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Final Report

Ecological Assessment of Vegetation Clearing at Wombinoo Station, Gunnawarra, Queensland

Prepared for

Commonwealth Department of the Environment and Energy

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GLOSSARY

Acronym	Description
ALA	Atlas of Living Australia
DEHP	Queensland Department of Environment and Heritage Protection
DEHWA	former Commonwealth Department of Environment, Heritage, Water and the Arts
DNRM	Queensland Department of Natural Resources and Mines
DoE	former Commonwealth Department of the Environment
DoEE	Commonwealth Department of the Environment and Energy
DSEWPaC	former Commonwealth Department of Sustainability, Environment, Populations and Communities
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
MNES	Matters of National Environmental Significance
RE	Regional Ecosystem
REDD	Regional Ecosystem Description Database
SP Act	*Sustainable Planning Act 2009*
TEC	Threatened Ecological Community. Listed under the EPBC Act.
TSSC	Threatened Species Scientific Committee
VM Act	*Vegetation Management Act 1999*

EXECUTIVE SUMMARY

Ecology and Heritage Partners Pty Ltd was engaged by the Commonwealth Department of the Environment and Energy (DoEE) to conduct an Ecological Assessment of vegetation that had been recently cleared at a rural property south-west of Cairns in North Queensland as well as vegetation approved for clearing. The purpose of this report is to provide an assessment of the vegetation that had been cleared as well as vegetation that is approved to be cleared to determine whether Matters of National Environmental Significance (MNES) listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) are likely to occur or had previously occurred within the study area and, if so, whether the clearing and/or proposed clearing had or will have a significant impact on these values.

Wombinoo Station is described as rural land approximately 38 kilometres south of Mount Garnet in North Queensland. For the purposes of this assessment, the study area is defined as the areas approved for clearing (some of which had been cleared at the time of the survey).

A desktop assessment and preliminary field survey were completed within the study area. The field assessment was conducted from 17 to 19 August 2016 and was completed to identify the vegetation communities and flora and fauna values (such as potential occurrence of threatened species) within the study area. Where vegetation communities had been cleared, an assessment of the felled vegetation and analogous vegetation communities adjacent to the clearing was completed, where possible. The field assessment included a fauna habitat assessment of the study area and targeted survey for threatened fauna species.

The majority of the study area assessed comprises similar gum-ironbark-bloodwood grassy woodlands with locally dominant species such as Queensland Blue Gum *Eucalyptus tereticornis*, Poplar Gum *E. platyphylla*, Lemon-scented Gum *Corymbia citriodora*, Clarkson's Bloodwood *C. clarksoniana,* Narrow-leaved Ironbark *E. crebra* and White Stringybark *E. portuensis*. The low tree layers are generally absent or sparse comprising juvenile canopy species as well as Powder Puff Wattle *Acacia flavescens*, Bushman's Clothes Peg *Grevillea glauca* and Quinine Bush *Petalostigma pubescens,* and occasionally *Melaleuca stenostachya*. The shrub layer was generally absent although occasional infestations of the shrubby weed Lantana *Lantana camara* provided this layer. The ground cover was generally grassy comprising the native grass species Kangaroo Grass *Themeda australis* and Black Speargrass *Heteropogon contortus*.

Most areas of remnant vegetation observed provide habitat in the form of arboreal hollows. Queensland Blue Gum, Narrow-leaved Ironbark and White Stringybark in particular commonly displayed habitat hollows. Recently felled woodland vegetation allowed close inspection of hollows, some of which displayed potential evidence of usage by birds and bats. Where thinning or selective logging had occurred, the abundant woody debris provided habitat for reptiles.

Six Greater Gliders *Petauroides volans*, listed as vulnerable under the EPBC Act, were detected during the survey period by spotlighting along Gunnawarra Road and active searching within habitat areas. Two individuals were detected within the study area and four individuals were detected immediately adjacent to the study area within similar habitats. Other threatened species that were considered to potentially occur within the study area included the vulnerable Yakka Skink *Egernia rugosa*, Red

Goshawk *Erythrotriorchis radiatus*, Black-footed Tree Rat *Mesembriomys gouldii rattoides* and the Koala *Phascolarctos cinereus*. It was found that an important population of Greater Glider and Koala are likely to occur within the study area and an important population of Black-footed Tree Rat has a moderate likelihood of occurring.

A significant impact assessment using the Significant Impact Guidelines and other published documents was completed for all three species based on the clearing that had been completed and areas approved for clearing. The assessment found that:

- An important population of Greater Glider occurs within Wombinoo Station and there is likely to have been a significant impact on this species from the clearing of 560 hectares of habitat that has been completed to date. Furthermore, the proposed clearing of additional habitat is likely to further exacerbate this impact.
- An important population of Koala occurs within Wombinoo Station and there is likely to have been a significant impact on this species due to the clearing of 560 hectares of secondary habitat that has been completed to date. Furthermore, the proposed clearing of additional habitat is likely to further exacerbate this impact.

An important population of Black-footed Tree Rat has a moderate likelihood of occurrence within Wombinoo Station and, if identified at the site, there is likely to have been a significant impact on this species due to the clearing of 560 hectares of habitat that has been completed to date. Furthermore, the proposed clearing of additional habitat is likely to further exacerbate this impact.

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1 INTRODUCTION

1.1 Background and Purpose

Ecology and Heritage Partners Pty Ltd was engaged by the Commonwealth Department of the Environment and Energy (DoEE) to conduct an Ecological Assessment of vegetation that had been recently cleared at a rural property south-west of Cairns in North Queensland as well as vegetation approved for clearing. The DoEE is investigating the proposed and completed clearing for potential significant impacts on matters of National Environmental Significance (MNES) listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The purpose of this report is to provide an assessment of the vegetation that had been cleared as well as vegetation that is approved to be cleared to determine whether MNES are likely to occur or had previously occurred within the study area and, if so, whether the clearing and/or proposed clearing had or will have a significant impact on these values.

1.2 Study Area

Wombinoo Station is described as rural land approximately 38 kilometres south of Mount Garnet in North Queensland (Figure 1). The property is located within the Tablelands Regional Council (TRC) area and is described as Lot 3825 on SP273689. The study area is located within the Einasleigh Uplands Bioregion (9) and Herberton – Wairuna subregion (9.6).

The study area, defined as the areas approved for clearing within Wombinoo Station, is approximately 3328.67 hectares in area and occurs between 600 metres to 720 metres above sea level. Approximately 560 hectares had been cleared at the time of the survey and a further 2,768 hectares had approval to be cleared.

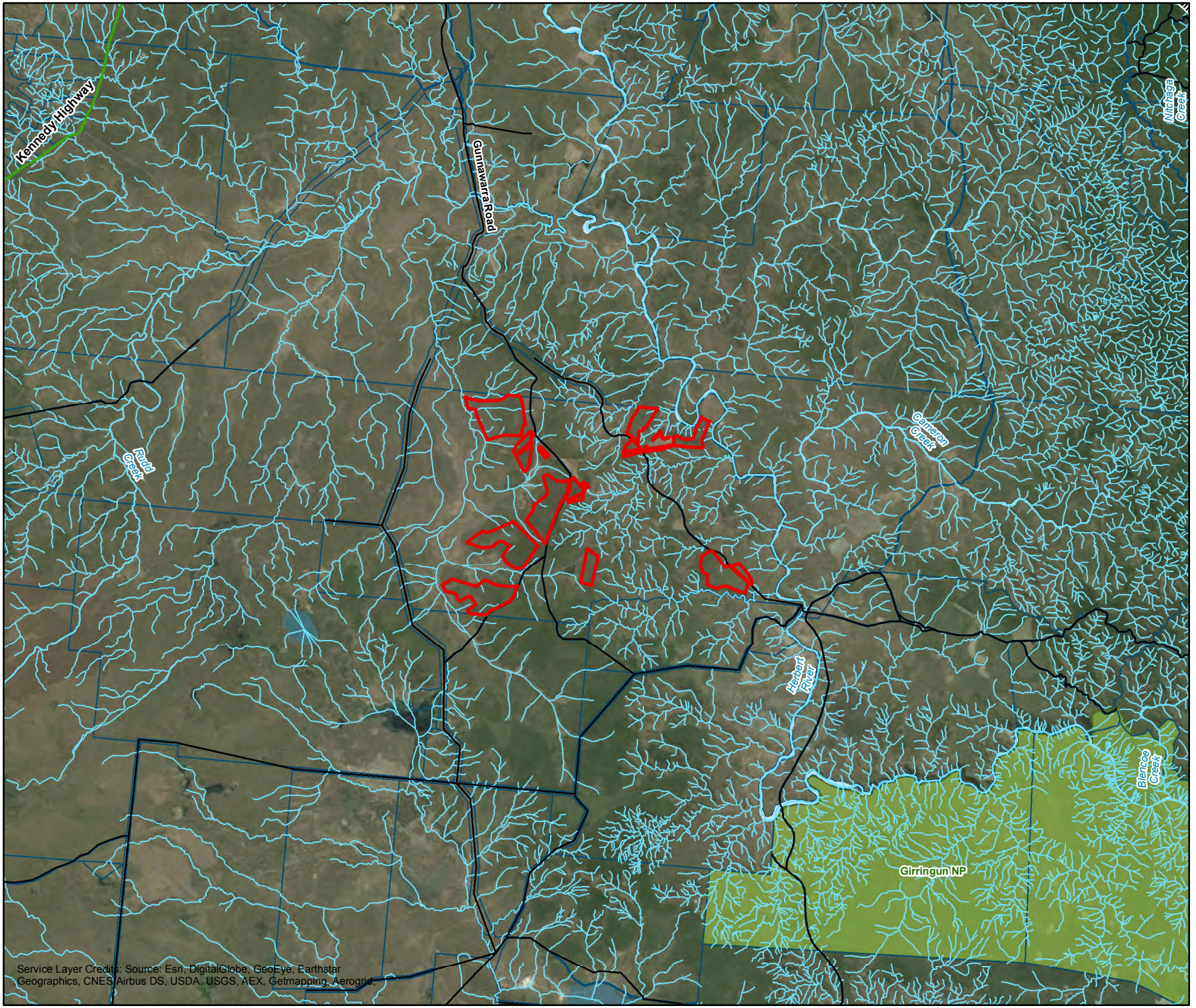
The study area comprises savannah woodlands and clearing recently occurred within some woodland vegetation. Several farm dams are located within Wombinoo Station, including natural wetland areas (Martins Swamp) (Figure 1). The western portion of the study area drains to Rudd Creek to the north and the eastern portion drains to the Herbert River to the east. Rudd Creek flows into the Herbert River approximately 10 kilometres north of the study area.

1.3 Scope of Works

The scope of works for this report includes:

- Describe the relevant existing environment within the study area based on desktop searches and a preliminary field survey;
- Identify the potential suite of threatened species that are likely to occur within vegetation approved to be cleared or would be expected to utilise the study area had vegetation clearing not commenced;

- Provide an assessment of the vegetation communities present and cleared using vegetation quadrats and analogues of adjacent similar vegetation; and
- Determine the following:
    - Based on the vegetation cleared at the time of the survey is it likely that any MNES listed under the EPBC Act has been significantly impacted?; and
    - Based on the vegetation that is approved to be cleared, is the proposed clearing likely to result in any MNES being significantly impacted?



Legend

- Study Area
- Highway
- Secondary road
- Major watercourse
- Minor watercourse
- Conservation areas/national parks
- Property boundaries

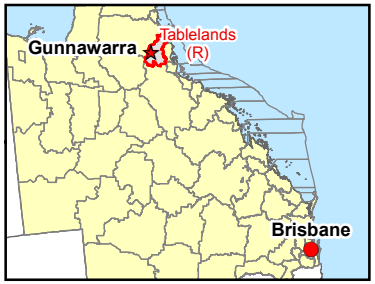


Figure 1

Location of Study Area

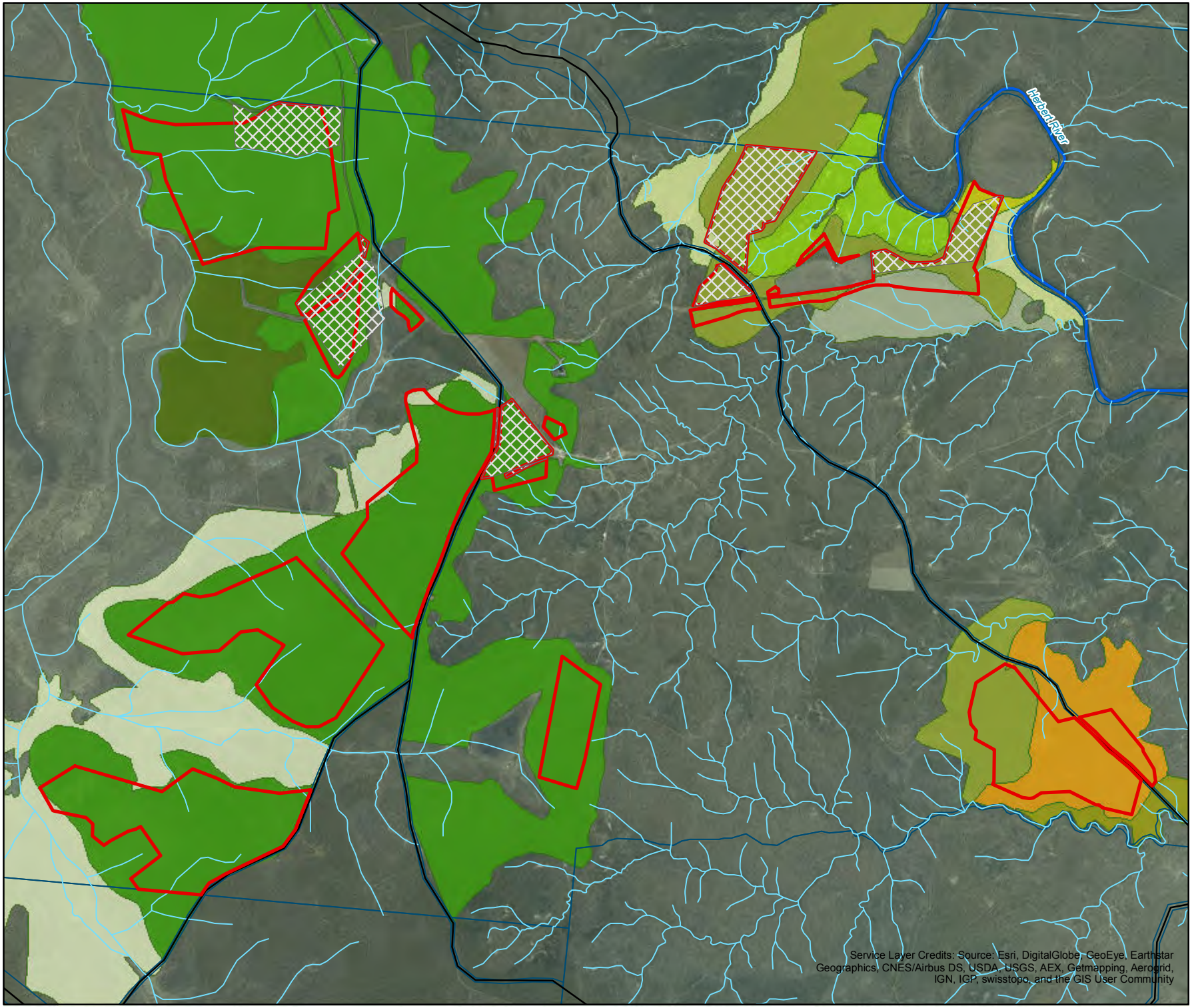
Ecological Assessment of Vegetation Clearing at Wombino Station, Gunnawarra Road, Gunnawarra

N

0 5 10

Kilometres

ecology & heritage partners



Legend

- Secondary road
- Study Area
- Cleared Areas

Regional Ecosystems

- 9.12.1a/9.12.2
- 9.3.8
- 9.3.8/9.3.16
- 9.5.5a
- 9.5.5a/9.5.5c/9.5.5b
- 9.5.5a/9.5.5c/9.5.5b/9.5.5e
- 9.5.5b
- 9.5.5c
- 9.5.5c/9.5.6a
- 9.5.5c/9.5.6a/9.3.11a/9.5.5e
- Major watercourse
- Minor watercourse

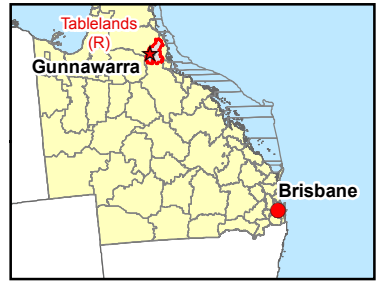


Figure 2 Overview

Location of clearing completed and proposed

Ecological Assessment of Vegetation Clearing at Wombino Station, Gunnawarra Road, Gunnawarra

N

0 1,000 2,000

Metres

ecology & heritage partners

8473_Fig02_Clearing_MB 11/09/2016 dfleming

2 METHODS

This section identifies the methods used to identify the ecological values occurring or likely to occur within the study area.

2.1 Nomenclature

Common and scientific names of vascular plants follow the Queensland Herbarium's Census of the Queensland Flora (Bostock and Holland 2010). The following sources were used for names of fauna species:

- Reptiles and Frogs – Cogger (2014) Reptiles and Amphibians of Australia. Seventh Edition;
- Birds – Christidis and Boles (2008) Systematics and Taxonomy of Australian Birds; and
- Mammals – Van Dyck and Strahan (2008) The Mammals of Australia. Third Edition.

2.2 Desktop Assessment

The following resources were reviewed prior to undertaking the field assessment:

- Queensland Herbarium Regional Ecosystem Description Database (REDD) version 9.0 – April 2015 (Queensland Herbarium 2015);
- Current remnant Regional Ecosystem (RE) and pre-clearing mapping (DEHP 2016a);
- Regulated Vegetation Management Map and essential habitat map (DNRM 2016) under the *Vegetation Management Act 1999* (VM Act);
- Protected Plants Flora Survey Trigger Map (DEHP 2016b);
- Relevant flora and fauna databases (Qld Herbarium HERBRECS, Queensland Museum, Commonwealth EPBC Act Protected Matters Search Tool, Wildlife Online [WildNet], Atlas of Living Australia;
- Current aerial photography of the study area via the Queensland Globe (DNRM 2016); and
- Published government guidelines, action plans, threat abatement plans and referral guidelines, including but not limited to:
    - Matters of National Environmental Significance: Significant impact guidelines 1.1 – *Environment Protection and Biodiversity Conservation Act 1999* (Department of the Environment (DoE) 2013);
    - Survey guidelines for Australia's threatened bats (Department of Environment, Water, Heritage and the Arts (DEWHA) 2010);
    - Survey guidelines for Australia's threatened mammals (DEWHA 2010);
    - EPBC Act referral guidelines for the vulnerable koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)(DoE 2014);

- Survey guidelines for Australia's threatened birds, EBPC Act survey guidelines 6.2 (DEWHA 2010); and
- Terrestrial Vertebrate Fauna Survey Assessment Guidelines for Queensland (Eyre *et al*, 2014).

2.3 Field Surveys

A preliminary field survey was conducted by Dave Fleming (Principal Ecologist, Ecology and Heritage Partners) and Angus McLeod (Senior Ecologist, Ecology and Heritage Partners) from 17 to 19 August 2016. The purpose of the field survey was to identify the vegetation communities and flora and fauna values (such as potential occurrence of threatened species listed under the EPBC Act) within the study area, and to confirm the vegetation mapping. Where vegetation communities had been cleared, an assessment of the felled vegetation and analogous vegetation communities adjacent to the clearing was completed.

2.3.1 Flora Survey

Flora surveys involved identifying vegetation communities within the study area with reference to Queensland and Commonwealth methods and guidelines as well as searches for threatened flora species.

A modified Quaternary vegetation assessment (based on Neldner *et al* 2012) was completed to assess the mapped remnant vegetation within the study area in terms of structure and dominant species and whether they were consistent with RE types (Sattler and Williams 1999) in the REDD. Where mapped remnant vegetation had been recently cleared, the dominant tree species were identified and analogous communities used to determine remnant status. Quaternary assessments were made over an area of approximately 20 metres by 20 metres (400 meters squared).

No threatened ecological communities (TEC) listed under the EPBC Act were known to occur within the vicinity of the study area, therefore no assessments for such communities were deemed necessary.

2.3.1.1 Searches for Threatened Flora

Formal searches for threatened flora species were not undertaken due to the limited time available within the study area. Nevertheless, several random meanders (Cropper, 1993) were completed within habitat areas to search for threatened flora species likely to occur. Within these areas a point was chosen to start the meander. The observer then randomly walked through the search area searching for threatened plants until the search area had been adequately surveyed. Searches were undertaken within Quaternary assessment sites.

2.3.2 Fauna Survey

The field assessment included a fauna habitat assessment of the study area, using sampling of sites that were approved to be cleared and sites that were typical of surrounding vegetation communities for those areas that had been cleared at the time of the survey. Habitat features including ground

cover and vegetation composition and structure, and the presence of hollows and fallen ground debris were noted as relevant to the species being targeted.

The following fauna survey methods were completed during the survey:

- Diurnal bird surveys;
- Active searches for reptiles;
- Microbat call detection using call detection units (Anabat SD2™ Titley Scientific);
- Spotlighting for nocturnal birds and mammals; and
- Vehicle transects (diurnal and nocturnal) for birds and mammals.

The fauna survey methods were chosen to target the suite of threatened fauna species that were likely occurrences within the study area and considering the type and extent of habitats present or recently cleared. A comprehensive baseline survey was not completed given the limited time available within the study area and the objectives of the preliminary field survey.

2.3.2.1 *Bird Survey*

A bird survey was completed at several sites and included a 20 minute observation period within a defined 100 metre by 100 metre search area or transect for linear features (e.g. creeks). As the intent of the surveys was to target threatened species rather than gather data on bird species richness, the search area was modified depending upon the habitat types present. Birds were also recorded incidentally during vehicle traverses of the study area.

The following methods were used to detect Black-throated Finch *Poephila cincta cincta* and Gouldian Finch *Erythrura gouldiae*:

- Surveys for finches were completed primarily around watering holes (farm dams). Surveys within adjacent woodlands and grasslands were also completed. Due to the lack of suitable mid-storey habitat within adjacent communities and limited time within the study area, surveys according to the survey guidelines (DEWHA 2010) were not warranted.

2.3.2.2 *Mammal Survey Methods*

Mammals were detected primarily through spotlighting and vehicle transects. This method targets medium to large mammals such as macropods, exotic predators (i.e. Feral Cat *Felis catus*, Wild Dog *Canis lupus* and Feral Pig *Sus scrofa*) and arboreal (tree dwelling) mammals (e.g. Koala *Phascolarctos cinereus*, possums and gliders). Vehicle transects were conducted on accessible tracks within the study area and involved driving slowly (20 kilometres per hour) along tracks searching for arboreal fauna by detecting eye shine. Where eye shine was detected, the species was identified by using binoculars.

The following methods were used to detect Koala:

- Koalas are readily detected through spotlighting surveys due to their size and eyeshine as well as active searches. To determine utilisation of an area by Koala, the Spot Assessment Technique (SAT) (Phillips and Callaghan, 2011; DoE 2014) is used and involves a radial assessment of Koala activity within the immediate survey area surrounding a tree that is known to be utilised by Koalas. Once a suitable tree has been identified (through active searches for scats and scratches on trees), the nearest 29 trees are searched for Koala

activity. The proportion of surveyed trees with Koala activity is then calculated and expressed as a percentage. Despite searches for signs of Koala activity within Quaternary assessment sites, no scratches or scats were identified. Therefore, this method was not used. Due to the expected low densities of Koalas within the region, the detectability of scratches or scats is extremely low and a comprehensive, systematic search would be required to detect signs of Koala presence.

The following methods were used to detect Greater Glider *Petauroides volans*:

- Greater Gliders are readily detected through spotlighting surveys due to their size and eyeshine (Eyre *et al.* 2012). Spotlighting was completed primarily through vehicle transects and walking transects in suitable habitat areas.

An ultrasonic bat detector and recorder was deployed in suitable locations within the study area. The detectors were left out for two nights at each site, where possible. Detectors were also carried by hand during spotlighting traverses and vehicle transects. Microbat calls were analysed and species identified by Balance Environmental Pty Ltd.

Remote infrared cameras were deployed in habitat areas in an attempt to detect Northern Quoll *Dasyurus hallucatus*. Camera sites were located within rock outcrops where there was potential for denning opportunities. The cameras were focussed on a bait (chicken necks were used) and collected after two nights.

2.3.2.3 Reptile and Frog Survey Methods

Although reptiles and frogs were not the target for this survey, several species were detected during active searches (e.g. turning rocks, logs, peeling bark from trees), nocturnal searches and vehicle transects.

3 RESULTS

3.1 Survey Conditions

The weather conditions during the field survey were characterised by mild days and cool nights and was typical for the region in August. Daytime maximum temperatures were around 22.0 degrees Celsius (°C) and night-time minimums were around 14.5 – 14.8 °C (as recorded at Walkamin Station, approximately 100 kilometres north of the study area and of similar altitude to the site at 600 metres above sea level) (Bureau of Meteorology 2016). Relative humidity was high at 81% at 9 AM due to constant showers, although only a total of 1.4 millimetres fell during the field survey. It was generally overcast with gusty winds on the first night and cloudless for the second night.

The moon was full on the 18 August; however there was sufficient cloud cover on both nights to reduce brightness. Bright nights are known to reduce the detectability for Greater Gliders (Eyre, 2006).

3.2 Desktop Assessment

The desktop assessment identified the vegetation communities mapped as occurring within the study area and the threatened flora and fauna species that are known to occur within the broader region or are predicted to occur from habitat modelling.

3.2.1 Vegetation Communities

The desktop assessment identified the following REs occurring within the study area:

- 9.3.8
- 9.3.8 / 9.3.16
- 9.5.5a
- 9.5.5b
- 9.5.5c
- 9.5.5a/9.5.5c/9.5.5b
- 9.5.5a/9.5.5c/9.5.5b/9.5.5e
- 9.5.5c/9.5.6a
- 9.5.5c/9.5.6a/9.3.11a/9.5.5e
- 9.12.1a/9.12.2.

These REs occur predominantly as heterogeneous polygons, but are described separately below:

- 9.3.8 - Woodland to open forest of Gum-topped Box *Eucalyptus moluccana* +/- Queensland Blue Gum *E. tereticornis* +/- Narrow-leaved Ironbark *E. crebra*. The shrub layer varies from absent to scattered shrubs including juvenile Gum-topped Box, Acacia spp. and Quinine *Petalostigma pubescens*. The ground layer is dominated by tussock grasses including

Bothriochloa spp. (bluegrasses) and Black Speargrass *Heteropogon contortu*. Occurs on alluvial deposits and run-on areas often on a Tertiary remnant surface. Soils may be grey self-mulching clays. Alluvial deposits may overlie lateritised surfaces

- 9.3.11a - Palustrine wetland (e.g. vegetated swamp). Wetlands (sometimes ephemeral), often with a fringing woodland which can contain River Red Gum *Eucalyptus camaldulensis*or Queensland Blue Gum +/- Poplar Gum *E. platyphylla* +/- Molloy Red Box *Eucalyptus leptophleba*. The fringing vegetation can also include a sub-canopy layer which can contain teatrees *Melaleuca* spp. Alternatively the fringing woodland species can occur as emergents +/- sheoaks *Casuarina* spp.. Ground layer species present include Short-fruited Nardoo *Marsilea hirsuta*, clubrush *Schoenoplectus* spp. and spike-rushes *Eleocharis* spp. This unit may have areas of grassland included. Occurs on run-on areas and areas of alluvial deposition on basalt geologies
- 9.3.16 - Queensland Blue Gum and/or *Eucalyptus platyphylla* and/or Clarkson's Bloodwood *Corymbia clarksoniana* woodland on alluvial flats, levees and plains.
- 9.5.5a - Mixed woodland to open forest of Narrow-leaved Ironbark, Clarkson's Bloodwood and Lemon-scented Gum *Corymbia citriodora* +/- White Mahogany *Eucalyptus portuensis* with a generally open sub-canopy of canopy species +/- Cypress Pine *Callitris intratropica* and Acacia spp. The open shrub layer often contains juvenile canopy species, Quinine, Powder Puff Wattle *Acacia flavescens* and other Acacia spp. Kangaroo Grass *Themeda triandra* is the dominant species in a dense grassy ground layer. Occurs on Tertiary plateaus and remnants.
- 9.5.5b - Woodland of Narrow-leaved Ironbark or *Eucalyptus granitica* +/- Clarkson's Bloodwood +/- Dallachy's gum *Corymbia dallachiana* +/- Red Bloodwood *C. erythrophloia* with a usually open sub-canopy and shrub layer including juvenile canopy species, Bushman's Clothes Peg *Grevillea glauca*, Silver Oak *G. parallela*, Powder Puff Wattle, Quinine, Broad-leaved Paperbark *Melaleuca viridiflora* and Yellow-berry *Denhamia cunninghamii*. The grassy ground layer is dominated by Kangaroo Grass. Occurs on Tertiary plateaus and remnants.
- 9.5.5c - Woodland to open woodland of Gum-topped Box or Queensland Blue Gum +/- Swamp Mahogany *Lophostemon suaveolens* +/- Clarkson's Bloodwood. The distinct sub-canopy usually contains canopy species +/- Broad-leaved Paperbark. Scattered Broad-leaved Paperbark, Quinine and Acacia spp. may be found in the shrub layer. The dense grassy ground layer is often dominated by Kangaroo Grass and Golden Beard Grass *Chrysopogon fallax*. Occurs on Tertiary sandplains.
- 9.5.5e - Woodland to open forest of Pink Bloodwood *Corymbia intermedia*, Narrow-leaved Ironbark +/- White Mahogany +/- Lemon-scented Gum +/- Dallachy's Gum. A sub-canopy is generally absent, but a tall shrub layer containing juvenile canopy species and Powder Puff Wattle +/- Bushman's Clothes Peg +/- *Persoonia falcata* often occurs. The dense grassy ground layer is dominated by Kangaroo Grass +/- Giant Speargrass *Heteropogon triticeus*. Occurs on Tertiary sandplains.
- 9.5.6a - Woodland to open woodland of Molloy Red Box +/- Clarkson's Bloodwood +/- Poplar Gum +/- Moreton Bay Ash *Corymbia tessellaris*. The mid layer is generally isolated shrubs which may include Quinine, Melaleuca spp. and Acacia spp., *Alphitonia pomaderroides* and

Bushman's Clothes Peg). There is a grassy ground layer usually dominated by Black Speargrass. Occurs on yellow kandosols and mapped as YEPR (yellow earths on gently undulating plains and plateaus on Tertiary lateritic remnants

- 9.12.1a - Woodland to low open woodland of Narrow-leaved Ironbark +/- Dallachy's Gum +/- Red Bloodwood +/- Clarkson's Bloodwood +/- Corymbia spp. Fine-leaved Ironbark *E. exilipes* or Granite Ironbark can sometimes occur as a dominant. An open sub-canopy can occur with canopy species as well as Wilga *Geijera salicifolia*, Quinine *Petalostigma pubescens*, Yellowberry Bush, Prickly Pine *Bursaria incana* and Acacia spp. An open shrub layer usually includes canopy and sub-canopy species and Currantbush. The sparse to dense ground layer is dominated by Black Speargrass and Kangaroo Grass. Occurs on a variety of landforms from undulating plains to steep hills.
- 9.12.2 – White Stringybark *Eucalyptus portuensis*, Lemon-scented Gum *Corymbia citriodora*, Granite Ironbark or Narrow-leaved Ironbark, Pink Bloodwood or Clarkson's Bloodwood mixed woodland on steep hills and ranges on igneous hills close to Wet Tropics boundary.

3.2.2 Threatened Species

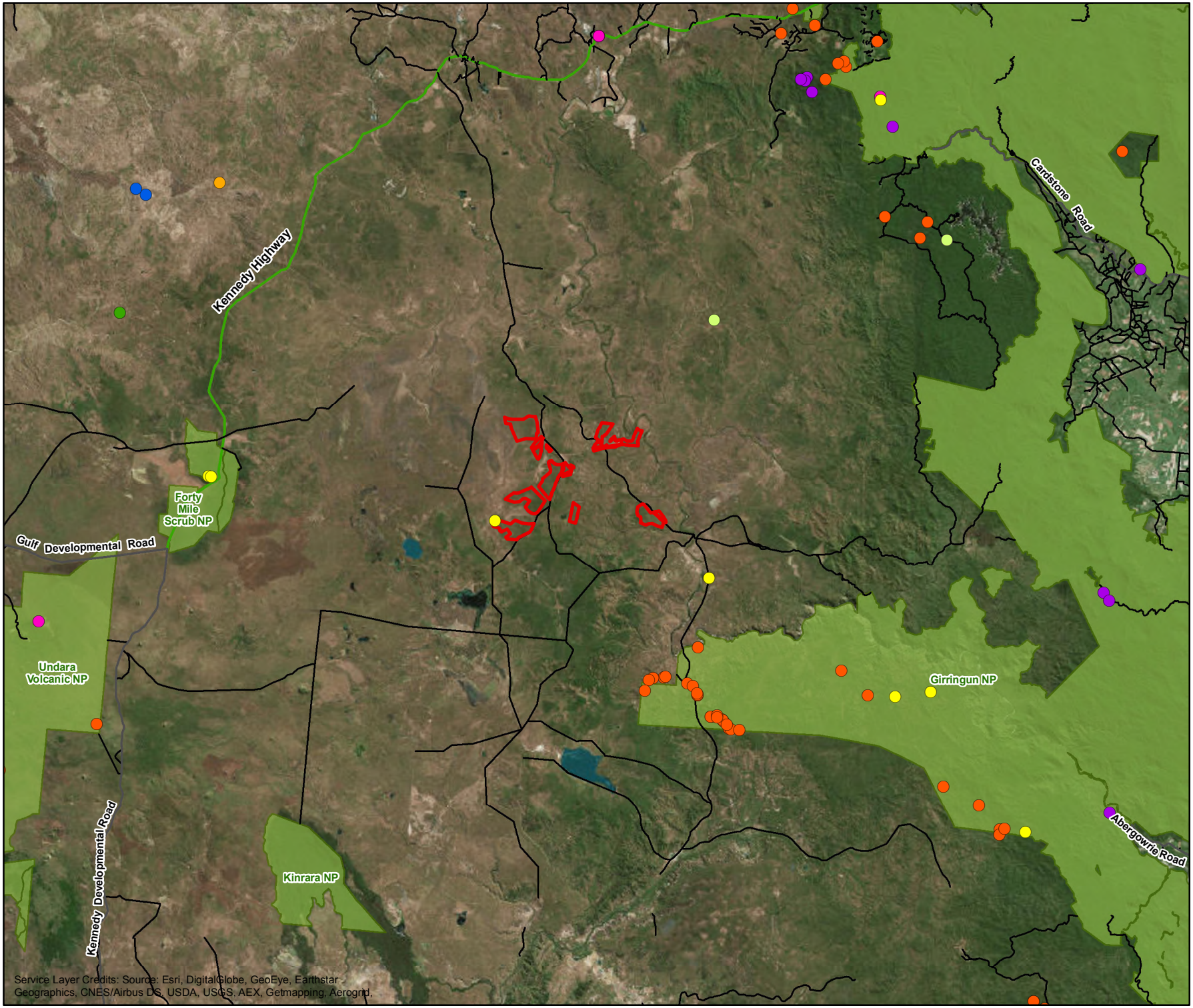
The Protected Matters Search Tool database (DoEE 2016) search identified 27 species listed as threatened under the EPBC Act that are predicted to occur within the study area. These include 11 mammals, six birds, one reptile, four frogs and five plants (Table 1). However, many of these species are associated with adjacent Wet Tropics areas and are unlikely to occur within the study area. In addition, Red Goshawk *Erythrotriorchis radiatus*, Koala, Greater Glider and Spectacled Flying-fox *Pteropus conspicillatus* have been previously recorded within 20 kilometres of the study area based on historic survey records (ALA 2016). Records of threatened species from within an approximate 50 kilometre radius from the study area are shown in Figure 3.

Table 1 EPBC Act listed threatened species within 20km of the study area

Species Name	Common Name	EPBC Act Status	Predicted Occurrence	Source^
Frogs				
Litoria dayi	Australian Lace-lid	Endangered	These species are associated with the Wet Tropics rainforests and are unlikely to occur within the study area.	PMST
Litoria nannotis	Waterfall Frog	Endangered		PMST
Litoria nyakalensis	Mountain Mistfrog	Critically Endangered		PMST
Litoria rheocola	Common Mistfrog	Endangered		PMST
Reptiles				
Egernia rugosa	Yakka Skink	Vulnerable	Species or species habitat may occur within area	PMST
Birds				
Casuarius casuarius johnsonii	Southern Cassowary	Endangered	This species is associated with the Wet Tropics rainforests and is unlikely to occur within the study area	PMST
Erythrotriorchis radiatus	Red Goshawk	Vulnerable	Species or species habitat likely to occur within area	PMST
Erythrura gouldiae	Gouldian Finch	Endangered	Species or species habitat may occur within area	PMST
Poephila cincta cincta	Black-throated Finch (southern)	Endangered	Species or species habitat may occur within area	PMST

Species Name	Common Name	EPBC Act Status	Predicted Occurrence	Source^
Rostratula australis	Australian Painted Snipe	Endangered	Species or species habitat may occur within area	PMST
Tyto novaehollandiae kimberli	Masked Owl (northern)	Vulnerable	Species or species habitat may occur within area	PMST
Mammals				
Bettongia tropica	Northern Bettong	Endangered	Species or species habitat likely to occur within area	PMST
Dasyurus hallucatus	Northern Quoll	Endangered	Species or species habitat likely to occur within area	PMST, ALA
Dasyurus maculatus gracilis	Spotted-tailed Quoll (North Queensland subspecies)	Endangered	This species is associated with the Wet Tropics rainforests and is unlikely to occur within the study area	PMST
Hipposideros semoni	Semon's Leaf-nosed Bat	Endangered	Species or species habitat may occur within area	PMST
Mesembriomys goudlii rattoides	Black-footed Tree-rat (North Queensland)	Vulnerable	Species or species habitat likely to occur within area	PMST
Petaurus australis	Yellow-bellied Glider (Wet Tropics)	Vulnerable	This species is associated with the Wet Tropics rainforests and is unlikely to occur within the study area	PMST
Petauroides volans	Greater Glider	Vulnerable	Species or species habitat likely to occur within area	ALA
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)	Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)	Vulnerable	Species or species habitat known to occur within area	PMST, ALA
Pteropus conspicillatus	Spectacled Flying-fox	Vulnerable	Species or species habitat likely to occur within area	PMST, ALA
Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	Foraging, feeding or related behaviour may occur within area	PMST
Rhinolophus robertsi	Large-eared Horseshoe Bat	Endangered	Species or species habitat likely to occur within area	PMST
Saccolaimus saccolaimus nudicluniatus	Bare-rumped Sheathtail Bat	Critically Endangered	This species is associated with coastal environs of the north Qld coast.	PMST
Plants				
Cajanus mareebensis		Endangered	Species or species habitat likely to occur within area	PMST
Euphorbia carissoides		Vulnerable	Species or species habitat likely to occur within area	PMST
Macropteranthes montana		Vulnerable	Species or species habitat may occur within area	PMST
Phalaenopsis rosenstromii		Endangered	Species or species habitat may occur within area	PMST
Tropilis callitrophilis		Vulnerable	Species or species habitat may occur within area	PMST

^ Source: PMST = Protected Matters Search Tool; ALA = Atlas of Living Australia



Legend

- Study Area
- *Cajanus mareebensis*
- *Chamaesyce carissoides*
- Greater Glider *Petauroides volans*
- Koala *Phascolarctos cinereus*
- *Macropteranthes montana*
- Northern Quoll *Dasyurus hallucatus*
- Red Goshawk *Erythrotriorchus radiatus*
- Spectacled Flying-fox *Pteropus conspicillatus*

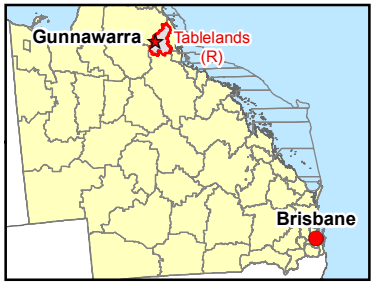


Figure 3

Threatened species records

Ecological Assessment of Vegetation Clearing at Wombino Station, Gunnawarra Road, Gunnawarra

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3.2.3 Migratory Species

The Protected Matters Search Tool database (DoEE 2016) search identified 14 species listed as migratory under the EPBC Act that are predicted to occur within the study area (Table 2).

Table 2 Migratory species predicted to occur within the study area

Species Name	Common Name	Predicted Occurrence
Ardea alba	Great Egret	Species or species habitat known to occur within area
Ardea ibis	Cattle Egret	Species or species habitat may occur within area
Cuculus optatus	Oriental Cuckoo	Species or species habitat may occur within area
Hirundapus caudacutus	White-throated Needle-tail	Species or species habitat may occur within area
Hirundo rustica	Barn Swallow	Species or species habitat may occur within area
Merops ornatus	Rainbow Bee-eater	Species or species habitat may occur within area
Monarcha melanopsis	Black-faced Monarch	Species or species habitat likely to occur within area
Motacilla cinerea	Grey Wagtail	Species or species habitat may occur within area
Motacilla flava	Yellow Wagtail	Species or species habitat likely occur within area
Myiagra cyanoleuca	Satin Flycatcher	Species or species habitat may occur within area
Rhipidura rufifrons	Rufous Fantail	Species or species habitat likely occur within area
Gallinago hardwickii	Latham's Snipe	Species or species habitat may occur within area
Pandion haliaetus	Osprey	Species or species habitat may occur within area
Tringa nebularia	Common Greenshank	Species or species habitat may occur within area

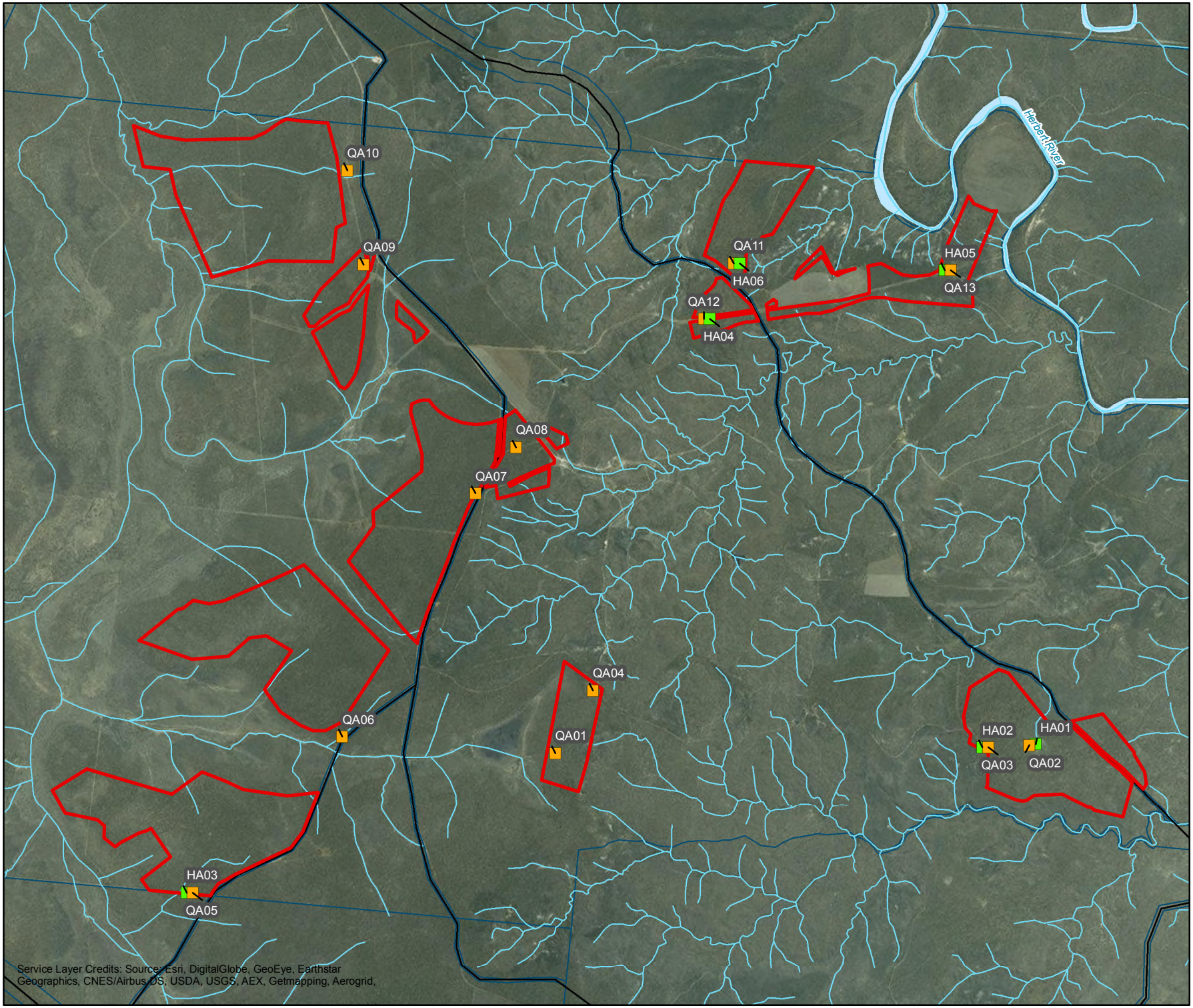
3.3 Field Survey

3.3.1 Survey Effort

The survey effort completed across the study area is shown in Table 3 below and on Figure 4. Some RE types were not surveyed as they were either difficult to access or accounted for a relatively small proportion of the overall study area. Furthermore, the survey effort expended to detect threatened fauna did not meet the survey guidelines for the species that are potential occurrences within the study area. This was primarily due to time constraints and the large size of the study area precluding a comprehensive, systematic survey being completed. Therefore, the survey effort expended should be considered preliminary in nature.

Table 3 Survey effort across the study area

Method	9.3.8	9.5.5a	9.5.5a / 9.5.5c / 9.5.5b	9.5.5a / 9.5.5c / 9.5.5b / 9.5.5e	9.5.5b	9.5.5c / 9.5.6a	9.5.5c / 9.5.6a / 9.3.11a / 9.5.5e
Vegetation sites (quadrats)	QA11	QA02	QA03, QA12, QA13	QA01, QA04, QA05, QA06, QA07, QA08 (cleared), QA09, QA10			
Threatened plant meanders	No	Yes	Yes	Yes	No	No	No
Qualitative Habitat Assessment	HA06	HA01	HA02, HA04, HA05,	HA03			
Bird census (100m x 100m)				80 person minutes (Martins Swamp)			40 person minutes
Spotlighting – vehicle transect	16 kilometres x 2 nights						
Spotlighting – walking				160 person minutes			80 person minutes
Camera trap				2 cameras x 2 nights			
Microbat detectors – in situ / walking				1 night (along road) 1 night (Martins Swamp) 1 night (farm dam)			
Koala - SAT	Not completed, no activity found						



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Study Area

Survey locations

- Habitat assessment
- Quaternary assessment

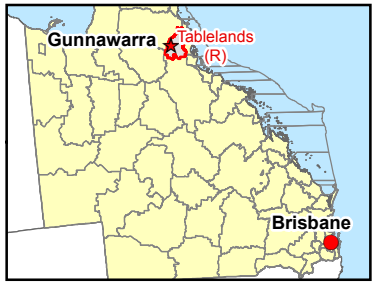

Figure 4

Survey locations

Ecological Assessment of Vegetation Clearing at Wombino Station, Gunnawarra Road, Gunnawarra

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3.3.2 Vegetation Communities

The vegetation communities identified within the study area are described below. The majority of the study area assessed comprises similar gum-ironbark-bloodwood grassy woodlands with locally dominant species such as Queensland Blue Gum, Poplar Gum, Lemon-scented Gum, Narrow-leaved Ironbark and White Stringybark.

Queensland Blue Gum-Ironbark-Bloodwood Woodlands

This community occurs within mapped areas of RE 9.5.5a / 9.5.5c / 9.5.5b / 9.5.5e and occurs where Queensland Blue Gum is a dominant feature of the canopy (9.5.5c), along with Clarkson's Bloodwood and Narrow-leaved Ironbark (Plates 1, 5 & 9). Other canopy species can include Moreton Bay Ash and White Mahogany. The canopy was found to be up 18 metres in height and mostly with a distinct low tree layer comprising juvenile canopy species with Powder Puff Wattle and Quinine Bush and occasionally *Melaleuca stenostachya*. The ground layer was grassy comprising Kangaroo Grass and Black Speargrass.

Poplar Gum-Ironbark-Bloodwood Woodlands

This community occurs in the far south-eastern portion of the study area and is mapped as RE 9.5.5a. The community comprises Poplar Gum, Narrow-leaved Ironbark and Clarkson's Bloodwood in the canopy with wattles *Acacia* spp., *Melaleuca stenostachya* and Swamp Mahogany in the low tree layer (Plate 2). A shrub layer was occasionally found to be present due to infestations of the exotic Lantana *Lantana camara*. The ground layer was grassy and comprised Black Speargrass and other native grasses.

White Stringybark-Ironbark-Bloodwood+/-Lemon-scented Gum Woodlands

This community occurs throughout the study area and is mapped as various RE 9.5.5 sub-types. The canopy is generally dominated by White Stringybark with Narrow-leaved Ironbark, Clarkson's Bloodwood and Dallachy's Gum also present (Plate 3, 4, 6 & 10). Lemon-scented Gum was found to be locally dominant in some areas (Plate 7, 8, & 11). The low tree layer comprises juvenile canopy species as well as Bushman's Clothes Peg, Powder Puff Wattle and Swamp Mahogany. The ground layer was grassy comprising Kangaroo Grass and Black Speargrass, with Mat-rush *Lomandra* spp. sometimes present. This community was found to have occasional infestations of Lantana.

Plate 1 – QA01 in 9.5.5a / 9.5.5c / 9.5.5b / 9.5.5e

Plate 2 – QA02 in 9.5.5a

Plate 3 – QA03 in 9.5.5a / 9.5.5c / 9.5.5b

Plate 4 – QA04 in 9.5.5a / 9.5.5c / 9.5.5b / 9.5.5e

Plate 5 – QA05 in 9.5.5a / 9.5.5c / 9.5.5b / 9.5.5e

Plate 6 – QA06 in 9.5.5a / 9.5.5c / 9.5.5b / 9.5.5e

Plate 7 – QA07 in 9.5.5a / 9.5.5c / 9.5.5b / 9.5.5e

Plate 8 – QA08 in 9.5.5a / 9.5.5c / 9.5.5b / 9.5.5e

Plate 9 – QA09 in 9.5.5a / 9.5.5c / 9.5.5b / 9.5.5e

Plate 10 – QA10 in 9.5.5a / 9.5.5c / 9.5.5b / 9.5.5e

Plate 11 – QA11 in 9.3.8

3.3.3 Habitat Values

The study area is largely homogenous in terms of habitat value due to the similar savannah woodlands present. Portions of the study area have undergone thinning, logging and under-scrubbing that has altered the habitat value of these areas such as removing hollow-bearing and conversely creating shelter opportunities for reptiles due to the presence of coarse woody debris. All areas inspected during the field survey contained trees with hollows of a range of sizes and across the range of canopy species present providing nesting and denning opportunities for arboreal mammals, birds and microbats. Woody debris was sparse to abundant and included felled trees and smaller branches that provides habitat for ground-dwelling reptiles and mammals. Habitat for small birds was sparse to absent and largely related to the absence of shrub cover.

The study area does not contain any waterways or farm dams, however ephemeral waterways are located adjacent to many of the assessed areas. Martin's Swamp is a large seasonal wetland located between portions of the study area. This feature was dry at the time of the survey; however, when full the wetland would provide significant habitat value for wetland birds, including migratory species.

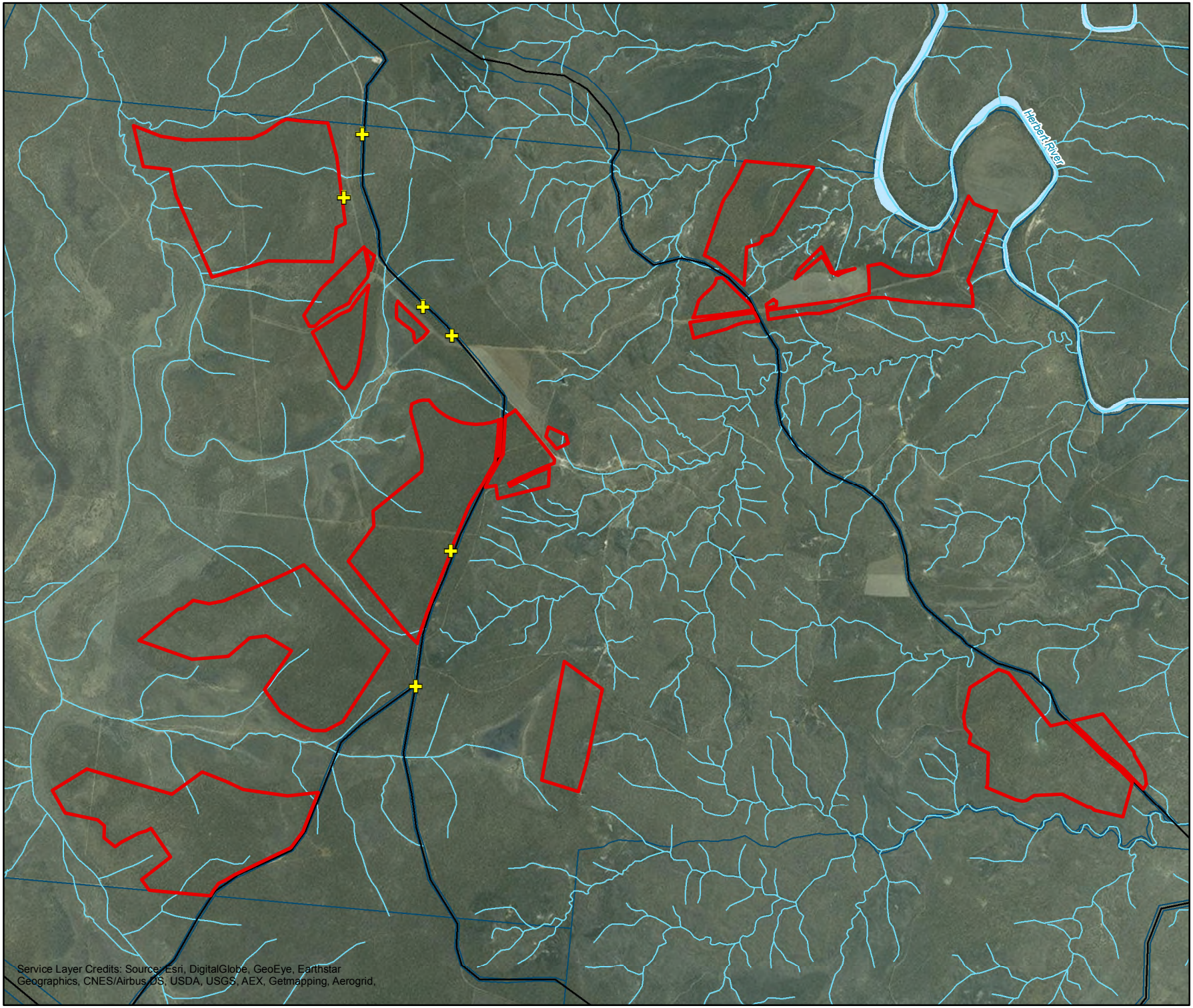
3.3.4 Threatened Species

Six Greater Gliders were detected during the survey period by spotlighting (walking and vehicle traverses) (Plate 12). Five individuals were detected along Gunnawarra Road within and adjacent to the study area and one individual was detected to the west of the road (Figure 5). All gliders were

detected within mapped RE 9.5.5a / 9.5.5c / 9.5.5b / 9.5.5e vegetation in Narrow-leaved Ironbark or Queensland Blue Gum trees and several were observed to retreat back into a hollow due to the presence of spotlights. The gliders in the northern portion of the study area were separated by approximately 0.7 to 1.2 kilometres and the gliders in the southern portion were separated by approximately 2.3 kilometres. Greater Gliders are largely solitary animals and have relatively small home ranges, which can overlap.

Comport *et al.* (1996) studied the home ranges and food-tree use of a population of Greater Gliders at Taravale Station, near Paluma approximately 140 kilometres to the south-east of the study area and within the Einasleigh Uplands bioregion. They found that the gliders preferred feeding on White Stringybark slightly less than half the time. Other species comprising their diet included Pink Bloodwood, Lemon-scented Gum, Queensland Blue Gum, Narrow-leaved Ironbark, Forest She-oak *Allocasuarina torulosa* and one observation was made of the species feeding on Swamp Mahogany. Denning occurred in hollows in all five Eucalyptus species with a preference shown for White Stringybark; however, the gliders utilised between 4-6 hollows within their range. Preferred species for foraging included Queensland Blue Gum, Narrow-leaved Ironbark, Swamp Mahogany, White Stringybark and Lemon-scented Gum, which occurred throughout the study area.

Plate 12 Greater Glider at Wombinoo Station on 17/8/2016 (A. Schoo, used with permission)



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Study Area

Threatened species

Greater Glider

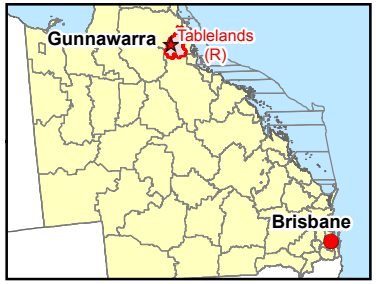

Figure 5

Threatened species locations

Ecological Assessment of Vegetation Clearing at Wombino Station, Gunnawarra Road, Gunnawarra

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3.4 Likelihood of Occurrence Assessment

A likelihood of occurrence assessment was completed to determine the likelihood of threatened or migratory species utilising the study area, either permanently or periodically. The assessment used a combination of database records for the region as well as interpretation of RE descriptions. The following criteria were used to determine the degree of likelihood of occurrence for each species.

- High Likelihood:
    - Known resident in the study area based on site observations, database records, or expert advice; and/or,
    - Recent records (i.e. within five years) of the species in the local area; and/or,
    - The study area contains the species' preferred habitat.
- Moderate Likelihood:
    - The species is likely to visit the study area regularly (i.e. at least seasonally); and/or
    - Previous records of the species in the local area; and/or,
    - The study area contains some characteristics of the species' preferred habitat.
- Low Likelihood:
    - The species is likely to visit the study area occasionally or opportunistically whilst en-route to more suitable sites; and/or
    - There are only limited or historical records of the species in the local area (i.e. more than 20 years old); and/or;
    - The study area contains few or no characteristics of the species' preferred habitat.
- Unlikely
    - No previous records of the species in the local area; and/or,
    - The species may fly-over or disperse through the study area when moving between areas of more suitable habitat; and/or,
    - Out of the species' range; and/or,
    - No suitable habitat present.

3.4.1 Threatened Species

Table 4 provides an assessment of the likelihood of occurrence for species identified from database searches.

Table 4 Likelihood of occurrence assessment for threatened species

Scientific Name	Common Name	Habitat Requirements and Distribution*	Likelihood of Occurrence Assessment
Plants			
Cajanus mareebensis	A herb	Occurs in grassy woodlands within North Queensland. It is associated with Melaleuca-Acacia, Eucalyptus-Callitris and Eucalyptus-Corymbia communities on sandy soils derived from granite (land zone 12). The nearest records are from 2005 approximately 26 kilometres to the north along Sundown-Gingerella Road within RE 9.12.7a and 9.12.7a / 9.5.16. The species is difficult to detect given that it is a short-lived annual species (i.e. dies off each year). It is also difficult to detect on sites where is has been previously found (Threatened Species Scientific Committee, 2008).	Low. All records are north of the Kennedy Highway and no suitable habitat is present within the study area. However, RE 9.12.1a / 9.12.2 occurs adjacent to the study area, which may provide habitat for this species.
Euphorbia carissoides		Grows along cliff lines and rocky outcrops in shrubland and low eucalypt woodland.	Unlikely. All records are located north of the Kennedy Highway.
Macropteranthes montana		Occurs in shallow soils in low woodlands or vine thickets.	Unlikely. All records are located north of the Kennedy Highway, with one record at Blackbraes National Park.
Phalaenopsis rosenstromii		Grows in trees, sometimes rocks, in humid, sheltered slopes and gullies, in deep gorges and close to streams in rainforests.	Unlikely. No records occur in the region and no suitable habitat is present within the study area.
Tropilis callitrophilis		Occurs in medium to high altitude rainforest.	Unlikely. No suitable habitat is present within the study area.
Reptiles			
Egernia rugosa	Yakka Skink	Ground-dwelling, reliant on logs, ground debris and/or burrows for shelter. Widespread but rare. Dry open forests or woodland with dense ground vegetation, rocky areas, fallen timber and other debris.	Moderate. Although there are no records from the locality, the study area lies within the range of this species and suitable habitats occur.
Birds			
Erythrotriorchis radiatus	Red Goshawk	The Red Goshawk is generally found in open woodland, the edges of rainforest, and in dense riverine vegetation of coastal and subcoastal forests. This species is known to have a large home range but nests in tall trees usually within 1km of a waterway or wetland.	High. There are several records surrounding the study area at Glen Ruth (to the west of the Herbert River), Bulleringa National Park and Crystalbrook to the north-west and Wairuna to the south-east (ALA 2016). The study area contains a diversity of habitats, which are preferred by the goshawk.

Scientific Name	Common Name	Habitat Requirements and Distribution*	Likelihood of Occurrence Assessment
Erythrura gouldiae	Gouldian Finch	The finch occurs in open grassy woodlands that has a good coverage of Sorghum and other grasses. The presence of Sorghum grasses appears to be an important determinant of habitat use by the species.	Low. The closest record is from Mount Surprise, approximately 40 kilometres to the west of the study area; however it is from 1992. Other records are from Georgetown to the west and Chillagoe to the north and the species is found in these areas regularly. However, it is recorded incidentally in other areas to the west, north and north-east. The lack of Sorghum grasses recorded within the study area is likely to preclude use by the finch.
Poephila cincta cincta	Black-throated Finch (southern)	The Black-throated Finch (southern) historically occurred from far south-eastern Queensland, near the Queensland-NSW border, through eastern Queensland north to the divide between the Burdekin and Lynd Rivers. The subspecies is now restricted to: - Townsville and surrounds; - Ingham and surrounds; and - central-eastern Qld sites	Unlikely. Although the study area is located within the historical distribution of the finch, the site occurs to the north of the known area of occupation for the finch.
Rostratula australis	Australian Painted Snipe	This species occurs in shallow, vegetated temporary or infrequently filled wetlands, sometimes with trees or shrubs where it feeds at the water's edge on seeds and invertebrates.	Low. Although the study area contains dams that could provide habitat, the presence of cattle within these areas has removed much of the vegetation surrounding the dam edges, precluding use of these areas by the snipe. However, when filled, Martins Swamp (adjacent to the study area) could provide habitat for this species.
Tyto novaehollandiae kimberli	Masked Owl (northern)	Very little information is known about the subspecies of the Masked Owl, however habitat has been recorded as riparian forests, rainforest, open forests and Melaleuca swamps as well as the margins of sugar cane fields. The southern limit of the species is not well defined and maybe as far south as Mackay or Rockhampton.	Low. The study area does not contain habitat for this species, however, Martins Swamp and other areas containing Melaleuca communities occur adjacent to the study area.
MAMMALS			
Bettongia tropica	Northern Bettong	Occurs in open eucalypt forests on the western edges of wet tropical rainforests.	Unlikely. No suitable habitat is present within the study area.

Scientific Name	Common Name	Habitat Requirements and Distribution*	Likelihood of Occurrence Assessment
Dasyurus hallucatus	Northern Quoll	Occurs within a variety of habitats, although areas of high relief such as ridges and escarpments are preferred. Also prefers woodland and forest habitats with an abundance of large rocks and close to water.	Low. An expanse of rock outcrops (land zone 12) occurs adjacent to the study area, although not within the study area itself. This area may contain habitat for the quoll although the habitat potential could not be confirmed during the field survey.
Hipposideros semoni	Semon's Leaf-nosed Bat	The bat is thought to occur from Cape York to Townsville, although there are isolated occurrences at Kroombit Tops and potentially further south (Churchill, 2008). The species occurs in tropical rainforest, monsoon forest, wet sclerophyll forests and open savannah woodland.	Unlikely. Most records are from coastal Queensland.
Mesembriomys gouldii rattoides	Black-footed Tree-rat (North Queensland)	The North Queensland subspecies is not well studied and most of its ecology has been inferred from the Northern Territory subspecies. Habitats are noted as tall eucalypts forests and woodlands and the structure of the communities appear important for the studied populations, such as tall canopy and diversity of shrub and ground covers (van Dyck & Strahan, 2008). Such communities tend to occur on deep loamy soils with constant soil moisture. Shelters in tree hollows during the day.	Moderate. There is a skull record from Mount Garnet, although no date of collection is associated with the record. The ascension date (when the specimen was provided to the Qld Museum) is given as 1977. A more recent record is from Chinaman Creek, 6.1 kilometres west of Watsonville and approximately 70 kilometres north of the study area (H. Janetski, *pers. comm.*). Areas of woodland on land zones 3 and 5 on lower slopes may provide some habitat for this species.
Petauroides volans	Greater Glider	Greater Gliders occur throughout Coastal and central Queensland from Port Douglas to Coolangatta and west to Carnarvon. A disjunct population occurs at Blackbraes in the Einasleigh Uplands bioregion. The species primarily feeds on the young leaves and flower buds of eucalypt species as they have a higher moisture content and lower fibre than mature leaves. Preference is shown for several species of *Eucalyptus* and *Corymbia* species and vary according to the location. Presence of large, old hollow-bearing trees is critical for determining presence of Greater Gliders.	Known. The Greater Glider was identified from within and adjacent to the study area, as well as in patches that have been approved for clearing. As the study area contains a similar suite of RE vegetation, the gliders would be expected to occur throughout the study area.

Scientific Name	Common Name	Habitat Requirements and Distribution*	Likelihood of Occurrence Assessment
Phascolarctos cinereus	Koala	Koalas naturally inhabit a range of temperate, sub-tropical and tropical forest, woodland and semi-arid communities dominated by Eucalyptus species. Koala habitat can be broadly defined as any environment containing Koala food trees species or shelter trees, which may be used by koalas for roosting, sheltering or breeding, and which is sufficiently connected. The distribution of this habitat is largely influenced by land elevation average, annual temperature and rainfall patterns, soil types and the resultant soil moisture availability and fertility. Preferred food and shelter trees are naturally abundant on fertile clayey soils.	High. A record from 1999 is known from the far south-western portion of the study area (ALA 2016). The study area provides some habitat for the Koala, where Queensland Blue Gum predominates and scores 7 in the habitat assessment (Table 5). This indicates that the habitat is critical to the survival of the Koala. Although signs of the presence of the species was not found (e.g. scratches, scats), this is not unexpected given the very low density of the species in the north of its range.
Pteropus conspicillatus	Spectacled Flying-fox	Occurs predominantly in wet tropical rainforest between Townsville and Cooktown. The species preferentially feeds on rainforest fruits, although is known to forage on flowering Eucalyptus and Corymbia species in adjacent wet sclerophyll forests and tropical savannah forests.	Low. The closest record to the study area is within Undara National Park, 60 kilometres to the south-west. No roost habitat occurs within the study area, however the species may potentially occur within the study area during peak flowering of the dominant Eucalyptus species.
Pteropus poliocephalus	Grey-headed Flying-fox	The Grey-headed Flying-fox requires foraging resources and roosting sites. It is a canopy-feeding frugivore and nectarivore, which utilises vegetation communities including rainforests, open forests, closed and open woodlands, Melaleuca swamps and Banksia woodlands. It also feeds on commercial fruit crops and on introduced tree species in urban areas. The primary food source is blossom from Eucalyptus and related genera but in some areas it also utilises a wide range of rainforest fruits. None of the vegetation communities used by the Grey-headed Flying-fox produce continuous foraging resources throughout the year. As a result, the species has adopted complex migration traits in response to ephemeral and patchy food resources. The Grey-headed Flying-fox roosts in aggregations of various sizes on exposed branches. Roost sites are typically located near water, such as lakes, rivers or the coast. Roost vegetation includes rainforest patches, stands of Melaleuca, mangroves and riparian vegetation, but colonies also use highly modified vegetation in urban and suburban areas. The species can maintain fidelity to roost sites for extended periods, although new sites have been colonised.	Unlikely. The nearest camp known to contain this species is at Ingham, over 100 kilometres to the south-east of the study area. Although, the species can forage up to 50 kilometres from roost sites, the study area is beyond the range of the Ingham camp.

Scientific Name	Common Name	Habitat Requirements and Distribution*	Likelihood of Occurrence Assessment
Rhinolophus robertsi	Large-eared Horseshoe Bat	Occurs along the eastern coast and adjacent inland areas of North Queensland from the Iron Range to Townsville and west to Chillagoe. The bat inhabits a range of forest types from rainforest to riparian gallery forest and open savannah woodland. Obligate cave breeder.	Low. The nearest records for this species are from south of Cooktown, although the study area lies within the species expected range and suitable habitats occur.

Notes: *Unless otherwise referenced, all habitat and distribution information is from the Species Profiles and Threats (SPRAT) database (DoEE, 2016).

Table 5 Habitat Assessment for Koalas

Attribute	Score	Inland Environs	Study Area Assessment
Koala occurrence	+2 (high)	Evidence of one or more koalas within the last 5 years.	The study area occurs within the inland environs under the referral guidelines for Koala as it occurs between the 701 – 751 millimetres annual rainfall isohyet. Areas within the ≥800 millimetres annual rainfall isohyet are considered to be in the coastal environs. +2. One record of the Koala is known from within the south-western most area along Wairuna Road (ALA 2016). This record was from a fauna survey conducted in 1999 as part of a proposed logging operation at Kent Holdings. The Koala was found within RE 9.5.5a / 9.5.5c / 9.5.5b / 9.5.5e, which is also found throughout the study area. Two recent records from 2012 are also known from approximately 7 kilometres to the south-east of the study area (ALA 2016). In assigning a score of +2, this takes into account the following: - The survey effort within the region is sparse and many Koala records (ALA 2016) are from incidental sightings rather than targeted surveys. - Although there are no published estimates of Koala density in the Einasleigh Uplands, it is thought that Koala densities are sparse within the region (DoE, 2016). - A comprehensive and targeted survey for Koalas has not been completed within the study area. The score assigned considers the likely occurrence of Koalas within the study area and immediate surrounds.
	+1 (medium)	Evidence of one or more koalas within 2 km of the edge of the impact area within the last 10 years.	
	0 (low)	None of the above.	

Attribute	Score	Inland Environs	Study Area Assessment
Vegetation composition	+2 (high)	Has forest, woodland or shrubland with 2 or more known koala food tree species, **OR** 1 food tree species that alone accounts for >50% of the vegetation in the relevant strata.	+1. Preferred food trees for the TRC area include River Red Gum and Queensland Blue Gum (Mitchell, 2015). Secondary food trees are noted as Brown's Box *Eucalyptus brownii*, Queensland Peppermint *E. exserta*, Flooded Gum *E. grandis*, Gum-topped Box and Mountain Coolibah *E. orgadophila*. Queensland Blue Gum was found to be frequently occurring in some areas, whilst absent in others (e.g. QA01 east of Martins Swamp, QA05 SE area, QA06 north of QA05, QA09 NE area).
	+1 (medium)	Has forest, woodland or shrubland with emerging trees with only 1 species known Koala food tree present.	
	0 (low)	None of the above.	
Habitat connectivity	+2 (high)	Area is part of a contiguous landscape ≥ 1000 ha.	+2. The study area is part of a contiguous landscape. The clearing has not fragmented the landscape to the point where habitats have been isolated.
	+1 (medium)	Area is part of a contiguous landscape < 1000 ha, but ≥ 500 ha.	
	0 (low)	None of the above.	
Key existing threats	+2 (high)	Little or no evidence of koala mortality from vehicle strike or dog attack at present in areas that score 1 or 2 for Koala occurrence. Areas which score 0 for koala occurrence and have no dog or vehicle threat present	+1. Due to the remoteness of the study area and very low densities of Koalas within the region, the actual number of Koala mortality is not known. However, as Wild Dogs/Dingoes are known from the region there is likely to be some degree of dog threat.
	+1 (medium)	Evidence of infrequent or irregular Koala mortality from vehicle strike or dog attack at present in areas that score 1 or 2 for Koala occurrence, **OR** Areas which score 0 for Koala occurrence and are likely to have some degree dog or vehicle threat present.	
	0 (low)	Evidence of frequent or regular Koala mortality from vehicle strike or dog attack in the study area at present, **OR** Areas which score 0 for Koala occurrence and have a significant dog or vehicle threat present.	

Attribute	Score	Inland Environs	Study Area Assessment
Recovery value	+2 (high)	Habitat is likely to be important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1.	The interim recovery objectives for Koala habitat in inland areas include: - Protect and conserve the quality and extent of habitat refuges for the persistence of the species during droughts and periods of extreme heat, especially in riparian areas and other areas with reliable soil moisture and fertility; and - Maintain the quality, extent and connectivity of large areas of Koala habitat surrounding habitat refuges. +1. Areas of riparian vegetation or woodland on floodplains (i.e. alluvial soils with reliable soil moisture content) are present adjacent to the study area (RE 9.3.13 occurs on alluvial soils adjacent to clearing areas) and several portions of the study area are adjacent to suitable habitats fringing the Herbert River to the east and Rudd Creek to the west. In assigning a score of +1, this recognises that the study area provides large areas of vegetation surrounding habitat refuges along riparian vegetation. Therefore, some areas of habitat will be important for achieving the interim recovery objectives.
	+1 (medium)	Uncertain whether the habitat is important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1.	
	0 (low)	Habitat is unlikely to be important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1.	

3.4.2 Migratory Species

The database searches identified 11 bird species listed as migratory under the EPBC Act that have been previously recorded or are predicted to occur within 20 kilometres of the study area (Table 6).

Table 6 Migratory species listed under the EPBC Act within 20 km of the study area

Species Name	Common Name	EPBC Act Status	Potential Occurrence	Source*
Acrocephalus australis	Australian reed-warbler	Migratory	Species or species habitat known to occur within area	Wildnet, ALA
Apus pacificus	Fork-tailed Swift	Migratory	Species or species habitat likely to occur within area	PMST
Ardea alba	Great Egret	Migratory	Species or species habitat known to occur within area	Wildnet, ALA
Ardea ibis	Cattle Egret	Migratory	Species or species habitat known to occur within area	ALA
Cuculus optatus	Horsfield's Cuckoo	Migratory	Species or species habitat may occur within area	PMST
Gallinago hardwickii	Latham's Snipe	Migratory	Species or species habitat may occur within area	PMST
Haliaeetus leucogaster	White-bellied Sea-eagle	Migratory	Species or species habitat known to occur within area	ALA
Merops ornatus	Rainbow Bee-eater	Migratory	Species or species habitat known to occur within area	Wildnet, ALA
Monarcha melanopsis	Black-faced Monarch	Migratory	Species or species habitat known to occur within area	PMST, ALA
Motacilla flava	Yellow Wagtail	Migratory	Species or species habitat may occur within area	PMST
Pandion haliaetus	Osprey	Migratory	Species or species habitat likely to occur within area	PMST

Species Name	Common Name	EPBC Act Status	Potential Occurrence	Source*

* Source – PMST = Protected Matters Search Tool; Wildnet = DEHP Wildlife Online database

The study area does not contain any habitat that could be considered 'important habitat' for any of these species as defined by the Department of the Environment (2015). Martin's Swamp is a large (approximately 60 kilometres) state significant wetland area that occurs between portions of the study area. The swamp was dry at the time of the survey; however, when full the swamp is likely to provide extensive areas of swampy vegetation favoured by wetland bird species, including migratory species.

4 IMPACT ASSESSMENT

4.1 Introduction

Under the EPBC Act, a significant impact on a MNES must be referred to the DoEE for a decision on whether the action is not a controlled action, not a controlled matter-particular matter or a controlled action. This section provides a description of the impact from clearing of vegetation and determines whether a significant impact has occurred for any MNES.

4.2 Impacts from the Action

The action is the clearing of vegetation for high value agriculture, as approved under the Queensland *Sustainable Planning Act 2009* (SP Act). Figure 2 shows those areas of vegetation that have been cleared and the areas are provided in Table 7 below. Please note that the areas shown in Table 7 are indicative only and were calculated on the assumption that all vegetation within an area shown as cleared was cleared and all vegetation shown as an approved area is proposed to be cleared.

In assessing the known or potential presence of threatened species within vegetation communities, it is necessary to define communities that provide habitat that would be of high quality and necessary for continued presence of that species within the area of interest, as well as communities that provide habitat for the species yet are lacking in some values such as the presence of secondary food/nesting resources or provides landscape connectivity. The habitats are defined as follows:

- Primary habitat – provides essential resources for the continued presence of the species in the area such as preferred food species, prey items or nesting/breeding resources (e.g. hollows, dens, caves). For the purposes of this assessment, primary habitat includes habitat that is critical to the survival of the species; and
- Secondary habitat – provides supplementary resources that may be used by the species occasionally, but is lacking in one of more values that would otherwise be considered primary habitat.

Due to the high proportion of mixed polygons within the study area, it is recognised that some species are likely to utilise portions of these mixed communities rather than be evenly distributed throughout the community. For example, Koalas are more likely to occur within areas that have a high abundance of Queensland Blue Gum, however these areas were not able to be separated in the field due to time constraints. Therefore, the area of habitats impacted as shown in Table 7 represent a 'worse case' scenario if the species could occur throughout the habitat. Furthermore, habitat for a species does not exist in isolation and surrounding habitat can be equally important for providing a buffer to disturbance or allowing dispersal through the landscape. Delineation of these habitat types was beyond the scope of this assessment.

Table 7 Clearing impacts within the study area

RE Type	Habitat Type	Primary Habitat	Secondary Habitat	Cleared Area (hectares)	Approved Area Remaining (hectares)
9.3.8	Gum-topped Box Woodland	Greater Glider, Koala, Red Goshawk	Yakka Skink, **Black-footed Tree-rat**	4.48	0.45
9.3.8 / 9.3.16	Queensland Blue Gum on Floodplain	Greater Glider, Koala, Red Goshawk	Yakka Skink, **Black-footed Tree-rat**	5.29	0
9.5.5a	Mixed Eucalypt Woodland	Greater Glider, Red Goshawk	Yakka Skink, Koala, **Black-footed Tree-rat**	0	265.41
9.5.5b	Ironbark Woodland	Greater Glider, Red Goshawk	Yakka Skink,, Koala, **Black-footed Tree-rat**	0	40.72
9.5.5c	Gum-topped Box or Queensland Blue Gum Woodland	Greater Glider, Koala, Red Goshawk	Yakka Skink, **Black-footed Tree-rat**	17.28	0
9.5.5a / 9.5.5c / 9.5.5b	Mixed Eucalypt Woodland / Gum-topped Box or Queensland Blue Gum Woodland / Ironbark Woodland	Greater Glider, Koala, Red Goshawk,	Yakka Skink, **Black-footed Tree-rat**	305.38	198.18
9.5.5a / 9.5.5c / 9.5.5b / 9.5.5e	Mixed Eucalypt Woodland / Gum-topped Box or Queensland Blue Gum Woodland / Ironbark Woodland / Bloodwood-Ironbark Woodland	Greater Glider, Koala, Red Goshawk	Yakka Skink, **Black-footed Tree-rat**	217.91	2212.98
9.5.5c / 9.5.6a	Gum-topped Box or Queensland Blue Gum Woodland / Molloy Red Box Woodland	Greater Glider, Koala, Red Goshawk	Yakka Skink, **Black-footed Tree-rat**	9.95	28.38
9.5.5c / 9.5.6a / 9.3.11a / 9.5.5e	Gum-topped Box or Queensland Blue Gum Woodland / Molloy Red Box Woodland / Vegetated swamp / Bloodwood-Ironbark Woodland	Greater Glider, Koala, Red Goshawk	Yakka Skink	0	22.26
9.12.1a / 9.12.2	Ironbark-Bloodwood Woodland / Stringybark-Ironbark-Bloodwood Woodland	Greater Glider, Red Goshawk	Yakka Skink	0	0.01*
			Totals	**560.29**	**2,768.38**

* Likely to be an error in the RE mapping.

4.3 Significance of Impact

When determining the significance of impact on threatened species habitat, the criteria in the Significant Impact Guidelines (DoE, 2013) are used. Some species, such as the Koala, also have referral guidelines which provide criteria specific to the species. These criteria were applied to the clearing areas for each species that are known or are considered a high or moderate potential occurrence, namely the following vulnerable species:

- Yakka Skink;
- Red Goshawk;
- Black-footed Tree Rat;
- Greater Glider; and
- Koala.

When assessing the significance of an action on a vulnerable species, it is necessary to define whether an 'important population' of the species occurs or could potentially occur within the study area. An important population is defined as one that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- Key source populations either for breeding or dispersal;
- Populations that are necessary for maintaining genetic diversity; and/or
- Populations that are near the limit of the species range.

An assessment of whether an important population for any vulnerable species occurs within the study area is provided (Table 8). When assessing important populations for Yakka Skink the draft Referral guidelines for nationally listed Brigalow Belt reptiles (DSEWPC 2011) are used. As Yakka Skink is difficult to detect and population information is limited, the DoEE considers that important habitat is a surrogate for an important population. Important habitats for the Yakka Skink include:

- Any contiguous patch of suitable habitat, particularly remnant vegetation, where a colony is known or identified; or
- Any microhabitat where colonies are likely to be found.

Due to time constraints an adequate survey effort for Yakka Skink was not able to be completed and combined with the paucity of records from the region provides considerable uncertainty with which to determine whether important habitat occurs within the study area. However, given the location of the study area within the far northern extent of the modelled predicted occurrence (main habitat area) of the Yakka Skink, it is considered unlikely that the study area provides important habitat.

Table 8 Assessment of important population for vulnerable species

Species	Key source population	Maintaining genetic diversity	Limit of the species range	Important Population?
Yakka Skink	Important habitat does not occur within the study area.			No

Species	Key source population	Maintaining genetic diversity	Limit of the species range	Important Population?
Red Goshawk	No. The study area is unlikely to contain a key source population given that roost trees do not occur within the study area.	No. There are several records of the species within the broader region and the extensive areas of habitat present allow dispersal through the landscape and breeding with other local populations.	No. The species is not at the limit of its range.	No
Black-footed Tree Rat	No. The study area is not located within proximity of any known habitat for this species.	No. The extensive areas of habitat present within the surrounding landscape allow dispersal and breeding with other local populations, should they be present.	Yes. The study area is likely at the southern extent of the species range and the Mount Garnet skull represents the most southerly record.	**Yes**, should the species occur within the study area.
Greater Glider	No. There are extensive areas of vegetation surrounding the study area, which are likely to provide similar habitat values. Therefore, the study area is not considered to contain a key source population.	No. There are several records of the species within the region and the extensive areas of habitat present allow dispersal through the landscape and breeding with other local populations.	Yes. The species is at the north-western limit of its range in North Queensland.	**Yes**
Koala	No. Key source populations of Koala in inland areas are considered to be those that occur within riparian and floodplain vegetation (i.e. those communities on land zone 3). The study area does not contain large areas of these communities (approximately 10 hectares only).	No. There are several records of the species within the region and the extensive areas of habitat present allow dispersal through the landscape and breeding with other local populations.	Yes. The modelled distribution of the Koala extends throughout the Einasleigh Uplands to north of Cooktown and west of Georgetown (DoE, 2014). The study area is located approximately 200 kilometres to the east and 250 kilometres to the south of the modelled distribution.	**Yes**

It can be shown that the population of Greater Gliders and Koalas within the study area can be considered an important population (Table 8). In addition, it is likely that should a population of Black-footed Tree Rat be present within the study area, it would be considered an important population under the EPBC Act. Therefore, the impacts on Greater Glider and Black-footed Tree Rat habitat associated with the clearing activity has been assessed against the significant impact criteria in Table 9 and Table 10, respectively. In assessing the likely impacts to Koala, the methods outlined in the Referral guidelines (DoE, 2014) were used.

Table 9 Significant Impact Assessment for Greater Glider

Significant Impact Criteria	Impact Assessment
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	At the time of the survey the landholder had cleared approximately 560.29 hectares of vegetation, comprising habitat for the Greater Glider. The landholder also has approval to clear a remaining 2,768.38 hectares of habitat. An important population of Greater Gliders occurs within the study area (Table 8). The clearing of 560 hectares of vegetation has resulted in the loss of preferred foraging habitat such as White Stringybark, Queensland Blue Gum, Lemon-scented Gum and Narrow-leaved Ironbark and the loss of hollows within these species. Although some portions of the study area had been thinned, the remaining trees contained an abundance of hollows of suitable size for denning. Even assuming a very low density of hollows within the study area (1-2 per hectare for example), the large area of vegetation cleared as well as the larger areas approved for clearing demonstrates the loss of a significant hollow resource as well as foraging resources. Therefore, it is plausible that the clearing that has been completed is likely to contribute to a long-term decrease in the size of an important population due to the loss of hollows and foraging resources.
Reduce the area of occupancy of an important population	The clearing is likely to have resulted in a reduction in the area of occupancy for the Greater Glider given the permanent loss of hollow and foraging resources. The approved clearing areas are also likely to contribute to a reduction in the area of occupancy should the clearing proceed as approved.
Fragment an existing important population into two or more populations	Considering the extent of habitat surrounding the study area and the way in which the study area is divided into distinct blocks (i.e. habitat has been retained between areas), the completed clearing and/or approved clearing activities are unlikely to fragment an existing important population into two or more populations.
Adversely affect habitat critical to the survival of a species	The Greater Glider occurs throughout the east coast and inland ranges of Australia and there is extensive habitat in the Gunnawarra area. The clearing and potential clearing of habitat for this species is therefore unlikely to adversely affect habitat critical to the survival of the species.
Disrupt the breeding cycle of an important population modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Satellite imagery provided by the DoEE for the study area indicates that the clearing was completed between 20 March, 2016 and 8 June, 2016. Female Greater Gliders give birth to young between March and June, therefore it is highly likely that the clearing was completed during the breeding cycle of the species. Furthermore, the study area is highly likely to have contained pregnant females or females with young at the time of tree felling. The clearing therefore disrupted the breeding cycle of the local glider population. As discussed previously, the removal of hollow and foraging resources is likely to have decreased the availability of habitat to the extent that the species is likely to decline. This is because ecological theory states that a species will become more abundant within a habitat area if sufficient resources (shelter, food, territory) are available and limiting factors (disease, predation) remain constant. It is therefore expected that the gliders within habitat areas adjacent to the study area are already at peak abundance and the introduction of additional animals (those that escaped mortality within felled trees) will increase competition for hollows and foraging resources. Essentially, the glider population within the study area must have declined, since habitat has been lost and the surrounding habitats are liklely to be at capacity.

Significant Impact Criteria	Impact Assessment
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Predatory owls have been found to predate heavily on Greater Gliders in NSW studies (Comport, 1996). However, in northern Queensland large predatory owls such as Powerful Owl *Ninox strenua* do not occur. Rufous Owl *N. rufa* occurs within the region, however the species require dense closed forests, which do not occur within the study area. The clearing is unlikely to have resulted in the introduction or spread of an invasive species that is harmful to the Greater Gliders.
Introduce disease that may cause the species to decline, or	There are no known diseases that affect Greater Gliders that could have been introduced through the clearing activity.
Interfere substantially with the recovery of the species.	A recovery plan has not been prepared for the Greater Glider and the TSSC recommends that one be prepared. The primary conservation actions (TSSC 2016) have been identified as: 1. Reduce the frequency and intensity of prescribed burns. 2. Identfy appropriate levels of patch retention, habitat tree retention, and logging rotation in hardwood production. 3. Protect and retain hollow-bearing trees, suitable habitat and habitat connectivity. As hollow-bearing trees have been felled within clearing areas, this action will interfere with the recovery of the species. However, there is insufficient information with which to determine whether the clearing has or will substantially interfere with the recovery of the species.

Table 10 Significant Impact Assessment for Black-footed Tree Rat

Significant Impact Criteria	Impact Assessment
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	At the time of the survey the landholder had cleared approximately 560.29 hectares of vegetation, comprising secondary habitat for the Black-footed Tree Rat. The landholder also has approval to clear a remaining 2,768.38 hectares of habitat. An important population of Black-footed Tree Rat occurs within the region and has the potential to occur within the study area (Table 8). The clearing of 560 hectares of habitat has resulted in the loss of potential habitat for this species. This is likely to be an overestimation given that the structure of vegetation within the study area is not uniform and woodlands on lowers slopes and fringing alluvial soils (land zone 3) would appear to provide more suitable habitats. Therefore, it is plausible that the clearing that has been completed is likely to contribute to a long-term decrease in the size of an important population due to the loss of hollows and foraging habitat.
Reduce the area of occupancy of an important population	The clearing is likely to have resulted in a reduction in the area of occupancy for the Black-footed Tree Rat given the permanent loss of hollows and foraging resources. The approved clearing areas are also likely to contribute to a reduction in the area of occupancy should the clearing proceed as approved.
Fragment an existing important population into two or more populations	Considering the extent of habitat surrounding the study area and the way in which the study area is divided into distinct blocks (i.e. habitat has been retained between areas), the completed clearing and/or approved clearing activities are unlikely to fragment an existing important population into two or more populations.
Adversely affect habitat critical to the survival of a species	The Black-footed Tree Rat occurs within Cape York Peninsula and around Mareeba and Atherton on the western slopes of the Atherton Tablelands. Given that the study area is beyond the most southerly record for the species (although the southern extent of the species range is not well understood), it is considered that the habitat is unlikely to be critical for the survival of the species.

Significant Impact Criteria	Impact Assessment
Disrupt the breeding cycle of an important population modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	As the Black-footed Tree Rat is not known from the study area or immediate surrounds, it is uncertain whether the clearing has disrupted the breeding cycle of a population. Breeding is thought to occur throughout the year, although activity peaks in the late dry season (August to September) and declines in the mid wet season (January to March). Satellite imagery provided by the DoEE for the study area indicates that the clearing was completed between 20 March, 2016 and 8 June, 2016. Therefore, there is a possibility that the clearing disrupted a breeding cycle of the species, should a population occur within the study area.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	There are no invasive species that are known to be harmful to the Black-footed Tree Rat that could become established within the study area. Predation from Feral Cats *Felis catus* and Wild Dogs / Dingoes *Canis lupus familiaris* / *C. l. dingo* is listed as a plausible threat, but not demonstrated (TSSC 2015).
Introduce disease that may cause the species to decline, or	There are no known diseases that affect Black-footed Tree Rat that could have been introduced through the clearing activity.
Interfere substantially with the recovery of the species.	The clearing within the study area and approved areas are unlikely to substantially interfere with the recovery of the species as shown in the Conservation Advice (TSSC 2015). The study area occurs within an intact landscape and connectivity is likely to be maintained.

The Referral guidelines for Koalas (DoE, 2104) was used to assess the potential impacts to Koalas within the study area. Portions of the study area have been assessed as having a habitat score of 7 (those areas containing Queensland Blue Gum) and the remainder of the study area scoring a 6 (due to the absence of Queensland Blue Gum). A habitat score of greater than 5 is considered to be habitat that is critical to the survival of the Koala. This assessment also recognises that Koalas also utilise trees that are not considered 'preferred' foraging species such as rest or refuge trees, which can be equally important as preferred foraging species in some regions (Crowther *et al.* 2013).

Figure 2 in the guidelines provides a flowchart that is used to determine whether a proposed action is likely to adversely impact habitat critical to the survival of the Koala. Using the flowchart, the clearing of 560.29 hectares of habitat indicates that impacts are uncertain and the referral decision depends on the nature of the action. An example is provided that a significant impact on Koala habitat would be expected if 25 hectares of habitat scoring a 6 or 7 is proposed to be completely cleared. Given that the clearing completed and approved clearing areas are many times over the 25 hectare threshold, this indicates that a significant impact has occurred to the Koala and would likely be exacerbated should the approved areas be cleared.

5 CONCLUSION

The proposed and completed clearing within Wombinoo Station have been assessed with respect to potential significant impacts to threatened species under the Commonwealth EPBC Act. Three species were considered in this assessment in accordance with published guidelines and known information regarding the species and their habitat; Black-footed Tree Rat, Greater Glider and Koala to determine whether a significant impact has or is likely to occur.

The assessment found that:

- An important population of Greater Glider occurs within Wombinoo Station and there is likely to have been a significant impact on this species from the clearing of 560 hectares of habitat that has been completed to date. Furthermore, the proposed clearing of additional habitat is likely to further exacerbate this impact.
- An important population of Koala occurs within Wombinoo Station and there is likely to have been a significant impact due to the clearing of 560 hectares of secondary habitat that has been completed to date. Furthermore, the proposed clearing of additional habitat is likely to further exacerbate this impact.
- An important population of Black-footed Tree Rat has a moderate likelihood of occurrence within Wombinoo Station and, should a population be identified within the study area, there is likely to have been a significant impact due to the clearing of 560 hectares of habitat that has been completed to date. Furthermore, the proposed clearing of additional habitat is likely to further exacerbate this impact.

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APPENDIX 1 - FLORA AND FAUNA SPECIES LIST

1.1 Flora Species

The following table shows the dominant flora species identified during the field survey.

Scientific Name	Common Name
Acacia flavescens	Yellow Wattle
Ageratum houstonianum	Blue Billy Goat Weed
Corymbia citriodora	Lemon-scented Gum
Corymbia clarksoniana	Clarkson's Bloodwood
Corymbia dallachiana	Dallachy's Gum
Corymbia tessellaris	Moreton Bay Ash
Eucalyptus crebra	Narrow-leaved Ironbark
Eucalyptus leptophleba	Molloy Red Box
Eucalyptus platyphylla	Poplar Gum
Eucalyptus portuensis	White Mahogany
Eucalyptus tereticornis	Forest Red Gum
Grevillea glauca	Bushman's Clothes Pegs
Heteropogon contortus	Black Speargrass
Lantana camara	Lantana*
Lomandra longifolia	Long-leaved Matrush
Lophostemon suaveolens	Swamp Box
Melaleuca stenostachya	Fibre-barked Teatree
Melinis repens	Red Natal Grass
Petalostigma pubescens	Quinine Bush
Stylosanthes var.	Stylo
Themeda triandra	Kangaroo Grass

1.2 Fauna Species List

The following table shows the fauna species identified during the field survey within areas proposed to be cleared.

Scientific Name	Common Name
Reptiles	
Oedura coggeri	Northern Spotted Velvet Gecko
Amalosia rhombifer	Zigzag Velvet Gecko
Heteronotia binoei	Bynoe's Gecko

Scientific Name	Common Name
Anomalopus gowi	Speckled Worm-skink
Dendrelaphis punctulata	Common Tree Snake
Birds	
Anas superciliosa	Pacific Black Duck
Nettapus coromandelianus	Cotton Pygmy Goose
Chenonetta jubata	Wood Duck
Vanellus miles	Masked Lapwing
Rhipidura fuliginosa	Grey Fantail
Cracticus torquatus	Grey Butcherbird
Rhipidura leucophrys	Willy Wagtail
Pardalotus striatus	Striated Pardalote
Platycercus adscitus	Pale-headed Rosella
Ocyphaps lophotes	Crested Pigeon
Grallina cyanoleuca	Magpie-lark
Trichoglossus moluccanus	Rainbow Lorikeet
Trichoglossus chlorolepidotus	Scaly-breasted Lorikeet
Threskiornis spinicollis	Straw-necked Ibis
Cracticus tibicen	Australian Magpie
Phaps chalcoptera	Common Bronzewing
Artamus leucorhynchus	White-breasted Woodswallow
Cracticus torquatus	Pied Butcherbird
Strepera graculina	Pied Currawong
Colluricincla harmonica	Grey Shrike-thrush
Geopelia humeralis	Bar-shouldered Dove
Coracina novaehollandiae	Black-faced Cuckoo-shrike
Entomyzon cyanotis	Blue-faced Honeyeater
Geophaps scripta peninsulae	Squatter Pigeon (nthn)
Todiramphus macleayii	Forest Kingfisher
Myiagra rubicola	Leaden Flycatcher
Cacatua galerita	Sulphur-crested Cockatoo
Geopelia placida	Peaceful Dove
Centropus phasianus	Pheasant Coucal
Corvus orru	Torresian Crow
Australian Raven	Corvus coronoides
Myzomela sanguinolenta	Scarlet Honeyeater
Lichmera indistincta	Brown Honeyeater
Philemon corniculatus	Noisy Friarbird
Gerygone olivacea	White-throated Gerygone
Dicrurus bracteatus	Spangled Drongo
Podargus strigoides	Tawny Frogmouth

Scientific Name	Common Name
Phalacrocorax varius	Pied Cormorant
Manorina melanocephala	Noisy Miner
Tachybaptus novaehollandiae	Australasian Grebe
Dacelo novaehollandiae	Laughing Kookaburra
Pachycephala rufiventris	Rufous Whistler
Glossopsitta pusilla	Little Lorikeet
Mammals	
Miniopterus australis	Little Bent-wing Bat
Miniopterus orianae oceanensis	Eastern Bent-wing Bat
Chalinolobus gouldii or *Mormopterus ridei*	Gould's Wattled Bat or Eastern Free-tailed Bat
Chalinolobus nigrogriseus or *Scotorepens sp*	Hoary Wattled Bat or a Broad-nosed Bat
Petauroides volans (VU)	Greater Glider
Trichosurus vulpecula	Brush-tailed Possum
Petaurus norfolcensis or *breviceps*	Squirrel Glider or Sugar Glider
Tachyglossus aculeatus	Echidna

VU = Vulnerable under EPBC Act.

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