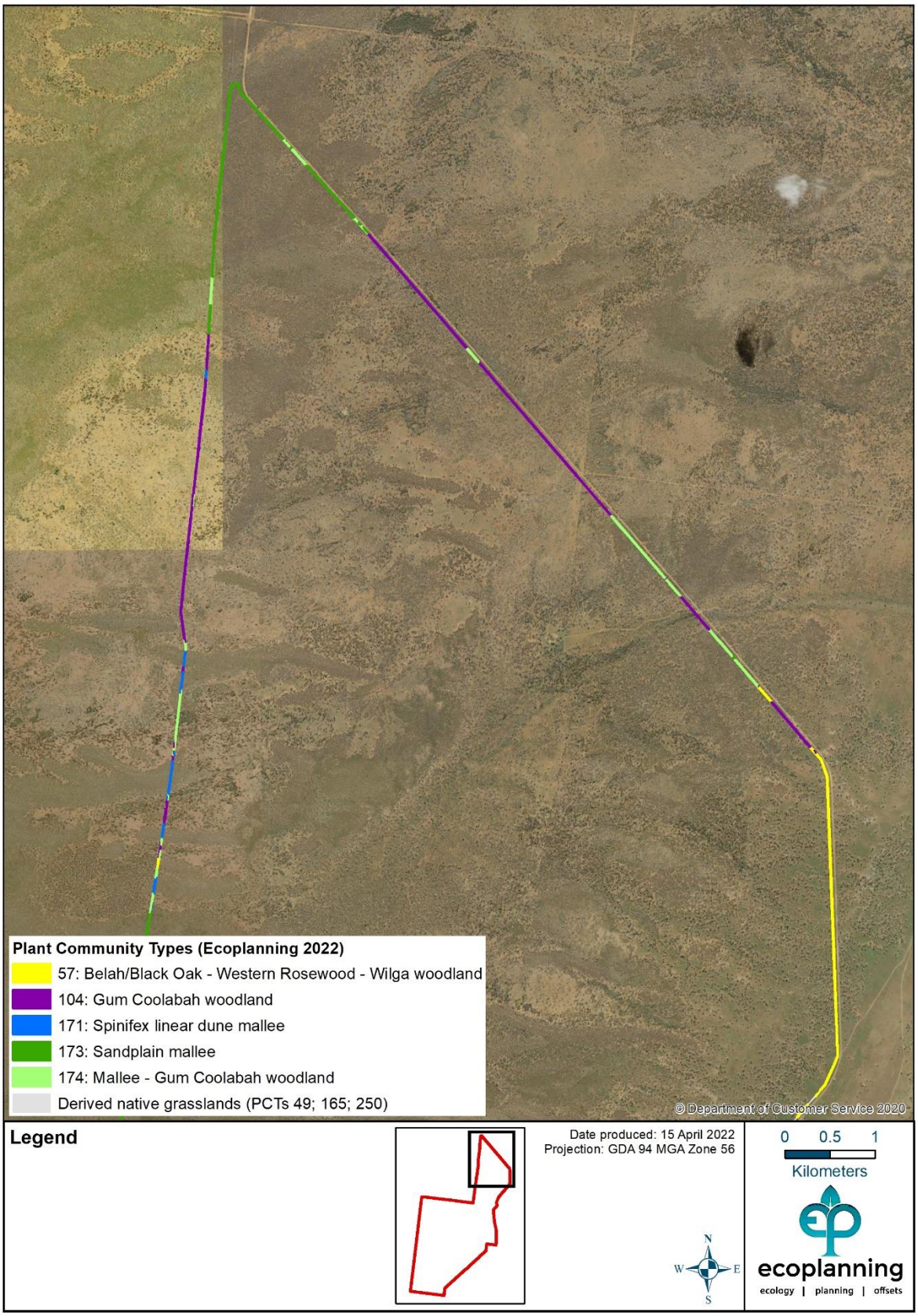

Figure 4.10: Validated PCTs within the subject site in the northern parts of the study area

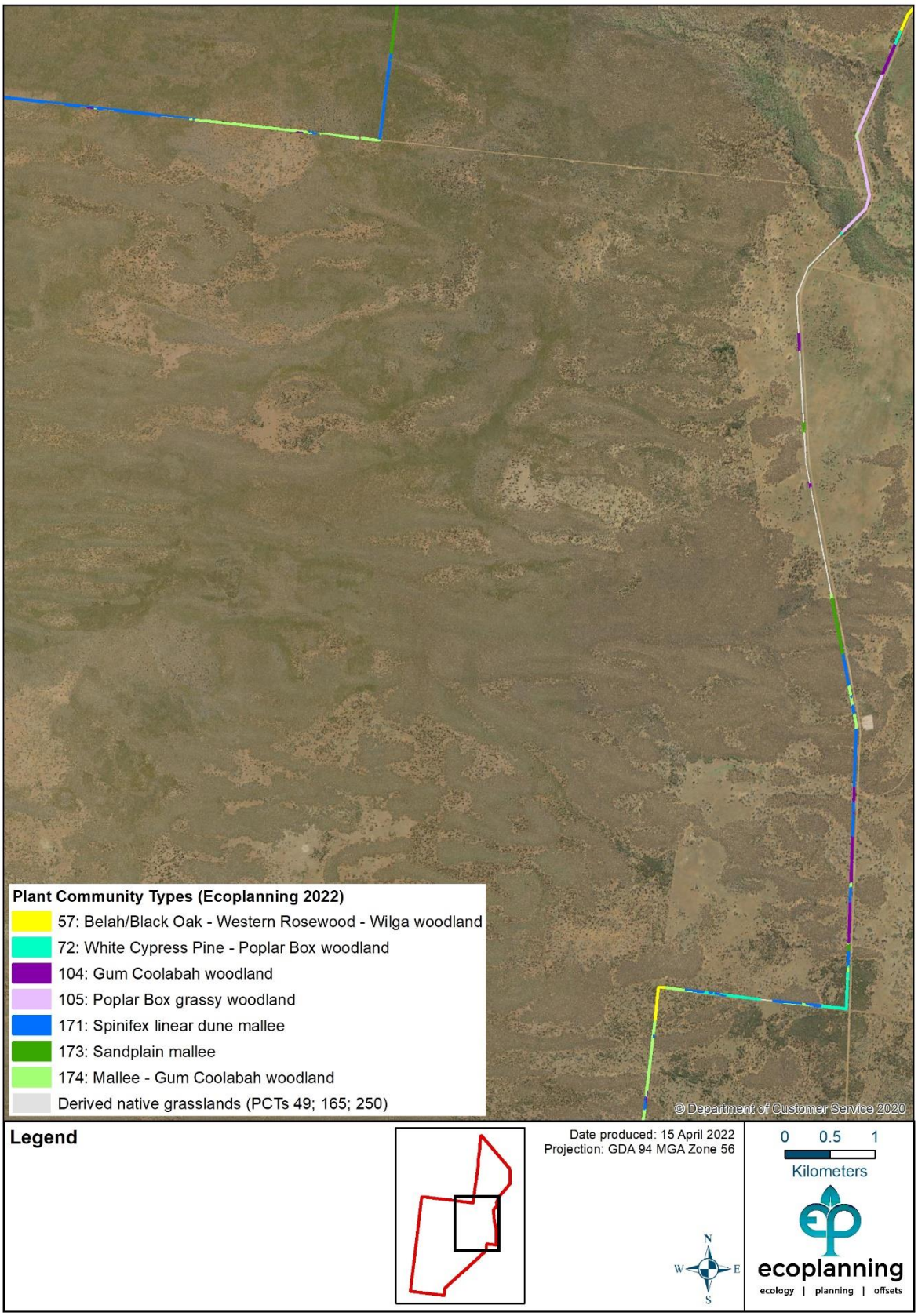

Figure 4.11: Validated PCTs within the subject site in the central eastern parts of the study area

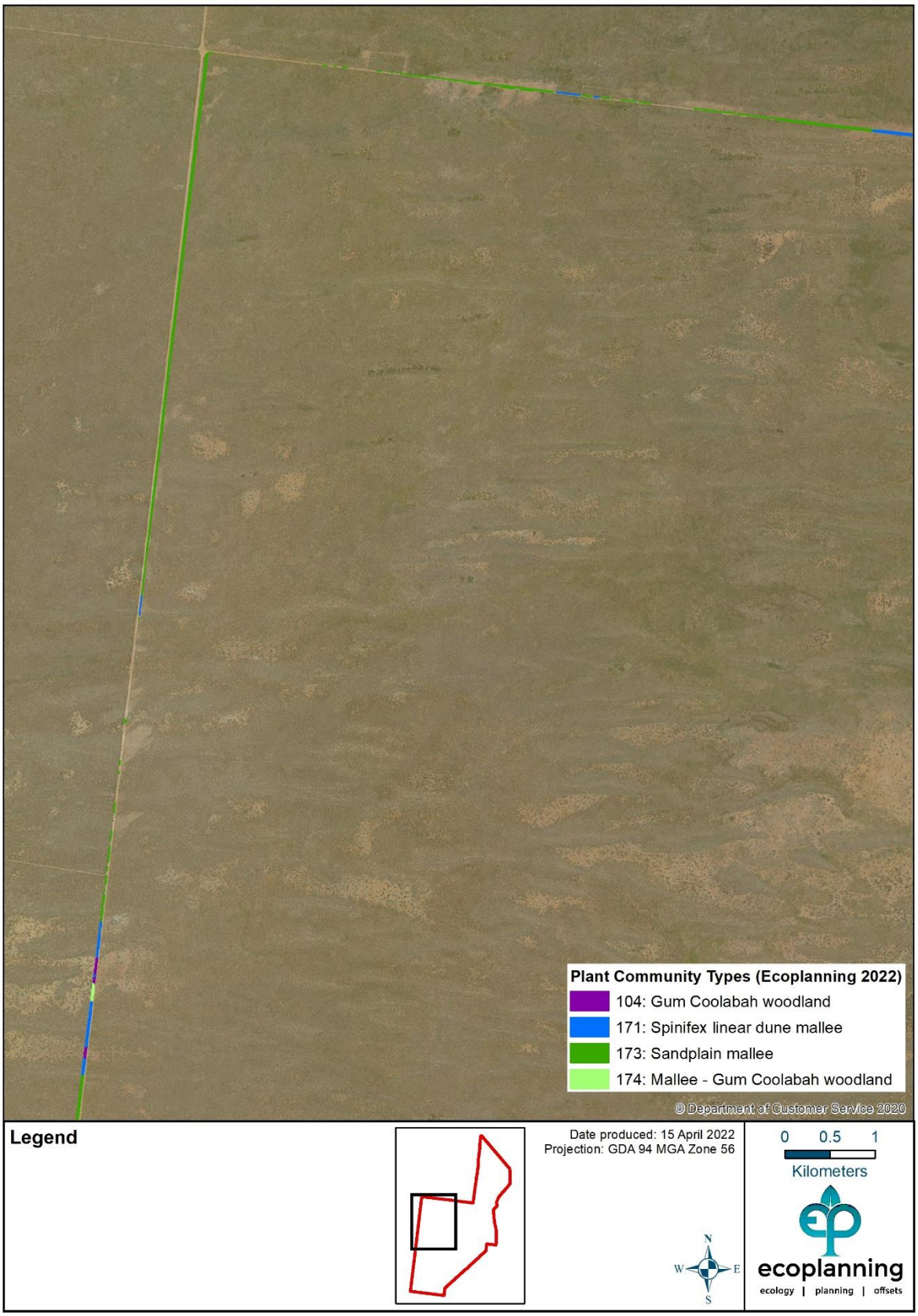

Figure 4.12: Validated PCTs within the subject site in the central western parts of the study area

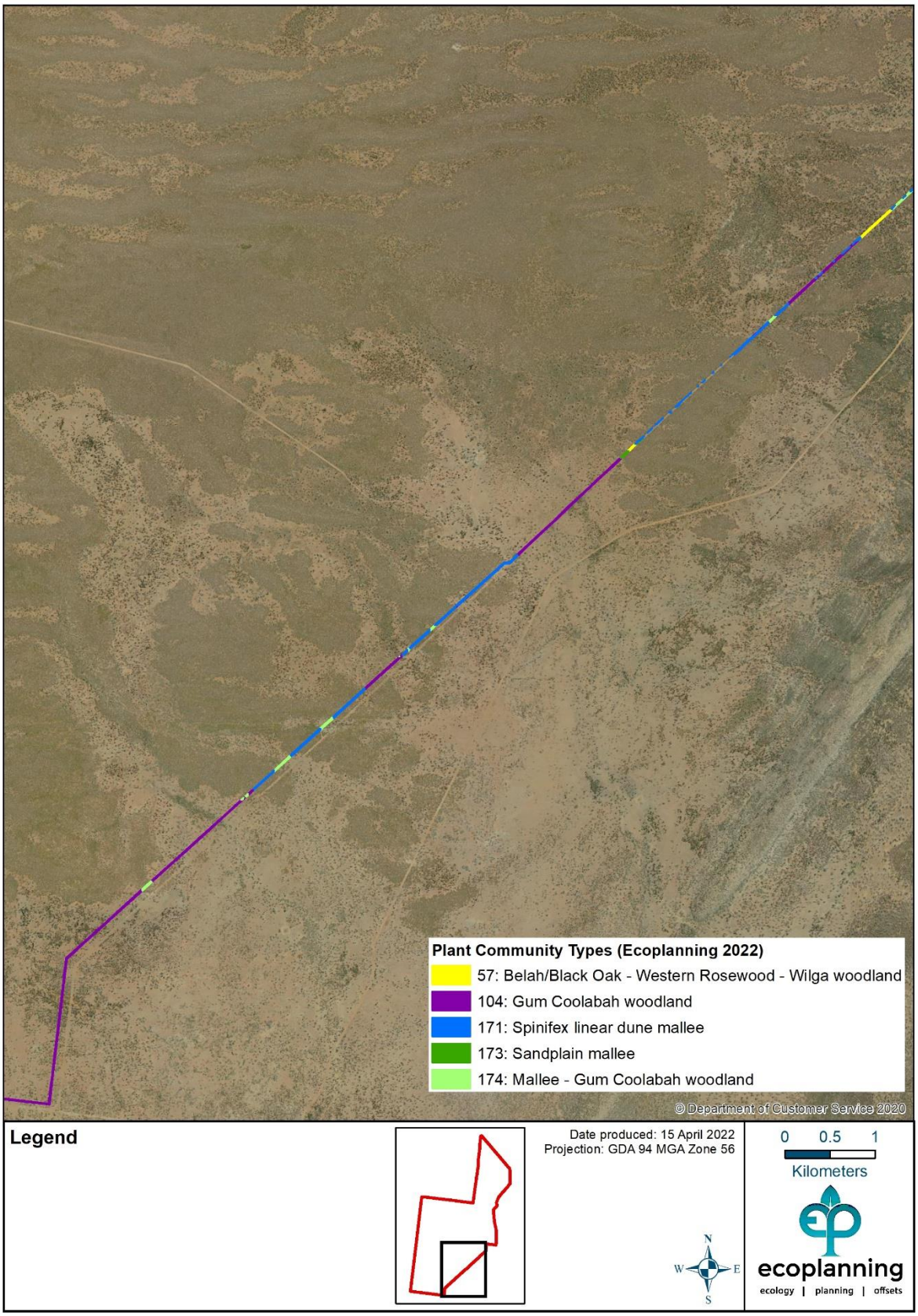

Figure 4.13: Validated PCTs within the subject site in the south eastern parts of the study area

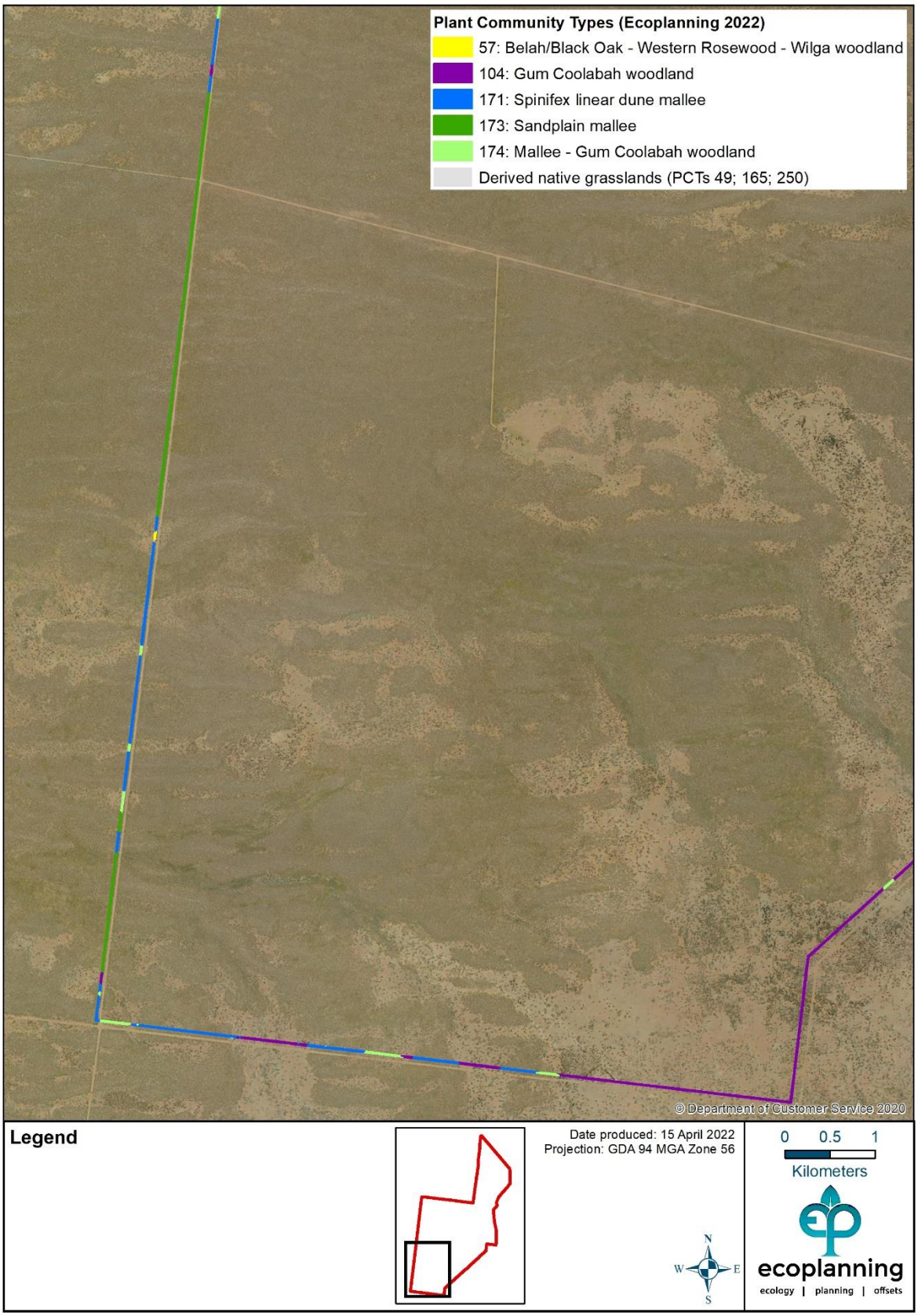

Figure 4.14: Validated PCTs within the subject site in the south western parts of the study area

Vegetation composition, structure and function surveys

Vegetation plot surveys were conducted by Bruce Mullins and Elizabeth Norris.

Vegetation composition, structure and function surveys were conducted in accordance with Draft OEHMF (DPIE 2021a). A total of 16 vegetation plots were sampled. Plot locations were pre-selected from sites sampled by DPIE (2019) prior to field survey and, based on a stratified sampling approach (at class level) using VIS_4468 as a mapping reference, additional sites were selected. Several plots from DPIE (2019) were resampled, along with two plots from older vegetation sampling projects and five new plot locations. The location of DPIE (2019) 0.04 ha plots was confirmed by locating a permanent site marker and using plot photos from the report to orient the plot. **Table 4.6** lists the vegetation plots sampled and the vegetation class in which they occurred. Detailed sampling of the proposed accommodation and site facilities was not conducted.

Vegetation composition and structure surveys were undertaken in a 50 m x 20 m plot with a nested 20 m x 20 m plot.

Floristics were sampled within the 20 x 20 m plot (0.04 ha). The data recorded in 0.04 ha plot was:

- Species
- Percent cover
- Abundance
- Growth form
- Height by dominant growth for each stratum

All vascular flora visible at the time of survey were identified to the lowest taxonomic level possible. The percent cover and abundance of each species was recorded. Percent cover was recorded in 0.1% intervals to 1%, then in single whole number intervals to 10%, then in 5% intervals to 100%. Abundance was recorded in single whole numbers to 20, then in intervals of 10 to 100, then in intervals of 100 to 1000, then in intervals of 1000 thereafter. Growth form data was added post survey.

The percent cover of ground layer features (litter, bare ground, cryptogams, grasses, forbs, ground shrubs) was assessed along a 50 m transect through the centre of the 20 m x 50 m plot 0.1 ha). Starting a 1 m along the transect, ground cover was assessed at 0.5 m intervals, giving a total of 100 points.

Midstorey cover was assessed along the 50 m transect by recording the first point at which a shrub or tree intersected the transect. Data for trees and shrubs was recorded in the following size classes 1-3 m, >3-5 m, >5 m.

Overstorey canopy was also assessed along the 50 m transect through the centre of the 0.1 ha plot at 5 m intervals within an estimated 1 x 1 m area.

The total length of fallen logs, and counts of trees in various stem classes and trees with hollows were conducted in the 20 m x 50 m plot. Only logs >10 cm diameter and >0.5 m in length were measured. The stem classes (diameter at breast height [DBH]) sampled within the 0.1 ha plot were <5 cm, 5-9 cm, 10-19 cm, 20-29 cm, 30-49 cm, >50 cm.

Rapid assessment

The rapid vegetation assessments were conducted by Bruce Mullins and Elizabeth Norris.

A rapid assessment of floristic diversity was conducted at five sites. The sites were selected because they were not sampled in the vegetation composition, structure and function surveys, or there was visible variation in the assemblage of species from equivalent PCTs surveyed.

A random meander was conducted at these locations, within an approximate 50 m radius. All visible flora only were recorded.

4.3.3 Fauna and fauna habitat

Birds

Diurnal bird census

Diurnal bird surveys were conducted by Bruce Mullins and Elizabeth Norris.

Each diurnal bird census was conducted over 20 minutes by two observers. The first 5 minutes consisted of a point count method in the centre of the survey area, after which a traverse through the 2 ha survey area was conducted. All birds seen, heard or were evidenced by other methods were recorded. The presence of birds within and outside the 2 ha area were noted. The dates and times of the surveys is provided in **Appendix C**.

Birds - Songmeter

Songmeters (SM4 Wildlife Acoustics) were used at selected sites to record acoustic sound, primarily targeting bird calls. Songmeters were set for approximately 44 hours per site. Each devices was programmed to record calls for the first 5 mins of every hour.

Data was analysed Bruce Mullins in Kaleidoscope Pro. Filters used in Kaleidoscope are provided in **Table 4.8**.

Table 4.8: Kaleidoscope analysis settings

Attribute	Filter value(s)
Recording	First 5 mins of every hour
Min and max frequency range	250 to 10,000 Hz
Min and max length of detection	0.1 to 8 seconds
Max inter-syllable gap	0.35 seconds

Most sites had high activity at 6:00 am and 7:00 am, with many sites continuing high activity at 8:00am. Due to this level of activity, overlapping calls and difficulty Kaleidoscope had in clustering calls, the entire data set was listened to at these times. Clustered calls were analysed for all other recordings. Identifications of calls was made to the lowest taxonomic level possible.

Incidental observations were collected throughout the survey period.

Reptiles

Ross Wellington and Rebecca O'Rourke conducted the reptile surveys.

Active searches for reptiles were conducted at some preselected sites, along with additional habitats of interest. A total of 27 sites were surveyed for reptiles. Two observers conducted the active search over a 30 min period within a 2 ha area. The search involved an initial period of passive reptile detection, recording basking and active species whilst meandering within the survey area. Following this period, a more active search was undertaken, searching for reptiles beneath woody debris, leaf litter and rocks. Where time allowed, the survey was repeated at selected sites. Most sites were surveyed twice: once in the morning and once in the afternoon.

Incidental observations were collected throughout the survey period.

Microbats

Four Anabat detectors (two Anabat express and two Anabat Swift [Titley Electronics]) were used to collect data at 16 sites for 2 nights per site. The sites and dates at which Anabats were deployed is in **Appendix C**.

Zero-crossed files were analysed by Fauna Sonics Pty Ltd. Call analysis ranked the certainty of species identification as "definite" or "possible".

Mammals

Motion activated cameras (Reconyx HF Pro covert) were set for a minimum of five nights. Key camera settings were as follows:

- Sensitivity – high
- Trigger – rapid fire
- Number of images per trigger – 3
- Sleep period – nil.

Figure 4.5 and **Figure 4.9** shows the location of remote cameras during the survey and their camera numbers.

Incidental observations were collected throughout the survey period.

Amphibians

No target surveys were conducted for frogs. Incidental observations were collected throughout the survey period.

Fauna habitat features

The area within 7.5 to 10 m either side of the proposed fence line was inspected to identify the location of habitat features, such as hollow bearing trees (HBTs) and rock outcrops.

For each HBT, the following data was recorded:

- Species
- DBH

- Number of hollows
- Location of hollows (e.g. limb, trunk)
- Waypoint.

The survey conducted as part of this survey was followed by another survey by NPWS following realignment of the fence along Yathong Road.

Other habitat features were identified, described and their location recorded with a waypoint.

4.3.4 Survey limitations

The flora survey aimed to record as many species as possible. However, a definitive list of the flora within the study area cannot be gathered without systematic traverses and survey across several seasons. However, the techniques used in this investigation are considered adequate to gather the data necessary to validate the vegetation communities and vegetation condition in the study area and assess the likelihood of occurrence of any threatened flora species.

Similarly, the fauna survey was limited to single period of survey in a single season. While the survey applied a stratified approach, and a range of passive and active techniques to record fauna, they were limited by time and resources. Nevertheless, they provide a snapshot of the fauna residing within the surveyed areas. These surveys are deemed sufficient for the purpose of the REF coupled with historic data for the area.

The impacts assessment is based on a line created in GIS, and the proposed fence line had not been surveyed and marked in the field. Therefore, there is likely to be a degree of error in the location of the fence line assessed in GIS, the calculations of area for each PCT affected, numbers of HBTs to be impacted and estimates of impact.

After the above fieldwork was completed, NPWS advised that there was a change to the conservation fence alignment along the 30 km section of Yathong Road. In this location, the conservation fence would be located approximately 37.5 m from the centreline of Yathong Road, with a 15 m disturbance corridor (7.5 m either side). The new alignment and disturbance corridor was not assessed by Molino Stewart, Ecoplanning and AES, therefore, an additional survey was completed by Dave Sturman from AREA Environmental & Heritage Consultants between 22 March and 25 March 2022. This additional survey completed by NPWS identified the below along the new conservation fence alignment and disturbance area:

- PCT verification of the new alignment.
- Incidental sightings of flora species not previously identified (if any).
- Hollow-bearing trees.
- Threatened species or previously unidentified TEC's.

Further, after the above fieldwork was completed, NPWS advised that additional site accommodation, roads and service trenching works were required. Surveys were not conducted where this infrastructure will be located, however, based on casual observations and photos provided by NPWS of the vegetation in the area, PCT seems the more likely 250. There is 8.19 ha of PCT 250 in the study area.

4.3.5 Field survey results

Vegetation communities

A total of 16 full floristic plots were completed within three dominant PCTs, the details of which are provided in **Table 4.9**. A further five rapid assessment surveys were also completed in vegetation communities not sampled or in patches that appeared to vary in structure and composition (**Table 4.10**).

Table 4.9: Vegetation plots surveyed

PCT No.	PCT name	Full floristic sites names
104	Gum Coolabah woodland on sedimentary substrates mainly in the Cobar Peneplain	YNR040, New1, New2, New3, New5
171	Spinifex linear dune mallee of the Murray Darling Depression Bioregion	YNR038, YNR048, YNR061, YNR080, CWPT6732, CWPT6745v2
173	Sandplain mallee of central NSW	YNR011, YNR054, YNR055, YNR074, YNR079

Table 4.10: Rapid assessment sites

PCT No.	PCT name	Rapid assessment sites completed
57	Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including the Cobar Peneplain Bioregion	Yathong 1
104	Gum Coolabah woodland on sedimentary substrates mainly in the Cobar Peneplain	Yathong 2 (New4 area)
173	Sandplain mallee of central NSW	Yathong 3 (YNR054 area), Yathong 4, Yathong 5

Of the 16 floristic sites and five rapid assessment sites, four occur within the Barnato Downs IBRA Subregion (which is part of the Cobar Peneplain Bioregion) (namely New1, New4 (rapid), New5 and YNR011), whilst the remaining sites all occur within the Darling Depression IBRA Subregion (which is part of the Murray Darling Depression Bioregion).

The following plant community descriptions are based upon the floristic and rapid sites surveyed as well as opportunistic observations made whilst traversing the reserve.

PCT 57 Belah/Black Oak – Western Rosewood – wilga woodland of central NSW including the Cobar Peneplain Bioregion

Sites completed: Yathong 1 rapid site assessment.

Extent within the study area: 11.87 ha.

This PCT occurs across both IBRA Bioregions with site Yathong 1 occurring within the Barnato Downs IBRA subregion. Scattered occurrences occur within the Darling Depression IBRA subregion. Several previously unmapped patches were also observed, for example, north of sites New2 adjacent to the access trail. Yathong 1 is located within the largest mapped area of this PCT.

This open woodland is dominated by *Casuarina cristata* (Belah) and *Callitris glaucophylla* (White Cypress Pine), 12 – 14 m in height and with a cover of 5%. Examples of this community are provided in **Figure 4.15**.

The mid-layer was dominated by scattered *Alectryon oleifolius* subsp. *canescens* (Western Rosewood)*, Geijera parviflora* (Wilga)*, Eremophila longifolia* (Berrigan) *and Eremophila mitchellii* (Budda) to a height of 4 – 5 m and a variable cover of up to 10%.

The extensive groundlayer was dominated by *Sclerolaena birchii* (Galvanized Burr), *Austrostipa scabra* (Speargrass)*, Erodium crinitum* (Blue Storksbill), *Rhodanthe floribunda* (Common White Sunray). Other species included the forbs *Calotis cuneifolia* (Purple Burr-daisy), *Crassula sieberiana* (Australian Stonecrop), *Cuphonotus humistratus* and *Wahlenbergia gracilenta,* and the chenopods *Salsola australis* and *Sclerolaena diacantha* (Grey Copperburr).

Several weed species were recorded including *Medicago laciniata* (Cut-leaved Medic), *Echium plantagineum* (Paterson's Curse), *Sonchus oleraceus* (Common Sowthistle), *Sisymbrium erysimoides* (Smooth Mustard) and *Carrichtera annua* (Wards Weed).

This PCT is equivalent, in part, to the TEC Acacia loderi shrublands where *Acacia loderi* dominates. *Acacia loderi* was not recorded on site, therefore, the TEC does not occur in the subject site.

Figure 4.15: Yathong 1 rapid assessment site

PCT 104 Gum Coolabah woodland on sedimentary substrates mainly in the Cobar Peneplain

Sites completed: New1, New2, New3, New4 (rapid survey), New5, YNR040.

Extent within the study area: 33.86 ha.

These six sites are spread across two IBRA subregions of the Cobar Peneplain IBRA Bioregion with sites New1, New4 and New5 occurring within the Barnato Downs IBRA subregion whilst sites New2, New3 and YNR040 occurring within the Darling Depression IBRA subregion.

This woodland to open woodland community is generally dominated by a canopy of *Eucalyptus intertexta* (Gum Coolabah) (New1, New2) or *Callitris glaucophylla* (White Cypress Pine) or in combination (New3, New4) up to 18 m in height and cover of up to 5%. Other canopy species included *Brachychiton populneus* subsp*. trilobus* (YNR040) and *Eucalyptus socialis* in association with *E. intertexta* (Red Mallee) (New5). Examples of this community are provided in **Figure 4.16**.

The mid-layer was generally sparse across sites New1, New2 and YNR040 where more open grassy and herbaceous vegetation was present in comparison to sites New3, New4 and New5 where shrubs were more common (**Figure 4.16**). The height of the mid-layer ranged from 1 – 6 m with a cover of 5% at most sites. Common species recorded included *Eremophila mitchellii* (Budda), *Eremophila glabra* (Tarbush), *Dodonaea viscosa* subsp. *angustissima* (Narrow-leaved Hopbush) and *Geijera parviflora* (Wilga). Other species occurring less frequently included *Eremophila deserti* (Turkeybush) and *Eremophila longifolia* (Berrigan).

The groundlayer was diverse across all sites, up to 0.8 m in height and with a cover of 15% at most sites, with the exception of New1 where *Austrostipa scabra* predominated. Smaller shrubs and ground layer species were dominated by *Austrostipa scabra* subsp. *scabra* (Speargrass), *Hyalosperma semisterile, Calotis lappulacea* (Yellow Burr-daisy), *Rhodanthe floribunda* (Common White Sunray)*, Rhodanthe corymbiflora* (Small White Sunray) and the chenopods *Sclerolaena diacantha* (Grey Copperburr), *Chenopodium desertorum* and *Einadia nutans* (Climbing Saltbush)*.* Other commonly occurring ground layer species included*, Goodenia cycloptera, Goodenia fascicularis* and *Calotis cuneifolia* Purple Burr-daisy).

Species richness was high across all sites ranging between 53 species (New2, New3, New5), 66 species (New1) and 79 species (YNR040) recorded.

Weed species commonly encountered included the forbs *Medicago minima* (Woolly Burr Medic), *M. polymorpha* (Burr Medic), *M. laciniata* (Cut-leaved Medic), *Silene apetala* (Mallee Catchfly), and the grasses *Rostraria pumila* (Roughtail), *Bromus rubens* (Red Brome), *Vulpia muralis* and *Monachather paradoxus* (Bandicoot Grass). Weed species were generally more common where historic clearing appears to have been undertaken such as at sites New1, New2 and YNR040 located towards the southern end of the study area.

Figure 4.16: Sites New1 start (left) and YNR040 start (right)

PCT 171 Spinifex linear dune mallee mainly of the Murray Darling Depression Bioregion

Sites completed: YNR038, YNR048, YNR061, YNR080, CWPT6732, CWPT6745.

Extent within the study area: 24.12 ha.

All six sites occur within the Darling Depression IBRA subregion.

This mallee shrubland to open shrubland community is dominated by a number of canopy including *Eucalyptus socialis* (Red Mallee), *E. gracilis* (Yorrell), *E. dumosa* (White Mallee) and *E. viridis* (Green Mallee) up to 7 m in height and having a projective foliage cover of up to 15%. The dominance of each mallee species was variable across all sites surveyed and not all four species were present at each site. Examples of this community are provided in **Figure 4.17**.

The mid-layer was generally sparse across all sites, ranging from 1 to 4 m in height with a cover of up to 5% (**Figure 4.17**). Dominant species recorded included *Eremophila glabra* (Tarbush) and *Geijera parviflora* (Wilga) with *Acacia colletioides* (Wait-a-while), *Acacia wilhelmiana* (Wilhelmi's Wattle), *Senna artemisioides, Pimelea microphylla* and *Bossiaea walkeri* (Cactus Bossiaea) occurring less frequently. Most shrub species were found to be growing in proximity to mallee species.

The groundlayer was also sparse across all sites, up to 0.6 m in height and a variable cover between sites up to 30% depending upon the abundance of Triodia patches. *Triodia scariosa* subsp. *scariosa* (Porcupine Grass) and *Austrostipa scabra* subsp. *scabra* (Speargrass) predominated at most sites. Oher common species included the shrubs *Olearia pimeleoides,* the forbs *Goodenia willisiana, Halgania cyanea* (Rough Halgania), *Vittadinia cervicularis* var. *cervicularis,* and the chenopods *Sclerolaena parviflora* and *Maireana enchylaenoides* (Wingless Bluebush). Other forbs recorded included several species of *Ptilotus* including *P. sessilifolius* (Silver-tails), *P. modestus, P. spathulatus* (Pussytails) and *P. erubescens* (Hairy Heads). *Lomandra collina* (Pale Mat-rush) and *L. effusa* (Scented Mat-rush) were present at some sites.

One undescribed orchid species belonging to the *Pterostylis biseta* group (L. Copeland pers. comm.) was recorded within site CWPT6745 where up to 15 individuals were found.

Several climbing species were also recorded including *Rhyncharrhena linearis* (Purple Pentatrope), *Parsonsia eucalyptophylla* (Gargaloo), *Marsdenia australis* (Doubah) and *Comesperma integerrimum.*

Species richness was variable ranging from 27 to 33 species (YNR080, CWPT6732, YNR038, YNR061, respectively), 43 species (CWPT6745) and 48 species (YNR048) recorded.

Weed species were not recorded within any of the sites surveyed.

Figure 4.17: Sites CWPT6732 start (left) and YNR080 start (right)

PCT 173 Sandplain mallee of central NSW

Sites completed: YNR011, YNR054, YNR055, YNR074, YNR079.

Extent within the study area: 30.52 ha.

All five sites occur within the Darling Depression IBRA subregion.

This mallee shrubland to open shrubland community is dominated by a number of canopy including *Eucalyptus socialis* (Red Mallee), *E. dumosa* (White Mallee) and *E. gracilis* (Yorrell) predominating with *E. viridis* (Green Mallee) occurring less frequently. The canopy extended up to 6 m in height cover of up to 20%. Of all four mallee species *E. gracilis* was recorded at every site. Examples of this community are provided in **Figure 4.18**.

The mid-layer was generally sparse to almost absent at one site (YNR079), but across other sites, it ranged from 1-3 m in height with a cover of 5% (**Figure 4.18**). Dominant shrub species varied between sites and included *Acacia colletioides* (Wait-a-while), *Acacia Senna artemisioides* subsp. *x petiolaris* (Woody Cassia), *Melaleuca uncinata* (Broombush), *Dodonaea viscosa* subsp. *angustissima* (Narrow-leaved Hopbush), *Eremophila glabra* and *Bossiaea walkeri* (Cactus Bossiaea) occurring less frequently. Most shrub species were found to be growing in proximity to mallee species. At site YNR074 the shrub *Melaleuca uncinata* formed dense thickets.

The groundlayer was also sparse, generally up to 0.5 m in height with a cover of 5% at most sites with the exception of site YNR079 where a cover of 17% was recorded with *Triodia scariosa* subsp. *scariosa* (Porcupine Grass) and *Westringia rigida* (Stiff Westringia)

predominating. *Triodia scariosa* subsp. *scariosa, Halgania cyanea* (Rough Halgania) and *Austrostipa scabra* subsp. *scabra* (Speargrass) predominated at most sites. Oher common species included the shrubs *Olearia pimeleoides,* the forbs *Vittadinia dissecta* var. *hirta* (Dissected New Holland Daisy) *Goodenia glabra, Calotis cuneifolia* (Mountain Burr-daisy) and the chenopods *Sclerolaena parviflora, Sclerolaena diacantha* and *Maireana enchylaenoides* (Wingless Bluebush) and the grass *Paspalidium constrictum*. *Lomandra collina* (Pale Mat-rush) and *L. leucocephala* subsp. *robusta* (Woolly Mat-rush) were present at some sites.

The climbing species *Rhyncharrhena linearis* (Purple Pentatrope) was recorded at several sites.

Species richness was variable ranging from 19 species (YNR079) to 42 species (YNR074) with the remaining sites recording 29 species (YNR011), 33 species (YNR054) and 23 species (YNR055) respectively.

Weed species were not recorded within any of the sites surveyed.

Figure 4.18: Sites YNR011 start (left) and YNR055 start (right)

Additional PCTs not surveyed

The following PCTs have been mapped within the study area but were not assessed in detail at the time of the survey. Evidence of two of these PCTs was not found along the proposed fence line but a description and notes have been provided. The descriptions are based upon visual observations whilst traversing parts of the study area located away from the subject site (where possible) in association with PCT descriptions (DPIE 2021f).

PCT 10 River Red gum- Black Box woodland wetland of the semi arid (warm) climatic zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion)

Two mapped areas of PCT 10 intersect the study area along the south-eastern boundary. Visual inspections of these patches whilst traversing the study indicated that these areas support vegetation dominated by *Eucalyptus intertexta* (Gum Coolabah), *Alectryon oleifolius* subsp. *canescens* (Western Rosewood), *Callitris glaucophylla* (White Cypress Pine) and mallee species. Without further detailed assessment, it is likely that these patches are a form of PCT 104 or PCT 105, rather than PCT 10.

PCT 72 White Cypress Pine – Poplar Box woodland on footslopes and peneplains mainly in the Cobar Peneplain Bioregion

PCT 72 is located along the south-eastern boundary adjacent to the southern entrance of the reserve. Another much smaller patch is located further to the south along the south-eastern boundary between sites YNR040 and New1. Examples of this community are provided in **Figure 4.19**. The extent of this PCT within the study area is 2.26 ha.

Within the study area this woodland PCT is characterised by a canopy of dense *Callitris glaucophylla* (White Cypress Pine) with younger regrowth present. Other canopy species included *Eucalyptus populnea* subsp. *bimbil* and scattered *Eucalyptus intertexta* (Gum Coolabah).

The mid-layer may contain a shorter stratum of *Callitris glaucophylla* and shrub species including *Eremophila mitchellii* (Budda), *Senna artemisioides* group and *Dodonaea viscosa.*

The groundlayer may range from mid-dense to sparse and be dominated by *Austrostipa scabra* subsp. *scabra,* the forbs *Calotis cuneifolia* (Purple Burr-daisy), *Sida cunninghamii* (Rigid Sida), *Chrysocephalum apiculatum* (Common Everlasting) and the chenopods *Sclerolaena birchii* (Galvanised Burr), *Sclerolaena diacantha* (Grey Copperburr) and *Enchylaena tomentosa* (Ruby Saltbush).

Figure 4.19: PCT 72 located at the intersection of Yathong Road and the South West Boundary Trail (left) and the South West Boundary Trail (right).

PCT 105 Poplar Box grassy woodland on flats mainly in the Cobar Peneplain Bioregion and Murray Darling Depression Bioregion

PCT 105 is located along the central eastern boundary adjacent to the intersection with the Western Fire trail. The extent of this PCT within the study area is 2.86 ha.

Within the study area, this woodland PCT is characterised by a canopy of *Eucalyptus populnea* subsp. *bimbil* (Poplar Box) in association with an ephemeral low-lying drainage area. The shrub layer is very sparse and the groundlayer is dominated by weedy species including *Echium plantagineum* (Paterson's Curse) (**Figure 4.20**).

The mid layer may include *Geijera parviflora* (Wilga), *Eremophila mitchellii* (Budda), *Eremophila glabra* and *Senna artemisioides group.*

The groundlayer may include the grasses *Austrostipa scabra* subsp. *scabra, Aristida behriana,* the forbs *Calotis cuneifolia* (Purple Burr-daisy), *Stackhousia muricata* (Western Stackhousia), *Stackhousia monogyna* (Creamy Candles), *Plantago turrifera, Erodium crinitum* (Blue Storksbill) and the chenopods *Sclerolaena convexula* (Tall Copperburr) and *Sclerolaena birchii* (Galvanised Burr).

Figure 4.20: PCT 105 located at the eastern end of the Western Fire Trail.

PCT 143 Narrow-leaved Hopbush – Scrub Turpentine – Senna shrubland on arid and semi-arid sandplains and dunes

A small patch PCT 143 is mapped along the central eastern boundary adjacent to the intersection with the Western Fire Trail and adjoining PCT 105. The community was not described in DPIE (2019) and was not observed during the current field survey. It is likely that vegetation mapped as PCT 143 is part of PCT 105 and/or 173.

This PCT is characterised by being a tall open shrubland dominated by *Dodonaea viscosa* subsp. *angustissima* (Narrow-leaved Hopbush), *Eremophila sturtii* (Scrub Turpentine) and *Senna artemisioides group. Alectryon oleifolius* subsp. *canescens* (Western Rosewood) may be present as an upper stratum layer. Other shrubs species may include *Eremophila glabra* and *Acacia colletioides.*

The groundlayer may contain the subshrub *Sida cunninghamii* (Rigid Sida), the forbs *Rhodanthe floribunda* (Common White Sunray), *Brachyscome lineariloba* (Hard-headed Daisy), *Harmsiodoxa blennodioides, Daucus glochidiatus* (Native Carrot) and the chenopods *Enchylaena tomentosa* (Ruby Saltbush), *Sclerolaena diacantha* (Grey Copperburr) and *Atriplex stipitata* (Mallee Saltbush).

PCT 143 is associated with, in part, with the *Acacia loderi* shrublands endangered ecological community.

PCT 250 Derived tussock grassland of the central western plains and lower slopes of NSW

The proposed accommodation and site facilities will be constructed on disturbed land identified as either PCT 49, 165 or 250. Surveys were not conducted where this infrastructure will be located, however, based on casual observations and photos provided by NPWS of the vegetation in the area, PCT seems the more likely 250. There is 8.19 ha of PCT 250 in the study area.

The tree layer had largely been removed, and there was a scant shrub layer. Native and exotic grasses and forbs dominated the ground layer.

DPIE (2019) recorded the presence of PCT 229 (Derived mixed shrubland on loamy-clay soils in the Cobar Peneplain Bioregion). However, PCT 229 is not located near the former homestead where there was more intensive land use. Therefore, it seems unlikely that it would be located near the Shearer's Quarters.

Flora

The field survey identified 202 flora species, which included 177 native species, 22 exotic species, and three indeterminate species (**Appendix D**).

None of the species recorded are listed as threatened species under the BC Act or EPBC Act. DPIE (2019) noted the presence of significant species and species of taxonomic interest. Of the species described, our survey recorded forms of *Chrysocephalum apiculatum*, *Bulbine semibarbata*, *Enchylaena tomentosa* that were of interest and mallee forms of *Eucalyptus intertexta*.

Field survey also identified an orchid from the *Pterostylis biseta* group. However, it is understood that this species is possibly an undescribed species and under revision (L. Copeland pers. comm.). This species occurred in Spinifex Linear Dune Mallee where up to 15 individuals were found within the 0.1 ha plot.

Only two priority weeds and one Weed of National Significance (WoNS) was identified in the BioNet Atlas search for Yathong Nature Reserve and two were recorded during the survey (**Table 4.11**).

Table 4.11: Priority weeds and Weeds of National Environmental Significance.

Species	WoNS	Duty
Lycium ferocissimum African Boxthorn	Y	**Prohibition on certain dealings** Must not be imported into the state, sold, bartered, exchanged or offered for sale **Regional Recommended Measure** Land managers mitigate the risk of the plant spreading from their land. Land managers reduce impact of plant on priority assets (riparian areas and floodplains).
Opuntia stricta Prickly Pear		**Prohibition on certain dealings** Must not be imported into the state, sold, bartered, exchanged or offered for sale

		Regional Recommended Measure Land managers mitigate the risk of the plant spreading from their land. Land managers mitigate the risk of the plant being introduced to their land. The plant or parts of the plant are not traded, carried, grown or released into the environment Land managers reduced impact of the plant on priority assets (grazing, conservation and urban areas).

Fauna and fauna habitat

Field survey recorded 22 reptiles, 87 birds, 18 mammals and no frogs. A simple list of fauna is included in **Appendix D** which shows the species detected by different survey techniques, with a detailed breakdown of species recorded per site during the survey in **Appendix H**. This included one threatened reptile, eight threatened birds and two threatened mammals. A list of these species, their conservation status and the sites at which they were recorded is provided in **Table 4.12** and shown in **Figure 4.21**.

Table 4.12: Threatened species recorded during the survey and the sites where they were identified

Species	Conservation status BC Act (EPBC Act)	Sites recorded
Western Blue-tongued Lizard (*Tiliqua occipitalis*)	Vulnerable	Incidental (intersection of Green Trail and Western Fire Trail)
Malleefowl (*Leipoa ocellata*)	Endangered (Vulnerable)	Incidental (CWPT6732, YNR061, approx. 1.5 km east of YNR074)
Grey-crowned Babbler (*Pomatostomus temporalis temporalis*)	Vulnerable	New1, New3, Yathong1, New4, New5, CWPT6732, YNR011, YNR038, YNR061, YNR080, Incidental (several locations)
Shy Heathwren (*Hylacola cautus*)	Vulnerable	YNR074
Chestnut Quail-thrush (*Cinclosoma castanotum*)	Vulnerable	CWPT6732, CWPT6745, YNR054, YNR079
Gilbert's Whistler (*Pachycephala inornata*)	Vulnerable	Incidental (near YNR079)
Southern Scrub-robin (*Drymodes brunneopygia*)	Vulnerable	YNR074
Pied Honeyeater (*Certhionyx variegatus*)	Vulnerable	YNR074, Incidental (near Yathong1, northern boundary)
Major Mitchell's Cockatoo (*Lophochroa leadbeateri*)	Vulnerable	YNR038, New5, New2, Incidental (New3, Yathong Rd near South West Boundary Trail)
Little Pied Bat (*Chalinolobus picatus*)	Vulnerable	YNR038, YNR011

Species	Conservation status BC Act (EPBC Act)	Sites recorded
Inland Forest Bat (*Vespadelus baverstocki*)	Vulnerable	YNR011, YNR048, YNR054, YNR038, New2

Figure 4.21: The location of threatened species recorded during the survey.

Fauna habitat values identified within the study area that may provide refuge for native fauna are listed in **Table 4.13**.

Table 4.13: Key fauna habitat features present across the study area.

Habitat features	Fauna species
Mallee woodland	Birds, small to medium mammals, reptiles, mammals
Open woodland	Birds, small to large mammals, microchiropteran bats, reptiles, mammals
Open grassland	Birds, small to large mammals, reptiles and frogs
Coarse woody debris and litter beds	Birds, small mammals, reptiles and frogs
Sandy soils	Burrowing mammals, reptiles, frogs
Hollow bearing trees	Arboreal mammals, microchiropteran bats, reptiles and frogs
Ephemeral watercourses	Birds, microchiropteran bats, reptiles and frogs

Based on the habitat values within the study area, a suite of fauna species are likely to use the study area for foraging, refuge and breeding purposes. Mallee woodlands offer habitat to a unique suite of fauna. Many species that occur in mallee community rely on this vegetation type throughout their life cycle due to the assemblage of species, vegetation structure and sandy soils.

Coarse woody debris provides a critical habitat feature for many ground dwelling fauna. The benefit of coarse woody debris for fauna is well researched and is positively correlated with species diversity, including for many threatened fauna. Coarse woody debris was low in sand plain and linear dune mallee woodland, with total lengths in plots less than 1 m and several plots recording 0 m. Often in these communities there was high amounts of fine debris. In Gum Coolabah woodlands, woody debris varied from 7.5 m to 30 m within the plot.

HBTs were mapped approximately 7.5 to 10 m either side of the proposed fence line. HBTs are a valuable resource in the landscape as they take many years to form in older growth trees and provide a limiting resource for fauna. The survey counted 525 HBTs in the search area. Hollows were most common in *Eucalyptus intertexta* with 230 trees being hollow bearing. Hollows were present in limbs and trunks, with several hollows in the trees with a 30-50 cm diameter at breast height. Tree hollows were also found in *E. populnea* (Poplar Box), *Allocasuarina cristata* (Belah), *E. socialis* (Red Mallee), *Callitris glaucophylla* (White Cypress Pine) and standing dead trees, most of which were likely to be *E. intertexta*. A summary of the number of hollows per species and size class is shown in **Figure 4.22** with raw data in **Appendix E**. The highest concentration of HBTs were in the northern and eastern parts of the study area. The distribution of HBTs is shown in **Figure 4.23**.

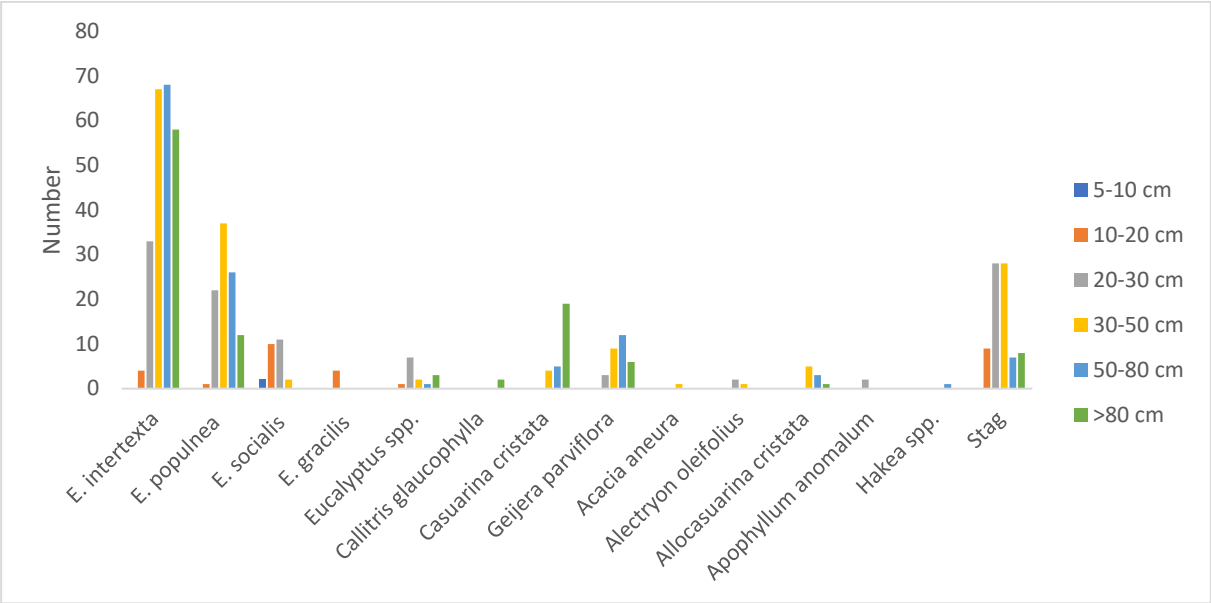

Figure 4.22: Number of trees with hollows according to DBH size classes.

4.4 Constraints

There are few constraints in the study area. The proposed fence line is primarily located along roads and fire trails avoiding the need to clear native vegetation. Further, the margins of some of these roads have been subject to strip burning to reduce the risk of wildfire. As a consequence, much of this vegetation is in poorer condition than the community that occurs >100 m from the road edge. Positioning the fence as far as practicable within the road reserve is desirable.

The native vegetation that grows either side of Green Trail, particularly in the northern half of the trail, is in relatively good condition with a higher apparent diversity of shrubs and a healthy cover of Spinifex (*Triodia* spp.). This area also had a high density of HBTs, which may also reflect less frequent fire and/or larger inter-fire interval.

Generally, HBTs and older growth mallee are a high constraint. HBTs can take decades to form. They provide a limiting resource to fauna as nest sites and roosts. Similarly, older growth mallee were often accompanied by a more diverse shrub layer and ground layer which is indicative of less frequent fire. Older growth mallee are also more likely to develop hollows.

Rock outcrops were not common along the fence line. There were some low rocky rises in the south eastern corner of the study area. While this habitat is more common east of the study area, it was uncommon in the study area.

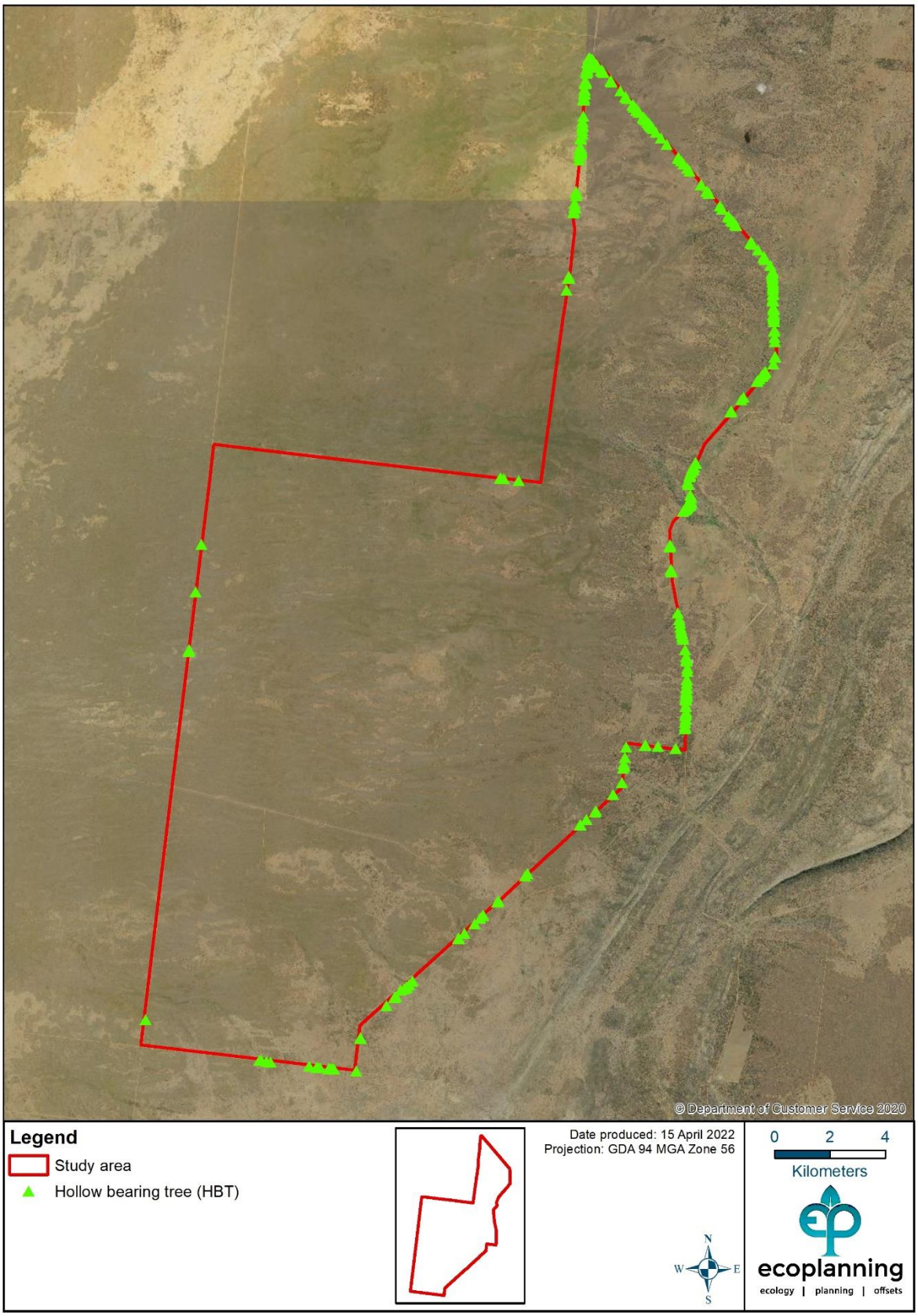

Figure 4.23: Hollow bearing trees in the study area

5 Impact assessment

5.1 Direct impacts

This section outlines the anticipated direct and indirect impacts of the proposed feral predator-free program on the ecological values of the study area. The impacts assessment is based on the line created in GIS, and a proposed fence line had not been surveyed and marked in the field. Therefore, there is likely to be a degree of error in the calculations and estimates of impact.

Direct impacts associated with the proposed feral predator-free program include:

- Clearing native vegetation
- Removal of hollow bearing trees
- Introducing a barrier in the landscape

Direct impacts have been calculated on the assumption that the construction of the fence will result in a maximum disturbance footprint of 15 m (7.5 m either side) and that all vegetation and fauna habitat will be removed in this impact area. It is likely that this will be an overestimation as it is anticipated that some ecological values (such as old growth mallee or HBTs) could be preserved within this area.

Direct impacts associated with the new accommodation and site facilities will include:

- Accommodation blocks 600 m^2 surrounded by a 75 m Asset Protection Zone.
- Access roads (up to 500 m x 12 m)
- Trenching for services (up to 1.3 km x 10 m)

Based on the validated vegetation map, the proposed fence line and site facilities will impact 137.41 ha of native vegetation. The area of each PCT impacted is shown in

Table 5.1. The actual area of native vegetation cleared may differ given the width of some fire trails, and the final location of the fence and management trails.

None of the PCTs within the subject site are consistent with any threatened ecological community currently listed under the EPBC Act or BC Act. The recently listed Mallee Bird Community of the Murray Darling Depression was present in the study area and, given the number of species characteristic of the Mallee Bird Community present during field surveys, the community is in Condition Category A. Mallee vegetation used by the community (PCTs 171, 173 and 174 [in part]) will be directly impacted by the proposal.

Further, the proposed feral predator free fence and disturbance area is located outside the footprint of Mukarrthippi Grasswren (*Amytornis striatus striatus*) AIS, therefore, no impact is anticipated.

Table 5.1: Impacts to PCTs along the proposed fence line.

PCT	PCT name	Class	Area (ha)
49	Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Semi-arid Floodplain Grasslands	5.54
57	Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including the Cobar Peneplain Bioregion	Semi-arid Sand Plain Woodlands	11.87
72	White Cypress Pine - Poplar Box woodland on footslopes and peneplains mainly in the Cobar Peneplain Bioregion	Western Peneplain Woodlands	2.26
104	Gum Coolabah woodland on sedimentary substrates mainly in the Cobar Peneplain Bioregion	Inland Rocky Hill Woodlands	33.86
105	Poplar Box grassy woodland on flats mainly in the Cobar Peneplain Bioregion and Murray Darling Depression Bioregion	Western Peneplain Woodlands	2.86
165	Derived corkscrew grass grassland/forbland on sandplains and plains in the semi-arid (warm) climate zone	Riverine Plain Grasslands	2.45
171	Spinifex linear dune mallee mainly of the Murray Darling Depression Bioregion	Dune Mallee Woodlands	24.12
173	Sandplain mallee of central NSW	Sand Plain Mallee Woodlands	30.52
174	Mallee - Gum Coolabah woodland on red earth flats of the eastern Cobar Peneplain Bioregion	Sand Plain Mallee Woodlands	15.73
250	Derived tussock grassland of the central western plains and lower slopes of NSW	Western Slopes Grassland	8.19
TOTAL NATIVE VEGETATION			137.41
	Not native (includes roads)		26.73
TOTAL			164.14

The proposal has the potential to remove up to 525 HBTs (refer to **Section 4.3.5**). This is considered an upper estimate as the survey mapped trees within approximately 7.5 to 10 m of the fence line which is greater than the predicted impact area. Despite the survey of HBTs being rapid, evidence of breeding activity was not detected in any of the HBTs.

The feral predator-free program will install a fence rendering many of the fauna inside the fence "captive" individuals and populations. The proposal intends to provide an overall conservation benefit by removing feral predators and herbivores, and returning extinct species to their former environment thereby restoring their role as environmental engineers and initiators of key ecological processes. However, limiting home range, dispersal capability, gene transfer

and resources has the potential to impact resident fauna. Similar projects in other states are beginning to notice the effect of some of these factors on flora (Kemp et al. 2021) and fauna as the equilibrium within the ecosystems present is altered.

The extent of the direct impact of this is difficult to predict at this point, and the drivers of impact may differ to other situations. However, observations from projects in similar environments may help to reduce the potential for negative impacts.

The fence line will also act as a barrier across drainage lines. Most of the drainage lines in the study area are relatively minor and rarely experience high flows or high velocity flows, as evidenced by the stream bed and bank. However, one drainage line along the southern boundary has a well-defined bed and bank and is likely to receive higher flows. A fence may restrict flow causing water to over-top the bank, scour the bed and bank, and retard the movement of fine to coarse debris through the landscape. The fence should be designed to mitigate these potential flood/flow impacts.

5.2 Indirect impacts

Indirect impacts associated with the proposed program include:

- Edge effects
- Over grazing from over abundant native herbivores
- Erosion and sediment transport

Clearing of native vegetation will introduce new edges which may be susceptible to weed invasion and increase the area of exposed earth that may lead to erosion and sediment transport. Some PCTs have very low levels of weed invasion and would be unlikely that the proposed fence would significantly increase the likelihood of weed invasion in these areas.

A “captive” population in the absence of predators has the potential to increase in size rapidly. This may result in over browsing, over population, increased competition, low genetic diversity in the captive population, and limitations to the food chain. In the event of over population of native herbivores, there is potential for impacts to native vegetation from selective grazing/browsing, low seed set and poor recruitment/succession. However, as grazing pressure is a component of the monitoring framework with triggers for herbivore management to be developed, the potential for grazing to negatively impact native vegetation is very low.

5.3 Application of avoid principles

The proposed location of the fence along existing fire trails and roads presents an opportunity for extensive areas of the fence to avoid clearing native vegetation. It may be possible to construct the fence close to the edge of mallee communities as they are low growing with a low risk of falling on the fence. Opportunities to avoid clearing native vegetation occur along the Western Boundary Fire Trail, Western Fire Trail, Southern Boundary Fire Trail, and South West Fire Trail. However, Green Trail is a narrow, and in some places overgrown, track that will require vegetation clearing, particularly in mallee woodland and heathy communities. In additional, positioning the fence 30 m from the centreline of Yathong Road will require vegetation clearing.

Some threatened species seem to be more common around the intersection on the Western Boundary Fire Trail and Western Fire Trail, and along Western Fire Trail. These species include Shy Hylacola and Southern Scrub-bird. These species were recorded during the survey in this area, and there are a number of historic records in this area also. Many of the threatened birds in this area use shrubby vegetation for refuge and nesting.

Impact to habitat features, such as rock outcrops, can be avoided by surveying the location of the fence line and micro-siting.

5.4 Application of minimise principles

Impacts that cannot be completely avoided must be minimised. Impacts to native vegetation could be minimised by adopting the following:

- Vary the construction and management footprint either side of the fence. If the area of impact was reduced from 7.5 m either side of the fence, to 5 m where the existing trails are narrow (for example), it may be possible to retain more ecological values. This approach should be considered along Green Trail, where there is old growth mallee in the north and high numbers of HBTs.
- Areas of native vegetation outside of the construction footprint will be “No Go-Zones” for people and machinery and will be clearly delineated.
- Areas designated as turn around zones will be required to avoid impacts to native vegetation.

The fence be micro-sited to avoid HBTs, rock outcrops, old growth mallee and other ecological values, where possible.

5.5 Application of mitigation principles

5.5.1 Vegetation clearing

The following mitigation measures are recommended to avoid and minimise potential impacts to threatened species and native vegetation on the site:

- Any exotic biomass cleared within the construction footprint will be removed from the study area and disposed of at an approved facility,
- Develop a Construction Environmental Management Plan to address pollution and contamination issues, such as silt control, and oil/fuel/chemical storage/spill management, which could arise during construction,
- Erosion and sediment control measures will be established before work begins and maintained in effective working order throughout the duration of the works, and until the study area has been stabilised to prevent off-site transport of eroded sediments.

5.5.2 Pre-clearance protocols

Appropriate pre-clearance protocols will be put in place at the time of construction to avoid and mitigate any potential harm or injury to fauna. These protocols are discussed below and should be included as a component of the Construction Environmental Management Plan. This could be in the form of a flora and fauna management sub-plan to guide the removal of native vegetation and relocation of fauna.

- The clearing footprint will need to be clearly marked and surveyed to identify and mark HBTs, habitat trees, and other unique features within the construction footprint.
- Tree clearing supervision by a qualified ecologist is required for the removal of trees that may provide suitable roosting habitat for native fauna
- The ecologist will need to work closely with the plant operators to identify HBTs and habitat trees, and to stop work if an animal is observed and requires rescue. The ecologist will encourage any fauna species that may be present to move from site or if considered necessary capture, store and actively relocate them to another area.
- All habitat trees should be left over night to give species that are not possible to handle, further opportunity to relocate. Advice on appropriate actions for individuals that continue to use habitat of trees should be provided by the onsite ecologist. Any variation to this protocol must be approved by onsite ecologist.
- The ecologist will ensure that any injured animals receive the appropriate levels of care. Given how remote the works area is, a plan regarding treatment of injured fauna must be developed prior to clearing works. If appropriate, the nearest veterinary clinics should be contacted prior to the works beginning to ensure that they have the capabilities to care for injured native animals. Qualified wildlife carer organisations (e.g. WIRES) could also be identified and contacted, if required.
- Soft felling techniques will be applied when felling HBTs and habitat trees. Where feasible, hollows could be inspected prior to felling to detect the presence of fauna and/or lowered in sections to avoid inadvertent injury to fauna.
- Remove ground-layer and mid-storey vegetation (underscrubbing) around the habitat trees first
- Tap/nudge HBTs and habitat trees by heavy machinery 24 hrs prior to the proposed removal of the habitat trees
- Soft fell / 'slow drop' habitat trees, involving the gentle lowering of habitat trees with hollows intact, and
- Inspection of lowered HBTs and habitat trees, and capture and release of any fauna species present. Injured fauna are to be treated as per the plan.
- Clearing should not be undertaken during the primary breeding season of threatened birds and microbats that breed in HBTs. It may be appropriate to conduct a survey to confirm that threatened species are not breeding in the area. **Table 5.2** indicates the typical breeding season for hollow nesting species identified during the survey.
- Coarse woody debris, hollow limbs and large trees could be salvaged and reused on site to create fauna habitat.

5.5.3 Erosion and Sediment Control Plan

To avoid potential indirect offsite impact during construction, an appropriate Erosion and Sedimentation Control Plan (ESCP) should be in place following best practice protocols such as Landcom (2004). These control measures should be established before work begins, maintained throughout the works and kept in place until the impact area has been stabilised. Any areas of bare soil created as part of the proposed works should be stabilised as soon as practicable.

It is recommended that the ESCP is included in a site-specific Construction Environmental Management Plan (CEMP) (that include tree clearing), prior to any construction works taking place.

Table 5.2: Nesting period for hollow nesting fauna.

Common name	Scientific name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Oct	Sep	Oct	Nov	Dec
Australian Owlet Nightjar	*Aegotheles cristatus*													
Australian Ringneck	*Barnardius zonarius*													
Barn Owl	*Tyto alba*													
Blue Bonnet	*Northiella haematogaster*													
Budgerigar	*Melopsittacus undulatus*													
Cockatiel	*Nymphicus hollandicus*													
Galah	*Eolophus roseicapilla*													
Major Mitchell's Cockatoo	*Lophochroa leadbeateri*													
Mulga Parrot	*Psephotus varius*													
Nankeen Kestrel	*Falco cenchroides*													
Red-rumped Parrot	*Psephotus haematonotus*													
Sacred Kingfisher	*Todiramphus sanctus*													
Southern Whiteface	*Aphelocephala leucopsis*													
Striated Pardalote	*Pardalotus striatus*													
Microbats														

5.5.4 Weed management

There are low numbers of exotic flora in the study area with weeds more common in PCT 104 Gum Coolabah woodland where there is likely to have been a history of livestock grazing. Prior to the construction of the fence line, weeds should be reduced or eliminated to limit the potential for them to spread. Machinery and plant equipment used to construct the fence must be cleaned and free of weeds and loose soil prior to entering the site. During and following the construction of the fence and maintenance trails, weed management must continue to limit the potential for them to establish within the disturbance footprint. Ongoing management will help to limit the potential for weeds to establish and impact native vegetation communities. A weed management plan should be prepared for the site to guide weed management practices and protocols before, during and after construction.

5.5.5 Monitoring and adaptive management

An overarching monitoring framework has been developed for the program, more broadly. Monitoring the impact of the program on all flora and fauna is important following the construction of the fence, removal of feral animals, and reintroduction of threatened species.

Ongoing monitoring and adaptive management will be key elements to ensure the success of the program at Yathong. The monitoring program, key performance indicators, and adaptive management measures should be reviewed no more than every 5 years to ensure that there is a net environmental benefit.Assessments of significance

5.5.6 State listings

The following threatened species listed under the BC Act may be impacted by the proposal:

- Western Blue-tongued Lizard (*Tiliqua occipitalis*) - vulnerable
- Malleefowl (*Leipoa ocellata*) – endangered
- Major Mitchell's Cockatoo (*Lophochroa leadbeateri*) - vulnerable
- Shy Heathwren (*Hylacola cautus*) - vulnerable
- Chestnut Quail-thrush (*Cinclosoma castanotum*) - vulnerable
- Southern Scrub-robin (*Drymodes brunneopygia*) – vulnerable
- Pied Honeyeater (*Certhionyx variegatus*) - vulnerable
- Mukarrthippi Grasswren (*Amytornis striatus striatus*) – proposed critically endangered
- Red-lored Whistler (*Pachycephala rufogularis*) – critically endangered
- Dusky Woodswallow (*Artamus cyanopterus cyanopterus*) – vulnerable
- Hooded Robin (*Melanodryas cucullata cucullata*) – vulnerable
- Kultarr (*Antechinomys laniger*) – endangered
- Little Pied Bat (*Chalinolobus picatus*) – vulnerable
- Inland Forest Bat (*Vespadelus baverstocki*) – vulnerable

Impact assessment in accordance with Part 7.3 of the BC Act (i.e. the 'Test of Significance') and the associated guidelines (OEH 2017) have been undertaken (**Appendix F**). These assessments found that there is unlikely to be any significant impacts to the above-listed threatened species. No TECs were identified in the study area.

5.5.7 Commonwealth listings

One ecological community (Mallee Bird Community of the Murray Darling Depression Bioregion) listed under the EPBC Act is known to occur in the study area, and two threatened species listed under the EPBC Act were assessed as having a 'high' likelihood or were 'present' within the study area: Malleefowl (*Leipoa ocellata*) and Red-lored Whistler (*Pachycephala rufogularis*) (**Appendix A**). Assessment of the potential impact upon the ecological community and these species was assessed against the relevant components of the Significant Impact Guidelines (Commonwealth Department of the Environment (DotE) 2013; **Appendix G**). In summary, a significant impact upon these entities is unlikely and a referral is not required.

6 Conclusions

The NSW National Parks and Wildlife Service are undertaking a Feral Predator-free program at Yathong Nature Reserve. The program will construct a fence around a 39,230 ha area in the western parts of Yathong Nature Reserve, remove feral animals from within the enclosed area, then release fauna locally extinct or threatened in NSW back into their habitat.

An ecological assessment was conducted of the proposed fence line and feral predator-free area, and the location for new accommodation and site facilities. The assessment reviewed selected literature and data, conducted field survey to validate vegetation community mapping and collect site specific data and assess the impact of the proposal threatened fauna known or likely to occur.

The fence line will be located along existing roads and fire trails to take advantage of existing trails and minimise the area of vegetation to be cleared. It is likely that the disturbance footprint will be 7.5 m either side of the proposed fence to accommodate the construction team and for ongoing management of the fence. It is possible that in some locations, the impact footprint will be reduced. The fence will stand 1.8 m high, will have two electrified strands on the outer side, and a wire skirt at the base to prevent burrowing animals from entering or exiting the area.

The proposed new accommodation and site facilities will be located in derived grassland (PCT 250) in the vicinity of the existing Shearer's Quarters.

Based on the available data the fence will and site facilities remove up to 137.41 ha of native vegetation and 525 HBTs. More accurate data of the proposed fence line may reduce the predicted area of vegetation to be cleared as well as the number of HBTs to be cleared.

The dominate PCTs in the subject site are:

- PCT 104 Gum Coolabah woodland on sedimentary substrates mainly in the Cobar Peneplain
- PCT 171 Spinifex linear dune mallee of the Murray Darling Depression Bioregion
- PCT 173 Sandplain mallee of central NSW

Minor PCTs in the subject site are:

- PCT 57 Belah/Black Oak – Western Rosewood – Wilga woodland of central NSW including the Cobar Peneplain Bioregion
- PCT 72 White Cypress Pine – Poplar Box woodland on footslopes and peneplains mainly in the Cobar Peneplain Bioregion.
- PCT 105 Poplar Box grassy woodland on flats mainly in the Cobar Peneplain Bioregion and Murray Darling Depression Bioregion
- PCT 174 Mallee – Gum Coolabah woodland on red earth flats of the eastern Cobar Peneplain Bioregion
- PCT 250 Derived tussock grassland of the central western plains and lower slopes of NSW

None of the PCTs identified in the study area were threatened ecological communities under the BC Act or EPBC Act.

The survey identified eleven threatened species during the survey:

- Western Blue-tongued Lizard (*Tiliqua occipitalis*)
- Malleefowl (*Leipoa ocellata*) – endangered
- Major Mitchell's Cockatoo (*Lophochroa leadbeateri*)
- Shy Heathwren (*Hylacola cautus*) – vulnerable
- Chestnut Quail-thrush (*Cinclosoma castanotum*)
- Southern Scrub-robin (*Drymodes brunneopygia*)
- Pied Honeyeater (*Certhionyx variegatus*)
- Gilbert's Whistler (*Pachycephala inornata*)
- Grey-crowned Babbler (*Pomatostomus temporalis temporalis*)
- Little Pied Bat (*Chalinolobus picatus*)
- Inland Forest Bat (*Vespadelus baverstocki*)

In additional, the assemblage of birds present within mallee woodlands conforms to the description of the Mallee Bird Community of the Murray Darling Depression Bioregion endangered ecological community listed under the EPBC Act. Also habitat for the Mukarrthippi Grasswren (*Amytornis striatus striatus*) along the Western Boundary Trail has been declared an Asset of Intergenerational Significance. A conservation action plan will be prepared for the species to reduce threats and monitor the population. The proposed feral predator free fence is likely to be compatible with these actions. Further, the proposed feral predator free fence and disturbance area is located outside the footprint of Mukarrthippi Grasswren (*Amytornis striatus striatus*) AIS, therefore, not impact is anticipated.

The report includes options to avoid, minimise and mitigate impacts to the environment. These include:

- Locating the works footprint within the existing trails as far as practicable
- Micro-siting the fence to avoid HBTs
- Develop a CEMP and tree clearing protocols

Assessments of significance were applied to species and an ecological community known or likely to occur listed under the BC Act and EPBC Act. The assessments of significance acknowledge the area of habitat to be cleared, and the potential for populations of less mobile species to become isolated and/or fragmented. However, the proposal will improve the management of 39,230 ha of native vegetation and remove or significantly diminish the impact of five feral fauna, all of which cause impact that are Key Threatening Processes. Considering the overall impact of the proposal, avoidance, minimisation and mitigation measures, the assessments concluded that the proposal was not likely to have a significant impact on threatened species or the Mallee Bird Community.

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Appendix A Likelihood of occurrence

A list of species recorded within 5 km of the fence boundary and their likelihood of occurrence.

Scientific name	Common name	Conservation status		Most recent	Closest record	Likelihood of occurrence
		BC Act	EPBC Act			
FLORA						
Acacia curranii	Curly-bark Wattle	V	V		YNR	Not present – this species occurs on the range east of the study area.
Osteocarpum pentapterum		E4			YNR	Not present
BIRDS						
Leipoa ocellata	Malleefowl	E1	V	3/09/2021 (8 m)	3/09/2021 (8 m)	Present
Grus rubicundus	Brolga	V			YNR	Low – wetland habitat not present near the study area
Apus pacificus	Fork-tailed Swift		C,J,K	15/09/2013 (2.8 km)	16/10/2006 (0 m)	Moderate – not recorded in the last 5 years
Hieraaetus morphnoides	Little Eagle	V		25/08/2013 (2.5 km)	25/08/2013 (2.5 km)	Low - no nest trees recorded during the survey
Lophoictinia isura	Square-tailed Kite	V		9/04/2004 (822 m)	9/04/2004 (822 m)	Low – more likely to occur east of the study area where there are taller woodlands. No nest trees recorded during the survey
Circus assimilis	Spotted Harrier	V			YNR	Moderate – potentially occurs over more grassy areas in Gum Coolabah woodland

Scientific name	Common name	Conservation status		Most recent	Closest record	Likelihood of occurrence
		BC Act	EPBC Act			
Falco subniger	Black Falcon	V			YNR	Moderate – potential to occur in the study area. Previously recorded in YNR but not within 5 km of the site
Ardeotis australis	Australian Bustard	E1		29/08/2017 (713 m)	29/08/2017 (713 m)	Low – a nomadic species which occurs infrequently in the region
Lophochroa leadbeateri	Major Mitchell's Cockatoo	V		12/09/2019 (3.0 km)	26/05/2017 (0 m)	Present
Polytelis swainsonii	Superb Parrot	V	V	17/05/2015 (2.9 km)	17/05/2015 (2.9 km)	Low – likely to be vagrant and a rare visitor to the area outside the breeding season.
Amytornis striatus striatus	Mukarrthippi Grasswren	CE (pending)		4/12/2020 (0 m)	4/12/2020 (0 m)	High – recent record
Hylacola cautus	Shy Heathwren	V		14/08/2015 (0 m)	14/08/2015 (0 m)	Present
Certhionyx variegatus	Pied Honeyeater	V		6/11/2012 (561 m)	6/11/2012 (561 m)	Present
Epthianura albifrons	White-fronted Chat	V		4/08/2013 (3.4 km)	1/09/2007 (8 m)	Moderate – not recorded in the last 5 years
Pomatostomus temporalis temporalis	Grey-crowned Babbler	V		2/05/2019 (3.4 km)	16/09/2012 (0 m)	Present
Cinclosoma castanotum	Chestnut Quail-thrush	V		2/10/2020 (0 m)	2/10/2020 (0 m)	Present
Daphoenositta chrysoptera	Varied Sittella	V		8/04/2001 (561 m)	8/04/2001 (561 m)	Moderate – not recorded in 20 years
Chthonicola sagittata	Speckled Warbler	V			YNR	Moderate – not recorded within 5 km of the study area.

Scientific name	Common name	Conservation status		Most recent	Closest record	Likelihood of occurrence
		BC Act	EPBC Act			
Pachycephala inornata	Gilbert's Whistler	V		14/08/2015 (0 m)	14/08/2015 (0 m)	Present
Pachycephala rufogularis	Red-lored Whistler	E4A	V	21/06/2018 (0 m)	21/06/2018 (0 m)	High – recently recorded
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V		21/06/2018 (69 m)	21/06/2018 (69 m)	High – recently recorded
Drymodes brunneopygia	Southern Scrub-robin	V		4/08/2013 (3.4 km)	30/03/2002 (0 m)	Present
Melanodryas cucullata cucullata	Hooded Robin	V		21/06/2018 (70 m)	2/09/2007 (0 m)	High – recently recorded
MAMMALS						
Antechinomys laniger	Kultarr	E1		26/09/2021 (2.9 km)	26/09/2021 (2.9 km)	High – recently recorded
Ningaui yvonneae	Southern Ningaui	V			YNR	Moderate – a relatively sedentary species with localised movements. The absence of records within 5 km of the study area suggests that the species occurs elsewhere in YNR
Petrogale penicillata	Brush-tailed Rock-wallaby	E	V		YNR	Low – lacks habitat in the study area
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V			YNR	Moderate – a solitary species with distinctive call signatures. Calls were not detected during the survey
Chalinolobus picatus	Little Pied Bat	V			YNR	Present
Nyctophilus corbeni	Corben's Long-eared Bat	V	V		YNR	Moderate – calls of *Nyctophilus* were not detected during the survey.

Scientific name	Common name	Conservation status		Most recent	Closest record	Likelihood of occurrence
		BC Act	EPBC Act			
Vespadelus baverstocki	Inland Forest Bat	V			YNR	Present
REPTILES						
Tiliqua occipitalis	Western Blue-tongued Lizard	V			YNR	Present
Delma australis	Marble-faced Delma	E			YNR	Moderate – the species has the potential to occur. Low litter levels in the surveyed areas from hazard reduction fires may have affected the species habitat and likely occurrence.

YNR = Yathong Nature Reserve

Appendix B Vegetation survey locations

Site	Start		End	
	Easting	Northing	Easting	Northing
CWPT6732	344279	6377570	344324	6377564
CWPT6745	344337	6373330	344351	6373381
New1	349910	6372697	349922	6372745
New2	359318	6381320	359270	6381326
New3	359199	6400961	359186	6400915
New4 (rapid)	362485	6404769	N/A	N/A
New5	361617	6406731	631606	6406684
YNR011	362381	6393011	362395	6393060
YNR038	358599	6380482	358551	6380496
YNR040	350931	6374561	350933	6374512
YNR048	355083	6393851	355095	6393900
YNR054	346439	6382099	346431	6382060
YNR055	344624	6380391	344633	6380429
YNR061	363197	6387684	363152	6387694
YNR074	347428	6394782	347417	6394733
YNR079	345873	6390864	345886	6390909
YNR080	345171	6385081	345159	6385035
Yathong1 (rapid)	366427	6398242	N/A	N/A
YNR054 (rapid)	346419	6381945	N/A	N/A
Yathong4 (rapid)	359558	6406466	N/A	N/A
Yathong5 (rapid)	359687	6408163	N/A	N/A

Appendix C Fauna survey details

20 min bird census

Site name	Start date	Start time	Duration (mins)
CWPT6732	19/09/2021	14:27:00	20
CWPT6745	16/09/2021	9:15:00	20
New1	16/09/2021	8:30:00	20
New2	18/09/2021	17:36:00	20
New2	20/09/2021	7:57:00	20
New3	17/09/2021	9:22:00	20
New4	22/09/2021	8:10:00	20
New5	22/09/2021	9:07:00	20
Yathong1	20/09/2021	17:11:00	20
YNR011	16/09/2021	17:07:00	20
YNR040	23/09/2021	8:44:00	20
YNR048	17/09/2021	7:35:00	20
YNR054	21/09/2021	7:54:00	20
YNR055	21/09/2021	8:30:00	20
YNR061	15/09/2021	17:34:00	20
YNR074	19/09/2021	8:04:00	20
YNR079	16/09/2021	16:00:00	20

Songmeter

Site name	Vegetation class	Device number	Start date	End date
CWPT6732	Dune Mallee Woodlands	559	17/09/2021	19/09/2021
New1	Inland Rocky Hills Woodlands	551	19/09/2021	21/09/2021
New3	Inland Rocky Hills Woodlands	559	15/09/2021	17/09/2021
New5	Inland Rocky Hills Woodlands	559	21/09/2021	23/09/2021
YNR038	Sand Plain Mallee Woodlands	559	19/09/2021	21/09/2021
YNR061	Dune Mallee Woodlands	551	21/09/2021	23/09/2021
YNR074	Sand Plain Mallee Woodlands	551	15/09/2021	17/09/2021
YNR080	Dune Mallee Woodlands	551	17/09/2021	19/09/2021

Anabat detection

Site name	Anabat type	Start date	End date
YNR048	Swift (SN493154)	15/09/2021	17/09/2021
YNR061	Swift (SN493172)	21/09/2021	23/09/2021
YNR080	Express (SN451383)	17/09/2021	19/09/2021
CWPT6732	Swift (SN493172)	17/09/2021	19/09/2021
CWPT6745	Express (SN451383)	19/09/2021	21/09/2021

Site name	Anabat type	Start date	End date
YNR038	Swift (SN493154)	19/09/2021	21/09/2021
YNR011	Swift (SN493154)	21/09/2021	23/09/2021
YNR054	Swift (SN493154)	17/09/2021	19/09/2021
YNR055	Express (SN451541)	17/09/2021	19/09/2021
YNR074	Express (SN451383)	15/09/2021	17/09/2021
YNR079	Swift (SN493172)	15/09/2021	17/09/2021
New1	Express (SN451541)	19/09/2021	21/09/2021
New2	Swift (SN493172)	19/09/2021	21/09/2021
New3	Express (SN451541)	15/09/2021	17/09/2021
New4	Express (SN451383)	21/09/2021	23/09/2021
New5	Express (SN451541)	21/09/2021	23/09/2021

Remote cameras and reptile survey locations

Date deployed	Camera serial number	Site name	Easting	Northing	Reptile survey site
16/09/2021	4620	YNR011	362348	6393131	
16/09/2021	4650	R2	359915	6408731	R2
16/09/2021	4830	NEW5	361578	6406932	R3
16/09/2021	4833	NEW4	362992	6405170	R4
16/09/2021	4628	Yathong 1 (R1)	366474	6398130	R1
17/09/2021	4968	CAMERA 025	347076	6394843	
17/09/2021	3835	CAMERA 026	348062	6394717	
17/09/2021	505	CAMERA 027	348993	6394625	R5
17/09/2021	4938	CAMERA 028	349962	6394503	
17/09/2021	4574	CAMERA 029	350971	6394382	
17/09/2021	4544	CAMERA 030	351901	6394256	R6
17/09/2021	5049	YNR048	355060	6393876	
17/09/2021	4958	R7	358004	6393571	R7
17/09/2021	3827	R8	358576	6397456	R8
17/09/2021	4838	NEW3	359109	6400890	R9
17/09/2021	2794	R10	359491	6405215	R10
18/09/2021	3118	CAMERA 001	359323	6378929	
18/09/2021	4832	CAMERA 002	354813	6379169	
18/09/2021	4819	CAMERA 003	354082	6379738	R11
18/09/2021	4829	CAMERA 004	353253	6380323	
18/09/2021	4828	CAMERA 005	352349	6380710	
18/09/2021	3836	CAMERA 006	351351	6380963	R12
18/09/2021	4956	CAMERA 007	350313	6381229	
18/09/2021	4890	CAMERA 008	349290	6381492	
18/09/2021	3829	CAMERA 009	348272	6381722	R13
18/09/2021	3389	CAMERA 010	347231	6382051	
18/09/2021	2791	CAMERA 011	346177	6382241	
18/09/2021	2826	CAMERA 012	345179	6382513	R14

Date deployed	Camera serial number	Site name	Easting	Northing	Reptile survey site
18/09/2021	4836	R15	349570	6372627	R15
18/09/2021	3387	R16	354398	6376549	R16
19/09/2021	4634	CAMERA 013	344934	6383483	R17
19/09/2021	5054	CAMERA 014	345059	6384504	
19/09/2021	4834	CAMERA 015	345155	6385457	
19/09/2021	2793	CAMERA 016	345289	6386449	R18
19/09/2021	4648	CAMERA 017	345390	6387444	
19/09/2021	4476	CAMERA 018	345503	6388401	
19/09/2021	3838	CAMERA 019	345649	6389484	R19
19/09/2021	5051	CAMERA 020	345754	6390596	
19/09/2021	4821	CAMERA 021	345895	6391495	
19/09/2021	5048	CAMERA 022	346009	6392691	R20
19/09/2021	3845	CAMERA 023	346124	6393637	
19/09/2021	3843	CAMERA 024	346250	6394739	
19/09/2021	4393	YNR055	344587	6380439	R22
19/09/2021	4831	CWPT6732	344226	6377560	R23
19/09/2021	4822	CWPT6745	344216	6373268	R24
19/09/2021	5022	HBT near CWPT6745	344429	6373299	R24
20/09/2021	4647	YNR061	363208	6387656	R25
20/09/2021	4827	NEW2	360402	6382208	R27
20/09/2021	4632	YNR038	358527	6380447	R28

Appendix D Flora and fauna species lists

Floristic plots percent cover scores and rapid assessments.

Family	Species	Floristic plots																Rapid assessments					Incidental
		YNR011	YNR038	YNR040	YNR048	YNR054	YNR055	YNR061	YNR074	YNR079	YNR080	CWP6732	CWPT6745	New1	New2	New3	New5	New4	Yathong1	YNR054 area	Yathong 4	Yathong 5	
Amaranthaceae	*Alternanthera* sp. A			0.1										0.1									
Amaranthaceae	*Ptilotus exaltatus*				0.5		0.1						2								x	x	
Amaranthaceae	*Ptilotus modestus*		0.1	0.1	0.1	0.1					0.1	0.1	0.1	0.2	0.1	0.1	0.1						
Amaranthaceae	*Ptilotus polystachyus*	0.1		0.1		0.1					0.1		0.1										
Amaranthaceae	*Ptilotus sessilifolius*	0.1		0.1	0.1		0.1				0.1		0.1	0.1	0.1	0.1		x					
Amaranthaceae	*Ptilotus spathulatus*	0.1						0.1						0.1									
Apiaceae	*Daucus glochidiatus*	0.1		0.1	0.1			0.1	0.1				0.1	0.1	0.1	0.1	0.1			x			
Apocynaceae	*Marsdenia australis*							0.1	0.1				0.1			0.1							
Apocynaceae	*Parsonsia eucalyptophylla*				0.1			0.1															
Apocynaceae	*Rhyncharrhena linearis*	0.1			0.1	0.1	0.1					0.1	0.1				0.1						
Asparagaceae	*Lomandra collina*		0.2							0.2		0.1											
Asparagaceae	*Lomandra effusa*	0.2	0.3			2				0.1	0.1	0.1								x	x		
Asphodelaceae	*Bulbine semibarbata*		0.1	0.1	0.1	0.1		0.1		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1			x			
Asparagaceae	*Lomandra leucocephala* subsp. *robusta*								1	0.1													

Family	Species	Floristic plots																Rapid assessments					Incidental
		YNR011	YNR038	YNR040	YNR048	YNR054	YNR055	YNR061	YNR074	YNR079	YNR080	CWP6732	CWPT6745	New1	New2	New3	New5	New4	Yathong1	YNR054 area	Yathong 4	Yathong 5	
Asteraceae	*Actinobole uliginosum*			0.1	0.1				0.1				0.1	0.1	0.2	0.1	0.1	x					
Asteraceae	*Asteraceae* indeterminate				0.1																		
Asteraceae	*Brachyscome lineariloba*			0.1	0.1	0.1						0.1		0.1	0.1	0.1							
Asteraceae	*Calotis cuneifolia*	0.2	0.1	0.3	0.2	0.2	0.1	0.1				0.1	0.2	0.1	0.2	0.1	0.3	x		x		x	
Asteraceae	*Calotis hispidula*		0.1	0.1	0.1	0.1	0.1	0.1	0.1			0.1	0.1	0.1	0.1	0.1	0.1	x	x		x		
Asteraceae	*Calotis lappulacea*			4										0.1				x					
Asteraceae	*Centaurea melitensis**			0.1										0.2									
Asteraceae	*Chrysocephalum apiculatum*		0.1	0.1							0.1			0.1	0.1							x	
Asteraceae	*Chthonocephalus pseudevax*			0.1											0.1	0.1	0.1						
Asteraceae	*Hyalosperma semisterile*			0.1	0.1				0.1				0.1	0.1	3	5	2			x		x	
Asteraceae	*Hypochaeris glabra**			0.1													0.1		x				
Asteraceae	*Isoetopsis graminifolia*			0.1	0.1		0.1		0.1					0.1	0.1	0.1	0.1	x				x	
Asteraceae	*Leontodon rhagadioloides**			0.1										0.3									
Asteraceae	*Minuria leptophylla*					0.1		0.1															
Asteraceae	*Olearia lepidophylla*		0.1																				
Asteraceae	*Olearia pimeleoides*	5	0.1		0.1	0.2		1	0.6		1		0.5							x	x	x	
Asteraceae	*Olearia subspicata*																						x

Family	Species	Floristic plots																Rapid assessments					Incidental
		YNR011	YNR038	YNR040	YNR048	YNR054	YNR055	YNR061	YNR074	YNR079	YNR080	CWP6732	CWPT6745	New1	New2	New3	New5	New4	Yathong1	YNR054 area	Yathong 4	Yathong 5	
Asteraceae	*Podolepis jaceoides*				0.1						0.1	0.1										x	
Asteraceae	*Rhodanthe corymbiflora*				0.1									0.5		0.1	0.2	x	x			x	
Asteraceae	*Rhodanthe floribunda*			0.2				0.1	0.1						0.1								
Asteraceae	*Rhodanthe pygmaea*				0.1	0.1			0.1			0.1	0.1	0.1	0.1	0.1							
Asteraceae	*Sonchus oleraceus**													0.1					x				
Asteraceae	*Stuartina muelleri*			0.1					0.1						0.1	0.1		x					
Asteraceae	*Taraxacum officinale**													0.1									
Asteraceae	*Vittadinia cervicularis* var. *cervicularis*				0.1			0.3	0.1				0.1		0.1	0.5	0.1				x		
Asteraceae	*Vittadinia condyloides*			0.1		0.2														x			
Asteraceae	*Vittadinia cuneata*	0.1																					
Asteraceae	*Vittadinia dissecta* var. *hirta*	0.1			0.5	0.2	0.2	0.1	0.2			0.1	0.1		0.1	0.1	0.3	x		x			
Asteraceae	*Vittadinia pustulata*												0.1										
Asteraceae	*Vittadinia* sp.		0.1													0.1							
Asteraceae	*Waitzia acuminata*																						x
Asteraceae	*Xerochrysum bracteatum*				0.1				0.1									x					
Boraginaceae	*Echium plantagineum**													5					x				

Family	Species	Floristic plots																Rapid assessments					Incidental
		YNR011	YNR038	YNR040	YNR048	YNR054	YNR055	YNR061	YNR074	YNR079	YNR080	CWP6732	CWPT6745	New1	New2	New3	New5	New4	Yathong1	YNR054 area	Yathong 4	Yathong 5	
Boraginaceae	*Halgania cyanea*		0.1			0.2	0.3		0.6	0.1	1	0.5								x	x	x	
Brassicaceae	*Carrichtera annua**																		x				
Brassicaceae	*Cuphonotus andraeanus*																0.1						
Brassicaceae	*Geococcus pusillus*													0.1									
Brassicaceae	*Harmsiodoxa blennodioides*			0.1	0.1										0.1		0.1						
Brassicaceae	*Cuphonotus humistratus*													0.1	0.1	0.1			x				
Brassicaceae	*Lepidium papillosum*													0.1	0.1								
Brassicaceae	*Menkea australis*								0.1														
Brassicaceae	*Sisymbrium erysimoides**													0.2					x				
Campanulaceae	*Wahlenbergia communis*			0.1					0.2					0.1	0.1	0.1	0.1	x					
Campanulaceae	*Wahlenbergia gracilenta*			0.1	0.1	0.1		0.1						0.1	0.1		0.1	x	x	x			
Campanulaceae	*Wahlenbergia* sp.			0.1			0.1					0.1	0.1										
Capparaceae	*Apophyllum anomalum*														1				x				
Caryophyllaceae	*Caryophyllaceae* indeterminate													0.1									
Caryophyllaceae	*Gypsophila tubulosa*														0.1								
Caryophyllaceae	*Silene apetala**			0.1										0.1									
Casuarinaceae	*Casuarina cristata*																		x			x	
Chenopodiaceae	*Atriplex* sp.														1	1		x	x				

Family	Species	Floristic plots																Rapid assessments					Incidental
		YNR011	YNR038	YNR040	YNR048	YNR054	YNR055	YNR061	YNR074	YNR079	YNR080	CWP6732	CWPT6745	New1	New2	New3	New5	New4	Yathong1	YNR054 area	Yathong 4	Yathong 5	
Chenopodiaceae	*Chenopodium desertorum*	0.1		3			0.1		0.1		0.1			0.2		0.1	0.5				x		
Chenopodiaceae	*Chenopodium desertorum* subsp. *desertorum*		0.1		0.1	0.1		0.5					0.2		0.1								
Chenopodiaceae	*Dysphania* sp.				0.1																		
Chenopodiaceae	*Einadia nutans*								0.1					0.2	0.3	0.1	0.1						
Chenopodiaceae	*Einadia nutans* subsp. *nutans*			0.1																			
Chenopodiaceae	*Enchylaena tomentosa*		0.1		0.1			0.1								0.1							
Chenopodiaceae	*Maireana enchylaenoides*	0.1	0.1	0.1	0.1	0.1		0.1	0.1	0.1		0.1	0.1	0.1	0.1		0.1						
Chenopodiaceae	*Maireana excavata*																	x					
Chenopodiaceae	*Salsola australis*																		x				
Chenopodiaceae	*Sclerolaena birchii*			0.1										0.2					x				
Chenopodiaceae	*Sclerolaena convexula*			0.1	0.1				0.1														
Chenopodiaceae	*Sclerolaena diacantha*	0.3	0.1	1	0.2	0.1	0.1	0.1	0.1		0.1		1	0.2	0.4	0.2	4	x	x	x		x	
Chenopodiaceae	*Sclerolaena parviflora*	0.2	0.1			0.1	0.3	0.3		0.1	0.3	0.2	0.3							x	x		
Convolvulaceae	*Convolvulus erubescens*			0.1	0.1									0.1		0.1	0.1						
Convolvulaceae	*Dichondra repens*			0.1										0.2									
Crassulaceae	*Crassula sieberiana*			0.1	0.1	0.1		0.1	0.1				0.1	0.1	0.3	0.1	0.1	x	x		x		
Cupressaceae	*Callitris glaucophylla*		1	0.1						0.2			0.1		0.3	5	2		x	x	x		

Family	Species	Floristic plots																Rapid assessments					Incidental
		YNR011	YNR038	YNR040	YNR048	YNR054	YNR055	YNR061	YNR074	YNR079	YNR080	CWP6732	CWPT6745	New1	New2	New3	New5	New4	Yathong1	YNR054 area	Yathong 4	Yathong 5	
Cyperaceae	*Schoenus subaphyllus*										0.1	0.1											
Euphorbiaceae	*Ricinocarpos bowmanii*																						x
Euphorbiaceae	*Euphorbia drummondii*	0.1		0.1		0.1		0.1					0.1	0.1	0.1	0.1	0.1				x		
Fabaceae - Faboideae	*Bossiaea walkeri*						5					4								x	x		
Fabaceae - Faboideae	*Eutaxia microphylla*		0.1																				
Fabaceae - Faboideae	*Glycine canescens*			0.1																			
Fabaceae - Faboideae	*Medicago laciniata**			0.1										5	0.1	0.1			x				
Fabaceae - Faboideae	*Medicago minima**			3										1	0.1	0.1	0.3						
Fabaceae - Faboideae	*Medicago polymorpha**			1										5									
Fabaceae-Caesalpinioideae	*Petalostylis labicheoides*																						x
Fabaceae-Caesalpinioideae	*Senna artemisioides <--> zygophylla*					0.3					0.1												
Fabaceae-Caesalpinioideae	*Senna artemisioides group*																	x		x	x		
Fabaceae-Caesalpinioideae	*Senna artemisioides* subsp. *X artemisioides*	0.5				0.3																	
Fabaceae-Caesalpinioideae	*Senna artemisioides* subsp. *x petiolaris*		1						0.5														

Family	Species	Floristic plots																Rapid assessments					Incidental
		YNR011	YNR038	YNR040	YNR048	YNR054	YNR055	YNR061	YNR074	YNR079	YNR080	CWP6732	CWPT6745	New1	New2	New3	New5	New4	Yathong1	YNR054 area	Yathong 4	Yathong 5	
Fabaceae - Mimosoideae	*Acacia aneura*																						x
Fabaceae - Mimosoideae	*Acacia brachybotrya*								0.1														
Fabaceae - Mimosoideae	*Acacia burkittii*																						x
Fabaceae - Mimosoideae	*Acacia colletioides*					0.3			0.5	0.5	3							x		x	x	x	
Fabaceae - Mimosoideae	*Acacia hakeoides*																			x			
Fabaceae - Mimosoideae	*Acacia* sp.																0.1						
Fabaceae - Mimosoideae	*Acacia wilhelmiana*		2																		x	x	
Geraniaceae	*Erodium crinitum*	0.1		0.2	0.1			0.1	0.1				0.1	5	10	0.1	0.3	x	x				
Goodeniaceae	*Goodenia cycloptera*			3											0.3	0.5	0.5	x				x	
Goodeniaceae	*Goodenia fasciculatis*			0.2										0.1									
Goodeniaceae	*Goodenia glabra*				0.2				0.2								0.1					x	
Goodeniaceae	*Goodenia havilandii*														0.2		0.1						
Goodeniaceae	*Goodenia pusilliflora*								0.1					0.1	0.2		0.2			x			
Goodeniaceae	*Goodenia* sp.								0.1		0.1												
Goodeniaceae	*Goodenia willisiana*		0.1									0.1	0.1										
Goodeniaceae	*Velleia glabrata*																	x					
Goodeniaceae	*Velleia paradoxa*				0.1																		
Haloragaceae	*Haloragis odontocarpa*										0.1	0.1											

Family	Species	Floristic plots																Rapid assessments					Incidental
		YNR011	YNR038	YNR040	YNR048	YNR054	YNR055	YNR061	YNR074	YNR079	YNR080	CWP6732	CWPT6745	New1	New2	New3	New5	New4	Yathong1	YNR054 area	Yathong 4	Yathong 5	
Lamiaceae	*Marrubium vulgare**													0.2									
Lamiaceae	*Prostanthera serpyllifolia* subsp. *microphylla*		0.1																				
Lamiaceae	*Salvia verbenaca*			0.2										0.1	0.1								
Lamiaceae	*Teucrium puberulum*																	x					
Lamiaceae	*Westringia rigida*		0.1							2		0.1											
Linaceae	*Linum marginale**			0.1								0.1									0.1		
Loranthaceae	*Lysiana exocarpi* subsp. *exocarpi*			0.2																			
Malvaceae	*Abutilon* sp.			0.1									0.1	0.1	0.1	0.1	0.1						
Malvaceae	*Brachychiton populneus* subsp. *trilobus*			5																		x	
Malvaceae	*Sida corrugata*			0.1				0.1						0.1	0.1								
Malvaceae	*Sida cunninghamii*	0.1		0.1										0.1	0.1	0.2	0.1	x					
Malvaceae	*Sida* sp.			0.1				0.1															
Montiaceae	*Calandrinia eremaea*			0.1	0.1	0.1		0.1				0.1	0.1	0.1	0.1	0.1	0.1				x		
Myrtaceae	*Eucalyptus dumosa*	10	2		4	1		2	5	2		5	2							x			
Myrtaceae	*Eucalyptus gracilis*		0.5		4	14	10	8	5	1	2		1							x	x		
Myrtaceae	*Eucalyptus intertexta*													0.3	2	5	5			x		x	
Myrtaceae	*Eucalyptus socialis*	5	6		2	14	5	5	1	6	5	8	3				0.5			x		x	

Family	Species	Floristic plots																Rapid assessments					Incidental
		YNR011	YNR038	YNR040	YNR048	YNR054	YNR055	YNR061	YNR074	YNR079	YNR080	CWP6732	CWPT6745	New1	New2	New3	New5	New4	Yathong1	YNR054 area	Yathong 4	Yathong 5	
Myrtaceae	*Eucalyptus viridis*		4		1		2			0.2	2	2									x		
Myrtaceae	*Melaleuca uncinata*					3			15											x			
Myrtaceae	*Micromyrtus striata*																						x
Nyctaginaceae	*Boerhavia* sp.			0.1																			
Ophioglossaceae	*Ophioglossum lusitanicum*			0.1																			
Opportunistic	*Leptospermum coriaceum*																						x
Orchidaceae	*Caladenia fuscata*				0.1																	x	
Orchidaceae	*Pterostylis biseta* group - undescribed species												0.1										
Orchidaceae	*Pterostylis* sp.		0.1																				
Oxalidaceae	*Oxalis chnoodes*										0.1		0.1										
Oxalidaceae	*Oxalis perennans*	0.1			0.1										0.1	0.1							
Oxalidaceae	*Oxalis radicosa*			0.1													0.1						
Phormiaceae	*Dianella longifolia*						0.1									0.1							
Phormiaceae	*Dianella revoluta* var. *revoluta*									0.2													
Phyllanthaceae	*Phyllanthus fuernrohrii*			0.1										0.1	0.1	0.1	0.1	x					
Phyllanthaceae	*Poranthera microphylla*																					x	
Pittosporaceae	*Billardiera versicolor*										0.1												
Plantaginaceae	*Plantago turrifera*			0.1	0.1				0.1					0.1		0.1							

Family	Species	Floristic plots																Rapid assessments					Incidental
		YNR011	YNR038	YNR040	YNR048	YNR054	YNR055	YNR061	YNR074	YNR079	YNR080	CWP6732	CWPT6745	New1	New2	New3	New5	New4	Yathong1	YNR054 area	Yathong 4	Yathong 5	
Poaceae	*Amphipogon caricinus* var. *caricinus*											0.1						x			x		
Poaceae	*Aristida behriana*			0.1																			
Poaceae	*Aristida jerichoensis*													0.1									
Poaceae	*Aristida jerichoensis* var. *subspinulifera*	0.1		0.2		0.1							0.1				0.2	x		x		x	
Poaceae	*Austrostipa nitida*			0.1																			
Poaceae	*Austrostipa scabra*													35			5		x	x			
Poaceae	*Austrostipa scabra* subsp. *falcata*	0.5	0.2		1			4			2		4		3	10		x					
Poaceae	*Austrostipa scabra* subsp. *scabra*			10		1	2		1	0.1		2											
Poaceae	*Austrostipa* sp.							0.1	0.2												x	x	
Poaceae	*Austrostipa tuckeri*													0.1									
Poaceae	*Bromus rubens**			0.1																			
Poaceae	*Enneapogon* sp.																				x		
Poaceae	*Enteropogon acicularis*															0.1							
Poaceae	*Eragrostis lacunaria*															0.1							
Poaceae	*Eragrostis* sp.			0.1																			
Poaceae	*Monachather paradoxus*													0.1	0.1		0.5	x					
Poaceae	*Panicum effusum*	0.1															0.5						
Poaceae	*Panicum* sp.			0.1									0.1					x					

Family	Species	Floristic plots																Rapid assessments					Incidental
		YNR011	YNR038	YNR040	YNR048	YNR054	YNR055	YNR061	YNR074	YNR079	YNR080	CWP6732	CWPT6745	New1	New2	New3	New5	New4	Yathong1	YNR054 area	Yathong 4	Yathong 5	
Poaceae	*Paspalidium constrictum*	0.1		0.1	0.2	0.1	0.1		0.1				0.1							x			
Poaceae	*Pentaschistis airoides**			0.1																			
Poaceae	*Poaceae* indeterminate											0.1											
Poaceae	*Rostraria pumila**			0.3										0.1									
Poaceae	*Rytidosperma* sp.		0.1																				
Poaceae	*Schismus barbatus**			0.1																			
Poaceae	*Thyridolepis mitchelliana*			0.1			0.1							0.1		0.1	0.5	x					
Poaceae	*Triodia scariosa* subsp. *scariosa*		30				5		4	15	10	5									x	x	
Poaceae	*Tripogon loliiformis*														0.1								
Poaceae	*Triptilodiscus pygmaeus*			0.1	0.1				0.1					0.1	0.1		0.1						
Poaceae	*Vulpia muralis**													0.1									
Poaceae	*Vulpia myuros**			0.1																			
Polygalaceae	*Comesperma integerrimum*							0.1															
Primulaceae	*Lysimachia arvensis**			0.1										0.1									
Proteaceae	*Grevillea huegelii*						1																
Proteaceae	*Hakea tephrosperma*												0.1										
Pteridaceae	*Cheilanthes sieberi* subsp. *sieberi*			0.1											0.1			x					
Rutaceae	*Geijera parviflora*	0.2						0.5					0.1	0.2	0.1		0.1	x	x		x		

Family	Species	Floristic plots																Rapid assessments					Incidental
		YNR011	YNR038	YNR040	YNR048	YNR054	YNR055	YNR061	YNR074	YNR079	YNR080	CWP6732	CWPT6745	New1	New2	New3	New5	New4	Yathong1	YNR054 area	Yathong 4	Yathong 5	
Santalaceae	*Exocarpos aphyllus*										2												
Santalaceae	*Santalum* sp.											1											
Sapindaceae	*Dodonaea boroniifolia*																						x
Sapindaceae	*Alectryon oleifolius* subsp. *canescens*			10															x				
Sapindaceae	*Dodonaea viscosa*															2							
Sapindaceae	*Dodonaea viscosa* subsp. *angustissima*	0.5	1									0.1			0.1		0.1			x			
Sapindaceae	*Dodonaea viscosa* subsp. *spatulata*												0.2					x					
Scrophulariaceae	*Eremophila deserti*				0.1											3							
Scrophulariaceae	*Eremophila glabra*	0.1	2	1	1	0.1		0.1	0.2	0.5	0.5		0.5	0.6		0.2	2	x		x		x	
Scrophulariaceae	*Eremophila longifolia*															0.1	0.1	x	x				
Scrophulariaceae	*Eremophila mitchellii*			0.5											4			x	x	x			
Scrophulariaceae	*Eremophila mitchellii*																						
Scrophulariaceae	*Eremophila* sp.						0.1																
Scrophulariaceae	*Eremophila sturtii*										0.5												
Scrophulariaceae	*Myoporum montanum*												0.2										
Solanaceae	*Nicotiana velutina*													0.1		0.1	0.1	x					

Family	Species	Floristic plots																Rapid assessments					Incidental
		YNR011	YNR038	YNR040	YNR048	YNR054	YNR055	YNR061	YNR074	YNR079	YNR080	CWP6732	CWPT6745	New1	New2	New3	New5	New4	Yathong1	YNR054 area	Yathong 4	Yathong 5	
Solanaceae	*Solanum coactiliferum*																			x			
Solanaceae	*Solanum ellipticum*			0.1													0.1				x		
Solanaceae	*Solanum ferocissimum*															0.2	0.1		x				
Stackhousiaceae	*Stackhousia monogyna*								0.1														
Stackhousiaceae	*Stackhousia viminea*																0.1					x	
Thymeleaceae	*Pimelea micrantha*																	x					
Thymeleaceae	*Pimelea microcephala* subsp. *microcephala*							0.5															
Thymeleaceae	*Pimelea trichostachya*			0.1										0.1									
Zygophyllaceae	*Roepera apiculata*				1								0.1										

X = observed

BioNet Atlas records of fauna recorded at Yathong Nature Reserve

Family	Scientific name	Common name	Exotic	NSW status	BioNet	Reptile survey	Bird survey	Mammal surveys
Amphibians								
Myobatrachidae	*Uperoleia capitulata*	Small-headed Toadlet		P	✓			
Myobatrachidae	*Uperoleia rugosa*	Wrinkled Toadlet		P	✓			
Hylidae	*Litoria rubella*	Desert Tree Frog		P	✓			
Limnodynastidae	*Limnodynastes interioris*	Giant Banjo Frog		P	✓			
Limnodynastidae	*Limnodynastes tasmaniensis*	Spotted Grass Frog		P	✓			
Limnodynastidae	*Neobatrachus sudellae*	Sudell's Frog		P	✓			
Reptiles								
Carphodactylidae	*Nephrurus levis*	Three-lined Knob-tail		P	✓			
Carphodactylidae	*Underwoodisaurus milii*	Thick-tailed Gecko		P	✓			
Diplodactylidae	*Diplodactylus vittatus*	Wood Gecko		P	✓			
Diplodactylidae	*Lucasium byrnei*	Gibber Gecko		P	✓			
Diplodactylidae	*Lucasium damaeum*	Beaded Gecko		P	✓			
Diplodactylidae	*Lucasium steindachneri*	Box-patterned Gecko		P	✓			
Diplodactylidae	*Oedura marmorata*	Marbled Velvet Gecko		P	✓			
Diplodactylidae	*Rhynchoedura ormsbyi*	Eastern Beaked Gecko		P	✓			
Diplodactylidae	*Strophurus ciliaris*	Spiny-tailed Gecko		P	✓			
Diplodactylidae	*Strophurus intermedius*	Southern Spiny-tailed Gecko		P	✓			
Gekkonidae	*Gehyra dubia*	Dubious Dtella		P	✓			
Gekkonidae	*Gehyra lazelli*					✓		
Gekkonidae	*Gehyra variegata*	Tree Dtella		P	✓			
Gekkonidae	*Heteronotia binoei*	Bynoe's Gecko		P	✓			
Pygopodidae	*Delma australis*	Marble-faced Delma		E1,P	✓			
Pygopodidae	*Delma butleri*	Unbanded Delma		P	✓			
Pygopodidae	*Lialis burtonis*	Burton's Snake-lizard		P	✓			
Pygopodidae	*Pygopus lepidopodus*	Common Scaly-foot		P	✓			
Pygopodidae	*Pygopus schraderi*	Eastern Hooded Scaly-foot		P	✓			
Scincidae	*Cryptoblepharus australis*	Inland Snake-eyed Skink		P	✓	✓		
Scincidae	*Cryptoblepharus pannosus*					✓		
Scincidae	*Ctenotus allotropis*	Brown-blazed Wedgesnout Ctenotus		P	✓			

Family	Scientific name	Common name	Exotic	NSW status	BioNet	Reptile survey	Bird survey	Mammal surveys
Scincidae	*Ctenotus atlas*	Southern Mallee Ctenotus		P	✓	✓		
Scincidae	*Ctenotus leonhardii*	Leonhardi's Ctenotus		P	✓			
Scincidae	*Ctenotus regius*	Pale-rumped Ctenotus		P	✓	✓		
Scincidae	*Ctenotus robustus*	Robust Ctenotus		P	✓	✓		
Scincidae	*Ctenotus schomburgkii*	Barred Wedgesnout Ctenotus		P	✓	✓		
Scincidae	*Egernia striolata*	Tree Skink		P	✓	✓		
Scincidae	*Eremiascincus richardsonii*	Broad-banded Sand-swimmer		P	✓			
Scincidae	*Lerista muelleri*	Wood Mulch-slider		P	✓			
Scincidae	*Lerista punctatovittata*	Eastern Robust Slider		P	✓			
Scincidae	*Lerista timida*	Timid Slider		P	✓	✓		
Scincidae	*Liopholis inornata*	Desert Skink		P	✓	✓		
Scincidae	*Menetia greyii*	Common Dwarf Skink		P	✓			
Scincidae	*Morethia boulengeri*	South-eastern Morethia Skink		P	✓	✓		
Scincidae	*Tiliqua occipitalis*	Western Blue-tongued Lizard		V,P	✓	✓		
Scincidae	*Tiliqua rugosa*	Shingle-back		P	✓	✓		
Scincidae	*Tiliqua scincoides*	Eastern Blue-tongue		P	✓			
Agamidae	*Ctenophorus fordi*	Mallee Military Dragon		P	✓	✓		
Agamidae	*Ctenophorus nuchalis*	Central Netted Dragon		P	✓	✓		
Agamidae	*Ctenophorus pictus*	Painted Dragon		P	✓	✓		
Agamidae	*Diporiphora nobbi*	Nobbi Dragon		P	✓	✓		
Agamidae	*Pogona barbata*	Bearded Dragon		P	✓	✓		
Agamidae	*Pogona sp.*			P	✓			
Agamidae	*Pogona vitticeps*	Central Bearded Dragon		P	✓	✓		
Varanidae	*Varanus gouldii*	Gould's Goanna		P	✓			
Varanidae	*Varanus varius*	Lace Monitor		P	✓	✓		
Typhlopidae	*Anilios bicolor*			P	✓			
Typhlopidae	*Anilios bituberculatus*	Prong-snouted Blind Snake		P	✓			
Pythonidae	*Morelia spilota*	Carpet & Diamond Pythons		P	✓			
Pythonidae	*Morelia spilota metcalfei*	Murray/Darling Carpet Python		P	✓			
Elapidae	*Brachyurophis australis*	Coral Snake		P	✓			
Elapidae	*Pseudechis australis*	Mulga Snake		P		✓		

Family	Scientific name	Common name	Exotic	NSW status	BioNet	Reptile survey	Bird survey	Mammal surveys
Elapidae	*Pseudonaja sp.*	Unidentified Brown Snake		P	✓			
Elapidae	*Pseudonaja aspidorhyncha*	Western Brown Snake		P		✓		
Elapidae	*Pseudonaja textilis*	Eastern Brown Snake		P	✓			
Elapidae	*Suta suta*	Curl Snake		P	✓			
Birds								
Pardalotidae	*Pardalotus punctatus xanthopyge*	Yellow-rumped Pardalote		P	✓			
Corcoracidae	*Struthidea cinerea*	Apostlebird		P	✓		SM, BC, I	
Podicipedidae	*Tachybaptus novaehollandiae*	Australasian Grebe		P	✓		I	
Anatidae	*Anas rhynchotis*	Australasian Shoveler		P	✓			
Otididae	*Ardeotis australis*	Australian Bustard		E1,P	✓			
Falconidae	*Falco longipennis*	Australian Hobby		P	✓		I	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		P	✓		SM, BC, I	
Aegothelidae	*Aegotheles cristatus*	Australian Owlet-nightjar		P	✓		SM	
Pelecanidae	*Pelecanus conspicillatus*	Australian Pelican		P	✓			
Motacillidae	*Anthus novaeseelandiae*	Australian Pipit		P	✓		I	
Glareolidae	*Stiltia isabella*	Australian Pratincole		P	✓			
Corvidae	*Corvus coronoides*	Australian Raven		P	✓		SM, BC	
Psittacidae	*Barnardius zonarius*	Australian Ringneck		P	✓		SM, BC	
Anatidae	*Chenonetta jubata*	Australian Wood Duck		P	✓			
Charadriidae	*Vanellus tricolor*	Banded Lapwing		P	✓			
Columbidae	*Geopelia humeralis*	Bar-shouldered Dove		P	✓			
Falconidae	*Falco subniger*	Black Falcon		V,P	✓			
Meliphagidae	*Sugomel nigrum*	Black Honeyeater		P	✓		SM, BC, I	
Anatidae	*Cygnus atratus*	Black Swan		P	✓			
Cuculidae	*Chalcites osculans*	Black-eared Cuckoo		P	✓		SM, BC	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		P	✓		SM, BC, I	
Artamidae	*Artamus cinereus*	Black-faced Woodswallow		P	✓			
Charadriidae	*Elseyornis melanops*	Black-fronted Dotterel		P	✓			
Accipitridae	*Elanus axillaris*	Black-shouldered Kite		P	✓		I	
Rallidae	*Tribonyx ventralis*	Black-tailed Native-hen		P	✓			

Family	Scientific name	Common name	Exotic	NSW status	BioNet	Reptile survey	Bird survey	Mammal surveys
Recurvirostridae	*Himantopus himantopus*	Black-winged Stilt		P	✓			
Psittacidae	*Northiella haematogaster*	Blue Bonnet		P	✓		SM, BC, I	
Meliphagidae	*Entomyzon cyanotis*	Blue-faced Honeyeater		P	✓			
Gruidae	*Grus rubicunda*	Brolga		V,P	✓			
Falconidae	*Falco berigora*	Brown Falcon		P	✓		I	
Accipitridae	*Accipiter fasciatus*	Brown Goshawk		P	✓		I	
Locustellidae	*Cincloramphus cruralis*	Brown Songlark		P	✓		I	
Climacteridae	*Climacteris picumnus victoriae*	Brown Treecreeper (eastern subspecies)		V,P	✓			
Meliphagidae	*Melithreptus brevirostris*	Brown-headed Honeyeater		P	✓			
Psittacidae	*Melopsittacus undulatus*	Budgerigar		P	✓		SM, BC, I	
Acanthizidae	*Acanthiza reguloides*	Buff-rumped Thornbill		P	✓			
Psophodidae	*Cinclosoma castanotum*	Chestnut Quail-thrush		V,P	✓		SM, BC	
Pomatostomidae	*Pomatostomus ruficeps*	Chestnut-crowned Babbler		P	✓			
Acanthizidae	*Acanthiza uropygialis*	Chestnut-rumped Thornbill		P	✓		SM, BC, I	
Cacatuidae	*Nymphicus hollandicus*	Cockatiel		P	✓		SM, BC	
Accipitridae	*Accipiter cirrocephalus*	Collared Sparrowhawk		P	✓			
Columbidae	*Phaps chalcoptera*	Common Bronzewing		P	✓		SM, BC, I	
Sturnidae	*Sturnus vulgaris*	Common Starling	*		✓			
Oreoicidae	*Oreoica gutturalis*	Crested Bellbird		P	✓		SM, BC, I	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		P	✓		SM, BC	
Meliphagidae	*Epthianura tricolor*	Crimson Chat		P	✓		I	
Columbidae	*Geopelia cuneata*	Diamond Dove		P	✓			
Estrildidae	*Stizoptera bichenovii*	Double-barred Finch		P	✓			
Artamidae	*Artamus cyanopterus cyanopterus*	Dusky Woodswallow		V,P	✓			
Tytonidae	*Tyto javanica*	Eastern Barn Owl		P	✓		SM, I	
Ardeidae	*Casmerodius modesta*	Eastern Great Egret		P	✓			
Petroicidae	*Eopsaltria australis*	Eastern Yellow Robin		P	✓			
Casuariidae	*Dromaius novaehollandiae*	Emu		P	✓		I	
Turdidae	*Turdus merula*	European Blackbird	*	U			I	
Rallidae	*Fulica atra*	Eurasian Coot		P	✓			

Family	Scientific name	Common name	Exotic	NSW status	BioNet	Reptile survey	Bird survey	Mammal surveys
Hirundinidae	*Petrochelidon ariel*	Fairy Martin		P	✓		I	
Cuculidae	*Cacomantis flabelliformis*	Fan-tailed Cuckoo		P	✓			
Petroicidae	*Petroica phoenicea*	Flame Robin		V,P	✓			
Apodidae	*Apus pacificus*	Fork-tailed Swift		P	✓			
Cacatuidae	*Eolophus roseicapilla*	Galah		P	✓		SM, BC, I	
Pachycephalidae	*Pachycephala inornata*	Gilbert's Whistler		V,P	✓		I	
Threskiornithidae	*Plegadis falcinellus*	Glossy Ibis		P	✓			
Pachycephalidae	*Pachycephala pectoralis*	Golden Whistler		P	✓			
Artamidae	*Cracticus torquatus*	Grey Butcherbird		P	✓		SM, BC, I	
Artamidae	*Strepera versicolor*	Grey Currawong		P	✓			
Rhipiduridae	*Rhipidura albiscapa*	Grey Fantail		P	✓		SM, BC	
Pachycephalidae	*Colluricincla harmonica*	Grey Shrike-thrush		P	✓		SM, BC, I	
Anatidae	*Anas gracilis*	Grey Teal		P	✓			
Pomatostomidae	*Pomatostomus temporalis temporalis*	Grey-crowned Babbler (eastern subspecies)		V,P	✓		SM, BC, I	
Meliphagidae	*Ptilotula plumula*	Grey-fronted Honeyeater		P	✓		I	
Campephagidae	*Coracina maxima*	Ground Cuckoo-shrike		P	✓			
Anatidae	*Aythya australis*	Hardhead		P	✓			
Podicipedidae	*Poliocephalus poliocephalus*	Hoary-headed Grebe		P	✓			
Petroicidae	*Melanodryas cucullata cucullata*	Hooded Robin (south-eastern form)		V,P	✓			
Cuculidae	*Chalcites basalis*	Horsfield's Bronze-Cuckoo		P	✓		SM	
Passeridae	*Passer domesticus*	House Sparrow	*		✓			
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		P	✓		SM, BC, I	
Petroicidae	*Microeca fascinans*	Jacky Winter		P	✓			
Alcedinidae	*Dacelo novaeguineae*	Laughing Kookaburra		P	✓			
Phalacrocoracidae	*Phalacrocorax sulcirostris*	Little Black Cormorant		P	✓			
Turnicidae	*Turnix velox*	Little Button-quail		P	✓		I	
Cacatuidae	*Cacatua sanguinea*	Little Corella		P	✓			
Corvidae	*Corvus bennetti*	Little Crow		P	✓			
Accipitridae	*Hieraaetus morphnoides*	Little Eagle		V,P	✓			
Ardeidae	*Egretta garzetta*	Little Egret		P	✓			
Meliphagidae	*Philemon citreogularis*	Little Friarbird		P	✓			

Family	Scientific name	Common name	Exotic	NSW status	BioNet	Reptile survey	Bird survey	Mammal surveys
Phalacrocoracidae	*Microcarbo melanoleucos*	Little Pied Cormorant		P	✓			
Corvidae	*Corvus mellori*	Little Raven		P	✓		SM, BC, I	
Artamidae	*Artamus minor*	Little Woodswallow		P	✓			
Monarchidae	*Grallina cyanoleuca*	Magpie-lark		P	✓		SM, BC, I	
Cacatuidae	*Lophochroa leadbeateri*	Major Mitchell's Cockatoo		V,P,2	✓		SM, BC, I	
Megapodiidae	*Leipoa ocellata*	Malleefowl		E1,P	✓		I	
Charadriidae	*Vanellus miles*	Masked Lapwing		P	✓			
Artamidae	*Artamus personatus*	Masked Woodswallow		P	✓			
Dicaeidae	*Dicaeum hirundinaceum*	Mistletoebird		P	✓		SM, BC	
Psittacidae	*Psephotus varius*	Mulga Parrot		P	✓		I	
Falconidae	*Falco cenchroides cenchroides*	Nankeen Kestrel		P	✓		I	
Ardeidae	*Nycticorax caledonicus*	Nankeen Night Heron		P	✓			
Meliphagidae	*Manorina melanocephala*	Noisy Miner		P	✓		SM, BC, I	
Oriolidae	*Oriolus sagittatus*	Olive-backed Oriole		P	✓			
Meliphagidae	*Epthianura aurifrons*	Orange Chat		P	✓		I	
Anatidae	*Anas superciliosa*	Pacific Black Duck		P	✓			
Turnicidae	*Turnix varius*	Painted Button-quail		P	✓		I	
Meliphagidae	*Grantiella picta*	Painted Honeyeater		V,P	✓			
Cuculidae	*Heteroscenes pallidus*	Pallid Cuckoo		P	✓		SM, BC, I	
Columbidae	*Geopelia striata*	Peaceful Dove		P	✓		I	
Falconidae	*Falco peregrinus*	Peregrine Falcon		P	✓			
Meliphagidae	*Certhionyx variegatus*	Pied Honeyeater					SM, BC, I	
Artamidae	*Cracticus nigrogularis*	Pied Butcherbird		P	✓		I	
Anatidae	*Malacorhynchus membranaceus*	Pink-eared Duck		P	✓			
Anatidae	*Dendrocygna eytoni*	Plumed Whistling-Duck		P	✓			
Meropidae	*Merops ornatus*	Rainbow Bee-eater		P	✓			
Alcedinidae	*Todiramphus pyrrhopygius*	Red-backed Kingfisher		P	✓		I	
Petroicidae	*Petroica goodenovii*	Red-capped Robin		P	✓		SM, BC, I	
Charadriidae	*Erythrogonys cinctus*	Red-kneed Dotterel		P	✓			
Pachycephalidae	*Pachycephala rufogularis*	Red-lored Whistler		E4A,P	✓			
Psittacidae	*Psephotus haematonotus*	Red-rumped Parrot		P	✓		SM, BC, I	

Family	Scientific name	Common name	Exotic	NSW status	BioNet	Reptile survey	Bird survey	Mammal surveys
Monarchidae	*Myiagra inquieta*	Restless Flycatcher		P	✓		I	
Locustellidae	*Cincloramphus mathewsi*	Rufous Songlark		P	✓			
Pachycephalidae	*Pachycephala rufiventris*	Rufous Whistler		P	✓		SM, BC, I	
Alcedinidae	*Todiramphus sanctus*	Sacred Kingfisher		P	✓		SM, BC	
Cuculidae	*Chalcites lucidus*	Shining Bronze-Cuckoo		P	✓		SM, BC	
Acanthizidae	*Hylacola cautus*	Shy Heathwren		V,P	✓		SM, BC	
Zosteropidae	*Zosterops lateralis*	Silvereye		P	✓			
Meliphagidae	*Gavicalis virescens*	Singing Honeyeater		P	✓		I	
Podicipedidae	*small grebe sp.*	Small grebe		P	✓			
Petroicidae	*Drymodes brunneopygia*	Southern Scrub-robin		V,P	✓		SM, BC	
Acanthizidae	*Aphelocephala leucopsis*	Southern Whiteface		P	✓		I	
Acanthizidae	*Chthonicola sagittata*	Speckled Warbler		V,P	✓			
Meliphagidae	*Acanthagenys rufogularis*	Spiny-cheeked Honeyeater		P	✓		SM, BC, I	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		P	✓			
Ptilonorhynchidae	*Chlamydera maculata*	Spotted Bowerbird		P	✓			
Accipitridae	*Circus assimilis*	Spotted Harrier		V,P	✓			
Caprimulgidae	*Eurostopodus argus*	Spotted Nightjar		P	✓		SM, BC, I	
Pardalotidae	*Pardalotus punctatus*	Spotted Pardalote		P	✓			
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		P	✓			
Maluridae	*Amytornis striatus striatus*	Mukarrthippi Grasswren		V,P	✓			
Pardalotidae	*Pardalotus striatus*	Striated Pardalote		P	✓		SM, BC	
Meliphagidae	*Plectorhyncha lanceolata*	Striped Honeyeater		P	✓		SM, BC, I	
Phasianidae	*Coturnix pectoralis*	Stubble Quail		P	✓		I	
Psittacidae	*^^Polytelis swainsonii*	Superb Parrot		V,P,3	✓			
Podargidae	*Podargus strigoides*	Tawny Frogmouth		P	✓			
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		P	✓			
Ardeidae	*Ardea/Egretta sp.*	Unidentified Egret		P	✓			
Neosittidae	*Daphoenositta chrysoptera*	Varied Sittella		V,P	✓			
Maluridae	*Malurus lamberti*	Variegated Fairy-wren		P	✓			
Accipitridae	*Aquila audax*	Wedge-tailed Eagle		P	✓		I	
Acanthizidae	*Smicrornis brevirostris*	Weebill		P	✓		SM, BC	
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		P	✓		I	

Family	Scientific name	Common name	Exotic	NSW status	BioNet	Reptile survey	Bird survey	Mammal surveys
Acanthizidae	*Gerygone fusca*	Western Gerygone		P	✓		SM, BC, I	
Laridae	*Chlidonias hybrida*	Whiskered Tern		P	✓			
Accipitridae	*Haliastur sphenurus*	Whistling Kite		P	✓			
Hirundinidae	*Cheramoeca leucosterna*	White-backed Swallow		P	✓			
Artamidae	*Artamus leucoryn*	White-breasted Woodswallow		P	✓			
Pomatostomidae	*Pomatostomus superciliosus*	White-browed Babbler		P	✓			
Artamidae	*Artamus superciliosus*	White-browed Woodswallow		P	✓		I	
Meliphagidae	*Nesoptilotis leucotis*	White-eared Honeyeater		P	✓		SM, BC, I	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		P	✓			
Meliphagidae	*Epthianura albifrons*	White-fronted Chat		V,P	✓			
Meliphagidae	*Purnella albifrons*	White-fronted Honeyeater		P	✓		SM, BC, I	
Ardeidae	*Ardea pacifica*	White-necked Heron		P	✓		I	
Meliphagidae	*Ptilotula penicillata*	White-plumed Honeyeater		P	✓			
Corcoracidae	*Corcorax melanorhamphos*	White-winged Chough		P	✓		SM, BC, I	
Campephagidae	*Lalage sueurii*	White-winged Triller		P	✓		I	
Rhipiduridae	*Rhipidura leucophrys*	Willie Wagtail		P	✓		SM, BC, I	
Acanthizidae	*Acanthiza nana*	Yellow Thornbill		P	✓		SM, BC	
Meliphagidae	*Ptilotula ornata*	Yellow-plumed Honeyeater		P	✓		SM, BC	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		P	✓			
Meliphagidae	*Manorina flavigula*	Yellow-throated Miner		P	✓			
Estrildidae	*Taeniopygia guttata*	Zebra Finch		P	✓		I	
Mammals								
Tachyglossidae	*Tachyglossus aculeatus*	Short-beaked Echidna		P	✓			I, RC
Dasyuridae	*Antechinomys laniger*	Kultarr		E1,P	✓			
Dasyuridae	*Antechinus flavipes*	Yellow-footed Antechinus		P	✓			
Dasyuridae	*Ningaui yvonneae*	Southern Ningaui		V,P	✓			

Family	Scientific name	Common name	Exotic	NSW status	BioNet	Reptile survey	Bird survey	Mammal surveys
Dasyuridae	*Sminthopsis crassicaudata*	Fat-tailed Dunnart		P	✓			
Dasyuridae	*Sminthopsis murina*	Common Dunnart		P	✓			
	Petaurus breviceps	Sugar Glider		P				SM
Phalangeridae	*Trichosurus vulpecula*	Common Brushtail Possum		P	✓			
Macropodidae	*Macropus fuliginosus*	Western Grey Kangaroo		P	✓			RC, I
Macropodidae	*Macropus giganteus*	Eastern Grey Kangaroo		P	✓			I
Macropodidae	*Osphranter robustus*	Common Wallaroo		P	✓			
Macropodidae	*Osphranter rufus*	Red Kangaroo		P	✓			I
Macropodidae	*Petrogale penicillata*	Brush-tailed Rock-wallaby		E1,P	✓			
Emballonuridae	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat		V,P	✓			
Molossidae	*Austronomus australis*	White-striped Freetail-bat		P	✓			
Molossidae	*Ozimops planiceps*	Little Mastiff-bat		P	✓			AB
Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat		P	✓			AB
Vespertilionidae	*Chalinolobus morio*	Chocolate Wattled Bat		P				AB
Vespertilionidae	*Chalinolobus picatus*	Little Pied Bat		V,P	✓			AB
Vespertilionidae	*Nyctophilus corbeni*	Corben's Long-eared Bat		V,P	✓			
Vespertilionidae	*Nyctophilus geoffroyi*	Lesser Long-eared Bat		P	✓			
Vespertilionidae	*Nyctophilus gouldi*	Gould's Long-eared Bat		P	✓			
Vespertilionidae	*Nyctophilus* sp.			P				AB
Vespertilionidae	*Scotorepens greyii*	Little Broad-nosed Bat		P	✓			AB
Vespertilionidae	*Vespadelus baverstocki*	Inland Forest Bat		V	✓			AB
Vespertilionidae	*Vespadelus* sp.	Unidentified Eptesicus		P	✓			
Vespertilionidae	*Vespadelus vulturnus*	Little Forest Bat		P	✓			AB
Muridae	*Mus musculus*	House Mouse	*		✓			
Canidae	*Vulpes vulpes*	Fox	*		✓			
Felidae	*Felis catus*	Cat	*		✓			RC
Leporidae	*Oryctolagus cuniculus*	Rabbit	*		✓			RC, I
Suidae	*Sus scrofa*	Pig	*		✓			I
Bovidae	*Bos taurus*	European cattle	*		✓			
Bovidae	*Capra hircus*	Goat	*		✓			RC, I
Bovidae	*Ovis aries*	Sheep (feral)	*		✓			
Insects								

Family	Scientific name	Common name	Exotic	NSW status	BioNet	Reptile survey	Bird survey	Mammal surveys
Chrysomelidae	*Trachymela* sp.				✓			

SM = songmeter, BC = bird census, RC = remote camera, I = incidental, AB = Anabat detection

Appendix E Hollow bearing tree data

Species	DBH Size Class						No. of Hollows	Location		Comments
	5-10cm	10-20cm	20-30cm	30-50cm	50-80cm	80+cm		Limb	Trunk	
E. intertexta		*					1		*	
E. socialis		*					2	*	*	
E. socialis		*					2		*	Dead trunk
E. intertexta			*				1	*		
E. socialis			*				1	*		
E. intertexta		*					1	*		Very small hollow
E. gracilis		*					1		*	
E. gracilis		*					1		*	Dead trunk
E. gracilis		*					2		*	Dead trunk
E. gracilis		*					1		*	Dead trunk
E. socialis			*				2		**	Dead trunk
E. intertexta				*			1	*		
E. intertexta			*				1		*	
E. intertexta			*				1	*		
E. intertexta			*				2	**		
E. intertexta					*		2	*	*	
E. intertexta				*			1	*		

Species	DBH Size Class						No. of Hollows	Location		Comments
	5-10cm	10-20cm	20-30cm	30-50cm	50-80cm	80+cm		Limb	Trunk	
E. intertexta				*			4	**	**	
E. intertexta				*			2	**		
E. intertexta					*		2	**		
E. intertexta					*		1	*		
E. intertexta				*			4	***	*	
E. socialis	*						1		*	Dead trunk
E. socialis	*						1		*	
E. socialis		*					1		*	
E. intertexta			*				1		*	
E. intertexta			*				1		*	
E. intertexta			*				1		*	
E. intertexta			*				1		*	
E. intertexta			*				1	*		
E. intertexta			*				1	*		
E. intertexta			*				1		*	
E. intertexta		*					1	*		
E. intertexta			*				1	*		Sandplain mallee - several photos
E. intertexta			*				1	*		Sandplain mallee - one photo
E. socialis		*					1	*		Dune heath
E. intertexta			*				1		*	Sandplain mallee - one photo

Species	DBH Size Class						No. of Hollows	Location		Comments
	5-10cm	10-20cm	20-30cm	30-50cm	50-80cm	80+cm		Limb	Trunk	
E. intertexta			*				1		*	Sandplain mallee - 2 x photo
E. intertexta			*				1		*	1 x photo
Stag		*					1		*	1 x photo
E. intertexta			*				2	**		Half dead. 1 x photo
E. intertexta				*			1	*		
E. intertexta					*		4	***	*	
E. intertexta						*	3	***		
E. intertexta					*		1	*		
E. intertexta					*		1	*		
E. intertexta				*			2	**		
E. intertexta				*			2	**		
E. intertexta					*		1	*		
E. intertexta					*		2	**		
E. intertexta				*			4	****		
E. intertexta				*			1		*	
E. intertexta				*			2		*	
E. intertexta					*		5	****	*	
E. intertexta					*		10	**********		
E. intertexta				*			2	*	*	
E. intertexta				*			2	**		

Species	DBH Size Class						No. of Hollows	Location		Comments
	5-10cm	10-20cm	20-30cm	30-50cm	50-80cm	80+cm		Limb	Trunk	
Stag				*			3	**	*	
E. intertexta				*			2	**		
E. intertexta				*			1		*	
E. intertexta			*				1		*	
E. intertexta			*				2	*		
E. intertexta					*		4	****		
E. intertexta				*			2	**		
E. intertexta				*			1		*	
E. intertexta				*			3	***		
E. intertexta				*			1	*		
E. intertexta				*			1	*		
E. intertexta				*			1		*	
E. intertexta					*		1		*	
E. intertexta					*		2	*		
Stag						*	4	****		
E. intertexta					*		Several		*	Lateral spout hollows
E. intertexta					*		Several		*	Lateral spout hollows
E. intertexta					*		1		*	
E. intertexta					*		2	**		
E. intertexta					*		Several	*	*	

Species	DBH Size Class						No. of Hollows	Location		Comments
	5-10cm	10-20cm	20-30cm	30-50cm	50-80cm	80+cm		Limb	Trunk	
E. intertexta					*		2	**		
E. intertexta					*		Several		*	Small hollows and fissures throughout trunk
E. intertexta				*			1	*		
E. intertexta					*		2	**		
E. intertexta				*			2	**		Two small, fissure like hollow in upper branches
E. intertexta				*			Several	*		
E. intertexta					*		1		*	
E. intertexta				*			1		*	Basal hollow
E. intertexta				*			2	**		Two dead central stems with hollows
E. intertexta						*	1	*		
E. intertexta						*	2	*	*	
E. intertexta				*			1		*	Central trunk split
E. intertexta					*		3	***		
Allocasuarina cristata				*	*		1		*	
E. intertexta				*			1	*		
E. intertexta					*		1		*	
E. intertexta					*		Several		*	Several hollows in mid-section
E. intertexta						*	5	*****		

Species	DBH Size Class						No. of Hollows	Location		Comments
	5-10cm	10-20cm	20-30cm	30-50cm	50-80cm	80+cm		Limb	Trunk	
E. intertexta						*	4	****		
E. intertexta				*			4	****		
Eucalyptus spp. *(mallee)*						*	Several	*	*	
Eucalyptus spp. *(mallee)*				*			3	***		
Eucalyptus spp. *(mallee)*						*	Several		*	Dead stump with hollows
Allocasuarina cristata						*	Several		*	Fissures in trunk
E. intertexta					*		2		**	
E. intertexta					*		2	**		
E. intertexta						*	1		*	
Eucalyptus spp. *(mallee)*					*		1		*	Dead snapped trunk with hollow
E. intertexta					*		Several	*		
E. intertexta					*		Several	*		Large split hollows where canopy branches have sheared off.
E. intertexta					*		2	**		
Eucalyptus spp. *(mallee)*			*				3	***		

Species	DBH Size Class						No. of Hollows	Location		Comments
	5-10cm	10-20cm	20-30cm	30-50cm	50-80cm	80+cm		Limb	Trunk	
E. intertexta					*		Several	*		Spout hollows from broken lateral leader
Allocasuarina cristata				*			1		*	
Stag				*			1		*	
E. intertexta				*			Several	*		
E. intertexta						*	5	*****		
Stag					*		1		*	
E. intertexta					*		2	**		
E. intertexta					*		3	***		
E. intertexta					*		Several	*		
E. intertexta					*		Several			Evidence of scratch marks
Eucalyptus spp. *(mallee)*						*	0			Nest
E. intertexta			*				0			Nest
Stag					*		Several	*	*	
E. intertexta						*	3	*	*	
Stag						*	Several	*	*	
E. intertexta						*	2	*	*	
E. intertexta				*			1	*		

Species	DBH Size Class						No. of Hollows	Location		Comments
	5-10cm	10-20cm	20-30cm	30-50cm	50-80cm	80+cm		Limb	Trunk	
E. intertexta						*	4	*	*	Avoid this tree, high retention value, consider fence realignment
E. intertexta					*		2	*	*	
E. intertexta					*		5	*	*	
E. intertexta				*			2	*	*	
E. intertexta				*			Several		*	Bifocated trunk
E. intertexta				*			Several	*		
E. intertexta					*		0			Disused birds nest
Allocasuarina cristata				*			1		*	
Allocasuarina cristata					*		1	*		
E. intertexta					*		Several	*		Knot hollows
Stag						*	1		*	Broken stag
Stag				*			1		*	
Stag				*			1	*		Small knot hole hollow
Allocasuarina cristata				*			1		*	Fissures throughout trunk
Allocasuarina cristata				*			1		*	Fissures throughout trunk. Snapped upper limbs.
E. intertexta						*	0			Raptor nest - unoccupied

Species	DBH Size Class						No. of Hollows	Location		Comments
	5-10cm	10-20cm	20-30cm	30-50cm	50-80cm	80+cm		Limb	Trunk	
E. intertexta						*	Several	*	*	Avoid this tree, high retention value, consider fence realignment
E. intertexta				*			1		*	
Allocasuarina cristata					*		1	*		
Eucalyptus spp. *(mallee)*				*			2	**		
E. intertexta						*	Several		*	Lateral terminal hollows
E. intertexta				*			Several	*	*	
E. intertexta						*	1	*		
E. intertexta						*	1		*	
E. intertexta						*	Several		*	Lateral hollows
Stag					*		1		*	
Stag						*	1		*	
E. intertexta						*	Several	*		
E. intertexta					*		Several		*	
Stag					*		Several	*	*	
E. intertexta						*	Several		*	
E. intertexta						*	Several		*	Multiple lateral hollows. Evidence of scratch marks. Check for fauna usage.

Species	DBH Size Class						No. of Hollows	Location		Comments
	5-10cm	10-20cm	20-30cm	30-50cm	50-80cm	80+cm		Limb	Trunk	
E. intertexta						*	Several		*	
E. intertexta						*	Several	*	*	
E. intertexta					*		Several	*		
E. intertexta						*	Several	*	*	
E. intertexta						*	Several	*	*	
E. intertexta					*		2	*	*	Vertical hollow and spout hollow
E. intertexta				*			Several	*		
E. intertexta				*				*		
E. intertexta				*				*		
E. intertexta					*				*	
E. intertexta			*						*	
Stag			*						*	
Stag			*						*	
E. intertexta			*					*		
Eucalyptus spp. *(mallee)*			*						*	
E. intertexta		*							*	
Stag			*						*	
E. intertexta			*						*	

Species	DBH Size Class						No. of Hollows	Location		Comments
	5-10cm	10-20cm	20-30cm	30-50cm	50-80cm	80+cm		Limb	Trunk	
Eucalyptus spp. *(mallee)*			*						*	
E. socialis			*						*	
E. intertexta					*			*		
E. intertexta					*				*	
E. intertexta						*		*	*	
Stag				*				*	*	
E. intertexta						*		*	*	
E. intertexta						*			*	
E. intertexta						*		*		
E. intertexta						*			*	
E. intertexta					*			*		
E. intertexta					*			*		
E. intertexta						*		*		
E. intertexta				*				*		
E. intertexta					*			*		
E. intertexta					*			*		
E. intertexta						*		*		
E. intertexta					*			*		
E. intertexta						*		*		

Species	DBH Size Class						No. of Hollows	Location		Comments
	5-10cm	10-20cm	20-30cm	30-50cm	50-80cm	80+cm		Limb	Trunk	
Stag				*				*	*	
Stag				*				*		
Stag						*		*		
Stag						*		*		
Stag						*		*	*	
E. intertexta				*				*		
E. intertexta				*				*		
E. intertexta						*		*		
E. intertexta						*		*	*	
E. intertexta						*		*	*	
E. intertexta						*		*		
E. intertexta				*				*		
Stag			*					*		
Stag				*					*	
Stag			*						*	
E. intertexta					*			*		
E. intertexta						*		*		
E. intertexta				*				*	*	
Stag				*				*		
E. intertexta						*		*		

Species	DBH Size Class						No. of Hollows	Location		Comments
	5-10cm	10-20cm	20-30cm	30-50cm	50-80cm	80+cm		Limb	Trunk	
E. intertexta				*				*		
E. intertexta					*			*		
E. intertexta				*				*		
Stag			*					*		
Stag		*							*	
Stag		*							*	
E. intertexta			*					*		
E. intertexta			*					*		
E. intertexta					*			*		
E. intertexta				*				*		
E. intertexta				*					*	
E. intertexta						*		*	*	
E. intertexta					*			*	*	
E. intertexta					*			*		
E. intertexta						*		*		
E. intertexta				*				*	*	
E. intertexta			*						*	
E. populnea						*		*		
E. intertexta						*		*		
E. intertexta					*			*		

Species	DBH Size Class						No. of Hollows	Location		Comments
	5-10cm	10-20cm	20-30cm	30-50cm	50-80cm	80+cm		Limb	Trunk	
E. intertexta						*		*		
Eucalyptus spp. *(mallee)*		*						*		
E. socialis				*				*	*	
Stag/stump			*						*	
Alectryon oleifolius			*						*	
Stump			*						*	
E. socialis		*						*		
E. socialis		*						*		
E. socialis			*					*		
E. socialis		*						*		
E. intertexta					*			*		
E. intertexta						*		*		
Alectryon oleifolius			*					*	*	
Stag				*				*		
E. intertexta						*		*	*	
E. intertexta				*				*		
E. intertexta					*			*		
Stag				*				*	*	

Species	DBH Size Class						No. of Hollows	Location		Comments
	5-10cm	10-20cm	20-30cm	30-50cm	50-80cm	80+cm		Limb	Trunk	
Stag		*						*		
E. socialis		*						*	*	
E. socialis			*					*		
Eucalyptus spp. *(mallee)*			*					*		
Eucalyptus spp. *(mallee)*			*						*	
E. socialis			*					*		
E. socialis		*						*		
E. intertexta			*					*		
E. socialis			*						*	
E. intertexta				*				*		
E. intertexta						*		*		
E. intertexta				*				*		
E. intertexta				*				*		
E. intertexta				*				*		
E. intertexta				*				*		
E. intertexta					*			*		
E. intertexta			*					*		
Geijera parviflora					*			*	*	

Species	DBH Size Class						No. of Hollows	Location		Comments
	5-10cm	10-20cm	20-30cm	30-50cm	50-80cm	80+cm		Limb	Trunk	
Apophyllum anomalum			*					*	*	
Stag				*				*	*	
Stag				*				*	*	
E. intertexta				*				*		
E. intertexta					*			*		
E. intertexta				*				*		
E. intertexta					*			*		
Eucalyptus spp. *(mallee)*			*					*	*	
Eucalyptus spp. *(mallee)*			*					*		
E. socialis			*					*		
E. socialis			*					*	*	
E. socialis			*					*		
Stag				*				*		
Stag/stump				*					*	
Stag			*					*		
E. socialis		*						*		
E. socialis			*					*		
Stag			*					*	*	

Species	DBH Size Class						No. of Hollows	Location		Comments
	5-10cm	10-20cm	20-30cm	30-50cm	50-80cm	80+cm		Limb	Trunk	
Apophyllum anomalum			*					*	*	
Stag			*					*	*	
Stag				*				*	*	
Casuarina cristata						*		*		
E. intertexta						*		*		
Geijera parviflora					*			*		
E. socialis				*				*		
Geijera parviflora				*					*	
Geijera parviflora				*				*		
Geijera parviflora					*			*		
E. intertexta						*			*	
Stag				*				*		
E. intertexta				*		*		*		
Stag				*				*		
Stag			*						*	
Stag				*				*		
Stag				*				*		
Stag				*				*		
Stag		*							*	

Species	DBH Size Class						No. of Hollows	Location		Comments
	5-10cm	10-20cm	20-30cm	30-50cm	50-80cm	80+cm		Limb	Trunk	
Stag			*					*		
Stag		*						*		
Stag					*			*	*	
Stag			*					*		
Stag					*			*	*	
Stag				*				*	*	
Stag				*				*		
E. populnea				*				*		
E. populnea				*				*		
E. populnea					*			*		
Stag					*			*		
E. populnea				*				*		
Stag			*					*		
E. populnea					*			*		
E. populnea				*				*	*	
E. populnea					*			*		
E. populnea					*			*		
E. populnea						*		*	*	
E. populnea					*			*	*	
E. populnea					*			*		

Species	DBH Size Class						No. of Hollows	Location		Comments
	5-10cm	10-20cm	20-30cm	30-50cm	50-80cm	80+cm		Limb	Trunk	
E. populnea					*			*		
E. populnea				*				*		
E. populnea			*					*		
E. populnea			*					*		
E. populnea				*				*		
Stag			*					*		
E. populnea			*					*	*	
Stag			*					*		
E. populnea			*					*		
E. populnea				*				*	*	
E. populnea					*			*		
Stag			*					*		
Stag			*					*		
E. populnea				*				*		
E. populnea				*				*		
E. populnea			*					*		
Stag			*						*	
Stag			*					*		
Stag				*				*		
Stag			*					*		

Species	DBH Size Class						No. of Hollows	Location		Comments
	5-10cm	10-20cm	20-30cm	30-50cm	50-80cm	80+cm		Limb	Trunk	
Stag				*				*		
Stag			*					*		
E. populnea			*					*		
Stag		*						*		
E. populnea			*					*		
E. populnea			*					*		
E. populnea			*					*		
E. populnea				*				*		
E. populnea			*					*		
E. populnea					*			*		
E. populnea				*				*		
E. populnea			*					*		
E. populnea				*				*		
E. populnea						*		*		
E. populnea				*				*		
E. populnea				*				*		
E. populnea				*				*		
Stag			*					*	*	
E. populnea				*				*	*	
E. populnea				*				*		

Species	DBH Size Class						No. of Hollows	Location		Comments
	5-10cm	10-20cm	20-30cm	30-50cm	50-80cm	80+cm		Limb	Trunk	
E. populnea			*					*	*	
E. populnea				*				*		
E. populnea					*			*		
E. populnea				*				*		
E. populnea				*'				*		
Stag		*							*	
E. populnea				*				*	*	
E. populnea				*				*	*	
E. populnea				*				*		
E. populnea					*			*		
E. populnea					*			*		
E. populnea					*			*		
E. populnea					*			*		
E. populnea				*				*		
E. populnea						*		*		
E. populnea				*				*		
Callitris glaucophylla						*			*	
E. intertexta						*		*		
E. intertexta						*		*		

Species	DBH Size Class						No. of Hollows	Location		Comments
	5-10cm	10-20cm	20-30cm	30-50cm	50-80cm	80+cm		Limb	Trunk	
E. populnea						*		*		
Hakea spp.					*				*	
E. intertexta						*			*	
E. populnea						*		*		
E. populnea					*			*	*	
E. populnea				*				*		
E. populnea					*			*		
E. populnea					*			*		
E. populnea					*			*		
E. populnea				*				*		
E. populnea			*					*		
E. populnea			*					*		
E. populnea					*			*		
E. populnea			*					*		
Stag		*						*		
E. populnea				*				*		
E. populnea			*					*	*	
E. populnea				*				*		
E. populnea				*				*		
E. populnea				*				*		

Species	DBH Size Class						No. of Hollows	Location		Comments
	5-10cm	10-20cm	20-30cm	30-50cm	50-80cm	80+cm		Limb	Trunk	
E. populnea			*					*	*	
Stag				*				*		
E. populnea				*				*	*	
E. populnea			*					*		
E. populnea			*					*		
E. populnea		*							*	
E. populnea			*					*	*	
E. populnea			*					*		
E. populnea				*				*		
E. populnea					*			*		
E. populnea						*		*	*	
E. populnea				*				*		
E. populnea					*			*		
E. populnea			*					*		
Stag			*					*		
E. populnea				*				*		
E. populnea					*			*		
E. populnea					*			*		
E. populnea						*		*		
E. populnea					*			*		

Species	DBH Size Class						No. of Hollows	Location		Comments
	5-10cm	10-20cm	20-30cm	30-50cm	50-80cm	80+cm		Limb	Trunk	
E. populnea						*		*		
Callitris glaucophylla						*			*	
E. populnea					*			*		
E. populnea					*			*	*	
Casuarina cristata					*			*	*	
Geijera parviflora				*				*	*	
Casuarina cristata						*		*	*	
Geijera parviflora			*					*		
E. populnea						*		*		
Geijera parviflora						*			*	
Geijera parviflora						*			*	
Geijera parviflora						*		*		
Geijera parviflora				*				*	*	
Stag			*						*	
Geijera parviflora						*		*	*	
Geijera parviflora					*				*	
Geijera parviflora						*			*	
Geijera parviflora					*			*	*	
Casuarina cristata				*				*	*	

Species	DBH Size Class						No. of Hollows	Location		Comments
	5-10cm	10-20cm	20-30cm	30-50cm	50-80cm	80+cm		Limb	Trunk	
Acacia aneura				*				*		
Casuarina cristata						*		*	*	
Casuarina cristata					*			*	*	
Geijera parviflora					*				*	
E. populnea						*		*	*	
E. populnea				*				*		
Stag						*		*	*	
Geijera parviflora				*					*	
Casuarina cristata					*			*	*	
Geijera parviflora					*				*	
Geijera parviflora				*					*	
Casuarina cristata						*			*	
Casuarina cristata						*		*	*	
Casuarina cristata						*			*	
Geijera parviflora			*					*		
Casuarina cristata						*		*	*	
Casuarina cristata						*		*	*	
Geijera parviflora				*				*		
Casuarina cristata						*		*		
Casuarina cristata				*				*	*	

Species	DBH Size Class						No. of Hollows	Location		Comments
	5-10cm	10-20cm	20-30cm	30-50cm	50-80cm	80+cm		Limb	Trunk	
Casuarina cristata				*				*		
Geijera parviflora						*		*		
E. intertexta						*			*	
Casuarina cristata						*		*	*	
Casuarina cristata						*			*	
E. intertexta					*			*		
E. populnea						*		*		
Casuarina cristata				*				*	*	
E. populnea				*				*		
Geijera parviflora			*					*		
E. intertexta						*		*	*	
E. intertexta						*		*		
E. intertexta				*				*		
Stag				*				*		
E. intertexta						*		*		
E. intertexta						*		*		
E. intertexta						*		*		
Stag			*					*	*	
E. intertexta				*				*		
E. intertexta						*		*		

Species	DBH Size Class						No. of Hollows	Location		Comments
	5-10cm	10-20cm	20-30cm	30-50cm	50-80cm	80+cm		Limb	Trunk	
Geijera parviflora					*			*	*	
E. intertexta					*			*	*	
E. intertexta						*			*	
Geijera parviflora					*				*	
Geijera parviflora					*				*	
Casuarina cristata					*			*		
Geijera parviflora				*					*	
Geijera parviflora					*			*	*	
Casuarina cristata					*			*	*	
Casuarina cristata						*		*		
Geijera parviflora				*				*		
Casuarina cristata						*			*	
Casuarina cristata						*			*	
Casuarina cristata						*			*	
Casuarina cristata						*			*	
Casuarina cristata						*			*	
Geijera parviflora					*			*		
Alectryon oleifolius				*					*	
Casuarina cristata						*		*	*	

Species	DBH Size Class						No. of Hollows	Location		Comments
	5-10cm	10-20cm	20-30cm	30-50cm	50-80cm	80+cm		Limb	Trunk	
Casuarina cristata						*			*	
E. intertexta				*				*		
E. intertexta				*				*		
E. intertexta				*				*		
E. intertexta				*				*		
E. intertexta			*						*	
E. intertexta				*				*		
E. intertexta			*					*		
E. intertexta			*					*		
E. intertexta			*					*		
Stag			*						*	
E. intertexta				*				*		
E. intertexta			*					*		
E. intertexta				*				*		
E. intertexta					*			*		
E. intertexta					*				*	
E. intertexta					*			*		
Stag				*					*	
E. intertexta					*			*		
E. intertexta					*			*		

Appendix F Test of significance

The following factors listed under Part 7.3 of the BC Act must be taken into account when deciding whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats. The below assessments have been prepared in accordance with the appropriate guidelines (OEH 2018).

Western Blue-tonged Lizard (Tiliqua occipitalis) – vulnerable species

The Western Blue-tonged Lizard is a terrestrial pale brown skink which typically inhabits plains, swales and ranges consisting of clayey, sandy soils. These zones are typically vegetated by woodlands, shrublands, heaths or hummock grasslands. The Western Blue-tonged Lizard's most preferred habitat has been recorded in areas which are dominated by a mixture of mallee/Triodia vegetation communities. This skink, with a series of broad brown transverse bands on its body and tail, diurnally forages for insects, snails, native vegetation and opportunistically on carrion.

a. *in the case of a threatened species, whether the proposed development or activity 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.*

There are few records of Western Blue-tongued Lizard in the study area. However, both records have been from near the intersection of Green Trail and the Western Fire Trail. It is likely that the proposed fence will create a barrier to the movement of Western Blue-tongued Lizard, however, the fence will not inhibit the lifecycle of the species. Habitat will be retained either side of the fence line, and the removal of feral predators from within the fence is likely to benefit the population within the fenced area. Therefore, the proposal should not place the species at risk of extinction.

b. *in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*
   (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or
   (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction

Not applicable.

c. *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 proposed development or activity,
   (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and
   (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality

Construction of the proposed fence line will remove up to 54.64 ha of Western Blue-tongued Lizard habitat (mallee communities on sandy soils). Within the study area there is approximately 25,000 ha of similar habitat.

The proposal will create a barrier to the dispersal of Western Blue-tongued Lizard in the area. There are only two records of the species in the study area, both of which are located near the intersection of Green Trail and Western Fire Trail. The detection of the species is likely to be biased to the proximity of the two individuals to roads. It is not known how widespread the species might be through the study area. The fence will fragment an area of habitat into two areas.

The central mallee reserves (Yathong, Nombinnie and Round Hill) are the eastern limit of Western Blue-tongued Lizard's range, and the species is limited to mallee habitats. While the fence line will isolate part of the population, the removal of feral predators within fence may benefit the species. A key part of the proposal is to monitor the impact of the program and compare data collected from inside to data collected outside the fence. This will provide greater certainty of the ecological benefits of the program on all flora and fauna.

While there have been few records of the species in the locality, and that the fence may fragment the population into two populations, the fence is not likely to cause the species to become extinct in the locality.

d. whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).

The proposed activity will not have an adverse effect (either directly or indirectly) on any declared area of outstanding biodiversity value.

e. whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

The proposal will contribute to the following key threatening processes:

- Clearing of native vegetation
- Loss of hollow bearing trees
- Removal of dead wood and dead trees

However, the proposal will also reduce and eliminate the impact of five feral animals within the study area:

- Competition and grazing by the feral European Rabbit (*Oryctolagus cuniculus*)
- Competition and habitat degradation by Feral Goats (*Capra hircus*)
- Predation by the European Red Fox (*Vulpes vulpes*)
- Predation by the Feral Cat (*Felis catus*)
- Predation, habitat degradation, competition and disease transmission by Feral Pigs (*Sus scrofa*).

While the removal of mallee is considered a threat to the species, the elimination of other threats (i.e. rabbits, foxes and cats) is likely to benefit the species

Conclusion of test of significance for Western Blue-tongued Lizard

The proposed works are unlikely to have a significant impact on the Western Blue-tongued Lizard. The proposed fence will create a barrier that could fragment a population in two and will result in the removal of mallee habitat, however, the proposal will remove key threats to the species and establish an ongoing monitoring program to determine the longer term effects of the fence on local populations.

Ground dwelling birds

Malleefowl (Leipoa ocellata) – endangered species

The Malleefowl is a ground-dwelling, omnivorous bird which inhabits arid and semi-arid inland areas dominated by mallee *Eucalyptus* spp., but are also present in woodlands and shrublands which are comprised of other native vegetation including *Callitris* and *Acacia* spp. The Malleefowl is one of Australia's few mound-building birds. The mounds are used to incubate their eggs within a narrow temperature range. These mounds are built on sandy substrates with high amounts of nearby leaf litter and can be up to 4 metres in diameter and a metre high. Specific fire regimes are required for sufficient leaf litter to be available which impacts suitable habitat. Despite being predominately ground dwelling, Malleefowl roost in trees come nightfall. As omnivores, Malleefowl eat anything from wattle seeds**,** flower blossoms**,** fruit and lerps, as well as preying on insects such as ants and cockroaches from amongst leaf litter.

Chestnut Quail-Thrush (Cinclosoma castanotum) – vulnerable species

The Chestnut Quail-Thrush occupies arid and semi-arid inland areas of NSW, predominately sticking to the low shrubs and undergrowth of mallee scrub, which has an understorey dominated by spinifex, chenopods or other shrubs including acacias. This species has been observed to occur at high densities in areas that are two to fifteen years post-fire. The Chestnut Quail-thrush is a medium-sized bird (21- 26 centimetres) which is ground-dwelling and distinctively patterned. The nest of the Chestnut Quail-Thrush is a depression in the ground lined with strips of bark, grasses or sticks near the trunk of a mallee tree, or under a low bush / sparse tuft of grass. It generally has a clutch of two eggs. As ground-dwelling birds, they prey among spinifex clumps invertebrates (including grasshoppers, beetles, caterpillars etc.), as well as seeds from both native and introduced species and certain fruits.

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

The program will erect a fence around a 39,230 ha, which includes approximately 25,000 ha of potential habitat for Malleefowl and Chestnut Quail-thrush. Both of these species are secretive, ground dwelling birds that are susceptible to predation by foxes and cats, and the success of Malleefowl nests is affected by disturbance caused by feral goats and pigs. The removal of feral fauna from the enclosed area will increase the potential for these species to complete their lifecycle, increasing the viability of the population within the study area.

b. in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or
(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction

Not applicable.

c. 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 proposed development or activity,
(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and
(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality

Construction of the proposed fence line will remove up to 54.64 ha of Malleefowl and Chestnut Quail-thrush habitat (mallee communities). Within the study area there is approximately 25,000 ha of similar habitat.

The proposal will create a barrier, however, the impact the fence will have at containing Malleefowl and Chestnut Quail-thrush is not likely to be considerable. While the Malleefowl is not a noted flyer, except when startled, the Chestnut Quail-thrush is a more competent flyer. Therefore, the fence is not likely to present an insurmountable barrier to these species to the extent that the study area would fragment a population in two.

Both species show distinct preference for mallee woodlands. The habitat within the central mallee reserves is likely to be locally important for Malleefowl and Chestnut Quail-thrush. While some habitat will be cleared to construct the fence and maintenance trails, it is not likely that the works will fragment or isolate a population in the locality.

A key part of the proposal is to monitor the impact of the program and compare data collected from inside to data collected outside the fence. This will provide greater certainty of the ecological benefits of the program on all flora and fauna.

d. whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).

The proposed activity will not have an adverse effect (either directly or indirectly) on any declared area of outstanding biodiversity value.

e. whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

The proposal will contribute to the following key threatening processes:

- Clearing of native vegetation
- Loss of hollow bearing trees
- Removal of dead wood and dead trees

However, the proposal will also reduce and eliminate the impact of five feral animals within the study area:

- Competition and grazing by the feral European Rabbit (*Oryctolagus cuniculus*)
- Competition and habitat degradation by Feral Goats (*Capra hircus*)
- Predation by the European Red Fox (*Vulpes vulpes*)
- Predation by the Feral Cat (*Felis catus*)
- Predation, habitat degradation, competition and disease transmission by Feral Pigs (*Sus scrofa*).

Conclusion of test of significance for Malleefowl and Chestnut Quail-thrush

The proposed works are unlikely to have a significant impact on the Malleefowl and Chestnut Quail-thrush. The proposed fence will create a barrier preventing many of the feral species that threatening the persistence of these species in the landscape. While the proposal will clear some native vegetation, a much larger area will be improved and likely lead to secure populations in the long-term.

Raptors

Spotted Harrier (Circus assimilis) – vulnerable species

The Spotted Harrier is a medium-sized bird of prey which inhabits a large area of mainland NSW, except for densely forested or wooded habitats of the coast, escarpment and ranges. The Spotted Harrier typically occurs in grassy open woodland comprised of acacia species and remnant mallee species, as well as inland riparian woodland, native grassland and shrub steppe. It also commonly inhabits agricultural land and is frequently observed foraging over open habitats including edges of inland wetlands. Spotted Harriers are stick nest builders (usually high in a tree) and lay their eggs in spring / autumn, with young occupying the nest for several months before fledging. As a carnivorous bird of prey, the Spotted Harrier preys on terrestrial mammals (such as bettongs, rodents etc.), other birds, reptiles, insects, and infrequently carrion.

Little Eagle (Hieraaetus morphnoides) – vulnerable species

The Little Eagle is a medium-sized bird of prey, which inhabits open eucalypt forest, woodland or open woodland. Little Eagles build large stick nests for breeding in mature living trees in open woodland or tree-lined watercourses, rarely nesting in isolated trees (Birdlife 2019). Nests are used repeatedly, in rotation of several years or new ones constructed in winter (Simpson and Day 1993). The Little Eagle is found throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment.

a. *in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.*

The Spotted Harrier and Little Eagle are mobile species that have been recorded in the reserve. The fence is not likely to place a population of these species at risk of extinction. The removal of cats and foxes from the study area may increase the number of prey for these

species, which may benefit their life cycle. One large nest was observed during the survey, but there was no evidence of nesting pairs. The proposed fence and feral predator-free area are not likely to place the Spotted Harrier or Little Eagle at risk of extinction.

b. in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:
- *(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- *(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction*

Not applicable.

c. 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 proposed development or activity,*
- *(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- *(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality*

Construction of the proposed fence line and site facilities will remove up to 137.41 ha of native vegetation. Within the study area there is approximately 39,230 ha of native vegetation.

Both the Spotted Harrier and Little Eagle are highly mobile species. The construction of a fence and site facilities will create a disturbed area and remove native vegetation, however, it will not fragment or isolate populations of these species.

The survey of HBTs identified one large nest. During the survey, there was no evidence that the nest was being used by any species. The area directly impacted by the proposal is not considered to be important for these species, and there is a vast area of similar habitat within the study area and Yathong Nature Reserve more broadly.

d. whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).

The proposed activity will not have an adverse effect (either directly or indirectly) on any declared area of outstanding biodiversity value.

e. whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

The proposal will contribute to the following key threatening processes:

- Clearing of native vegetation
- Loss of hollow bearing trees
- Removal of dead wood and dead trees

However, the proposal will also reduce and eliminate the impact of five feral animals within the study area:

- Competition and grazing by the feral European Rabbit (*Oryctolagus cuniculus*)
- Competition and habitat degradation by Feral Goats (*Capra hircus*)
- Predation by the European Red Fox (*Vulpes vulpes*)
- Predation by the Feral Cat (*Felis catus*)
- Predation, habitat degradation, competition and disease transmission by Feral Pigs (*Sus scrofa*).

Conclusion of test of significance for Spotted Harrier and Little Eagle

The proposed works are unlikely to have a significant impact on Spotted Harrier and Little Eagle. Both species are highly mobile and the construction of a fence line is not likely to remove habitat important in their life cycle, nor fragment or isolate a population in the locality.

Major Mitchell's Cockatoo (Lophochroa leadbeateri) – vulnerable species

The Major Mitchell Cockatoo is found across a wide area of arid and semi-arid inland NSW and usually inhabits dry woodland dominated by eucalyptus and acacia species within close vicinity of water. They require trees that are mature enough to bear large hollows for habitat, and typically lay their eggs on a bed of rotting wood at the base of the hollow. Nesting occurs throughout the latter half of the year. Nesting pairs are usually more than 2 km apart (Saunders and Smith 1982), with no more than one pair every 30 square kilometres. Major Mitchell's Cockatoo has a distinctive salmon-pink underbelly and a large prominent red and gold banded crest. This omnivorous cockatoo feeds predominately on the ground, especially on the seeds of native vegetation such as saltbush, grasses, wattles and cypress pines, but also insect larvae.

a. in the case of a threatened species, whether the proposed development or activity 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.

Major Mitchell's Cockatoo is a mobile species. The proposed fence line and feral predator-free area may remove HBTs that provide suitable nest sites, however, the survey of HBTs did not indicate any breeding behaviour by this species. While there are up to 525 HBTs within the disturbance footprint, there are likely to be thousands of suitable HBTs within the study area and more broadly in Yathong Nature Reserve. Therefore, the proposal is not likely to affect the life-cycle of a viable population of Major Mitchell's Cockatoo and place it at risk of extinction.

b. in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:
(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or
(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction

Not applicable

c. 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 proposed development or activity,

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

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

Construction of the proposed fence line will remove up to 49.59 ha of Major Mitchell's Cockatoo habitat (PCTs 104 and 174). Within the study area there is approximately 11,000 ha of similar habitat.

The Major Mitchell's Cockatoo is a highly mobile species. The construction of a fence will create a disturbed area and remove native vegetation, however, it will not fragment or isolate populations of these species.

The survey of HBTs identified one large nest. During the survey, there was no evidence that the nest was being used by any species. The area directly impacted by the proposal is not considered to be important for these species, and there is a vast area of similar habitat within the study area and Yathong Nature Reserve more broadly.

d. whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).

The proposed activity will not have an adverse effect (either directly or indirectly) on any declared area of outstanding biodiversity value.

e. whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

The proposal will contribute to the following key threatening processes:

- Clearing of native vegetation
- Loss of hollow bearing trees
- Removal of dead wood and dead trees

However, the proposal will also reduce and eliminate the impact of five feral animals within the study area:

- Competition and grazing by the feral European Rabbit (*Oryctolagus cuniculus*)
- Competition and habitat degradation by Feral Goats (*Capra hircus*)
- Predation by the European Red Fox (*Vulpes vulpes*)
- Predation by the Feral Cat (*Felis catus*)
- Predation, habitat degradation, competition and disease transmission by Feral Pigs (*Sus scrofa*).

Conclusion of test of significance for Major Mitchell's Cockatoo

The proposed works are unlikely to have a significant impact on Major Mitchell's Cockatoo. The species is highly mobile and the construction of a fence line is not likely to remove habitat important in its life cycle, nor fragment or isolate a population in the locality.

Passerines

Mukarrthippi Grasswren (Amytornis striatus striatus) – proposed critically endangered species

Striated Grasswren (*Amytornis striatus*) is listed as a vulnerable species in NSW. A recent taxonomic revision of Striated Grasswren has distinguished seven subspecies, one of which is the Mukarrthippi Grasswren. A preliminary determination to list Mukarrthippi Grasswren as critically endangered and omit reference to the Striated Grasswren as vulnerable has been made by the NSW Threatened Species Scientific Committee.

The Mukarrthippi Grasswren is found in mallee woodland and dunes typically occupied by large clumps of well-developed Porcupine Grass (*Triodia irritans)* where it scurries quickly around on the ground and lower branches. Occupying inland NSW, populations remain extant in Yathong Nature Reserve and possibly on areas of leasehold land to the north, however, it is only known to occur with certainty on a single 30 ha sandhill on the western side of Yathong Nature Reserve. The Mukarrthippi Grasswren is similar in appearance to other closely related grasswrens. It is a long-tailed bird with rusty-brown upperparts, white throat and buff-coloured underparts. The Mukarrthippi Grasswren may reoccupy habitat within three years of fire, but prefers habitat that has not been burnt for 5-15 years, though preferring areas with large hummocks of spinifex which is most established 25 to 40 years post-fire. The species lives in pairs or, on occasion, groups of three. The Mukarrthippi Grasswren feeds on seeds, insects and spiders. Breeding has been recorded between August and January and they build a nest on the ground.

Shy Heathwren (Hylacola cautus) – vulnerable species

Shy Heathwren generally inhabit mallee woodlands that support a relatively dense understorey of shrub and heath vegetation. The central NSW population has also been recorded as occurring in rocky hilltop vegetation zones with thick shrub layers, such as those including Broombush *(Melaleuca uncinata)* or Tea-tree *(Leptospermum)*. Occurring in all age classes of vegetation, though more typically occupying areas that are one to five years into post-fire recovery when the resprouting eucalypts provide denser vegetation cover. Contrarily, they have also been observed to occupy long unburnt areas (>40 years) which have had time to develop a well-defined shrub layer. The Shy Heathwren is 11.5-14 cm in size, with warm brown top plumage and heavily streaked underparts. Breeding season is late winter to early summer, where eggs are laid in a dome-shaped nest on the ground. Typically occurring singly or in pairs, Shy Heathwren prey predominately on insects (grasshoppers, beetles, moths etc.) as well as on spiders and insect larvae.

Gilberts Whistler (Pachycephala inornata) – vulnerable species

The Gilbert's Whistler is lightly distributed over much of the arid and semi-arid areas of the central NSW mallee. Though the Gilbert's Whistler occurs in a range of habitats, the prevailing feature appears to be the presence of a dense, continuous or patchy shrub layer. It is widely recorded in mallee shrublands, but also occurs in box-ironbark woodlands, Cypress Pine and River Red Gum forests. The Gilbert's Whistler is a stocky (around 17 to 20 cm) and possesses a short, robust bill. Nests are typically built below about two and a half metres but can be up to six metres in some cases above the ground in the fork of dense foliage of plants such as

wattles or cypress pines. Breeding has been recorded to take place between August and November. The diet of the Gilbert Whistler consists mainly of spiders and insects (caterpillars, beetles, ants etc.) and on occasion seeds and fruits are also eaten.

Red-lored Whistler (Pachycephala rufogularis) – critically endangered species

The Red-lored Whistler (19–22 cm in length) has been recorded occurring in mallee dominated woodland with a shrub layer, usually of Broombush *(Melaleuca uncinata)* and native pines such as Mallee Pine (*Callitris verrucosa*), with understory patches of spinifex and emergent mallee. It is known to occupy vegetation with a post fire age of between 4-40 years but is most commonly seen in areas with a post fire age of 21-40 years. The Red-Lored Whistler nest is cup-shaped, built predominately from coarse bark and mallee leaves, which are located within low shrub vegetation. It preys predominately on invertebrates (airborne and ground-dwelling, including caterpillars, weevils, grasshoppers etc.), and some berries, seeds and insect larvae.

Southern Scrub-robin (Drymodes brunneopygia) – vulnerable species

The Southern Scrub-robin is a ground-dwelling thrush-like bird that generally inhabits mallee and acacia communities, particularly those with dense sub-shrubs in the understorey, including Broombush *(Melaleuca uncinata)* and other dry shrubs and is dependent on a well-established shrub layer. The Southern Scrub-robin is a medium-sized (19 - 22 centimetres) is greyish above and paler grey underbelly, with faint wingbars and long tail, often flicked upward. It also has a very subtle dark mark through the eye and cheek. It typically constructs a shallow cup-shaped nest of twigs, bark and grass, and is located on the ground, usually concealed in the shelter of a tree, shrub or fallen branch. This species usually has a clutch of only one egg. The Southern Scrub-robin has been recorded foraging around the base of mallee trees and on the ground beneath shrubs for ground- and litter-dwelling invertebrates, typically preying on certain ant species that dominate here.

a. *in the case of a threatened species, whether the proposed development or activity 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.*

These five passerines occur in mallee woodlands within the study area. For many of them, shrubs in the midstorey (e.g. *Melaleuca uncinata*) is also an important component of their habitat. The proposal will remove 54.64 ha of mallee woodland, however, 25,000 ha will be retained in the study area.

Majority of records for these species occur either side of the Western Fire Trail, and Shy Heathwren and South Scrub-robin were detected at the western end of this fire trail during the survey.

The proposal will remove feral predators that may prey on these species. The removal of feral predators from the study area should provide an overall benefit to the species and increase their likely survival and breeding success.

While the proposal will remove native vegetation, given the extent of habitat in Yathong Nature Reserve, mobility of these species and the limited impact area, the proposal is not likely to place these species at risk of extinction.

b. in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

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

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

Not applicable.

c. 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 proposed development or activity,

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

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

Construction of the proposed fence line will remove up to 55.82 ha of mallee woodland. Within the study area there is approximately 25,000 ha of similar habitat.

The habitat of Striated Grasswren, Shy Heathwren, Gilbert's Whistler, Red-lored Whistler and Southern Scrub-robin will not be fragmented or isolated once a fence is constructed. While the proposal will remove some habitat for these species, they are sufficiently mobile that the proposed fence will not create an insurmountable barrier.

Mallee woodlands is the preferred habitat for the five passerines. Therefore, these woodlands are important for their long-term survival in the locality. The proposal will remove up to 54.64 ha of mallee woodland, however, much of this impact will be along an existing edge adjacent to a road. It is not likely that the edges of mallee woodland have a higher importance than elsewhere in the woodland.

d. whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).

The proposed activity will not have an adverse effect (either directly or indirectly) on any declared area of outstanding biodiversity value.

e. whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

The proposal will contribute to the following key threatening processes:

- Clearing of native vegetation
- Loss of hollow bearing trees
- Removal of dead wood and dead trees

However, the proposal will also reduce and/or eliminate the impact of five feral animals within the study area:

- Competition and grazing by the feral European Rabbit (*Oryctolagus cuniculus*)

- Competition and habitat degradation by Feral Goats (*Capra hircus*)
- Predation by the European Red Fox (*Vulpes vulpes*)
- Predation by the Feral Cat (*Felis catus*)
- Predation, habitat degradation, competition and disease transmission by Feral Pigs (*Sus scrofa*).

Conclusion of test of significance for Striated Grasswren, Shy Heathwren, Gilbert's Whistler, Red-lored Whistler and Southern Scrub-robin

The proposed works are unlikely to have a significant impact on of Striated Grasswren, Shy Heathwren, Gilbert's Whistler, Red-lored Whistler and Southern Scrub-robin. The proposal will remove some habitat but will result in the removal of feral predators that should benefit the species. Further, the impact will be located on the edge of a patch along fire trails and the habitat for each species will not be fragmented or isolated by the works.

Grey-crowned Babbler (Pomatostomus temporalis) (eastern subspecies) – vulnerable species

The eastern subspecies of the Grey-crowned Babbler occurs on the western slopes of the Great Dividing Range, and partially on the western plains. The Grey-crowned Babbler typically inhabits open Box-Gum Woodlands on sloping topography, and Box-Cypress-pine and open Box Woodlands on alluvial plains, preferring rough-barked trees and trees with peeling bark. The largest of the four Australian babblers, the Grey-crowned Babbler can reach between 23-29 cm long, with a distinctive bill which is scimitar-shaped, long and heavy. Living in family groups consisting of a breeding pair and young from previous breeding seasons, they maintain their nest (usually located in shrubs or sapling eucalypts) year-round, with old nests commonly being dismantled to construct new ones. Breeding occurs between July and February with eggs being incubated by the female. Grey-crowned Babblers are insectivores, feeding on invertebrates on the trunks and branches of woodland trees, on the ground, and by digging and probing amongst tussock grasses.

a. in the case of a threatened species, whether the proposed development or activity 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.

Grey-crowned Babbler was observed in several locations during the survey. The species was often associated with Gum Coolabah woodlands, but was also recorded in or near mallee woodlands. Given that the species was widespread and mobile, and that the resources needed to complete its life cycle are distributed through the study area, the proposal is not likely to place the species at risk of extinction.

b. in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:
   (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or
   (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction

Not applicable.

c. 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 proposed development or activity,*
- *(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- *(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality*

Construction of the proposed fence line and site facilities will remove up to 137.41 ha of native vegetation, much of which is habitat for Grey-crowned Babbler. Within the study area there is approximately 39,230 ha of potential habitat.

The proposal will create a fence around the study area and site facilities, however, given the mobility of Grey-crowned Babbler, the fence will not create a barrier to the movement and dispersal of the species in the area. Therefore, the proposal will not fragment or isolate habitat for Grey-crowned Babbler.

The study area is likely to be potential habitat for Grey-crowned Babbler. This species was recorded in the dominant vegetation types present within the study area. Therefore, the removal of vegetation to construct a fence is not likely to be important habitat for the species.

d. whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).

The proposed activity will not have an adverse effect (either directly or indirectly) on any declared area of outstanding biodiversity value.

e. whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

The proposal will contribute to the following key threatening processes:

- Clearing of native vegetation
- Loss of hollow bearing trees
- Removal of dead wood and dead trees

However, the proposal will also reduce and eliminate the impact of five feral animals within the study area:

- Competition and grazing by the feral European Rabbit (*Oryctolagus cuniculus*)
- Competition and habitat degradation by Feral Goats (*Capra hircus*)
- Predation by the European Red Fox (*Vulpes vulpes*)
- Predation by the Feral Cat (*Felis catus*)
- Predation, habitat degradation, competition and disease transmission by Feral Pigs (*Sus scrofa*).

Conclusion of test of significance for Grey-crowned Babbler

The proposal will not have a significant impact on Grey-crowned Babbler. Suitable habitat for the species is spread throughout the study area, and the removal of up to 137.41 ha of habitat to construct the fence should not place the species at risk of extinction.

Dusky Woodswallow (Artamus cyanopterus cyanopterus) – vulnerable species

The Dusky Woodswallow occupies a variety of habitats, including open forest, woodlands and disturbed lands, such as roadsides and golf courses. Dusky Woodswallow nests colonially in 'neighbourhoods', although are nomadic and migrate north during autumn (specifically the eastern population). The main source of food for Dusky Woodswallow is insects, which are taken on the wing, from foliage and on the ground, however, they also consume small amount of nectar from eucalyptus species.

a. in the case of a threatened species, whether the proposed development or activity 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.

Dusky Woodswallow was not observed during the survey, however, potential habitat for the species is widespread in the study area. Being a nomadic species, it is not likely that the species relies heavily on the resources in the study area. Considering that the species is mobile, and that the resources needed to complete its life cycle are distributed beyond the study area, the proposal is not likely to place the species at risk of extinction.

b. in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:
- *(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- *(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction*

Not applicable.

c. 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 proposed development or activity,*
- *(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- *(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality*

Construction of the proposed fence line and site facilities will remove up to 137.41 ha of native vegetation, much of which is habitat for Dusky Woodswallow. Within the study area there is approximately 39,230 ha of potential habitat.

The proposal will create a fence around the study area and site facilities, however, given the mobility of Dusky Woodswallow, the fence will not create a barrier to the movement and dispersal of the species in the area. Therefore, the proposal will not fragment or isolate habitat for Dusky Woodswallow.

The study area is likely to be potential habitat for Dusky Woodswallow. This species is nomadic and will reside in the area periodically. Therefore, the removal of vegetation to construct a fence is not likely to be important habitat for the species.

d. whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).

The proposed activity will not have an adverse effect (either directly or indirectly) on any declared area of outstanding biodiversity value.

e. whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

The proposal will contribute to the following key threatening processes:

- Clearing of native vegetation
- Loss of hollow bearing trees
- Removal of dead wood and dead trees

However, the proposal will also reduce and eliminate the impact of five feral animals within the study area:

- Competition and grazing by the feral European Rabbit (*Oryctolagus cuniculus*)
- Competition and habitat degradation by Feral Goats (*Capra hircus*)
- Predation by the European Red Fox (*Vulpes vulpes*)
- Predation by the Feral Cat (*Felis catus*)
- Predation, habitat degradation, competition and disease transmission by Feral Pigs (*Sus scrofa*).

Conclusion of test of significance for Dusky Woodswallow

The proposal is not likely to significantly impact Dusky Woodswallow. It is a nomadic and wide ranging species whose range extends over Yathong Nature Reserve. The loss of 137.41 ha of native vegetation and the construction of a fence and site facilities will not fragment or isolate the species, nor is it likely to result in the extinction of the species.

Mammals

Kultarr (Antechinomys laniger) – endangered species

The Kultarr is a small, nocturnal marsupial that is brown/sandy coloured with a white belly, with very distinctive large ears and protruding eyes. The Kultarr is widespread across arid and semi-arid zones of inland NSW, however, in very low numbers. Populations appear to fluctuate seasonally in response to environmental stresses, with a decline in numbers following periods of drought and intensive flooding. As a terrestrial insectivore, it inhabits open country, especially claypans among acacia woodlands. The Kultarr shelters by day in hollow logs or tree-stumps, beneath saltbush *(Atriplex)* and spinifex tussocks, in deep cracks in the soil and in the burrows of other animals, before hunting invertebrates (cockroaches, spiders and crickets etc.) at night.

a. in the case of a threatened species, whether the proposed development or activity 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.

Kultarr are a small Dasyurid that inhabit woodlands in the semi-arid to arid zone. There are few records of the species in Yathong Nature Reserve, and while the species was not recorded in the survey, it was recently recorded in 2021 north of the proposed fence in the cat project area (T. Leary, pers. comm.).

Kultarr are prone to predation by foxes and cats, therefore, the construction of a fence to exclude these predators is likely to benefit the species in the study area. The reintroduction of native burrowing species may also provide additional shelter sites for Kultarrs. The proposal will remove up to 137.41 ha of native vegetation, some of which is habitat for the species. However, the proposal is not likely to adversely affect the life cycle of the species placing it at risk of extinction.

b. in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:
- *(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- *(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction*

Not applicable.

c. 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 proposed development or activity,*
- *(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- *(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality*

Construction of the proposed fence line and site facilities will remove up to 137.41 ha of native vegetation. Within the study area there is approximately 25,000 ha of mallee woodland and 11,000 ha of open woodland.

The proposal will create a barrier to the dispersal of Kultarr in the area. There is potential that a population in the area may be fragmented into two or more sub-populations; one inside the fence and the other outside the fence. Fence construction will prevent this species from passing through the fence, thereby fragmenting the population. Currently, all records of the species are outside the proposed fenced area.

Consolidated patches of semi-arid and arid woodlands are likely to be important for Kultarr. The proposal will remove up to 137.41 ha of native vegetation within an area of approximately 39,230 ha. It is not likely that the area to be cleared is important to Kultarr given the extent of native vegetation within the study area and adjoining areas.

While there have been few records of the species in the locality, and that the fence may fragment the population into two populations, the fence is not likely to cause the species to become extinct in the locality.

d. whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).

The proposed activity will not have an adverse effect (either directly or indirectly) on any declared area of outstanding biodiversity value.

e. whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

The proposal will contribute to the following key threatening processes:

- Clearing of native vegetation
- Loss of hollow bearing trees
- Removal of dead wood and dead trees

However, the proposal will also reduce and eliminate the impact of five feral animals within the study area:

- Competition and grazing by the feral European Rabbit (*Oryctolagus cuniculus*)
- Competition and habitat degradation by Feral Goats (*Capra hircus*)
- Predation by the European Red Fox (*Vulpes vulpes*)
- Predation by the Feral Cat (*Felis catus*)
- Predation, habitat degradation, competition and disease transmission by Feral Pigs (*Sus scrofa*).

Conclusion of test of significance for Kultarr

The proposal is not likely to significantly affect Kultarr. The study area and surround contains large areas of suitable habitat such that the removal of up to 137.41 ha of habitat is not likely to cause the species to decline. The vegetation to be removed is primarily located on the margins of roads that is often subject to higher frequency fire which limits the amount of habitat for the species. The removal of feral predators within the study area is likely to remove a significant threat to the species, which is likely to benefit the species long-term survival.

Hollow roosting microbats

Yellow-bellied Sheathtail-bat (Saccolaimus flaviventris) – vulnerable species

The Yellow-bellied Sheathtail-bat is a wide ranging species that is found across northern and eastern Australia. They forage for insects across a range of habitats, including land with and without trees. It roosts in tree hollows and buildings, and in treeless areas are known to use mammal burrows. The Yellow-bellied Sheathtail-bat is quite distinctive and grow up to 87 mm long. It has long, narrow wings a jet-black, glossy back and a yellow belly that extends to the shoulders and a small portion of the ear.

Little Pied Bat (Chalinolobus picatus) – vulnerable species

The Little Pied Bat is a distinctive black and white bat with two white stripes that run on the sides of the body and form a 'V' at the pubic region. Has a total length of around 8 to 10 cm. It occurs predominately in open woodland, dry open forest, chenopod shrubland, cypress pine forest, mallee and Bimble Box woodlands. Roosting in caves, rock outcrops, tunnels, tree hollows and buildings, the Little Pied Bat can tolerate high temperatures and dryness but still needs access to a nearby open water source. Generally solitary roosters, with females giving birth to one or two young in October and November. The Little Pied Bat feeds on moths and possibly other flying invertebrates.

Inland Forest Bat (Vespadelus baverstocki) – vulnerable species

The Inland Forest Bat is an insectivorous bat which has generally been known to occur in areas with an annual rainfall of less than 400 millimetres. It is generally sandy-brown above, with a paler underbody. The Inland Forest Bat roosts in tree hollows and in very small hollows of stunted trees only a few metres high. Though the habitat requirements of this species are poorly known, it has been recorded in a variety of woodland formations, including mallee, Mulga *(Acacia aneura)* and River Red Gum *(Eucalyptus camaldulensis)*. Most records of the species derive from drier woodland habitats with riparian areas as a water source for the bat. Colony size ranges from a few individuals to more than sixty. The Inland Forest Bat flies rapidly, covering an extensive foraging area and are presumed to feed on flying insects.

Corben's Long-eared Bat (Nyctophilus corbeni) – vulnerable species

The Corben's Long-eared Bat is uniformly dark grey-brown with ears that are about 3 cm long and larger than the head, and a total head and body length of around 5-7 cm. It has a low ridge of skin running between the eyes and across the nose. The Corben's Long-eared Bat has been recorded inhabiting a variety of vegetation types, including mallee, *Allocasuarina luehmannii* (Buloke) and box dominated communities, but it is distinctly more common in box/ironbark/cypress-pine vegetation. It is known to roost in tree hollows, crevices, and under loose bark. Mating takes place in autumn with one or two young born in late spring to early summer. The Corben's Long-eared Bat typically hunts non-flying prey such as caterpillars and beetles.

a. in the case of a threatened species, whether the proposed development or activity 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.

Yellow-bellied Sheathtail Bat, Little Pied Bat, Inland Forest Bat and Corben's Long-eared Bat are species that use HBTs as roosts and maternity sites, although the Little Pied Bat also used caves and tunnels. Only Little Pied Bat and Inland Forest Bat were detected during the survey.

The proposal will remove up to 137.41 ha of suitable foraging habitat and 525 HBTs. There is potential that one of the HBTs is a maternity or roost site for one or more of these species. However, if the number of HBTs is evenly distributed, there is potentially 162,000 HBTs in the study area, of which the proposal will remove 0.3%.

Recommendations in the report include pre-clearing protocols and requirements to avoid clearing during the breeding season of important fauna. Careful clearing and management of tree hollows will be important to avoid unnecessary injury or death to microbats.

Given the likely abundance of hollows in the study area, which is important in the life cycle of each species, the proposal is not likely to place these species at risk of extinction.

b. in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:
(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or
(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction

Not applicable.

c. 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 proposed development or activity,
(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and
(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality

Construction of the proposed fence line and site facilities will remove up to 137.41 ha of native vegetation, which includes up to 525 HBTs. Within the study area there is approximately 39,230 ha of native vegetation and thousands of HBTs

The proposal will not fragment or isolate habitat for Yellow-bellied Sheathtail Bat, Little Pied Bat, Inland Forest Bat and Corben's Long-eared Bat. These species are highly mobile and their movements will not be inhibited by the proposed fence.

A relatively small area of potential habitat will be removed for Yellow-bellied Sheathtail Bat, Little Pied Bat, Inland Forest Bat and Corben's Long-eared Bat, which includes up to 525 HBTs. While the recommendations include micro-siting the fence lines to retain HBTs, the importance of individual trees is not currently known. However, given that there are likely to be thousands of HBTs in the study area, and more in other parts of Yathong Nature Reserve, the species are not likely to have a high dependence on HBTs in the subject site.

d. whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).

The proposed activity will not have an adverse effect (either directly or indirectly) on any declared area of outstanding biodiversity value.

e. whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

The proposal will contribute to the following key threatening processes:

- Clearing of native vegetation

- Loss of hollow bearing trees
- Removal of dead wood and dead trees

However, the proposal will also reduce and eliminate the impact of five feral animals within the study area:

- Competition and grazing by the feral European Rabbit (*Oryctolagus cuniculus*)
- Competition and habitat degradation by Feral Goats (*Capra hircus*)
- Predation by the European Red Fox (*Vulpes vulpes*)
- Predation by the Feral Cat (*Felis catus*)
- Predation, habitat degradation, competition and disease transmission by Feral Pigs (*Sus scrofa*).

Conclusion of test of significance for Yellow-bellied Sheathtail Bat, Little Pied Bat, Inland Forest Bat and Corben's Long-eared Bat

The proposal is not likely to have a significantly effect Yellow-bellied Sheathtail Bat, Little Pied Bat, Inland Forest Bat and Corben's Long-eared Bat. While these species are known to use HBTs, the study area is likely to contain thousands on HBTs such that the removal of up to 525 HBTs represents just 0.3% of HBTs in the study area. In addition, recommendations in the report include pre-clearing protocols which will reduce the potential for microbats to be injured or killed when clearing naïve vegetation.

Appendix G Significant impact criteria

The EPBC Act Matters of National Environmental Significance (MNES) (EPBC Act Significant Impact Guidelines) (DotE 2013) provides 'Significant Impact Criteria' that are to be used to assist in determining whether a proposed action is likely to have a significant impact on a MNES and subsequently the need for referral. MNES identified within the study area have been addressed below.

Malleefowl (Leipoa ocellata) – vulnerable species

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

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

The proposal will remove up to 54.64 ha of mallee woodland to construct a fence for the program. The program includes the removal of feral predators which are a key threat to Malleefowl from within the fenced area. Therefore, while the proposal will clear habitat, which is acknowledged as a threat to the species (Benshemesh 2007), the removal of known predators should result in greater breeding success and lead to an overall positive benefit. On this basis, the proposal should not lead to a long-term decrease in the population.

- reduce the area of occupancy of an important population

The proposal will clear up to 54.64 ha of mallee woodland, most of which is located along the edge of roads. Within the study area will be approximately 25,000 ha of mallee woodland, which is suitable habitat for Malleefowl.

- fragment an existing important population into two or more populations

The fence line has the potential to constrain movements of Malleefowl. Malleefowl are not noted flyers, and are more likely to take flight when startled; however, it is understood that Malleefowl (adults at least) are capable of flying over conservation fences. The conservation fence may create a barrier that restricts, but does not necessarily preclude, movement of individuals between the fenced area and surrounding habitat, potentially dividing the population in two with some birds remaining within the fence and other birds outside the fence.

- adversely affect habitat critical to the survival of a species

The study area has not been declared critical habitat for the species. However, the species is restricted to mallee woodlands and the central mallee reserves are a large, consolidated area that includes mallee woodland. The proposal will remove 137.41 ha of native vegetation, which is a small area compared to the area of mallee woodland retained within the study area (i.e. 25,000 ha).

- disrupt the breeding cycle of an important population

The proposal is likely to benefit the breeding cycle and success of the species by removing key threats (i.e. feral predators) from within the study area. Foxes and cats will predate on

Malleefowl chicks, and pigs and goats are known to disturb Malleefowl nests. It is anticipated that Malleefowl within the fenced area will be more likely to complete their life cycle.

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

The proposal will remove up to 54.64 ha of mallee woodland, however, it is not likely that this will cause the species to decline.

- result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species habitat

The proposal will remove feral predators from the fenced area. Many of these species are considered a threat to Malleefowl, either because they predate on them or they disturb Malleefowl nests. Therefore, the proposal will not result in invasive species becoming established in Malleefowl habitat.

- introduce disease that may cause the species to decline, or

The proposal will construct a fence around a 39,230 ha area that includes Malleefowl habitat. It is not likely that the proposal will introduce a disease that may cause the species to decline.

- interfere substantially with the recovery of the species.

The proposal will not interfere with the recovery of the species. Rather the proposal is likely to be an opportunity to benefit the species.

Conclusion of EPBC Act Significant Impact Guidelines (DoE 2013) for Malleefowl.

A referral is not recommended for Malleefowl. While the proposal has the potential to isolate a population of Malleefowl, within the fenced area feral animals that threaten the species will be removed which should increase the likelihood that they will be a viable and productive population. The proposal will also remove up to 54.64 ha of mallee woodland. However, the study area will retain 25,000 ha of mallee woodland for the species.

Red-lored Whistler (Pachycephala rufogularis) – vulnerable species

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

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

The proposal will remove up to 54.64 ha of mallee woodland to construct a fence for the program. The Red-lored Whistler is a mobile species and the fence will not inhibit the species and lead to a long-term decrease in the population.

- reduce the area of occupancy of an important population

The proposal will clear up to 54.64 ha of mallee woodland, most of which is located along the edge of roads. Within the study area will be approximately 25,000 ha of mallee woodland, which is suitable habitat for Red-lored Whistler.

- fragment an existing important population into two or more populations

The fence line is not likely to fragment a population of Red-lored Whistler. Red-lored Whistler are a mobile species and will be able to move freely across the fence line.

- adversely affect habitat critical to the survival of a species

The study area has not been declared critical habitat for the species. However, the species is restricted to mallee woodlands and the central mallee reserves are a large, consolidated area that includes mallee woodland. The proposal will remove 54.64 ha of mallee woodland, which is a small area compared to the area of mallee woodland retained within the study area (i.e. 25,000 ha).

- disrupt the breeding cycle of an important population

The proposal is not likely to disrupt the breeding cycle of Red-lored Whistler. Within the fence, feral animals will be removed, which will eliminate some threats to the breeding success of the species.

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

The proposal will remove up to 54.64 ha of mallee woodland, however, it is not likely that this will cause the species to decline.

- result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species habitat

The proposal will remove feral species from the fenced area. Many of these species are considered a threat to Red-lored Whistler because they predate on them (i.e. cats and foxes) or they degrade habitat (i.e. goats). Therefore, the proposal will not result in invasive species becoming establish in Red-lored Whistler habitat.

- introduce disease that may cause the species to decline, or

The proposal will construct a fence around a 39,230 ha area that includes Red-lored Whistler habitat. It is not likely that the proposal will introduce a disease that may cause the species to decline.

- interfere substantially with the recovery of the species.

The proposal will not interfere with the recovery of the species. Rather the proposal is likely to be an opportunity to benefit the species.

Conclusion of EPBC Act Significant Impact Guidelines (DoE 2013) for Red-lored Whistler.

A referral is not recommended for Red-lored Whistler, as

- the proposal will affect a relatively small area of habitat primarily located along the edge of roads,
- the species is mobile and the fence will not fragment the population

- feral animals that pose a threat to the species will be removed from within the fenced area.

Mallee Bird Community of the Murray Darling Depression Bioregion

The Mallee Bird Community of the Murray Darling Depression Bioregion is an assemblage of birds that are dependant on mallee vegetation that occurs in the Bioregion. The Mallee Bird Community is composed of 20 bird species that includes eight mallee specialist species and 12 mallee dependant species, some of which are listed individually as threatened species. The loss of habitat for mallee specialists could leas to local or regional scale extinctions, which the loss of mallee habitat for mallee dependant species could lead to substantial declines.

The mallee specialist species are:

- Black-eared Miner (*Manorina melanotis*)
- Chestnut Quail-thrush (*Conclosoma castanotum*)
- Mallee Emu-wren (*Stipiturus mallee*)
- Malleefowl (*Leipoa ocellata*)
- Red-lored Whistler (*Pachycephala rufogularis*)
- Scarlet-chested Parrot (*Neophema splendida*)
- Striated Grasswren (*Amytonis striatus*)(note now Mukarrthippi Grasswren [*A. striatus striatus*])
- Mallee Western Whipbird (*Psophodes nigrogularis*)

The mallee dependant species are:

- Crested Bellbird (*Oreoica gutturalis*)
- Grey-fronted Honeyeater (*Ptilotula plumula*)
- Jacky Winter (*Microeca fascinans*)
- Purple-gaped Honeyeater (*Lichenostomus cratitius*)
- Regent Parrot (*Polytelis anthopeplus*)
- Shy Heathwren (*Calamanthus cautus*)
- Southern Scrub-robin *(Drymodes brunneopygia*)
- Splendid Fairy-wren (*Malurus splendens*)
- Spotted Pardalote (*Pardalotus punctatus*)
- White-eared Honeyeater (*Nesoptilotis leucotis*)
- White-fronted Honeyeater (*Purnella albifrons*)
- Yellow-plumed Honeyeater (*Ptilotula ornata*)

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

- reduce the extent of an ecological community

The proposal will clear up to 54.64 ha of mallee woodland, most of which is located along the edge of roads. Within the study area will be approximately 25,000 ha of mallee woodland, which is suitable habitat for the Mallee Bird Community.

- fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines

The proposal is located along existing roads within the reserve, with the exception of small areas where new gaps will be created. While the roads along which the fence will be created already fragment mallee woodland, the width of some gaps will be wider than they current are to allow for the ongoing management of the fence.

- adversely affect habitat critical to the survival of an ecological community

Critical habitat has not been identified for the Mallee Bird Community. However, critical habitat for the Black-eared Miner has been registered under the EPBC Act. None of this habitat will be affected by the program. While not formally recognised, long unburnt patches of mallee are considered important for many mallee species. Mallee woodland adjacent to roads in Yathong are subject to periodic hazard reduction burning. Therefore, these areas in hazard reduction burning takes place to protect the majority of habitat in the reserve are likely to be less important for the Mallee Bird Community

- modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community; survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns.

The proposed fence will cross drainage lines on site. Mechanisms will be put in place to allow water to flow through fenced areas to avoid the potential for the fences to create a barrier to free flow. Therefore, the proposal is not likely to destroy abiotic factors.

- 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

Field survey identified nine of the 20 species characteristic of the Mallee Bird Community. The program is not likely to negatively affect the community, but should increase the abundance of species threatened by the feral predators and herbivores that will be removed as part of the program. The program will be monitored closely to detect change over time, and will apply adaptive management principles to deliver a positive outcome, including to the Mallee Bird Community.

- cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but limited to:
    - assisting invasive species, that are harmful to the listed ecological community, to become established, or
    - 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, or

The program is intended to improve the quality and integrity of vegetation and ecological communities present. It will do this by removing feral predators and herbivores from the area that are harmful and considered a key threat to the Mallee Bird Community, amongst others.

Vegetation management of the area may require weed management, but the objective of weed control will be to improve the condition of the native vegetation on site. It is not likely that herbicide application will have a detrimental effect on the ecological community.

- interfere with the recovery of an ecological community.

A recovery has not yet been prepared for the Mallee Bird Community.

Conclusion of EPBC Act Significant Impact Guidelines (DoE 2013) for the Mallee Bird Community.

A referral is not recommended for Mallee Bird Community, as

- the proposal will affect a relatively small area of habitat for the ecological community primarily located along the edge of roads some of which has been burnt as a hazard reduction measure,
- habitat is currently fragmented,
- the program should not reduce the composition of the Mallee Bird Community,
- the program will remove threats to birds that are characteristic of the Mallee Bird Community.

Appendix H Fauna survey results

Birds – call census surveys (note full list of birds recorded during the surveys)

Threatened species are highlighted in green.

Common name	Scientific name	YNR061	New1	CWPT6745	YNR079	YNR011	YNR048	New3	New2	YNR038	YNR074	Yathong1	YNR054	YNR055	New4	New5	YNR040
Apostlebird	*Struthidea cinerea*		✓					✓	X			X			✓	X	✓
Australian Magpie	*Gymnorhina tibicen*	X	X					✓	✓						✓		X
Australian Owlet Nightjar	*Aegotheles cristatus*																
Australian Pipit	*Anthus novaeseelandiae*																
Australian Raven	*Corvus coronoides*	X				X						X					
Australian Ringneck	*Barnardius zonarius*		✓				X	✓	X		X			X	X	X	✓
Banded Lapwing	*Vanellus tricolor*																
Barn Owl	*Tyto alba*																
Black Honeyeater	*Sugomel nigrum*									✓			X				X
Black-eared Cuckoo	*Chrysococcyx osculans*																
Black-faced Cuckoo Shrike	*Coracina novaehollandiae*					✓											
Black-shouldered Kite	*Elanus axillaris*																
Blue Bonnet	*Northiella haematogaster*		✓														✓
Brown Falcon	*Falco berigora*																
Brown Goshawk	*Accipiter fasciatus*																

Common name	Scientific name	YNR061	New1	CWPT6745	YNR079	YNR011	YNR048	New3	New2	YNR038	YNR074	Yathong1	YNR054	YNR055	New4	New5	YNR040
Brown Songlark	*Cincloramphus cruralis*											✓					
Budgerigar	*Melopsittacus undulatus*		X	X			X	✓	X		✓	✓			✓	✓	X
Chestnut Quail-thrush	*Cinclosoma castanotum*		✓	✓									✓				
Chestnut-rumped Thornbill	*Acanthiza uropygialis*					✓	✓		✓				✓	X	✓		
Cockatiel	*Nymphicus hollandicus*		✓	X					X		✓	✓			✓		
Common Bronzewing	*Phaps chalcoptera*														✓	✓	X
Crested Bellbird	*Oreoica gutturalis*	X		X	X					✓	X						X
Crested Pigeon	*Ocyphaps lophotes*		✓						✓			✓				✓	
Crimson Chat	*Epthianura tricolor*														X		
Emu	*Dromaius novaehollandiae*									✓	✓						
European Blackbird	*Turdus merula*																
Fairy Martin	*Petrochelidon ariel*																
Galah	*Eolophus roseicapilla*		✓			X							✓		✓	X	
Gilbert's Whistler	***Pachycephala inornata***																
Grey Butcherbird	*Cracticus torquatus*	X	✓	X	X	X	X	X	X		X	X		X	X	X	X
Grey-crowned Babbler	***Pomatostomus temporalis temporalis***		X			X		X				X			X	X	
Grey Fantail	*Rhipidura albiscapa*																
Grey Shrike-thrush	*Colluricincla harmonica*				X				X	✓	X						

Common name	Scientific name	YNR061	New1	CWPT6745	YNR079	YNR011	YNR048	New3	New2	YNR038	YNR074	Yathong1	YNR054	YNR055	New4	New5	YNR040
Grey-fronted Honeyeater	*Ptilotula plumula*																
Horsefields Bronze-Cuckoo	*Chrysococcyx basalis*																
Inland Thornbill	*Acanthiza apicalis*													✓		✓	
Little Button Quail	*Turnix velox*																
Little Raven	*Corvus mellori*		X												X		ü
Magpie-lark	*Grallina cyanoleuca*					X						X				X	
Major Mitchell's Cockatoo	***Lophochroa leadbeateri***																
Malleefowl	***Leipoa ocellata***																
Mistletoe bird	*Dicaeum hirundinaceum*														✓		
Mulga Parrot	*Psephotus varius*																
Nankeen Kestrel	*Falco cenchroides*																
Noisy Miner	*Manorina melanocephala*	✓	✓			X		✓	✓			✓			✓	✓	✓
Orange Chat	*Epthianura aurifrons*																
Painted Button Quail	*Turnix varius*																
Pallid Cuckoo	*Cacomantis pallidus*																
Peaceful Dove	*Geopelia placida*																
Pied Butcherbird	*Cracticus nigrogularis*																
Pied Honeyeater	***Certhionyx variegatus***																
Red-backed Kingfisher	*Todiramphus pyrrhopygius*																

Common name	Scientific name	YNR061	New1	CWPT6745	YNR079	YNR011	YNR048	New3	New2	YNR038	YNR074	Yathong1	YNR054	YNR055	New4	New5	YNR040
Red-capped Robin	*Petroica goodenovii*																
Red-rumped Parrot	*Psephotus haematonotus*		✓									✓					
Restless Flycatcher	*Myiagra inquieta*																
Rufous Songlark	*Megalurus mathewsi*								X			✓	X				X
Rufous Whistler	*Pachycephala rufiventris*			X			X		X		X						X
Sacred Kingfisher	*Todiramphus sanctus*																
Shining Bronze-cuckoo	*Chalcites lucidus*										✓						X
Shy Heathwren	***Hylacola cauta***																
Singing Honeyeater	*Lichenostomus virescens*																
Southern Scrub Robin	***Sericornis frontalis***																
Southern Whiteface	*Aphelocephala leucopsis*																
Spiny-cheeked Honeyeater	*Acanthagenys rufogularis*	X		X	X	X	✓		✓	✓	X		X	X	✓	✓	
Spotted Nightjar	*Eurostopodus argus*																
Striated Pardalote	*Pardalotus striatus*															✓	
Striped Honeyeater	*Plectorhyncha lanceolata*								X								
Stubble Quail	*Coturnix pectoralis*																
Variegated Fairy-wren	*Malurus lamberti*				✓												
Wedge-tailed Eagle	*Aquila audax*																

Common name	Scientific name	YNR061	New1	CWPT6745	YNR079	YNR011	YNR048	New3	New2	YNR038	YNR074	Yathong1	YNR054	YNR055	New4	New5	YNR040
Weebill	*Smicrornis brevirostris*																
Welcome Swallow	*Hirundo neoxena*																
Western Gerygone	*Gerygone fusca*																
White-breasted Woodswallow	*Artamus leucorynchus*				✓												✓
White-browed Babbler	*Pomatostomus superciliosus*																
White-browed Woodswallow	*Artamus superciliosus*				✓				✓								
White-eared Honeyeater	*Nesoptilotis leucotis*									✓	X						
White-fronted Honeyeater	*Purnella albifrons*				X						✓						
White-necked Heron	*Ardea pacifica*																
White-winged Chough	*Corcorax melanorhamphos*																
White-winged Triller	*Lalage tricolor*								X			✓				X	
Willie Wagtail	*Rhipidura leucophrys*															✓	
Yellow Thornbill	*Acanthiza nana*								✓								
Yellow-plumed Honeyeater	*Lichenostomus ornatus*																
Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*								✓								
Zebra Finch	*Taeniopygia guttata*																

✓ = species recorded in the 2 ha search area. X = species recorded outside the 2 ha search area.

Birds – songmeters and incidental observations

Threatened species are highlighted in green.

Common name	Scientific name	Incidental	New3	CWPT6732	YNR038	New5	YNR074	YNR080	New1	YNR061
Apostlebird	*Struthidea cinerea*	✓	✓	✓		✓			✓	✓
Australian Magpie	*Gymnorhina tibicen*	✓	✓	✓	✓		✓	✓		✓
Australian Owlet Nightjar	*Aegotheles cristatus*		✓	✓				✓	✓	✓
Australian Pipit	*Anthus novaeseelandiae*	✓								
Australian Raven	*Corvus coronoides*								✓	
Australian Ringneck	*Barnardius zonarius*	✓	✓	✓	✓	✓	✓	✓	✓	
Banded Lapwing	*Vanellus tricolor*	✓								
Barn Owl	*Tyto alba*	✓				✓				
Black Honeyeater	*Sugomel nigrum*	✓		✓	✓		✓	✓		
Black-eared Cuckoo	*Chrysococcyx osculans*						✓			
Black-faced Cuckoo Shrike	*Coracina novaehollandiae*	✓		✓	✓	✓		✓	✓	
Black-shouldered Kite	*Elanus axillaris*	✓								
Blue Bonnet	*Northiella haematogaster*	✓	✓			✓			✓	
Brown Falcon	*Falco berigora*	✓								
Brown Goshawk	*Accipiter fasciatus*	✓								
Brown Songlark	*Cincloramphus cruralis*	✓								
Budgerigar	*Melopsittacus undulatus*	✓	✓	✓	✓	✓		✓	✓	✓
Chestnut Quail-thrush	***Cinclosoma castanotum***			✓						
Chestnut-rumped Thornbill	*Acanthiza uropygialis*	✓		✓		✓				✓
Cockatiel	*Nymphicus hollandicus*	✓	✓							
Common Bronzewing	*Phaps chalcoptera*	✓	✓			✓				

Common name	Scientific name	Incidental	New3	CWPT6732	YNR038	New5	YNR074	YNR080	New1	YNR061
Crested Bellbird	*Oreoica gutturalis*	✓		✓	✓	✓	✓	✓	✓	✓
Crested Pigeon	*Ocyphaps lophotes*	✓				✓			✓	✓
Crimson Chat	*Epthianura tricolor*	✓								
Emu	*Dromaius novaehollandiae*	✓								
European Blackbird	*Turdus merula*	✓								
Fairy Martin	*Petrochelidon ariel*	✓								
Galah	*Eolophus roseicapilla*	✓	✓			✓			✓	✓
Gilbert's Whistler	***Pachycephala inornata***	✓								
Grey Butcherbird	*Cracticus torquatus*	✓	✓	✓	✓	✓	✓	✓	✓	✓
Grey-crowned Babbler	***Pomatostomus temporalis temporalis***	✓	✓	✓	✓	✓		✓	✓	✓
Grey Fantail	*Rhipidura albiscapa*							✓		
Grey Shrike-thrush	*Colluricincla harmonica*	✓		✓	✓	✓	✓	✓	✓	✓
Grey-fronted Honeyeater	*Ptilotula plumula*	✓								
Horsefields Bronze-Cuckoo	*Chrysococcyx basalis*			✓						
Inland Thornbill	*Acanthiza apicalis*	✓								✓
Little Button Quail	*Turnix velox*	✓								
Little Raven	*Corvus mellori*	✓	✓		✓	✓	✓		✓	✓
Magpie-lark	*Grallina cyanoleuca*	✓	✓			✓			✓	
Major Mitchell's Cockatoo	***Lophochroa leadbeateri***	✓			✓	✓				
Malleefowl	***Leipoa ocellata***	✓								
Mistletoe bird	*Dicaeum hirundinaceum*					?				✓
Mulga Parrot	*Psephotus varius*	✓								
Nankeen Kestrel	*Falco cenchroides*	✓								
Noisy Miner	*Manorina melanocephala*	✓	✓	✓	✓	✓		✓	✓	✓

Common name	Scientific name	Incidental	New3	CWPT6732	YNR038	New5	YNR074	YNR080	New1	YNR061
Orange Chat	*Epthianura aurifrons*	✓								
Painted Button Quail	*Turnix varius*	✓								
Pallid Cuckoo	*Cacomantis pallidus*	✓						✓	✓	
Peaceful Dove	*Geopelia placida*	✓								
Pied Butcherbird	*Cracticus nigrogularis*	✓								
Pied Honeyeater	***Certhionyx variegatus***	✓					✓			
Red-backed Kingfisher	*Todiramphus pyrrhopygius*	✓								
Red-capped Robin	*Petroica goodenovii*	✓		✓	✓	✓		✓		✓
Red-rumped Parrot	*Psephotus haematonotus*	✓							✓	
Restless Flycatcher	*Myiagra inquieta*	✓								
Rufous Songlark	*Megalurus mathewsi*	✓								
Rufous Whistler	*Pachycephala rufiventris*	✓	✓	✓	✓		✓	✓	✓	✓
Sacred Kingfisher	*Todiramphus sanctus*		✓							
Shining Bronze-cuckoo	*Chalcites lucidus*									
Shy Heathwren	***Hylacola cauta***						✓			
Singing Honeyeater	*Lichenostomus virescens*	✓								
Southern Scrub Robin	***Sericornis frontalis***						✓			
Southern Whiteface	*Aphelocephala leucopsis*	✓								
Spiny-cheeked Honeyeater	*Acanthagenys rufogularis*	✓	✓	✓	✓	✓	✓	✓	✓	✓
Spotted Nightjar	*Eurostopodus argus*	✓	✓	✓	✓		✓	✓	✓	
Striated Pardalote	*Pardalotus striatus*			✓		✓				
Striped Honeyeater	*Plectorhyncha lanceolata*	✓								✓
Stubble Quail	*Coturnix pectoralis*	✓								
Variegated Fairy-wren	*Malurus lamberti*									

Common name	Scientific name	Incidental	New3	CWPT6732	YNR038	New5	YNR074	YNR080	New1	YNR061
Wedge-tailed Eagle	*Aquila audax*	✓								
Weebill	*Smicrornis brevirostris*			✓						
Welcome Swallow	*Hirundo neoxena*	✓								
Western Gerygone	*Gerygone fusca*	✓								✓
White-breasted Woodswallow	*Artamus leucorynchus*	✓		?	?	?	?	?	?	
White-browed Babbler	*Pomatostomus superciliosus*	✓								
White-browed Woodswallow	*Artamus superciliosus*	✓		?	?	?	?	?	?	
White-eared Honeyeater	*Nesoptilotis leucotis*	✓		✓	✓		✓			
White-fronted Honeyeater	*Pumella albifrons*	✓					✓			
White-necked Heron	*Ardea pacifica*	✓								
White-winged Chough	*Corcorax melanorhamphos*	✓		✓	✓					✓
White-winged Triller	*Lalage tricolor*	✓								
Willie Wagtail	*Rhipidura leucophrys*	✓						✓		✓
Yellow Thornbill	*Acanthiza nana*								✓	✓
Yellow-plumed Honeyeater	*Lichenostomus ornatus*							✓		
Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*									
Zebra Finch	*Taeniopygia guttata*	✓								

✓ = recorded, ? = possible identification

Reptiles

Threatened species are highlighted in green.

Family	Scientific name	Common name	Incidental	Reptile survey
Gekkonidae	*Gehyra lazeli*			R16
Agamidae	*Ctenophorus fordi*	Mallee Military Dragon		R18, R20
	Ctenophorus nuchalis	Central Netted Dragon	✓	Ü
	Ctenophorus pictus	Painted Dragon	✓	R13
	Diporiphora nobbi	Nobbi Dragon		R13
	Pogona barbata	Eastern Beard Dragon	✓	R3
	Pogona vitticeps	Inland Bearded Dragon	✓	R10, R14
Scincidae	*Cryptoblepharus australis*	Inland Small-eyed Skink		R27
	Cryptoblepharus pannosus			R1, R2, R3, R4, R27
	Ctenotus atlas	Southern Mallee Ctenotus		R16
	Ctenotus regius	Pale-rumped Ctenotus	✓	R13, R22, R23, R26
	Ctenotus robustus	Robust Ctenotus		R2
	Ctenotus schomburgkii	Barred-wedgesnout Ctenotus		R21
	Egernia striolata	Tree Skink		R1
	Lerista timida			R2, R4, R9, R27
	Liopholis inornata	Desert Skink		R2
	Morethia boulengeri	South-eastern Morethia Skink		R3, R7
	Tiliqua occipitalis	**Western Blue-tongued Lizard**	✓	
	Tiliqua rugosa rugosa	Shingleback Lizard	✓	
Varanidae	*Varanus varius*	Lace Monitor	✓	ü
Elapidae	*Pseudechis australis*	Mulga Snake	✓	
	Pseudonaja aspidorhyncha	Western Brown Snake	✓	

Mammals – total species list

Common name	Scientific name	Incidental	Remote Camera	Songmeter	Anabat
Goat	*Capra hircus*	✓	✓	✓	
Gould's Wattled Bat	*Chalinolobus gouldii*				✓
Chocolate Wattled Bat	*Chalinolobus morio*				✓
Little Pied Bat	***Chalinolobus picatus***				✓
Feral Cat	*Felis catus*		✓		
Rabbit	*Oryctolagus cuniculus*	✓	✓		
Western Grey Kangaroo	*Macropus fuliginosus*	✓	✓		
Eastern Grey Kangaroo	*Macropus giganteus*	✓			
Red Kangaroo	*Macropus rufus*	✓			
Long-eared Bat	*Nyctophilus* sp.				✓
South-eastern Freetail Bat	*Ozimops planiceps*				✓
Sugar Glider	*Petaurus breviceps*			✓?	
Little Broad-nosed Bat	*Scotorepens greyii*				✓
Pig	*Sus scrofa*	✓			
Echidna	*Tachyglossus aculeatus*	✓	✓		
White-striped Mastiff bat	*Tadarida australis*			✓	
Inland Forest Bat	***Vespadelus baverstocki***				✓

Remote camera survey results

Camera Serial Number	Site	Species detected
4620	YNR011	
4650	R2	Western Grey Kangaroo (*Macropus fuliginosus*)
4830	NEW5	Emu (*Dromaius novaehollandiae*)
4833	NEW4	Emu (*Dromaius novaehollandiae*)
		Western Grey Kangaroo (*Macropus fuliginosus*)
4628	R1	Nil

Camera Serial Number	Site	Species detected
4968	CAMERA 25	Short Beaked Echidna (*Tachyglossus aculeatus*)
		Willy Wagtail (*Rhipidura leucophrys*)
3835	CAMERA 26	Feral Goat (*Capra aegagrus hircus*)
5059	CAMERA 27	Nil
4938	CAMERA 28	Feral Goat (*Capra aegagrus hircus*)
4574	CAMERA 29	Nil
4544	CAMERA 30	Short Beaked Echidna (*Tachyglossus aculeatus*)
5049	YNR048	Nil
4958	R7	Nil
3827	R8	Western Grey Kangaroo (*Macropus fuliginosus*)
4838	NEW3	Feral Cat (*Felis catus*)
2794	R10	Emu (*Dromaius novaehollandiae*)
		Western Grey Kangaroo (*Macropus fuliginosus*)
3118	CAMERA 001	Nil
4832	CAMERA 002	Nil
4819	CAMERA 003	Short Beaked Echidna (*Tachyglossus aculeatus*)
4829	CAMERA 004	Nil
4828	CAMERA 005	Nil
3836	CAMERA 006	Emu (*Dromaius novaehollandiae*)
		Western Grey Kangaroo (*Macropus fuliginosus*)
4956	CAMERA 007	Nil
4890	CAMERA 008	Nil
3829	CAMERA 009	Nil
3389	CAMERA 010	Short Beaked Echidna (*Tachyglossus aculeatus*)
		Feral Rabbit/European Rabbit (*Oryctolagus cuniculus*)
2791	CAMERA 011	Western Grey Kangaroo (*Macropus fuliginosus*)
		Feral Rabbit/European Rabbit (*Oryctolagus cuniculus*)
2826	CAMERA 012	Eastern Grey Kangaroo (*Macropus fuliginosus*)

Camera Serial Number	Site	Species detected
4836	R15	Grey-crowned babbler (*Pomatostomus temporalis*)
3387	R16	Apostlebird (*Struthidea cinerea*)
		Bell's form Lace Monitor (*Varanus varius*)
4634	CAMERA 013	Western Grey Kangaroo (*Macropus fuliginosus*)
5054	CAMERA 014	Nil
4834	CAMERA 015	Nil
2793	CAMERA 016	Nil
4648	CAMERA 017	Nil
4476	CAMERA 018	Nil
3838	CAMERA 019	Nil
5051	CAMERA 020	Nil
4821	CAMERA 021	Nil
5048	CAMERA 022	Nil
3845	CAMERA 023	Nil
3843	CAMERA 024	Feral Goat (*Capra aegagrus hircus*)
		Western Grey Kangaroo (*Macropus fuliginosus*)
4393	YRNRO55	Emu (*Dromaius novaehollandiae*)
4831	CWPT6732	Feral Goat (*Capra aegagrus hircus*)
4822	CWPT6746	Feral Goat (*Capra aegagrus hircus*)
		Eastern Grey Kangaroo (*Macropus fuliginosus*)
5022	HBT	Nil
4647	YNR061	White-winged Chough (*Corcorax melanorhamphos*)
4827	NEW2	Lace Monitor (*Varanus varius*)
4632	YNR038	Nil
5052		Western Grey Kangaroo (*Macropus fuliginosus*)
		Feral Goat (*Capra aegagrus hircus*)

AREA Landscape Design Consultants Pty Ltd ABN: 56 646 194 176

- ✓ Commercial external landscape designs for built or natural environments
- ✓ Vegetation Management Plans
- ✓ Stakeholder and community engagement
- ✓ Peer review / project briefs / budgeting assistance

AREA Environmental Consultants & Communication Pty Ltd. Trading as
'AREA Environmental & Heritage Consultants' ABN: 29 616 529 867

- ✓ Environmental impact assessments and approvals : REFs, MW REFs, PEAs
- ✓ Ecology, Aboriginal and historic heritage assessments
- ✓ Biodiversity assessment method (BAM) assessments (BDAR) and offsetting (BSAR)
- ✓ Plans of Management
- ✓ Aboriginal community engagement
- ✓ Stakeholder and community engagement
- ✓ Peer review / project briefs / budgeting assistance / expert witness

Denyell Clark
Senior Project Officer, Central West Area
NSW National Parks and Wildlife Service
74 River Street,
Dubbo NSW 2830

RE: Results of Yathong field assistance along Cobar/Yathong Road- Yathong Feral-Predator-Free Area.

Please find attached a short report on the field assistance provided by AREA to NPWS and associated Plant Community Type Mapping and data collected for hollow bearing trees along the Yathong/Cobar Road.

This report provides an overview of the results of the inspection of a proposed fence line alignment along Yathong/Cobar Road by Dave Sturman of AREA Environmental & Heritage Consultants in March 2022. This report aims to outline the results of Plant Community Type Mapping and hollow bearing tree mapping along with the methods used.

If NPWS require any additional information, please do not hesitate to contact us.

Regards,

Dave Sturman

Manager Landscape Design
Ecologist-Biodiversity
NSW Biodiversity Assessment Method (BAAS #22015)
B.Env.Sci, CERT III Horticulture- Landscape Construction
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AREA acknowledges Traditional Owners of the country on which we work

Yathong Feral-Predator-Free Area

Field Survey report

Yathong Nature Reserve, NSW

Cobar LGA

May 2022

AREA
ENVIRONMENTAL & HERITAGE CONSULTANTS

Contents

1 Scope

NSW National Parks and Wildlife Service (NPWS - the proponent) proposes to construct a feral predator free area in Yathong Nature Reserve, NSW. AREA Environmental & Heritage Consultants (AREA) was commissioned to:

- Assist with undertaking a survey and on-ground marking of the western extent of Cobar Road Reserve and the South-west Management Trail led by NPWS
- Verify on-ground vegetation communities against mapped communities –
  Note: Previous on-site vegetation map data were not available at the time of writing this report.
- Provide on-ground support and on the job training of one of NPWS ecologist in vegetation rapid assessment techniques and plant identification used to verify vegetation communities
- Provide a short-written report and map indicating if any additional threatened species are likely to occur within the proposed 15 metre corridor, and completion of entries for all records into BioNet
- Provide a short-written report and map showing the extent of hollow bearing trees to be impacted within the cleared 15 metre corridor

2 Background

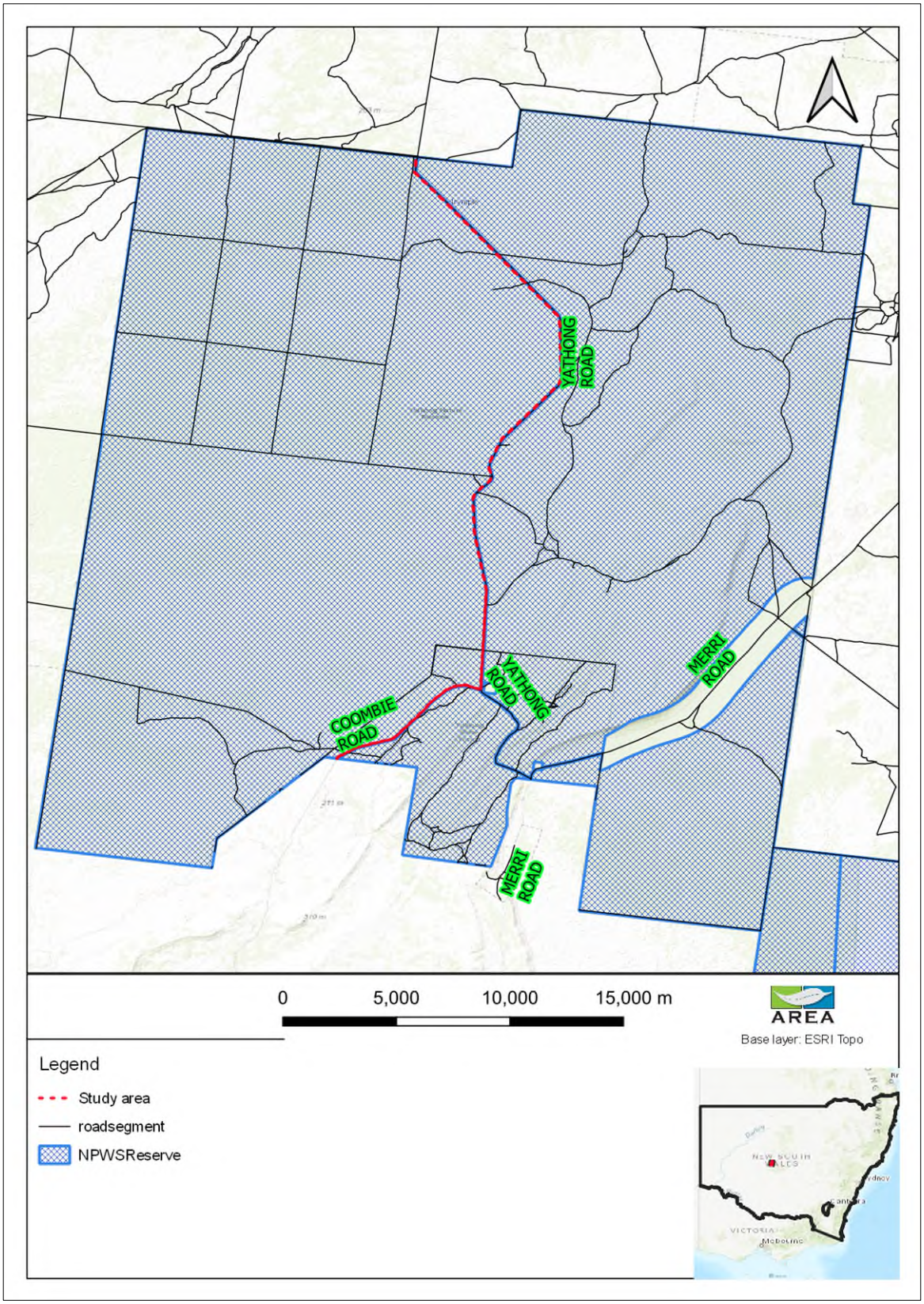
As provided by NPWS in the Request for Quotation provided to AREA the background for this project is as follows.

On 18 December 2020, the former Minister for Energy and Environment, the Hon Matt Kean MP announced a plan to establish four new feral predator-free areas across NSW, including a 40,000 hectare site in Yathong Nature Reserve in central western NSW. The program will enable the reintroduction of locally extinct species, improved protection of extant species, and restoration of ecosystem health and functioning of selected reserves (National Parks and Wildlife Service, 2022).

3 Study area

The study area for this project is the alignment of the proposed conservation fencing along the Yathong/Cobar Road. The alignment runs parallel to the road for approximately 40 kilometres and will be positioned at least 30 metres to the west of the midline of this road (Figure 3-1) (National Parks and Wildlife Service, 2022). The corridor assessed was 20 metres wide as advised by NPWS staff working on the alignment with AREA.

Figure 3-1: Overview of study area



4 Field assessment

Fieldwork was carried out by Dave Sturman of AREA Environmental & Heritage Consultants, concurrently with NPWS staff Project Officer Ecologist Katie Oxenham, and Spatial Analyst John Druhan from 22 March to 25 March 2022. Responsibilities of field staff is found in Table ***4-1***.

Table 4-1: Personnel

Name	Position	Responsibilities
Dave Sturman	AREA Environmental & Heritage Consultants	• Verification of on-ground vegetation communities against mapped communities • On- ground support and on the job training of one of NPWS ecologist in vegetation rapid assessment techniques and plant identification used to verify vegetation communities • Opportunistic threatened species surveys • Report Writing • Cartography
Katie Oxenham	NPWS	• Hollow marking • Opportunistic threatened species surveys.
John Druhan	NPWS	• Undertaking a survey and on-ground marking of the western extent of Cobar Road Reserve and the South-west Management Trail using differential GPS.

4.1 Vegetation assessment

Vegetation assessments were conducted by AREA ecologist Dave Sturman. The methods used to verify vegetation communities were a combination of:

- Vegetation class (and PCT) mapping using methods modified from the NSW Biodiversity Conservation Trust (BCT)- Funded Conservation Agreement Site Assessment Standard Operating Procedure (NSW Biodiversity Conservation Trust, 2020).
- Rapid assessment techniques as prescribed by NPWS.

Vegetation Class and PCT Mapping

Methods used for vegetation class and PCT mapping were a modified form taken from the NSW BCT Site Assessment Standard Operating Procedures (NSW Biodiversity Conservation Trust, 2020). This method was used to rapidly allocate the study area into zones based on the Vegetation Class as described in Ocean Shores to Desert Dunes (Keith, 2004). The process for this technique is as follows

1. Traverse the study area and map changes in vegetation class (zones) by visual assessment. This was done via vehicle given the proximity of Yathong Road to the study area.
2. Zones were allocated vegetation classes based on landform and species assemblage with a particular focus on dominant upper stratum species. Vegetation class mapping was conducted for the whole of the study area.
3. Once rapid vegetation class mapping was complete, each zone was inspected for key indicator species for allocation of Plant community type.
4. Rapid vegetation assessment data was used to inform the decision-making process.

This process was followed as Vegetation Class mapping can be done more rapidly than PCT mapping. Once class mapping is complete, PCT allocation to zones can be done more accurately and quickly.

Where PCTs were not known or immediately obvious the following process was used to classify them:

1. Access BioNet Vegetation classification (Export to CSV to work off the spreadsheet)
2. Filter by IBRA region and IBRA subregion.
3. Filter by dominant upper stratum species
4. Filter by dominant mid stratum species
5. Check dominant ground stratum species for consistency with plot data
6. Check vegetation description is consistent with data captured,
7. Check VIS mapping for evidence of potential PCTs mapped in the region of the study area.
8. Consult with other resources, Local mapping, local data, and any available state data.

Rapid Vegetation Assessment

Rapid vegetation plots were conducted using the methods prescribed by NPWS. A total of 20 rapid plots were completed using the template in Table 4-2. Data collected from these plots was used to aid in the allocation of Plant Community Types. The location the rapid plots is show in Figure 4-1. Completed rapid assessment plots sheets are found in Appendix B.

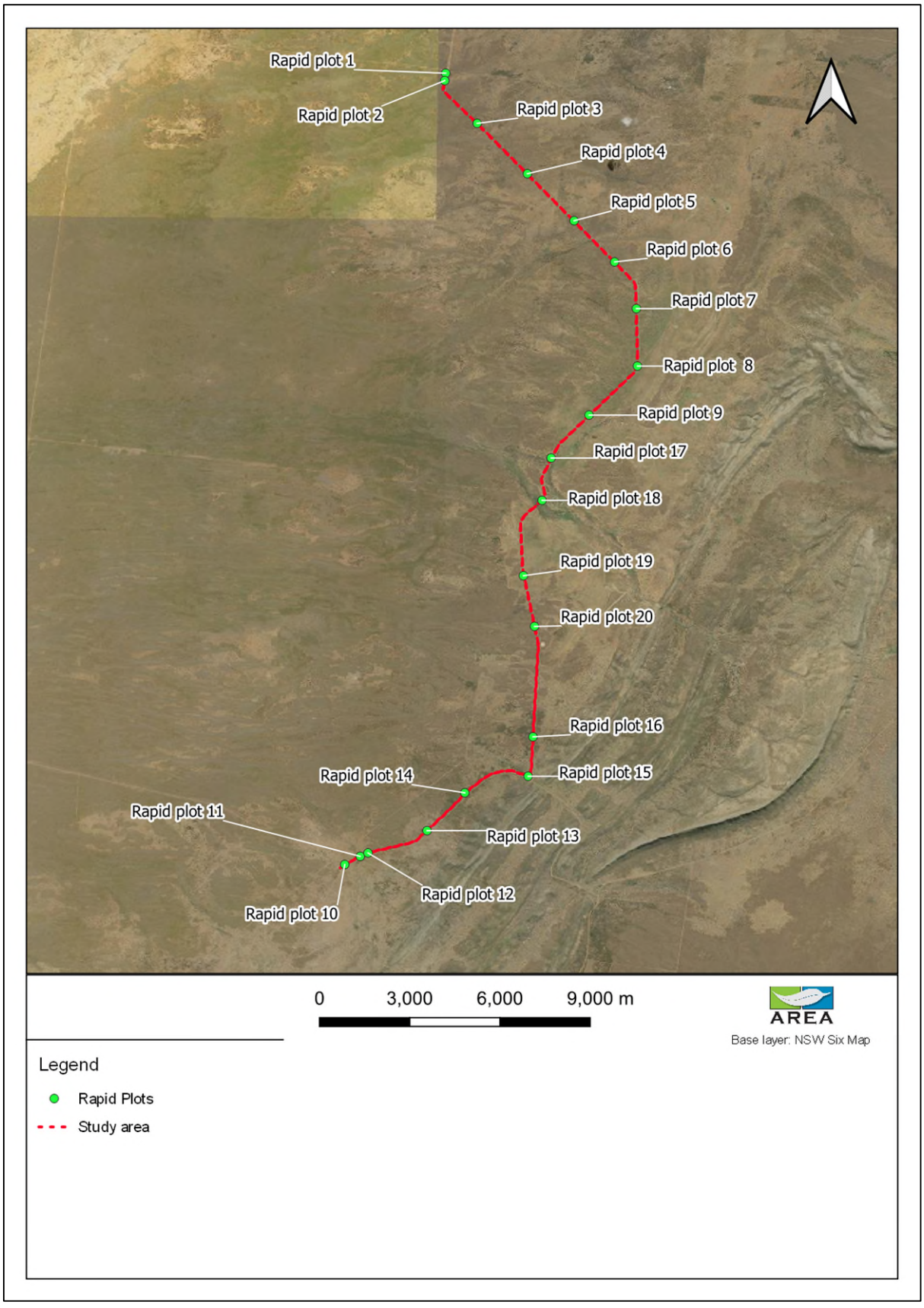
Table 4-2: Rapid assessment template

Yathong Nature Reserve – feral predator free area		
Site no:	Date:	Recorder:
Easting:	Northing:	GDA Zone:
Geology:	Aspect:	Slope:
Plot size: 20x 20m		
Location:		
Photo notes / bearing:		
Notes: (e.g. landscape, soil, drainage, disturbance):		

Stratum	Height	% PFC	Dominant species (in order of importance)
Upper tree / canopy			
Lower tree / mid storey			
Shrub			
Ground			

Threatened species:
Plant community type:
Significant threats, weeds:
Additional notes / comments:

Figure 4-1 Rapid Plot Locations



4.2 Plant Community Type mapping

Plant Community Type mapping followed the process outlined in section 4.1 above. Plant Community Types identified during field survey are listed in Table 4-3 and mapped in Figures 4-2 to 4-5.

Table 4-3: Plant Community Types identified during field survey

Plant Community Type ID (PCT ID)	PCT Common Name	PCT Scientific Name	Upper Stratum Species	Mid Stratum Species	Ground Stratum Species	Vegetation Formation	Vegetation Class	Associated TEC Names
57	Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including the Cobar Peneplain Bioregion	*Casuarina cristata, Casuarina pauper / Geijera parviflora, Exocarpos aphyllus, Apophyllum anomalum, Alectryon oleifolius subsp. canescens / Maireana decalvans, Maireana georgei, Rhagodia spinescens*	*Casuarina cristata; Casuarina pauper; Eucalyptus populnea subsp. bimbil; Eucalyptus intertexta; Callitris glaucophylla;*	*Alectryon oleifolius subsp. canescens; Geijera parviflora; Apophyllum anomalum; Exocarpos aphyllus; Senna form taxon filifolia; Maireana decalvans; Maireana georgei; Rhagodia spinescens; Maireana pyramidata; Eremophila mitchellii; Eremophila sturtii; Eremophila glabra; Eremophila deserti; Capparis mitchellii; Olearia pimeleoides; Hakea tephrosperma; Hakea leucoptera subsp. leucoptera; Eremophila longifolia; Dodonaea viscosa subsp. cuneata; Jasminum lineare;*	*Enchylaena tomentosa; Atriplex stipitata; Sclerolaena diacantha; Sclerolaena birchii; Zygophyllum glaucum; Salsola tragus subsp. tragus; Chenopodium desertorum subsp. anidiophyllum; Calotis cuneifolia; Rhodanthe floribunda; Aristida jerichoensis var. subspinulifera; Austrodanthonia caespitosa; Austrostipa scabra subsp. scabra;*	Semi-arid Woodlands (Shrubby sub-formation);	Semi-arid Sand Plain Woodlands;	Listed BC Act, Endangered: Acacia loderi shrublands (Part)
72	White Cypress Pine - Poplar Box woodland on footslopes and peneplains mainly in the Cobar Peneplain Bioregion	*Callitris glaucophylla, Eucalyptus populnea subsp. bimbil / Acacia deanei subsp. deanei, Eremophila mitchellii, Dodonaea viscosa subsp. spatulata, Pimelea microcephala subsp. microcephala / Austrostipa scabra subsp. scabra, Sida cunninghamii, Calotis cuneifolia*	*Callitris glaucophylla; Eucalyptus populnea subsp. bimbil; Eucalyptus intertexta;*	*Acacia deanei subsp. deanei; Eremophila mitchellii; Dodonaea viscosa subsp. spatulata; Pimelea microcephala subsp. microcephala; Acacia decora; Geijera parviflora; Senna form taxon artemisioides; Eremophila deserti; Eremophila glabra; Hakea tephrosperma; Myoporum montanum; Eremophila longifolia; Cassinia laevis; Pittosporum angustifolium;*	*Austrostipa scabra subsp. scabra; Sida cunninghamii; Calotis cuneifolia; Chrysocephalum semipapposum; Chenopodium desertorum subsp. desertorum; Einadia nutans subsp. nutans; Maireana enchylaenoides; Oxalis perennans; Cheilanthes sieberi subsp. sieberi; Crassula sieberiana subsp. sieberiana; Vittadinia cuneata; Abutilon otocarpum; Enchylaena tomentosa; Dianella longifolia var. longifolia; Sclerolaena birchii; Sclerolaena diacantha; Calandrinia eremaea; Austrodanthonia setacea; Austrodanthonia eriantha; Enteropogon acicularis; Eragrostis lacunaria; Xerochrysum bracteatum; Erodium crinitum; Brunoniella australis;*	Semi-arid Woodlands (Shrubby sub-formation);	Western Peneplain Woodlands;	N/A
104	Gum Coolabah woodland on sedimentary substrates mainly in the Cobar Peneplain Bioregion	*Eucalyptus intertexta, Callitris glaucophylla, Acacia excelsa subsp. excelsa / Eremophila mitchellii, Geijera parviflora, Dodonaea viscosa subsp. angustissima, Senna form taxon artemisioides / Aristida jerichoensis var. subspinulifera, Eragrostis lacunaria, Calotis cuneifolia, Sida cunninghamii*	*Eucalyptus intertexta; Callitris glaucophylla; Acacia excelsa; Grevillea striata; Brachychiton populneus subsp. populneus;*	*Eremophila mitchellii; Geijera parviflora; Dodonaea viscosa subsp. angustifolia; Dodonaea viscosa subsp. angustissima; Acacia deanei subsp. deanei; Senna form taxon filifolia; Senna form taxon artemisioides; Apophyllum anomalum; Alectryon oleifolius subsp. canescens; Beyeria viscosa; Hakea tephrosperma; Acacia oswaldii; Eremophila longifolia; Acacia decora; Dodonaea lobulata; Lycium australe; Eremophila serrulata; Acacia decora;*	*Aristida jerichoensis var. subspinulifera; Eragrostis lacunaria; Calotis cuneifolia; Sida cunninghamii; Sclerolaena diacantha; Digitaria brownii; Enteropogon acicularis; Austrostipa scabra subsp. scabra; Ptilotus polystachyus var. polystachyus; Olearia decurrens; Sclerolaena diacantha; Helichrysum rutidolepis; Halgania cyanea; Chenopodium desertorum subsp. microphyllum; Salsola tragus subsp. tragus; Cheilanthes sieberi subsp. sieberi; Aristida anthoxanthoides;*	Semi-arid Woodlands (Shrubby sub-formation);	Inland Rocky Hill Woodlands;	N/A
105	Poplar Box grassy woodland on flats mainly in the Cobar Peneplain Bioregion and Murray Darling Depression Bioregion	*Eucalyptus populnea subsp. bimbil, Callitris glaucophylla / Acacia aneura var. latifolia, Acacia colletioides, Bertya cunninghamii, Eremophila glabra / Einadia nutans, Maireana microphylla, Aristida behriana, Enteropogon acicularis*	*Eucalyptus populnea subsp. bimbil; Callitris glaucophylla; Alectryon oleifolius subsp. canescens; Brachychiton populneus subsp. populneus; Eucalyptus largiflorens;*	*Acacia aneura var. latifolia; Acacia colletioides; Eremophila glabra; Geijera parviflora; Bursaria spinosa; Senna form taxon filifolia; Senna form taxon artemisioides; Eremophila mitchellii; Myoporum montanum; Eremophila longifolia; Acacia oswaldii; Capparis mitchellii; Hakea tephrosperma; Acacia decora; Apophyllum anomalum;*	*Einadia nutans subsp. nutans; Maireana microphylla; Aristida behriana; Enneapogon avenaceus; Enneapogon polyphyllus; Austrostipa scabra subsp. scabra; Calotis cuneifolia; Sclerolaena birchii; Austrodanthonia setacea; Eragrostis megalosperma; Solanum quadriloculatum; Stackhousia viminea; Stackhousia viminea; Wahlenbergia luteola; Erodium crinitum; Sclerolaena convexula; Plantago turrifera; Harmsiodoxa blennodioides;*	Semi-arid Woodlands (Shrubby sub-formation);	Western Peneplain Woodlands;	N/A
143	Narrow-leaved Hopbush - Scrub Turpentine - Senna shrubland on semi-arid and arid sandplains and dunes.	*Dodonaea viscosa subsp. angustissima, Eremophila sturtii, Senna form taxon filifolia / Enchylaena tomentosa, Rhagodia spinescens, Maireana pentatropis / Dissocarpus paradoxus, Enneapogon avenaceus*	*Casuarina pauper; Alectryon oleifolius subsp. canescens;*	*Dodonaea viscosa subsp. angustissima; Eremophila sturtii; Senna form taxon petiolaris; Senna form taxon filifolia; Rhagodia spinescens; Maireana pyramidata; Maireana pentatropis; Maireana astrotricha; Olearia pimeleoides; Eremophila longifolia; Eremophila glabra; Senna form taxon zygophylla; Acacia colletioides; Acacia ligulata; Acacia victoriae subsp. arida; Acacia aneura; Chenopodium curvispicatum; Eremophila duttonii;*	*Enchylaena tomentosa; Dissocarpus paradoxus; Enneapogon avenaceus; Austrostipa nitida; Dactyloctenium radulans; Salsola tragus subsp. tragus; Sclerolaena obliquicuspis; Sclerolaena diacantha; Sclerolaena tricuspis; Sclerolaena decurrens; Sclerolaena bicornis var. bicornis; Atriplex stipitata; Atriplex limbata; Podolepis capillaris; Aristida contorta; Eragrostis eriopoda; Ptilotus obovatus var. obovatus; Sida cunninghamii; Rutidosis helichrysoides; Rhodanthe floribunda; Rhodanthe moschata; Wahlenbergia stricta*	Arid Shrublands (Acacia sub-formation);	Sand Plain Mulga Shrublands;	Listed BC Act, Endangered Acacia loderi shrublands (Part)

Plant Community Type ID (PCT ID)	PCT Common Name	PCT Scientific Name	Upper Stratum Species	Mid Stratum Species	Ground Stratum Species	Vegetation Formation	Vegetation Class	Associated TEC Names
					subsp. stricta; Brachyscome lineariloba; Gnephosis arachnoidea; Stenopetalum lineare; Harmsiodoxa blennodioides; Solanum esuriale; Daucus glochidiatus; Einadia nutans subsp. eremaea; Convolvulus erubescens; Boerhavia dominii; Vittadinia sulcata; Tetragonia eremaea; Plantago drummondii; Pycnosorus pleiocephalus; Goodenia pinnatifida;			
171	Spinifex linear dune mallee mainly of the Murray Darling Depression Bioregion	*Eucalyptus socialis, Eucalyptus dumosa, Eucalyptus gracilis, Eucalyptus costata / Acacia colletioides, Dodonaea viscosa subsp. angustissima, Eremophila glabra / Triodia scariosa subsp. scariosa, Vittadinia cuneata, Austrostipa nitida*	*Eucalyptus socialis; Eucalyptus dumosa; Eucalyptus gracilis; Eucalyptus costata; Callitris verrucosa; Eucalyptus leptophylla; Eucalyptus oleosa;*	*Acacia colletioides; Dodonaea viscosa subsp. angustissima; Eremophila glabra; Eremophila sturtii; Olearia pimeleoides; Maireana pentatropis; Acacia wilhelmiana; Senna form taxon filifolia; Bossiaea walkeri; Chenopodium curvispicatum; Grevillea huegelii; Eutaxia microphylla; Dodonaea bursariifolia; Beyeria opaca; Exocarpos sparteus; Alectryon oleifolius subsp. canescens; Westringia rigida; Acacia brachybotrya; Acacia sclerophylla var. sclerophylla; Capparis lasiantha; Maireana triptera;*	*Triodia scariosa subsp. scariosa; Vittadinia cuneata; Austrostipa nitida; Sclerolaena diacantha; Enchylaena tomentosa; Sclerolaena parviflora; Chenopodium desertorum subsp. desertorum; Halgania cyanea; Vittadinia cuneata; Lomandra effusa; Atriplex stipitata; Ptilotus exaltatus var. exaltatus; Sclerolaena obliquicuspis; Podolepis capillaris; Lomandra leucocephala subsp. leucocephala; Chenopodium desertorum subsp. anidiophyllum;*	Semi-arid Woodlands (Shrubby sub-formation);	Dune Mallee Woodlands;	N/A
173	Sandplain mallee of central NSW	*Eucalyptus socialis, Eucalyptus dumosa, Eucalyptus gracilis / Olearia pimeleoides, Eremophila glabra, Melaleuca uncinata / Triodia scariosa subsp. scariosa, Dianella revoluta var. revoluta, Lomandra effusa*	*Eucalyptus socialis; Eucalyptus dumosa; Eucalyptus gracilis; Eucalyptus oleosa; Eucalyptus leptophylla; Callitris verrucosa; Casuarina cristata; Eucalyptus intertexta; Callitris glaucophylla; Eucalyptus microcarpa;*	*Olearia pimeleoides; Eremophila glabra; Melaleuca uncinata; Acacia rigens; Acacia brachybotrya; Acacia tindaleae; Acacia havilandiorum; Dodonaea viscosa subsp. cuneata; Senna form taxon filifolia; Geijera parviflora; Beyeria opaca; Templetonia aculeata; Bossiaea walkeri; Acacia colletioides; Bertya cunninghamii; Pittosporum angustifolium; Pimelea microcephala subsp. microcephala; Hakea tephrosperma; Eremophila longifolia; Acacia oswaldii; Acacia homalophylla;*	*Triodia scariosa subsp. scariosa; Dianella revoluta var. revoluta; Lomandra effusa; Halgania cyanea; Austrostipa elegantissima; Stackhousia viminea; Daucus glochidiatus; Chrysocephalum apiculatum; Hyalosperma semisterile; Vittadinia pterochaeta; Sclerolaena diacantha; Austrostipa scabra subsp. scabra;*	Semi-arid Woodlands (Shrubby sub-formation);	Sand Plain Mallee Woodlands;	Listed BC Act, Endangered: Acacia loderi shrublands (Part) Listed BC Act, Endangered: Acacia melvillei Shrubland in the Riverina and Murray-Darling Depression bioregions (Part)
174	Mallee - Gum Coolabah woodland on red earth flats of the eastern Cobar Peneplain Bioregion	*Eucalyptus socialis, Eucalyptus dumosa, Eucalyptus viridis, Eucalyptus intertexta / Acacia deanei subsp. deanei, Eremophila glabra, Bertya cunninghamii, Eremophila mitchellii / Triodia scariosa subsp. scariosa, Sclerolaena birchii, Austrostipa scabra subsp. scabra, Calotis cuneifolia*	*Eucalyptus socialis; Eucalyptus dumosa; Eucalyptus viridis; Eucalyptus intertexta; Eucalyptus leptophylla; Eucalyptus microcarpa; Eucalyptus sideroxylon; Brachychiton populneus subsp. populneus; Acacia doratoxylon; Casuarina cristata; Alectryon oleifolius subsp. canescens; Callitris glaucophylla; Santalum acuminatum;*	*Acacia deanei subsp. paucijuga; Eremophila glabra; Bertya cunninghamii; Pimelea microcephala subsp. microcephala; Dodonaea viscosa subsp. cuneata; Eremophila deserti; Eremophila mitchellii; Cassinia laevis; Cassinia aduncа; Olearia pimeleoides; Olearia decurrens; Dodonaea viscosa subsp. spatulata; Dodonaea boroniifolia; Myoporum montanum; Senna form taxon zygophylla; Bossiaea walkeri; Templetonia aculeata; Acacia buxifolia subsp. buxifolia; Acacia havilandiorum; Acacia lineata; Hakea leucoptera subsp. leucoptera; Eremophila longifolia; Westringia eremicola; Westringia rigida; Geijera parviflora; Eremophila mitchellii; Philotheca difformis subsp. difformis; Jasminum lineare; Melaleuca uncinata; Phebalium glandulosum subsp. glandulosum; Micromyrtus striata; Dodonaea viscosa subsp. cuneata; Apophyllum anomalum; Choretrum glomeratum; Philotheca brevifolia; Jasminum lineare; Senna form taxon filifolia; Olearia ramulosa;*	*Sclerolaena birchii; Triodia scariosa subsp. scariosa; Austrodanthonia fulva; Austrostipa scabra subsp. scabra; Austrodanthonia caespitosa; Solanum ellipticum; Calotis cuneifolia; Vittadinia cervicularis var. cervicularis; Enchylaena tomentosa; Ptilotus obovatus var. obovatus; Solanum coactiliferum; Solanum ferocissimum; Xerochrysum bracteatum; Dianella revoluta var. revoluta; Goodenia hederacea subsp. hederacea; Halgania cyanea; Lomandra effusa; Scaevola humilis; Vittadinia cuneata var. hirsuta; Daucus glochidiatus; Brachyscome multifida var. multifida; Cryptandra amara var. floribunda; Sclerolaena bicornis var. horrida; Vittadinia cervicularis; Euchiton sphaericus; Plantago cunninghamii; Cheilanthes sieberi subsp. sieberi;*	Semi-arid Woodlands (Shrubby sub-formation);	Sand Plain Mallee Woodlands;	Listed BC Act, Endangered: Acacia loderi shrublands (Part);

Figure 4-2: PCT Map 1

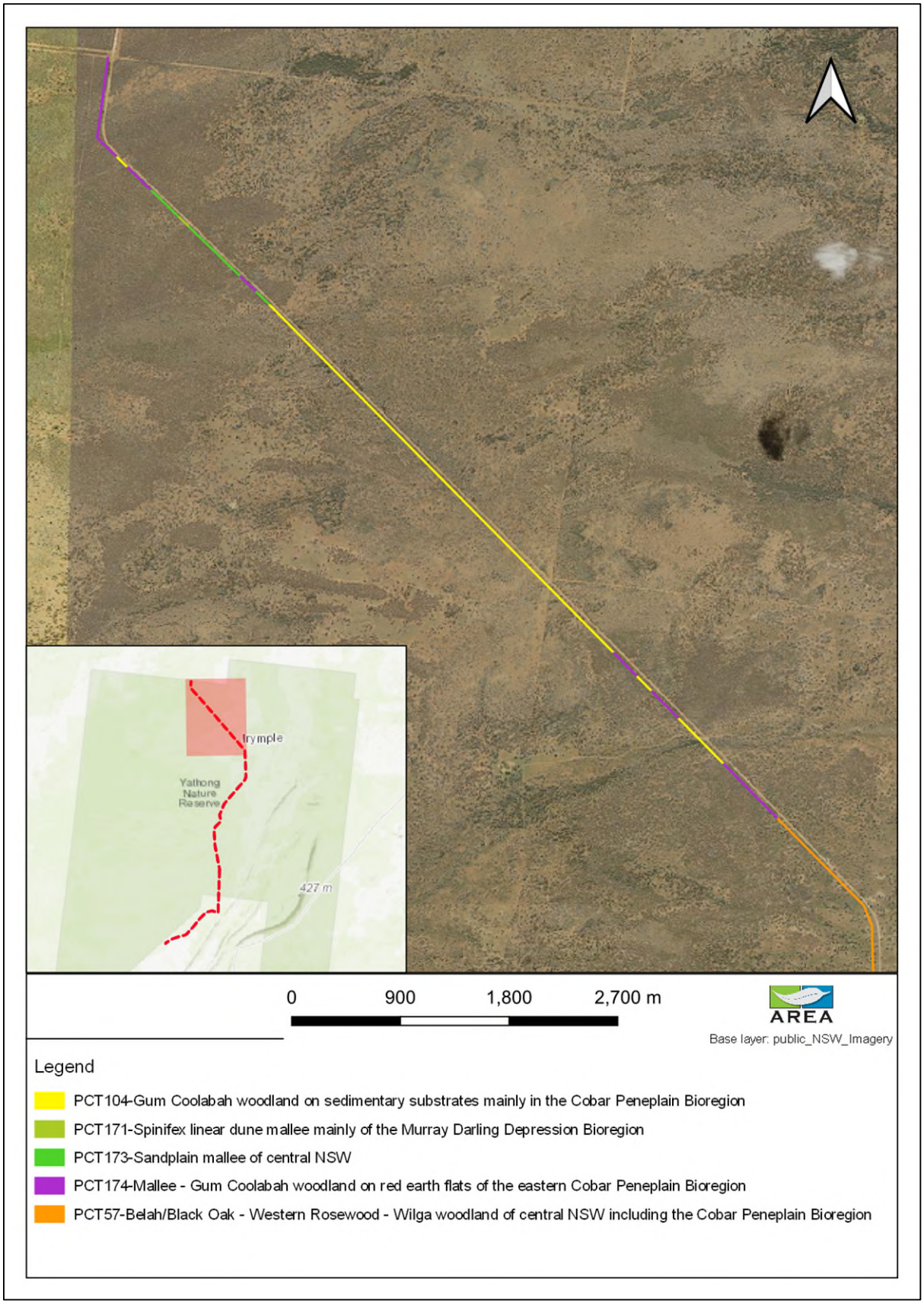


Figure 4-3: PCT Map 2

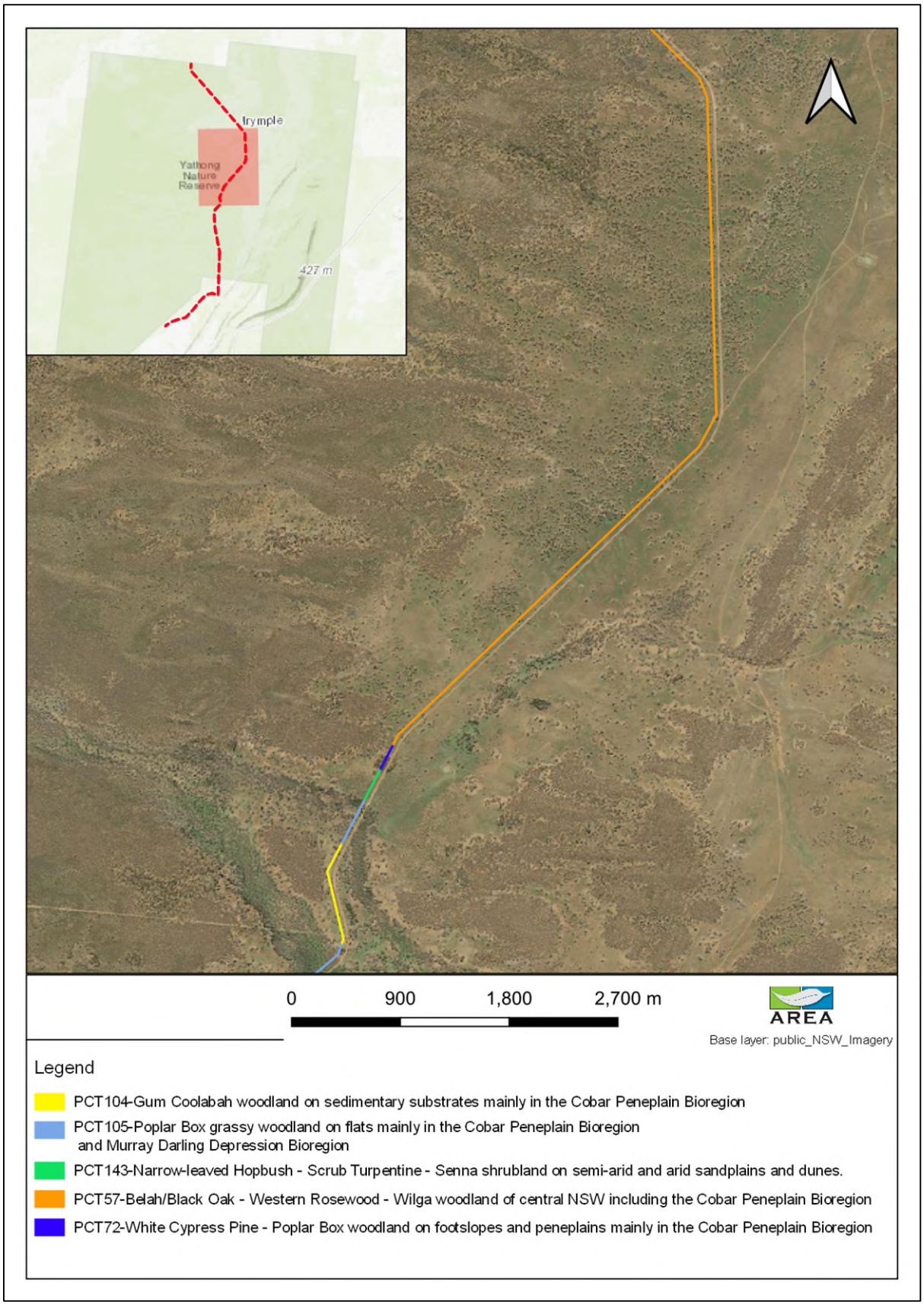


Figure 4-4 PCT Map 3

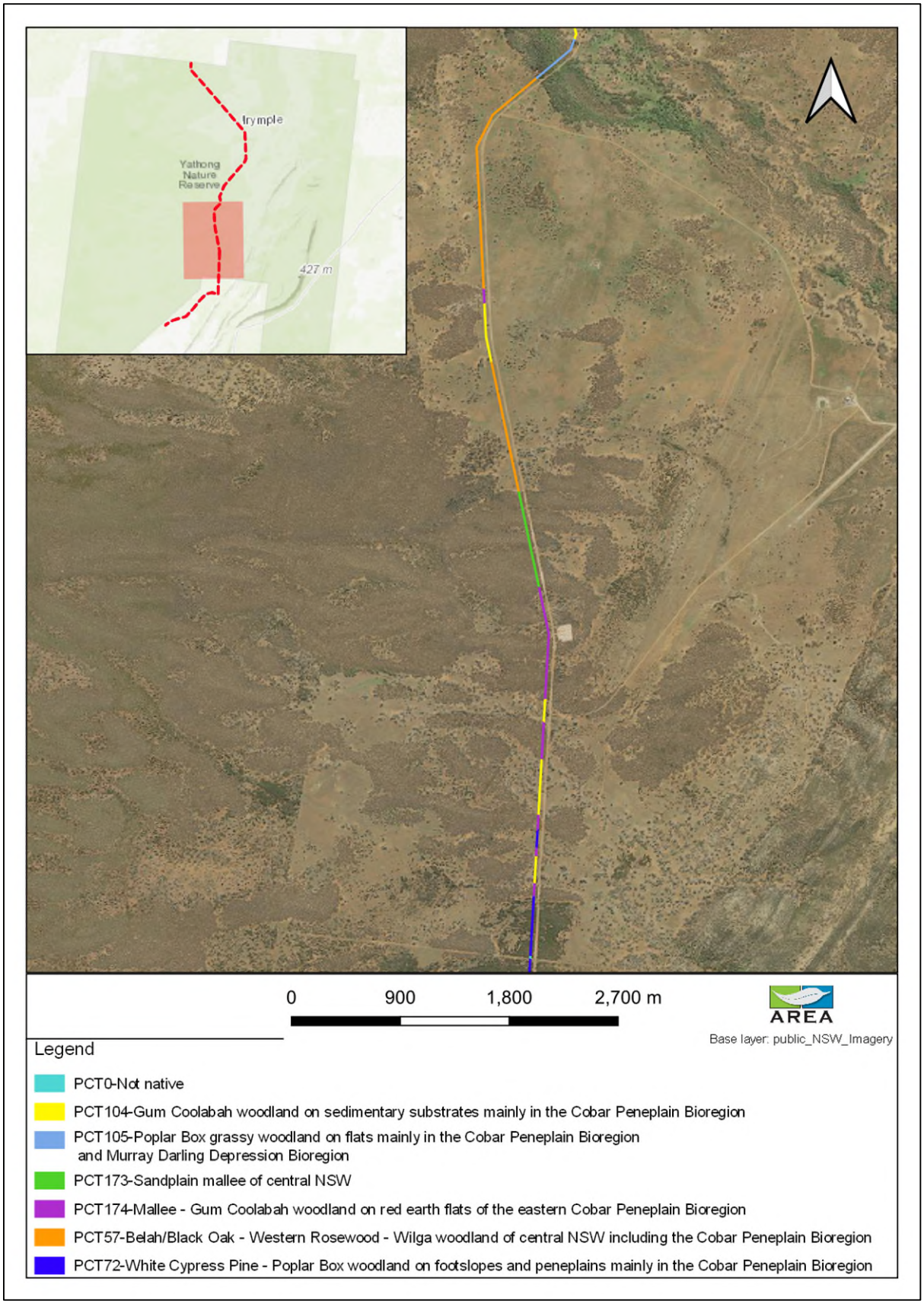
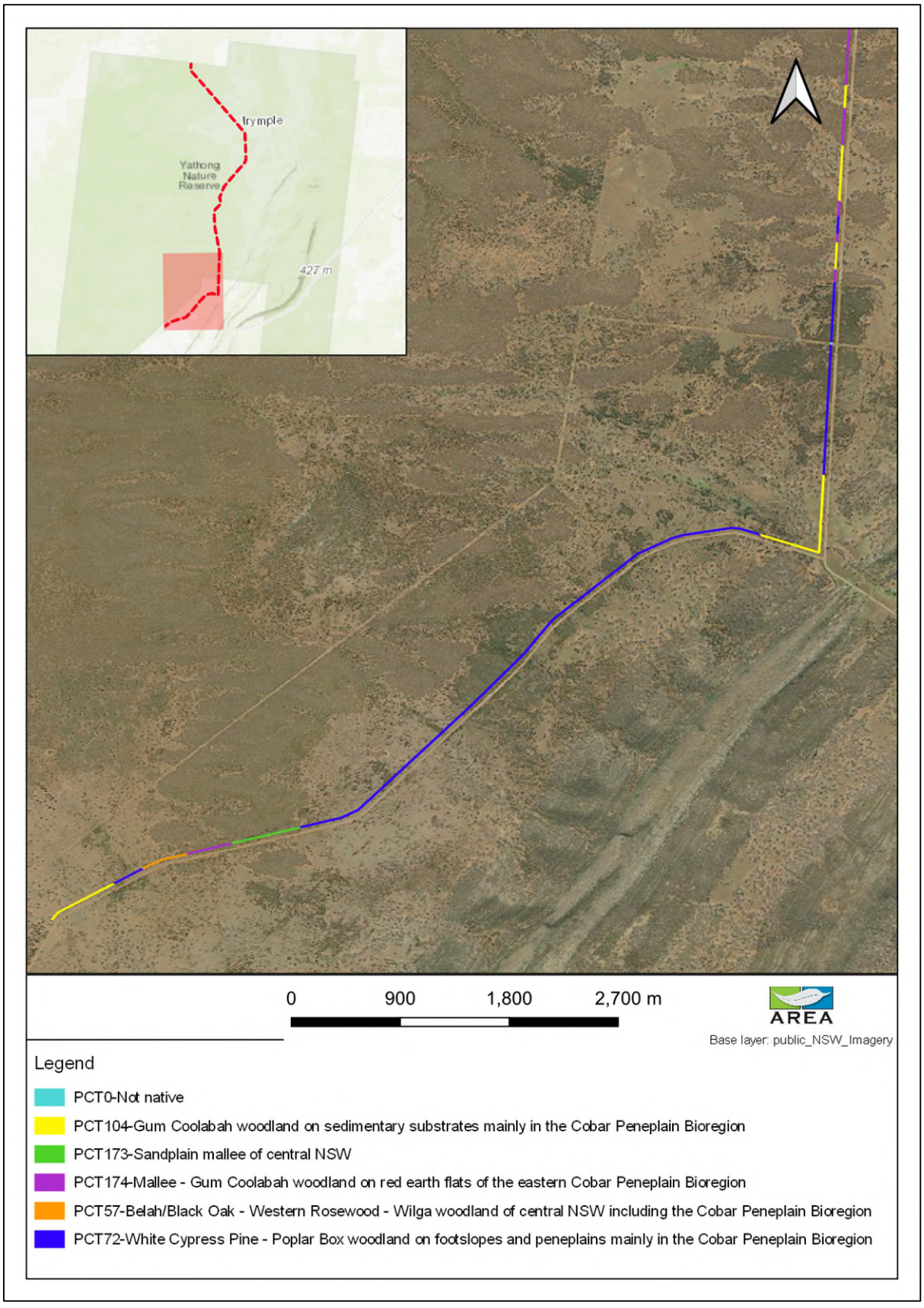


Figure 4-5: PCT Map 4



4.3 Endangered Ecological Communities

Two Endangered Ecological Communities (EECs) are listed under the *Biodiversity Conservation Act 2016* as having associations with PCTs identified during the field assessment (Table 4-4). No EECs were identified during the rapid assessment.

Table 4-4: Listed Endangered Ecological Communities

Endangered Ecological Community (EEC)	Associated Plant Community Type	Presence in the study area.
Listed BC Act, *Endangered: Acacia loderi shrublands* (Part)	PCT57- *Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including the Cobar Peneplain Bioregion* PCT143- *Narrow-leaved Hopbush - Scrub Turpentine - Senna shrubland on semi-arid and arid sandplains and dunes.* PCT173- *Sandplain mallee of central NSW* PCT174- *Mallee - Gum Coolabah woodland on red earth flats of the eastern Cobar Peneplain Bioregion*	No Vegetation consistent with this EEC was identified in the study area.
BC Act, Endangered: *Acacia melvillei Shrubland in the Riverina and Murray-Darling Depression bioregions* (Part)	PCT173- *Sandplain mallee of central NSW*	No Vegetation consistent with this EEC was identified in the study area.

4.4 Tree hollow assessment

Tree hollow assessments were conducted primarily by NPWS Ecologist Katie Oxenham with AREA providing training on flora identification where required.

Any tree hollow has potential to provide habitat. The main question for this proposal is ‘*’Of these what is important habitat*?’.

The Biodiversity Assessment Method 2020 Operational Manual provides guidance; in Stage 1 *Hollow bearing trees include living and dead native species allocated to both the tree and shrub growth form groups and that have at least one hollow. A tree is considered to contain a hollow if: (a) the entrance can be seen; (b) the entrance width is at least 5 centimetres; (c) the hollow appears to have depth (i.e. solid wood cannot be seen beyond the entrance); and (d) the hollow is at least 1 metre above the ground* (State of NSW and Department of Planning, Industry and Environment, 2020).

Many trees recorded in both mallee and Callitris woodlands are unlikely to provide hollow value consistent with the description above. All tree hollow data can be found in Appendix A of this report as supplied to AREA by NPWS. Figure 4-6 shows the location of trees with a diameter at breast height (DBH) of 30-50 centimetres that were recorded as hollow bearing while Figure 4-7 shows trees from 50 centimetres DBH and greater recorded as having hollows. These larger trees are the most likely to contain viable habitat for cavity-nesting species of threatened fauna such as the Pink Cockatoo *Lophochroa leadbeateri*, and

Maternity colonies for microbats such as Little Pied-Bat *Chalinolobus picatus* and Inland Forest-Bat *Vespadelus baverstocki.*

Figure 4-6: Trees of 30-50cm DBH containing hollows

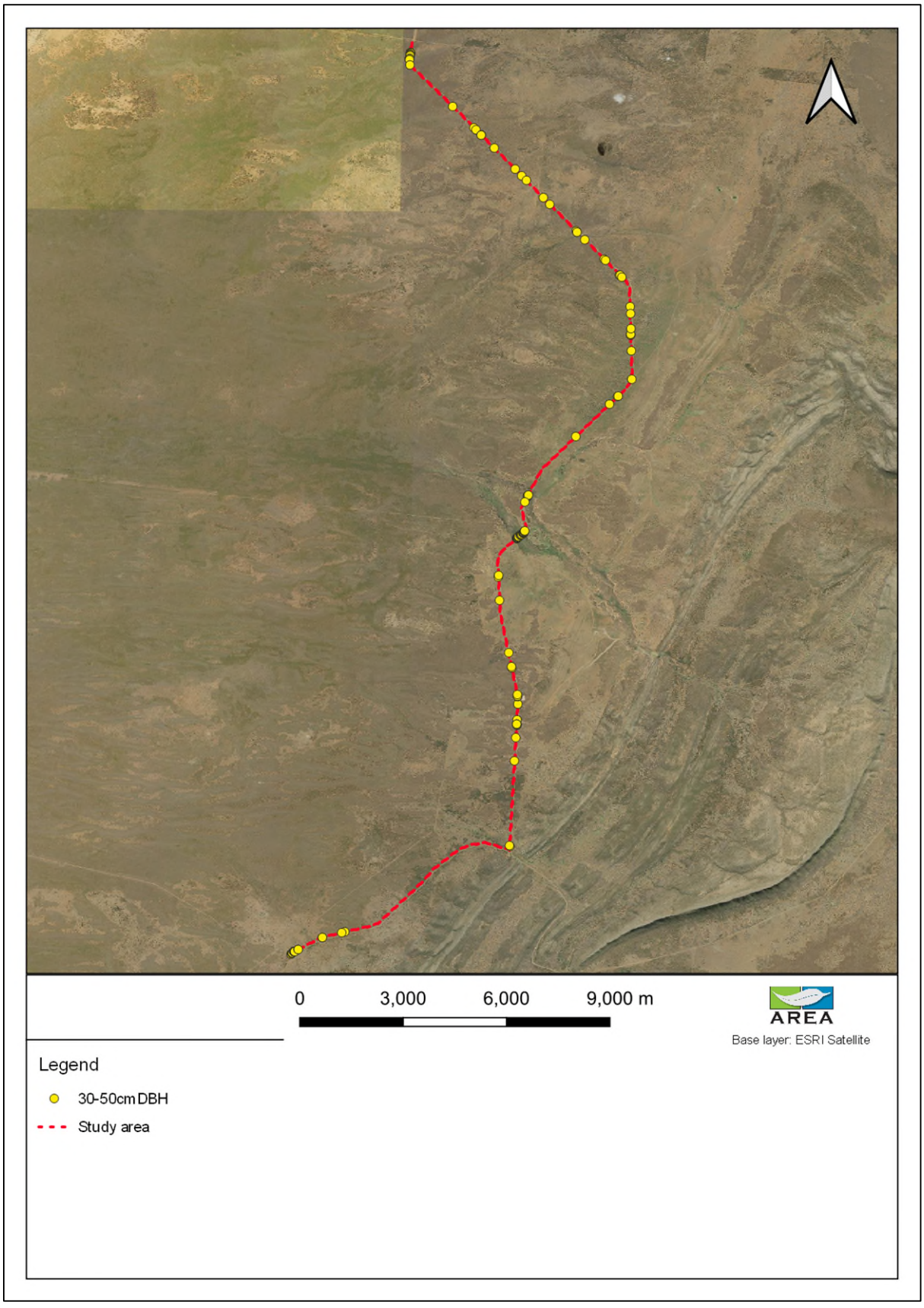
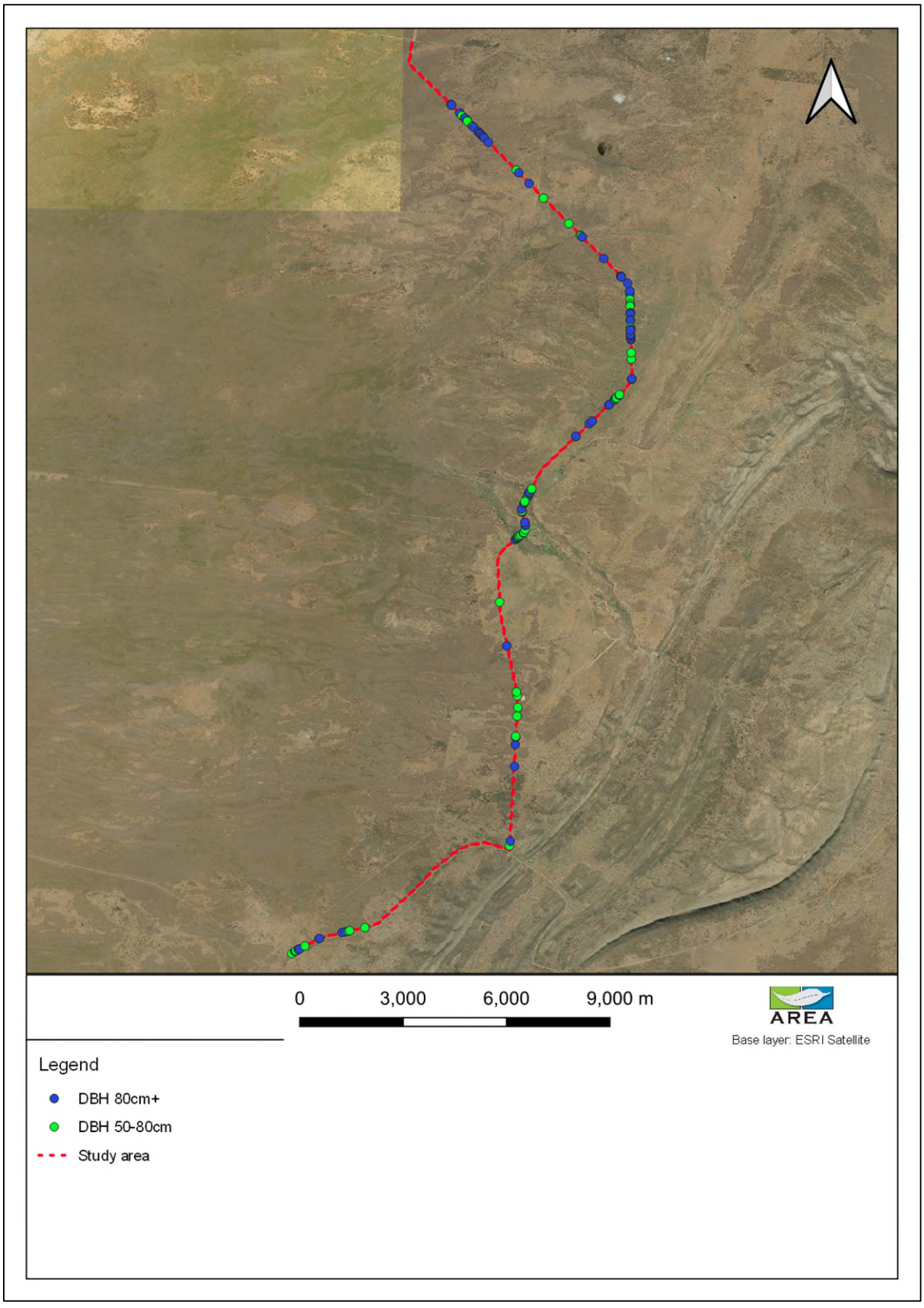


Figure 4-7: Trees of 50-80cm DBH containing hollows



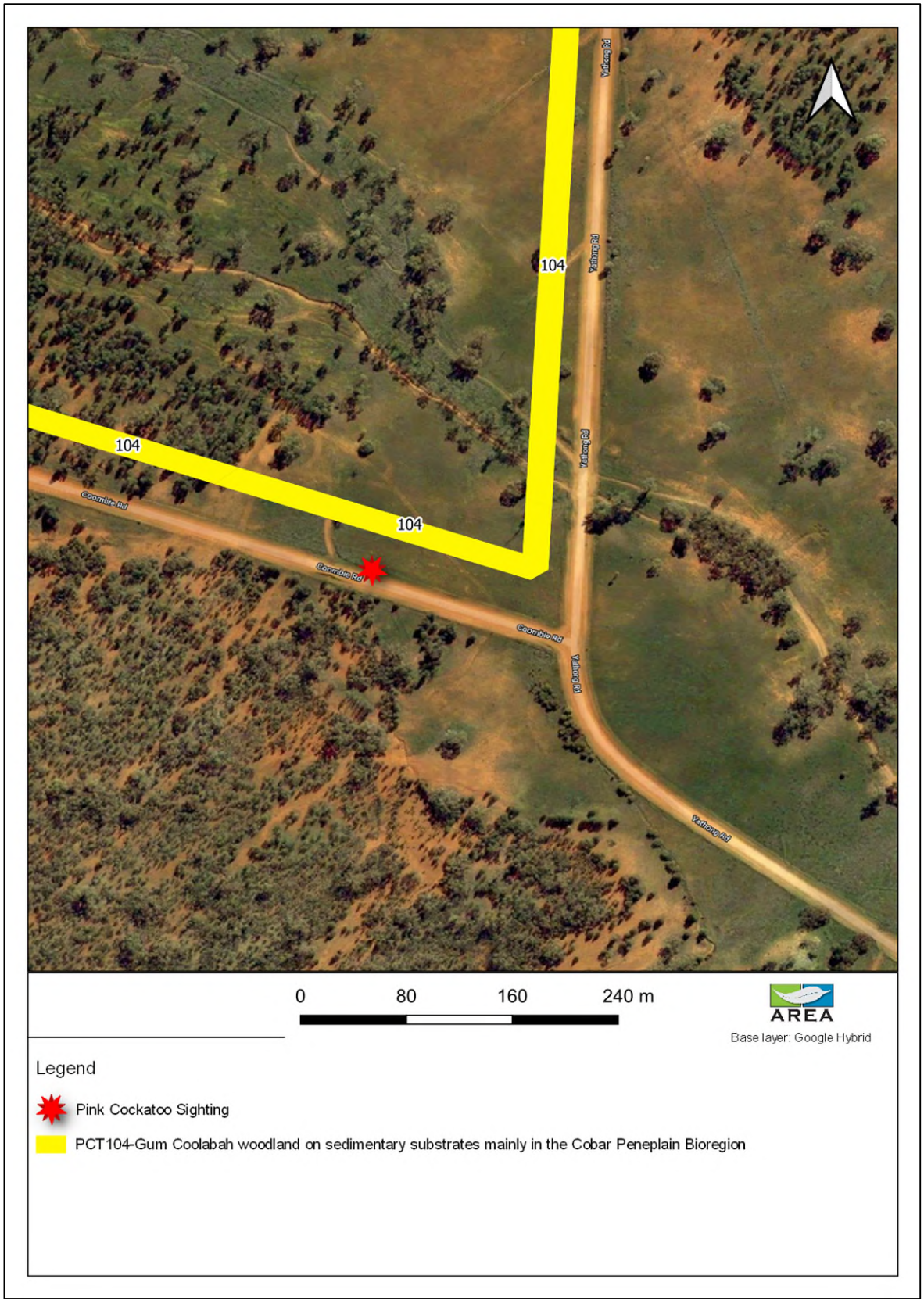
5 Threatened species searches

Threatened species searches were largely restricted to incidental sightings for threatened fauna and sampling searches from rapid assessment plots.

Five Pink Cockatoos *Lophochroa leadbeateri* were sighted at the intersection of Yathong and Coombie roads (

Figure ***5-1***). No other threatened species were identified during the field assessment.

Figure 5-1: Threatened species sighting



6 Limitations

The scope of works indicated a focus on threatened flora searches. No threatened flora was identified during field assessment. Time constraints meant that the whole alignment was unable to be walked in transects to thoroughly survey for threatened flora. Random sampling by way of rapid assessments plots was conducted with no listed flora identified. This does not rule out the potential for listed flora species to occur in the study area. An AREA Ecologist was available to aid NPWS staff in species identification as required however no potentially listed species were identified by NPWS staff during field assessments.

At the time of writing no groundtruthed PCT data was available to AREA. PCT maps groundtruthed by AREA have been included in section 4.2 of this report. Additionally, shapefiles have been provided to NPWS of AREA groundtruthed PCT mapping.

7 Conclusion

This report details a rapid inspection of the proposed fence corridor along the Yathong/Cobar Road. The focus from AREA being PCT classification, rapid vegetation assessments and threatened species searches.

Seven Plant Community Types were identified during field surveys with 20 rapid assessment plots completed.

The length of PCTs impacted are approximately:

- 9.9 kilometres of PCT104
- 0.97 kilometres of PCT105
- 0.32 kilometres of PCT143
- 0.14 kilometres of PCT171
- 2.7 kilometres of PCT173
- 5.3 kilometres of PCT174
- 12.55 kilometres of PCT57
- 7.54 kilometres of PCT72

Area of PCTs with potential to be impacted have not been calculated as the width of the clearing was not clear.

Further targeted threatened species searches are recommended as only incidental/opportunistic surveys were completed due to time constraints. *Lophochroa leadbeateri* was the only listed species sighted during the survey however the number of hollows with potential to be impacted indicates there is potential for listed species to have habitat in the study area.

The high number of tree hollows recorded may not be an accurate indication of habitat used by threatened species in the study area as it is likely that many hollows recorded in the mallee vegetation formations and Callitris woodlands are not suitable habitat hollows.

The survey did establish the presence of some habitat bearing trees in the study area. Recommended mitigation measure for clearing these hollow bearing trees are:

- Avoid clearing native vegetation in late spring where reasonably practicable.
- Ensure a trained spotter catcher is on hand
- It is recommended that WIRES are contacted prior to clearing commencing so that volunteers can be ready to care for any potentially injured wildlife.
- Implement staged habitat removal to allow fauna to vacate if present.
- Respond to (e.g., rescue, relocate) fauna detected during the clearing process (refer to Fauna Handling and Rescue Procedure in Appendix C.

8 References

Keith, D. A., 2004. *Ocean Shores to Desert Dunes: The Native Vegetation of New South Wales and the ACT.* Hurstville: Department of Environment and Conservation (NSW), 2004.

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NSW Biodiversity Conservation Trust, 2020. *Funded Conservation Agreement Site Assessment Standard Operating Procedure.* Version 2 ed. s.l.:NSW Biodiversity Conservation Trust.

State of NSW and Department of Planning, Industry and Environment, 2020. *Biodiversity Assessment Method 2020 Operational Manual – Stage 1.* Parramatta: Environment, Energy and Science, Department of Planning, Industry and Environment.

Appendix A: Tree Hollow data

Easting	Northing	Species	5-10cm	10-20cm	20-30cm	30-50cm	50-80cm	80+ cm	limb	trunk
356852	6378231	*Eucalyptus intertexta*				x			x	x
356872.8	6378249	*Eucalyptus intertexta*					x			x
356869.7	6378256	*Stag*				x			x	
356885.3	6378272	*Eucalyptus intertexta*				x			x	
356890.5	6378281	*Eucalyptus intertexta*				x			x	
356926.1	6378317	*Stag*				x			x	
356939.6	6378317	*Eucalyptus intertexta*				x			x	
356950.5	6378320	*Eucalyptus intertexta*				x			x	
356927.8	6378323	*Eucalyptus intertexta*				x			x	
356957	6378323	*Eucalyptus intertexta*				x			x	
356933.3	6378327	*Eucalyptus intertexta*				x				x
356961.1	6378328	*Eucalyptus intertexta*					x		x	
356982.8	6378344	*Eucalyptus intertexta*						x	x	
356991.1	6378352	*Eucalyptus intertexta*					x		x	
357063.6	6378393	*Eucalyptus intertexta*					x		x	
357058.1	6378396	*Stag*				x			x	
357052.9	6378396	*Stag*				x			x	
357064.5	6378398	*Stag*					x		x	
357093.4	6378410	*Eucalyptus intertexta*						x	x	
357084.4	6378415	*Stag*					x		x	
357250.1	6378518	*Stag*					x		x	
357253.1	6378527	*Stag*			x				x	
357659.3	6378780	*Casuarina cristata*					x		x	
357671.6	6378786	*Casuarina cristata*						x	x	x
357754.6	6378819	*Casuarina cristata*				x				x
357747.5	6378819	*Casuarina cristata*				x			x	
357769.3	6378826	*Stag*			x				x	
358138	6378931	*Eucalyptus socialis*			x					x
358141.6	6378939	*Eucalyptus intertexta*			x					x
358312.9	6378992	*Eucalyptus intertexta*				x			x	
358321.4	6378998	*Eucalyptus intertexta*						x	x	x
358409	6379021	*Stag*						x	x	
358402.1	6379024	*Stag*				x			x	
358506	6379048	*Casuarina cristata*					x			x
358543.3	6379064	*Eucalyptus intertexta*					x		x	
358683.1	6379106	*Eucalyptus socialis*			x					x
358982.6	6379178	*Geijera parviflora*					x		x	

Easting	Northing	Species	5-10cm	10-20cm	20-30cm	30-50cm	50-80cm	80+ cm	limb	trunk
363159	6382027	*Eucalyptus intertexta*				x			x	
363141.7	6382046	*Eucalyptus intertexta*					x		x	
363142.3	6382054	*Eucalyptus intertexta*				x			x	
363165.1	6382207	*Eucalyptus intertexta*						x	x	
363253.7	6384771	*Eucalyptus intertexta*						x	x	
363242	6384836	*Eucalyptus sp. (mallee)*		x					x	
363246.1	6384966	*Eucalyptus socialis*				x			x	x
363262.2	6385075	*Stag/stump*			x					x
363260.9	6385085	*Alectryon oleifolius*			x					x
363255.9	6385215	*Eucalyptus socialis*		x					x	
363262	6385263	*Eucalyptus socialis*		x					x	
363264.9	6385271	*Eucalyptus socialis*			x				x	
363260.5	6385271	*Eucalyptus socialis*		x					x	
363262	6385527	*Eucalyptus intertexta*						x	x	
363269	6385558	*Alectryon oleifolius*			x				x	x
363275.8	6385764	*Stag*				x			x	
363270	6385769	*Eucalyptus intertexta*						x	x	x
363272.4	6385811	*Eucalyptus intertexta*					x		x	
363286.8	6385907	*Stag*		x					x	
363289.6	6385933	*Eucalyptus socialis*		x					x	x
363292.9	6385963	*Eucalyptus socialis*			x				x	
363285.2	6386012	*Eucalyptus sp. (mallee)*			x				x	
363288.8	6386017	*Eucalyptus sp. (mallee)*			x					x
363290.3	6386028	*Eucalyptus socialis*			x				x	
363283.6	6386088	*Eucalyptus socialis*			x					x
363289.5	6386090	*Eucalyptus intertexta*			x				x	
363302.8	6386189	*Eucalyptus intertexta*				x			x	
363302.9	6386212	*Eucalyptus intertexta*				x			x	
363295	6386229	*Eucalyptus intertexta*				x			x	
363299.5	6386230	*Eucalyptus intertexta*				x			x	
363302.8	6386378	*Eucalyptus intertexta*				x			x	
363300.8	6386499	*Eucalyptus intertexta*					x		x	
363310.4	6386526	*Eucalyptus intertexta*			x				x	
363320	6386803	*Geijera parviflora*					x		x	x
363318	6386808	*Apophyllum anomalum*			x				x	x
363320.2	6386919	*Stag*				x			x	x
363310.2	6387175	*Stag*				x			x	x
363306.8	6387189	*Eucalyptus intertexta*				x			x	
363300.9	6387197	*Eucalyptus intertexta*					x		x	
363301.5	6387245	*Eucalyptus intertexta*				x			x	

Easting	Northing	Species	5-10cm	10-20cm	20-30cm	30-50cm	50-80cm	80+ cm	limb	trunk
363274.1	6387333	*Eucalyptus intertexta*					x		x	
363243.6	6387579	*Eucalyptus sp. (mallee)*			x				x	x
363238.6	6387581	*Eucalyptus sp. (mallee)*			x				x	
363150.3	6388022	*Eucalyptus socialis*			x				x	x
363141.3	6388076	*Eucalyptus socialis*			x				x	
363125.4	6388157	*Stag*				x			x	
363116.9	6388200	*Stag/stump*				x				x
363119.9	6388218	*Stag*			x				x	
363097.9	6388293	*Eucalyptus socialis*		x					x	
363079.5	6388382	*Eucalyptus socialis*			x				x	
363059.8	6388536	*Stag*			x				x	x
363058.5	6388538	*Apophyllum anomalum*			x				x	x
363035	6388677	*Stag*			x				x	x
363031.3	6388679	*Stag*				x			x	x
362971.7	6388911	*Casuarina cristata*						x	x	
362742	6390412	*Geijera parviflora*					x		x	
362736	6390476	*Eucalyptus socialis*				x			x	
362690.3	6391275	*Geijera parviflora*				x				x
362700.5	6391332	*Geijera parviflora*				x			x	
363164.4	6392569	*Eucalyptus intertexta*						x		x
363213	6392604	*Stag*				x			x	
363205.3	6392614	*Eucalyptus intertexta*				x		x	x	
363216.8	6392615	*Stag*				x			x	
363227	6392618	*Stag*					x		x	x
363228.1	6392618	*Stag*		x					x	
363218.4	6392624	*Stag*				x			x	
363218.3	6392624	*Stag*			x				x	
363218.7	6392626	*Stag*		x						x
363211.4	6392627	*Stag*				x			x	
363230.3	6392629	*Stag*			x				x	
363220.3	6392634	*Stag*				x			x	x
363235.8	6392634	*Eucalyptus populnea*				x			x	
363223.1	6392636	*Stag*					x		x	x
363230.9	6392636	*Stag*				x			x	
363250	6392646	*Eucalyptus populnea*					x		x	
363246.9	6392647	*Stag*					x		x	
363251.2	6392648	*Eucalyptus populnea*				x			x	
363258.9	6392653	*Eucalyptus populnea*				x			x	
363259.3	6392654	*Stag*			x				x	
363257.9	6392667	*Eucalyptus populnea*					x		x	

Easting	Northing	Species	5-10cm	10-20cm	20-30cm	30-50cm	50-80cm	80+ cm	limb	trunk
363262.8	6392673	*Eucalyptus populnea*				x			x	x
363290	6392681	*Eucalyptus populnea*						x	x	x
363285.8	6392701	*Eucalyptus populnea*					x		x	
363308.9	6392719	*Eucalyptus populnea*				x			x	
363309.7	6392721	*Eucalyptus populnea*			x				x	
363312.9	6392722	*Stag*			x				x	
363314.4	6392724	*Eucalyptus populnea*			x				x	
363312.3	6392725	*Eucalyptus populnea*				x			x	
363321.4	6392725	*Eucalyptus populnea*			x				x	x
363334.1	6392731	*Eucalyptus populnea*					x		x	
363320.8	6392735	*Stag*			x				x	
363325.4	6392736	*Eucalyptus populnea*			x				x	
363334.4	6392740	*Eucalyptus populnea*				x			x	
363333.5	6392741	*Eucalyptus populnea*				x			x	x
363329.3	6392744	*Stag*			x				x	
363339.6	6392744	*Eucalyptus populnea*			x				x	
363349.5	6392748	*Stag*			x				x	
363335.7	6392748	*Eucalyptus populnea*				x			x	
363352	6392748	*Stag*				x			x	
363346.6	6392749	*Stag*				x			x	
363345	6392750	*Stag*			x				x	
363337.3	6392750	*Stag*			x				x	
363336.1	6392753	*Stag*			x					x
363364.4	6392764	*Stag*			x				x	
363365.4	6392767	*Eucalyptus populnea*			x				x	
363380	6392773	*Eucalyptus populnea*			x				x	
363369.4	6392778	*Eucalyptus populnea*			x				x	
363360.2	6392778	*Stag*		x					x	
363383.4	6392787	*Eucalyptus populnea*			x				x	
363371.3	6392787	*Eucalyptus populnea*			x				x	
363396.2	6392793	*Eucalyptus populnea*						x	x	
363401.3	6392796	*Eucalyptus populnea*				x			x	
363385.1	6392797	*Eucalyptus populnea*			x				x	
363380.2	6392797	*Eucalyptus populnea*				x			x	
363388.1	6392797	*Eucalyptus populnea*				x			x	
363405.9	6392798	*Eucalyptus populnea*				x			x	
363408.6	6392800	*Eucalyptus populnea*				x			x	
363409.3	6392802	*Eucalyptus populnea*				x			x	x
363404.2	6392804	*Stag*			x				x	x
363412.2	6392810	*Eucalyptus populnea*				x			x	

Easting	Northing	Species	5-10cm	10-20cm	20-30cm	30-50cm	50-80cm	80+ cm	limb	trunk
363411.9	6392818	*Eucalyptus populnea*			x				x	x
363407.7	6392820	*Eucalyptus populnea*				x			x	
363415.3	6392823	*Eucalyptus populnea*					x		x	
363414.5	6392833	*Eucalyptus populnea*				x			x	
363427.1	6392853	*Eucalyptus populnea*				x'			x	
363432.5	6392859	*Stag*		x						x
363435.9	6392865	*Eucalyptus populnea*				x			x	x
363429.4	6392866	*Eucalyptus populnea*				x			x	x
363437.7	6392873	*Eucalyptus populnea*				x			x	
363450.5	6392913	*Eucalyptus populnea*					x		x	
363453.1	6393057	*Callitris glaucophylla*						x		x
363454.7	6393078	*Eucalyptus intertexta*						x	x	
363431	6393162	*Eucalyptus intertexta*						x	x	
363358	6393523	*Eucalyptus populnea*						x	x	
363348.8	6393550	*Hakea sp.*					x			x
363333.6	6393623	*Eucalyptus intertexta*						x		x
363399.2	6393808	*Eucalyptus populnea*						x	x	
363414.5	6393848	*Eucalyptus populnea*					x		x	x
363418.7	6393851	*Eucalyptus populnea*					x		x	
363428.5	6393864	*Eucalyptus populnea*				x			x	
363424.1	6393882	*Eucalyptus populnea*					x		x	
363463.1	6393972	*Eucalyptus populnea*					x		x	
363501.3	6394043	*Eucalyptus populnea*				x			x	
363487.8	6394046	*Eucalyptus populnea*			x				x	
363508.2	6394053	*Eucalyptus populnea*					x		x	
363499.6	6394057	*Eucalyptus populnea*			x				x	
363508.3	6394062	*Eucalyptus populnea*			x				x	
363510.9	6394068	*Stag*		x					x	
363514.8	6394071	*Eucalyptus populnea*			x				x	x
363510.9	6394072	*Eucalyptus populnea*				x			x	
363508	6394077	*Eucalyptus populnea*				x			x	
363516.2	6394079	*Stag*				x			x	
363502.4	6394080	*Eucalyptus populnea*				x			x	
363517.5	6394083	*Eucalyptus populnea*			x				x	x
363506.9	6394090	*Eucalyptus populnea*				x			x	
363522.1	6394092	*Eucalyptus populnea*		x						x
363525.2	6394093	*Eucalyptus populnea*			x				x	x
363512.6	6394094	*Eucalyptus populnea*				x			x	x
363515.1	6394094	*Eucalyptus populnea*			x				x	
363514.7	6394095	*Eucalyptus populnea*			x				x	

Easting	Northing	Species	5-10cm	10-20cm	20-30cm	30-50cm	50-80cm	80+ cm	limb	trunk
363529.1	6394097	*Eucalyptus populnea*			x				x	
363530.6	6394098	*Eucalyptus populnea*					x		x	
363532.2	6394102	*Eucalyptus populnea*						x	x	x
363511.8	6394103	*Stag*			x				x	
363527.9	6394103	*Eucalyptus populnea*				x			x	
363521.7	6394103	*Eucalyptus populnea*					x		x	
363517.7	6394104	*Eucalyptus populnea*			x				x	
363519.3	6394121	*Eucalyptus populnea*					x		x	
363541.2	6394166	*Eucalyptus populnea*					x		x	
363546.6	6394178	*Eucalyptus populnea*						x	x	
363561.8	6394180	*Eucalyptus populnea*					x		x	
363556.9	6394187	*Eucalyptus populnea*						x	x	
363608.6	6394288	*Eucalyptus populnea*					x		x	
363612.4	6394310	*Callitris glaucophylla*						x		x
363622	6394321	*Eucalyptus populnea*					x		x	x
364879.7	6396133	*Casuarina cristata*					x		x	x
364879.7	6396133	*Geijera parviflora*				x			x	x
364884.2	6396144	*Casuarina cristata*						x	x	x
364909.3	6396177	*Geijera parviflora*			x				x	
365266.8	6396580	*Eucalyptus populnea*						x	x	
365350.1	6396670	*Geijera parviflora*						x		x
365827.3	6397234	*Geijera parviflora*						x		x
365841.6	6397241	*Geijera parviflora*						x	x	
365844.2	6397257	*Geijera parviflora*				x			x	x
365920.5	6397329	*Stag*			x					x
365984.5	6397409	*Geijera parviflora*						x	x	x
366001.8	6397432	*Geijera parviflora*					x			x
366020.8	6397465	*Geijera parviflora*						x		x
366045.4	6397476	*Geijera parviflora*					x		x	x
366072.5	6397527	*Casuarina cristata*				x			x	x
366093.4	6397539	*Acacia aneura*				x			x	
366120.4	6397567	*Casuarina cristata*						x	x	x
366132.1	6397592	*Casuarina cristata*					x		x	x
366481.1	6398123	*Eucalyptus populnea*				x			x	
366475.3	6398125	*Eucalyptus populnea*						x	x	x
366486.2	6398138	*Stag*						x	x	x
366457.8	6398815	*Casuarina cristata*					x		x	x
366453.2	6399035	*Geijera parviflora*					x			x
366455.1	6399101	*Geijera parviflora*				x				x
366438.5	6399481	*Casuarina cristata*						x	x	x

Easting	Northing	Species	5-10cm	10-20cm	20-30cm	30-50cm	50-80cm	80+ cm	limb	trunk
366429.3	6399534	*Casuarina cristata*						x		x
366432.1	6399577	*Geijera parviflora*			x				x	
366432.3	6399609	*Casuarina cristata*						x	x	x
366427.1	6399636	*Geijera parviflora*				x			x	
366426.3	6399636	*Casuarina cristata*						x	x	x
366425.2	6399661	*Casuarina cristata*						x	x	
366431.7	6399664	*Casuarina cristata*				x			x	x
366427.9	6399668	*Casuarina cristata*				x			x	
366417.8	6399806	*Casuarina cristata*						x		x
366431.8	6399845	*Casuarina cristata*						x	x	x
366433.1	6399862	*Alectryon oleifolius*				x				x
366422.1	6399901	*Geijera parviflora*					x		x	
366408.6	6400145	*Casuarina cristata*						x		x
366409.6	6400163	*Casuarina cristata*						x		x
366410.1	6400367	*Casuarina cristata*						x		x
366406	6400377	*Casuarina cristata*						x		x
366414.8	6400377	*Geijera parviflora*				x			x	
366410	6400397	*Casuarina cristata*						x	x	
366413.8	6400409	*Casuarina cristata*					x		x	x
366400.9	6400619	*Geijera parviflora*				x				x
366396.1	6400628	*Casuarina cristata*					x		x	
366401.9	6400654	*Geijera parviflora*					x			x
366402	6400720	*Geijera parviflora*					x			x
366391.4	6400861	*Eucalyptus intertexta*					x		x	x
366385	6401066	*Eucalyptus intertexta*						x		x
366383.6	6401159	*Casuarina cristata*						x		x
366315.6	6401421	*Eucalyptus intertexta*						x	x	
366144.1	6401627	*Eucalyptus intertexta*				x			x	
366141	6401632	*Stag*			x				x	x
366129	6401637	*Eucalyptus intertexta*						x	x	
366124.3	6401653	*Eucalyptus intertexta*						x	x	
366110.8	6401656	*Eucalyptus intertexta*						x	x	
366096.3	6401696	*Stag*				x			x	
366072.6	6401700	*Eucalyptus intertexta*				x			x	
365672.5	6402177	*Geijera parviflora*			x				x	
365662.9	6402201	*Eucalyptus populnea*				x			x	
365622.1	6402237	*Casuarina cristata*				x			x	x
365611.6	6402263	*Eucalyptus populnea*						x	x	
365086.8	6402861	*Eucalyptus intertexta*			x					x
365049.3	6402898	*Eucalyptus intertexta*				x			x	x

Easting	Northing	Species	5-10cm	10-20cm	20-30cm	30-50cm	50-80cm	80+ cm	limb	trunk
364978.5	6402992	*Eucalyptus intertexta*						x	x	
364937.8	6403022	*Eucalyptus intertexta*					x		x	
364919	6403052	*Eucalyptus intertexta*					x		x	x
364819.5	6403156	*Eucalyptus intertexta*				x				x
364798.5	6403197	*Eucalyptus intertexta*				x			x	
364576.5	6403446	*Eucalyptus intertexta*					x		x	
364492.2	6403553	*Eucalyptus intertexta*			x				x	
364101.9	6404011	*Eucalyptus intertexta*			x				x	
364086.5	6404015	*Stag*		x						x
364091	6404024	*Stag*		x						x
364036	6404075	*Stag*			x				x	
364013.4	6404099	*Eucalyptus intertexta*				x			x	
363829	6404311	*Eucalyptus intertexta*					x		x	
363824.2	6404329	*Eucalyptus intertexta*				x			x	
363404.6	6404806	*Eucalyptus intertexta*						x	x	
363323.5	6404916	*Stag*				x			x	
363182.5	6405070	*Eucalyptus intertexta*				x			x	x
363096.6	6405174	*Eucalyptus intertexta*						x	x	
363008.1	6405262	*Stag*			x					x
363019.8	6405263	*Eucalyptus intertexta*					x		x	
362989.2	6405298	*Stag*				x				x
362580.2	6405775	*Stag*			x				x	
362370.9	6406013	*Eucalyptus intertexta*				x			x	
362197.7	6406209	*Eucalyptus intertexta*						x	x	
362077.6	6406353	*Eucalyptus intertexta*						x	x	x
362045.7	6406400	*Eucalyptus intertexta*						x	x	x
362010.2	6406435	*Eucalyptus intertexta*						x	x	
361983.7	6406451	*Eucalyptus intertexta*				x			x	
361988.1	6406462	*Eucalyptus intertexta*				x			x	
361955.5	6406504	*Stag*						x	x	x
361939.5	6406523	*Stag*						x	x	
361896.8	6406574	*Stag*						x	x	
361829.5	6406635	*Stag*				x			x	
361767.8	6406702	*Stag*				x			x	x
361764.5	6406721	*Eucalyptus intertexta*						x	x	
361736.2	6406749	*Eucalyptus intertexta*					x		x	
361724.8	6406756	*Eucalyptus intertexta*						x	x	
361576.6	6406924	*Eucalyptus intertexta*					x		x	
361571.7	6406953	*Eucalyptus intertexta*					x		x	
361491.6	6407026	*Eucalyptus intertexta*					x		x	

Easting	Northing	Species	5-10cm	10-20cm	20-30cm	30-50cm	50-80cm	80+ cm	limb	trunk
361498.4	6407033	*Eucalyptus intertexta*						x	x	
361413.1	6407112	*Eucalyptus intertexta*					x		x	
361416.3	6407112	*Eucalyptus intertexta*						x		x
361355.9	6407197	*Eucalyptus intertexta*						x	x	x
361351.9	6407199	*Eucalyptus intertexta*						x		x
361140.8	6407423	*Stag*				x			x	x
361109.2	6407473	*Eucalyptus intertexta*						x	x	x
361091.4	6407478	*Eucalyptus intertexta*					x			x
361091.8	6407489	*Eucalyptus intertexta*					x		x	
360597	6408022	*Eucalyptus intertexta*								
360562	6408064	*Eucalyptus intertexta*								
360309	6408362	*Eucalyptus intertexta*								
360304	6408363	*Eucalyptus intertexta*								
360261	6408403	*Eucalyptus intertexta*								
360260	6408413	*Eucalyptus intertexta*								
360242	6408418	*Eucalyptus intertexta*								
360231	6408439	*Stag*								
360220	6408463	*Eucalyptus intertexta*								
360083	6408600	*Eucalyptus intertexta*								
360069	6408625	*Eucalyptus intertexta*								
360050	6408630	*Eucalyptus intertexta*								
360047	6408632	*Stag*								
360032	6408670	*Eucalyptus intertexta*								
360021	6408671	*Eucalyptus intertexta*								
359961	6408735	*Eucalyptus socialis*			x					x
359958	6408744	*Eucalyptus sp. (mallee)*			x					x
359956.7	6408758	*Eucalyptus intertexta*			x					x
359917.1	6408801	*Stag*			x					x
359904.7	6408804	*Eucalyptus intertexta*		x						x
359892	6408805	*Eucalyptus sp. (mallee)*			x					x
359889.2	6408808	*Eucalyptus intertexta*			x				x	
359891.1	6408816	*Stag*			x					x
359878	6408819	*Eucalyptus intertexta*			x					x
359887.5	6408821	*Stag*			x					x
359877.2	6408834	*Eucalyptus intertexta*				x			x	
359861.6	6409014	*Eucalyptus intertexta*				x			x	
359865	6409023	*Eucalyptus intertexta*				x			x	
359866.1	6409054	*Eucalyptus intertexta*				x			x	
359859.4	6409054	*Eucalyptus intertexta*				x			x	
359865.3	6409065	*Eucalyptus intertexta*				x			x	

Easting	Northing	Species	5-10cm	10-20cm	20-30cm	30-50cm	50-80cm	80+ cm	limb	trunk
359865	6409100	*Eucalyptus intertexta*			x				x	
359871.7	6409147	*Eucalyptus intertexta*				x			x	
359887.1	6409171	*Eucalyptus intertexta*			x					x
359876.8	6409177	*Eucalyptus intertexta*			x					x
359879.2	6409178	*Eucalyptus intertexta*				x				x
359877.2	6409194	*Eucalyptus intertexta*				x				
359883.6	6409202	*Eucalyptus intertexta*				x				
359887.2	6409235	*Eucalyptus intertexta*				x			x	x
359892.6	6409244	*Eucalyptus intertexta*				x				
359886.2	6409254	*Eucalyptus intertexta*			x				x	
359885.9	6409262	*Eucalyptus intertexta*				x			x	
359890.3	6409326	*Stag*			x					x
359892.9	6409329	*Eucalyptus intertexta*			x				x	

Appendix B: Rapid Plot Data

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Yathong Nature Reserve – feral predator free area

Site no: 1 Date: 22/3/2022 Recorder: Dave Sturman

Easting: 359929 Northing: 6409564 GDA 94

Geology: Aspect: South Zone: 55

Plot size: 20x 20m Slope:

Location: Yathong Road fence corridor

Photo notes / bearing: All photos taken heading South along alignment

Notes: (e.g. landscape, soil, drainage, disturbance):

Stratum	Height	% PFC	Dominant species (in order of importance)
Upper tree / canopy	7-9m	30	Eucalyptus viridis Eucalyptus sociabis Eucalyptus dumosa
Lower tree / mid storey	2.5m	2	Eucalyptus viridis Eucalyptus sociabis
Shrub	2.5m	2	Enchylaena tomentosa Olearia pimeleoides Hakea tephrosperma
Ground	30cm	20	Triodia Scariosa Atriplex eardleyae Austrostipa scabra

Threatened species:

N/A

Plant community type: 173

Significant threats, weeds:

N/A

Additional notes / comments:

N/A

Yathong Nature Reserve – feral predator free area

Site no: 2 Date: 22/3/22 Recorder: Dave Stevens

Easting: 359900 Northing: 6400272 GDA 94 Zone: 55

Geology: Aspect: South Slope: Flat

Plot size: 20x 20m

Location: Yathong Road fence corridor

Photo notes / bearing: All photos taken heading south along alignment

Notes: (e.g. landscape, soil, drainage, disturbance):

Stratum	Height	% PFC	Dominant species (in order of importance)
Upper tree / canopy	10	7	Eucalyptus intertexta Eucalyptus sociabis
Lower tree / mid storey	3-4	5	Eucalyptus intertexta
Shrub	1-2	30	Eremophilla glabra Olearia pimeleoides Eremophilla oleavica
Ground	<1	20	Triodia scariosa Austrostipa scabra Vittadinea cuneata

duttonii/glabra

Threatened species:

NA

Plant community type: 171 Inkeley

Significant threats, weeds:

N/A

Additional notes / comments:

N/A

Yathong Nature Reserve – feral predator free area

Site no: 3
Date: 23.3.22
Recorder: Jane Sherman
Easting: 361007
Northing: 6407605
GDA 94
Zone: 55
Geology:
Aspect: South ~~East~~
Slope:
Plot size: 20x 20m

Location: Yathong Road fence corridor
Photo notes / bearing: All photos taken bearing South along alignment
Notes: (e.g. landscape, soil, drainage, disturbance):

Stratum	Height m	% PFC	Dominant species (in order of importance).
Upper tree / canopy	8	40	Eucalyptus socialis Eucalyptus viridis Eucalyptus dumosa
Lower tree / mid storey	NA	—	—
Shrub	1–2	6	Eremophila glabra Hakea tephrosperma Olearia pimeleoides
Ground	0.3	40	Austrostipa scabra Vittadinea cuneata Austrostipa elegantissima

Threatened species: NA

Plant community type: 173

Significant threats, weeds:

NA

Additional notes / comments:

Euc gracilis present just outside plot
Geijera parviflora"

Yathong Nature Reserve – feral predator free area

Site no: 4
Easting: 362708
Geology:
Plot size: 20x 20m

Date: 23/3/22
Northing: 6405644
Aspect: South east

Recorder: D Sturman
GDA 94
Zone: 55
Slope:

Location: Yathong Road fence corridor
Photo notes / bearing: All photos taken bearing south along alignment
Notes: (e.g. landscape, soil, drainage, disturbance):

Stratum	Height	% PFC	Dominant species (in order of importance)
Upper tree / canopy	12	10	Eucalyptus intertexta
Lower tree / mid storey			
Shrub	1-2	15	Dodonaea viscosa Eremophila mitchelli Dodonea aculeata
Ground	<0.3	20	Austrostipa scabra Thyridolepis mitchelliana Sclerolaena diacantha

Threatened species:

N/A

Plant community type: 104

Significant threats, weeds:

N/A

Additional notes / comments:

Open woodland

Yathong Nature Reserve – feral predator free area

Site no: 5 Date: 23-3-22 Recorder: D. Sturman

Easting: 364293 Northing: 6403816 GDA 94

Geology: Aspect: South east Zone: 55

Plot size: 20x 20m Slope:

Location: Yathong Road fence corridor.

Photo notes / bearing: All photos taken bearing south along alignment

Notes: (e.g. landscape, soil, drainage, disturbance):

Stratum	Height	% PFC	Dominant species (in order of importance)
Upper tree / canopy	6	30	Eucalyptus intertexta Eucalyptus socialis Eucalyptus dumosa
Lower tree / mid storey	4	3	Casuarina parvula
Shrub	3	2	Eremophila Mitchelli Dodonea viscosa
Ground	<03	60	Eragrostis sp Maireana sedifolia Vittadinia cuneata

intertexta socialis dumosa

Threatened species:

N/A

Plant community type: 174

Significant threats, weeds:

N/A

Additional notes / comments:

Signs of pig rooting

Yathong Nature Reserve – feral predator free area

Site no: 6
Date: 23.3.22
Recorder: O Sturman
Easting: 385665
Northing: 6402210
GDA 94
Zone: 55
Geology:
Aspect: South east
Slope:
Plot size: 20x 20m

Location: Yathong Road fence corridor
Photo notes / bearing: All photos taken bearing south along alignment
Notes: (e.g. landscape, soil, drainage, disturbance):

Stratum	Height	% PFC	Dominant species (in order of importance)
Upper tree / canopy	20 16	8 1	Eucalyptus populnea Casuarina cristata
Lower tree / mid storey	8	4	Geijera parviflora
Shrub	2 1 0.4	2 0.5 1	Dodonaea viscosa Eremophilla longifolia Enchylaena tomentosa
Ground	<0.3	5 3 1	Austrostipa scabra Paspalidium constrictum Sclerolaena diacantha

(Foliage cover only)

Threatened species:

N/A

Plant community type: 57

Significant threats, weeds:

N/A

Additional notes / comments:

Zone dominant species is Casuarina Cristata

Yathong Nature Reserve – feral predator free area

Site no: 7
Easting: 366417
Geology:
Plot size: 20x 20m

Date: 23-5-22
Northing: 6400383
Aspect: South

Recorder: D Sturman
GDA 94
Zone: 55
Slope:

Location: Yathong Road fence corridor
Photo notes / bearing: All photos taken bearing south along alignment
Notes: (e.g. landscape, soil, drainage, disturbance):

Stratum	Height	% PFC	Dominant species (in order of importance)
Upper tree / canopy	16	30	Casuarina cristata
Lower tree / mid storey	9	4	Geijera parviflora
Shrub	0.4 1 0.5	1.5 1 0.5	Enchylaena tomentosa Eremophila glabra Solanum ferocissimum
Ground	<0.3	6 0.5 0.2	Austrostipa scabra Atriplex eardleyi Sclerolaena diacantha

Threatened species:

N/A

Plant community type: 57

Significant threats, weeds:

N/A

Additional notes / comments:

N/A

Yathong Nature Reserve – feral predator free area

Site no: B
Date: 23-3-22
Recorder: D Sturmans
Easting: 386481
Northing: 6398120
GDA 94
Zone: 55
Geology:
Aspect: South
Slope:
Plot size: 20x 20m

Location: Yathong Road fence corridor
Photo notes / bearing: All photos taken bearing south along alignment
Notes: (e.g. landscape, soil, drainage, disturbance):

Stratum	Height	% PFC	Dominant species (in order of importance)
Upper tree / canopy	14	3	Eucalyptus populnea
Lower tree / mid storey	2	1	Apophyllum anomalum
Shrub	≤0.5	6 3 3	Salsola kali Enchylaena tomentosa Einadia nutans
Ground	≤0.3	2 5 4	Dichanthium sericeum Sclerolaena diacantha

Threatened species:

N/A

Plant community type: 57

Significant threats, weeds:

N/A

Additional notes / comments:

N/A

Yathong Nature Reserve – feral predator free area

Site no: 9 Date: 23-3-22 Recorder: D Sturman

Easting: 364 894 Northing: 6396169 GDA 94

Zone: 55

Geology: Aspect: South West Slope:

Plot size: 20x 20m

Location: Yathong Road fence corridor.

Photo notes / bearing: All photos taken bearing south along alignment

Notes: (e.g. landscape, soil, drainage, disturbance):

Stratum	Height	% PFC	Dominant species (in order of importance)
Upper tree / canopy	15 14	5 2	Casuarina cristata Callitris glaucophylla
Lower tree / mid storey	6	3	Hakea decurvifolia
Shrub	N/A	N/A	N/A.
Ground	<0.4	3 0.5 0.2	Enchylaena tomentosa Salsola kali Sclerolaena diacantha

Threatened species:

N/A

Plant community type: 57

Significant threats, weeds:

N/A

Additional notes / comments:

N/A

Yathong Nature Reserve – feral predator free area

Site no: 10
Date: 24-5-22
Recorder: D. Sturman
Easting: 357006
Northing: 6378360
GDA 94
Zone: 55
Geology:
Aspect: South west
Slope:
Plot size: 20x 20m

Location: Coombie Road fence corridor
Photo notes / bearing: All photos taken south along alignment
Notes: (e.g. landscape, soil, drainage, disturbance):

Stratum	Height	% PFC	Dominant species (in order of importance)
Upper tree / canopy	14	20	Eucalyptus interfexta
Lower tree / mid storey	1	0.2	Callitris glaucophylla
Shrub	1 1 0.5	2 1 0.5	Eremophilla longifolia Geijera parviflora Solanum ferocissimum
Ground	≤0.4	20 10 5	Austrostipa scabra Pasplidium constrictum Calotis cuneifolia

Threatened species:
N/A

Plant community type: 104

Significant threats, weeds:
N/A

Additional notes / comments:
N/A

Yathong Nature Reserve – feral predator free area

Site no: 11 Date: 24-3-22 Recorder: D. Sturman

Easting: 357517 Northing: 6378689 GDA 94

Zone: 55

Geology: Aspect: South west Slope: Plain

Plot size: 20x 20m

Location: Coombie Road fence corridor

Photo notes / bearing: All photos taken south along alignment

Notes: (e.g. landscape, soil, drainage, disturbance): flat grassy woodland

Stratum	Height	% PFC	Dominant species (in order of importance)
Upper tree / canopy	12	15	Callitris glaucophylla
Lower tree / mid storey	2	4	callitris glaucophylla
Shrub	2	3	Myoporum montanum Eremophila longifolia Eremophila glabra
Ground	<0.3	20 7 3	Austrostipa Calotis cuneifolia Abutilon (oxycarpum)

Threatened species:

N/A

Plant community type: 77

Significant threats, weeds:

N/A

Additional notes / comments:

lots of variety of chenopods

Enchylaena tomentosa

Sulsola kali

Sclerolaena chacanthe

Atriplex leucocarpa

Atriplex semibarcata

Yathong Nature Reserve – feral predator free area

Site no: 12 Date: 24-3-22 Recorder: D Shurman

Easting: 357773 Northing: 6378825 GDA 94 Zone: 55

Geology: Aspect: South west Slope: flat

Plot size: 20x 20m

Location: Coombie Road fence corridor

Photo notes / bearing: All photos taken bearing South along alignment

Notes: (e.g. landscape, soil, drainage, disturbance):

Stratum	Height	% PFC	Dominant species (in order of importance)
Upper tree / canopy	18	8	Casuarina cristata
Lower tree / mid storey	12	20	Geijera parviflora
Shrub	0.4 0.3	3 1.5	Enchylaena tomentosa Atriplex stipitata
Ground	≤0.3	10 4 2	Austrostipa scabra sclerolaena divaricata Calotis hispidula

Threatened species:

N/A

Plant community type: 37

Significant threats, weeds:

N/A

Additional notes / comments:

N/A

Yathong Nature Reserve – feral predator free area

Site no: 13 Date: 24-3-22 Recorder: D. Sturman

Easting: 359726 Northing: 6379732 GDA 94

Geology: Aspect: South west Zone: 55

Plot size: 20x 20m Slope: flat

Location: Coombie Road fence corridor

Photo notes / bearing: All photos taken bearing south along alignment

Notes: (e.g. landscape, soil, drainage, disturbance):

Stratum	Height	% PFC	Dominant species (in order of importance)
Upper tree / canopy	13	5	Callitris glaucophylla
Lower tree / mid storey	3	3	Alectryon oleifolius
	1	1	Myoporum montanum
Shrub	<0.5	3	Enchylaena tomentosa
		2	Sclerolaena birchii
Ground	<0.5	20	Austrostipa scabra
		6	Atriplex semibaccata
		3	Atriplex stipitata
		1.5	Solanum heterosymum
		0.5	Einadia hastata
		0.5	Sida sp

Threatened species:

N/A

Plant community type: 72

Significant threats, weeds:

N/A

Additional notes / comments:

N/A

Yathong Nature Reserve – feral predator free area

Site no: 14
Date: 24-3-22
Recorder: D Sturman
Easting: 360961
Northing: 6381239
GDA 94
Zone: 55
Geology:
Aspect: South west
Slope: flat
Plot size: 20x 20m

Location: Coombie Road fence corridor
Photo notes / bearing: All photos taken bearing south along alignment
Notes: (e.g. landscape, soil, drainage, disturbance):

Stratum	Height	% PFC	Dominant species (in order of importance)
Upper tree / canopy	10	30	Callitris glaucophylla
Lower tree / mid storey			
Shrub	2	1	Dodonaea sp
Ground	<0.3	4	Austrostipa scabra
		1	Enchylaena tomentosa
		0.5	Abutilon sp
		0.5	Rhyticocarpa
		0.2	Sclerolaena diacantha

Threatened species:
N/A

Plant community type: 72

Significant threats, weeds:
N/A

Additional notes / comments:
Callitris forest. Quite bare ground.

Yathong Nature Reserve – feral predator free area

Site no: 15
Easting: 363058
Geology:
Plot size: 20x 20m

Date: 24-3-22
Northing: 6381921
Aspect: South west

Recorder: DSterman
GDA 94
Zone: 55
Slope: flat

Location: Coombie Road fence corridor
Photo notes / bearing: All photos taken bearing south along alignment
Notes: (e.g. landscape, soil, drainage, disturbance):

Stratum	Height	% PFC	Dominant species (in order of importance)
Upper tree / canopy	4	1	Callitris glaucophylla
Lower tree / mid storey			
Shrub	0.5	0.1	Senna artemisioides
Ground	<0.5	4	Austrostipa scabra
		3	Abutilon sp
		0.5	Solanum esuriale
		3	Sclerolaena diacantha
		0.5	Atriplex stipitata
		0.2	Sida cunninghamii
		0.2	Calotis cuneifolia
		0.1	Atriplex semibaccata
		0.1	Sclerolaena birchii

Threatened species:
N/A

Plant community type:
Derived (from 72 Richea) Sida corrugata

Significant threats, weeds:
Wild Sage
Bathurst burr in drainage gutter along road

Additional notes / comments:
N/A

Yathong Nature Reserve – feral predator free area

Site no: 16 Date: 24-3-22 Recorder: D. Sturman

Easting: 383201 Northing: 6383475 GDA 94

Zone: 55

Geology: Aspect: South Slope: flat

Plot size: 20x 20m

Location: Yathong Road fence corridor

Photo notes / bearing: All photos taken bearing south along alignment

Notes: (e.g. landscape, soil, drainage, disturbance):

Stratum	Height	% PFC	Dominant species (in order of importance)
Upper tree / canopy	6	40	Callitris glaucophylla
Lower tree / mid storey	3	1	Geijera parviflora
Shrub	0.5 0.6	1 0.5	Enchylaena tomentosa Myoporum montanum
Ground	0.3	3 1 1 0.5 0.2	Austrostipa scabra Aristida jerichoensis Sclerolaena diacantha Tall copperburr Sida sp

Threatened species:

N/A

Plant community type:

72

Significant threats, weeds:

N/A

Additional notes / comments:

N/A

Yathong Nature Reserve – feral predator free area

Site no: 17
Date: 24-3-22
Recorder: J Sturmer
Easting: 363653
Northing: 6394463
GDA 94
Zone: 55
Geology:
Aspect: South west
Slope: flat
Plot size: 20x 20m

Location: Yathong Road fence corridor
Photo notes / bearing: All photos taken bearing south along alignment
Notes: (e.g. landscape, soil, drainage, disturbance):

Stratum	Height	% PFC	Dominant species (in order of importance)
Upper tree / canopy	N/A	N/A	N/A
Lower tree / mid storey	3	5	Eremophilla sturtii
Shrub	0.4	6 5	Sclerolaena birchii Sclerolaena diacantha
Ground	≤0.3	20 8 3 1 0.2	Calotis cuneifolia Aristida spp. Abutilon spp. Sida corrugata Enchinochloa colonum

Threatened species:
N/A

Plant community type: 143

Significant threats, weeds:
N/A

Additional notes / comments:
N/A

Yathong Nature Reserve – feral predator free area

Site no: 18 Date: 24.3.2022 Recorder: D. Sturman

Easting: 363375 Northing: 6392791 GDA 94 Zone: 55

Geology: Aspect: south west Slope: N.I

Plot size: 20x 20m

Location: Yathong Road fence corridor

Photo notes / bearing: All photos taken bearing south along alignment

Notes: (e.g. landscape, soil, drainage, disturbance):

Stratum	Height	% PFC	Dominant species (in order of importance)
Upper tree / canopy	7 3	9 17	Eucalyptus populnea Callitris glaucophylla
Lower tree / mid storey	3	1.5	Geijera parviflora
Shrub	0.4	2	Sclerodaena birchii
Ground	≤0.3	25 30 15 6 4 3 1	Panicum sp Austrostipa scabra Paspalidium jubiflorum 5 minute grass Calotis cuneifolia Sclerolaena diacantha Vittadinea cuneata

Threatened species:

N/A

Plant community type: 105

Significant threats, weeds:

N/A

Additional notes / comments:

Single age cohort of Bimble box.

low point where water is likely to pool.

Yathong Nature Reserve – feral predator free area

Site no: 19
Easting: 342794

Date: 24-3-22
Northing: 6389815

Recorder: O Sturman
GDA 94
Zone: 55
Slope: Slight slope 15%

Geology:
Plot size: 20x 20m

Aspect: South

Location: Yathong Road fence corridor
Photo notes / bearing: All photos taken bearing South along alignment
Notes: (e.g. landscape, soil, drainage, disturbance):

Stratum	Height	% PFC	Dominant species (in order of importance)
Upper tree / canopy	19 19	10 6	Casuarina cristata Eucalyptus populnea
Lower tree / mid storey	5	7	Geijera parviflora
Shrub	1.2 1	3 1	Eremophila longifolia narrow leaved Dodonaea
Ground	<0.4	3 5 5	Enchylaena tomentosa Sclerolaena birchii Austrostipa scabra

3 Atriplex stipitata
2 5 Sclerolaena diacantha
0 2 Abutilon
0.2 Sida sp
0 1 Atriplex eardleyi

Threatened species:
N/A

Plant community type: 57

Significant threats, weeds:
N/A

Additional notes / comments:
N/A

Yathong Nature Reserve – feral predator free area

Site no: 20
Easting: 363191
Date: 24-3-22
Northing: 6387823
Recorder: D Shannon
GDA 94
Zone: 55
Geology:
Aspect: South
Slope: Slight Slope
Plot size: 20x 20m

Location: Yathong Road fence corridor
Photo notes / bearing: All photos taken bearing South along alignment 15 - 20°
Notes: (e.g. landscape, soil, drainage, disturbance):

Stratum	Height	% PFC	Dominant species (in order of importance)
Upper tree / canopy	~~7~~ 7 8	~~30~~ 12 5	Eucalyptus socialis Eucalyptus gracilis Eucalyptus dumosa
Lower tree / mid storey			
Shrub	0.5 0.4	2 0.1	Olearia pimeleoides Ruby salt
Ground	<0.3	10 1 0.1	Austrostipa scabra Vittadinea cuneata Sclerolaena diacantha

Threatened species:
N/A

Plant community type: 173

Significant threats, weeds:
N/A

Additional notes / comments:
N/A

Appendix C Fauna Handling and Rescue Procedure

Purpose

This procedure explains the actions to be taken if an animal or eggs are discovered on the site that require handling or rescue during vegetation and soil clearance and ongoing construction activities. The procedure relates primarily to injured shocked and juvenile individuals but also applies to nocturnal fauna or slow-moving species that may not be capable of moving away from mobile plant and equipment.

Scope

This procedure is applicable to all native and introduced species that are found on the site. Attendee construction staff and contractors will attend a project induction, which will include a section on fauna.

Procedure

In the event wildlife (including shocked, juvenile animals or eggs) are discovered on the site during vegetation and soil clearance and ongoing construction activities the following steps shall be taken:

1. STOP ALL WORK in the vicinity of the fauna and immediately notify the work supervisor, who will then notify a member of the Environmental/ management team.

2. If required, contact project ecologist to obtain positive identification of the subject species.

3. Preferably allow fauna to leave the area without intervention.

4. If immediately available, use a licensed fauna ecologist or wildlife carer with specific animal handling experience to carry out any fauna handling.

5. To minimise stress to native fauna and remove the risk of further injury an appropriately competent person shall:

    a. If time permits call ecologist or fauna rescue for advice.

    b. Attempt to herd animal into adjoining forest, outside construction area.

    c. If capture is necessary cover larger animals with a towel or blanket and place in a large cardboard box and/or cotton/calico bag

    d. Place smaller animals in a cotton/calico bag tied at the top

    e. Keep the animal in a quiet, warm, ventilated and dark place away from noisy construction activities.

    f. Aquatic fauna are to be placed in plastic aquaria or a moistened plastic bag. Frogs will be transported in moistened plastic bags (1 frog/bag) with a small amount of leaf litter. Handling and translocation of frogs shall be in accordance with the Hygiene Protocol for the Control of Disease in Frogs (DECC 2008).