QEJ22069 Spring Creek North Continuation Project SIA

METServe / Glencore
Spring Creek North Continuation Project

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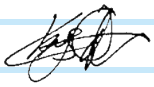
3	8/05/2023	Issued for use	J. Gamack	C. Ogston	

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Definitions

Term	Definition
Conservation significant	A term applied to species and communities listed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) as well as species listed as Critically Endangered, Endangered, Vulnerable, Near Threatened or Special Least Concern under the *Nature Conservation Act 1992* (QLD).
Drainage feature	Determined by the Department of Natural Resources, Mines and Energy under the *Water Act 2000* (QLD) as 'not a watercourse'.
Glencore	Glencore Coal Assets Australia
Population of a species	Defined under the *Environment Protection and Biodiversity Conservation Act 1999* as an occurrence of the species in a particular area
Prescribed regional ecosystem	Remnant vegetation
Regional Ecosystem	A vegetation community in a bioregion that is consistently associated with a particular combination of geology, landform and soil. Regional Ecosystems are described in the Regional Ecosystem Description Database, produced by the Queensland Herbarium.
Regulated vegetation	Vegetation that is mapped within the regulated vegetation management map produced by DNRME. Regulated Vegetation is managed under the *Vegetation Management Act 1999* (QLD).
Study area	Area of Rolleston West Mining Lease's (MLs) 70415 and 70307 that is north of the existing Spring Creek pit (Figure 1) known as Spring Creek North.
Target species	Conservation significant species (i.e. MNES and MSES) that are known, likely or have the potential to occur in the Study area as per the outcome of the likelihood of occurrence Assessment.
The Project	The mining extension of the Rolleston Open Cut (ROC) coal mine referred to as the Spring Creek North Continuation Project.
Threatened species	Critically Endangered, Endangered, Vulnerable species under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) and Endangered, Vulnerable or Near Threatened (EVNT) under the *Nature Conservation Act 1992* (QLD).
Vegetation community	An identified vegetation community (i.e. structure, composition, condition and/or underlying geology) verified from a field survey. Communities may include Regional Ecosystems, remnant vegetation and/or disturbed/novel ecosystems (e.g. parkland, disturbed roadsides etc.).
Watercourse	A watercourse as determined by the Department of Natural Resources, Mines and Energy under the *Water Act 2000* (QLD).

Abbreviations

Abbreviation	Description
ALA	Atlas of Living Australia
DAWE	Commonwealth Department of Agriculture, Water and the Environment
DCCEEW	Commonwealth Department of Climate Change, Environment, Energy and Water
DEE	Commonwealth Department of the Environment and Energy
DotE	Commonwealth Department of the Environment
DEWHA	Commonwealth Department of the Environment, Water, Heritage and the Arts
DSEWPC	Commonwealth Department of Sustainability, Environment, Water, Population and Communities
DES	Queensland Department of Environment and Science
DNRME	Queensland Department of Natural Resources, Mines and Energy
E2M	E2M Pty Ltd
EIS	Environmental Impact Statement
ELA	Ecological Australia Pty Ltd
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
GTRE	Ground-truthed Regional Ecosystem
LIKT	Locally Important Koala Trees as defined within *A review of koala habitat assessment criteria and methods* (Youngentob et al., 2021)
ML	Mining Lease
MNES	Matters of National Environmental Significance are prescribed under the *Environmental Protection and Biodiversity Conservation Act 1999* (Cth)
MSES	Matters of State Environmental Significance as defined in Schedule 2 of the *Environmental Offsets Regulation 2014* (QLD) and other environmental matters prescribed under Queensland legislation, subsidiary regulations and codes
NC Act	*Nature Conservation Act 1992* (QLD)
NSW	New South Wales
PMST	Protected Matters Search Tool used to determine matters protected under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth). The PMST generates a Protected Matters Report.
QLD	Queensland
RCEP	Rolleston Coal Expansion Project
RE	Regional Ecosystem
REDD	Regional Ecosystem Description Database

Abbreviation	Description
ROC	Rolleston Open Cut
sp.	Singular species. For example, a single *Eucalyptus* sp.
spp.	Multiple species within a genus. For example, many *Eucalyptus* spp.
SPRAT	Species Profile and Threats database provides information about species and ecological communities listed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth)
SCN	Spring Creek North
TEC	Threatened Ecological Community listed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth)
TSSC	Threatened Species Scientific Committee
VCs	Vegetation communities
VM Act	*Vegetation Management Act 1999* (QLD)
WONS	Weeds of National Significance

Executive summary

Glencore propose to extend mining operations north of the existing Spring Creek pit on the northern sections of Mining Leases (ML's) 70415 and 70307 (Study area) (Figure 1). The extension, referred to as the Spring Creek North Continuation Project (hereafter 'the Project') (Figure 1) is situated on existing ML's, however, the Study area has not been previously approved for mining.

E2M was commissioned to prepare a Significant Impact Assessment (SIA) for MNES and MSES relating to terrestrial ecology for the Project. The aim of this assessment was to determine whether activities relating to the Project are likely to have a significant impact on MNES and MSES identified within the Study area. Works undertaken by E2M for this SIA included:

1. A desktop assessment to identify MNES and MSES likely to occur within the Study area (see Sections 3 and 4 of this report)
2. Field surveys to assess the suitability of habitat for MNES and MSES and document the presence of MNES and MSES on site (see Sections 3 and 5 of this report)
3. An assessment of potential Project impacts on MNES and MSES (see Section 6 of this report); and
4. An assessment of residual impacts on MNES and MSES in accordance with Commonwealth and State legislation and guidelines (see Section 7 of this report).

A SIA was completed for each of the MNES likely to occur within the Study area in accordance with applicable *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) guidelines. The likelihood of a 'significant residual impact' to MSES was assessed using the *Queensland Environmental Offsets Policy: Significant Residual Impact Guideline* (DEHP, 2014) (SRI Guideline). MSES that were assessed under the EPBC Act Guidelines (species also listed under the EPBC Act), were not assessed under the Queensland Guideline, in accordance with the QLD *Environmental Offsets Act 2014*.

The SIA determined that the Project is likely to have a significant impact on MNES and MSES occurring within the Study area (as summarised in Table 1).

Table 1: Summary of SIA for MNES and MSES occurring within the Study area

Environmental Matter	Status	Anticipated significant impact	Habitat within the Study area (ha)
MNES	**EPBC Act status**		
Natural Grasslands of the Queensland Central Highlands and northern Fitzroy Basin	Endangered	Likely	124.10
King bluegrass *Dichanthium queenslandicum*	Endangered	Likely	536.2
Koala *Phascolarctos cinereus*	Endangered	Potential	424.8
MSES			
Protected habitat	**NC Act status**		
Cyperus clarus	Vulnerable	Likely	536.2

Environmental Matter	Status	Anticipated significant impact	Habitat within the Study area (ha)
Belyando cobbler's pegs *Trioncinia retroflexa*	Endangered	Likely	124.10
Regulated vegetation	**VM Act status**		
Prescribed RE 11.4.7	Endangered	Likely	7.0
Prescribed RE 11.8.11	Of concern	Likely	124.10
Prescribed REs within a defined distance from the defining banks of a relevant watercourse	N/A	Likely	20.5

1 Introduction

1.1 Project background

Rolleston Coal Holdings Pty Limited (RCH) own and operate the Rolleston Open Cut (ROC) coal mine located approximately 16 kilometres (km) west of the town of Rolleston in central Queensland. RCH is owned by Glencore PLC (Glencore) through various intermediatory companies. The ROC mine has been operational since 2005 and is approved to produce up to 19 million tonnes per annum (mtpa) of thermal coal under federal (EPBC 2011/5965, 2009/5175 and 2001/497) and state (EA EMPL00370013) approval conditions.

RCH propose to extend mining operations north of the existing Spring Creek pit on existing Mining Leases (ML's) 70415 and 70307 herein referred to as the Study area which is illustrated in Figure 1. The extension, referred to as the Spring Creek North Continuation Project (hereafter 'the Project') will utilise existing ROC mine infrastructure such as powerlines, haul roads, water pipelines and rail. Despite the use of existing mine infrastructure, additional environmental approvals are required for clearing, construction work and mining activities. Significant impact assessments for Matters of National (MNES) and State Environmental Significance (MSES) are required to support these approvals.

The Study area has previously been subject to ecological investigations undertaken by Ecological Australia Pty Ltd (ELA) in 2022 which are detailed in the *Rolleston Pit Expansion – Ecological Field Assessment* (ELA, 2022) (Appendix B). However, additional desktop and field investigations were required to assess Project impacts on MNES and MSES that were not considered in pre-approved conditions within the Rolleston Coal Expansion Project (RCEP) Environmental Impact Statement (EIS) approved in 2015.

1.2 Objective and scope

E2M Pty Ltd (E2M) was engaged by METServe on behalf of Glencore to conduct a Significant Impact Assessment (SIA) for terrestrial ecological MNES and MSES. The objective of the SIA is to determine whether the Project is likely to have a significant residual impact on terrestrial flora and fauna listed under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) and / or *Nature Conservation Act 1992* (NC Act). The SIA builds upon previous ecological investigations conducted within the Study area.

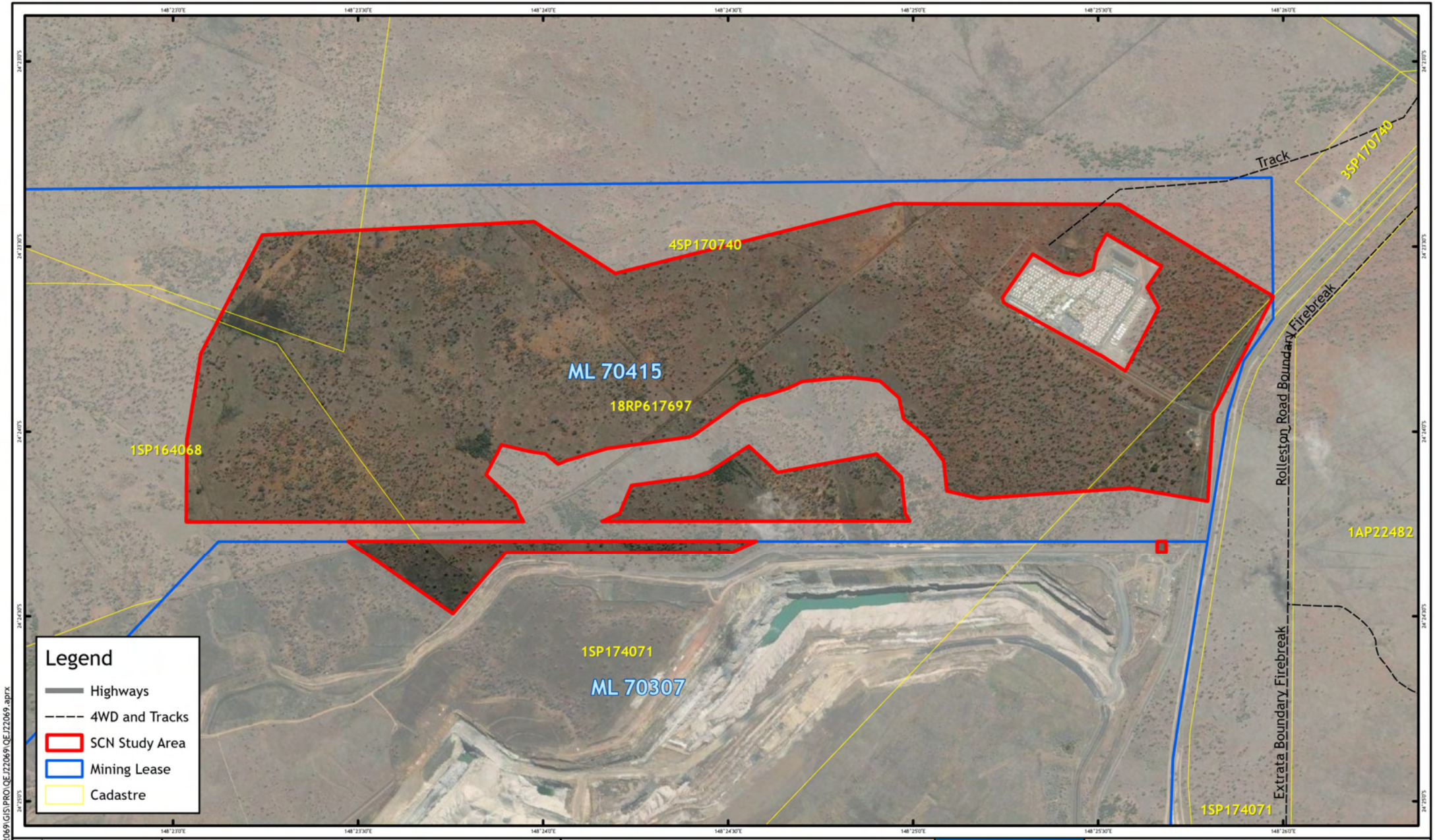
The scope of works for this SIA includes:

- a comprehensive review of the existing environmental assessment reports detailing the ecological values previously identified within the ROC coal mine area
- targeted surveys for conservation significant flora and fauna species potentially occurring or likely to occur within the Study area
- identifying the potential impact of clearing, construction and operational activities on terrestrial MNES and MSES known or likely to occur within the Study area; and
- evaluating the residual impact (if any) against the State and Commonwealth significant residual impact criteria.

1.3 Site overview

The ROC is situated amongst a coal mining precinct in the Bowen Basin where resource extraction, agriculture and livestock grazing are the predominant land uses. Consequently, the landscape has been highly modified. The Study area is located immediately north of the existing Rolleston Spring Creek pit and has been subject to direct and indirect disturbances associated with ongoing operational activities.

Vegetation within the 592.2 ha Study area consists mainly of grasslands and open eucalypt woodland on black soils derived from Cainozoic basalt. The Study area also includes two drainage lines (Stream Order 1) that merge to form a small Stream Order 2 creek line that flows into Spring Creek. The riparian areas support *Melaleuca bracteata* woodland. Other water sources include a diversion running along the northern limit of the existing mining lease. The diversion is not permanent and is pumped downstream to maintain overland flow. A single cattle trough was identified within the Study area.



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3	Issued for Use	PR	JG	06/04/2023
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FIGURE 1: STUDY AREA

Rolleston Open Cut Ecology Survey

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2 Relevant legislation

The assessment of Project impacts on MNES and MSES for this SIA was conducted in accordance with Commonwealth and State legislation and guidelines, as summarised below.

2.1 Commonwealth

Significant impacts on MNES are evaluated using the Australian Government's environmental and offset framework. Key elements of this framework are outlined below.

Environment Protection and Biodiversity Act 1999	• framework to protect and manage nationally significant flora, fauna, ecological communities and heritage places • provides a national environmental assessment and approvals process
Environmental Offsets Policy 2012	• outlines the Australian Government's approach to the application of environmental offsets • aims to achieve net positive environmental outcomes through a consistent application of best practice offset principles
MNES Significant Impact Guidelines 1.1	• describes the nine MNES • steps out whether or not an action is likely to have a significant impact on MNES • lists the 'Significant impact criteria' used as part of this assessment
Offsets assessment guide	• a practical tool using a balance sheet approach to compare impacts to offsets for threatened species and ecological communities (not included as part of this report)

2.2 State

Significant impacts on MSES are evaluated using the Queensland offset framework, as outlined below.

Environmental Offsets Act 2014	• outlines the offsets framework in Queensland • specifies the delivery of environmental offsets across jurisdictions
Environmental Offsets Regulation 2014	• lists the MSES regulated under the *Environmental Offsets Act 2014* • specifies prescribed activities
Queensland Environmental Offsets Policy Version 1.10	• details how offset proposals are assessed to ensure they meet the requirements of the *Environmental Offsets Act 2014*
Significant Residual Impact Guideline	• applied to assist in determining whether or not the Project will, or is likely to have a significant residual impact on the MSES identified within the Study area • includes the Landscape Fragmentation and Connectivity tool

3 Methods

The following sections detail the methodology of the desktop assessment (Section 3.1), including likelihood of occurrence assessment (Section 3.2), as well as the field survey (Section 3.3).

3.1 Desktop assessment

The desktop assessment consolidated information from relevant databases, mapping, aerial imagery, and published literature to produce an initial characterisation of the ecological values of the Study area and surrounding landscape. In part, this initial characterisation guides the assessment strategy required in the field by providing information such as previously recorded threatened species, potential habitat features and mapped vegetation communities.

The desktop assessment sourced information from the:

- Rolleston Coal Expansion Project Environmental Impact Statement (DEHP, 2015) including Chapter 13: Terrestrial Flora, Chapter 14: Terrestrial Fauna, and Chapter 21: MNES
- Rolleston Coal Extension Project Biodiversity Offsets – Phase 1 Report; Kellogg, Brown and Root (KBR) 2015
- Rolleston Pit Expansion - Gap analysis (ELA, 2021)
- Rolleston Pit Expansion – Ecological Field Assessment (ELA, 2022)
- Rolleston Open Cut – Stage 2 Offset Assessment (ELA, 2022b)
- Wildlife Online
- EPBC Act – Protected Matters Search; and
- Atlas of Living Australia (ALA).

Databases searches applied a 50 km buffer around the Study area.

The desktop assessment is presented as a gap analysis of previous work completed within the Study area including any other MNES and MSES that need to be considered. This is presented in Section 4.

3.2 Likelihood of occurrence assessment

A likelihood of occurrence assessment evaluates the qualitative probability that a conservation significant flora or fauna species might inhabit the Study area during all or part (e.g. breeding season, migration) of its life cycle. The objectives of the Likelihood of Occurrence Assessment are to:

- guide the field survey design by highlighting conservation-significant species that:
  - are known to occur in the area;
  - are likely to occur in the area; and
  - have the potential to occur in the area.
- inform the terrestrial ecological assessment of the potential risk of impact from the Project on the identified species/habitat.

To determine whether a species is known, likely or has potential to occur in the area, the likelihood of occurrence assessment considers:

- species-specific ecological and physiological requirements
- previously recorded species observations
- the resources and constraints present in the Study area informed by the desktop assessment; and
- the resources and constraints present in the Study area informed by the field surveys.

The likelihood of occurrence assessment criteria is detailed in Table 2.

Table 2. Likelihood of occurrence assessment criteria

Assessment Outcome	Criteria
known to occur	The species has been recorded within the Study area. Records include E2M and/or ELA field survey data, recent Wildnet database records
likely to occur	Suitable habitat for a species is present within the Study area, there are nil or negligible constraints and local records are present
potential to occur	Suitable habitat for a species occurs within the Study area but local records are few/absent/not recent or a threatening process/constraint (e.g. habitat fragmentation, introduced species) within the Study area reduces the probability a species/population is present
unlikely to occur	• A low to very low probability that a species inhabits/occurs within the Study area due to the lack of suitable habitat, lack of local records or the presence of threatening process • If suitable habitat for a conspicuous species of flora is comprehensively surveyed during favourable conditions and the species is undetected, it may be considered unlikely to occur within the Study area. Local threatening processes and/or a lack of local or recent records supports the assessment outcome (i.e. unlikely to occur)
does not occur	The species will not occur within the Study area (e.g. marine species in terrestrial study site)

Species that are considered likely or have the potential to occur in or near the Study area, as based on the desktop assessment, were identified as target species for the survey. A comprehensive threatened flora survey was conducted by ELA across the Study area therefore no flora species were subject to target field surveys by E2M.

The prescribed survey methodologies used to detect target species in the field (discussed in Section 3.3) form the basis of the field survey design. Target species detected during the field surveys are further evaluated to establish the Project's potential impact. Target species not detected however, are not necessarily assumed to be absent from the Study area. Certain species, for example, are naturally rare throughout their range or are difficult to detect in the field (e.g. cryptic or fossorial). Some populations are naturally cyclical or fluctuate in response to resource availability and environmental conditions. Highly mobile species may utilise habitat within the Study area only intermittently during migration or as part of a larger home range.

To account for the variability of detection and to maintain logistical practicality of survey design, the precautionary principle may be applied. If a particular target species is not detected in the Study area during a survey of suitable habitat but there is reason to believe the species is likely to occur, the species

is included in further evaluation. In contrast, if a target species is not detected in the Study area and there is no reason to believe the species has potential to occur, the species may be considered unlikely to occur and not evaluated further.

A target species may also be determined unlikely to occur if the species remains undetected after all suitable habitat within the Study area is comprehensively surveyed in favourable conditions and there is no reason otherwise to believe the species may be present (e.g. the species is difficult to detect). This outcome is often more pertinent for conspicuous flora species and where extensive surveys in optimal conditions allow a higher confidence that a species is unlikely to be present. Unlike fauna, which are highly mobile and may utilise habitat intermittently, flora species are more likely to be detected should they occur within the Study area if all suitable habitat is surveyed systematically during suitable survey conditions.

3.3 Field assessment

Field surveys were conducted to identify target species and species habitat within the Study area. The methods employed adhere to the guidelines and methodologies prescribed or supported by the Queensland and Commonwealth governments.

3.3.1 Survey timing and conditions

Field surveys within the Study area were undertaken by two E2M ecologists from the 13th to 16th November 2022. Weather during the survey was warm and dry, with a maximum daily temperature of 33.5°C and a minimum of 16.5°C (Bureau of Meteorology, 2022). No rainfall was recorded during the survey period.

3.3.2 Flora survey

Opportunistic searches for conservation significant flora species were undertaken within suitable habitat during habitat assessments and fauna surveys.

3.3.3 Fauna survey

Fauna surveys undertaken by E2M ecologists targeted MNES and MSES species that were identified during the gap analysis (Methodology described in Section 3.1 and 3.2 and presented in Section 4). Survey methods were based on survey guidelines for threatened species published by the Commonwealth and Queensland Governments, including:

- *A review of koala habitat assessment criteria and methods* (Youngentob et al., 2021)
- *Draft referral guidelines for the nationally listed Brigalow Belt reptiles* (DSEWPC, 2011a)
- *Survey guidelines for Australia's threatened birds* (DEWHA, 2010)
- *Survey guidelines for Australia's threatened mammals* DSEWPC, 2011b)
- *Survey guidelines for Australia's threatened reptiles* (DSEWPC, 2011c).
- *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland V.4*(Eyre et al., 2022); and

The prescribed survey effort, survey methods and survey effort conducted by E2M during the field survey are outlined in Table 3.

Table 3: Fauna survey methods and survey effort

Target species	Survey Methods and prescribed effort	Survey effort
Acanthophis antarcticus (common death adder)	Active searches were undertaken between mid-morning and late afternoon to coincide with optimal temperatures for the detection of the species as well as during the middle of the day. Active searches involved searching suitable microhabitat (e.g. deep fixed leaf litter, overhanging foliage (DCCEEW, 2022)).	Active searches for the species in appropriate habitat over 4 days. Spotlighting surveys were undertaken over 3 nights for approximately 3-4 hours per night
Egernia rugosa (yakka skink)	Active searches were undertaken between mid-morning and late afternoon to coincide with optimal temperatures for the detection of the species as well as during the middle of the day. Active searches involved searching suitable microhabitat (e.g. fallen woody debris, leaf litter, decorticating bark, rocks (DCCEEW, 2022)).	Active searches for burrow systems and communal defecation sites over 4 days. Spotlighting surveys were also undertaken over 3 nights for approximately 3-4 hours per night.
Falco hypoleucos (grey falcon)	No prescribed methods for targeting this species. Therefore, surveys were undertaken as per Squatter pigeon requirements.	60 person hours over a 4-day period
Geophaps scripta scripta (squatter pigeon)	Area searches, transect surveys and flushing surveys in suitable habitat for 15 person hours over a 3 day period (DEWHA, 2010).	60 person hours over a 4-day period
Hemiaspis damelii (grey snake)	There are currently no prescribed methods for targeting this species likely due to its recent federal up-listing (October 2022). Due to the species similarity with *Denisonia maculata* (Ornamental snake), this species' prescribed survey methods from the federal reptile survey guidelines (DSEWPC, 2011c) has been adopted.	Nocturnal spotlighting around suitable microhabitat for 3 nights for approximately 3-4 hours per night.
Phascolarctos cinereus (koala)	Direct observation: Active diurnal and nocturnal (spotlighting) searches in suitable habitat. Spot assessment technique (SAT): Searching for scats for 2 minutes (or until the first scat is detected) within a 1 m radius of the base of a central tree and its nearest 29 neighbouring trees. All trees must be at least 10 cm diameter at breast height (DBH).	Diurnal searches: 4 days Nocturnal searches: 3 nights SAT: 3 searches in separate areas of the Study area

3.4 Survey limitations

Ecological surveys have a range of inherent limitations associated with seasonal timing of the survey, variable climate conditions and species behaviour. As such, the survey conducted only represents a "snapshot" in time and may not provide a true indication of presence or absence of fauna species within the Study area.

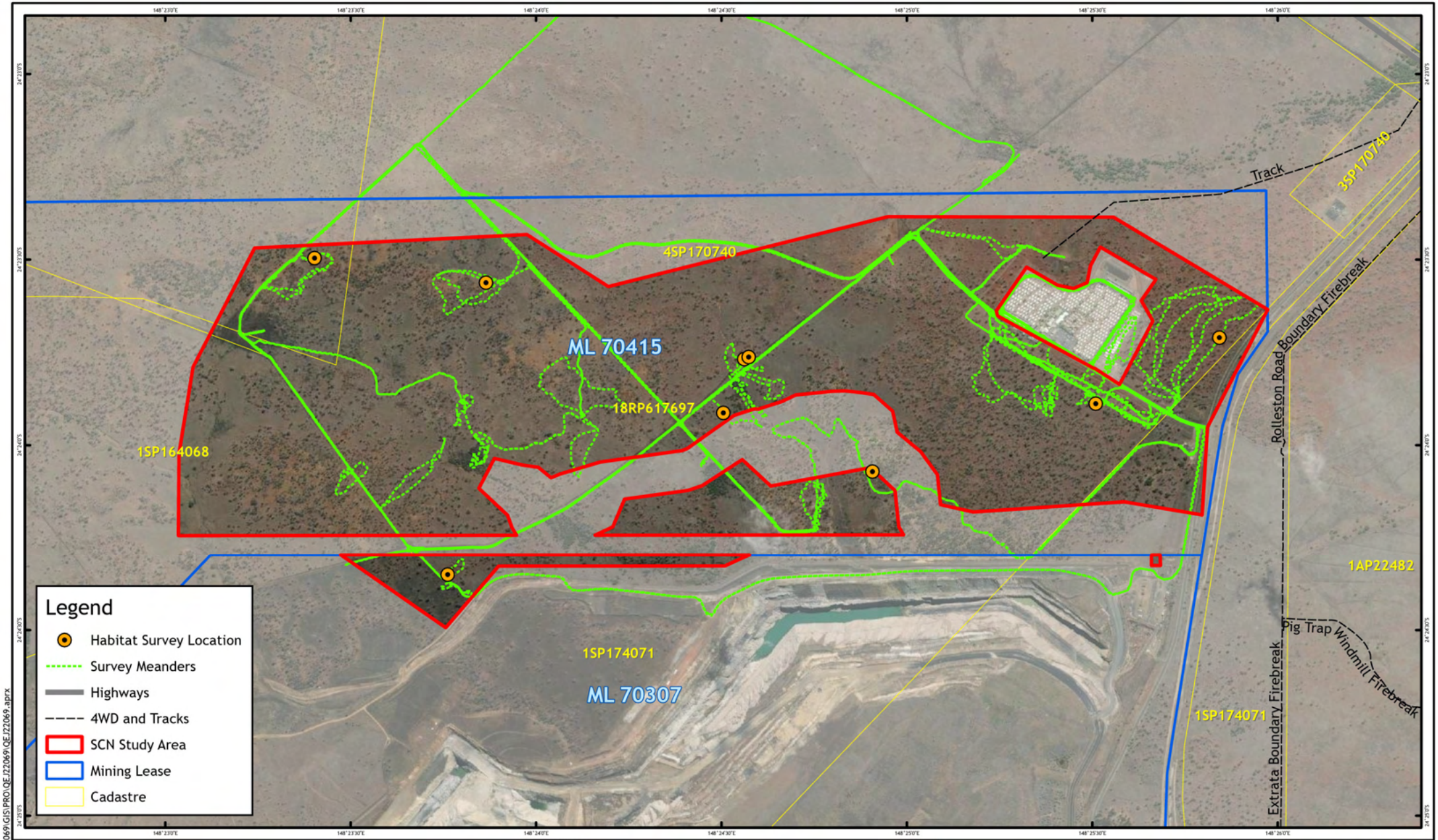

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FIGURE 2: FAUNA SURVEY EFFORT WITHIN THE STUDY AREA

Rolleston Open Cut Ecology Survey

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4 Gap analysis

4.1 Desktop assessment results

ELA (2022) confirmed the presence of two MNES and two MSES within the Study area:

- Natural Grasslands TEC (MNES) (~124 ha)
- king bluegrass (*Dichanthium queenslandicum)* habitat (MNES) (~536 ha)
- regulated vegetation (MSES) (~151.6ha); and
- connectivity areas (MSES) (~549 ha).

The *Rolleston Pit Expansion - Ecological Field Assessment* (ELA, 2022) (Appendix A) also documented several additional environmental matters likely/potential to occur (Table 4.).

Table 4: Summary results from ELA (2022) ecological studies

MNES		
Threatened species	**EPBC Act status**	**Habitat within Study area (ha) mapped by ELA**
Known to occur		
king bluegrass *(Dichanthium queenslandicum)*	Endangered	536.2
Likely to occur		
shrubby bush pear *(Leichhardtia brevifolia syn. Marsdenia brevifolia)*	Vulnerable	536.2
squatter pigeon *(Geophaps scripta scripta)*	Vulnerable	424.8
Potential to occur		
annual wiregrass *(Aristida annua)*	Vulnerable	124.1
bluegrass *(Dichanthium setosum)*	Vulnerable	124.1
grey falcon *(Falco hypoleucos)*	Vulnerable	548.8
koala *(Phascolarctos cinereus)*	Endangered	424.8
white-throated needletail *(Hirundapus caudacutus)*	Vulnerable	592.2
yakka skink *(Egernia rugosa)*	Vulnerable	146.9
Migratory species	**EPBC Act status**	**Habitat within Study area (ha)**
Likely to occur		
fork-tailed swift *(Apus pacificus)*	Migratory	592.2
Threatened ecological communities	**EPBC Act status**	**Habitat within Study area (ha)**

Known to occur		
Natural Grasslands of the Queensland Central Highlands and northern Fitzroy Basin	Endangered	124.1
MSES (not listed as MNES)		
Regulated vegetation	**VM Act status**	**Total within Study area (ha)**
Prescribed RE 11.4.7	Endangered	7.0
Prescribed RE 11.8.11	Of concern	124.1
Prescribed REs that intersect with an area of essential habitat	-	15.4
Prescribed REs within a defined distance from the defining banks of a relevant watercourse	-	20.5
Connectivity		
Connectivity areas present as remnant vegetation	-	548.9
Protected wildlife habitat	**NC Act status**	**Habitat within Study area (ha)**
Likely to occur		
Belyando cobbler's pegs *(Trioncinia retroflexa)*	Endangered	124.1
Cyperus clarus	Vulnerable	536.2
finger panic grass *(Digitaria porrecta)*	Near threatened	124.1
short-beaked echidna *(Tachyglossus aculeatus)*	Special Least Concern	548.9
Potential to occur		
common death adder *(Acanthophis antarcticus)*	Vulnerable	419.1

E2M identified a further four species during review of the desktop information:

- glossy black cockatoo (*Calyptorhynchus lathami*) Vulnerable under the EPBC Act and the NC Act
- bridled nail-tail wallaby (*Onychogalea fraenata*) Endangered under the EPBC Act and the NC Act
- Yellow-bellied glider (*Petaurus australis australis*) Vulnerable under the EPBC Act and the NC Act; and
- grey snake (*Hemiaspis damelii*) Endangered under the EPBC Act and the NC Act.

4.2 Target species for field survey

The conservation significant species identified during the gap analysis were evaluated for their likelihood of occurrence (using the assessment method detailed in Section 3.2). This assessment is presented in Table 5.

ELA (2022) conducted a comprehensive flora survey to ground-truth the vegetation communities within the Study area as well as identify Threatened Ecological Communities (TECs) and threatened flora species. ELA (2022) confirmed the presence of:

- approximately 124 ha of Natural Grasslands TEC
- king bluegrass (*Dichanthium queenslandicum*); and
- two MSES (not listed as MNES), including regulated vegetation and connectivity values.

These field surveys have been considered during the likelihood of occurrence assessment presented in Table 5.

Table 5: Likelihood of occurrence assessment results and target species for field survey

Species	Previous likelihood assessment (ELA, 2022)	Current likelihood assessment (E2M, 2023)	Target Species for field survey	Rationale
MNES				
TEC				
Natural Grassland TEC	Known	Known	No	ELA (2022) confirmed the presence of Natural Grassland TEC within the Study area. No further field assessment required.
Flora				
annual wiregrass *(Aristida annua)*	Potential	Potential	No	Four records within 50 km of the Study area. Additionally, there is potential habitat mapped within the Study area, RE 11.8.11 (ELA, 2021). The Study area is just outside of the known species range. ELA has conducted a comprehensive flora field survey of the Study area within peak conditions. No further field assessment required.
bluegrass *(Dichanthium setosum)*	Potential	Potential	No	Seven known records within 50 km of the Study area, of which three records are within 1 km of the Study area. Potential habitat has been mapped within the Study area, RE 11.8.5 (ELA, 2021). ELA has conducted a comprehensive flora field survey of the Study area within peak conditions. No further field assessment required.
king bluegrass (*Dichanthium queenslandicum*)	Known	Known	No	ELA (2022) confirmed the presence of king bluegrass within the Study area. No further field assessment required.

Species	Previous likelihood assessment (ELA, 2022)	Current likelihood assessment (E2M, 2023)	Target Species for field survey	Rationale
Shrubby bush pear (*Leichhardtia brevifolia*)	Likely	Unlikely	No	ELA identified *Leichhardtia brevifolia* as unlikely and *Marsdenia brevifolia* as likely. These species are synonymous. *Leichhardtia brevifolia* being the current recognised name for the species (Queensland Herbarium, 2022). The nearest record for this species is 25 km away and is within the mountain range to the north of the site. Appropriate habitat is not present within the Study area such as woodlands dominated by *Corymbia erythrophloia* and *Eucalyptus crebra* with dense *Themeda triandra* understory on basalt (DES, 2022). ELA has conducted a comprehensive flora field survey of the Study area within peak conditions. No further field assessment required.
Fauna				
bridled nail-tail wallaby *(Onychogalea fraenata)*	Not assessed	Unlikely	No	The species has not been recorded within 50 km and the Study area contains no suitable habitat for the species which consists of dense acacia forest dominated by *Acacia harpophylla* and open grassy woodland dominated by *Eucalyptus populnea* (TSSC, 2016).
Fork-tailed swift (*Apus pacificus*)	Likely	Likely	Yes	The Project is within the known distribution ranges of the species. There have been five records within 50 km of the Study area.
glossy-black cockatoo (*Calyptorhynchus lathami)*	Not assessed	Unlikely	No	The Study area is outside the species known distribution and the species has not been recorded within 50 km of the area. No *Allocasuarina* or *Casuarina* dominated woodlands are present within the site which is their primary food source (DCCEEW, 2022).
grey falcon (*Falco hypoleucos*)	Potential	Potential	Yes	The species has not been recorded within 50 km and the Study area contains no suitable habitat for the species which consists of tree lined watercourses and low timbered woodlands.

Species	Previous likelihood assessment (ELA, 2022)	Current likelihood assessment (E2M, 2023)	Target Species for field survey	Rationale
Grey snake (*Hemiaspis damelii*)	Not assessed	Potential	Yes	The species has not previously been recorded within 50 km of the Study area however is within the species distribution. The Study area contains limited habitat for the species however lacks the preferred woodland habitat of *Acacia harpophylla* and *Casuarina cristata* (DCCEEW, 2022a).
koala *(Phascolarctos cinereus)*	Potential	Potential	Yes	Multiple koala records exist adjacent to the Study area with one record 1.2 km to the north-east and another 14.5 km to the south with more on all boundaries of the Study area. The Study area contains suitable habitat for the species including Locally Important Koala Trees (LIKT). Riparian areas and alluvial terraces dominated by Eucalyptus are not present within the Study area.
squatter pigeon *(Geophaps scripta scripta)*	Likely	Likely	Yes	Suitable habitat (grassy woodlands) occurs across the Study area and there are 30 known records within 50 km of the Study area. One permanent water source occurs within or surrounding (within 1 km) the Study Area (refer to Section 5.1.3).
white-throated needletail *(Hirundapus caudacutus)*	Potential	Likely	Yes	There are 13 known records within 50 km of the Study area including within the adjacent Stage 1 and Stage 2 areas, potential non-breeding habitat is present.
yakka skink (*Egernia rugosa*)	Potential	Potential	Yes	The species has been recorded once within 50 km and the Study area contains potentially suitable dry eucalypt woodland habitat.
yellow-bellied glider *(Petaurus australis australis)*	Not assessed	Unlikely	No	The species has not been recorded within 50 km and the Study Area contains no suitable habitat for the species which consists of mature old growth forest and forests with a high proportion of winter flowering and smooth barked eucalypts (DAWE, 2022).

Species	Previous likelihood assessment (ELA, 2022)	Current likelihood assessment (E2M, 2023)	Target Species for field survey	Rationale
MSES (not listed as MNES)				
Flora				
Cyperus clarus	Likely	Likely	No	Four records within 50 km of the Study area are known and is within the known species distribution range. Potential habitat is mapped within the Study area, RE 11.8.11 and 11.8.5 (ELA, 2021). Additionally, *Cyperus clarus* was confirmed in the Meteor Downs property to the west of SCN in March 2022. ELA has conducted a comprehensive flora field survey of the Study area within peak conditions. No further field assessment required.
finger panic grass *(Digitaria porrecta)*	Likely	Likely	No	11 records known within 50 km of the Study area, additionally four records within 1 km. The Study area is within the species known range and habitat is present, RE 11.8.11 (ELA, 2021). ELA has conducted a comprehensive flora field survey of the Study area within peak conditions. No further field assessment required. This species is listed as Near Threatened, therefore under the Environmental Offsets Policy, the species is not assessed under the *significant residual impact guideline* and the species is not classified as an MSES for this Project (refer to Section 7.2).
Belyando cobbler's pegs *(Trioncinia retroflexa)*	Likely	Likely	No	Four records within 50 km of the Study area are known and the Study area is within the known species distribution. Potential habitat is mapped within the Study area, RE 11.8.11 and 11.8.5 (ELA, 2021). ELA has conducted a comprehensive flora field survey of the Study area within peak conditions. No further field assessment required.
Fauna				

Species	Previous likelihood assessment (ELA, 2022)	Current likelihood assessment (E2M, 2023)	Target Species for field survey	Rationale
Common death adder *(Acanthophis antarcticus)*	Potential	Potential	Yes	There are known records within 50 km of the Study area. Whilst some potential habitat (grassland) occurs within the Study area, habitat present requires essential microhabitat features such as leaf litter and debris to be suitable. Cane toads are also present within the Study area which decreased habitat quality.
short-beaked echidna *(Tachyglossus aculeatus)*	Likely	Likely	Yes	Suitable habitat is available in the Study area. Species is a habitat generalist and may utilise a range of habitats within the Study area. Several species records exist within 50 km of the Study area including a recent record (2012) (ALA, 2022).

5 Field survey results

5.1 MNES

No target MNES fauna were detected within the Study area during field surveys, however suitable habitat was recorded for several species that are known to occur within 50 km of the Study area.

5.1.1 Fork-tailed swift (*Apus pacificus*)

The global population of Fork-tailed swift is known to occur in multiple countries throughout Asia including New Zealand and is listed as Migratory under the EPBC Act. The species is almost entirely aerial and it does not breed in Australia. The species was not observed during field surveys within the Study Area but five records exist within 50km. Fork-tailed swifts fly at varying altitudes from just above ground level to hundreds of metres above the ground foraging for flying insects. It is uncommon for the species to roost with some locations including branches, fences, towers, cliff sides and caves (DCCEEW, 2023). Records for the species exist throughout Australia over a variety of habitats. Therefore, most airspace above Australia is considered fly-over habitat. This species has been assessed under the relevant SIA criteria in Section 7.1.4.

5.1.2 Grey falcon (*Falco hypoleucos*)

The grey falcon is a highly mobile species which is migratory and locally nomadic. The species frequents timbered lowland plains, particularly acacia shrublands that are crossed by tree-lined water courses (Garnett et al., 2011). The species has also been observed hunting in treeless areas, tussock grassland and open woodland, especially in winter (Schoenjahn, 2013). During the breeding season (June to November) the species nests in the tallest available trees along watercourses, particularly River Red Gum (*Eucalyptus camaldulensis*) and Coolibah (*E. coolabah*) (Garnett et al., 2011).

The grey falcon was not recorded during surveys. The Study area lacked tree lined watercourses and low timbered woodlands suitable for the species, however, grassland areas were mapped and these may provide some foraging habitat for the species. In addition, considering the migratory and locally nomadic lifestyle of the species, individuals may utilise the site at other times throughout the year

Due to the absence of nearby records and lack of suitable breeding habitat within the Study area and surrounds, no significant impact is anticipated, and this species is not considered further in this assessment.

5.1.3 Grey snake (*Hemiaspis damelii*)

The grey snake requires black cracking clays with microrelief, and/or lakes and river systems where the species feeds almost exclusively on anuran species. Vegetation communities with which the species is associated include *Acacia harpophylla* (brigalow) woodlands/open forests, *Casuarina cristata* (belah) woodlands/open forests and *Dichanthium* spp. (bluegrass) grasslands.

Habitat within the Study area includes areas of black soil that may support successful breeding and recruitment of native frog species after heavy rain, providing foraging opportunities for the grey snake. However, this habitat was not typical gilgai microrelief and would drain quickly after rain events. Other areas included a diversion and ephemeral waterbodies within the Study area. The waterways within the Study area were minimal and dry at the time of the survey even after recent rain events. A large diversion was present at the southern end of the Study area. This area contained numerous native anuran species however no grey snake was identified during nocturnal surveys.

The grey snake was not identified during the targeted threatened fauna survey. Limited occurrences of the species exist within the region (two occurrences surrounding Emerald and Clermont) with majority of the species occurrences along the Macintyre and Condamine rivers and associated floodplains.

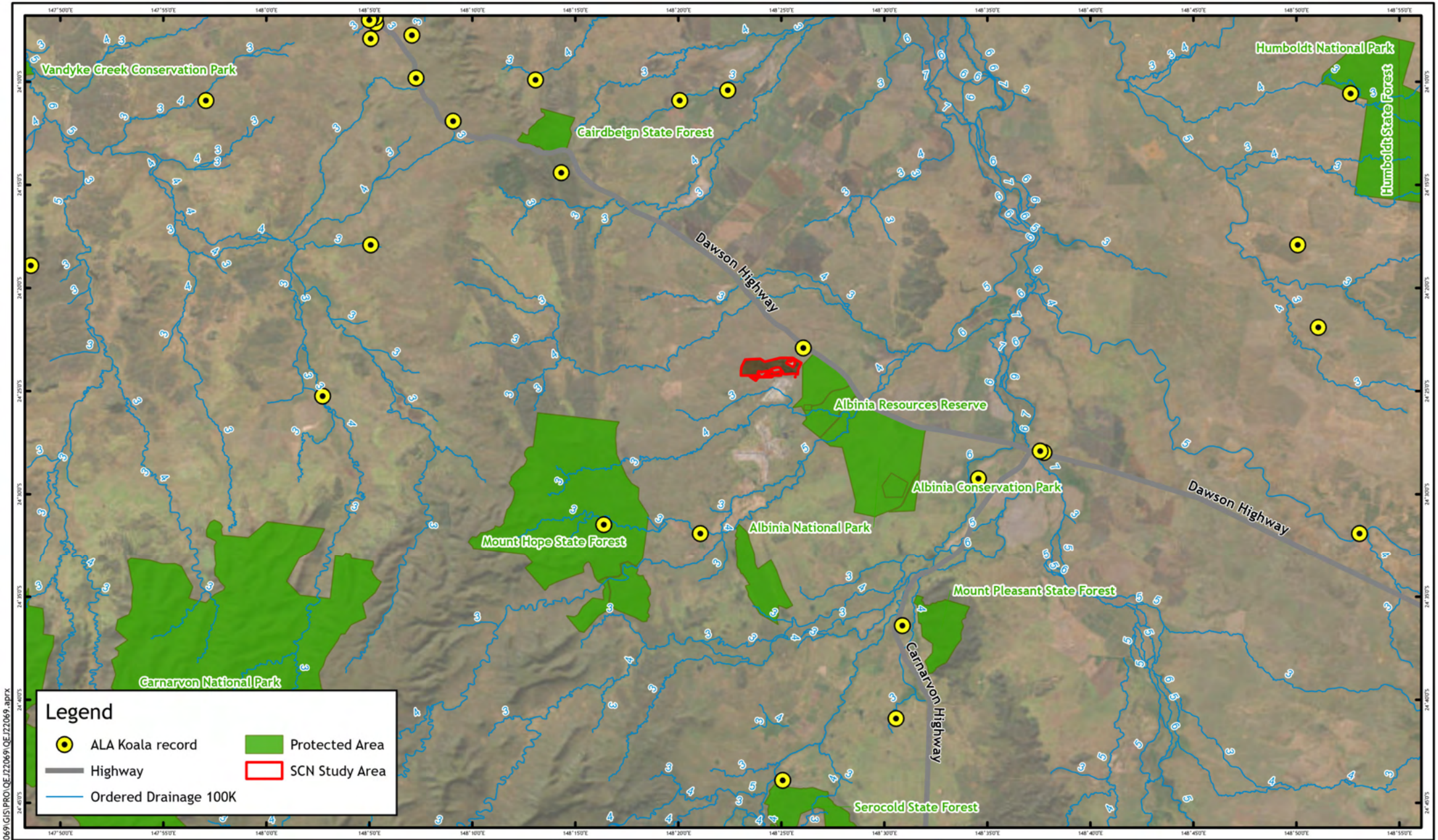
Due to the limited availability of microhabitat, lack of species records and no evidence of the species within the Study area, no significant impact is anticipated, and this species is not considered further in this assessment.

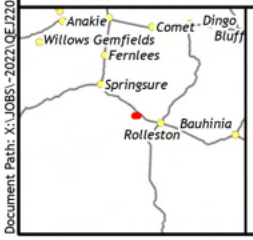
5.1.4 Koala (*Phascolarctos cinereus*)

Koalas were not detected during the field survey by ELA (2022) or E2M during the respective field surveys; however, approximately 424.8 ha of potential habitat was identified within the Study area. The majority of the habitat consists as one contiguous patch of silver-leaved ironbark (*E. melanophloia*) and mountain coolabah (*E. orgadophila*) open woodland. Both the silver-leaved ironbark and mountain coolabah are locally important koala trees (LIKTs). A LIKT is a tree species that is regularly browsed by koalas within the Brigalow Belt koala management bioregions such that it could be considered a substantial portion of the koala's diet (Youngentob et al. 2021). The abundance of LIKTs are supported by ancillary habitat trees such as black tea-tree (*Melaleuca bracteata*) within the Study area's two Stream Order 1 drainage lines.

Larger Stream Order 5 watercourses, Meteor Creek and Aldebaran Creek, located to the south and north of the Study area, respectively, are associated with numerous koala records. The larger watercourses likely serve as a movement corridor through an otherwise highly modified landscape. No such corridors are present within the Study area. Furthermore, the lack of riparian areas, alluvial terraces and floodplains associated with larger watercourses (e.g. stream order 3 or greater) suggests limited refugia habitat able to support a koala/koala population during times of stress (e.g. droughts, heatwaves). Therefore, due to no evidence of koalas being recorded within the Study area and the lack of connectivity to movement corridors and refugia habitat, koalas are considered only potential occurrences.

While koala is only considered a potential occurrence within the Study area, having regard to the context of the impact (424.8 ha of LIKT dominant open woodland), a significant impact assessment has been undertaken against the Significant Impact Criteria in Section 7.1.2.2.





N

Scale 1:450,000 (A4)

0 5 10 15 20

Kilometres

Coordinate System: GDA 2020

Notes:
Aerial Imagery: © ESRI 2022
Koala Records: © Atlas of Living Australia 2022
Ordered Drainage: © DoR 2022
Protected Areas: © DoR 2022
Road: © DoR 2022

Rev	Description	Drawn	Approved	Date
3	Issued for Use	PR	JG	06/04/2023
2	Issued for Use	GO	CO	16/02/2023

FIGURE 3: KOALA HABITAT WITHIN THE SURROUNDING LANDSCAPE

Rolleston Open Cut Ecology Survey

Map Number	Job Number	Rev
1 of 1	QEJ22069	3

Document Path: X:\JOBS\~2022\QEJ22069\GIS\PRO\QEJ22069\QEJ22069.aprx

5.1.1 Squatter pigeon (southern) (*Geophaps scripta scripta)*

Squatter pigeon are ground-dwelling birds known to occur in a wide range of environments from open-forest and woodland to areas of modified vegetation, including cleared pasture and regrowth (DEE 2018). The species require access to water for drinking and will utilise natural or man-made water including dams, troughs, isolated pools and billabongs and water along water courses.

Within suitable habitat types, the squatter pigeon frequents areas with relatively sparse ground cover vegetation (33%) and sparse shrub layer. Ground cover within the Study area was mostly dense (typically above 60%) and weedy vegetation species (*Parthenium hysterophorus* and *Cyclospermum leptophyllum*) were abundant. This habitat is not optimal for the squatter pigeon due to the high ground cover, however it is likely that the species may utilise the area at times, such as during dry periods when the ground cover is less dense, which would allow for foraging. Only one water source, a cattle trough, was located within the Study area (Photo 1). This trough was monitored at dusk daily and no squatter pigeons were seen or heard during that time. Bare ground was available at the water's edge, however ground cover surrounding the trough was dominated by *Parthenium hysterophorus*, therefore not considered habitat for the squatter pigeon.

The species was identified within proximity to the Study area during the November 2022 surveys conducted by E2M. However, due to the cattle trough not being considered habitat and no other permanent water sources occurring within the Study area, the Study area is considered dispersal habitat only. Due to the presence of nearby records and suitable dispersal habitat within the Study area, squatter pigeon has been assessed under the significant impact criteria in Section 7.1.3.1.

Photo 1: Cattle trough within the Study area

5.1.2 White-throated needletail (*Hirundapus caudacutus*)

No direct observations were made of the white-throated needletail during the surveys, however, there are 13 known records within 50 km of the Study area (ALA, 2022). This species is almost exclusively aerial when in Australia during non-breeding season (September to April). They often occur flying over open forest and rainforest habitat but have also been recorded over heathland and remnant vegetation. They only temporarily roost within dense foliage within canopy trees or in hollows. Given their broad habitat use and aerial nature, a total of 592.2 ha of potential fly over habitat was mapped and includes the full Study area (ELA, 2022). This habitat would potentially be used as temporary roosting and perching habitat, and fly-over habitat.

Due to the presence of nearby records and suitable habitat within the Study area, the white-throated needletail is considered likely to occur and has been assessed under the significant impact criteria in Section 7.1.3.2.

5.1.3 Yakka skink (*Egernia rugosa*)

The yakka skink is known to occur most commonly in woodland dominated by *Acacia harpophylla, A. aneura, A. catenulata, A. shirleyi, Casuarina cristata, Eucalyptus populnea, Eucalyptus spp.* and *Callitris glaucophylla*, where it is commonly found in cavities under and between partly buried rocks, logs or tree stumps, root cavities and abandoned animal burrows (Brigalow Belt Reptiles Workshop, 2010). Colonies of individuals tend to utilise the same system of burrows and have communal defecation sites near these burrows (DSEWPC, 2011b).

Yakka skink are especially wary and will quickly retreat into their burrows or take shelter if they detect movement or a disturbance in their surrounding environment, making them a notoriously difficult species to detect (Brigalow Belt Reptiles Workshop, 2010).

The Study area contains marginal habitat for yakka skink, consisting of largely eucalypt woodland with a small area of Poplar box (*Eucalyptus populnea*) woodland with brigalow (*Acacia harpophylla*) as a component of the understory in the south-east of the site and areas of *Melaleuca bracteata* fringing drainage lines. However, these areas lack suitable microhabitat, such as hollow logs, fallen timber and partly buried rocks. The broader landscape surrounding the Study area was lacking in suitable microhabitat and is unlikely to be within proximity to a colony or provide connectivity for the species.

No evidence of yakka skink, including direct observations of the species, communal defecation or burrow sites, were recorded during the survey and there is only a single known record within 50 km of the Study area (ELA, 2021).

Due to the limited availability of microhabitat, lack of species records and no evidence of the species within the Study area, the yakka skink is considered unlikely to occur within the Study area and this species is not considered further in this assessment.

5.2 MSES (not listed as MNES)

No target MSES fauna species were detected within the Study area during the survey, however suitable habitat was recorded for several species that are known to occur within 50 km of the Study area.

5.2.1 Common death adder (*Acanthophis antarcticus*)

Common death adder habitat exists as dense leaf litter, woody debris, dense ground vegetation and rocky refugia microhabitat in multiple well-drained habitat types including montane woodlands, dry sclerophyll forests, wet sclerophyll forests, rainforests, grasslands, and heathlands. This dense ground cover microhabitat was not observed across the SCN during field surveys. Minimal areas existed that may provide habitat such as the waterways dominated by *Melaleuca bracteata* and areas of RE 11.4.7 due to the increase in shade and woody debris. However, these areas were exposed and unconnected to other areas of suitable habitat to support a population.

Due to the lack of microhabitat within the Study area, no significant impact is anticipated, and this species is not considered further in this assessment.

5.2.2 Short-beaked echidna (*Tachyglossus aculeatus*)

The short-beaked echidna is listed as Special Least Concern under the NC Act 1992 due to 'special cultural significance of the animal'. The short-beaked echidna is considered a likely occurrence within the Study area as the species occurs in a wide variety of habitats, including forest, woodlands, heath, and grasslands, and has been previous recorded within the wider locality (ALA records; Wildlife Online).

Whilst no individuals were observed during the survey, it has been previously recorded within Albinia National Park, less than 10 km from the Study area. Given the broad habitat capability, there is potential for the species to use all habitat types mapped within the Study area.

Due to the presence of nearby records and suitable habitat within the Study area, the short-beaked echidna is considered likely to occur and has been assessed under the significant impact criteria in Section 7.2.1.1.

6 Impacts to MNES and MSES

6.1 Vegetation clearing

Regulated vegetation is defined under the *Vegetation Management Act 1999* and is listed under the *Environmental Offsets Regulation 2014* as an MSES.

Removal of regulated vegetation is required to facilitate the development of the Project. The Project requires the maximum removal of:

- 548.9 ha of Category B (remnant) vegetation, including:
  - 397.3 ha of Least Concern REs
  - 7.0 ha of Endangered RE 11.4.7
  - 124.1 ha of Of Concern RE 11.8.11; and
  - 20.5 ha of prescribed REs within a defined distance of a watercourse.

6.2 Habitat removal

Potential habitat loss affecting MNES and MSES within the Study area is listed in Table 6. The following MNES and MSES include matters with potential to be significantly impacted by the Project.

DoR mapped Essential habitat is assessed under 'Protected Wildlife Habitat' as a MSES.

Table 6: Habitat removal for MNES and MSES

Environmental Matter	Status	Habitat within the Study area (ha)
MNES	**EPBC Act status**	
Natural Grasslands TEC	Endangered	124.1
King bluegrass *(Dichanthium queenslandicum)*	Endangered	536.2
Koala *(Phascolarctos cinereus)*	Endangered	424.8
Squatter pigeon (*Geophaps scripta scripta*)	Vulnerable	424.8 (dispersal habitat only)
Fork-tailed swift (*Apus pacificus*)	Migratory	592.2
white-throated needletail *(Hirundapus caudacutus)*	Vulnerable	592.2
MSES		
Protected wildlife habitat	**NC Act status**	
Cyperus clarus	Vulnerable	536.2

Environmental Matter	Status	Habitat within the Study area (ha)
Finger panic grass (*Digitaria porrecta*)	Near Threatened	124.1
Short-beaked echidna (*Tachyglossus aculeatus*)	Special Least Concern	548.9

6.3 Connectivity

Connectivity areas are defined under the *Environmental Offsets Regulation 2014* (Qld) as an MSES:

- to the extent the regional ecosystem contains remnant vegetation; and
- if the regional ecosystem contains an area of land that is required for ecosystem functioning (a connectivity area).

Connectivity areas within the Study area include all remnant vegetation (548.9 ha).

The remnant vegetation exists mostly as open woodlands and grasslands. These vegetation community types are limited in the connectivity they provide due to lack of tree cover. This limits arboreal mammal and reptile species as well as small avian species that rely on midstory and shrub cover. Grass height will provide varying levels of connectivity across the landscape for different species. The surrounding landscape to the north, east and west is consistent with vegetation within the Study area. Therefore, the Study area is unlikely to be pivotal in providing connectivity between two patches nor will the vegetation removal interrupt important corridors of vegetation.

The impact to connectivity values, as defined by the State, are assessed using the Landscape Fragmentation and Connectivity Tool (LFC) (DES, 2018) in Section 7.2.4.

7 Significant Residual Impact Assessment

A significant impact assessment has been conducted in accordance with the relevant significant impact guidelines for MNES and MSES that are considered likely or known to occur or have been discussed as requiring a significant impact assessment in Section 5.

7.1 Matters of National Environmental Significance

7.1.1 Threatened ecological communities

7.1.1.1 Natural Grasslands of the Queensland Central Highlands and northern Fitzroy Basin

To determine if the Project is likely to have a significant impact on the Natural Grasslands of the Queensland Central Highlands and northern Fitzroy Basin (Natural grasslands TEC), the *Significant Impact Guidelines 1.1 Matters of National Environmental Significance* (MNES SI guidelines) (DotE 2013) require an assessment against the significant impact criteria for TECs listed as Endangered or Critically endangered under the EPBC Act. These assessments are detailed in Table 7.

Table 7: Significant Impact Assessment - Natural Grasslands of the Queensland Central Highlands and northern Fitzroy Basin

MNES Significant Impact Guideline criteria	Response
Reduce the extent of an ecological community	The Project will result in the removal of 124.1 ha of the Natural grasslands TEC. Therefore, the Project will reduce the extent of an ecological community
Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	The Project will involve the expansion of a previous disturbance. The TEC consists as a mosaic within the surrounding area. The Project will not further fragment the Natural grasslands TEC more than what previous agricultural practices in the surrounding area already have
Adversely affect habitat critical to the survival of an ecological community	Habitat critical to the survival of the Natural grasslands TEC is not formally defined or mapped under the provisions of the EPBC Act. Therefore, the community will be assessed under the definition of habitat critical to the survival from the MNES SI guidelines. The Study area includes 124.1 ha of Natural grassland TEC that provides habitat for activities such as foraging, breeding, roosting, and dispersal for fauna and flora assemblages associated with the threatened community, provides habitat essential for the long-term maintenance of the ecological community, and is necessary for the recovery of the community being within a local area where the ecological community is fragmented and requires refuge and connectivity to other areas for genetic diversity

MNES Significant Impact Guideline criteria	Response
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	The Project will remove all vegetation within the Study area and remove topsoil and extract material from below the surface. This will change the abiotic attributes within the Study area that the ecological community will no longer exist and will likely not return to its current condition once the Project operational stages are complete.
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	The Project will remove approximately 124.1 ha of Natural grasslands TEC. Therefore, the Project will cause a substantial change in the species composition of an occurrence of an ecological community.
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: • assisting invasive species, that are harmful to the listed ecological community, to become established, 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 Project will remove approximately 124.1 ha of Natural grasslands TEC. Therefore, the Project will cause a substantial reduction in the quality or integrity of an occurrence of an ecological community.
Interfere with the recovery of an ecological community.	There is no current or required recovery plan for the Natural grasslands TEC. The decision for not requiring a recovery plan is based on the conservation advice being an effective, efficient and responsive document to guide the implementation of priority management actions, mitigate key threats, and support the recovery of the TEC. Within the community listing advice, Mining is considered a key threat to the Natural grasslands TEC. The removal of 124.1 ha of Natural grasslands TEC will reduce available habitat and reduce the extent of the Natural grasslands TEC.
Assessment Outcome	**Project is likely to result in a significant residual impact on the Natural Grasslands of the Queensland Central Highlands and northern Fitzroy Basin**

7.1.2 Endangered wildlife

To determine if the Project is likely to have a significant impact on King bluegrass or koala, the MNES SI guidelines (DotE 2013) require an assessment against the significant impact criteria for endangered species listed under the EPBC Act. The assessment is detailed in Table 8 and Table 9.

7.1.2.1 King bluegrass (*Dichanthium queenslandicum*)

Table 8: Significant Impact Assessment - King bluegrass (*Dichanthium queenslandicum*)

MNES Significant Impact Guideline criteria	Response
Lead to a long-term decrease in the size of a population	King bluegrass was not recorded during the ecological field investigations conducted by ELA in 2021 within the Study area. However, there are 16 records of the species within 50 km and four records within 1 km (ELA, 2022a). The Project will require the clearing of approximately 536.2 ha of suitable King bluegrass habitat. King bluegrass is endemic to central and southern Queensland occurring in grassland communities on black soil within three disjunct populations (SEWPaC, 2013). Initial assessment by Accad et al. (2008) estimated a reduction in the extent of the occurrence from 1,100 km^2 to 245 km^2, resulting from continued expansion of agriculture, mining and infrastructure development. Habitat surrounding the Study area comprising RE 11.8.11 and some areas of RE 11.8.5 is considered suitable habitat for King bluegrass. Due to the removal of 536.2 ha of suitable habitat within the Study area, the Project is considered likely to lead to a long-term decrease in the size of a local population.
Reduce the area of occupancy of the species	No individuals were recorded during the targeted threatened fauna surveys conducted by E2M in November 2022 or the ecological field investigations conducted by ELA in 2022 within the Study area. Due to the direct loss of 536.2 ha of suitable habitat within the Study area and abundance of nearby records in the area, the Project is considered likely to reduce the area of occupancy for a local population of the species. Although the removal of suitable habitat within the Study area is likely to reduce the area of occupancy for a local population, due to the species distribution and extent of potential habitat within the region, the habitat impacted by the Project is localised and not considered likely to reduce the area of occupancy of the species within the greater landscape or subregion.
Fragment an existing population into two or more populations	The Project will result in the removal of 536.2 ha of suitable habitat for King bluegrass. 16 records of the species exist within a 50 km radius and four records within a 1 km radius (Ecological Australia (ELA), 2022a). Due to the presence of the surrounding population and wind associated reproduction methods, the Project is considered unlikely to result in the fragmentation of an existing population into two or more populations.

MNES Significant Impact Guideline criteria	Response
Adversely affect habitat critical to the survival of a species	No individuals were recorded during the targeted threatened fauna surveys conducted by E2M in November 2022 or the ecological field investigations conducted by ELA in 2022 within the Study area. The Project will require the clearing of approximately 536.2 ha of suitable habitat for King bluegrass. This habitat is considered to be 'habitat critical to the survival of the species', as defined under the MNES SI guidelines (DotE, 2013), for King bluegrass. The Study area provides habitat utilised by the local population for reproduction and dispersal purposes, habitat to be utilised for genetic diversity of the species, and habitat with the potential to provide refuge and recovery for the species. Therefore, the Project is likely to adversely affect habitat critical to the survival of a species.
Disrupt the breeding cycle of a population	The Project will result in the direct loss of 536.2 ha of suitable habitat for King bluegrass. The direct loss 536.2 ha of suitable habitat is considered unlikely to disrupt/interfere with the breeding cycle (wind associated pollination and seed dispersal) of a population
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No individuals were recorded during the targeted threatened fauna surveys conducted by E2M in November 2022 or the ecological field investigations conducted by ELA in 2022 within the Study area. The Project will result in the direct loss of 536.2 ha of suitable habitat for the species. Suitable habitat for the species is heavily reduced within the greater landscape. The Study area is situated within a localised area where habitat for the species is abundant. Therefore, due to the importance of the localised habitat, the Project is considered likely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to an Endangered species becoming established in the Endangered species' habitat	The Project is unlikely to result in an increase in the abundance of invasive/non-native species that may be harmful to the species, above the existing levels observed or result in the introduction of new invasive species.
Introduce disease that may cause the species to decline	It is considered unlikely that the Project has the potential to introduce a disease to the local area, given there are no known diseases that impact King bluegrass.
Interfere with the recovery of the species	Although there is no current recovery plan for the species, priority actions are identified within the 'Approved Conservation Advice' for the species (DSEWPaC 2013). Associated recovery and abatement strategies target reduction in habitat loss and disturbance, management of weeds, disturbance by livestock and community awareness (DSEWPaC 2013). The Project will remove 536.2 ha of suitable habitat for the species. This habitat is considered habitat critical to the survival of the species. The recovery and abatement strategies highlight habitat loss as a leading priority action in the recovery of the species. Due to the extent of habitat critical to the survival of the species to be removed for the Project, the Project is considered likely to substantially interfere with the recovery of the species.
Assessment Outcome	**Project is likely to result in a significant residual impact on King bluegrass.**

7.1.2.2 Koala (Phascolarctos cinereus)

Table 9: Significant Impact Assessment - Koala (*Phascolarctos cinereus*)

MNES Significant Impact Guideline criteria	Response
Lead to a long-term decrease in the size of a population	While the Project will require the removal of approximately 424.8 ha of suitable habitat for the species, it is unlikely this will result in a long-term decrease in population size as: • The species was not detected within the Study area during field surveys despite significant survey effort, suggesting limited usage of habitat within the Study area. • The area subject to clearing represents a small proportion of suitable koala habitat available within the surrounding landscape which includes extensive areas of known (occupied) koala habitat to the south/south-east (within Carnarvon National Park, Serocold State Forest, and Mount Hope State Forest) and north of the Study area (within Humboldt National Park (Figure **3**). This includes areas of higher value koala habitat associated with drainage lines and water courses where most existing records occur (Figure **3**).
Reduce the area of occupancy of the species	The Project will result in the loss of >400 ha of likely koala habitat and, as such, may result in a reduction in the species' Area of Occupancy (when measured using 2 x 2 km square grid cells in accordance with (IUCN Standards and Petitions Committee, 2022) guidelines).
Fragment an existing population into two or more populations	The Project will not fragment an existing koala population into two or more separate populations as: • The Project will not result in the isolation of areas of known or potential koala habitat. • The Study area does not form an important linkage between areas of known or likely koala habitat within the surrounding landscape. As such, the Project will neither prevent nor significantly impede koala movement within or between areas of koala habitat surrounding the Study area.

MNES Significant Impact Guideline criteria	Response
Adversely affect habitat critical to the survival of a species	Remnant vegetation within the Study area meets the definition of critical habitat provided in the National Recovery Plan for the Koala (DAWE, 2022). While the project will require the removal of approximately 424.8 ha of habitat deemed 'critical to the survival of the koala', this action is unlikely to result in a significant impact on the species given the context of the impact, noting that: • The area subject to clearing represents a small proportion of suitable koala habitat available within the surrounding landscape, including extensive areas of known (occupied) koala habitat to the south/south-east (within Carnarvon National Park, Serocold State Forest, and Mount Hope State Forest) and north of the Study area (within Humboldt National Park). This includes areas of higher value foraging, breeding and shelter habitat associated with drainage lines and water courses to the south-west and north-west of the Study area • The Project will neither prevent nor significantly impede koala movement within or between areas of suitable habitat within the surrounding landscape (see response to previous criterion, above).
Disrupt the breeding cycle of a population	The Project is unlikely to significantly impact the breeding cycle of the local koala population given: • The species was not detected within the Study area during field surveys despite significant survey effort, suggesting limited usage of habitat by locally occurring koalas within the Study area. • Suitable habitat within the Study area represents a small proportion of habitat available to the local koala population which includes extensive areas of known (occupied) koala habitat to the south/south-east (within Carnarvon National Park, Serocold State Forest, and Mount Hope State Forest) and north of the Study area (within Humboldt National Park). This includes areas of higher value koala breeding habitat associated with drainage lines and water courses to the south-west and north-west of the Study area (Figure **3**).

MNES Significant Impact Guideline criteria	Response
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The Project is considered unlikely to significantly impact the koala as it is unlikely to modify, destroy, remove, isolate, or decrease the availability or quality of habitat to the extent that the species is likely to decline, given: • Habitat usage by koalas within the Study area appears limited. • The area of koala habitat being cleared represents a small proportion of habitat available to koalas within the surrounding landscape which includes extensive areas of known (occupied) koala habitat to the south/south-east (within Carnarvon National Park, Serocold State Forest, and Mount Hope State Forest) and north of the Study area (within Humboldt National Park). This includes areas of higher value koala habitat associated with drainage lines and water courses where most existing records occur (Figure **3**). • Habitat within the Study area is unlikely to serve as an important refuge for koalas during times of stress (i.e., drought and heat waves). • The clearing of vegetation within the Study area will not result in the fragmentation or isolation of koala habitat (see response to previous criteria, above).
Result in invasive species that are harmful to an Endangered species becoming established in the Endangered species' habitat	The Project is unlikely to have a significant impact on the koala as it is unlikely that the Project will significantly increase the abundance of invasive species above their current levels or result in the introduction of new invasive species.
Introduce disease that may cause the species to decline	Koalas are susceptible to chlamydia and koala retrovirus which are currently present in most koala populations. The Project is unlikely to result in the introduction of diseases/pathogens not already present within the local koala population and is therefore unlikely cause an associated decline in koala numbers.
Interfere with the recovery of the species	According to the National Koala Recovery Plan (DAWE, 2022), recovery of the koala requires that: • 'the area of occupancy and estimated size of populations that are declining, suspected to be declining, or predicted to decline are instead stabilised then increased, • the area of occupancy and estimated size of populations that are suspected and predicted to be stable are maintained or increased, and • metapopulation processes are maintained or improved'. Given the potential reduction in Area of Occupancy for the species, the Project may therefore interfere in the recovery of the species.
Assessment Outcome	**Based on the Study area's context in the broader landscape, koala is only considered a potential occurrence within the Study area. However, given the Project may result in a reduction in Area of Occupancy for listed populations of the koala, and in doing so interfere with the recovery of the species, there is potential that the Project will have a significant impact on the species.**

7.1.3 Vulnerable wildlife

To determine if the Project is likely to have a significant impact on squatter pigeon, the MNES SI guidelines (DotE 2013) require an assessment against the significant impact criteria for vulnerable species listed under the EPBC Act. The assessment is detailed in Table 10.

The significant impact criteria used to assess the significance of an impact on a Vulnerable listed MNES refer to an impact on an 'important population'. An 'important population' as defined under the EPBC Act is a population that is necessary for a species' long-term survival and recovery. An important population includes:

- key source populations either for breeding or dispersal
- populations that are necessary for maintaining genetic diversity
- populations located near the extent of the species range; and
- populations identified in species recovery plans.

7.1.3.1 Squatter pigeon (southern) (*Geophaps scripta scripta*)

Important populations of the squatter pigeon (southern) are defined within the Species Profile and Threats Database (SPRAT) (DCCEEW, 2022) as;

- populations occurring in the Condamine River catchment and Darling Downs of southern Queensland;
- populations known to occur in the Warwick-Inglewood-Texas region of southern Queensland, and
- any populations potentially occurring in northern NSW.

The species has a relatively wide distribution across QLD and into NSW extending between Burdekin-Lynd divide to Charleville and Longreach, east to the coast between Proserpine to Port Curtis and throughout scattered sites in southeast Queensland and into the Border Rivers-Gwydir Catchment Management Authority region in NSW. The southern boundary of the subspecies distribution, however, is contracting northwards and records from the south of the species' range are rare. As a result, all relatively small, isolated and sparsely distributed sub-populations occurring south of the Carnarvon Ranges are considered important for the subspecies.

The Study area is located approximately 50 km north of the Carnarvon Ranges where squatter pigeon (southern) are likely distributed as a single, continuous (i.e. inter-breeding) sub-population (TSSC, 2015). Therefore, populations potentially occurring within the Study area and the broader Rolleston region are not considered to be an 'important population' or an important subpopulation as per the EPBC Act definition above.

Table 10: Significant Impact Assessment - Squatter pigeon (southern) *(Geophaps scripta scripta)*

MNES Significant Impact Guideline criteria	Response
Lead to a long-term decrease in the size of an important population of a species	A potentially occurring population of squatter pigeon within the Study area would not be considered an important population. As such, the Project would not lead to a long-term decrease in the size of an important population.

MNES Significant Impact Guideline criteria	Response
Reduce the area of occupancy of an important population	A potentially occurring population of squatter pigeon within the Study area would not be considered an important population. No evidence of squatter pigeon was detected during the targeted threatened fauna surveys conducted by E2M in 2022. Furthermore, at a regional scale, there is extensive habitat within the southern Bowen Basin sub-region and therefore the loss of 424.8 ha is considered unlikely to impact the species. Habitat identified within the Study area consists of dispersal habitat only. As such, the Project would not reduce the area of occupancy of an important population.
Fragment an existing important population into two or more populations	A potentially occurring population of squatter pigeons within the Study area would not be considered an important population. As such, the Project would not fragment an existing important population.
Adversely affect habitat critical to the survival of a species	Habitat critical to the survival of the squatter pigeon is not formally defined. Preferred habitat for the species is described within the *Central Queensland Threatened Species Habitat Descriptions* (Kerswell et al., 2020) as: • Remnant or regrowth grassy open forest to woodland dominated by *Eucalyptus, Corymbia, Callitris* or *Acacia* with patchy, relatively sparse ground cover vegetation (33 %) and sparse shrub layer on well-draining sandy, loamy or gravelly soils within 1 km of a suitable permanent waterbody. • Preferred habitat may be located on land zones 3, 5, 7, 8, 9 and 10. Squatter pigeon habitat within the Study area is limited due to areas of dense ground cover including native tussock grasses and exotic forbs including *Cyclospermum leptophyllum* and *Parthenium hysterophorus*. There was a lack of permanent water sources that were deemed suitable habitat within the Study area. Habitat identified within the Study area consists of dispersal habitat only. No evidence of squatter pigeon was detected during the targeted threatened fauna surveys conducted by E2M in 2022. Therefore, the Project is considered unlikely to adversely affect habitat critical to the survival of the species.
Disrupt the breeding cycle of an important population	A potentially occurring population of squatter pigeons within the Study area would not be considered an important population. As such, the Project would not disrupt the breeding cycle of an important population.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Dispersal habitat within the Study area is likely limited/infrequent and habitat suitable for squatter pigeon is plentiful within the surrounding landscape. As such, neither the local population, or the species, is dependent on the habitat present within the Study area. Therefore, the removal of 424.8 ha of squatter pigeon dispersal habitat is unlikely to trigger a decline in the species.

MNES Significant Impact Guideline criteria	Response
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Within the Study area, exotic forb species such as *Cyclospermum leptophyllum* and *Parthenium hysterophorus* are already prolific. The Project is therefore unlikely to result in further establishment of invasive species within remaining squatter pigeon habitat.
Introduce disease that may cause the species to decline	It is considered unlikely that the Project will the introduce a disease to the local area which is likely to impact Squatter pigeon numbers.
Interfere substantially with the recovery of the species	The recovery of the subspecies depends on the protection and restoration of critical habitat, reducing mortality from feral predators and developing a deeper understanding of the species ecology within modified landscapes (Squatter Pigeon Workshop, 2011). Regionally, the Commonwealth TSSC (2015) recommend identifying, monitoring and protecting sub-populations, managing threats to vegetation that support important sub-populations and adapting management actions to adjust effectiveness. The 424.8 ha of squatter pigeon dispersal habitat within the Study area is not deemed to be critical to the survival of the species, as such, the Project's removal of 424.8 ha of squatter pigeon habitat is unlikely to substantially interfere with the recovery of the subspecies.
Assessment Outcome	**The Project is unlikely to result in a significant residual impact on the squatter pigeon (southern).**

7.1.3.2 White-throated needletail

Populations of white-throated needletail potentially occurring within the Study area and the broader Rolleston region are not considered to be an 'important population' or an important subpopulation as per the EPBC Act definition above.

Table 11: Significant Impact Assessment - white throated needletail

MNES Significant Impact Guideline criteria	Response
Lead to a long-term decrease in the size of an important population of a species	White-throated needletail is a migrant species which occupies Australia exclusively for foraging. Breeding for this species occurs in Asia. This species is mostly aerial, rarely landing while in Australia therefore the Project activities will not lead to a long-term decrease in the size of an important population.
Reduce the area of occupancy of an important population	White-throated needletail is an austral Spring/Summer migrant, with habitat use in Australia restricted to aerial foraging. The AOO for the species in Australia is estimated at 126,200 km^2 (DoEE, 2019). As such, this species is not considered to occupy the Study area for any significant length of time and the area to be cleared would not significantly reduce the AOO for the species.
Fragment an existing important population into two or more populations	A potentially occurring population of white-throated needletail within the Study area would not be considered an important population. As such, the Project would not fragment an existing important population.

MNES Significant Impact Guideline criteria	Response
Adversely affect habitat critical to the survival of a species	Given that when in Australia, this species is largely aerial and non-breeding, habitat critical to survival is considered unlikely to be present within the Study area. The loss of 592.2 ha of potential foraging habitat is not considered significant enough to impact the persistence of this species, given the broad range of suitable habitat types.
Disrupt the breeding cycle of an important population	White-throated Needletail breeds exclusively in the Northern Hemisphere. As such the proposed development is not expected to impact the breeding cycle of this species.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Given that the species does not breed in Australia and is largely aerial when here, it is unlikely that the Project activities will modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Given White-throated Needletail rarely comes to ground, there are no known threats from invasive species (DCCEEW, 2022b).
Introduce disease that may cause the species to decline	There are no known threatening diseases which have potential to cause White-throated Needletail to decline (DCCEEW, 2022b).
Interfere substantially with the recovery of the species	Threats to the recovery of white-throated needletail are primarily collision with overhead wires, windows and lighthouses, though, as this affects only a few individuals, and only one of these is considered a possible threat of the Project (overhead wires), it is not a threat to the species overall.
Assessment Outcome	**The Project is unlikely to result in a significant residual impact on the white throated needletail**

7.1.4 Migratory species

A project is required to seek approval under the EPBC Act for actions that are likely to have 'significant impact' on listed migratory species. Under the MNES SI guidelines (DotE, 2013), a project is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will exceed one or more of the criteria in Table 12.

In accordance with the MNES SI guidelines (DotE, 2013) the definition of 'important habitat' is:

- habitat that is of critical importance to the species at particular life-cycle stages, and/or;
- habitat utilised by a migratory species which is at the limit of the species range, and/or;
- habitat within an area where the species is declining.

The fork-tailed swift has been identified as likely to occur within the Study area (ELA, 2022a) and Project impacts on this species have been assessed in accordance with MNES SI guidelines, as detailed below.

Table 12: Significant Impact Assessment - Migratory species - *Fork-tailed swift (Apus pacificus)*

MNES Significant Impact Guideline criteria	Response
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species	No 'important habitat' was identified within the Study area for the fork-tailed swift. The Study area does not meet the definition of 'important habitat' as per the MNES SI guidelines (DotE, 2013)
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species	No 'important habitat' was identified within the Study area for the fork-tailed swift. The Study area does not meet the definition of 'important habitat' as per the MNES SI guidelines (DotE, 2013)
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species	There is no ecologically significant proportion of the fork-tailed swift population within the Study area.
Assessment Outcome	**The Project is unlikely to result in a significant residual impact on the fork-tailed swift.**

7.2 Matters of State Environmental Significance

7.2.1 Protected wildlife habitat

Due to the Project being a resource activity defined under the EP Act, the Project is assessed under the *Significant Residual Impact Guidelines* (DEHP, 2014). The Project is likely to have a significant impact on wildlife listed as Endangered, Vulnerable or Special Least Concern (non-migratory) under the NC Act if the impact on the species/habitat is likely to meet one or more of criteria listed in the guidelines. Species listed as Near Threatened (Finger panic) are not assessable under the *significant residual impact guideline* and the species is not classified as an MSES for this Project. Species that are considered likely or known to occur within the Study area are assessed in the following sections.

7.2.1.1 Belyando cobbler's pegs (Trioncinia retroflexa)

Table 13: Significant Impact Assessment - Belyando cobbler's pegs (*Trioncinia retroflexa*)

Criteria	Response
Lead to a long-term decrease in the size of a local population	No individuals of Belyando cobbler's pegs were identified within the Study area. There are six records of the species within 50 km of the Study area. The species is represented by two known populations. One from the Clermont-Capella region and one from the Springsure-Rolleston region. The species grows in black soils derived from basalt. There is approximately 124.1 ha of suitable habitat present within the Study area. Although the Project will remove habitat that will reduce the potential to increase or sustain the population, due to the lack of individuals within the Study area, the Project is considered unlikely to lead to a long-term decrease in the size of a local population.
Reduce the extent of occurrence of the species	The species is represented by two known populations. One from the Clermont-Capella region and one from the Springsure-Rolleston region. No individuals of Belyando cobbler's pegs were identified within the Study area. There are six records of the species within 50 km of the Study area. These records are all north of the Project. As the Study area is currently outside the species extent of occurrence, the Project is unlikely to reduce the extent of occurrence.
Fragment an existing population	No individuals of Belyando cobbler's pegs were identified within the Study area. There are six records of the species within 50 km of the Study area. These records are all north of the Project. As the Study area is currently outside the species extent of occurrence, the Project is unlikely to fragment an existing population.
Result in genetically distinct populations forming as a result of habitat isolation	No individuals of Belyando cobbler's pegs were identified within the Study area. There are six records of the species within 50 km of the Study area. These records are all north of the Project. As the Study area is currently outside the species extent of occurrence, the Project is unlikely to result in genetically distinct populations forming as a result of habitat isolation.

Criteria	Response
Result in invasive species that are harmful to an endangered or vulnerable species becoming established in the species' habitat	The Project is unlikely to result in an invasive species that is harmful to Belyando cobbler's pegs becoming established within the Study area.
Introduce disease that may cause the population to decline	The Project is unlikely to introduce a disease and/or vector for disease that may cause the species to decline as there is no documented disease that significantly affects this species.
Interfere with the recovery of a species	Threatening processes for Belyando cobbler's pegs are not outlined within government or publicly available literature. Therefore, threatening processes have been assumed from its associated habitat, the Natural grasslands of the Queensland Central Highlands and the northern Fitzroy Basin (TSSC, 2009). Threatening processes for the habitat includes agricultural practices, weeds and pests, mining activities, and construction of roads and infrastructure. The removal of 124.1 ha of suitable habitat for the species is likely to contribute to threatening processes leading to the species decline. Therefore, it is likely that the Project will interfere with the recovery of the species.
Cause disruption to ecologically significant locations (e.g. breeding, feeding, nesting, migration or resting sites) of a species	Ecologically significant locations for Belyando cobbler's pegs are considered suitable habitat where the species is present. The species has not been recorded within the Study area. The Project will not cause disruption to ecologically significant locations of a species.
Assessment Outcome	**The Project is likely to result in a significant residual impact on Belyando cobbler's pegs**

7.2.1.2 Cyperus clarus

Table 14: Significant Impact Assessment - *Cyperus clarus*

Criteria	Response
Lead to a long-term decrease in the size of a local population	No individuals of *Cyperus clarus* were identified within the Study area. There are five records of the species within 50 km of the Study area. The species was identified in a neighbouring property (Meteor Downs) during an ecological field survey in March 2022 (ELA, 2022a). *Cyperus clarus* is known from grasslands and eucalypt woodlands, growing in soils derived from basalt. There is approximately 536.2 ha of this habitat present within the Study area. Although the Project will remove habitat that will reduce the potential to increase or sustain the population, due to the lack of individuals within the Study area, the Project is considered unlikely to lead to a long-term decrease in the size of a local population.

Criteria	Response
Reduce the extent of occurrence of the species	The distribution for the species extends from Emerald south to Delungra in New South Wales. The Study area is not at the distributional limit of the species. Therefore, the Project will not reduce the extent of occurrence of the species.
Fragment an existing population	Habitat for the species is common within the surrounding area. The species is wind-pollinated and wind-dispersed. Although, the nature of the Project may disrupt pollinator and dispersal methods directly within the mining lease, the Project is unlikely to fragment an existing population.
Result in genetically distinct populations forming as a result of habitat isolation	Habitat for the species is common within the surrounding area. The species is wind-pollinated and wind-dispersed. Although, the nature of the Project may disrupt pollinator and dispersal methods within the mining lease, the Project is unlikely to fragment or isolate an existing population to any extent that a genetically distinct population forms.
Result in invasive species that are harmful to an endangered or vulnerable species becoming established in the species' habitat	The Project is unlikely to result in an invasive species that is harmful to *Cyperus clarus* becoming established within the Study area.
Introduce disease that may cause the population to decline	The Project is unlikely to introduce a disease and / or vector for disease that may cause the species to decline. Likewise, there is no documented disease that significantly affects this species.
Interfere with the recovery of a species	Threatening processes for the species are outlined within the DES Species Profile (DES, 2019) as habitat removal for agriculture and mining. The removal of 536.2 ha of suitable habitat for the species is likely to contribute to threatening processes leading to the species decline. Therefore, it is likely that the Project will interfere with the recovery of the species.
Cause disruption to ecologically significant locations (e.g. breeding, feeding, nesting, migration or resting sites) of a species	Ecologically significant locations for *Cyperus clarus* is considered suitable habitat where the species is present. The species has not been recorded within the Study area. The Project will not cause disruption to ecologically significant locations of a species.
Assessment Outcome	**The Project is likely to result in a significant residual impact on *Cyperus clarus***

7.2.1.1 Short-beaked echidna (*Tachyglossus aculeatus*)

Special-least concern (non-migratory) species are likely to be significantly impacted if the Project will result in any of the criteria listed in Table 15.

Table 15: Significant Impact Assessment - Short-beaked echidna *(Tachyglossus aculeatus)*

Criteria	Response
A long-term decrease in the size of a local population	The short-beaked echidna is a habitat generalist found in suitable habitat across Australia and recorded regularly within the Bowen Basin. The loss of habitat within the Study area is unlikely to lead to a long-term decrease in the size of the local population.
A reduced extent of occurrence of the species	Short-beaked echidnas are found throughout Australia in almost all habitat types. They are present in urban as well as rural areas and are relatively tolerant of disturbance. As a habitat generalist, most vegetated areas within the Study area provide suitable echidna habitat. The species has not been documented within the Study area but is likely to utilise the eucalypt woodlands and grasslands as part of its range with adjoining habitat. Approximately 548.9 ha of potential echidna habitat is present within the Study area. The progressive removal of 548.9 ha will reduce the extent of occurrence; however, the impact generated is expected to be negligible given how widely distributed the species across Queensland and Australia. The Project is therefore unlikely to result in a significant reduction in the species' extent of occurrence.
Fragmentation of an existing population	The Project is unlikely to isolate or fragment habitat within the broader landscape and, as such, is unlikely to fragment an existing population of this species.
Result in genetically distinct populations forming as a result of habitat isolation	The Project is unlikely to isolate or fragment habitat, nor impede movement/dispersal of animals and gene flow within the broader landscape. As such, the Project is considered unlikely to result in genetically distinct populations forming as a result of habitat isolation.
Disrupt ecologically significant locations (breeding, feeding or nesting sites) of a species	The Project will require the clearing of suitable habitat available to the species. However, it is unlikely that the Project will further restrict the species movement to surrounding suitable habitat or disrupt ecologically significant locations.
Assessment outcome	**The Project is unlikely to result in a significant residual impact on the short-beaked echidna**

7.2.2 Essential habitat

In accordance with the Queensland *Significant Residual Impact Guideline* (DEHP, 2014), a significant residual impact on DoR mapped essential habitat is assessed by applying the same criteria as the 'Endangered and Vulnerable wildlife habitat' applied in Section 7.2.

The *Rolleston Pit Expansion – Ecological Field Survey* (ELA, 2022a) identified DoR mapped essential habitat for *Dichanthium queenslandicum* within the Study area. As this species is an MNES, it was assessed using an equivalent set of criterion in Section 7.1.2.1. The significant impact assessment of *Dichanthium queenslandicum* yielded a significant impact on the species (see Table 8).

7.2.3 Regulated vegetation

The removal of regulated vegetation may constitute a significant residual impact under the *Queensland Environmental Offsets Policy's* Significant Residual Impact Guideline criteria. The significant residual impact test was completed by ELA and is summarised below (see Table 16).

Table 16: Significant Impact Assessment Summary - Regulated vegetation

Significantly impacted Regulated vegetation	Total within the Study area (ha)	Assessment outcome
Non-linear Clearing area of >5 ha in a grassland (structural category) RE	124.10	Yes
Non-linear clearing area >2 ha in a mid-dense (structural category) RE	7.0	Yes
Clearing within 25 m of the defining bank of a watercourse	20.5	Yes

7.2.4 Connectivity

The Landscape Fragmentation and Connectivity Tool (LFC) (DES 2018) was used to assess the significance of impact on connectivity areas as defined in the *Environmental Offsets Regulation 2014*. The results of the Test 2 (below) returned a 'false' result indicating that the Project is unlikely to have a significant impact on connectivity within the Study area.

Test 1

- The regional total area is 150,850.82 ha with extent of core remnant of 52,814.14 ha (35.01 %). This level of regional fragmentation sets a local impact threshold of 10 %.
- The area of core at the local scale (pre impact) is 7,304.48 ha and area of core at the local scale (post impact) is 6,611.89 ha, yielding a percent change of core at the local scale (post impact) of 9.48%.

As the change in the core remnant ecosystem extent at the local scale (post impact) is not greater than a threshold determined by the level of fragmentation at the regional scale, this analysis has determined a significant impact on connectivity areas as 'false' (i.e. no significant impact).

Test 2

- The number of core remnant areas occurring on the site: 1
- The number of core remnant areas remaining on the site post impact: 1

This analysis has determined a significant impact on connectivity areas as there was a change from core to non-core remnant at the site scale as ‘false’ (i.e. no significant impact).

8 Conclusion

E2M Pty Ltd (E2M) was engaged by METServe on behalf of Glencore to conduct a Significant Impact Assessment (SIA) including targeted threatened fauna searches. The SIA was restricted to terrestrial MNES and MSES and built upon previous ecological investigations conducted within the Study area.

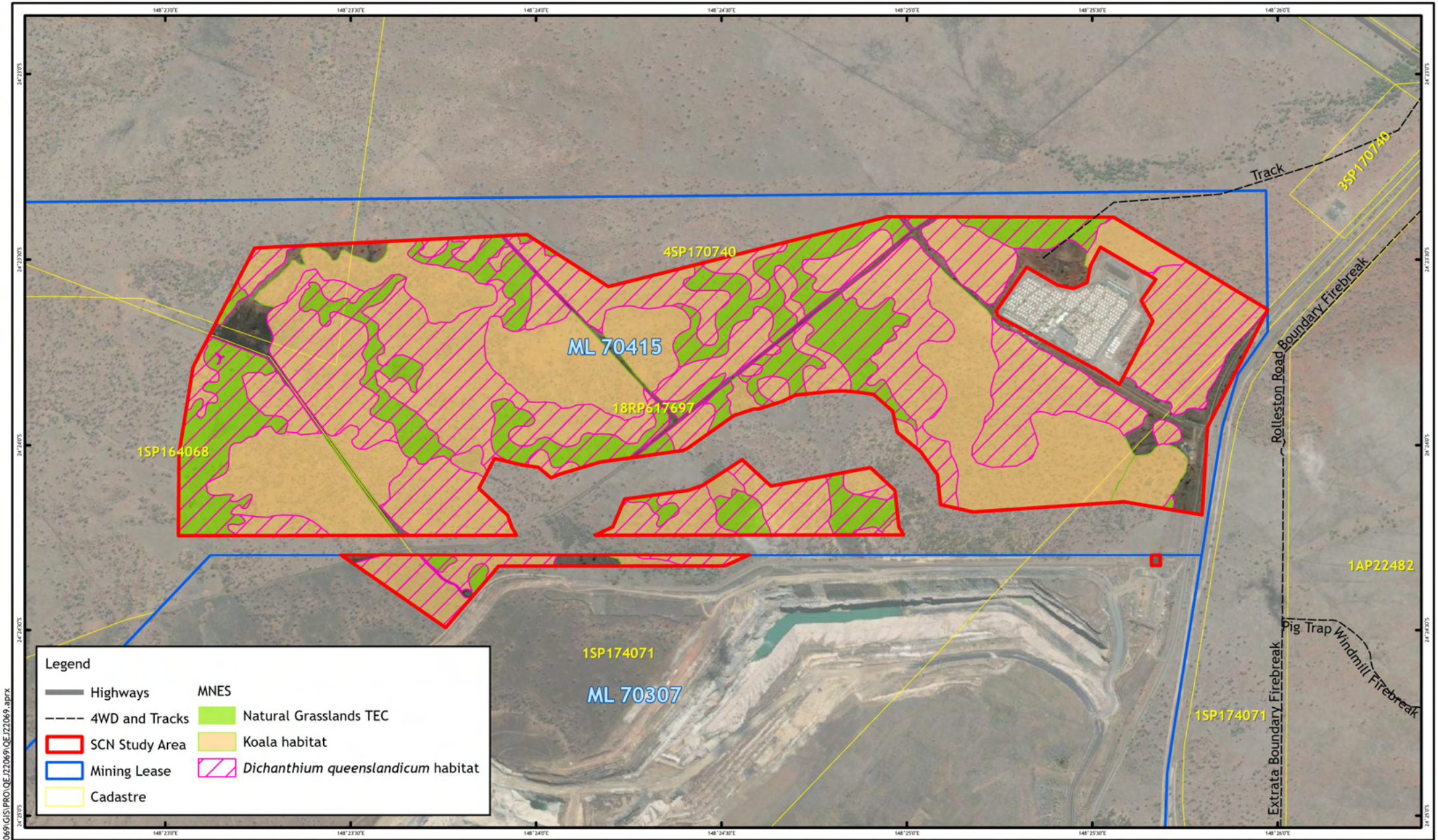
The objective of the SIA was to determine whether the Project is likely to have a significant residual impact on terrestrial MNES or MSES identified within the Study area listed under the EPBC Act or NC Act. The Project potential impacts on MNES or MSES were identified (Section 6).

The SIA was conducted to assess any potential residual impacts on MNES and MSES that are likely or known to occur within the Study area. The SIA found the Project is likely to have a significant residual impact on several environmental matters as summarised in Table 17 and depicted in Figure 4 and Figure 5.

Table 17: MNES and MSES for which a significant impact is considered likely or potential

Environmental Matter	Status	Anticipated significant impact	Habitat within the Study area (ha)
MNES	**EPBC Act status**		
Natural Grasslands of the Queensland Central Highlands and northern Fitzroy Basin	Endangered	Likely	124.10
king bluegrass *Dichanthium queenslandicum*	Endangered	Likely	536.2
koala *Phascolarctos cinereus*	Endangered	Potential	424.8
MSES (not listed as MNES)			
Protected habitat	**NC Act status**		
Cyperus clarus	Vulnerable	Likely	536.2
Belyando cobbler's pegs *Trioncinia retroflexa*	Endangered	Likely	124.10
Regulated vegetation	**VM Act status**		
Prescribed RE 11.4.7	Endangered	Likely	7.0
Prescribed RE 11.8.11	Of concern	Likely	124.10
Prescribed REs within a defined distance from the defining banks of a relevant watercourse	-	Likely	20.5

It is therefore recommended that the Project is assessed under federal (EPBC 2011/5965) and state (EA EMPL00370013) approval conditions and referred to the commonwealth minister for the Environment to determine whether the Project will require an Offset Strategy.



N

Scale 1:25,000 (A4)

0 250 500 750 1,000

Metres

Coordinate System: GDA 2020

Notes:
Aerial Imagery: © 2022
Cadastre: © DoR 2022
Ordered Drainage: © DoR 2022
Road: © DoR 2022
MNES data: © Eco Logical 2022

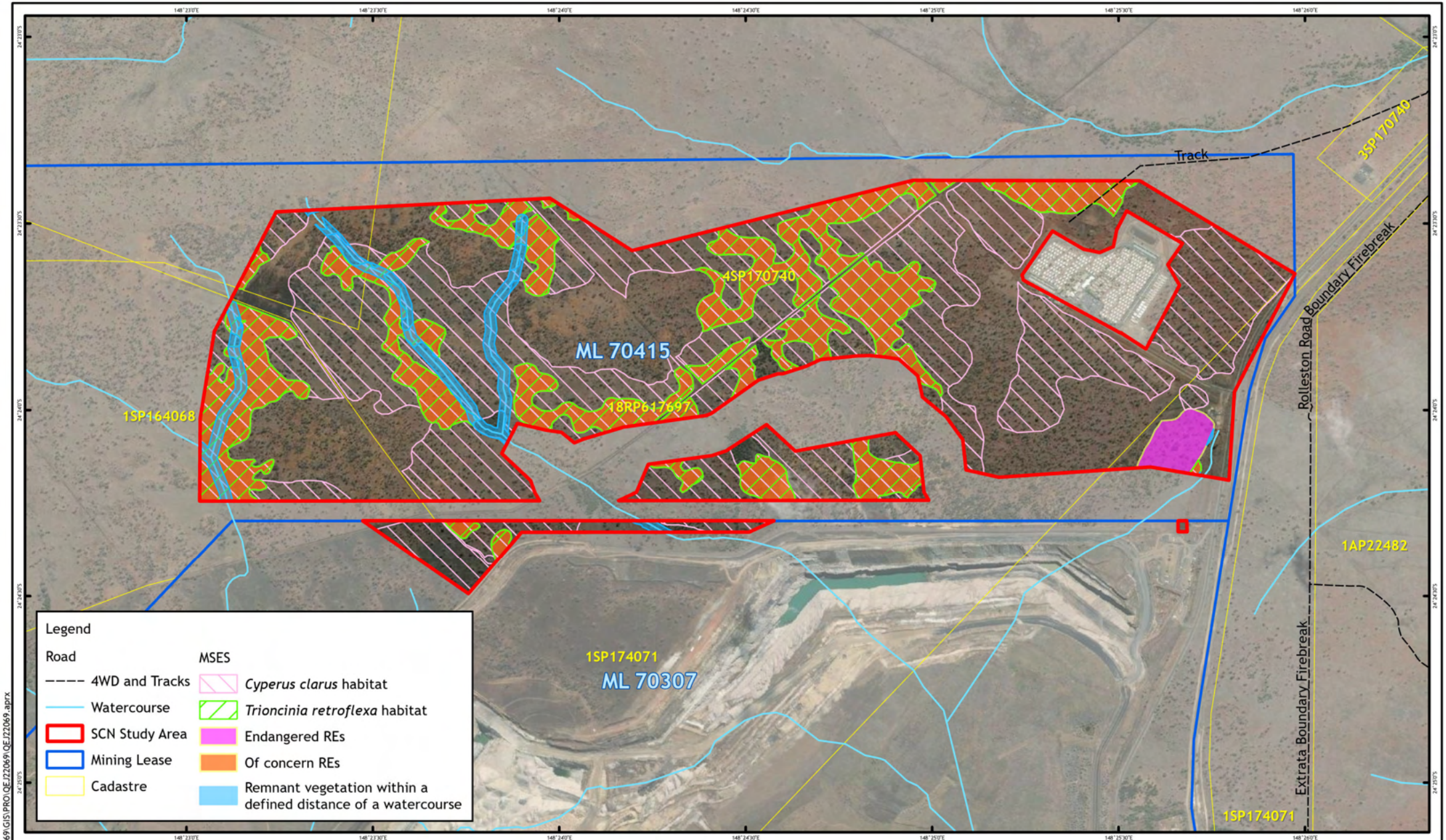
Rev	Description	Drawn	Approved	Date
3	Issued for Use	PR	JG	06/04/2023
2	Issued for Use	GO	CO	16/02/2023

FIGURE 4: MNES WHICH IS LIKELY OR POTENTIAL TO RESULT IN A SIGNIFICANT IMPACT

Rolleston Open Cut Ecology Survey

Map Number	Job Number	Rev
1 of 1	QEJ22069	3

Document Path: X:\JOBS\~2022\QEJ22069\GIS\PRO\QEJ22069\QEJ22069.aprx



N

Scale 1:25,000 (A4)

0 250 500 750 1,000

Metres

Coordinate System: GDA 2020

Notes:
Aerial Imagery: © 2022
Cadastre: © DoR 2022
Road: © DoR 2022
MSES data: © Eco Logical 2022
Watercourse: © DoR 2022

Rev	Description	Drawn	Approved	Date
3	Issued for Use	PR	JG	06/04/2023
2	Issued for Use	GO	CO	16/02/2023

FIGURE 5: MSES WHICH IS LIKELY OR POTENTIAL TO RESULT IN A SIGNIFICANT IMPACT

Rolleston Open Cut Ecology Survey

Map Number	Job Number	Rev
1 of 1	QEJ22069	3

Document Path: X:\JOBS\~2022\QEJ22069\GIS\PRO\QEJ22069\QEJ22069.aprx

9 References

Atlas of Living Australia (2020) Atlas of Living Australia Occurrence Records. Accessed <<https://www.ala.org.au/>>

Bean, A. R. (2004) The taxoAccad, A., Neldner, V., Wilson, B. A., & Niehus, R. E. (2008). *Remnant vegetation in Queensland: Analysis of remnant vegetation 1997-1999-2000-2001-2003-2005, including regional ecosystem information*. Queensland Herbarium.

Brigalow Belt Reptiles Workshop. (2010). *Proceedings from the workshop for the nine listed reptiles of the Brigalow Belt bioregions*. Queensland Herbarium.

Bureau of Meteorology. (2022). *Rolleston, Queensland November 2022 Daily Weather Observations—Observations from Rolleston Airport*. http://www.bom.gov.au/climate/dwo/IDCJDW4103.latest.shtml

DAWE, D. of A., Water and the Environment. (2022). *National Recovery Plan for the Koala—Phascolarctos cinereus*. https://www.dcceew.gov.au/sites/default/files/documents/recovery-plan-koala-2022.pdf

DCCEEW. (2022). *Conservation Advice for Calyptorhynchus lathami lathami (South-eastern Glossy Black Cockatoo)*. http://www.environment.gov.au/biodiversity/threatened/species/pubs/67036-conservation-advice-10082022.pdf

Department of Agriculture, Water and the Environment. (2022). *Approved Conservation Advice for Petaurus australis australis (yellow-bellied glider (south-eastern))*. Department of the Environment. http://www.environment.gov.au/biodiversity/threatened/species/pubs/87600-conservation-advice-02032022.pdf.

Department of Climate Change, Energy, the Environment and Water. (2022a). *Conservation Advice for Hemiaspis damelii (grey snake)*. https://www.environment.gov.au/biodiversity/threatened/species/pubs/1179-conservation-advice-05102022.pdf

Department of Climate Change, Energy, the Environment and Water. (2022b). *Species Profile and Threats Database*. http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl

Department of Environment and Heritage Protection. (2014). *Queensland Environmental Offsets Policy Significant Residual Impact Guideline*. State of Queensland.

Department of Environment and Heritage Protection. (2015). *Rolleston Coal Expansion Project Environmental Impact Statement*.

Department of Environment and Science. (2018). *Environmental offset landscape connectivity assessment tool*. Queensland Government.

Department of Environment and Science. (2019). *QGov Species profile—Cyperus clarus*. Species Profiles. https://apps.des.qld.gov.au/species-search/details/?id=9855

Department of Environment and Science (DES). (2022). *Guide to greater glider habitat in Queensland*.

Department of Sustainability, Environment, Water, Population and Communities. (2011a). *Draft referral guidelines for the nationally listed Brigalow Belt reptiles*. Australian Government.

Department of Sustainability, Environment, Water, Population and Communities. (2011b). *Survey guidelines for Australia's threatened mammals*. Australian Government.

Department of Sustainability, Environment, Water, Population and Communities. (2011c). *Survey guidelines for Australia's threatened reptiles*. Australian Government.

Department of Sustainability, Environment, Water, Population and Communities (SEWPaC). (2013). *Approved Conservation Advice for Dichanthium queenslandicum (king blue-grass)*. Department of Sustainability, Environment, Water, Population and Communities. http://www.environment.gov.au/biodiversity/threatened/species/pubs/5481-conservation-advice.pdf

Department of the Environment. (2013). *Significant Impact Guidelines 1.1—Matters of National Environmental Significance*. Commonwealth of Australia.

Department of the Environment, Water, Heritage and the Arts. (2010). *Survey guidelines for Australia's threatened birds*. Australian Government.

DES. (2022). *Species profile—Marsdenia brevifolia*. https://apps.des.qld.gov.au/species-search/details/?id=6166

Ecological Australia (ELA). (2021). *Rolleston Pit Expansion—Gap Analysis*.

Ecological Australia (ELA). (2022a). *Rolleston Pit Expansion—Ecological Field Assessment*. X:\JOBS\~2022\QEJ22069\CLIENT SUPPLIED\ROC Ecology Survey\20536_Rolleston_ecological_field_study_report_V4.pdf

Ecological Australia (ELA). (2022b). *Rolleston Open Cut—Stage 2 Offset Assessment*.

Eyre, T. J., Ferguson, D. J., Smith, G. C., Mathieson, M. T., Venz, M. F., Hogan, L. D., Hourigan, C. L., Kelly, A. L., & Rowland, J. (2022). *Terrestrial Vertebrate Fauna Survey Assessment Guidelines for Queensland (V. 4.0)*. Department of Environment and Science.

Garnett, S., Szabo, J., & Dutson, G. (2011). *The Action Plan for Australian Birds*. CSIRO Publishing.

IUCN Standards and Petitions Committee. (2022). *The Guidelines for Using the IUCN Red List Categories and Criteria* (Version 15.1). https://www.iucnredlist.org/resources/redlistguidelines

Kerswell, A., Kaveney, T., Evans, C., & Appleby, L. (2020). *Habitat descriptions for 12 threatened species, specific to central Queensland*. BHP Billiton Mitsubishi Alliance.

NSW Threatened Species Scientific Committee. (2022, November 22). *Greater Glider—Profile*. https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=20306

Queensland Herbarium. (2018). *Terrestrial vertebrate fauna survey guidelines for Queensland*. Queensland Government. https://www.qld.gov.au/__data/assets/pdf_file/0022/68224/fauna-survey-guidelines.pdf

Queensland Herbarium. (2022). *Census of the Queensland Flora 2021*. Department of Environment and Science.

Schoenjahn, J. (2013). A hot environment and one type of prey: Investigating why the Grey Falcon (Falco hypoleucos) is Australia's rarest falcon. *Emu*, *113*, 19–25.

Squatter Pigeon Workshop. (2011). *Proceedings from the workshop for the Squatter Pigeon (southern). 14-15 December 2011*. Toowoomba Office of the Queensland Parks and Wildlife Service.

Threatened Species Scientific Committee. (2009). *Commonwealth Listing Advice on Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin*. Department of the Environment, Water, Heritage and the Arts.

TSSC. (2015). *Approved Conservation Advice for Geophaps scripta scripta (Squatter Pigeon (southern)*. Department of the Environment.

TSSC. (2016). *Conservation Advice Onychogalea fraenata bridled nailtail wallaby*. http://www.environment.gov.au/biodiversity/threatened/species/pubs/239-conservation-advice-16122016.pdf

Youngentob, K., Marsh, K., & Skewes, J. (2021). *A review of koala habitat assessment criteria and methods*. Department of Agriculture, Water and the Environment.

Appendix A Database search results

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 22-Nov-2022

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	7
Listed Threatened Species:	36
Listed Migratory Species:	11

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	16
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	8
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	25
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Brigalow (Acacia harpophylla dominant and co-dominant)	Endangered	Community known to occur within area	In buffer area only
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	Endangered	Community likely to occur within area	In buffer area only
Natural Grasslands of the Queensland Central Highlands and northern Fitzroy Basin	Endangered	Community likely to occur within area	In feature area
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	Community likely to occur within area	In feature area
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	Endangered	Community likely to occur within area	In buffer area only
Weeping Myall Woodlands	Endangered	Community likely to occur within area	In feature area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area	In buffer area only

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat may occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area	In feature area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat known to occur within area	In feature area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Neochmia ruficauda ruficauda Star Finch (eastern), Star Finch (southern) [26027]	Endangered	Species or species habitat likely to occur within area	In feature area
Poephila cincta cincta Southern Black-throated Finch [64447]	Endangered	Species or species habitat may occur within area	In buffer area only
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area	In feature area
MAMMAL			
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Dasyurus hallucatus Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Macroderma gigas](#) Ghost Bat [174]	Vulnerable	Species or species habitat may occur within area	In feature area
[Nyctophilus corbeni](#) Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may occur within area	In feature area
[Onychogalea fraenata](#) Bridled Nail-tail Wallaby, Bridled Nailtail Wallaby [239]	Endangered	Species or species habitat may occur within area	In buffer area only
[Petauroides volans](#) Greater Glider (southern and central) [254]	Endangered	Species or species habitat known to occur within area	In feature area
[Petaurus australis australis](#) Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)](#) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat known to occur within area	In feature area
PLANT			
[Aristida annua](#) [17906]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Arthraxon hispidus](#) Hairy-joint Grass [9338]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
[Bertya opponens](#) [13792]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Cadellia pentastylis](#) Ooline [9828]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Dichanthium queenslandicum](#) King Blue-grass [5481]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Dichanthium setosum bluegrass [14159]	Vulnerable	Species or species habitat known to occur within area	In feature area
Eucalyptus virens [10181]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Haloragis exalata subsp. velutina Tall Velvet Sea-berry [16839]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Leichhardtia brevifolia listed as Marsdenia brevifolia [91893]	Vulnerable	Species or species habitat known to occur within area	In feature area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Vincetoxicum forsteri listed as Tylophora linearis [92384]	Endangered	Species or species habitat may occur within area	In buffer area only
REPTILE			
Delma torquata Adorned Delma, Collared Delma [1656]	Vulnerable	Species or species habitat may occur within area	In feature area
Denisonia maculata Ornamental Snake [1193]	Vulnerable	Species or species habitat known to occur within area	In feature area
Egernia rugosa Yakka Skink [1420]	Vulnerable	Species or species habitat known to occur within area	In feature area
Elseya albagula Southern Snapping Turtle, White-throated Snapping Turtle [81648]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Furina dunmalli Dunmall's Snake [59254]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hemiaspis damelii			
Grey Snake [1179]	Endangered	Species or species habitat likely to occur within area	In feature area
Rheodytes leukops			
Fitzroy River Turtle, Fitzroy Tortoise, Fitzroy Turtle, White-eyed River Diver [1761]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Listed Migratory Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Cuculus optatus			
Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area	In feature area
Hirundapus caudacutus			
White-throated Needletail [682]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Motacilla flava			
Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Myiagra cyanoleuca			
Satin Flycatcher [612]		Species or species habitat known to occur within area	In feature area
Rhipidura rufifrons			
Rufous Fantail [592]		Species or species habitat may occur within area	In buffer area only
Migratory Wetlands Species			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos			
Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Gallinago hardwickii			
Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area	In feature area

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Anseranas semipalmata			
Magpie Goose [978]		Species or species habitat may occur within area overfly marine area	In feature area
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis			
Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat may occur within area overfly marine area	In buffer area only
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat may occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Rostratula australis as Rostratula benghalensis (sensu lato)			
Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area overfly marine area	In feature area

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Albinia	National Park	QLD	In buffer area only
Albinia	Conservation Park	QLD	In buffer area only
Albinia	Resources Reserve	QLD	In buffer area only
Carnarvon	National Park	QLD	In buffer area only
Cometside	Nature Refuge	QLD	In buffer area only
Minerva Hills	National Park	QLD	In buffer area only
Phiara Downs	Nature Refuge	QLD	In buffer area only
Rainbow	Nature Refuge	QLD	In buffer area only

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Blackwater Mine South Coking Coal Project	2022/09279		Assessment	In buffer area only
Gas Supply Security Project	2020/8856		Assessment	In buffer area only
rail track to link the proposed MIM Rolleston coal mine to existing rail network	2002/637		Post-Approval	In buffer area only
Controlled action				
Arcturus Coal Project; A combined open cut and underground longwall coal mine	2010/5783	Controlled Action	Completed	In buffer area only
Coal Seam Gas Field Development for Natural Gas Liquefaction Park, Curtis Island	2008/4059	Controlled Action	Completed	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Construct and operate a coal gasification plant and carbon dioxide capture and storage	2006/3040	Controlled Action	Completed	In feature area
Derrillo Irrigation Project	2019/8581	Controlled Action	Further Information Request	In buffer area only
Future Gas Supply Area Project	2012/6357	Controlled Action	Completed	In buffer area only
Meteor Downs South Coal Project, central Qld	2013/6799	Controlled Action	Post-Approval	In buffer area only
Meteor Downs South Mine Rail Loop, Qld	2019/8482	Controlled Action	Post-Approval	In buffer area only
Open-cut Coal Mine/Steaming Coals	2001/497	Controlled Action	Post-Approval	In feature area
Rolleston Coal Expansion Project	2011/5965	Controlled Action	Post-Approval	In feature area
Rolleston Open Cut Coal Mine Expansion	2009/5175	Controlled Action	Post-Approval	In feature area
Rolleston Solar Farm, 16km north-west of Rolleston, Qld	2017/8125	Controlled Action	Completed	In buffer area only
Santos GLNG Gas Field Development Project, QLD	2012/6615	Controlled Action	Post-Approval	In buffer area only
Springsure Creek Coal Project	2010/5782	Controlled Action	Post-Approval	In buffer area only
ZeroGen Integrated Gasification Combined Cycle Power Plant and CO2 Capture, Transport and Storage	2009/5195	Controlled Action	Completed	In feature area
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
Mahalo Development Area CSG Project	2019/8534	Not Controlled Action	Completed	In buffer area only
Repair, reconstruction & rehabilitation of Carnarvon & Dawson Highways, QLD	2012/6485	Not Controlled Action	Completed	In buffer area only
Rolleston Accomodation Village Upgrade Project	2011/5937	Not Controlled Action	Completed	In buffer area only
Springsure Creek 132kV powerline and switchyards	2012/6385	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
Blackwater to Rolleston 132 kV transmission line	2002/880	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Changes to practices in Bluegrass community	2003/924	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Clearing of regrowth Brigalow	2003/962	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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Queensland Government

Department of Environment and Science

Environmental Reports

Matters of State Environmental Significance

For the selected area of interest
Longitude: 148.4074 Latitude: -24.3965 with 2 kilometre radius

Environmental Reports - General Information

The Environmental Reports portal provides for the assessment of selected matters of interest relevant to a user specified location, or area of interest (AOI). All area and derivative figures are relevant to the extent of matters of interest contained within the AOI unless otherwise stated. Please note, if a user selects an AOI via the "central coordinates" option, the resulting assessment area encompasses an area extending for a 2km radius from the point of interest.

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 1994). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

The matters of interest reported on in this document are based upon available state mapped datasets. Where the report indicates that a matter of interest is not present within the AOI (e.g. where area related calculations are equal to zero, or no values are listed), this may be due either to the fact that state mapping has not been undertaken for the AOI, that state mapping is incomplete for the AOI, or that no values have been identified within the site.

The information presented in this report should be considered as a guide only and field survey may be required to validate values on the ground.

Please direct queries about these reports to: Planning.Support@des.qld.gov.au

Disclaimer

Whilst every care is taken to ensure the accuracy of the information provided in this report, the Queensland Government makes no representations or warranties about its accuracy, reliability, completeness, or suitability, for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which the user may incur as a consequence of the information being inaccurate or incomplete in any way and for any reason.

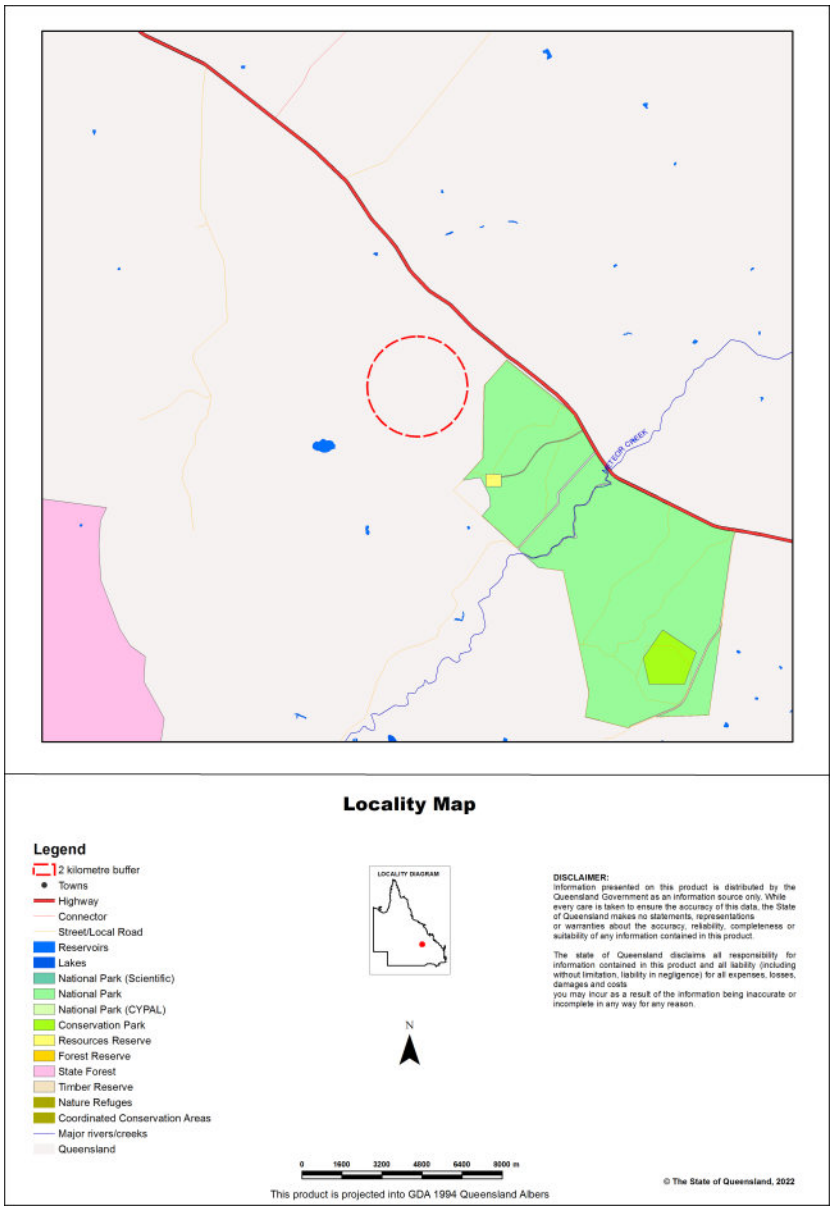
Table of Contents

Assessment Area Details

The following table provides an overview of the area of interest (AOI) with respect to selected topographic and environmental values.

Table 1: Summary table, details for AOI Longitude: 148.4074 Latitude: -24.3965

Size (ha)	1,256.55
Local Government(s)	Central Highlands Regional
Bioregion(s)	Brigalow Belt
Subregion(s)	Basalt Downs
Catchment(s)	Fitzroy



Matters of State Environmental Significance (MSES)

MSES Categories

Queensland's State Planning Policy (SPP) includes a biodiversity State interest that states:

'The sustainable, long-term conservation of biodiversity is supported. Significant impacts on matters of national or state environmental significance are avoided, or where this cannot be reasonably achieved; impacts are minimised and residual impacts offset.'

The MSES mapping product is a guide to assist planning and development assessment decision-making. Its primary purpose is to support implementation of the SPP biodiversity policy. While it supports the SPP, the mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations. Similarly, the SPP biodiversity policy does not override or replace specific requirements of other Acts or regulations.

The SPP defines matters of state environmental significance as:

- Protected areas (including all classes of protected area except coordinated conservation areas) under the *Nature Conservation Act 1992* ;

- Marine parks and land within a 'marine national park', 'conservation park', 'scientific research', 'preservation' or 'buffer' zone under the *Marine Parks Act 2004* ;

- Areas within declared fish habitat areas that are management A areas or management B areas under the Fisheries Regulation 2008;

- Threatened wildlife under the *Nature Conservation Act 1992* and special least concern animals under the Nature Conservation (Wildlife) Regulation 2006;

- Regulated vegetation under the *Vegetation Management Act 1999* that is:

    • Category B areas on the regulated vegetation management map, that are 'endangered' or 'of concern' regional ecosystems;

    • Category C areas on the regulated vegetation management map that are 'endangered' or 'of concern' regional ecosystems;

    • Category R areas on the regulated vegetation management map;

    • Regional ecosystems that intersect with watercourses identified on the vegetation management watercourse and drainage feature map;

    • Regional ecosystems that intersect with wetlands identified on the vegetation management wetlands map;

- Strategic Environmental Areas under the *Regional Planning Interests Act 2014* ;

- Wetlands in a wetland protection area of wetlands of high ecological significance shown on the Map of Queensland Wetland Environmental Values under the Environment Protection Regulation 2019;

- Wetlands and watercourses in high ecological value waters defined in the Environmental Protection (Water) Policy 2009, schedule 2;

- Legally secured offset areas.

MSES Values Present

The MSES values that are present in the area of interest are summarised in the table below:

Table 2: Summary of MSES present within the AOI

1a Protected Areas- estates	0.0 ha	0.0 %
1b Protected Areas- nature refuges	0.0 ha	0.0 %
1c Protected Areas- special wildlife reserves	0.0 ha	0.0 %
2 State Marine Parks- highly protected zones	0.0 ha	0.0 %
3 Fish habitat areas (A and B areas)	0.0 ha	0.0 %
4 Strategic Environmental Areas (SEA)	0.0 ha	0.0 %
5 High Ecological Significance wetlands on the map of Referable Wetlands	0.0 ha	0.0 %
6a High Ecological Value (HEV) wetlands	0.0 ha	0.0 %
6b High Ecological Value (HEV) waterways	0.0 km	Not applicable
7a Threatened (endangered or vulnerable) wildlife	10.36 ha	0.8%
7b Special least concern animals	0.0 ha	0.0 %
7c i Koala habitat area - core (SEQ)	0.0 ha	0.0 %
7c ii Koala habitat area - locally refined (SEQ)	0.0 ha	0.0 %
7d Sea turtle nesting areas	0.0 km	Not applicable
8a Regulated Vegetation - Endangered/Of concern in Category B (remnant)	315.44 ha	25.1%
8b Regulated Vegetation - Endangered/Of concern in Category C (regrowth)	0.0 ha	0.0 %
8c Regulated Vegetation - Category R (GBR riverine regrowth)	6.23 ha	0.5%
8d Regulated Vegetation - Essential habitat	29.67 ha	2.4%
8e Regulated Vegetation - intersecting a watercourse	9.9 km	Not applicable
8f Regulated Vegetation - within 100m of a Vegetation Management Wetland	0.0 ha	0.0 %
9a Legally secured offset areas- offset register areas	0.0 ha	0.0 %
9b Legally secured offset areas- vegetation offsets through a Property Map of Assessable Vegetation	0.0 ha	0.0 %

Additional Information with Respect to MSES Values Present

MSES - State Conservation Areas

1a. Protected Areas - estates

(no results)

1b. Protected Areas - nature refuges

(no results)

1c. Protected Areas - special wildlife reserves

(no results)

2. State Marine Parks - highly protected zones

(no results)

3. Fish habitat areas (A and B areas)

(no results)

Refer to **Map 1 - MSES - State Conservation Areas** for an overview of the relevant MSES.

MSES - Wetlands and Waterways

4. Strategic Environmental Areas (SEA)

(no results)

5. High Ecological Significance wetlands on the Map of Queensland Wetland Environmental Values

(no results)

6a. Wetlands in High Ecological Value (HEV) waters

(no results)

6b. Waterways in High Ecological Value (HEV) waters

(no results)

Refer to **Map 2 - MSES - Wetlands and Waterways** for an overview of the relevant MSES.

MSES - Species

7a. Threatened (endangered or vulnerable) wildlife

Values are present

7b. Special least concern animals

Not applicable

7c i. Koala habitat area - core (SEQ)

Not applicable

7c ii. Koala habitat area - locally refined (SEQ)

Not applicable

7d. Wildlife habitat (sea turtle nesting areas)

Not applicable

Threatened (endangered or vulnerable) wildlife habitat suitability models

Species	Common name	NCA status	Presence
Boronia keysii		V	None
Calyptorhynchus lathami	Glossy black cockatoo	V	None
Casuarius casuarius johnsonii	Sthn population cassowary	E	None
Crinia tinnula	Wallum froglet	V	None
Denisonia maculata	Ornamental snake	V	Core
Litoria freycineti	Wallum rocketfrog	V	None
Litoria olongburensis	Wallum sedgefrog	V	None
Macadamia integrifolia		V	None
Macadamia ternifolia		V	None
Macadamia tetraphylla		V	None
Melaleuca irbyana		E	None
Petaurus gracilis	Mahogany Glider	E	None
Petrogale persephone	Proserpine rock-wallaby	E	None
Pezoporus wallicus wallicus	Eastern ground parrot	V	None
Phascolarctos cinereus	Koala - outside SEQ*	V	None
Taudactylus pleione	Kroombit tinkerfrog	E	None
Xeromys myoides	Water Mouse	V	None

**For koala model, this includes areas outside SEQ. Check 7c SEQ koala habitat for presence/absence.*

Threatened (endangered or vulnerable) wildlife species records

Scientific name	Common name	NCA status	EPBC status	Migratory status
Dichanthium queenslandicum		V	E	

Special least concern animal species records

(no results)

Shorebird habitat (critically endangered/endangered/vulnerable)

Not applicable

Shorebird habitat (special least concern)

Not applicable

**Nature Conservation Act 1992 (NCA) Status- Endangered (E), Vulnerable (V) or Special Least Concern Animal (SL). Environment Protection and Biodiversity Conservation Act 1999 (EPBC) status: Critically Endangered (CE) Endangered (E), Vulnerable (V)*

Migratory status (M) - China and Australia Migratory Bird Agreement (C), Japan and Australia Migratory Bird Agreement (J), Republic of Korea and Australia Migratory Bird Agreement (R), Bonn Migratory Convention (B), Eastern Flyway (E)

To request a species list for an area, or search for a species profile, access Wildlife Online at:
https://www.qld.gov.au/environment/plants-animals/species-list/

Refer to **Map 3a - MSES - Species - Threatened (endangered or vulnerable) wildlife and special least concern animals, Map 3b - MSES - Species - Koala habitat area (SEQ)** and **Map 3c - MSES - Wildlife habitat (sea turtle nesting areas)** for an overview of the relevant MSES.

MSES - Regulated Vegetation

For further information relating to regional ecosystems in general, go to:
https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/
For a more detailed description of a particular regional ecosystem, access the regional ecosystem search page at:
https://environment.ehp.qld.gov.au/regional-ecosystems/

8a. Regulated Vegetation - Endangered/Of concern in Category B (remnant)

Regional ecosystem	Vegetation management polygon	Vegetation management status
11.8.11	O-dom	rem_oc
11.3.3a/11.3.4	O-dom	rem_oc
11.4.9	E-dom	rem_end
11.3.3a	O-dom	rem_oc
11.8.5/11.8.11	O-subdom	rem_oc

8b. Regulated Vegetation - Endangered/Of concern in Category C (regrowth)

Not applicable

8c. Regulated Vegetation - Category R (GBR riverine regrowth)

Regulated vegetation map category	Map number
R	8549

8d. Regulated Vegetation - Essential habitat

Values are present

8e. Regulated Vegetation - intersecting a watercourse**

A vegetation management watercourse is mapped as present

8f. Regulated Vegetation - within 100m of a Vegetation Management wetland

Not applicable

Refer to **Map 4 - MSES - Regulated Vegetation** for an overview of the relevant MSES.

MSES - Offsets

9a. Legally secured offset areas - offset register areas

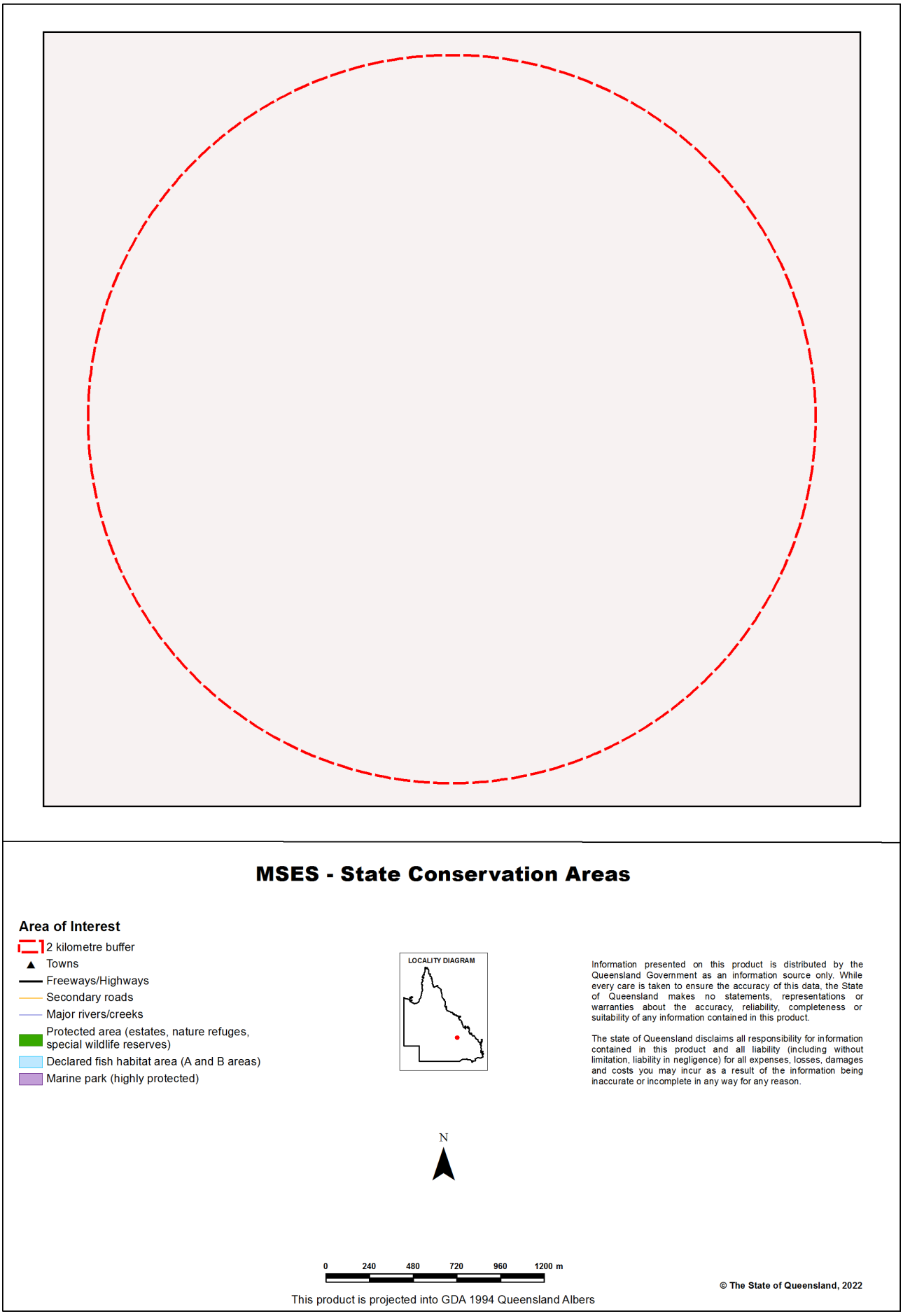
(no results)

9b. Legally secured offset areas - vegetation offsets through a Property Map of Assessable Vegetation

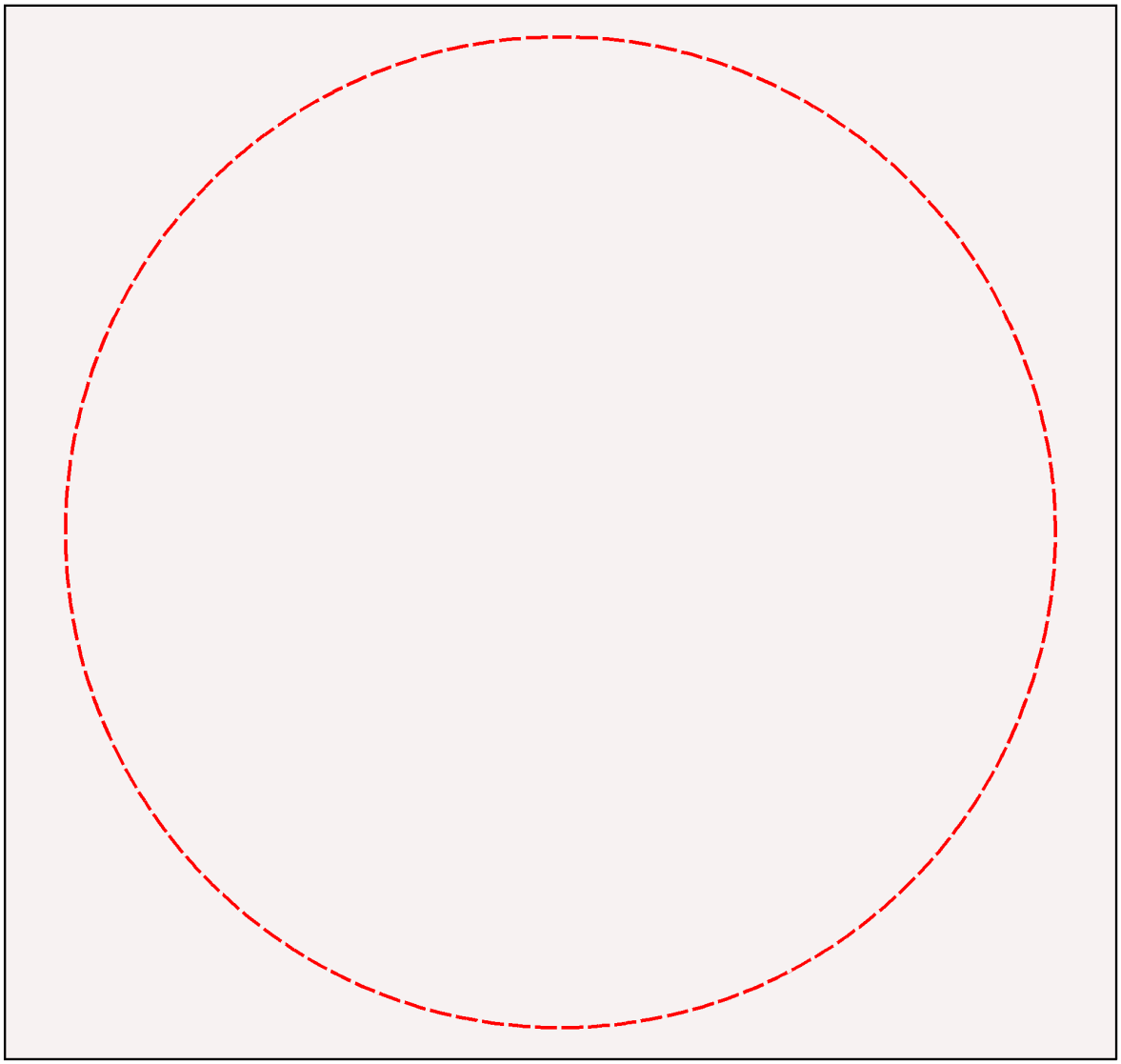
(no results)

Refer to **Map 5 - MSES - Offset Areas** for an overview of the relevant MSES.

Map 1 - MSES - State Conservation Areas



Map 2 - MSES - Wetlands and Waterways

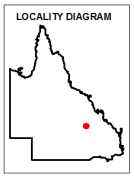


MSES - Wetlands and Waterways

Area of Interest

- 2 kilometre buffer
- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Declared high ecological value waters (watercourse)
- Strategic environmental area (designated precinct)
- Declared high ecological value waters (wetland)
- High ecological significance wetlands

LOCALITY DIAGRAM



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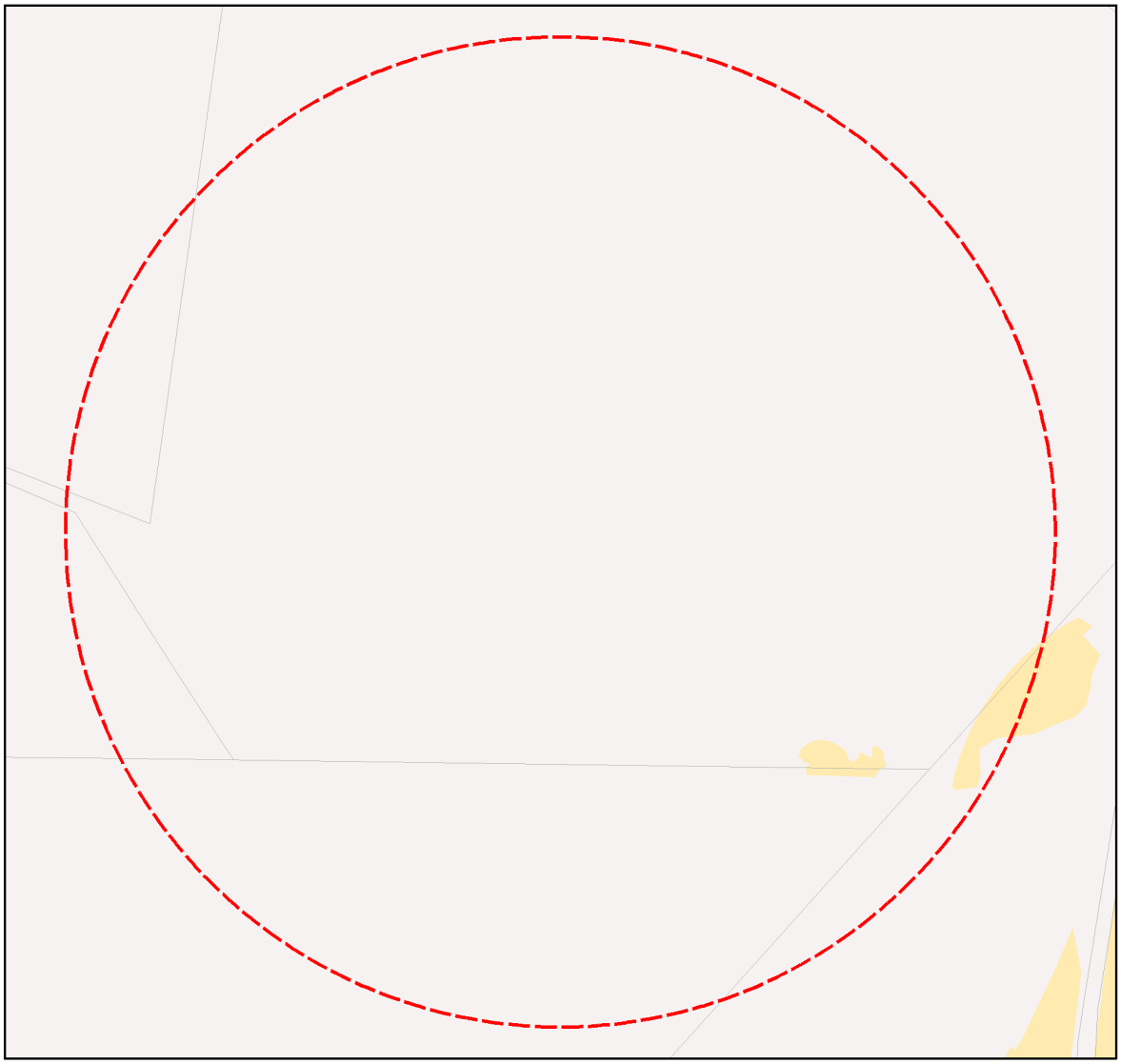
Map 3a - MSES - Species - Threatened (endangered or vulnerable) wildlife and special least concern animals

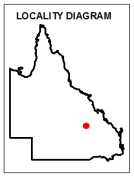


MSES - Species
Threatened (endangered or vulnerable) wildlife and special least concern animals

Area of Interest

- 2 kilometre buffer
- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Wildlife habitat (special least concern)
- Wildlife habitat (endangered or vulnerable)

LOCALITY DIAGRAM



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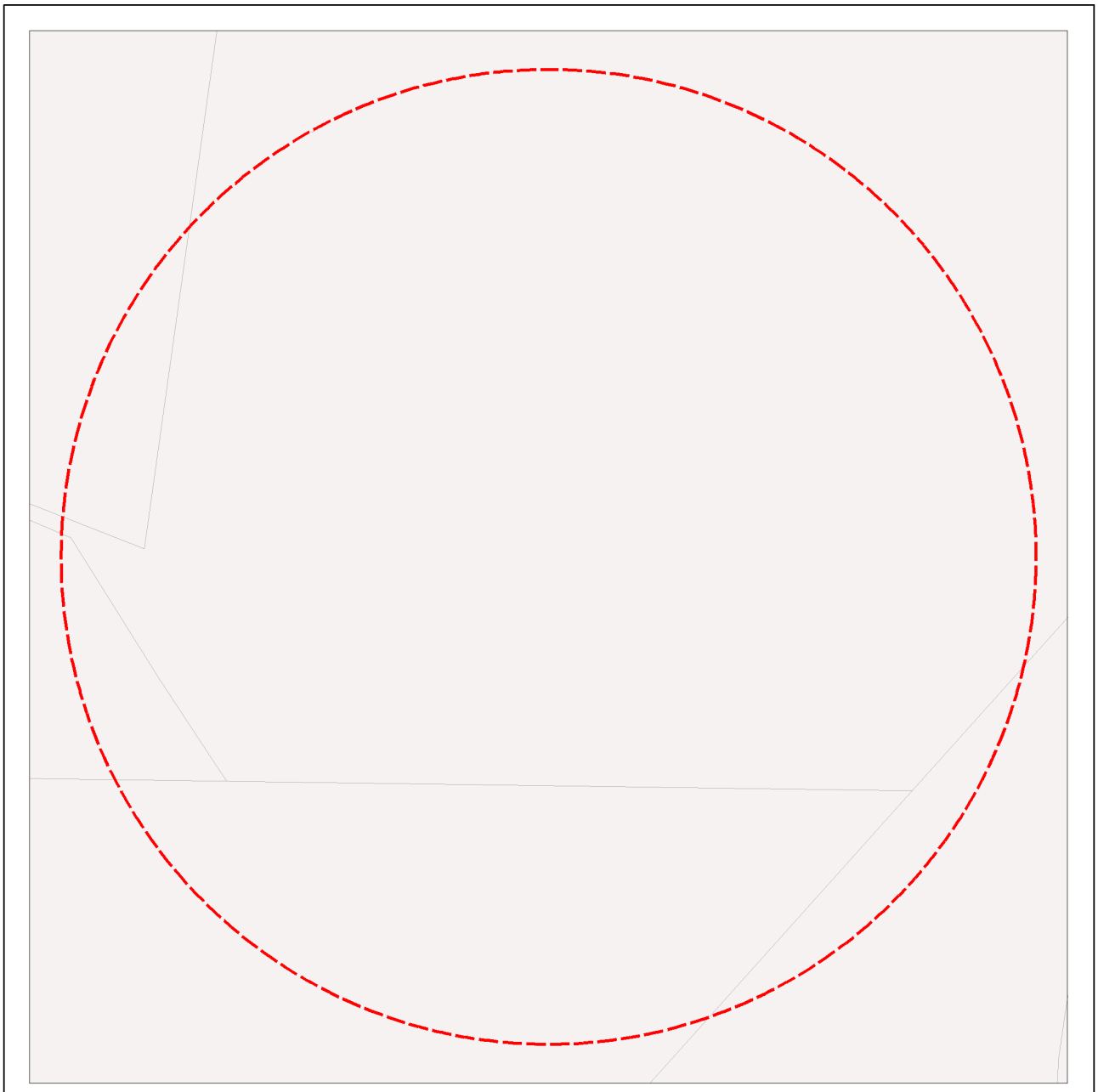
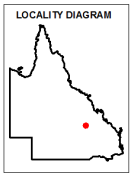
Map 3b - MSES - Species - Koala habitat area (SEQ)



MSES - Species
Koala habitat area (SEQ)

Area of Interest
- 2 kilometre buffer
- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Koala habitat area (core)
- Koala habitat area (locally refined)

LOCALITY DIAGRAM



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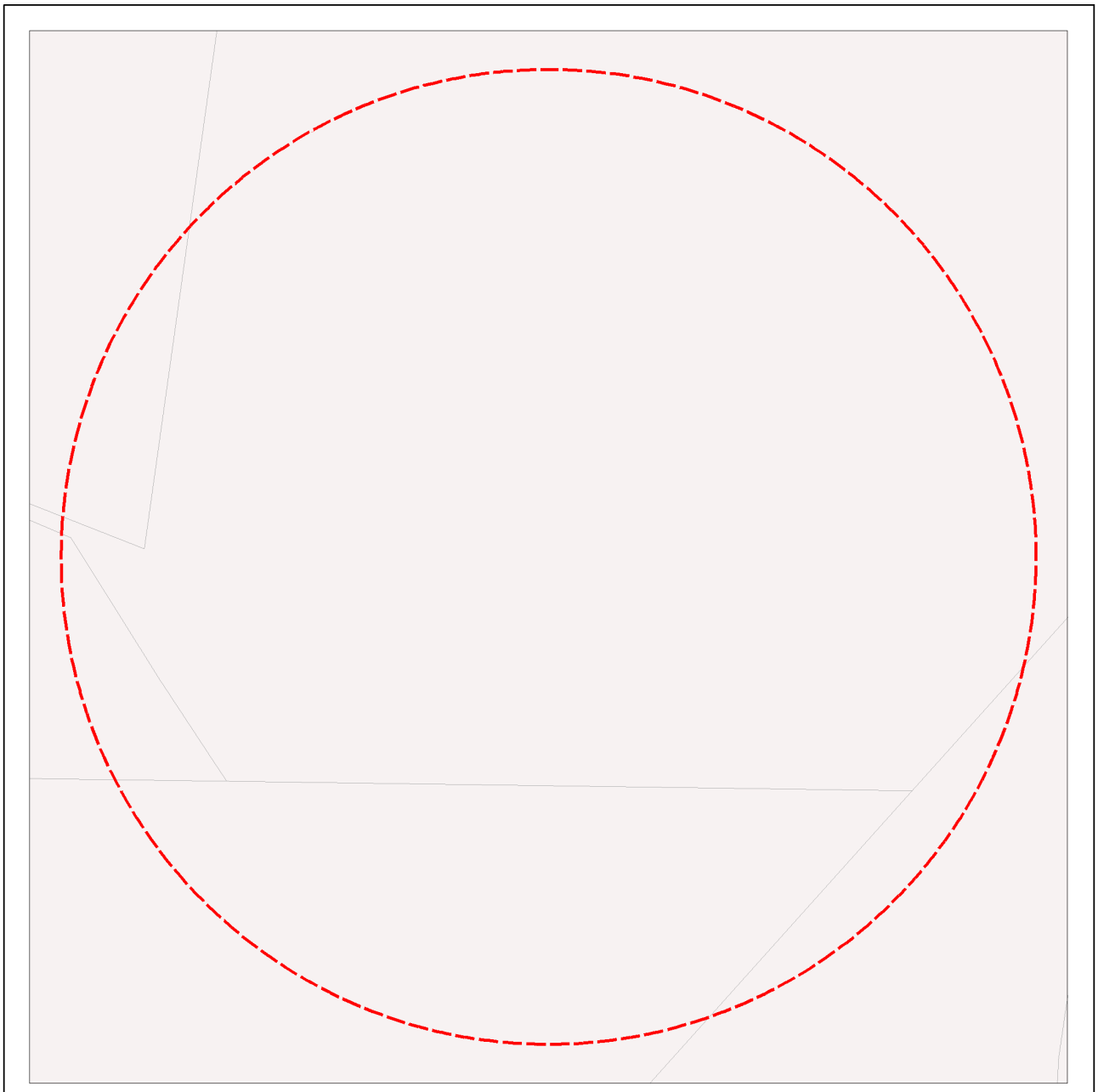
The represented layers for SEQ 'koala habitat area-core' and 'koala habitat area- locally refined' in MSES are sourced directly from the regulatory mapping under the Nature Conservation (Koala) Conservation Plan 2017. Whilst every effort is made to ensure the information remains current, there may be delays between updating versions. Please refer to the original mapping for the most recent version. See https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping

The koala habitat mapping within South East Queensland uses regional ecosystem linework compiled at a scale varying from 1:25,000 to 1:100,000. Linework should be used as a guide only. The positional accuracy of regional ecosystem data mapped at a scale of 1:100,000 is +/- 100 metres.

0 220 440 660 880 1,100 m

This product is projected into GDA 1994 Queensland Albers

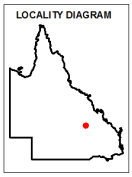
Map 3c - MSES - Wildlife habitat (sea turtle nesting areas)



MSES - Wildlife habitat (sea turtle nesting areas)

Area of Interest
- 2 kilometre buffer
- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Wildlife habitat (sea turtle nesting areas)

LOCALITY DIAGRAM



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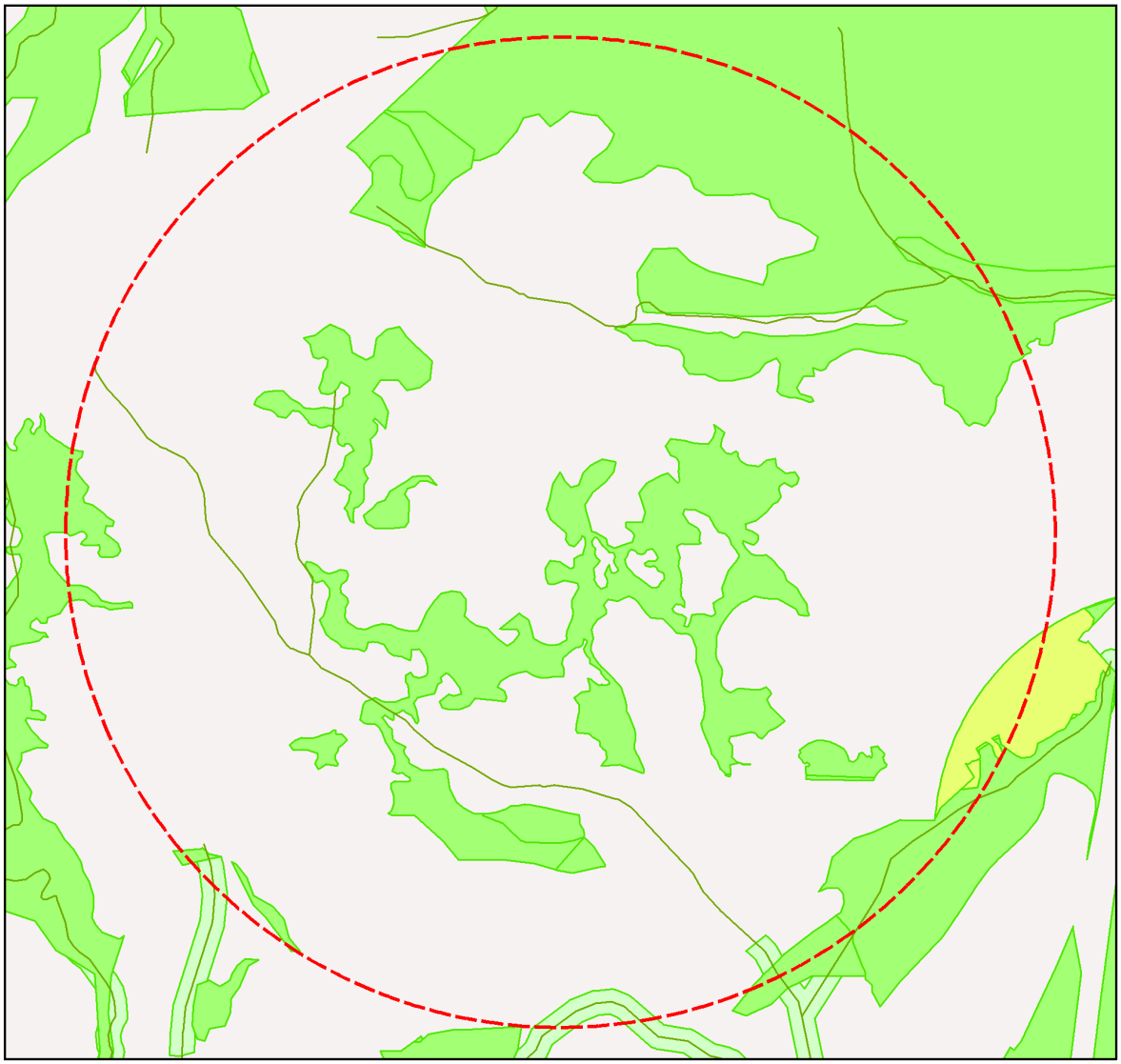
MSES mapping of sea turtle nesting areas identifies beaches where the recorded number of turtle nests are over 1% of the turtle species or genetic stock. The linework is also deliberately extended along nearby rocky coastlines and headlands to recognise that significant numbers of nesting adults and hatchlings can become disoriented by light pollution from development on rocky coastlines and headlands while navigating offshore from nesting beaches.

0 220 440 660 880 1,100 m

This product is projected into GDA 1994 Queensland Albers

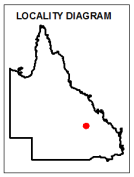
Map 4 - MSES - Regulated Vegetation



MSES - Regulated Vegetation

Area of Interest

- 2 kilometre buffer
- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Regulated vegetation (intersecting a watercourse)
- Regulated vegetation (100m from wetland)
- Regulated vegetation (category B - endangered or of concern)
- Regulated vegetation (category C - endangered or of concern)
- Regulated vegetation (category R - GBR riverine)
- Regulated vegetation (essential habitat)



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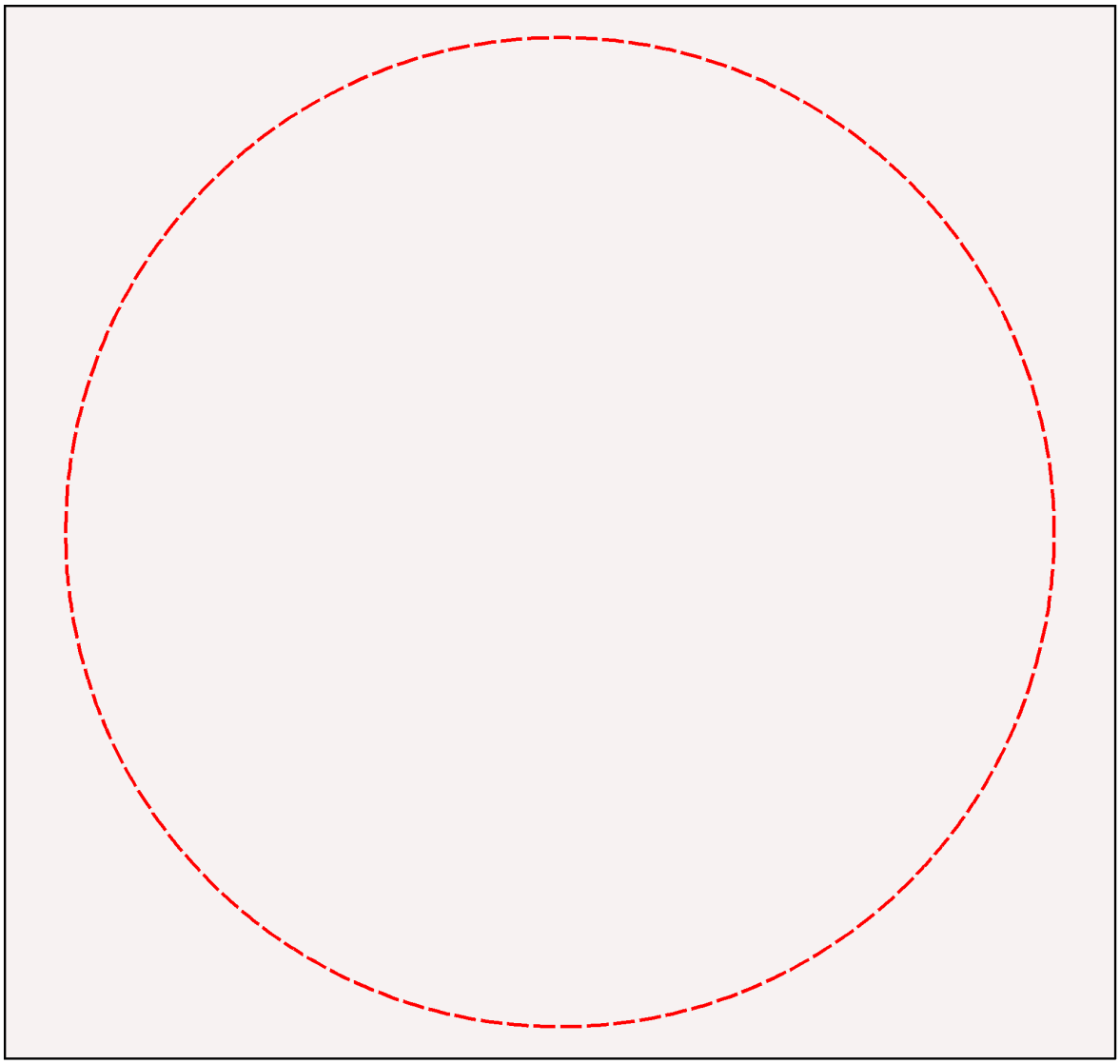
This product is projected into GDA 1994 Queensland Albers

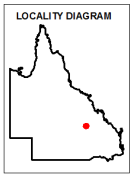
Map 5 - MSES - Offset Areas



MSES - Offsets

Area of Interest

- 2 kilometre buffer
- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Legally secured offset area (offset register)
- Legally secured offset area (vegetation offsets)



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0 240 480 720 960 1200 m

This product is projected into GDA 1994 Queensland Albers

Appendices

Appendix 1 - Matters of State Environmental Significance (MSES) methodology

MSES mapping is a regional-scale representation of the definition for MSES under the State Planning Policy (SPP). The compiled MSES mapping product is a guide to assist planning and development assessment decision-making. Its primary purpose is to support implementation of the SPP biodiversity policy. While it supports the SPP, the mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations. Similarly, the SPP biodiversity policy does not override or replace specific requirements of other Acts or regulations.

The Queensland Government's "Method for mapping - matters of state environmental significance for use in land use planning and development assessment" can be downloaded from:

http://www.ehp.qld.gov.au/land/natural-resource/method-mapping-mses.html .

Appendix 2 - Source Data

The datasets listed below are available on request from:

http://qldspatial.information.qld.gov.au/catalogue/custom/index.page

- Matters of State environmental significance

Note: MSES mapping is not based on new or unique data. The primary mapping product draws data from a number of underlying environment databases and geo-referenced information sources. MSES mapping is a versioned product that is updated generally on a twice-yearly basis to incorporate the changes to underlying data sources. Several components of MSES mapping made for the current version may differ from the current underlying data sources. To ensure accuracy, or proper representation of MSES values, it is strongly recommended that users refer to the underlying data sources and review the current definition of MSES in the State Planning Policy, before applying the MSES mapping.

Individual MSES layers can be attributed to the following source data available at QSpatial:

MSES layers	**current QSpatial data (http://qspatial.information.qld.gov.au)**
Protected Areas-Estates, Nature Refuges, Special Wildlife Reserves	- Protected areas of Queensland - Nature Refuges - Queensland - Special Wildlife Reserves- Queensland
Marine Park-Highly Protected Zones	Moreton Bay marine park zoning 2008
Fish Habitat Areas	Queensland fish habitat areas
Strategic Environmental Areas-designated	Regional Planning Interests Act - Strategic Environmental Areas
HES wetlands	Map of Queensland Wetland Environmental Values
Wetlands in HEV waters	HEV waters: - EPP Water intent for waters Source Wetlands: - Queensland Wetland Mapping (Current version 5) Source Watercourses: - Vegetation management watercourse and drainage feature map (1:100000 and 1:250000)
Wildlife habitat (threatened and special least concern)	- WildNet database species records - habitat suitability models (various) - SEQ koala habitat areas under the Koala Conservation Plan 2019 - Sea Turtle Nesting Areas records
VMA regulated regional ecosystems	Vegetation management regional ecosystem and remnant map
VMA Essential Habitat	Vegetation management - essential habitat map
VMA Wetlands	Vegetation management wetlands map
Legally secured offsets	Vegetation Management Act property maps of assessable vegetation. For offset register data-contact DES
Regulated Vegetation Map	Vegetation management - regulated vegetation management map

Appendix 3 - Acronyms and Abbreviations

AOI	- Area of Interest
DES	- Department of Environment and Science
EP Act	- *Environmental Protection Act 1994*
EPP	- Environmental Protection Policy
GDA94	- Geocentric Datum of Australia 1994
GEM	- General Environmental Matters
GIS	- Geographic Information System
MSES	- Matters of State Environmental Significance
NCA	- *Nature Conservation Act 1992*
RE	- Regional Ecosystem
SPP	- State Planning Policy
VMA	- *Vegetation Management Act 1999*

Queensland Government

WildNet species list

Search Criteria: Species List for a Specified Point
Species: All
Type: Native
Queensland status: Rare and threatened species
Records: Confirmed
Date: Since 1980
Latitude: -24.3965
Longitude: 148.4074
Distance: 50
Email: jacqui.gamack@e2mconsulting.com.au
Date submitted: Thursday 24 Nov 2022 16:38:53
Date extracted: Thursday 24 Nov 2022 16:40:05

The number of records retrieved = 16

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Columbidae	*Geophaps scripta scripta*	squatter pigeon (southern subspecies)		V	V	6
animals	mammals	Petauridae	*Petaurus australis australis*	yellow-bellied glider (southern subspecies)		V	V	12
animals	mammals	Phascolarctidae	*Phascolarctos cinereus*	koala		E	E	12
animals	mammals	Pseudocheiridae	*Petauroides armillatus*	central greater glider		E	E	34
plants	land plants	Apocynaceae	*Leichhardtia brevifolia*			V	V	4/4
plants	land plants	Asteraceae	*Trioncinia retroflexa*			E		4/4
plants	land plants	Cyperaceae	*Cyperus clarus*			V		6/6
plants	land plants	Myrtaceae	*Corymbia scabrida*	rough-leaved yellowjacket		NT		1/1
plants	land plants	Myrtaceae	*Eucalyptus sicilifolia*			V		14/14
plants	land plants	Myrtaceae	*Sannantha brachypoda*			V		1/1
plants	land plants	Poaceae	*Aristida annua*			V	V	4/4
plants	land plants	Poaceae	*Dichanthium queenslandicum*			V	E	16/15
plants	land plants	Poaceae	*Digitaria porrecta*			NT		11/11
plants	land plants	Solanaceae	*Solanum dissectum*			E	E	1/1
plants	land plants	Solanaceae	*Solanum elachophyllum*			E		1/1
plants	land plants	Surianaceae	*Cadellia pentastylis*	ooline		V	V	1/1

CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992.*
The codes are Extinct (EX), Extinct in the Wild (PE), Critically Endangered (CR), Endangered (E), Vulnerable (V), Near Threatened (NT), Special Least Concern (SL) and Least Concern (C).

A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999.*
The values of EPBC are Extinct (EX), Extinct in the Wild (XW), Critically Endangered (CE), Endangered (E), Vulnerable (V) and Conservation Dependent (CD).

Records - The first number indicates the total number of records of the taxon (wildlife records and species listings for selected areas).
This number is output as 99999 if it equals or exceeds this value. A second number located after a / indicates the number of specimen records for the taxon.
This number is output as 999 if it equals or exceeds this value.

Appendix B Rolleston Pit Expansion – Ecological Field Assessment (Ecological Australia 2022)

Spring Creek North Continuation Project - Ecological Field Assessment

Glencore Coal Assets Australia

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DOCUMENT TRACKING

Project Name	Spring Creek North Continuation Project - Ecological Field Assessment
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Project Manager	Talia Jenner
Prepared by	Talia Jenner
Reviewed by	Loren Appleby and May-Le Ng
Approved by	May-Le Ng
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Abbreviations

Abbreviation	Description
AU	Assessment unit
BioCondition Manual	*BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland Assessment Manual* (Eyre *et al.*, 2015).
DES	Department of Environment and Science
EA	Environmental Authority
EIS	Environmental Impact Statement
ELA	Eco Logical Australia
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ESA	Environmentally Sensitive Areas
Gap Analysis	*Rolleston Pit Expansion – Terrestrial Ecology Gap Analysis* (ELA, 2021)
GCAA	Glencore Coal Assets Australia
Habitat Quality Assessment Guide	*Guide to Determining Terrestrial Habitat Quality* (version 1.3) (DES, 2020)
m	metre
ML	Mining Lease
MSES	Matters of State Environmental Significance
Natural Grasslands TEC	Natural Grassland of the Queensland Central Highlands and northern Fitzroy Basin TEC
NC Act	*Nature Conservation Act 1992*
PMST	Protected Matters Search Tool
RCEP	Rolleston Coal Expansion Project
RE	Regional Ecosystem
REDD	Regional Ecosystem Description Database
ROC	Rolleston Open Cut
SPRAT	Species Profile and Threats
TEC	Threatened Ecological Community
The approvals	2015 Rolleston Coal Expansion Project Environmental Impact Statement, Environmental Authority EPML00370013 and *Environment Protection and Biodiversity Conservation Act 1999*
The Project	Spring Creek North Continuation Project
The study area	Spring Creek North Continuation Project disturbance area
VM Act	*Vegetation Management Act 1999*
WoNS	Weeds of National Environmental Significance

1. Introduction

1.1. Project background

Glencore Coal Assets Australia (GCAA) is planning to expand current operations at Rolleston Open Cut (ROC) coal mine. The expansion, known as Spring Creek North Continuation Project (herein referred to as 'the Project') is planned to occur within the northern portion of Mining Lease (ML) 70415 and 70307.

The Project is located outside of currently approved disturbance areas under the 2015 Rolleston Coal Expansion Project (RCEP) Environmental Impact Statement (EIS), Environmental Authority (EA) EPML00370013 and *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) approval 2011/5965, 2009/5175 and 2001/497 (herein referred to as 'the approvals'). Consequently, the Project is likely to trigger a requirement for an EA amendment and EPBC Act referral.

Ecological surveys have been previously undertaken for current operations and adjacent areas in MLs 70415, 70307, 70416 and 70458. Detailed ecological surveys were undertaken to assist developing the RCEP EIS in 2015. However, only limited surveys were included over the proposed Spring Creek North Continuation Project disturbance area of the Project (herein referred to as 'the study area').

A gap analysis was undertaken in 2021 to determine any additional studies required to support an EA amendment and EPBC Act referral. Gaps in the database and literature review, including data age limitations, changes to site conditions, new threatened species listings and habitat quality assessments were identified (ELA, 2021). To address these gaps, Eco Logical Australia (ELA) were engaged to undertake an ecological field study.

1.2. Objectives and scope of works

The objective of the scope of works was to undertake an ecological study to address information and data gaps identified in *Rolleston Pit Expansion – Gap Analysis Report* (herein referred to as 'Gap Analysis') (ELA, 2021) (refer to **Appendix A**) which were recommended to support a EPBC Act referral and EA amendment. Specifically, the scope of works included:

- validation of the extent and condition of Regional Ecosystems (REs) within the study area;
- confirmation of presence/absence of Threatened Ecological Communities (TEC), species, and associated habitat; and
- collection of habitat quality data in accordance with the *Guide to Determining Terrestrial Habitat Quality* (version 1.3) (herein referred to as 'Habitat Quality Assessment Guide') (DES, 2020) for use in offsets calculations.

1.3. Project area and study area

The Project is located 22 km north-west of Rolleston township and 125 km south of Emerald within the Fitzroy Basin, Queensland (**Figure 1**). The Project is located within the Brigalow Belt bioregion under the Regional Ecosystem framework (Queensland Government, 2016).

The study area comprises 592.2 ha of non-remnant and remnant vegetation, located within ML 70415 and 70307 to the north of current operations.

There are no major waterways that intersect the study area, however, there are three minor tributaries which flow into the Aldebaran and Meteor Creeks to the north and south. There are no wetlands present within the study area.

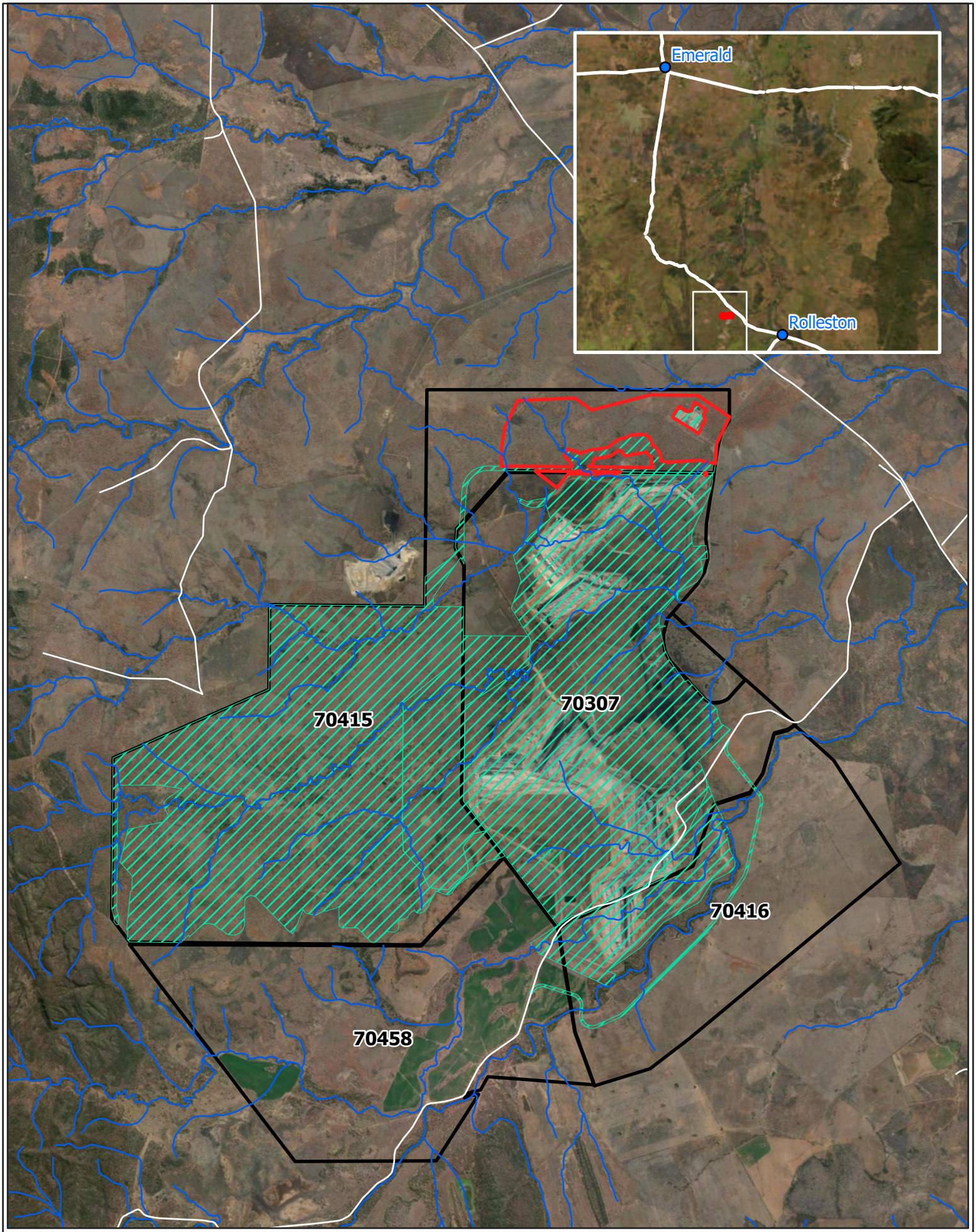

Figure 1: Study area and project location

Study area
Approval Limit
Mining lease
Watercourse
Roads

N

0 1.75 3.5
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 20536-TJ Date: 2/28/2023

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2. Methods

2.1. Desktop Analysis

A desktop assessment of the Protected Matters Search Tool (PMST) report (50 km buffer), Matters of State Environmental Significance (MSES) report and WildNet report (50 km buffer) were conducted to provide contemporary listing status of species.

The likelihood of occurrence table from the Gap Analysis (ELA, 2021) was updated with the results of the desktop search results and the findings of the field survey and is provided in **Appendix B**.

2.2. Field survey

A field survey was undertaken by two suitably qualified ecologists between 23 to 25 November 2021. The purpose of the field survey was to validate RE extent and condition within the study area, undertake targeted flora and fauna surveys and to collect habitat quality data in accordance with the Habitat Quality Assessment Guide (DES, 2020).

Due to access limitations as a result of weather conditions, a second field survey was undertaken by an additional two suitably qualified ecologists on 8 March 2022. The purpose of the second field survey was to undertake additional BioCondition and habitat quality assessments to meet the recommended survey effort outlined in the *BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland Assessment Manual* (herein referred to as 'BioCondition Manual') (Eyre *et al.*, 2015).

2.2.1. Data collection

Field data was collected using project specific forms in ArcGIS Field Maps (version 21.4.0) and FormConnect on tablets and smart phone devices using Geocentric Datum of Australia 2020 and with a 3-8 m accuracy.

2.2.2. Flora survey

Data were collected via four methods: BioCondition, tertiary, quaternary and TEC assessments. These are described in detail below.

Flora assessment focused primarily on gathering vegetation data and conducting BioCondition assessments. Data were used to refine ground-truthed RE mapping, TECs, Category B Environmentally Sensitive Areas (ESAs) and presence of habitat values for potentially occurring threatened flora species.

An indicative species list for flora species was compiled concurrently whilst undertaking the following methods, this list is provided in **Appendix C**.

2.2.2.1. BioCondition Assessment

BioCondition assessments were undertaken within the study area in accordance with the BioCondition Manual (Eyre *et al.* 2015). BioCondition assessments involved the collection of the following 13 site-based attributes within a 100 m x 50 m nested sampling plot and the use of mapping data to calculate three additional landscape attributes. The site-based attributes are:

- recruitment of woody perennial species;

- native tree species richness;
- native shrub species richness;
- native grass species richness;
- native forb species richness;
- tree canopy height;
- tree canopy cover;
- shrub canopy cover;
- native perennial grass cover;
- organic litter cover;
- number of large trees;
- coarse woody debris abundance; and
- non-native plant cover.

BioCondition scores are calculated for each site and a weighted average is based upon these scores for each assessment unit (AU). The AU is a homogenous unit of one RE type in a broad condition state (remnant, high value regrowth or regrowth). Further details of the calculation method is outlined in **Section 2.3.3**.

2.2.2.2. Tertiary assessments

Tertiary assessments were undertaken to determine and verify RE classification and condition across the study area in accordance with the Regional Ecosystem Description Database (version 12.1) (REDD) (Queensland Herbarium, 2010). Tertiary assessments were undertaken in accordance with the *Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland* (Neldner *et al.,* 2020). The tertiary assessment sites are 10 x 50 m^2 as per Neldner *et al.* (2020) with the following information recorded:

- RE classification;
- vegetation condition (remnant, high-value regrowth, regrowth, non-remnant);
- dominant, co-dominant, sub-dominant and associated species, as well as average height and cover at each structure level (emergent, T1, T2, T3, S1, S2, ground);
- ecologically dominant layer (emergent, T1, T2, T3, S1, S2, ground);
- structure (dense, mid-dense, sparse, very-sparse);
- landform;
- slope class and degree;
- soil texture and colour; and
- evidence of disturbance (for example weeds, clearing, grazing or fire) and erosion.

RE classification was determined based on the vegetation, soil and landform characteristics identified in the field, geological mapping for the region and the REDD (Queensland Herbarium, 2010). Condition status for woody vegetation is evaluated using the definitions of remnant vegetation under the *Vegetation Management Act 1999* (VM Act), including vegetation that is:

- an Endangered RE; or
- an Of Concern RE; or
- a Least Concern RE; and
- forming the predominant canopy of the vegetation:

- covering more than 50 % of the undisturbed predominant canopy; and
- averaging more than 70 % of the vegetation's undisturbed height; and
- composed of species characteristic of the vegetation's undisturbed predominant canopy.

High value regrowth vegetation is defined in the VM Act as vegetation which has not been cleared since 31 December 1989. Alternatively, regrowth vegetation is vegetation that is not remnant or high value regrowth.

2.2.2.3. Quaternary assessments

Quaternary assessments were undertaken to validate the extent, classification and condition of vegetation communities and habitat types within the study area. Quaternary surveys were undertaken in accordance with Neldner et al. (2020). At each survey point, the following information was recorded:

- RE classification;
- vegetation condition (remnant, high-value regrowth, regrowth, non-remnant);
- dominant species at each structure level (emergent, T1, T2, T3, S1, S2, ground);
- estimated ecologically dominant layer height (metres (m)) and cover (percentage);
- structure (dense, mid-dense, sparse, very sparse); and
- landzone.

2.2.2.4. Threatened ecological community assessments

The presence and status of potentially occurring TECs, as identified during the likelihood of occurrence assessment, was assessed for all vegetation comprising TEC listed REs. The TEC assessments included collection of data to determine TEC status in accordance with diagnostic and condition threshold criteria specific to each TEC.

NATURAL GRASSLAND TEC

Natural Grassland of the Queensland Central Highlands and northern Fitzroy Basin TEC (Natural Grassland TEC) assessments were undertaken in areas mapped as natural grassland to verify and identify areas meeting the key diagnostic and condition threshold criteria as described in the Commonwealth Listing Advice (**Table 1**) (DEWHA, 2008). The assessments consisted of collecting the following data at various sites within the natural grassland communities:

- tree canopy cover;
- presence of listed indicator species in the ground layer; and
- assessment against condition thresholds.

Table 1: Natural Grassland TEC key diagnostic and condition thresholds

	Best quality	Good quality
Patch size	At least 1 ha	At least 5 ha
Grasses	At least four native perennial grass species from the list of perennial native grass indicator species	At least three native perennial grass species from the list of perennial native grass indicator species
Tussock cover	At least 200 native grass tussocks	At least 200 native grass tussocks
Woody shrub cover	Total projected canopy cover of shrubs is <30 %	Total projected canopy cover of shrubs is <50 %

	Best quality	Good quality
Introduced species	Perennial non-woody introduced species are <5 % of the total projected plant cover	Perennial non-woody introduced species are <30 % of the total projected plant cover

2.2.2.5. Threatened species

Whilst undertaking flora surveys, targeted searches were concurrently undertaken for threatened species which were identified during the likelihood of occurrence assessment (**Appendix B**) as potentially occurring. The targeted threatened species included:

- *Aristida annua;*
- *Cyperus clarus;*
- *Dichanthium setosum* (bluegrass)*;*
- *Dichanthium queenslandicum* (king bluegrass);
- *Digitaria porrecta* (finger panic-grass);
- *Marsdenia brevifolia;* and
- *Trioncinia retroflexa*.

Targeted threatened flora species surveys were undertaken in areas identified as potential habitat for each species known or potentially occurring as determined during habitat assessments. If any potential threatened species were identified, a sample was collected and sent to the Queensland Herbarium for confirmation.

2.2.2.6. Exotic flora

A high-level exotic flora survey was conducted within the study area. Presence and abundance records were made for significant exotic species listed as:

- restricted matter flora species listed under the *Biosecurity Act 2014*, Schedules 1 and 2; and
- Weeds of National Environmental Significance (WoNS).

Species were identified, and a count and/or area of occupancy estimate was recorded in ArcGIS Field Maps where each significant exotic species was detected. The data collected is indicative only and is not considered a comprehensive representation of all exotic flora across the study area. The data is intended for use in understanding the dominant exotic flora and associated threatening process within the study area.

2.2.3. Fauna survey

The fauna assessment consisted of validating habitat values and fauna species presence across the study area. This was collected by undertaking active diurnal searches and using habitat assessments, as described in **Sections 2.2.3.1** to **2.2.3.2**.

2.2.3.1. Habitat assessments

General habitat suitability assessments and species-specific habitat assessments were conducted throughout the study area. Information on species-specific habitat assessments was derived from available literature including the Species Profile and Threats (SPRAT) database, relevant Government documents, published research papers and vegetation assessments conducted in the field.

Habitat suitability assessments were undertaken to quantify the presence and extent of threatened species habitat within the study area. Habitat assessments were species-specific and included identifying the presence of key values such as:

- habitat condition (i.e. remnant or regrowth vegetation);
- presence and abundance of foraging resources (Eucalyptus species, ground layer species);

- presence and abundance of shelter resources (hollows, soil cracks, fallen woody debris);
- canopy cover % and condition;
- presence of or distance to water;
- soil type and landform; and
- species-specific threat presence and severity.

2.2.3.2. Targeted threatened or migratory species searches

Targeted searches were undertaken for threatened species which were identified during the gap analysis (ELA, 2021) likelihood of occurrence assessment (**Appendix B**) as potentially occurring. The targeted species included:

- *Phascolarctos cinereus* (koala);
- *Apus pacificus* (fork-tailed swift);
- *Geophaps scripta scripta* (squatter pigeon);
- *Falco hypoleucos* (grey falcon);
- *Hirundapus caudacutus* (white-throated needletail);
- *Acanthophis antarcticus* (common death adder); and
- *Egernia rugosa* (yakka skink).

Targeted threatened fauna species surveys were undertaken in areas identified as potential habitat for each species known or potentially occurring as determined during habitat assessments.

2.2.3.3. Acoustic monitoring

Two unattended acoustic monitoring devices were placed within eucalypt woodlands for two nights, comprising 84 recording hours. Data was analysed by a suitably qualified ecologist using Kaleidoscope Pro software (Wildlife Acoustics). Analysis focused on three species, koala, grey falcon and white-throated needletail.

2.2.3.4. Habitat quality assessments

Habitat quality assessments were undertaken in accordance with the Habitat Quality Assessment Guide (DES, 2020). Habitat quality assessments were conducted in representative areas of potential species habitat and included assessments of:

- site-based attributes – indicates the general vegetation condition of an area; and
- species habitat attributes – determines the ability of an area to support a particular fauna species based on that species' specific habitat requirements.

The two assessment methods are discussed in detail in the sections below.

Habitat quality scores are calculated as a weighted average for each matter area out of 10. The matter area for this report refers to the total area of habitat for a specific species (i.e. koala habitat), which is formed from all relevant AU. Data analysis methods are discussed in detail in **section 2.3.4**.

2.2.3.5. Site-based attribute assessments

Site-based habitat quality attribute assessment was undertaken as per the Habitat Quality Assessment Guide (DES, 2020), which refers to the method described in the BioCondition Manual (Eyre *et. al.,* 2015). Refer to **Section 2.2.2.1**.

2.2.3.6. Species habitat attribute assessments

There are no State Government prescribed species-specific assessment matrices. This method requires assessors to independently develop indicators, habitat attributes and a scoring system for each target species. ELA draws on available literature and practical experience to develop species habitat attribute assessments for target species. These are transformed into a digital form to allow field data collection within ArcGIS Field Maps.

Species habitat quality attributes were designed to assess the capacity of a habitat area to support a species for all or part of its life. Species specific habitat requirements were researched using available literature and the knowledge of experienced, suitably qualified ecologists for each potentially occurring threatened species (as determined by the desktop assessment). Terrestrial habitat quality assessments were conducted concurrently at each site-based attribute assessment site for each relevant species. These assessments were conducted for species assessed as potentially occurring, per the likelihood of occurrence (**Appendix B**) and on site habitat suitability assessments (**Table 3**).

For each species, three measurable habitat attributes are assessed against a series of species-specific environmental indicators. Each environmental indicator is assigned a score from 0-5, where 0 represents the lowest quality and/or availability, and 5 represents the highest quality and/or availability. Each score in the five-point rating scale is assigned a specific measure of the indicator, for example the number and average size of hollows in an area for greater glider. Measured habitat attributes include:

- quality and availability of food and habitat required for foraging;
- quality and availability of habitat required for shelter and breeding; and
- quality and availability of habitat required for mobility.

Additionally, for each species the habitat is assessed for the presence and/or absence of threats. Each identified threat is assessed according to scope and severity against the threat matrix, provided in the Habitat Quality Assessment Guide (DES, 2020). Threats were assessed using the following principles:

- Scope of threat assesses the percentage proportion of the population, or its habitat, within the matter area that is expected to be affected over the next 10 years or 3 generations given the continuation of current circumstances and trends.
    - Low scores are assigned if a higher percentage (80-100%) of the population or habitat will be destroyed while high scores are assigned if a smaller portion (1-19%) of habitat or population will be slightly degraded or negligibly affected.
- Severity of threat assesses the percentage proportion of the population, or its habitat, within the scope that is expected to be affected by the threat.
    - Low scores are assigned if 80-100% of the population or its habitat will be affected, and high scores are assigned if the threat is negligible and will affect only a small proportion (1-5%) of a species habitat or population.

Table 3 provides a summary of the habitat attributes, environmental indicators and justification for each listed species potentially occurring in the study area, as determine during the likelihood of occurrence assessment (**Table 2**) (refer to **Appendix B**).

Table 2: Threatened fauna species potential, likely or known to occur within the study area

Species	Common Name	EPBC Act Status	NC Act Status
Phascolarctos cinereus	Koala	Endangered	Vulnerable
Falco hypoleucos	Grey falcon	Vulnerable	Vulnerable
Geophaps scripta scripta	Southern squatter pigeon	Vulnerable	Vulnerable
Acanthophis antarcticus	Common death adder	NA	Vulnerable
Egernia rugosa	Yakka skink	Vulnerable	Vulnerable

Habitat quality assessments were not undertaken for *Hirundapus caudacutus* (white-throated needletail) or *Apus pacificus* (fork-tailed swift) as this species is almost entirely aerial in Australia. Additionally, habitat quality assessments were not undertaken for *Tachyglossus aculeatus* (short-beaked echidna) as this species use the majority of habitats within their range, in the study area they will use the entire area. Terrestrial habitat quality assessments were conducted concurrently at each site-based attribute assessment site.

Table 3: Summary of species habitat attributes and field indicators

Species habitat attribute	Field based indicators assessed	Justification of inclusion of field indicator
Grey falcon		
Quality and availability of food and habitat required for foraging	Habitat type	This species feeds almost exclusively on birds, especially flocking, ground feeding species. Prey species include doves, pigeons, small parrots and cockatoos, and finches. Occasionally this species will feed upon small mammals, reptiles and large insects. This species has been observed hunting within treeless areas and frequent tussock grassland and open woodland, especially in winter.
	Abundance of trees	Open woodlands or treeless areas allowing for this species to hunt ground-dwelling birds will be scored the highest. This species hunts by flying fast, level and low to the ground and taking prey by surprise. Areas which are heavily wooded prevent this technique from being highly effective, therefore they are scored lowest.
Quality and availability of habitat required for shelter and breeding	Old stick nests	This species lays its eggs in old nests of other birds, with a preference for nests of other raptors or corvids. The nests tend to be in the tallest trees along watercourses, with a preference for *Eucalyptus camaldulensis* (river red gum) and *Eucalyptus coolabah* (coolabah).
	Proximity to water	Areas with stick nests present along watercourses, especially with river red gums and coolabah trees, will be scored the highest. Areas without a watercourse or preferred nesting trees will be scored the lowest.
Quality and availability of habitat required for mobility	Connectivity and dispersal potential	This species is sensitive to habitat loss and fragmentation caused by land clearing or overgrazing by herbivores. Land clearing and overgrazing are preventing the regeneration of suitable nesting trees and may also reduce the abundance of prey species. Areas of remnant vegetation, particularly fringing riparian woodlands, will be scored the highest. Alternatively, areas of non-remnant vegetation will be scored the lowest.
Absence of threats	Scope and severity of all species-specific threats.	Scope of threat is assessed when considering the percentage of the population or habitat within the matter area that will be affected over the next 10 years or 3 generations. Common threats can include but are not restricted to clearing of mature growth, habitat fragmentation, predation by cats, climatic changes (increasing temperatures) and human interaction (e.g. vehicle collision, human disturbances, falconry). High scores will reflect higher percentage of population or habitat being destroyed while lower scores will be assigned where smaller proportion of habitat or population is slightly degraded or negligibly affected. Severity of threat assesses the level of damage to the population, or its habitat, due to the threat. Higher scores being those where almost 100% of the population or its habitat will be affected. Lowest scores will be given to areas where threats are unlikely to affect any individuals or habitat.
Squatter pigeon		
Quality and availability of food and habitat required for foraging	Food resources (groundcover)	Assesses the availability and quality of food for foraging in terms of the percentage of the ground cover comprised of seed-bearing grasses, herbs and shrubs relied upon for food. Preferred native foraging food resources for the species should

Species habitat attribute	Field based indicators assessed	Justification of inclusion of field indicator
		compromise approximately 33% ground cover. Ground cover with these characteristics this scored highest, whilst ground cover unlike this scored lower.
	Food quality (native derived)	Assesses the proportion of the available food resources comprising native species. High score will be assigned to food resources totally derived from native species and the absence of weeds, while lower scores will reflect habitats dominated by exotic species.
	Proximity to water and soil type	This species requires access to water to drink daily. Habitat patches (for foraging) which are greater than 3 km from a seasonal or permanent waterbody will automatically be assigned score of 0. Species prefers to forage in *Eucalyptus, Corymbia, Acacia* or *Callitris* woodlands on well-draining, gravelly, sandy or loamy soils (Land zone 3, 5 and 7). Remnant woodland habitats comprised of these canopy species will be assigned the highest score while regrowth or disturbed vegetation will score lower.
Quality and availability of habitat required for shelter and breeding	Proximity to water and soil type	This species requires access to water to drink daily. Habitat patches (for breeding) which are greater than 1 km from a permanent waterbody will automatically be assigned the lowest score. Species prefers to forage in *Eucalyptus, Corymbia, Acacia* or *Callitris* woodlands on well-draining, gravelly, sandy or loamy soils (Land zone 3, 5 and 7). Remnant woodland habitats comprised of these canopy species will be assigned a higher score while regrowth or disturbed vegetation will score lower.
Quality and availability of habitat required for mobility	Connectivity and dispersal potential	Assesses the ease of species to disperse within a forest or woodland to access foraging habitat, breeding habitat and water sources, including cleared areas. Dispersal habitat which includes cleared areas are ideally less than 100 m wide between suitable habitat patches. Patches which are isolated by physical barriers or extensive non remnant vegetation (>100 m) will be allocated the lowest score, while patches which adjoin large contiguous suitable habitat (Land zone 3, 5 and 7) or lack physical barriers will be given a high score. Habitat occurring on other land zones (4, 9, 10) are assigned moderate scores.
Absence of threats	Scope and severity of all species-specific threats.	Scope of threat is assessed when considering the percentage of the population or habitat within the matter area that will be affected over the next 10 years or 3 generations. Common threats can include but are not restricted to habitat loss and fragmentation, habitat degradation by overgrazing, invasive weeds, predation by feral cats and foxes, and inappropriate fire regimes. High scores will reflect a higher percentage of population or habitat being destroyed while lower scores will be assigned where a smaller proportion of habitat or population is slightly degraded or negligibly affected. Severity of threat assesses the level of damage to the population, or its habitat, due to the threat. Higher scores being those where almost 100% of the population or its habitat will be affected. Lowest scores will be given to areas where threats are unlikely to affect any individuals or habitat.
White-throated needletail		
Quality and availability of food and habitat required for foraging	NA	This species is only present in Australia during the non-breeding season, usually arriving between September and October before migrating to the northern hemisphere in March to April. The species feeds upon a variety of insects including beetles, cicadas, flying ants, bees, wasps, flies, termites, moths, locusts and grasshoppers.

Species habitat attribute	Field based indicators assessed	Justification of inclusion of field indicator
		In Australia, this species is predominantly aerial, up to 1,000 m above the ground. They occur over most types of habitat but are predominantly recorded above wooded areas, including open forest and rainforests. They have been recorded flying over farmland. This attribute is not relevant to this species as they are predominantly aerial.
Quality and availability of habitat required for shelter and breeding	Presence of hollows	This species does not breed within Australia. This species roosts in trees amongst dense foliage in the canopy or within hollows. Open forest and woodland habitats with the presence of hollows will be scored the highest, whilst cleared and grazing habitat will be scored the lowest.
Quality and availability of habitat required for mobility	NA	This species is predominantly aerial and therefore is not reliant on habitat for dispersal. Therefore, this attribute is not relevant to this species.
Absence of threats	Scope and severity of all species-specific threats.	Scope of threat is assessed when considering the percentage of the population or habitat within the matter area that will be affected over the next 10 years or 3 generations. Common threats can include but are not restricted to clearing of roosting habitat, wind turbines and overhead wires resulting in individual fatalities. High scores will reflect higher percentage of population or habitat being destroyed while lower scores will be assigned where smaller proportion of habitat or population is slightly degraded or negligibly affected. Severity of threat assesses the level of damage to the population, or its habitat, due to the threat. Higher scores being those where almost 100% of the population or its habitat will be affected. Lowest scores will be given to areas where threats are unlikely to affect any individuals or habitat.
Greater glider		
Quality and availability of food and habitat required for foraging	Food tree species richness Food tree abundance	The species is primarily a folivore, consuming eucalypt leaves and occasionally flowers. A higher richness in potential food species (*Eucalyptus* and *Corymbia* species) receives a higher score. Key species in inland Queensland include *E. moluccana, E. acmenoides E. tereticornis*. *E. fibrosa* and *C. citriodora*. Having a diet of primarily eucalypt leaves, areas with abundant, mature (remnant) eucalypt (75% canopy cover) provide higher quality food resources for the species and will receive the highest score. Compared to sparse canopies with an absence or low abundance of food trees which will be scored the lowest.
Quality and availability of habitat required for shelter and breeding	Availability of hollows with an entrance size of >8cm diameter per ha	The species is a hollow specialist that uses hollows during the day for breeding and shelter. The species prefers large, well-connected, old growth forests, however, within low productivity environments (such as in inland Queensland) the species may require between 4-20 ha across their home ranges. A minimum entrance size of 8cm is required, higher scores are awarded to areas with a higher hollow count, with a minimum of 4/ha and a minimum entrance size of 8cm.

Species habitat attribute	Field based indicators assessed	Justification of inclusion of field indicator
	Patch size	It is recognised that the species will not persist in isolated patches of less than 160 ha. As species is likely to use the same habitat for shelter and breeding, patches less than 160 ha will be assigned the lowest score, while larger patches will reflect higher scoring.
Quality and availability of habitat required for mobility	Connectivity	The species is sensitive to fragmentation and does not disperse easily across non-native vegetation. To maintain viable populations, they appear to require large areas of continuous habitat (at least 160 km^2 in Queensland). Larger patches that are well-connected to other suitable habitat receive the highest scores. Alternatively, areas which are fragmented will receive the lowest scores.
Absence of threats	Scope and severity of all species-specific threats.	Scope of threat is assessed when considering the percentage of the population or habitat within the matter area that will be affected over the next 10 years or 3 generations. Common threats can include but are not restricted to clearing of mature growth, habitat fragmentation and inappropriate fire regimes. High scores will reflect higher percentage of population or habitat being destroyed while lower scores will be assigned where smaller proportion of habitat or population is slightly degraded or negligibly affected. Severity of threat assesses the level of damage to the population, or its habitat, due to the threat. Higher scores being those where almost 100% of the population or its habitat will be affected. Lowest scores will be given to areas where threats are unlikely to affect any individuals or habitat.
Koala		
Quality and availability of food and habitat required for foraging	Food tree abundance	Assesses of the proportion (% canopy cover) of food trees within the canopy from genera *Angophora, Eucalyptus, Corymbia, Lophostemon* and *Melaleuca* in which the species is known to forage. This provides an assessment on the availability of food resources, with a higher score awarded to higher percentage cover (>75%).
	Canopy quality (crown cover %)	Assesses the quality and connectivity of the canopy that provides food and shelter for the species. Highly connect canopies and those unaffected by drought or clearing are awarded highest scores, whilst impacted canopies by clearing and drought (dieback) are assigned lower scores.
	Patch size (ha)	Evidence suggests that a breeding population of koalas will not persist in patches smaller than 50 ha. Patches below 50 ha were assigned a low score, whilst large contiguous patches >500 ha were assigned the highest score.
	Dry season refugia	Koala use vegetation with reliable leaf moisture during times of drought and severe heat. Environments with reliable leaf moisture (e.g. riparian zones) were assigned higher scores.
Quality and availability of habitat required for shelter and breeding	Food tree abundance Canopy quality (crown cover %) Patch size (ha) Dry season refugia	Species shelter, breeding and food requirements are not fundamentally different. Therefore, the same field-based indicators for *Quality and availability of food and habitat required for foraging* were also used to score and assess *Quality and availability of habitat required for shelter and breeding*

Species habitat attribute	Field based indicators assessed	Justification of inclusion of field indicator
Quality and availability of habitat required for mobility	Patch size isolation (connectivity)	Patch size isolation assesses the degree of connectivity between patches. Koalas are reluctant to transverse cleared areas greater than 200m. Patches that are separated by >200m are assigned the lowest score. Patches that are closer together are awarded higher scores.
Absence of threats	Scope and severity of all species-specific threats.	Scope of threat is assessed when considering the percentage of the population or habitat within the matter area that will be affected over the next 10 years or 3 generations. Common threats can include but are not restricted to habitat clearing, habitat fragmentation, inappropriate fire regimes, drought, extreme temperatures, predation by dogs and vehicle strike. High scores reflect higher percentage of population or habitat being destroyed while lower scores to be assigned where a smaller portion of habitat or population is slightly degraded or negligibly affected. Severity of threat assesses the level of damage to the population, or its habitat, due to the threat. Higher scores being those where almost 100% of the population or its habitat will be affected. Lowest scores will be given to areas where threats are unlikely to affect any individuals or habitat.
Common death adder		
Quality and availability of food and habitat required for foraging	Leaf litter	This species inhabits a wide variety of well drained habitats including wet and dry forests/woodlands, rainforests, grasslands, shrublands and coastal heaths. This species spends most of its time concealed under leaf litter. The common death adder is an ambush predator, wiggling its tail whip like a worm to lure prey. This species has a wide variety of prey, including insects, frogs, lizards, birds and small mammals. Habitat for this species will be scored the highest for habitats with well drained soils and an abundance of leaf litter.
Quality and availability of habitat required for shelter and breeding	Leaf litter Overhanging foliage	This species burrows into sand or leaf litter or hides under overhanging foliage. Highest scores will be given to forests/woodlands, rainforests, grasslands, shrublands and coastal heaths with a high abundance of leaf litter. Moderate scores will be given for areas with overhanging foliage and the lowest score will be given to habitat with sparse leaf litter or overhanging foliage.
Quality and availability of habitat required for mobility	Connectivity Leaf litter	The species is sensitive to fragmentation and does not disperse easily across areas with little to no leaf litter and/or overhanging foliage. Larger patches with leaf litter that are well-connected to other suitable habitat receive the highest scores.
Absence of threats	Scope and severity of all species-specific threats.	Scope of threat is assessed when considering the percentage of the population or habitat within the matter area that will be affected over the next 10 years or 3 generations. Common threats can include but are not restricted to habitat loss, vehicle strikes, trampling by livestock, predation by feral cats and the introduced cane toads. High scores reflect higher percentage of population or habitat being destroyed while lower scores to be assigned where a smaller portion of habitat or population is slightly degraded or negligibly affected.

Species habitat attribute	Field based indicators assessed	Justification of inclusion of field indicator
		Severity of threat assesses the level of damage to the population, or its habitat, due to the threat. Higher scores being those where almost 100% of the population or its habitat will be affected. Lowest scores will be given to areas where threats are unlikely to affect any individuals or habitat.
Yakka skink		
Quality and availability of food and habitat required for foraging	Microhabitat features	The yakka skink occurs in a wide variety of vegetation types including *Eucalyptus populnea, Acacia harpophylla,* ironbark, *Callitris columellaris* (white cypress pine), *Acacia aneura* (mulga), *Acacia catenulata* (bendee) and *Acacia shirleyi* (lancewood) woodlands and open forests. Often these habitats are occurring on rock, sand, clay and loamy red substrates. Marginal habitat includes clearings where shelter sites (i.e. tunnel erosion, rabbit warrens and log piles) are available. The yakka skink is omnivorous, consuming a mixture of soft plant tissues and fruit, and invertebrates such as beetles, grasshoppers and spiders. Attribute scoring will be highest for habitat with microhabitat features such as rocks, hollow logs, ground vegetation and/or burrow systems for the skink to shelter in. Areas with marginal habitat will get moderate scores, and areas with little to no microhabitat features will get the lowest scores.
Quality and availability of habitat required for shelter and breeding	Microhabitat features	This species is extremely secretive and often hides beneath rocks, in hollow logs or ground vegetation, or in burrow systems. Attribute scoring will be highest for habitat with microhabitat features such as rocks, hollow logs, ground vegetation and/or burrow systems for the skink to shelter in.
Quality and availability of habitat required for mobility	Microhabitat features	Microhabitat features (rocks, hollow logs, ground vegetation and/or burrows) providing shelter for this species is important, therefore areas with no microhabitat features will score low, while habitat with more will score higher.
Absence of threats	Scope and severity of all species-specific threats.	Scope of threat is assessed when considering the percentage of the population or habitat within the matter area that will be affected over the next 10 years or 3 generations. Common threats can include but are not restricted to habitat loss, inappropriate roadside management, removal of wood debris and rocks, ripping of rabbit warrens and predation by foxes and cats. High scores reflect higher percentage of population or habitat being destroyed while lower scores to be assigned where a smaller portion of habitat or population is slightly degraded or negligibly affected. Severity of threat assesses the level of damage to the population, or its habitat, due to the threat. Higher scores being those where almost 100% of the population or its habitat will be affected. Lowest scores will be given to areas where threats are unlikely to affect any individuals or habitat.

2.3. Data analysis

Spatial data collected during the field survey were imported into ArcGIS Pro. The ground-truthed vegetation and habitat mapping was used to assess landscape-scale attributes using the BioCondition Manual (Eyre *et al.,* 2015) to provide the site-based condition score and the Habitat Quality Assessment Guide (DES, 2020) to provide a quantitative assessment of the landscape values of the study area. Site-based attribute data was also analysed in accordance with the above-mentioned guide. Together these scores provided overall habitat quality data for each species.

2.3.1. Regional ecosystem mapping

A combination of quaternary and tertiary assessments was used to produce the ground-truthed RE mapping. The fine scale nature (1:100,000) of the available imagery (Maxar, 2021) and supporting site survey data allowed for the identification of REs across the landscape based on landscape position, visual signature (texture, pattern and colour) and structure.

Spatial accuracy and attribute accuracy was assigned either a high, moderate or low confidence rating in accordance Neldner *et. al.,* 2020 (**Table 4**).

Table 4: RE spatial and attribute accuracy confidence ratings

Attribute	Confidence rating
Spatial accuracy of boundaries	A = high confidence in accuracy of polygon boundary B = moderate confidence in accuracy of polygon boundary C = low confidence in accuracy of polygon boundary
Attribute accuracy	A = high confidence in accuracy of polygon attribute B = moderate confidence in accuracy of polygon attribute C = low confidence in accuracy of polygon attribute

2.3.2. Acoustic data analysis

A full description of the acoustic data analysis method is contained in **Appendix D**.

2.3.3. BioCondition scoring

BioCondition assessments have two components as discussed in the following sections:

- landscape-scale attributes – describes the surrounding landscape of the subject area, and the influence this has on the vegetation quality; and
- site-based attributes – provide an indication of the general vegetation condition of an area.

2.3.3.1. Landscape-scale attributes

For fragmented systems such as the Brigalow Belt Bioregion, in which the Project is located, the landscape surrounding the study area and its influence on the site's vegetation quality is measured via assessment of the following four attributes:

- size of patch;
- context;
- connectivity; and

- ecological corridors.

The landscape-scale attribute score is calculated by adding the scores obtained for each landscape-scale attribute then dividing it by the maximum possible score for the landscape types (i.e. fragment landscape = 20).

2.3.3.2. Site-based attributes

Site-based attribute data collected during the field survey was scored relative to the Queensland Herbarium Benchmarks (Brigalow Belt BioCondition Benchmarks, 2021; 2019).

The site-based score for each site is calculated by adding the scores obtained for each site-based attribute and then dividing by the maximum possible score for the ecosystem type (i.e. woodland = maximum score of 80, grassland = maximum score of 50).

2.3.3.3. BioCondition score

The BioCondition score for each assessment site was calculated by adding the scores for each site-based attribute and landscape level attribute and dividing by the maximum possible score for the RE (e.g. 100 for wooded REs, 65 for shrubland REs and 50 for grassland REs), in accordance with the BioCondition manual (Eyre *et al.,* 2015).

The average BioCondition score for each AU are categorised into classes which reflect the condition and functionality of an AU, as outlined in **Table 5**.

Table 5: BioCondition classes

BioCondition class	Average BioCondition score	Functionality and condition
1	>0.80	High functioning and best condition – remnant or undisturbed communities
2	>0.60 – 0.80	Less functional and in good condition – remnant or high-value regrowth condition but with slight disturbance and altering characteristics of community has occurred
3	0.40 – 0.59	Functioning but poor condition – regrowth vegetation with signs of disturbance and alteration to community
4	<0.40	Dysfunctional and poor condition – non-remnant communities with large amounts of alteration which has occurred.

2.3.4. Habitat quality data analysis

Habitat quality assessments have three components as discussed in the following sections:

- landscape-scale attributes – describes the surrounding landscape of the subject area, and the influence this has on the vegetation quality;
- site-based attributes – provide an indication of the general vegetation condition of an area; and
- species habitat attributes – determine the ability of an area to support a particular fauna species based on that species' specific habitat requirements.

2.3.4.1. Landscape-scale attributes

The assessment of landscape-scale attributes (**section 2.3.3.1**) was undertaken as per the Habitat Quality Assessment Guide (DES, 2020). The method differs from the BioCondition Manual (Eyre *et al.,* 2015) only in presentation of the numerical score (instead of a percentage out of 20 %).

2.3.4.2. Site-based attributes

Please refer to **section 2.3.3.2**.

2.3.4.3. Species habitat attributes

Species habitat attributes were assessed and scored for the entire matter area based upon data collected in the field at each assessment site. The species habitat attributes, and their respective weightings are presented in **Table 6**. These attributes and weightings are derived from the Habitat Quality Assessment Guide (DES, 2020). In the case where multiple indicators were used to determine species habitat attribute scores, indicators were averaged and then multiplied by 5 to achieve a score out of 25 for each attribute.

Table 6: Species habitat attributes and their weightings

Species habitat attribute	Weighting (%)
Quality and availability of food and habitat required for foraging	25
Quality and availability of habitat required for shelter and breeding	25
Quality and availability of habitat required for mobility	25
Absence of threats	25

2.3.4.4. Habitat quality scoring

Habitat quality scoring was undertaken in accordance with the method described in the Habitat Quality Assessment Guide to generate a BioCondition score and a species habitat score for MNES and MSES present within the study area. The habitat quality score represents the quality of habitat and condition of vegetation as shown in **Table 7**. The habitat quality score is calculated according to the Habitat Quality Assessment Guide and based upon a weighted average of AU for the matter area.

Table 7: Summary of habitat quality scores

Score	Definition
10	Fully intact system with highest quality habitat and/or best quality remnant vegetation
7-9	High value habitat and/or good quality remnant vegetation
4-6	Medium value habitat and/or good quality regrowth
2-3	Low value habitat and/or poor quality regrowth
0-1	Totally cleared and highly disturbed landscapes

2.4. Survey limitations

The study area received a total of 26.6 mm of rain during the November survey with 144.2 mm during the fortnight preceding that survey. Access roads within the study area became too wet to traverse and most of the study area was inaccessible by 25th November 2021. The site was revisited in March to complete the survey of the area that was previously inaccessible.

During both surveys, conditions were ideal for identifying flora species as seed heads remained on most grasses and other ground layer species being readily identifiable.

3. Results

3.1. Desktop assessment

The desktop assessment identified a total of seven TEC, 21 threatened flora species, and 36 threatened fauna species (21 birds, seven mammals and eight reptiles) listed under the *Nature Conservation Act 1992* (NC Act) and/or the EPBC Act (**Appendix B**). Of these, only one TEC, seven flora species and eight fauna species were identified as likely or potential to occur within the study area based on habitat requirements, distributions and known records within the study area (**Table 8**).

Table 8: Summary of threatened ecological communities and species

Scientific name	Common name	NC Act listing	EPBC Act listing	Likelihood of occurrence
TEC				
Natural Grasslands TEC		-	Endangered	Confirmed
Flora				
Aristida annua	-	Vulnerable	Vulnerable	Potential
Cyperus clarus	-	Vulnerable		Likely
Dichanthium setosum	Bluegrass	-	Vulnerable	Potential
Dichanthium queenslandicum	King bluegrass	Vulnerable	Endangered	Known
Digitaria porrecta	Finger panic-grass	Near threatened	-	Likely
Marsdenia brevifolia	-	Vulnerable	Vulnerable	Likely
Trioncinia retroflexa	-	Endangered	-	Likely
Fauna				
Phascolarctos cinereus	Koala	Vulnerable	Endangered	Potential
Tachyglossus aculeatus	Short-beaked echidna	SL	-	Likely
Apus pacificus	Fork-tailed swift	SL	Migratory	Likely
Falco hypoleucos	Grey falcon	Vulnerable	Vulnerable	Potential
Geophaps scripta scripta	Squatter pigeon	Vulnerable	Vulnerable	Likely
Hirundapus caudacutus	White-throated needletail	Vulnerable	Vulnerable	Potential
Acanthophis antarcticus	Common death adder	Vulnerable	-	Potential
Egernia rugosa	Yakka skink	Vulnerable	Vulnerable	Potential

The study area is currently mapped by the Department of Environment and Science (DES) (RE version 12) as remnant vegetation of homogeneous polygons dominated by No Concern at Present (Biodiversity status) and, to a lesser extent, Of Concern (Biodiversity status) REs with some non-remnant areas.

Field surveys undertaken during the 2015 RCEP EIS mapped the study area as predominantly remnant vegetation of No Concern at Present (Biodiversity status) and to a lesser extent, Of Concern (Biodiversity status) REs, however, large areas were mapped as mixed RE polygons, including REs of mixed Biodiversity status (No Concern at Present and Of Concern REs) (**Table 9**). Small non-remnant areas, which have been historically cleared for road use, were also mapped (**Figure 4**).

3.2. Survey conditions

The weather conditions leading up to and during the surveys, as recorded at Rolleston Airport (station 035129) located approximately 22 km south-east of the study area, are presented in **Figure 2** (BOM, 2022). Conditions were warm (26.4 to 33.6 °C) and wet, with high rainfall preceding and during the November survey. A total of 26.6 mm of rainfall was received during the November field survey. No rainfall was received during the March survey, however the conditions were optimal for flora surveys due to the rainfall preceding the survey.

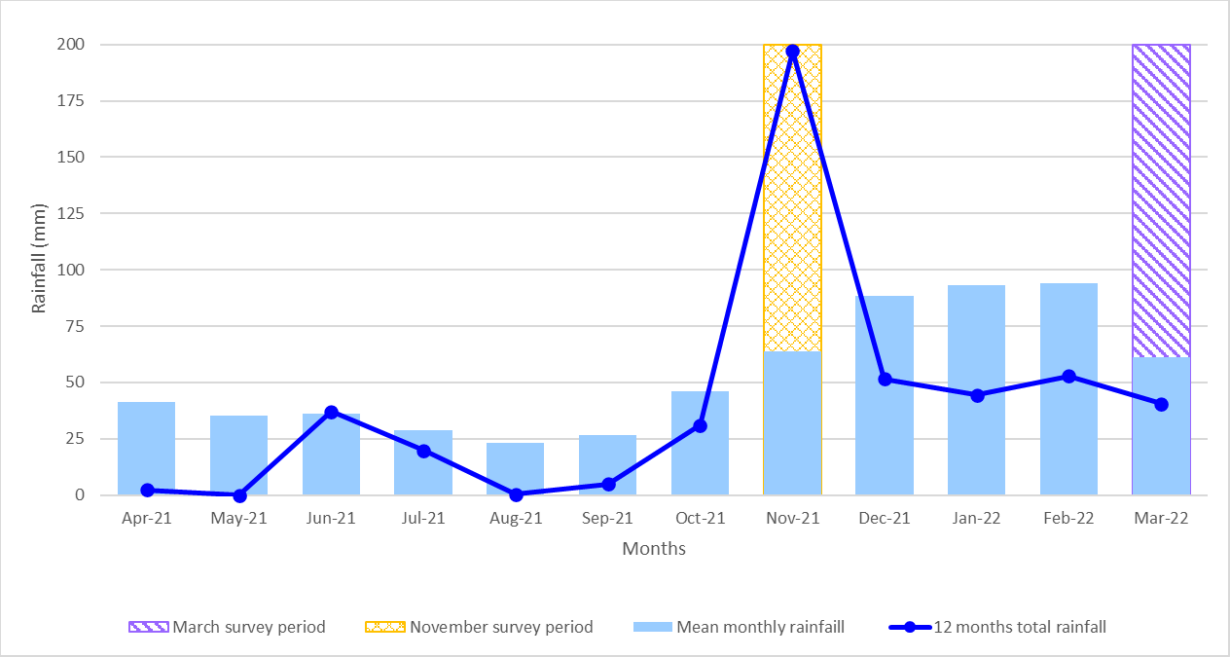

Figure 2: Survey conditions preceding and during the surveys

3.3. Regional ecosystems

Ground-truthing of vegetation communities within the study area (**Figure 3**) revealed inaccuracies in the DES and RCEP mapping in regard to composition (RE type) and spatial extent of RE boundaries (**Table 9**). Additionally, an Endangered RE (Biodiversity status), RE 11.4.7 was ground-truthed occurring in the south-east of the study area. This RE was confirmed by the Queensland Herbarium. The ground-truthing resulted in the majority of the study area (92.7 %) mapped as remnant vegetation and approximately 46.3 ha (7.3 %) was mapped as non-remnant or cleared vegetation associated with current mine infrastructure and roads.

Ground-truthing resolved mixed polygons identified in the 2015 RCEP EIS. Additionally, some REs previously mapped were no longer accurate due to changes to RE definitions and were remapped to align with the current REs (i.e. RE 11.8.11a has changed to RE 11.3.25d) (**Table 9**). Ground-truthed REs within the study area are described in **Table 10** and presented in **Figure 5.**

BioCondition scores ranged from 0.57 to 0.77, equating to class 2 and 3 (**Table 10**). The lowest score (0.57), class 3, was calculated for RE 11.8.4 which experienced higher levels of grazing pressures and infestation of exotic flora species.

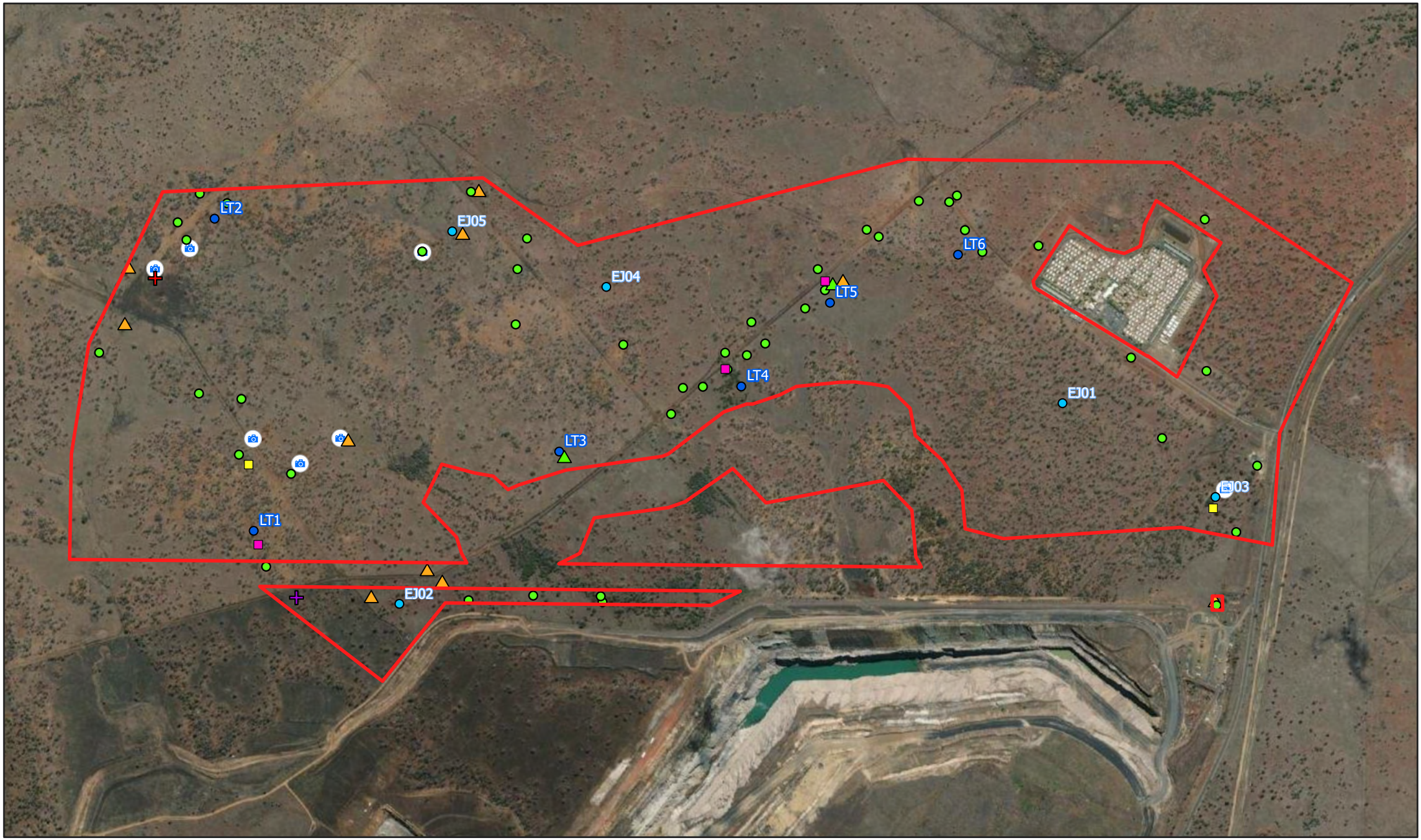

Figure 3: Flora survey sites

Study area

November 2021
- Quaternary assessment
- Tertiary assessment
- BioCondition

Grasslands TEC assessment
Exotic flora species point
Photo point

March 2022
- Tertiary assessments
- BioCondition
- Natural Grasslands TEC
- Exotic flora species point

Photo point

N

0 0.35 0.7
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 20536-TJ Date: 2/28/2023

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Table 9: Amendments to regional ecosystems identified in the RCEP

RE	VM Act status	BD status	RCEP area (ha) (Xstrata, 2015)	Updated area (ha) (ELA, 2021)	Justification
11.3.25d	LC	OC	NA	5.7	Presence of *Melaleuca bracteata* fringing riverine habitat is a characteristic of 11.3.25d. All RE 11.8.11a (not longer in REDD 12.1) were changed to 11.3.25d when *Melaleuca bracteata* was present.
11.4.7	E	E	NA	7.0	This area was previously mapped as RE 11.8.5, however it was remapped as RE 11.4.7 due to an understory of brigalow and discontinuous emergent canopy of poplar box. These two species are not characteristic of RE 11.8.5. Additionally, occurs on flat to gently undulating plains with clay or fine sandy soils (land zone 4) not basaltic soil which is land zone 8.
11.5.3	LC	No concern at present	2.6	0.0	Landline (2017) data describes patches as *Eucalyptus populnea* (poplar box) with scattered presence of *Acacia harpophylla* (brigalow). Brigalow does not occur within 11.5.3, nor is land zone 5 present in the surrounding region. These patches have been changed to land zone 9.
11.8.4	LC	NC	67.3	139.8	Presence of *Eucalyptus melanophloia* (silver-leaved ironbark) on land zone 8.
11.8.5	LC	NC	299.6	272.2	-
11.8.5/11.8.11	LC/OC	NC/OC	47.9	0.0	Resolved mixed polygons to either 11.8.5 or 11.8.11.
11.8.5a	LC	NC	15.4	0.0	Was remapped as 11.8.4 due to the lack of a dense shrubby understorey which is characteristic of this RE and presence of fine-grained sedimentary rocks.
11.8.11	OC	OC	116.9	124.1	-
11.8.11/11.8.5	OC/LC	OC/NC	8.1	0.0	Resolved mixed polygons to either 11.8.5 or 11.8.11.
11.8.11a	OC	OC	6.1	0.0	This RE was remapped as 11.3.25d as this RE code (11.8.11a) is no longer a valid RE in RE version 12.1. This area had a canopy layer which is not present in RE 11.8.11 which is a grassland.
11.9.2	LC	NC	67.3	0.0	Was remapped as 11.8.4 due to the dominated to monoculture of silver-leaved ironbark as the canopy cover. This area was also on land zone 8.
Non-remnant	NA	NA	29.4	43.3	
		Total:	579.7	592.2	

Table 10: Ground-truthed regional ecosystems within the study area

RE	Condition [1]	REDD short description	Field description	Representative photograph	VM Act status [2]	BD status [2]	BioCondition score	Area (ha)
11.3.25d	Remnant	*Melaleuca bracteata* woodland to open forest. Occurs on fringing alluvial soils or near-channel levees on heavy wet clays. Riverine wetland or fringing riverine wetland.	This RE occurred along ephemeral creeks. The dominant tree species was *Melaleuca bracteata* (black tea-tree). The dominant groundcover species included: feathertop wire-grass, blue trumpet, *Calotis cuneata* (blue burr daisy), *Dichanthium sericeum* subsp. *humilius* (annual bluegrass), *Dichanthium sericeum* subsp. *sericeum* (Queensland bluegrass), *Digitaria brownii* (cotton panic grass), *Hypoxis arillacea, Panicum queenslandicum* (yabila grass) and *Pimelea haematostachya*. Exotic species which are present within this RE included: **Bidens pilosa* (cobblers peg), **Megathyrsus maximus* (guinea grass) and **Parthenium hysterophorus* (parthenium).		LC	OC	0.70	5.7
11.4.7	Remnant	*Eucalyptus populnea* with *Acacia harpophylla* and/or *Casuarina cristata* open forest to woodland on Cainozoic clay plains	This RE occurred on level to gently undulating plains with a sedimentary substrate (clay to fine sandy soils). A sparse canopy cover consisted of poplar box. Brigalow formed a subcanopy layer and was the dominant tree species within the RE. Brigalow was also present as a shrub species. The groundcover was sparse and predominantly consisted of grasses including *Aristida latifolia* (feathertop wire-grass), and the exotic species **Cenchrus ciliaris* (buffel grass) and **Melinis repens* (red natal).		OC	E	0.68	7.0

RE	Condition [1]	REDD short description	Field description	Representative photograph	VM Act status [2]	BD status [2]	BioCondition score	Area (ha)
11.8.4	Remnant	*Eucalyptus melanophloia* woodland to open woodland on Cainozoic igneous rocks.	This RE occurred on sedimentary soils on undulating plains. The canopy cover was sparse (10-30 %), the dominant species was silver-leaved ironbark. Red bloodwood formed a subcanopy. A sparse groundcover consisted predominantly of native grasses including feathertop wire-grass.		LC	NC	0.57	139.8
11.8.5	Remnant	*Eucalyptus orgadophila* open woodland on Cainozoic igneous rocks.	This RE occurred on basalt plains with the dominant tree species being silver-leaved ironbark and/or *Eucalyptus orgadophila* (mountain coolabah). The understorey was sparsely present within this RE. *Corymbia erythrophloia* (Red bloodwood) was present as low trees. The groundcover consisted of predominantly native grasses and some forb species including: feathertop wire-grass, *Aristida leptopoda* (white spear grass), *Bothriochloa decipiens* (pitted bluegrass), *Brunoniella australis* (blue trumpet), *Glycine tabacina* (glycine*), Phyllanthus virgatus* (creeping phyllanthus) and *Rhynchosia minima* (rycho).		LC	NC	0.77	272.2

RE	Condition [1]	REDD short description	Field description	Representative photograph	VM Act status [2]	BD status [2]	BioCondition score	Area (ha)
			The only exotic species present within this RE included: *red natal.					
11.8.11	Remnant	*Dichanthium sericeum* grassland on Cainozoic igneous rocks.	This RE occurred on basalt plains with sparse to no canopy cover. Scattered tree species included mountain coolabah and red bloodwood. The groundcover was dominated by native grasses. The dominant species included *Heteropogon contortus* (black speargrass), feathertop wire-grass, white speargrass, *Bothriochloa erianthoides* (satintop grass), Queensland bluegrass, *Digitaria divaricatissima* (spreading umbrella grass), *Eriochloa crebra* (spring grass), ryncho, *Panicum decompositum* (Australian millet) *and P. effusum* (hairy panic). Exotic species present within this RE included *red natal, *guinea grass, and **Malvastrum americanum* (spiked mallow).		OC	OC	0.77	124.1
Non-remnant			Non-remnant areas consisted of mining infrastructure such as roads, communication towers, tower pads and soil stockpiles.				NA	43.3
						Total:		**592.2**

[1] Remnant vegetation is defined in the VM Act. Remnant vegetation is vegetation that is an endangered, of concern or least concern RE and includes vegetation that has at least 50 per cent of the undisturbed predominant canopy cover and at least 70 per cent of the undisturbed canopy height, as well as species characteristic of the undisturbed canopy.

[2] E – endangered, OC – of concern, LC – least concern, NC – no concern at present

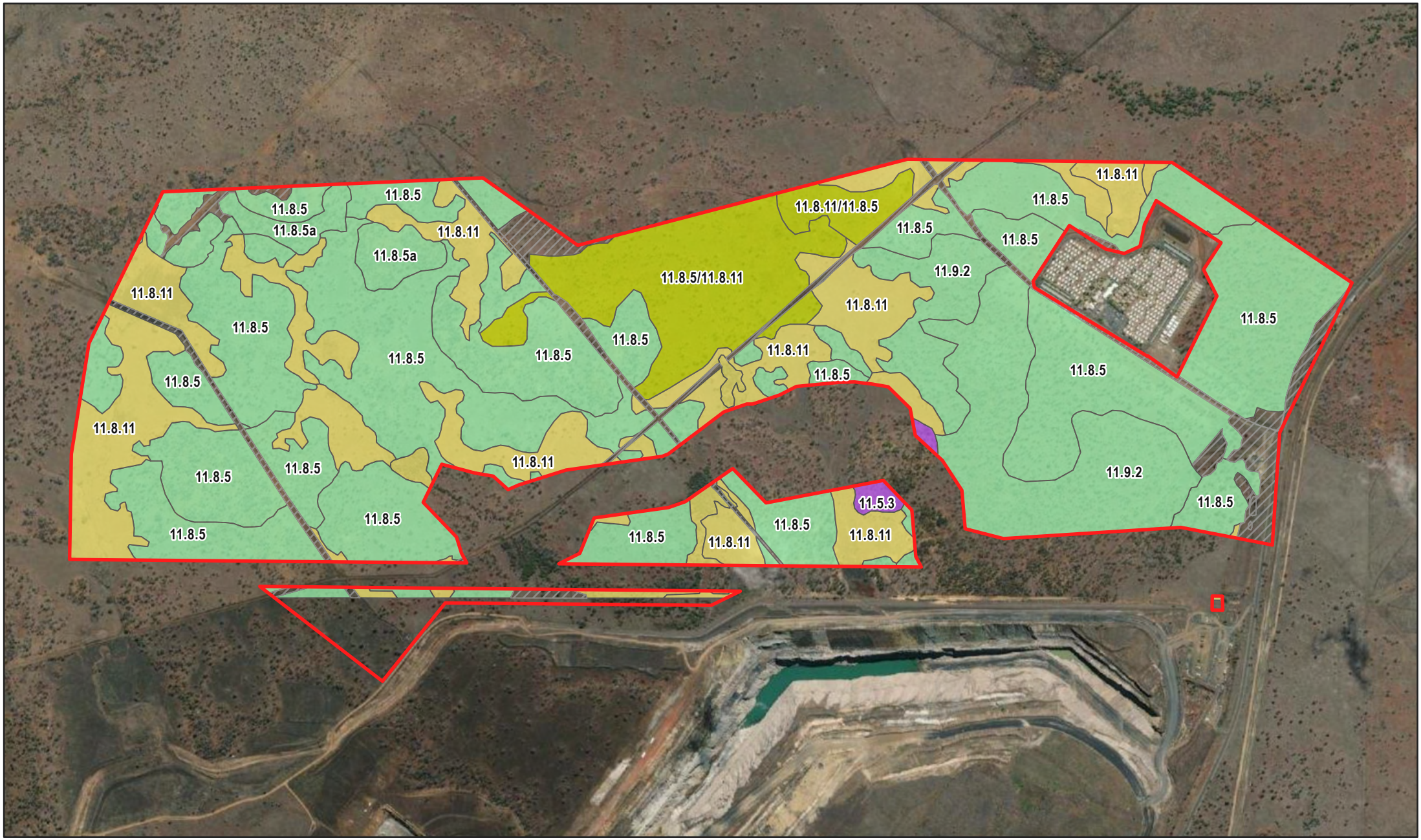

Figure 4: RCEP EIS regional ecosystem mapping (Xstrata, 2013)

Study area

Remnant biodiversity status

- Non-Remnant
- Endangered

- No concern at present
- Of concern / no concern at present
- Of concern

N

0 0.35 0.7

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 20536-TJ Date: 2/28/2023

Data source: The data displayed in this figure was provided to ELA by the client which was formed during the development of the RCEP EIS (Xstrata, 2013).

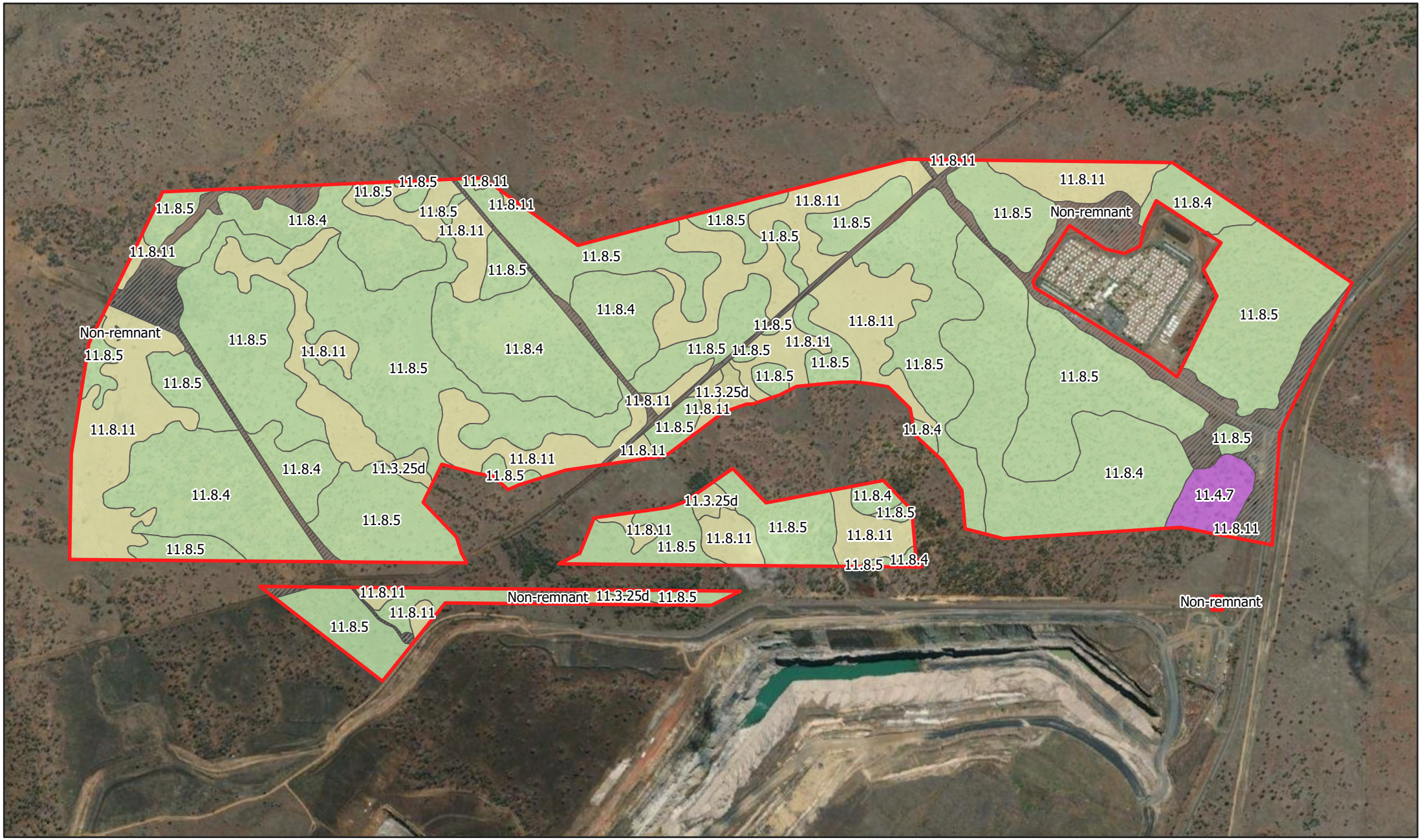

Figure 5: Ground-truthed regional ecosystems

Study area

Regional ecosystems

Endangered

Of Concern

No Concern at present

Non-remnant

N

0 0.35 0.7

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

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3.4. Habitat types

A total of four habitat types (excluding the non-remnant areas) were identified within the study area, these include:

- black tea-tree closed woodland fringing drainage lines;
- eucalypt woodland on tertiary to early-quaternary clay deposits;
- natural grasslands; and
- open woodland to open forest on igneous or sedimentary substrate.

These habitats provide a range of resources for foraging and dispersal habitat for a variety of native fauna species. A summary of the habitat types including values and associated REs are described in **Table 11** and displayed in **Figure 6.**

Table 11: Habitat types within the study area

Habitat type	Associated REs	Field description and associated values	Area (ha)
Black tea-tree closed woodland fringing drainage lines	11.3.25d	This habitat type is found fringing minor waterways and is characterised by a black tea-tree dominated low closed woodland. Vegetation in this habitat type was in remnant condition. Koala may use this habitat type for shelter habitat given its proximity to eucalyptus, however, it would be marginal habitat due to the fragmented nature and lack of *Eucalyptus* spp. Squatter pigeons may use this habitat for breeding, foraging and dispersal given the presence of seasonal waterbodies and native perennial grasses present. This habitat may provide perching habitat for the white-throated needletail and fork-tailed swift which may fly over the study area. This habitat is also potential habitat for grey falcon perching and hunting as this species preys upon small ground-dwelling birds, small mammals and reptiles which are likely to use this area as well.	5.7
Eucalypt woodland on clay deposits	11.4.7	This RE occurred on level to gently undulating plains with a sedimentary substrate (clay to fine sandy soils). This habitat type is characterised by poplar box dominating the canopy cover with a denser subcanopy consisting of brigalow. Vegetation in this habitat type was in remnant condition. Koala may utilise this habitat for foraging and dispersal due to the presence of poplar box, a known food tree. Squatter pigeons are likely to use this area for foraging and dispersal habitat with native perennial grasses present. However, due to the presence of buffel grass (a listed threatened species under the Conservation advice), it is unlikely to be best quality. The white-throated needletail and fork-tailed swift may fly over this habitat as temporary visitors whilst in Australia. This habitat may provide potential habitat for grey falcon perching and hunting due to the presence of prey species such as small ground-dwelling birds, small mammals and reptiles. This habitat type may contain the following flora species which all occur on basalt soils: *Marsdenia brevifolia*, king bluegrass, *Cyperus clarus*.	7.0
Open woodland to open forest	11.8.4	This habitat is characterised by *Eucalyptus* spp. (silver-leaved ironbark and mountain coolabah) dominated open woodlands to open forests	412.1

Habitat type	Associated REs	Field description and associated values	Area (ha)
on igneous or sedimentary substrate	11.8.5	occurring on igneous or sedimentary soils. Vegetation within this habitat type was in remnant condition. This habitat type has a sparse canopy cover and low abundance of tree hollows, all of which were small (<20 cm). This habitat type may provide foraging habitat for koala, with the presence of two food tree species (mountain coolabah and silver-leaved ironbark). Squatter pigeons are likely to use this area for foraging and dispersal habitat due to its the native perennial grass cover and open ground layer. This habitat type may provide potential dispersal habitat for yakka skink and common death adder in areas with thick groundcover and leaf litter. White-throated needletails and fork-tailed swifts will likely use this habitat as fly-over habitat. Grey falcons may use this habitat for hunting as the sparse canopy trees allows it to ambush prey from above. This habitat type may contain the following flora species which all occur on basalt soils: *Marsdenia brevifolia,* king bluegrass, *Cyperus clarus.*	
Natural grassland	11.8.11	This habitat type occurred on basalt plains and hills and is characterised by a perennial grass dominated groundcover with sparse to no trees. The dominant perennial grass species were *Panicum decompositum* (native millet) and/or feathertop wire-grass. The grassland habitat occurs in association with moderate to deep cracking soils. Vegetation within this habitat type was in remnant condition. The white-throated needletail and fork-tailed swift may fly over this habitat as temporary visitors whilst in Australia during non-breeding season but are unlikely to use it for perching, roosting or foraging given the treeless natural. This habitat type may provide grey falcons with hunting habitat where they can prey upon ground dwelling birds, small mammals and reptiles. This habitat type may contain the following flora species which all occur in basalt grasslands: *Trioncinia retroflexa,* finger panic grass, king bluegrass, bluegrass, *Cyperus clarus* and *Aristida annua.*	124.1

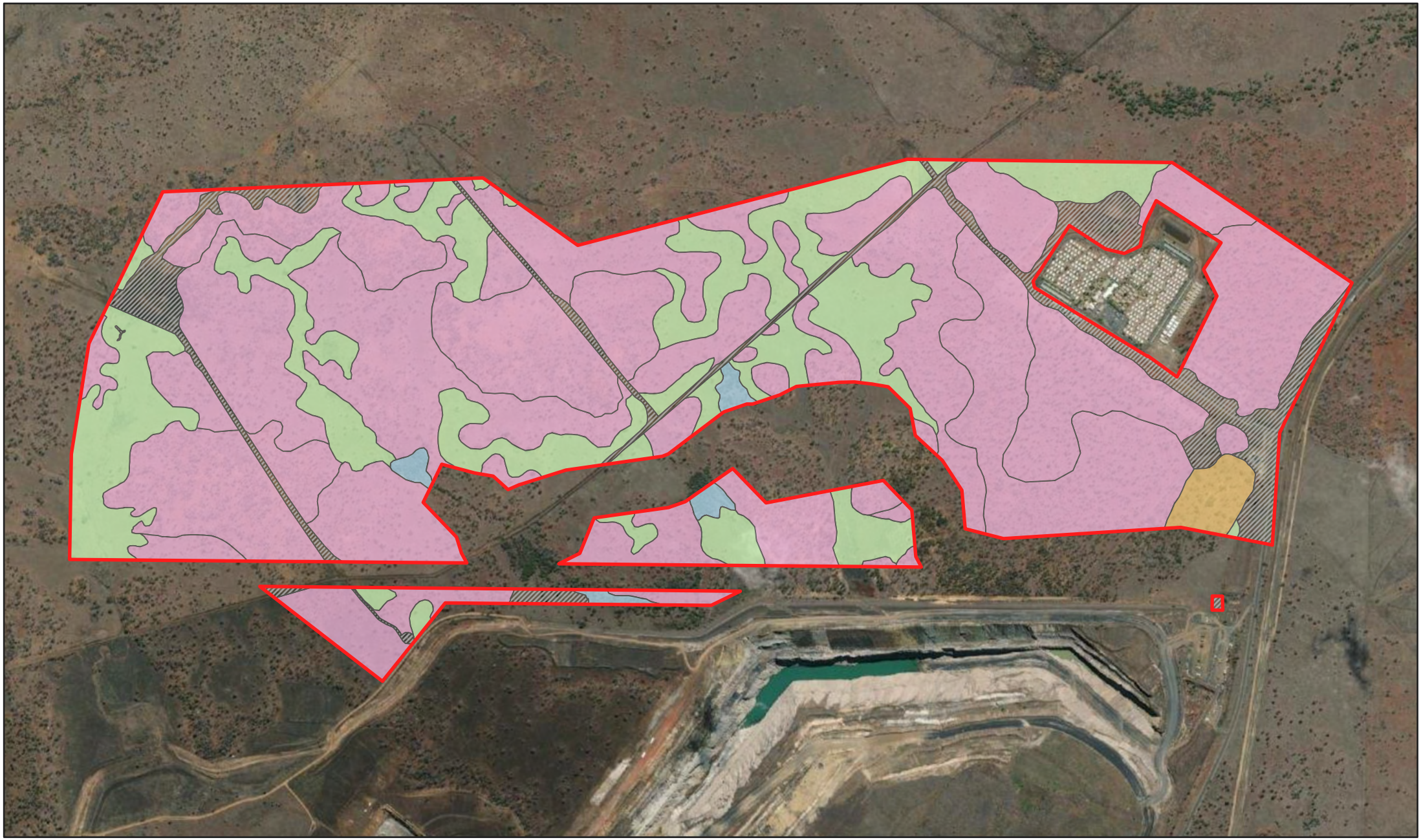

Figure 6: Habitat types

3.5. General flora and fauna observations

An array of flora and fauna species were observed throughout the field survey which are common throughout the region (**Figure 3** and **Figure 7**) (**Appendix C**).

Fauna observations were largely confined to observations of diurnal birds, with 31 species recorded, however, two macropods (*Macropus giganteus* [eastern grey kangaroo] and *Macropus parryi* [whiptail wallaby]), two amphibian (*Litoria caerulea* [green tree frog], *Litoria rubella* [desert tree frog]) and one reptile (*Pogona barbata* [bearded dragon]) were also recorded. No threatened flora or fauna species were recorded.

A total of 99 flora species were observed throughout the study area. The dominant tree species consisted of *Eucalyptus* spp., either mountain coolabah or silver-leaved iron bark and to a lesser extent, poplar box within the woodlands and black tea-tree in closed woodlands fringing drainage line. Shrubs were scarcely recorded throughout the study area. The majority of groundcover species were native grasses, including white spear grass, *Aristida* spp., feathertop wire-grass, black speargrass, *Thellungia advena* (Coolabah grass) and *Themeda triandra* (kangaroo grass). Eight exotic species were recorded (**Appendix C**). Multiple groundcover species were common across the study area including *Achyranthes aspera* (chaff flower).

3.6. Exotic flora

A total of 11 exotic flora species were recorded across the study area. Two species (*Opuntia stricta* [common prickly pear] and *Parthenium hysterophorus* [parthenium]) are listed as Category 3 restricted matter under the *Biosecurity Act 2014* and are WoNS (**Table 12; Appendix C**).

Additionally, non-native pasture grasses such as buffel grass and red natal grass were identified within the study area. These species are not listed under the *Biosecurity Act 2014* or as a WoNS. However, non-native grasses can present a threat to many ecological communities (such as natural grasslands) and flora and fauna species, such as the squatter pigeon.

Table 12: Category 3 Restricted Matter and Weeds of National Significance

Scientific name	Common name	Biosecurity Act category	WoNS	Occurrence within the study area
Opuntia stricta	common prickly pear	3	Yes	Common prickly pear is scattered across the study area, often in the vicinity of disturbance such as roads. The majority of the records were in the eastern section of the study area.
Parthenium hysterophorus	parthenium	3	Yes	Parthenium was recorded at four locations scattered across the study area, often in association with heavier textured soils.

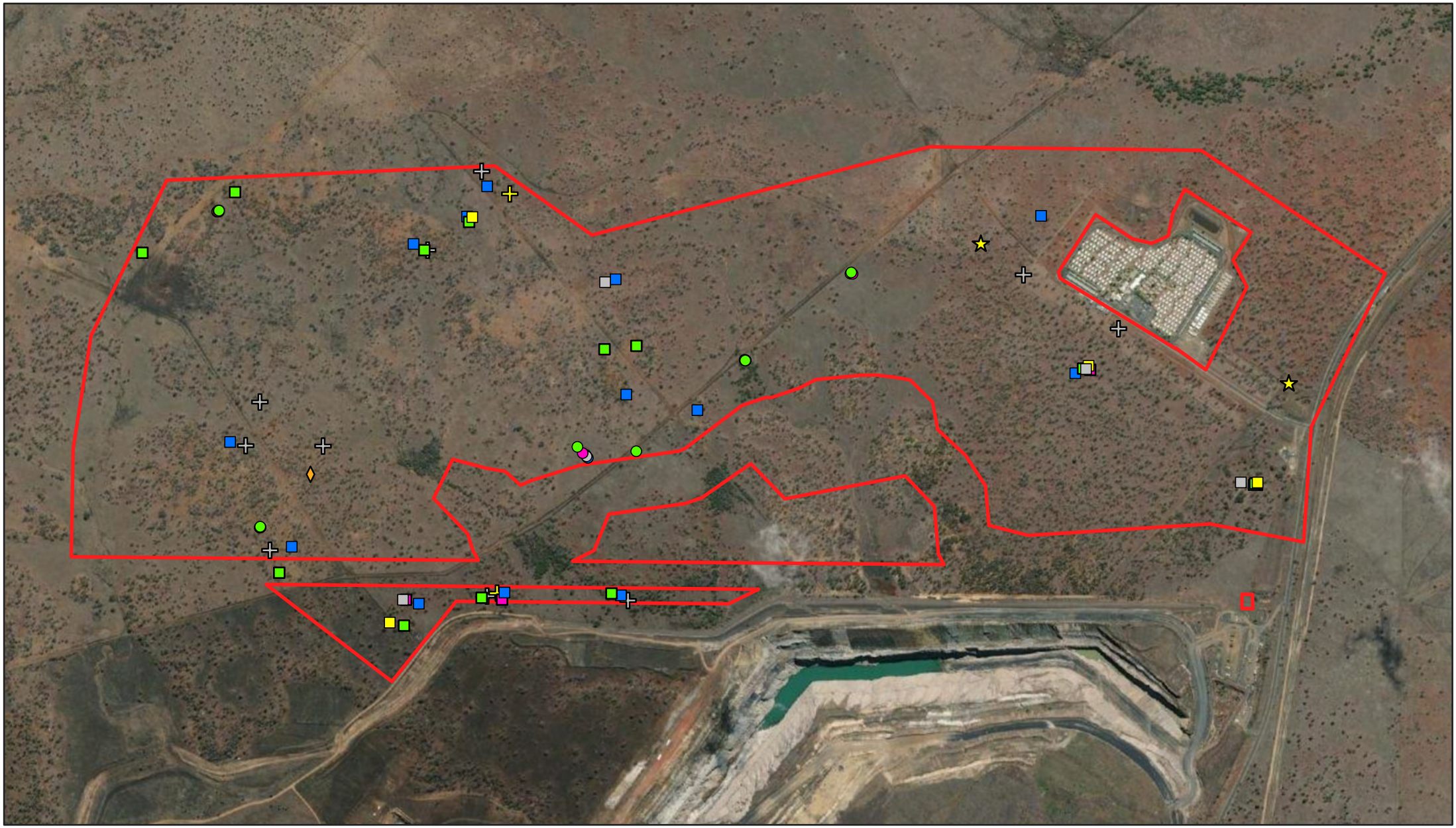

Figure 7: Fauna survey sites

Study area
Songmeter survey site (Nov 2021)
Habitat site point (Nov 2021)

Habitat quality assessments (Mar 2022)
Grey falcon
Yakka skink
Koala
Squatter pigeon
Common death adder

Habitat quality assessment (Nov 2021)
Koala
Yakka skink
Common death adder
Grey falcon

Microhabitat assessment (Nov 2021)
Yakka skink
Koala
squatter pigeon

0.00 0.33 0.65
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55
Project: 20536-TJ Date: 2/28/2023

N

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3.7. State values

3.7.1. Environmentally sensitive areas

Under the *Environmental Protection Regulation 2019*, REs with an endangered biodiversity status as defined in the REDD are classified as Category B ESAs (Queensland Herbarium, 2010). RE 11.4.7 which has an Endangered Biodiversity status, was identified within the study area and therefore comprises Category B ESA. A total of 7.0 ha of Category B ESA was ground-truthed within the study area (**Figure 8**).

No Category A or Category C ESAs were identified within the study area.

3.7.2. Threatened flora species

Table 13 shows the threatened flora species listed under the NC Act that are likely or have potential to occur within the study area, as informed by the likelihood and field survey. The area of potential habitat within the study area, the associated RE and the BioCondition score for the habitat are also shown below.

Table 13: Summary of State threatened flora habitat and extent

Scientific name	Common name	NC Act listing	Likelihood of occurrence	Area (ha)	Associated RE	BioConditi on scores
Aristida annua	-	Vulnerable	Potential	124.1	11.8.11	0.77
Cyperus clarus	-	Vulnerable	Likely	536.2	11.8.4 11.8.5 11.8.11	0.57 0.77 0.77
Dichanthium queenslandicum	King bluegrass	Vulnerable	Likely	536.2	11.8.4 11.8.5 11.8.11	0.57 0.77 0.77
Digitaria porrecta	Finger panic-grass	Near threatened	Likely	124.1	11.8.11	0.77
Marsdenia brevifolia	-	Vulnerable	Likely	536.2	11.8.4 11.8.5 11.8.11	0.57 0.77 0.77
Trioncinia retroflexa	-	Endangered	Likely	124.1	11.8.11	0.77

3.7.2.1. Aristida annua

No direct observations of *Aristida annua* were recorded during the November 2021 or March 2022 surveys. However, there have been four records within 50 km of the study area (ALA, 2021).

This species is an annual tufted grass which occurs on black clay soils, basalt soils and disturbed landscapes. This species has also been known to occur within the Natural Grasslands TEC. Within the study area a total of 124.1 ha was mapped as potential habitat, identified as RE 11.8.11 (**Figure 9**).

3.7.2.2. Cyperus clarus

No direct observations of *Cyperus clarus* were recorded during the November 2021 or March 2022 surveys. However, *Cyperus clarus* was recorded in March 2022 within the potential offset area to the west of SCN, on Meteor Downs property.

Cyperus clarus is a slender tufted perennial species which occurs within grasslands and open woodlands on basalt soils. Within the study area a total of 536.2 ha was mapped as potential habitat, identified as RE 11.8.4, 11.8.5 and 11.8.11 (**Figure 9**).

3.7.2.3. *Dichanthium queenslandicum* (king bluegrass)

No direct observations of king bluegrass were recorded during the November 2021 or March 2022 surveys. However, there have been 16 records within 50 km of the study area and four records within 1 km (ALA, 2021). Additionally, king bluegrass was recorded as a small population on Meteor Downs in March 2022.

This species is known to occur as a component of Natural Grasslands TEC and is associated with other species of bluegrasses. This species and the associated Natural Grasslands TEC occurs on fine grained soils, typically cracking clays on basaltic or fine-grained sedimentary rocks, on flat or gently undulating rises, within areas which have relatively high summer rainfall. Within the study area a total of 536.2 ha was mapped as potential habitat, identified as RE 11.8.4, 11.8.5 and 11.8.11 (**Figure 9**).

3.7.2.4. Digitaria porrecta (finger panic grass)

No direct observations of finger panic-grass were recorded during the November 2021 or March 2022 surveys. However, there are 11 known records within 50 km of the study area, and four records within 1 km (ALA, 2021). A seed head was observed at the site offices and another seed head was observed within Meteor Downs during a separate field survey in March 2022, indicating finger panic grass may be present nearby.

This species is known to occur within tussock grasslands and open woodland of poplar box or forest red gum. Preferring heavy textured soils, typically cracking clays. Within the study area a total of 124.1 ha was mapped as potential habitat, identified as RE 11.8.11 (**Figure 9**).

3.7.2.5. Marsdenia brevifolia

No direct observations of *Marsdenia brevifolia* were recorded during the November 2021 March 2022 surveys. However, there are 11 known records within 50 km of the study area (ALA, 2021).

This species is known to occur within woodlands dominated by red bloodwood and *Eucalyptus crebra*, with dense kangaroo grass understorey on basaltic substrate. Kangaroo grass was recorded within the study area in RE 11.8.5 which has a mountain coolabah and silver-leaved ironbark canopy cover. Within the study area a total of 536.2 ha was mapped as potential habitat, identified as RE 11.8.4, 11.8.5 and 11.8.11 (**Figure 9**).

3.7.2.6. Trioncinia retroflexa

No direct observations of *Trioncinia retroflexa* were recorded during the November 2021 and March 2022 surveys. However, there are six known records within 50 km of the study area (ALA, 2021).

This species is known to occur within dark brown or black cracking clay soils. It is also known to occur within grasslands. Within the study area a total of 124.1 ha was mapped as potential habitat, identified as RE 11.8.11 (**Figure 9**).

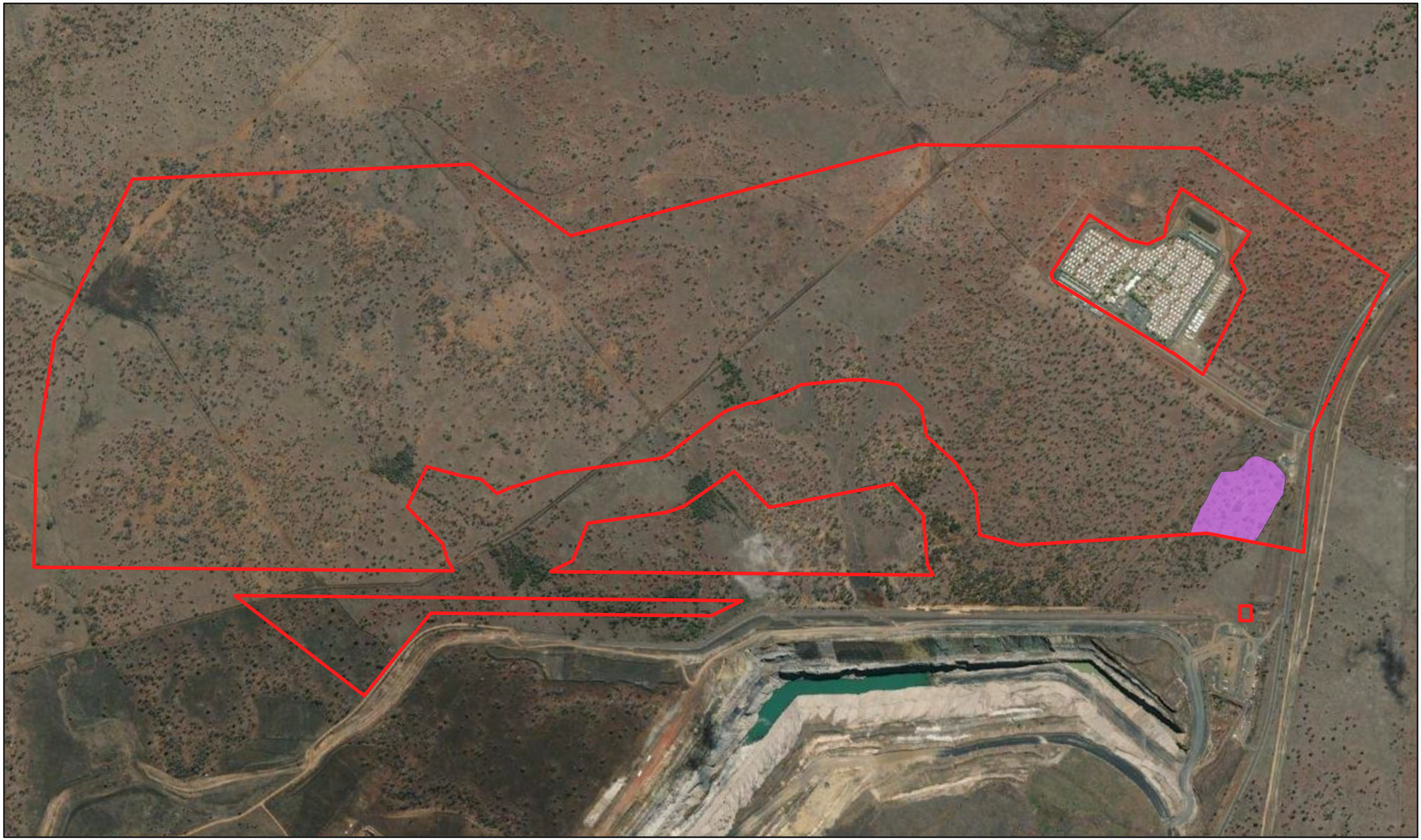

Figure 8: Category B - Environmentally Sensitive Area

Study area

Category B ESA

RE 11.4.7

N

0 0.33 0.65

Kilometers

Datum/Projection:
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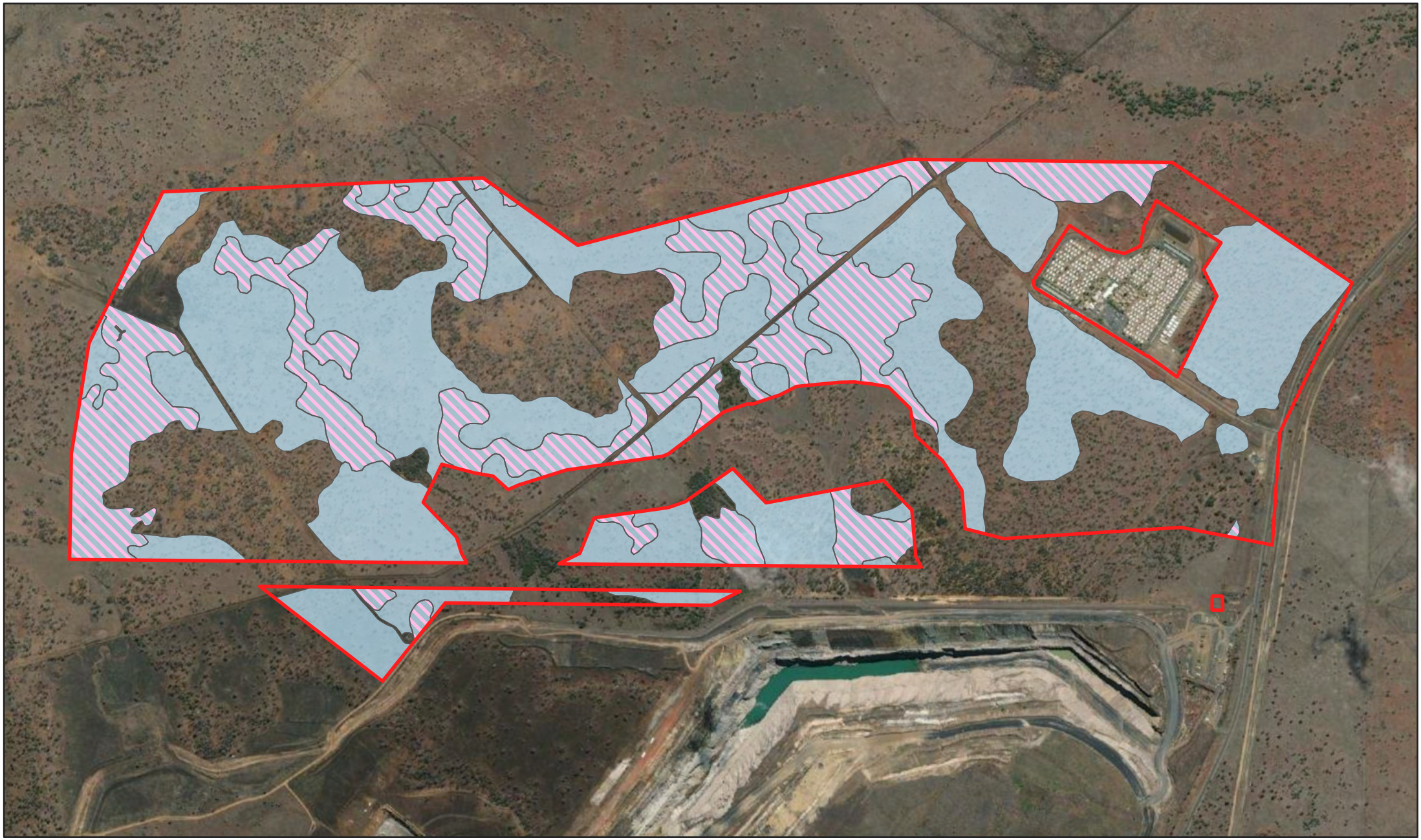

Figure 9: Threatened flora habitat

Study area

Potential habitat

Aristida annua, finger panic grass, Trionicinia retroflexa and bluegrass

Cyperus clarus, king bluegrass and Marsdenia brevifolia

N

0 0.35 0.7

Kilometers

Datum/Projection:
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3.7.3. Threatened fauna species

No detection of threatened fauna species occurred within SCN during either field survey. Suitable habitat for threatened fauna was identified through habitat suitability assessments. **Table 14** shows the threatened fauna species listed under the NC Act that are likely or have potential to occur within the study area, as informed by the likelihood and field survey. The area of potential habitat within the study area and habitat quality score are also shown below.

Table 14: Summary of State threatened species habitat extent and quality score

Scientific name	Common name	NC Act listing	Likelihood of occurrence	Area (ha)	Habitat quality score[1]
Phascolarctos cinereus	Koala	Vulnerable	Potential	424.8	6.43
Geophaps scripta scripta	Squatter pigeon	Vulnerable	Likely	424.8	5.91
Falco hypoleucos	Grey falcon	Vulnerable	Potential	548.8	2.61
Hirundapus caudacutus	White-throated needletail	Vulnerable	Potential	592.2	NA
Acanthophis antarcticus	Common death adder	Vulnerable	Potential	419.1	2.76
Egernia rugosa	Yakka skink	Vulnerable	Potential	146.9	2.54

[1]Habitat quality assessment was not applicable for the white-throated needletail as it is an aerial species.

Results of the acoustic analysis are contained in **Appendix D**, which was undertaken for koala, grey falcon and white-throated needletail.

3.7.3.1. Phascolarctos cinereus (koala)

No direct observations of the koala were recorded during the November 2021 or March 2022 surveys. However, there are more than 40 known records within 50 km of the study area including along Meteor Creek which flows through the southern Rolleston ML (109801) (ALA, 2021).

Koala are arboreal marsupials whose diet comprises mainly of Eucalyptus and/or Corymbia leaves of several preferred species (Australian Koala Foundation, 2015; Youngenthob *et al.*, 2021). This species is more commonly encountered in habitats dominated by eucalypt forests along watercourses, however, all vegetation communities dominated by eucalypts provide suitable habitat. Within the study area, locally important koala trees, silver-leaved ironbark and mountain coolabah (The Australian National University, 2021), were recorded. Locally important koala trees are characterised as trees which koalas regularly browse which could be considered a substantial portion of the koala diet.

Ancillary habitat trees which were also recorded within the study area include brigalow and black tea-tree. Ancillary trees are defined as trees which are not necessarily food trees but provide important habitat for koalas (The Australian National University, 2021).

Within the study area a total of 424.8 ha of potential habitat was mapped, present as Myrtaceae dominant vegetation communities including RE 11.3.25d, 11.4.7, 11.8.4 and 11.8.5 (**Figure 10**). This habitat may be used for breeding, foraging and dispersal, however, given the absence of eucalypt dominated riparian habitat, no refuge habitat was identified in the study area. Refuge habitat is habitat which koalas can persist in hot and dry conditions where trees will retain enough moisture for koala survival.

Note that due to the lack of Eucalyptus trees within RE 11.3.25d, this RE is likely to only be used for dispersal to the surrounding areas with Eucalyptus trees present or shelter habitat.

3.7.3.2. *Geophaps scripta scripta* (squatter pigeon) (southern)

No direct observations of the squatter pigeon were recorded during the November 2021 or March 2022 surveys. However, there are 30 known records within 50 km of the study area (ALA, 2021).

Squatter pigeons are ground-dwelling birds which predominantly forage on seeds from grasses, herbs and shrubs. Squatter pigeons tend to inhabit the grassy understorey of eucalypt woodlands and open grass areas including regrowth and modified areas such as paddocks, tracks and stock yards. Squatter pigeons require access to permanent waterbodies for drinking, either natural or man-made as long as there is bare-ground at the water's edge. The substrate within the squatter pigeon habitat is generally well draining soils such as gravel, sand or loam.

Within the study area a total of 424.8 ha of potential habitat was mapped, identified as RE 11.3.25d, 11.4.7, 11.8.4 and 11.8.5 (**Figure 10**). This habitat has potential to be used for foraging and dispersal. As it is not within 1 km of a permanent water source it is unlikely to be breeding habitat.

3.7.3.3. Falco hypoleucos (grey falcon)

No direct observations of the grey falcon were recorded during the November 2021 or March 2022 surveys. However, there have been two records within 50 km of the study area (ALA, 2021).

This species generally occurs within arid and semi-arid Australia, however, it has been identified within open woodlands, stony plains, acacia shrublands, grasslands and along riparian vegetation.

A total of 548.8 ha of potential habitat was mapped within the study area, identified as RE 11.3.25d, 11.4.7, 11.8.4, 11.8.5 and 11.8.11 (**Figure 11**). The species may be an occasional visitor to the area, due to the presence of potential foraging habitat. However, due to the lack of tall emerging trees with large stick nests of similar sized birds, it is unlikely that the study area will provide grey falcon with breeding habitat.

3.7.3.4. Hirundapus caudacutus (white-throated needletail)

No direct observations of the white-throated needletail were recorded during the November 2021 or March 2022 surveys. However, there are 13 known records within 50 km of the study area including within the adjacent project area (ALA, 2021).

This species is almost exclusively aerial when in Australia during non-breeding season (September to April). They often occur flying over open forest and rainforest habitat but have also been recorded over heathland and remnant vegetation. They only temporarily roost within dense foliage within canopy trees or in hollows.

Given their broad habitat use and aerial nature, a total of 592.2 ha of potential fly over habitat was mapped and includes the full study area (**Figure 11**). This habitat would potentially be used as temporary roosting and perching habitat, and fly-over habitat.

Figure 10: Koala and squatter pigeon habitat

Figure 11: Grey falcon, white-throated needletail and fork-tailed swift habitat

Study area

Potential habitat

Fork-tailed swift, white-throated needletail and grey falcon (fly over)

Grey falcon

Habitat quality assessment (Nov 2021)

Habitat quality assessment (Mar 2022)

N

0 0.35 0.7

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 20536-TJ Date: 2/28/2023

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Acanthophis antarcticus (common death adder)

No direct observations of the common death adder were recorded during the November 2021 or March 2022 surveys. However, there are known records within 50 km of the study area (ALA, 2021).

This species inhabits a wide variety of habitats ranging from grasslands to woodlands, heaths, rainforests and wet sclerophyll forests (DES, 2021). The main habitat requirement for this species is the presence of microhabitat features such as leaf litter and debris within woodland, shrubland and grasslands where they can shelter and ambush prey species.

Potential dispersal and foraging habitat was present in areas with thick ground cover vegetation and deep leaf litter. Within the study area a total of 419.1 ha of potential habitat was mapped, identified as RE 11.4.7, 11.8.4, 11.8.5 and 11.8.11 (**Figure 12**).

3.7.3.5. Egernia rugosa (yakka skink)

No direct observations of the yakka skink were recorded during the November 2021 or March 2022 surveys. However, there is a single known record within 50 km of the study area (ALA, 2021).

The yakka skink inhabits dry eucalypt and acacia woodlands and open woodlands. They can be found in cavities, between and under rocks, logs, tree stumps or abandoned animal burrows.

Within the study area a total of 146.9 ha of potential habitat was mapped, identified as RE 11.4.7 and 11.8.4 (**Figure 12**) where potential fallen hollow logs occur in which they can shelter.

Figure 12: Common death adder and yakka skink habitat

3.7.4. Special least concern

Table 15 shows the special least concern fauna species listed under the NC Act that are likely or have potential to occur within the study area, as informed by the likelihood and field survey. The area of potential habitat within the study area is shown below.

Table 15: Summary of State special least concern species habitat extent

Scientific name	Common name	NC Act listing	Likelihood of occurrence	Area (ha)
Apus pacificus	Fork-tailed swift	SL	Likely	592.2
Tachyglossus aculeatus	Short-beaked echidna	SL	Likely	548.9

3.7.4.1. Apus pacificus (fork-tailed swift)

No direct observations of the fork-tailed swift were recorded during the November 2021 or March 2022 surveys. However, there have been five records within 50 km of the study area (ALA, 2021).

The fork-tailed swift is almost exclusively aerial when in Australia and occurs over a variety of habitat types from rainforest to semi-arid areas. Therefore, habitat for this species has been mapped across all remnant vegetation where they may forage above the habitat and occasionally perch on exposed branches.

Within the study area a total of 592.2 ha of potential habitat was mapped across the full study area (**Figure 11**). This habitat would potentially be used as temporary roosting and perching habitat, as well as fly-over habitat.

3.7.4.2. Tachyglossus aculeatus (short-beaked echidna)

No direct observations of the short-beaked echidna were recorded during the November 2021 or March 2022 surveys (ELA, 2021). However, this species has been recorded within 50 km of the study area (ALA, 2021) and it is a wide-ranging and common species.

Short-beaked echidnas are monotremes which feed upon termites. They use their snouts to break apart termite mounds and logs. They are found throughout Australia and occupy the majority of habitat types throughout their range. Given this broad habitat capability, there is potential for the species to use all of the habitat types mapped within the study area, a total of 548.9 ha.

3.8. Matters of State Environmental Significance

MSES, as defined in Schedule 2 of the *Environmental Offsets Regulation 2014*, were assessed within the study area (**Table 16** and **Figure 13**).

Table 16: Matters of state environmental significance

MSES	Presence within study area

Regulated vegetation
• Prescribed REs that are endangered RE.
• Prescribed REs that are of concern RE.
• Prescribed REs that:
  ○ intersect with an area shown as a wetland on the vegetation management wetlands map; or
  ○ an area of essential habitat on the essential habitat map for an animal that is endangered wildlife or vulnerable wildlife or a plant that is endangered wildlife or vulnerable wildlife.
• A prescribed RE is a MSES, for a prescribed activity mentioned in schedule 1, item 7(e), if the ecosystem is an area of essential habitat on the essential habitat map for an animal that is near threatened wildlife or a plant that is near threatened wildlife.
• A prescribed regional ecosystem to the extent that the ecosystem is located within a defined distance from the defining banks of a relevant watercourse.
	Present as:
	• Prescribed REs that are endangered (7.0 ha);
	• prescribed REs that are of concern (129.8 ha);
	• prescribed REs that intersect with an area of essential habitat on the essential habitat map (15.4 ha); and
	• Prescribed REs within a defined distance from the defining banks of a relevant watercourse (20.5 ha).
	(Not present as REs that intersect an area shown as a wetland on the vegetation management wetlands map).

Connectivity areas	Present as 548.9 ha of remnant vegetation within the study area.

Wetlands and watercourses
• a wetland:
  ○ in a wetland protection area
  ○ of high ecological significance shown on the map of Queensland wetland environmental values.
• a wetland or watercourse in high ecological value waters.
	Not present.

Designated precinct in a strategic environmental area	Not present.
Protected wildlife habitat	Present as potential habitat for the following endangered, vulnerable, and special least concern (non-migratory species) under the NC Act: • *Aristida annua* (124.1 ha); • *Cyperus clarus* (536.2 ha); • king bluegrass (536.2 ha); • *Marsdenia brevifolia* (536.2 ha); • *Trioncinia retroflexa* (124.1 ha); • koala (424.8 ha); • short-beaked echidna (548.9 ha); • squatter pigeon (424.8 ha); • grey falcon (548.8 ha); • white-throated needletail (592.2 ha); • common death adder (419.1 ha); and • yakka skink (146.9 ha).
Protected areas	Not present.
Highly protected zones of State marine parks	Not present.

MSES	Presence within study area
Fish habitat areas	Not present.
Waterway providing for fish passage	Not present.
Marine plants	Not present.
Legally secured offset areas	Not present.

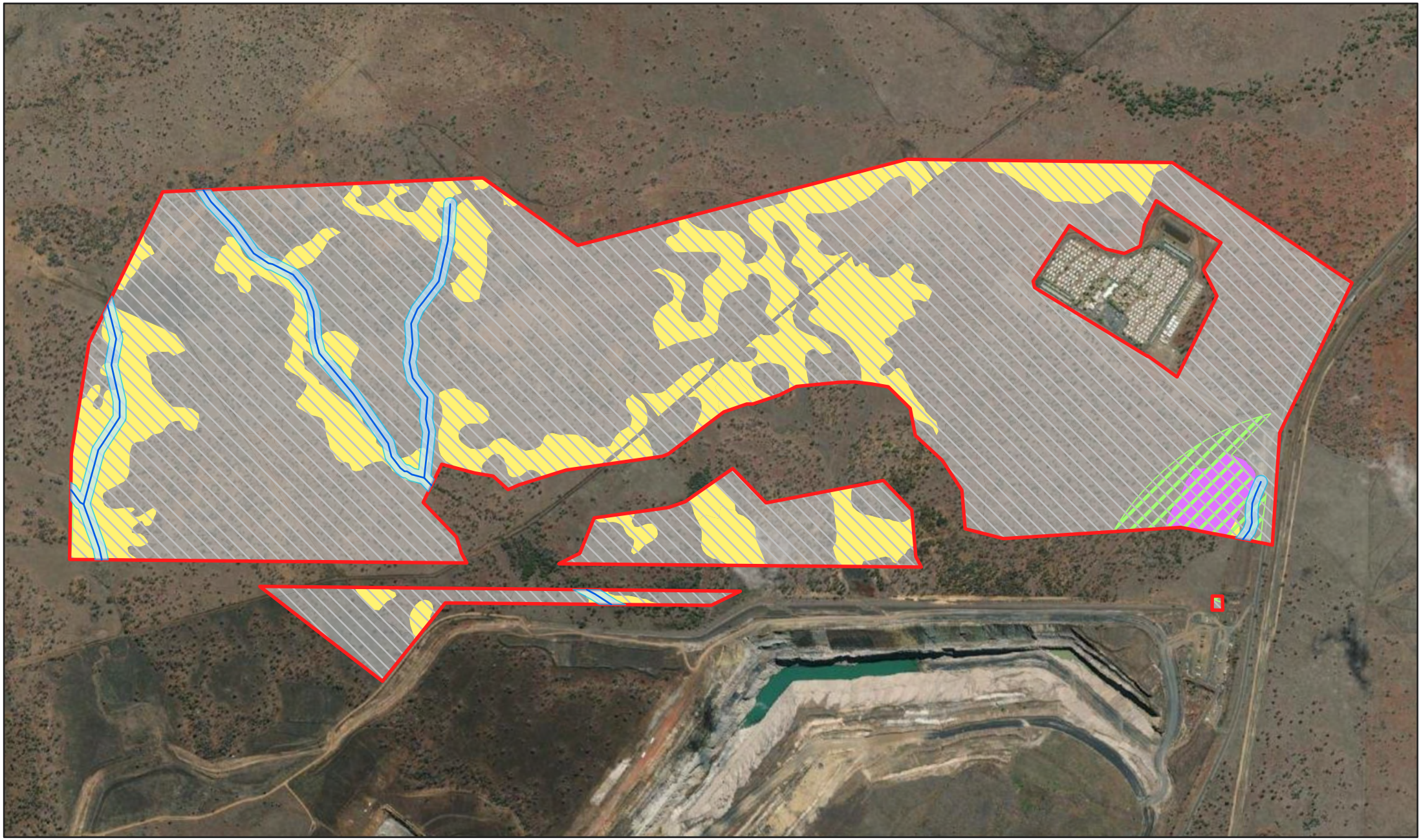

Figure 13: Matters of State Environmental Significance

Study area
Watercourse
Protected wildlife habitat
Protected wildlife habitat (fly over only)
Essential habitat
Prescribed REs intersecting a watercourse

Biodiversity status

Prescribed REs - endangered
Prescribed REs - of concern

N

0 0.35 0.7
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 20536-TJ Date: 2/28/2023

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3.9. Commonwealth values

3.9.1. Threatened ecological communities

One TEC was confirmed (Natural Grasslands TEC) during the field survey (refer to **Appendix B**). A total area of 124.1 ha met key diagnostic characteristics and condition thresholds for the TEC outlined in the Commonwealth Listing Advice (DEWHA, 2008) (**Figure 14**). The key diagnostic thresholds included having a sparse or absent tree canopy cover and presence of indicator species. Given the presence of rainfall preceding the survey, grasses were in good condition and easily identifiable to species due to the presence of seed heads. The indicator species for the Natural Grassland TEC identified during the November 2021 field survey included Queensland bluegrass, feathertop wiregrass, white speargrass, Queensland bluegrass, native millet and coolabah grass. The areas identified as Natural Grasslands TEC within the study area meet the condition thresholds to be classified as best quality TEC (refer to **Table 1**).

Figure 14: Natural Grassland TEC

Study area

TECs

Natural Grassland TEC

Natural Grassland TEC assessments

November 2021

March 2022

N

0 0.35 0.7

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 20536-TJ Date: 2/28/2023

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3.9.2. Threatened flora

Table 17 shows the threatened flora species listed under the EPBC Act that are likely or have potential to occur within the study area, as informed by the likelihood and field surveys. The area of potential habitat within the study area are also shown below.

Table 17: Summary of Commonwealth threatened flora habitat and extent

Scientific name	Common name	EPBC Act status	Likelihood of occurrence	Area (ha)	Associated RE
Aristida annua	-	Vulnerable	Potential	124.1	11.8.11
Dichanthium setosum	Bluegrass	Vulnerable	Potential	124.1	11.8.11
Dichanthium queenslandicum	King bluegrass	Endangered	Known	536.2	11.8.4 11.8.5 11.8.11
Marsdenia brevifolia	-	Vulnerable	Likely	536.2	11.8.4 11.8.5 11.8.11

Three of these species are listed under the NC Act and therefore discussed in **Sections 3.7.2.1** to **3.7.2.6** the additional species is discussed below**.**

3.9.2.1. Dichanthium setosum (bluegrass)

No direct observation of bluegrass was recorded during either of the surveys. However, seven records have been identified within 50 km of the study area, three of which are within 1 km (ALA, 2021).

Bluegrass occurs within areas of cleared woodland, grassy roadside remnant vegetation and heavily disturbed pasture. This species tends to grow on heavy basaltic black soils and red-brown loams with clay subsoils. Species which were recorded within the study area which bluegrass often grows in association with includes silver-leaved ironbark and kangaroo grass.

A total of 124.1 ha of potential habitat was mapped within the study area, identified as RE 11.8.11 (**Figure 9**).

3.9.3. Threatened and migratory fauna

Table 18 shows the threatened fauna species listed under the EPBC Act that are likely or have potential to occur within the study area, as informed by the likelihood and field survey. The area of potential habitat within the study area is shown below.

Table 18: Summary of Commonwealth threatened and migratory fauna habitat and extent

Scientific name	Common name	EPBC Act listing	Likelihood of occurrence	Area (ha)
Phascolarctos cinereus	Koala	Vulnerable	Potential	424.8
Geophaps scripta scripta	Squatter pigeon	Vulnerable	Likely	424.8
Falco hypoleucos	Grey falcon	Vulnerable	Potential	548.8
Hirundapus caudacutus	White-throated needletail	Vulnerable	Potential	592.2
Apus pacificus	Fork-tailed swift	Migratory	Likely	592.2
Egernia *rugosa*	Yakka skink	Vulnerable	Potential	146.9

All of these species are also listed under the NC Act, and therefore are discussed in **Sections 3.7.3.1** to **3.7.4.2.**

4. Conclusion and Recommendations

An ecological field assessment was undertaken in November 2021 to validate State and Commonwealth ecological values within the study area. A second ecological field assessment was undertaken in March 2022 to provide further evidence of ecological values and obtained the recommended number of BioCondition and habitat quality assessments per assessment unit. The majority of the study area consists of remnant vegetation, with a few non-remnant areas.

State values identified within the study area include:

- threatened species habitat:
  - *Aristida annua*;
  - *Cyperus clarus;*
  - king-bluegrass;
  - finger panic grass;
  - *Marsdenia brevifolia;*
  - *Trioncinia retroflexa;*
  - koala;
  - short-beaked echidna;
  - squatter pigeon;
  - grey falcon;
  - white-throated needletail;
  - common death adder;
  - yakka skink;
- MSES that is regulated vegetation:
  - Endangered REs;
  - Of Concern REs;
  - REs that intersect with an area of essential habitat;
  - REs within a defined distance from a relevant watercourse;
- MSES that is connectivity areas; and
- Category B ESA (Endangered RE).

Commonwealth values identified within the study area include the following:

- habitat for the following MNES that are threatened and migratory species:
  - *Aristida annua;*
  - bluegrass;
  - king bluegrass;
  - *Marsdenia brevifolia;*
  - koala;
  - squatter pigeon;
  - grey falcon;
  - white-throated needletail;

- fork-tailed swift;
- yakka skink; and

- Natural Grassland TEC.

References

Atlas of Living Australia (ALA). 2021. Species records database search. Available at: https://www.ala.org.au/

Australian Koala Foundation (2015) National Koala Tree Planting List. Prepared by Dave Mitchell, Australian Koala Foundation.

Bureau of Meteorology (BOM), 2021.

Department of Agricultural, Water and the Environment (DAWE) (2021) *Interim Biogeographic Regionalisation for Australia (version 7)*. Department of Agricultural, Water and the Environment, Australian Government, Canberra.

Department of Environment and Science (DES) (2020) Queensland Guide to Determining Terrestrial Habitat Quality (version 1.3). Queensland Government.

Department of Environment and Science (DES) (2021) Species Profile – *Acanthophis antarcticus* (common death adder). Queensland Government

Department of the Environment, Water, Heritage and the Arts (DEWHA) (2008). Approved Conservation Advice for Natural grasslands of the Queensland Central Highlands and the northern Fitzroy Basin. Canberra: Department of the Environment, Water, Heritage and the Arts.

ELA (2021) Rolleston Pit Expansion – Terrestrial Ecology Gap Analysis. Prepared for Spinifex on behalf of Glencore.

Eyre, T.J., Kelly, A.L, Neldner, V.J., Wilson, B.A., Ferguson, D.J., Laidlaw, M.J. and Franks, A.J. (2015) BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland. Assessment Manual. Version 2.2. Queensland Herbarium, Department of Science, Information Technology, Innovation and Arts, Brisbane

Maxar (2010) ArcPro GIS world imagery base map.

Neldner, V.J., Wilson, B.A., Dillewaard, H.A., Ryan, T.S., Butler, D.W., McDonald, W.J.F., Addicott, E.P., and Appelman C.N. (2020) Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland. Queensland Herbarium, Science and Technology Division, Department of Environment and Science.

Queensland Herbarium (2019) BioCondition benchmarks for Regional Ecosystems. Department of Environment and Science, Brisbane.

Xstrata (2013) Rolleston Coal Expansion Project Environmental Impact Statement. Prepared for Glencore.

Appendix A Rolleston Pit Expansion - Gap Analysis

MEMORANDUM			
TO	David Campbell (Spinifex Pty Ltd)		
FROM	Talia Jenner (Eco Logical Australia)		
DATE	2 November 2021	PURPOSE	For Information
SUBJECT	Rolleston Pit Expansion – Terrestrial Ecology Gap Analysis		

1. Introduction

1.1. Project background

The Rolleston Open Cut (ROC) coal mine is located approximately 22 km north-west of Rolleston township, and 240 km south west of Rockhampton, in Queensland. ROC is operated by Glencore Coal Assets Australia (GCAA) operating under the Environmental Authority (EA) EPML00370013 within Mining Leases (ML) 70415, 70307, 70418, 70416 and 70458.

GCAA is planning an expansion, known as the Spring Creek Northern Pit Extension (SCN Pit Extension) (herein referred to as 'the Project') within the northern portion of ML 70415 at ROC. The proposed disturbance area associated with the Project is located outside of the area approved under the 2015 Rolleston Coal Expansion Project (RCEP) Environmental Impact Statement (EIS), the EA EPML00370013 and *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) approval 2011/5965 (here in referred to as 'the approvals'). GCAA has identified that a major amendment to the EA and an EPBC Act referral are required for the Project.

The RCEP EIS, approved in 2015, included detailed ecological surveys for much of the area within the ROC MLs, including within the area of the SCN Pit Extension. However, given the studies did not consider the SCN Pit Extension as a proposed disturbance area, a review of the information presented in the EIS is required to assess its adequacy for meeting the current regulatory requirements for an EA amendment and EPBC Act referral, and determine if any additional studies are required. Eco Logical Australia (ELA) was engaged to undertake this gap analysis.

1.2. Objectives and scope of works

The objective of the scope was to undertake a gap analysis of available information to provide details of any information gaps that exist that would need to be addressed prior to amending the EA and preparing a EPBC Act referral. Specifically, the scope of works included:

- a desktop assessment to gather contemporary information on ecological values that may occur within the Project area;
- literature review of existing ecological information available within the Project area;
- review of proposed versus currently approved disturbance areas;
- determination of the likelihood of occurrence of ecological values currently listed under relevant legislation (i.e., *Environmental Protection Act 1994* [EP Act], *Nature Conservation Act 1992* [NC

Act], *Vegetation Management Act 1999* [VM Act] and EPBC Act) that may occur within the Project area;

- assessment of existing ecological information and survey data in line with relevant legislative guidelines;
- prepare a memo-style report of the gap analysis (this document) documenting the methods, findings and recommendations for any gaps and additional works required.

The desktop assessment and literature review as well as the likelihood of occurrence assessment were undertaken prior to the gap analysis, the findings of which are presented in **Appendix A** and **Appendix B**, respectively.

1.3. Project area

The Project is located 22 km north-west of Rolleston township in the Fitzroy Basin, Queensland and comprises of a total area of 606.8 ha (**Figure 1**). The Project area is currently used as grazing and mapped as remnant vegetation.

The Project area is located within the northern portion of ML 70415, however, it is outside of previously approved areas under the EA and EPBC 2011/5965, known as Stage 1 and Stage 2.

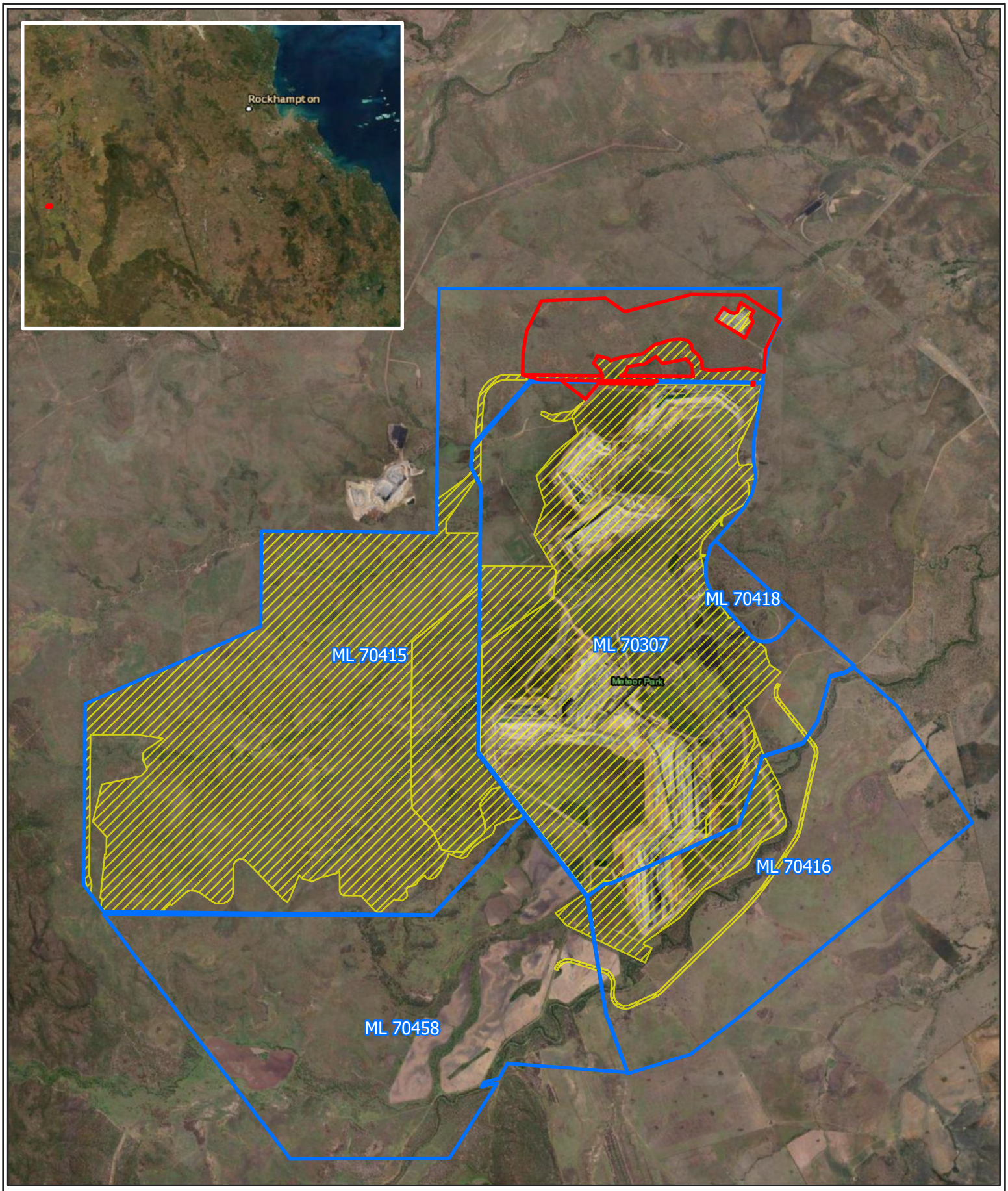

Figure 1: Location of Project area

Legend

Project area | Mining leases | Approval limit

0 2 4

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 19861-TJ Date: 3/11/2021

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2. Legislation Context

An overview of relevant legislation to the scope of works is provided below to provide context of legislation considered when conducting the gap analysis.

2.1. State legislation

2.1.1. Environmental Protection Act 1994

The EP Act and the *Environmental Protection Regulation 2008* (EP Regulation) regulates environmental harm caused by Environmentally Relevant Activities, which include resource activities such as mining. An EA is required to carry out mining activities and may include environmental conditions relating to management of potential ecological impacts.

2.1.2. Environmental Offsets Act 2014

The conditioning and delivery of environmental offsets for 'significant residual' impacts to prescribed environmental matters in Queensland is regulated by the *Environmental Offsets Act 2014* (EO Act), *Environmental Offsets Regulation 2014* (EO Regulations) and the Queensland Environmental Offset Policy 2019.

The environmental offset framework only applies when a prescribed activity is likely to have a significant residual impact on a prescribed environmental matter. Prescribed environmental matters include those MSES defined in the EO Regulations. A 'prescribed activity' is also defined under the EO Regulations and includes activities requiring approval under the EP Act such as resource activities. Significant residual impacts are determined through the application of criteria outlined in the appropriate significant residual impact guidelines.

2.1.3. Nature Conservation Act 1992

The NC Act establishes a regulatory regime to manage flora and fauna within Queensland. Specifically, the NC Act regulates the removal (i.e. fell, catch, etc.) of flora and fauna and provides a permitting framework for such activities. Under the NC Act, permits are required to:

- tamper with an animal breeding place (i.e. a bower, burrow, cave, hollow, nest etc); and/or
- clear protected plants.

A pre-clearing survey prior to commencing vegetation clearing is required to confirm the presence of active animal breeding places and clearing is to be carried out in accordance with an approved Species Management Program (SMP).

A flora survey must be undertaken prior to clearing vegetation in 'high risk areas' as mapped on a protected plants flora survey trigger map. Where endangered, vulnerable or near threatened flora species are found to occur within the clearing impact area an application for a clearing permit under the NC Act must be made, accompanied by a flora survey report. Where no threatened flora is observed, an exempt clearing application with the accompanying flora survey report is to be provided to Department of Environment and Science (DES) prior to carrying out clearing.

Clearing that was exempt under the previous protected plants framework (prior to 2014) for mining leases authorised under the Mineral Resources Act 1989 remains exempt.

Threatened species listed under the NC Act gets reviewed periodically, with the most recent listings occurring in August 2020.

2.1.4. Vegetation Management Act 1999

The VM Act regulates the clearing of native vegetation in Queensland. Approval under the Act is required if remnant or certain types of regrowth vegetation is to be cleared, with applications for approval likely to be accompanied by a Property Vegetation Management Plan (PVMP).

An exemption applies where the clearing is for mining activities, as defined under the *Mineral Resources Act 1989.* Accordingly, vegetation clearing under an authorised mining tenure is exempt from assessment under the VM Act. Vegetation clearing related to incidental activities outside the mining tenure, often including infrastructure such as camps and borrow pits, would require development approval (under the *Planning Act 2017*) and a clearing permit under the VM Act.

It should be noted that a range of vegetation values provisioned under the VM Act are recognised as MSES. The presence and extent of MSES is relevant to mining activities through the application of the EP Act, NC Act and EO Acts.

In relation to MSES, regulated vegetation includes the following values described under the VM Act:

- endangered or of concern Regional Ecosystems (RE) that are remnant;
- endangered or of concern REs that are regrowth;
- category R (Great Barrier Reef) riverine regrowth;
- essential habitat;
- regulated vegetation (remnant REs) intersecting a watercourse; and
- regulated vegetation within 100 m of a Vegetation Management wetland.

2.2. Commonwealth legislation

2.2.1. Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places, which are designated under the Act as MNES. The EPBC Act requires that if an action has, will have, or is likely to have a 'significant impact' on MNES, it must be referred to the Commonwealth Minister for the Environment for consideration. The Minister may require further assessment and approval of an action, which in this instance is deemed a 'controlled action'. The nine matters of MNES are:

- World Heritage properties;
- National Heritage places;
- Wetlands of international importance (listed under the Ramsar Convention);
- Nationally threatened species and threatened ecological communities (TEC);
- migratory species;
- Commonwealth marine areas;

- The Great Barrier Reef Marine Park;
- nuclear actions (including uranium mines); and
- a water resource, in relation to coal seam gas development and large coal mining development.

Nationally threatened species and communities and migratory species are the MNES relevant to this report.

3. Review and Gap Analysis

Desktop information and literature review is provided in **Appendix A**, whilst the likelihood of occurrence assessment for relevant ecological values is provided in **Appendix B**. These documents should be referred to when interpreting the below summary of gaps.

The following provides a summary of the data gaps and recommended actions required to support an EA amendment and EPBC approval variation. The gaps have been provided in the following categories with corresponding recommendations provided:

- data age and changes to site conditions;
- threatened species legislation listing changes;
- disturbance approval limits for prescribed environmental values and MNES listed in the existing approvals; and
- flora and fauna species survey guidelines.

3.1. Data age and changes to site conditions

The majority of ecological data was captured in 2011, 2012, and 2013, data is now ten years old. The accuracy of the majority of data is likely to still be current. This is particularly the case for attributes that do not change significantly in short periods, such as habitat values for threatened species associated with vegetation communities within the Project area.

However, considerations regarding the accuracy of data that may require further actions have been identified that relate to:

- Changes to RE descriptions under the Regional Ecosystem Description Database (REDD) which may impact the mapped REs within the Project area (i.e., mapped RE 11.8.11a is now classified as RE 11.3.25d). These small areas will require validation for accuracy to determine if the REs present should be redefined as new REs and associated changes to Biodiversity status and/or environmentally sensitive areas (ESAs).
- Areas identified as either non-remnant in 2011, 2012 and 2013 may have had the opportunity to mature in the subsequent years and re-assessment will determine whether non-remnant areas are now identifiable as regrowth REs. Conversely, these areas are often routinely cleared by landholders and is possible that areas of remnant vegetation identified in 2011 and 2012 have been recently cleared and are now non-remnant and therefore would no longer require consideration.
- Natural Grasslands of the Queensland Central Highlands and northern Fitzroy Basin TEC (Natural Grasslands TEC) was identified within the Project area in 2011 and 2012 (Xstrata 2012). This TEC is very sensitive to seasonal changes and threats by non-native grass species so re-assessment of some areas, especially around the edges of TECs will enable the obtainment of accurate TEC boundaries. Additionally, threatened flora species and habitat associated with these grasslands (*Aristida annua*, *Cyperus clarus*, *Dichanthium setosum* [Blue-grass], *Dichanthium queenslandicum* [King blue-grass], *Digitaria porrecta* [Finger panic grass], *Marsdenia brevifolia* and *Trioncinia retroflexa*) may have changed in the past ten years.

- A small portion, 2.25 % (13.66 ha) of the Project area has not previously been surveyed. This area will require a field survey to conduct RE mapping, habitat assessments and threatened species surveys to determine ecological value.

3.1.1. Recommendations

The majority of the above identified gaps are not considered crucial for obtaining an EA amendment and/or EPBC Act approval, however, increased confidence in data will assist GCAA in accurately considering MNES (relating to potential EPBC Act referral) and RE Biodiversity Status and related ESAs and/or prescribed environmental values (when considering EA amendment).

It is therefore recommended that a rapid field survey (one day) be undertaken of the following:

- Of the small portion of the Project area in the south that has not been previously surveyed. The objective of this survey will be to ground-truth RE and associated threatened species habitat and resolve mixed (11.8.11/11.8.5 and 11.8.5/11.8.11). Additionally, given the changes to the RE descriptions as per the REDD, it would be beneficial to validate the REs which were previously mapped as 11.8.11a to determine current Biodiversity Status of the RE.
- To spot check grassland TEC boundaries and conduct additional threatened flora surveys given the high diversity of perennial species and the seasonal variability of these values.
- Collection of photographic observations of the above areas.

3.2. Threatened species legislation listing changes

Species have been listed as threatened under the EPBC Act since the EIS was developed, and subsequent EPBC Act approval was issued, and have potential to occur in the Project area (refer to **Appendix B**) therefore would need to be considered in future EPBC Act approvals. The threatened species were identified during the likelihood of occurrence assessment (**Appendix B**) based upon species' known distributions, extent of habitat present within the Project area and known records of the species. Each species was assessed as known, likely or potential or unlikely to occur.

Species which have a potential to occur within the Project area and have been listed as threatened since the EIS and EPBC Act approval include:

- *Falco hypoleucos* (Grey falcon) listed as vulnerable under the EPBC Act in 2020, however, was listed under the NC Act at the time of the EIS;
- *Hirundapus caudacutus* (White-throated needletail) listed as vulnerable under the EPBC Act in 2019, however, was listed as migratory at the time of the EIS; and
- *Petauroides armillatus* (Central greater glider) listed as vulnerable under the EPBC Act in 2016.
- The above species are all currently listed as vulnerable under the NC Act.

Alternatively, several species have been removed as threatened species under the NC Act and would no longer need to be considered. These include:

- Two plant species:
  - *Commersonia argentea;*
  - *Desmodium macrocarpum* (Large-podded trefoil);

- Eight fauna species:
  - *Cyclorana verrucosa* (Rough collared frog);
  - *Accipiter novaehollandiae* (Grey goshawk);
  - *Ephippiorhynchus asiaticus* (Black-necked stork);
  - *Lophoictinia isura* (Square-tailed kite);
  - *Melithreptus gularis gularis* (Black-chinned honeyeater);
  - *Nettapus coromandelianus* (Cotton pygmy goose);
  - *Chalinolobus picatus* (Little pied bat); and
  - *Paradelma orientalis* (Brigalow scaly-foot).

3.2.1. Recommendations

Threatened species listed under the EPBC Act and NC Act since the time of the EIS should be considered when preparing EA amendments and EPBC Act variations and/or referral (and associated significant impact assessments). Additional threatened species surveys targeting the Grey falcon, White-throated needletail and Central greater glider are recommended as these species would not have been targeted during previous studies undertaken as part of the EIS. The survey methods recommended include species-specific habitat assessments, diurnal bird surveys, acoustic recording devices and spotlighting. Where possible, these surveys should be undertaken in accordance with the '*Terrestrial Vertebrate Fauna Survey Guidelines for Queensland*' (Queensland Herbarium, 2018) or the relevant species guidelines. The threatened species surveys can be undertaken simultaneously with the proposed rapid field survey (combined total of three days, excluding travel). The rapid survey approach is justified given the extensive previous survey effort for other values occurring adjacent to the Project area and the previous occurrences of greater glider and white-throated needletail known to occur in these areas (AECOM, 2013) (refer to **Appendix B**).

Species habitat occurring within the Project area for those species that have been removed from the NC Act are no longer required to be considered in future approvals (i.e., NC Act Species Monitoring Programs or EA amendments).

3.3. Approval disturbance limits

Both the approvals describe maximum disturbance limits associated with ROC maximum disturbance of associated State and Commonwealth environmental values that cannot be exceeded.

For State values, Schedule K – Biodiversity (Table K1) of the EA describes the maximum extent of impact (ha) to prescribed environmental matters that can occur. Identified prescribed environmental matters within the Project area that should be considered in EA amendments include:

- of concern (VM Act) RE 11.8.11 (142.27 ha), 11.8.11a (6.06 ha) and 11.9.2 (67.26 ha);
- prescribed RE that intersects with an area of essential habitat on the essential habitat map (15.43 ha);
- connectivity areas, present as remnant vegetation within the Project area (563.7 ha);
- habitat for a species that is threatened (King blue-grass, Finger panic grass and *Acanthophis antarcticus* [Common death adder]); and
- high-risk area on the flora trigger map (258.24 ha).

For Commonwealth values, Condition 2 of the EPBC Act approval describes the maximum extents to MNES that occur within the Project area, including:

- endangered (EPBC Act)Natural Grasslands TEC (122.92 ha);
- habitat for a plant that is threatened (*Aristida annua*, Blue-grass, King blue-grass and *Marsdenia brevifolia*); and
- habitat for a fauna species that is threatened (*Actitis hypoleucos* [Common sandpiper], *Apus pacificus* [Fork-tailed swift], Grey falcon, *Geophaps scripta scripta* [Squatter pigeon], White-throated needletail, Central greater glider, koala and Yakka skink).

Dependent on existing disturbance of these prescribed environmental values within the Project area, changes to maximum disturbance limits through an EA amendment may be required. Further, associated environmental offsets made in accordance with the *Environmental Offsets Act 2014* and Queensland Environmental Offsets Policy may be required. Similarly, changes to the EPBC Act disturbance limits for Commonwealth values may be required via a EPBC Act variations to the existing approval or disturbance sort through a EPBC Act referral. The associated disturbance may be required to be compensated via the *EPBC Act Environmental Offsets Policy 2012*.

3.3.1. Recommendations

It is recommended that a desktop exercise of documenting the conducted disturbance to both State and Commonwealth values associated with the EA and EPBC Act be conducted prior to applying for increased disturbance via an EA amendment and EPBC Act referral. It is possible that proposed disturbances predicted during the EIS may not have been exceeded and therefore there may be an opportunity to avoid having to increase limits to certain values. Additionally, those threatened species (i.e., Grey falcon, White-throated needletail, Central greater glider) that were not listed under the EPBC Act at the time of the approval will need to be considered in future impact assessments and thus their habitats mapped.

3.4. Survey guidelines

The current version of the *Guide to determining terrestrial habitat quality (version 1.3)* (DES, 2020) (the guide) was published in February 2020. The guide outlines the method to be used to determine impact and offset site habitat quality for the purpose of establishing offsets under the Queensland *Environmental Offsets Act 2014,* however, can also be used for assisting qualifying habitat quality for EPBC Act required offsets. Changes in version 1.3 have significantly altered the requirements for the collection of field data specific to each potentially occurring threatened species and/or TEC to support offsets calculations.

Given the majority of field work was conducted within 2011, 2012 and 2013, no habitat quality data within the Project area would be available to support potential offset requirements in line with current government expectations.

Extensive survey effort was conducted across the approved areas, and portions of the Project area during the assessments conducted for the EIS (Xstrata, 2015). These surveys were largely conducted in accordance with the recommended flora and fauna survey guidelines and were conducted over seven field surveys between 2011 and 2013 (AECOM, 2013). Whilst specific effort conducted within the Project area itself may not have been achieved for each species deemed potentially occur (as per **Appendix B**)

within the Project area, given the extensive survey effort conducted in the adjacent ROC as part of the EIS, it is reasonable to infer results for those species into the Project area when identifying values of State and Commonwealth. This however is limited to those species that were listed under the NC Act and/or EPBC Act at the time of EIS. For those species that were not listed and therefore not previously surveyed for, a rapid assessment as stated above is recommended.

3.4.1. Recommendations

Habitat quality surveys are recommended to be undertaken across the Project area to assist with future offset planning and establishment. The timing of these surveys could, however occur after initial engagement with relevant regulatory authorities has occurred. Given current offset legislation framework reviews and expectations regarding proponents providing comprehensive offset packages that provide a proven conservation net gain, the offsets for the Project should be considered with the broader context of the ROC Project (specifically Stage 2) rather than separate offset packages.

Habitat quality assessments should be conducted for the entire suite of potentially occurring threatened flora and fauna species, including those listed since the EIS. It is recommended that the collection of habitat quality data in accordance with the guideline occur during the three day field survey recommended in **Section 3.1.1** and **Section 3.2.1**.

4. Conclusions and Recommendations

The overall recommendation of this gap analysis is for a rapid field verification over three field days be conducted with the purpose of providing contempary data in key areas (i.e. changes to TEC / RE extents, presence of newly listed species and incorporation of data collected in line with the habitat quality guidelines).

4.1. Legislative requirements

4.1.1. Environmental Protection Act 1994

Condition K1 of the EA (EPML 00370013) conditions authorised maximum significant residual impacts to prescribed environmental matters. The EA states maximum extents for the currently approved areas which does not include the Project area and therefore these disturbance limits may need to be changed via an EA amendment. To support the EA amendment and ensure existing disturbance limits are not exceeded, the following is recommended:

- Determine the total extent of prescribed environmental matters (i.e., REs listed as 'of concern' and 'endangered', 'high risk trigger map areas', threatened species habitat etc.) that occur in the Project area. This will require a rapid field survey exercise to determine the REs and any associated habitat for threatened wildlife / plants within the Project area.
- Determine the residual significant impacts (in accordance with the Queensland Environmental Offsets Policy – Significant Residual Impact Guideline [Department of Environment and Heritage Protection (DEHP), 2014]) of the Projects proposed impacts on prescribed environmental matters and apply for an EA amendment should these coupled with the existing disturbance from ROC exceed the maximum disturbance limits of the EA.
- Determine offsets liability of prescribed environmental values in accordance with the EO Act.

4.1.2. Environment Protection and Biodiversity Conservation Act 1999

Condition 2 of the EPBC 2011/5965 approval stipulates maximum disturbance limits on EPBC Act listed threatened species and communities within the ROC approval area. The maximum disturbance limits of the EPBC approval is calculated for Stage 1 and Stage 2 of RCEP, however the Project area is outside of the approved area. To ensure accurate assessment of MNES within the Project area, and determine whether an EPBC Act variation of 2011/5965 will be obtained or a EPBC Act referral sought after, the following is recommended:

- All potential MNES are identified within the Project area. This would include a rapid assessment of areas not previously ground-truthed and for those EPBC Act species that have been listed since the approval to be surveyed for (via habitat assessments). Additionally, verification of the extent of Natural Grasslands TEC present within the Project area should be conducted given the age of data.
- Proposed impacts from the Project be determined for all MNES within the Project area. Should a variation to Condition 2 of the EPBC Act be the preferred approvals pathway, these extents should be compared to existing maximum disturbance limits on EPBC Act listed threatened species and communities.

- Proposed impacts on MNES that may result from the Project should be assessed in accordance with relevant significant impact guidelines (i.e., MNES Significant Impact Guidelines 1.1 (Department of Agriculture, Water and the Environment [DAWE], 2013).

4.2. Other considerations

Whilst the scope was limited to identifying gaps in data relating to obtaining an EA amendment and EPBC Act referral, when reviewing existing data and likelihood of occurrence (**Appendix A** and **B**) other considerations were identified relevant to other legislation (i.e., NC Act and EO Act) and are provided below.

4.2.1. Nature Conservation Act 1992

The protected plant flora survey trigger map identified high risk areas within the Project area which under the NC Act is classified as a prescribed environmental matter. Threatened flora survey were conducted in 2011, 2012 and 2013 and no threatened flora species were present, however, under the *Nature Conservation (Plants) Regulation 2020* a flora survey must be undertaken in accordance with the '*Flora Survey Guidelines – Protected Plants (Version 2.01)*' (Wildlife and Threatened Species Operations, 2020) within 3 years of clearing. Therefore, to meet this requirement a flora survey and associated relevant approvals (i.e., clearing permit exemption) be obtained. Whilst these surveys are specific to the NC Act, those flora species relevant (refer to **Appendix C**) are dually listed under the EPBC Act and therefore are MNES relevant to the EPBC Act referral.

It should be noted that there is an exemption under the NC Act for MLs granted under the *Mineral Resources Act 1989* and therefore the granting of ML 70415 be considered in relation to the NC Act.

4.2.2. Species management programs

ROC has a number of management plans to mitigate and manage the impacts to flora and fauna on site as a result of the mine. These plans should be updated to include the Project area and additional threatened species identified (i.e., those previously not included such as the Central greater glider).

4.2.3. Offset requirements

GCAA should consider identifying suitable offset areas whilst undertaking their approval process. Whilst the majority of field surveys were conducted in 2011-2013, habitat quality data in accordance with the guide (DES, 2020) is not available to support potential offset requirements for the Project area. It is recommended that these surveys be conducted within the impact area of the Project area (once known) and the proposed offset area in accordance with the guide.

4.2.3.1. Environmental Offsets Act 2014

The conditioning and delivery of environmental offsets for 'significant residual' impacts to prescribed environmental matters in Queensland is regulated by the *Environmental Offsets Act 2014* (EO Act), *Environmental Offsets Regulation 2014* (EO Regulations) and the Queensland Environmental Offset Policy 2019.

The environmental offset framework only applies when a prescribed activity is likely to have a significant residual impact on a prescribed environmental matter. Prescribed environmental matters include MSES, defined in the EO Regulations. A 'prescribed activity' is also defined under the EO Regulations and

includes activities requiring approval under the EP Act such as resource activities. Significant residual impacts are determined through the application of criteria outlined in the appropriate significant residual impact guidelines. Prescribed environmental values are known to occur in the Project area and include regulated vegetated, connectivity and protected wildlife habitat.

4.2.3.2. EPBC Act Offsets Policy 2012

The EPBC Act Offsets Policy (2012) outlines the requirement for offsets to compensate for unavoidable significant impacts to MNES and should only be applied after all other measures to avoid and reduce impacts have been implemented. Offsets must be delivered for the MNES that will be impacted (i.e. be like-for-like) and be built around direct (i.e. land-based) offsets that are proportionate to the size and scale of impact. In relation to the Project, considerations of both State and Commonwealths should be made concurrently and made with Stage 2 liability of the RCEP.

References

AECOM (2013) *Terrestrial Fauna, technical report.* AECOM prepared for Xstrata. Department of Agriculture, Water and the Environment (DAWE) (2013) *Significant Impact Guidelines 1.1 – Matters of National Environmental Significance.* Department of Agriculture, Water and the Environment, Australian Government, Canberra.

Department of Environment and Heritage Protection (DEHP) (2014) *Queensland Environmental Offsets Policy – Significant Residual Impact Guideline.* Biodiversity Integration and Offsets, Ecosystems Outcomes, Department of Environment and Heritage Protection, Queensland Government, Brisbane.

Department of Environment and Science (DES) (2020) *Guide to determining terrestrial habitat quality (Version 1.3*). Department of Environment and Science, Queensland Government, Brisbane.

Landline Consulting (2013a) *Regional Ecosystem Assessment, Rolleston Coal*. Landline Consulting prepared for Xstrata.

Landline Consulting (2013b) Area 5: Assessment of Region Ecosystem of Fringing Woodland along Bootes Creek. Landline Consulting prepared for Xstrata.

Queensland Government (2019) *Protected plants flora survey trigger map.* Queensland Government.

Queensland Herbarium (2018) *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland*. Ecological Science, Queensland Herbarium. Queensland Government, Brisbane.

Wildlife and Threatened Species Operations (2020) *Flora Survey Guidelines – Protected Plants.* Department of Environment and Science, State of Queensland.

Xstrata (2013a) *RCEP EIS*. Xstrata.

Xstrata (2013b) Soil survey technical report, RCEP (2013) Xstrata.

Appendix A: Desktop assessment and literature review

Methods

Desktop assessment and literature review

A desktop assessment and review of previous ecological studies, environmental databases, maps and associated literature was undertaken to evaluate existing data and identify the potential presence of ecological values within the Project area.

Database searches

The following databases were reviewed to assess the potential for Commonwealth and State ecological values to occur within the Project area:

- Protected Matters Search Tool (PMST) report (50 km buffer);
- Wildlife Online report (50 km buffer);
- Matters of State Environmental Significance (MSES) report and associated MSES mapping layers;
- Map of Environmentally Sensitive Areas (ESA);
- Map of Queensland wetland environmental values (Environmental Protection (Water and Wetland Biodiversity) Policy 2019);
- *Vegetation management Act 1999* (VM Act) wetlands map;
- VM Act essential habitat map;
- VM Act regulated vegetation management map;
- VM Act regional ecosystem map
- VM Act watercourse and drainage feature map;
- Regional Ecosystem (RE) (biodiversity status) remnant and preclearing mapping (Queensland Herbarium);
- *Water Act 2000* (Water Act) Watercourse identification map – watercourses;
- Water Act Watercourse identification map – drainage features;
- Queensland geological digital data (Queensland Globe);
- Atlas of Living Australia (ALA) records;
- Commonwealth Species Profile and Threats database;
- Queensland Land Use Mapping Program;
- protected plant flora survey trigger mapping;
- Approved Conservation Advice, National Recovery Plan and Survey Guidelines for Matters of National Environmental Significance (MNES) occurring with the Project area; and
- aerial imagery.

The PMST and Wildlife Online reports are provided in **Appendix C**.

Literature review

The following documents were reviewed as part of the literature review:

- Environmental Authority (EA) (EPML00370013) – Schedule K and Figures 4 to 8;
- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Approval 2011-5965;

- *Guideline Application requirements for activities with impacts to land* (Department of Environment and Science (DES), 2017);
- Environmental Impact Statement (EIS) assessment report under the EPBC Act for the Rolleston Coal Expansion Project (RCEP) (proposed by Glencore) (Department of Environment and Heritage Protection (DEHP), 2015);
- Soil survey technical report, RCEP (Xstrata, 2013);
- RCEP) EIS (Xstrata, 2013); and
- available spatial data for the terrestrial ecology maps presented in the EIS and/or EA figures.

Previous ecology field studies have been undertaken across the approved areas, and portions of the Project area; these were undertaken across the following periods and were reviewed to determine potentially occurring State and Commonwealth values:

- baseline pre-wet season (7-11 November 2011) and post-wet season (16-18 March 2012, 11-13 April 2012 and 17 April 2012) flora and vegetation surveys;
- project footprint area pre-wet season (4-11 November 2012) and post-wet season (13-16 March 2013) flora and vegetation surveys;
- Sandy and Meteor Creek winter vegetation survey (1-2 July 2013) within MLA70416, and Bootes Creek survey (3 and 30 July 2013) within 'Area 5' of the current ML 70416 and MLA70307;
- wet season fauna surveys (19-25 November 2011) with supplementary bird surveys and spotlighting (16-18 March 2012);
- second wet season fauna survey wet season fauna survey (5-11 December 2012);
- dry season bird surveys (27-31 July 2012); and
- additional habitat assessments (July 2013).

The following relevant flora and fauna survey guidelines were reviewed:

- *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland* (Eyre et. al., 2018);
- *Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland* (Nelder et. al., 2020);
- *A Condition Assessment Framework for Terrestrial Biodiversity in Queensland* (Eyre et. al., 2015);
- *Survey Guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the EPBC Act* (Department of the Environment, Water, Heritage and the Arts [DEWHA], 2010);
- *Survey Guidelines for Australia's threatened mammals: Guidelines for detecting mammals listed as threatened under the EPBC Act* (Department of Sustainability, Environment, Water, Population and Communities [DSEWPC], 2011b);
- *Draft referral guidelines for the nationally listed Brigalow Belt reptiles* (DSEWPC, 2011a);
- Commonwealth Listing and Conservation Advice diagnostic and condition threshold criteria for Threatened Ecological Communities (TECs);
- *EPBC Act Referral Guidelines for Vulnerable Koala* (Department of the Environment [DoE], 2014); and
- *Guide to determining terrestrial habitat quality* (DES, 2020).

Likelihood of occurrence

A likelihood of occurrence assessment for threatened species and threatened ecological communities (TECs) was completed following the desktop assessment and literature review. The likelihood of occurrence assessment was based on species' known distribution, extent of habitat present within the Project area and known records of the species. Each species was assessed as known, likely, potential or unlikely to occur based on the criteria in **Table 1**.

The outcome of the likelihood of occurrence assessment is provided in **Appendix B**.

Table 1: Likelihood of occurrence assessment criteria

Likelihood	Definition
Known	Species has been recorded within the Project area.
Likely	Species has not been recorded within the Project area, however there are known records within the nearby surrounding area (within 50 km) and important habitat (foraging or breeding) is abundant and/or good condition general habitat exists on site.
Potential	Species has not been recorded within the Project area, however limited and/or moderate condition general habitat is present within the Project area.
Unlikely	There is a low probability that the species will occur within the Project area as it is outside the species known distribution, low quality habitat occurs within the area or the species is not known to occur within the region.

State values

Vegetation communities

The majority (97.75 %) of the Project area has been ground-truthed, with 2.25 % (13.66 ha) of the Project area still containing State RE mapping. The Project area comprises predominantly of remnant vegetation with small patches of regrowth and non-remnants areas along the eastern boundary. The current Queensland Vegetation Management RE mapping (version 12) (DES, 2021) has the Project area mapped as a mosaic of homogenous polygons of REs 11.8.5, 11.8.5a and 11.8.11.

Ground-truthed REs (Landline Consulting, 2013) across the Project area are presented in **Table 2.** The RE descriptions are as per the Regional Ecosystem Description Database (REDD).

Table 2: Ground-truthed REs within Project area

RE	Condition	Short description	Biodiversity status	VM Act status	Area (ha)
11.5.3[1]	Remnant	*Eucalyptus populnea* +/- *E. melanophloia* +/- *Corymbia clarksoniana* woodland on Cainozoic sand plains and/or remnant surfaces	No concern at present	Least concern	2.56
11.8.5	Remnant	*Eucalyptus orgadophila* open woodland on Cainozoic igneous rocks	No concern at present	Least concern	329.13
11.8.5a	Remnant	*Eucalyptus orgadophila* woodland with a dense understorey of low trees species including *Geijera parviflora, Callitris glaucophylla, Pittosporum angustifolium, Casuarina cristata, Alectryon*	No concern at present	Least concern	15.42

[1] Was mapped as 11.8.15 originally, Landline Consulting remapped as 11.5.3.

RE	Condition	Short description	Biodiversity status	VM Act status	Area (ha)
		oleifolius, Psydrax odorata and *Notelaea microcarpa.*			
11.8.11	Remnant	*Dichanthium sericeum* grassland on Cainozoic igneous rocks	Of concern	Of concern	143.27
11.8.11a[2]	Remnant	*Melaleuca bracteata* woodland drainage depressions. Occurs in drainage depressions.	Of concern	Of concern	6.06
11.9.2	Remnant	*Eucalyptus melanophloia* +/- *E. orgadophila* woodland to open woodland on fine-grained sedimentary rocks	No concern at present	Of concern	67.26
-	Non-remnant	-			29.44
				Total area[3]	**593.14**

Environmentally sensitives areas

There are no ESAs mapped within the Project area as per the current Queensland ESA map or ground-truthed.

Wetlands

No wetlands, general ecological significance (GES) or high ecological significance (HES) are mapped within the Project area as per the Queensland wetland environmental values map (Environmental Protection (Water and Wetland Biodiversity) Policy 2019).

Protected plants flora survey trigger map

The Flora Survey Trigger Map (version 8) (Queensland Government, 2021) shows high-risk area mapped in the western and eastern sections of the Project area. The total area mapped as high-risk is 258.24 ha. Consequently, as per Section 141 of the *Nature Conservation (Plants) Regulation 2020* 'If any part of an area to be cleared is within a high risk area, a flora survey must be undertaken in accordance with the Protected Plant Flora Survey Guidelines of the clearing impact area before the clearing starts'.

The field surveys did not identify any threatened flora species within the Project area, however, given surveys were conducted in 2013, these surveys were prior to the commencement of the current Protected Plants Framework (commencing 2014).

[2] RE 11.8.11a as of RE version 12 is mapped as 11.3.25d.

[3] It should be noted that the previous survey effort did not include all of the Project area, a total of 13.69 ha has not been surveyed.

Threatened, near threatened or special least concern species

Potentially occurring NC Act listed threatened species

A total of eight threatened flora species and eight threatened fauna species (four birds, two mammals and two reptiles) listed under the *Nature Conservation Act 1992* (NC Act) as endangered, vulnerable, near threatened or special least concern were identified as known, likely or have a potential to occur within the Project area (**Table 3**).

Table 3: Threatened species under the NC Act with the potential to occur within the Project area

Scientific name	Common name	NC Act**	Likelihood of occurrence	Justification
Flora				
Aristida annua	-	V	Potential	Four records within 50 km of the Project area. Additionally, there is potential habitat mapped within the Project area, RE 11.8.11 (Xstrata, 2013). The Project area is just outside of the known species range, however, given the species has limited survey information, the precautionary principle has been applied and the species deemed a potential occurrence.
Cyperus clarus	-	V	Potential	Four records within 50 km of the Project area is within the known species distribution range. Potential habitat is mapped within the Project area, RE 11.8.11, 11.8.5 and 11.8.5a (Xstrata, 2013).
Dichanthium queenslandicum	King blue-grass	V	Likely	16 records known within 50 km of the Project area, additionally four records within 1 km. King blue-grass was not recorded within the Project area during the previous ecology surveys, however, habitat was mapped as being present within REs 11.8.11 and mixed polygons of 11.8.11/11.8.5 (Xstrata, 2013).
Digitaria porrecta	Finger panic grass	NT	Likely	11 records known within 50 km of the Project area, additionally four records within 1 km. The Project area is within the species known range and habitat is present within the Project area, RE 11.8.11 (Xstrata, 2013).
Marsdenia brevifolia	-	V	Likely	There are 11 known records within 50 km of the Project area. The Project area is within the known species range and potential habitat is present (RE 11.8.11) (Xstrata, 2013).
Trioncinia retroflexa	-	E	Likely	There are six records within 50 km of the Project area. The Project area is also within the known distribution range. Potential habitat, RE 11.8.11, is mapped within the Project area (Xstrata, 2013).
Fauna				
Birds				
Apus pacificus	Fork-tailed swift	SL	Likely	There is potential habitat mapped as RE 11.8.11 within the Project area and it is within the known distribution ranges of the species. There have been five records within 50 km of the Project area.

Scientific name	Common name	NC Act**	Likelihood of occurrence	Justification
Falco hypoleucos	Grey falcon	V	Potential	The majority of species records occur within the arid and semi-arid Australia, in which the Project area is not situated. However, given the species can inhabit grasslands and there are two known records within 50 km of the Project area, there is potential for the species to occasionally occur.
Geophaps scripta scripta	Squatter pigeon (southern)	V	Likely	Suitable habitat (grassy woodlands) occurs across the Project area and there are 30 known records within 50 km of the Project area. There are no watercourses within the Project area, but there are in the surrounding areas.
Hirundapus caudacutus	White-throated needletail	V	Potential	The species is almost exclusively aerial when in Australia and is a non-breeding visitor. As the species forages above a variety of habitat type and there are 13 known records within 50 km of the Project area, potential non-breeding habitat is present.
Mammals				
Petauroides armillatus	Central Greater Glider	V	Potential	The species is known to occur in the region (>50 records within 50 km of the Project area) and requires large hollow-bearing trees for denning. Some marginal habitat may be present within larger eucalyptus associated with RE 11.8.5, 11.8.5a and 11.9.2. However, no hollows were recorded during the last field survey which is den habitat (Xstrata, 2013).
*Phascolarctos cinereus**	Koala	V	Potential	The species is known to occur in the region with >40 records within 50 km of the Project area. Whilst the species is more readily encountered in eucalypt forests along watercourses when in central Qld, all vegetation types dominated by eucalyptus specie provides suitable species habitat. This includes eucalyptus woodlands associated with RE 11.8.5, 11.8.5a and 11.9.2 within the Project area.
Reptiles				
Acanthophis antarcticus	Common death adder	V	Potential	There are known records within 50 km of the Project area. Whilst some potential habitat (grassland) occurs within the Project area, habitat present requires essential microhabitat features such as leaf litter and debris to be suitable.
Egernia rugosa	Yakka skink	V	Potential	The Project area is within the Brigalow Belt North region, therefore not within the species core range. However, it is within the outer range and some suitable habitat woodlands habitat on suitable habitat for burrowing occur (RE 11.9.2) within the Project area. There is a single known record within 50 km of the Project area.

*koala - combined populations of QLD, NSW and the ACT

**NC Act – endangered (E), vulnerable (V), near threatened (NT) or special least concern (SL)

Species which were identified in the AECOM (2013) report may vary slightly due to NC Act threatened species changes. *Hirundapus caudacutus* (White-throated needletail) and *Petauroides armillatus* (Central greater glider) were not previously identified as it was added to the threatened species list under the NC Act and are considered to potentially occur within the Project area. Alternatively, there is a list of species which are no longer listed as threatened species under the NC Act and are presently classified as 'least concern), including the following:

- *Commersonia argentea*;
- *Desmodium macrocarpum* (Large-podded trefoil);
- *Cyclorana verrucosa* (Rough collared frog);
- *Accipiter novaehollandiae* (Grey goshawk);
- *Ephippiorhynchus asiaticus* (Black-necked stork);
- *Lophoictinia isura* (Square-tailed kite);
- *Melithreptus gularis gularis* (Black-chinned honeyeater);
- *Nettapus coromandelianus* (Cotton pygmy goose);
- *Chalinolobus picatus* (Little pied bat); and
- *Paradelma orientalis* (Brigalow scaly-foot).

Habitat types

A total of two broad habitat types were identified within the Project area during the 2013 field surveys (AECOM, 2013). These habitats provide a range of resources for native fauna species, such as seeding grasses during favourable seasons for birds species, including *Geophaps scripta scripta* (Squatter pigeon). The habitat types within the Project area are presented in **Table 4**.

Table 4: Broad habitat types within the Project area

Habitat type	Associated REs	Area (ha)
Natural grasslands	11.8.11 and 11.8.11a	122.92
Open woodland to woodlands on igneous rocks, sandplains and fine-grained sediments	11.5.3, 11.8.5, 11.8.5a and 11.9.2	384.84
Grassy woodlands on igneous rocks	11.8.11/11.8.5 and 11.8.5/11.8.11	55.94

The broad habitat descriptions below are based upon the general descriptions provided in Chapter 14 of the EIS and encompass the full ML 70415.

It should be noted that a number of previously listed threatened species under NC Act species (such as square-tailed kite, black-chinned honeyeater, little pied bat, brigalow scaly-foot) identified within Chapter 14 of the EIS are no longer listed as threatened under the NC Act. These species have been excluded from the descriptions below. Further, species in which were not identified as 'known, likely or potentially' within the likelihood of occurrence assessment (refer to **Appendix B**) are not reported further below.

Natural grasslands

Natural grasslands are described in Chapter 14 of the EIS as consisting of Bluegrass tussock grassland on basalt plains. This habitat was in good condition, with a good tussock structure, litter and ground cover and species diversity. This habitat has sparse canopy tree cover but did have isolated trees or small isolated stands. There was extensive and deep cracking of the clay soils across the habitat type.

The natural grasslands provide habitat for grassland specialist species, open-country species and generalists. Grasses provide shelter and foraging opportunities for birds, reptiles and mammals. Whilst the cracking soils provides habitat for mammals, reptiles and frogs. This habitat generally has minimal fallen timber, reducing sheltering opportunities for some species. Potential threatened species, identified in the likelihood of occurrence assessment, that may utilise this habitat includes:

- Grey falcon;
- *Apus pacificus* (Fork-tailed swift);
- *Aristida annua;*
- *Cyperus clarus;*
- *Dichanthium queenslandicum* (King blue-grass);
- *Digitaria porrecta* (Finger panic grass);
- *Marsdenia brevifolia;*
- *Trioncinia retroflexa;* and
- Natural Grassland TEC.

Open woodland to woodlands on igneous rocks, sandplains and fine-grained sediments Open woodland on igneous rocks, sandplains and fine-grain sediments was described in the EIS (Chapter 14) as sparse woodlands on the ridge-tops, with *Eucalyptus orgadophila*, *E. melanophloia* and *E. populnea*. This habitat supported grassy open woodlands consisting of *Eucalyptus orgadophila* or *E. populnea* with *E. melanophloia* and *Corymbia erythrophloia*. Shrubs were scattered and the groundcover was dense and grassy.

The open woodland on igneous or sedimentary soils is likely to provide habitat to a broad range of fauna. Fallen timber, litter and grass tussocks provide shelter and foraging resources for ground dwelling species. *Eucalyptus* and *Corymbia* species provide floral and food resources for bark and foliage foraging birds and mammals. In some areas rocks and boulders were present which provide reptiles and mammals shelter and basking sites. This habitat type may provide habitat for the following threatened species, identified in the likelihood of occurrence assessment, within the Project area:

- *Cyperus clarus;*
- Squatter pigeon;
- Grey falcon;
- Central greater glider;
- *Phascolarctos cinereus* (Koala);
- *Acanthophis antarcticus* (Common death adder); and
- *Egernia rugosa* (Yakka skink).

Grassy woodlands on igneous rocks

The grassy woodlands on igneous rocks had an understorey in good condition consisting of grasses, retaining good cover, tussock structures, and diversity of species. A wide range of age, size classes and species were represented in the tree strata, as well as some shrubs present. Hollows were present and abundant, whereas there were limited logs and dead trees.

The logs and dead trees in combination to good litter cover provides shelter for small ground-dwelling species. Whilst the hollows provide roosting and breeding habitat for a number of birds and mammals. This habitat may provide habitat for the following threatened species, identified in the likelihood of occurrence assessment, within the Project area:

- King blue-grass;
- Squatter pigeon;

- Grey falcon; and
- Common death adder.

Essential habitat

The vegetation management essential habitat map identified a total of 15.43 ha along the eastern boundary of the Project area.

Matters of State Environmental Significance

Table 5: Matters of State Environmental Significance

MSES	Presence within Project area

Regulated vegetation
• prescribed REs that are endangered REs;
• prescribed REs that are of concern REs;
• prescribed REs that:
  ○ intersect with an area shown as a wetland on the vegetation management wetlands map; or
  ○ an area of essential habitat on the essential habitat map for an animal that is endangered wildlife or vulnerable wildlife or a plant that is endangered wildlife or vulnerable wildlife.
• a prescribed RE is a matter of State environmental significance, for a prescribed activity mentioned in schedule 1, item 7(e), if the ecosystem is an area of essential habitat on the essential habitat map for an animal that is near threatened wildlife or a plant that is near threatened wildlife
• a prescribed RE to the extent that the ecosystem is located within a defined distance from the defining banks of a relevant watercourse
	Present as:
	• prescribed regional ecosystems that are of concern (190.78 ha); and
	• prescribed regional ecosystems that intersect with an area of essential habitat on the essential habitat map (15.43 ha).
	(Not present as regional ecosystems that intersect an area shown as a wetland on the vegetation management wetlands map)

Connectivity areas	Present as 563.7[4] ha of remnant vegetation within the Project area.

Wetlands and watercourses
• a wetland:
  ○ in a wetland protection area; or
  ○ of high ecological significance shown on the map of Queensland wetland environmental values;
• a wetland or watercourse in high ecological value waters.
	Not present within the Project area.

Designated precinct in a strategic environmental area	present/not present
Protected wildlife habitat	The previous ecological field surveys identified potential habitat for the following species listed as endangered or vulnerable under the NC Act to occur within the Project area: • King blue-grass;

[4] Based upon the area previously surveyed, approximately 13.66 ha is excluded from this calculation.

MSES	Presence within Project area
	• Finger panic grass; and • Common death adder. Additionally, the likelihood of occurrence assessment identified an additional 6 flora species and 7 fauna species which are known, likely or have a potential to occur within the Project area (**Table 3**).
Protected areas	Not present within the Project area
Highly protected zones of State marine parks	Not present within the Project area
Fish habitat areas	Not present within the Project area
Waterway providing for fish passage	Not present within the Project area
Marine plants	Not present within the Project area
Legally secured offset areas	Not present within the Project area

Commonwealth values

Threatened ecological communities

The PMST report identified a total of seven threatened ecological communities (TEC) as potentially occurring within 50 km of the Project area. The likelihood of occurrence assessment identified only one TEC is known to occur in the Project area (**Table 3**), with the others considered unlikely to occur. The full likelihood of occurrence is presented in **Appendix B**.

Table 6: TECs known or likely to occur within the Project area

TEC	EPBC Act	Likelihood of occurrence	Justification
Natural Grasslands of the Queensland Central Highlands and northern Fitzroy Basin	E	Known	Natural Grasslands TEC was mapped in a small area of the Project area which was previously surveyed. However, the remaining Project area was not surveyed for TECs. The TEC mapped corresponds to RE 11.8.11 and is likely to be present across the Project area where this RE has been mapped, similar to the surrounding areas, as long as the key diagnostic criteria and condition thresholds are met.

Threatened and migratory EPBC Act listed species

The PMST report identified a total of ten threatened flora species and 19 threatened fauna species as potentially occurring within a 50 km buffer of the Project area.

The likelihood of occurrence was updated with the results from the literature review which identified a total of seven threatened flora species and 24 fauna species as known or likely to occur (**Table 7**).

Table 7: Threatened and migratory species under the EPBC Act with the potential to occur within the Project area

Scientific name	Common name	EPBC Act	Likelihood of occurrence	Justification
Flora				
Aristida annua	-	V	Potential	Four records within 50 km of the Project area. Additionally, there is potential habitat mapped within the Project area, RE 11.8.11 (Xstrata, 2013). The Project area is just outside of the known species range, however, given the species has limited survey information, the precautionary principle has been applied and the species deemed a potential occurrence.
Dichanthium setosum	Blue-grass	V	Likely	Seven known records within 50 km of the Project area, of which three records are within 1 km of the Project area. Potential habitat has been mapped within the Project area, RE 11.8.5 and 11.8.5a (Xstrata, 2013).
Dichanthium queenslandicum	King blue-grass	E	Likely	16 records known within 50 km of the Project area, additionally four records within 1 km. King blue-grass was not recorded within the Project area during the previous ecology surveys, however, habitat was mapped as being present within REs 11.8.11 and mixed polygons of 11.8.11/11.8.5 (Xstrata, 2013).
Marsdenia brevifolia	-	V	Likely	There are 11 known records within 50 km of the Project area. The Project area is within the known species range and potential habitat is present (RE 11.8.11) (Xstrata, 2013).
Fauna				
Birds				
Actitis hypoleucos	Common sandpiper	Mi, Ma	Potential	There are no records within 50 km of the Project area. There are no wetlands within the Project area, however, there are within the surrounding areas. Grasslands have been mapped which the Common sandpiper may use for foraging.
Apus pacificus	Fork-tailed swift	Ma, Mi	Likely	There is potential habitat mapped as RE 11.8.11 within the Project area and it is within the known distribution ranges of the species. There have been five records within 50 km of the Project area.
Falco hypoleucos	Grey falcon	V	Potential	The majority of species records occur within the arid and semi-arid Australia, in which the Project area is not situated. However, given the species can inhabit grasslands and there are two known records within 50 km of the Project area, there is potential for the species to occasionally occur.
Geophaps scripta scripta	Squatter pigeon (southern)	V	Likely	Suitable habitat (grassy woodlands) occurs across the Project area and there are 30 known records within 50 km of the Project area. There are no watercourses within the Project area, but there are in the surrounding areas.
Hirundapus caudacutus	White-throated needletail	V	Potential	The species is almost exclusively aerial when in Australia and is a non-breeding visitor. As the species forages above a variety of habitat types and there are 13 records within 50 km of the Project area, potential non-breeding habitat is present.
Mammals				

Scientific name	Common name	EPBC Act	Likelihood of occurrence	Justification
Petauroides armillatus	Central greater glider	V	Potential	The species is known to occur in the region (>50 records within 50 km of the Project area) and requires large hollow-bearing trees for denning. Some marginal habitat may be present within larger eucalyptus associated with RE 11.8.5, 11.8.5a, 11.9.2 and 11.5.3. However, no hollows were recorded during the last field survey which is den habitat (Xstrata, 2013).
Phascolarctos cinereus	Koala*	V	Known	The species is known to occur in the region with >40 records within 50 km of the Project area. Whilst the species is more readily encountered in eucalypt forests along watercourses when in central Qld, all vegetation types dominated by eucalyptus specie provides suitable species habitat. This includes eucalyptus woodlands associated with RE 11.8.5, 11.8.5a, 11.9.2 and 11.5.3 within the Project area.
Reptiles				
Egernia rugosa	Yakka skink	V	Potential	The Project area is within the Brigalow Belt North region, therefore not within the species core range. However, it is within the outer range and some suitable habitat woodlands habitat on suitable habitat for burrowing occur (RE 11.5.3 and 11.9.2) within the Project area. There is a single known record within 50 km of the Project area.
*Koala - combined populations of QLD, NSW and the ACT				

References

Department of Environment and Heritage Protection (DEHP) (2015) *EIS assessment report under the EPBC Act for the RCEP (proposed by Glencore)*. Department of Environment and Heritage Protection, Queensland Government.

Department of Environment and Science (DES) (2017) *Guideline Application requirements for activities with impacts to land.* Department of Environment and Science, Queensland Government.

Department of Environment and Science (DES) (2020) *Guide to determining terrestrial habitat quality (Version 1.2*). Department of Environment and Science, Queensland Government, Brisbane.

Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) (2011a) *Draft Referral guidelines for the nationally listed Brigalow Belt reptiles*, Australian Government, Canberra.

Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) (2011b) *Survey guidelines for Australia's threatened mammals: Guidelines for detecting mammals listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999*, Australian Government, Canberra.

Department of the Environment (DoE) (2014) *EPBC Act Referral Guidelines for the vulnerable koala (combined populations of Queensland, New South Wales and the Australian Capital Territory),* Australian Government, Canberra.

Department of the Environment, Water, Heritage and the Arts (DEWHA) (2008) *Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999.* Australian Government, Canberra.

Eyre, T.J., Ferguson, D.J., Hourigan, C.L., Smith, G.C., Mathieson, M.T., Kelly, A.L., Venz, M.F., Hogan, L.D. and Rowland, J. (2018) *Terrestrial Vertebrate Fauna Survey Assessment Guidelines for Queensland*, Department of Environment and Science, Queensland Government, Brisbane.

Eyre, T.J., Kelly, A.L, Neldner, V.J., Wilson, B.A., Ferguson, D.J., Laidlaw, M.J. and Franks, A.J. (2015) BioCondition: *A Condition Assessment Framework for Terrestrial Biodiversity in Queensland. Assessment Manual.* Version 2.2. Queensland Herbarium, Department of Science, Information Technology, Innovation and Arts, Brisbane

Nelder, V.J., Wilson, B.A., Dillewaard, H.A., Ryan, T.S., Butler, D.W., McDonald, W.J.F., Addicott, E.P. and Appelman, C.N. (2020) *Methodology for surveying and mapping regional ecosystems and vegetation communities in Queensland (Version 5.1)*. Queensland Herbarium, Queensland Department of Environment and Science, Brisbane.

Threatened Species Scientific Committee (TSSC) (2009) *Commonwealth Listing Advice on Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin.* Department of the Environment, Water, Heritage and the Arts, Australian Government.

Appendix B: Likelihood of occurrence assessments

Table 1: Likelihood of occurrence for TECs

TEC	Description	EPBC Act	Likelihood of occurrence	Justification
Brigalow (*Acacia harpophylla* dominant and co-dominant)	*Acacia harpophylla* is commonly the dominant species in a range of open forests and woodlands; these are collectively referred to as brigalow woodlands. The community is characterised by the presence of *A. harpophylla* as one of the most abundant tree species. *A. harpophylla* is either, dominant in the tree layer, or co-dominant with other species – notably *Casuarina cristata* (belah), other species of *Acacia*, or species of *Eucalyptus*. Occasionally these other species may be more common than *A. harpophylla* within the broad matrix of brigalow woodlands vegetation. The community has a considerable range of vegetation structure and composition united by a suite of species that tend to occur on acidic and salty clay soils.	E	Unlikely	None of the 16 associated REs to the TEC are mapped within the Project area. Additionally, no *Acacia harpophylla* was recorded within the Project area which is a key diagnostic characteristic.
Coolibah - Black Box woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	Semi-arid to humid subtropical woodland where *Eucalyptus coolabah subsp. coolabah* (Coolibah) and/or *Eucalyptus largiflorens* (Black Box) are the dominant canopy species and where the understorey tends to be grassy. Other tree species may occur in the tree canopy but are not dominant, including *Acacia salicina* (Cooba), *Acacia stenophylla* (River Cooba), *Casuarina cristata* (Belah), *Eremophila bignoniiflora* (Eurah), *Eucalyptus camaldulensis* (River Red Gum) and *Eucalyptus populnea* (Bimble Box). The mid or shrub layer may or may not be present. Ground cover lifeforms typically comprise native graminoids, other herbs, chenopods and other low shrubs that are typically under 50 cm tall. Associated with the floodplains and drainage areas of the Darling Riverine Plains and the Brigalow Belt South bioregions. Found on the grey, self-mulching clays of periodically waterlogged floodplains, swamp margins, ephemeral wetlands, stream levees, drainage depressions and gilgai.	E	Unlikely	This TEC is only found within the Brigalow Belt South bioregion as per the listing advice, the Project area is located within the Brigalow Belt North.
Natural Grasslands of the Queensland Central Highlands and northern Fitzroy Basin	The ecological community occurs entirely within Queensland, extending from Collinsville in the north to Carnarvon National Park in the south. It typically occurs on flat ground gently undulating rises on soils formed in situ on basalt, or on fine grained sedimentary rocks. Typically, this includes the following REs: 11.3.21, 11.4.4, 11.4.11, 11.8.11, 11.9.3, 11.9.12, 11.11.17. The community is typically composed of a mixture of forbs and native grasses. Native grasses include *Dichanthium* spp. (Bluegrasses), with tropical *Aristida* spp. (Three-awned grasses) and *Panicum* spp. (Panic grasses)	E	Known	Natural Grasslands TEC was mapped in a small area of the Project area which was previously surveyed (Landline, 2013). RE 11.8.11, an RE that can form the TEC is mapped within the Project area. Ground-

TEC	Description	EPBC Act	Likelihood of occurrence	Justification
	also a major component. Drier sites of the ecological community may include a higher proportion of *Astrebla* spp. (Mitchell grasses). Common forb species which may be present include *Commelina ensifolia* (scurvy grass), *Corchorus trilocularis* (native jute), *Ipomoea lonchophylla* (cow vine), *Vigna lanceolata* (pencil yam), *Vigna radiata* (mung bean), *Desmodium campylocaulon* (creeping tick trefoil), *Neptunia gracilis* (native sensitive plant), *Cullen tenax* (emu foot), *Rhynchosia minima* (rhyncho), *Crotalaria dissitiflora* (grey rattlepod), *Glycine latifolia* and *Hibiscus trionum* var. *vesicarius* (bladder ketmia).			truthing of this area confirmed the TECs presence (Landline, 2013).
Poplar Box Grassy Woodland on Alluvial Plains	The ecological community is located west of the Great Dividing Range, typically at less than 300 m above sea level (ASL) and between latitudes 20°S to 34°S. In Queensland, it corresponds fully or partially with REs 11.3.2, 11.3.17, 11.4.7, 11.4.12 and 12.3.10. The ecological community is typically a grassy woodland with a canopy dominated by *Eucalyptus populnea* and understorey mostly of grasses and other herbs, including *Aristida* spp. (wiregrass), *Bothriochloa* spp. (Blue Grass), *Dichanthium* spp. (bluegrass), *Heteropogon* sp. (spear grass) and *Themeda* sp. (kangaroo grass).The ecological community mostly occurs in gently undulating to flat landscapes and occasionally on gentle slopes on a wide range of soil types of alluvial and depositional origin	E	Unlikely	None of the mapped REs met the key diagnostic characteristics of the Poplar Box TEC. This TEC tends to occur along watercourses or alluvial plains in Queensland and these are not present within the Project area. None of the associated REs as per the listing advice are mapped within the Project area. Further, although the TEC was listed after the EIS (listed in 2019), within the broader EIS project area, no corresponding REs to the TEC area mapped.
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	The community is found in eastern Queensland and northern New South Wales and is considered an extreme form of dry seasonal subtropical rainforest. The community is characterised by the prominence of trees with microphyll sized leaves (i.e. leaves usually 2.5–7.6 cm long), the presence of bottle trees (Brachychiton spp.) as emergent from the vegetation, and the thickets occurring in areas with a subtropical, seasonally dry climate on soils of high to medium fertility	E	Unlikely	None of the 10 associated REs to the TEC are mapped within the Project area. Additionally, species commonly recorded within the TEC were not recorded during the previous field surveys (Landline, 2013), these include: *Drypetes deplanchei* (Grey Boxwood, Yellow Tulip), *Diospyros humilis, Gyrocarpus americanus, Pouteria cotinifolia* and *Strychnos psilosperma* (Strychnine) and the vine *Cissus reniformis*.

TEC	Description	EPBC Act	Likelihood of occurrence	Justification
Weeping Myall Woodlands	Open woodlands to woodlands, generally 4-12 m high, in which *Acacia pendula* (Weeping Myall) trees are the sole or dominant overstorey species. Other vegetation may include *Alectryon oleifolius subsp. elongatus* (Western Rosewood), *Eucalyptus populnea* (Poplar Box) or *Eucalyptus largiflorens* (Black Box). *Amyema quandang* (Grey Mistletoe) commonly occurs on the branches of Weeping Myall trees. The understorey often includes an open layer of shrubs above an open ground layer of grasses and herbs, though the ecological community can exist naturally either as a shrubby or a grassy woodland. Inland alluvial plains west of the Great Dividing Range. In NSW, it occurs in the Riverina, NSW South Western Slopes, Darling Riverine Plains, Brigalow Belt South, Murray-Darling Depression, Nandewar and Cobar Peneplain Bioregions. Generally occur on flat areas, shallow depressions or gilgais on raised (relict) alluvial plains. Occurs on black, brown, red-brown or grey clay or clay loam soils.	E	Unlikely	The Weeping Myall Woodlands is only located within the Darling Riverine Plains and Brigalow Belt South, therefore this is not the correct region for this TEC. Additionally, none of the two associated REs that form components of the TEC are mapped within the Project area.
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Characterised by a species-rich understorey of native tussock grasses, herbs and scattered shrubs, and the dominance, or prior dominance, of Eucalyptus albens (White Box), E. melliodora (Yellow Box) and E. blakelyi (Blakely's Red Gum). In the Nandewar Bioregion, Eucalyptus microcarpa or E. moluccana (Grey Box) may also be dominant or co-dominant. The tree-cover is generally discontinuous and consists of widely-spaced trees of medium height in which the canopies are clearly separated. Occurs in an arc along the western slopes and tablelands of the Great Dividing Range from Southern Queensland through NSW to central Victoria. In NSW, it occurs in the Brigalow Belt South, Nandewar, New England Tableland, Sydney Basin, NSW North Coast, South Eastern Highlands, South East Corner, NSW South Western Slopes and Riverina Bioregions. Areas where rainfall is between 400 and 1200 mm per annum, on moderate to highly fertile soils at altitudes of 170 m to 1200 m.	CE	Unlikely	The White Box-Yellow Box Blakely's Red Gum Grassy Woodland and Derived Native Grassland is only found in Brigalow Belt South, Nandewar and South-eastern Queensland Bioregions. The study is within the Brigalow Belt North, and therefore outside of the range. Additionally, none of the associated REs are mapped within the Project area.

Table 2: Likelihood of occurrence for threatened flora species

Scientific name	Common name	EPBC Act	NC Act	Habitat Description	Likelihood of occurrence	Justification
Aristida annua	-	V	V	Restricted to a small area in central Queensland, the northern distribution of the species occurs on the eastern slopes of Lord's Table Mountain, north of Yungaba. Other locations include Gindi Downs via Springsure. An annual tufted grass. The species has limited survey information, however known records occur within black clay soils, basalt soils and disturbed sites. Also known to occur within the Natural grasslands of the Queensland and Central Highlands TEC.	Potential	Four records within 50 km of the Project area. Additionally, there is potential habitat mapped within the Project area, RE 11.8.11 (Xstrata, 2013). The Project area is just outside of the known species range, however, given the species has limited survey information, the precautionary principle has been applied and the species deemed a potential occurrence.
Arthraxon hispidus	Hairy-joint grass	V	V	Recorded from scattered locations across Queensland and on the northern tablelands and north coast of NSW. In Queensland it occurs north to Port Douglas, and west to disjunct occurrences around springs in Carnarvon National Park. Most occurrences are from Noosa southwards. Edges of rainforest and in wet eucalypt forest, often near creeks or swamps, as well as woodlands.	Unlikely	Potential habitat may be present as woodlands along creeks, however, no rainforests or eucalypt forests area present. No known records within 50 km of the Project area and it is just outside of the species known distribution range.
Bertya opponens	-	V	-	Stony mallee ridges and cypress pine forest on red soils. Often associated with *Eucalyptus chloroclada, Callitris glaucophylla* and *Eucalyptus fibrosa*. Flowering occurs between July and August, although seed formation can commence as early as July in some areas. The disturbance agents of fire and mechanical disturbance appear to trigger germination.	Unlikely	This species requires stony mallee ridges or cypress pine forests, both of which are not present in the Project area, therefore there is not habitat present. There is a single record within 50 km of the Project area.
Cadellia pentastylis	Ooline	V	V	Once widespread, it is now restricted in distribution from near Duaringa west of Rockhampton to the NSW border in Queensland, and on the western edge of the North West Slopes north of Gunnedah in northern NSW. Dry rainforests, semi-evergreen vine thickets and sclerophyll	Unlikely	One record known within 50 km of the Project area and within the species known distribution range. However, no suitable species habitat

Scientific name	Common name	EPBC Act	NC Act	Habitat Description	Likelihood of occurrence	Justification
				communities. Usually on low to medium nutrient soils of sandy clay or clayey consistencies. Appears to flower spasmodically, during a general flowering period of October to January. Dispersal of fruit and seed is probably by "passive fall" or by birds. Has capacity to re-sprout from rootstock and coppice vigorously from stumps, a feature which may be critical for the species survival in a fire prone environment.		(semi-evergreen vine thickets) is mapped within the Project area.
Corymbia scabrida	Rough-leaved yellowjacket	-	NT	Restricted to central Queensland, southwest of Springsure. Grows within woodland communities usually as a co-dominant in association with *Eucalyptus melanophloia, Corymbia clarksoniana, Angophora leiocarpa, Eucalyptus chloroclada* and *Corymbia polycarpa*. It occurs on low sandstone ridges and flat top hills on shallow, sandy or loamy soils, and occasionally on gravelly textured soils. Flowers have been recorded in October and fruits throughout the year.	Unlikely	Four known records within 50 km of the Project area, however, are restricted west of the Project area between Springsure and Tambo. Additionally, as the Project area is comprised of basalt soils, no suitable habitat (woodlands on sandstone) are present (Xstrata, 2013).
Cyperus clarus	-	-	V	Found from near Emerald in central Queensland to near Delungra in NSW. Once population located within Jandowae State Forest. *Cyperus clarus* is a slender tufted perennial. The species is known to grow in grasslands and open woodlands on basalt soils.	Potential	Four records within 50 km of the Project area is within the known species distribution range. Potential habitat is mapped within the Project area, RE 11.8.11, 11.8.5 and 11.8.5a (Xstrata, 2013).
Dichanthium setosum	Blue-grass	V	-	Cleared woodland, grassy roadside remnants and highly disturbed pasture, on heavy basaltic black soils and red-brown loams with clay subsoil. Associated species include *Eucalyptus albens, Eucalyptus melanophloia, Eucalyptus melliodora, Eucalyptus viminalis, Myoporum debile, Aristida ramosa, Themeda triandra, Poa sieberiana, Bothriochloa ambigua, Medicago minima, Leptorhynchos squamatus, Lomandra* aff. *longifolia, Ajuga australis, Calotis hispidula* and *Austrodanthonia, Dichopogon, Brachyscome, Vittadinia, Wahlenbergia* and *Psoralea* species.	Likely	Seven known records within 50 km of the Project area, of which three records are within 1 km of the Project area. Potential habitat has been mapped within the Project area, RE 11.8.5 and 11.8.5a (Xstrata, 2013).

Scientific name	Common name	EPBC Act	NC Act	Habitat Description	Likelihood of occurrence	Justification
				Flowering time is mostly in summer.		
Dichanthium queenslandicum	King blue-grass	E	V	King blue-grass is known to occur as a component of Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin (Natural Grasslands TEC) and is associated with other species of blue grasses (*Dichanthium* spp. and *Bothriochloa* spp.). The grassland community occurs on fine textured soils, typically cracking clays on derived from either basalt or fine-grained sedimentary rocks, on flat of gently undulating rise, in areas with relatively high summer rainfall.	Likely	16 records known within 50 km of the Project area, additionally four records within 1 km. King blue-grass was not recorded within the Project area during the previous ecology surveys, however, habitat was mapped as being present within REs 11.8.11 and mixed polygons of 11.8.11/11.8.5 (Xstrata, 2013).
Digitaria porrecta	Finger panic grass	-	NT	In Queensland occurs in the Nebo district, south-west of Mackay; the central Highlands between Springsure and Rolleston; and from Jandowae south to Warwick. Finger panic grass is known to occur in tussock grassland and open woodland of poplar box or forest red gum. The species prefers richer heavy textured soils, typically cracking clays and can occur within alluvial plains within the Brigalow Belt bioregion. Most frequently recorded in association with *Eucalyptus albens* and *Acacia pendula.*	Likely	11 records known within 50 km of the Project area, additionally four records within 1 km. The Project area is within the species known range and habitat is present within the Project area, RE 11.5.3 and 11.8.11 (Xstrata, 2013).
Eucalyptus sicilifolia	Springsure ironbark	-	V	Found exclusively within St Peter Mountain, Little St Peter Mountain and the Minerva Hills National Park within central Queensland. The species is restricted to low woodlands on the rocky hilltops and scree slopes. Associated species include *Corymbia trachyphloia, Acacia julifera subsp. curvinervia* and *Triodia mitchellii*	Unlikely	This species has a very restricted distribution, known only from St Peter Mountain, Little St Peter Mountain and Minerva Hills National Park near Springsure. The Project area is just south of the known distribution range and 31 records known within 50 km of the Project area, however, given the species specific habitat requirements (low woodlands on the rocky hilltops and scree slopes), the species is deemed

Scientific name	Common name	EPBC Act	NC Act	Habitat Description	Likelihood of occurrence	Justification
						unlikely to occur within the Project area as habitat is not present.
Eucalyptus virens	shiny-leaved ironbark	V	V	Occurring within scattered woodland communities in southern Queensland, North of Inglewood to Injune and Nour Nour National Park. The species prefers sandy soils, along hillslopes and sandstone escarpments. The species is commonly associated with *Angophora leiocarpa, Corymbia trachyphloia, Eucalyptus exserta, Allocasuarina inophloia and Lysicarpus angustifolius. Other species occasionally recorded with E. virens include E. panda, E. apothalassica, E. sideroxylon, Allocasuarina luehmannii* and *Callitris glaucophylla*	Unlikely	No records are identified within 50 km of the Project area. There is marginal habitat mapped within the Project area, but it is outside of the species known distribution range (Xstrata, 2013).
Haloragis exalata subsp. velutina	Tall velvet sea-berry	V	V	Recorded in the south-east Queensland, from Brisbane west to Bunya Mountains with isolated occurrence in Carnarvon National Park. The species prefers brown heavy clay, shallow rock loam, and basaltic soils near watercourses. However, has been recorded within woodland on the steep rocky slopes of gorges. Tall velvet sea-berry overlaps with the Natural Grasslands TEC associated with and is associated with other species of blue grasses *Dichanthium spp. and Bothriochloa spp.*	Unlikely	No species records occur within 50 km of the Project area and is out of the species known distribution range.
Leichhardtia brevifolia	-	V	V	Restricted to south east Queensland from Neerdie State Forest and as far south as Ben Lomond. Requiring moist areas of open eucalypt forest or within grasslands atop Mt Kandanga, it has been found in both sandstone and stony soils. Associated vegetation includes *Corymbia maculata, Eucalyptus crebra, E. propinqua, E. siderophloia, E. pilularis, E. microcorys, Corymbia intermedia*	Unlikely	No known records occur within 50 km of the Project area. The Project area is within the known species distribution range. However, no suitable species habitat occurs within the Project area.
Marsdenia brevifolia	-	V	V	Occurring in north and central Queensland, near Townsville, Springsure and north of Rockhampton. Plants have also been recorded at Springsure in woodlands dominated by *Corymbia erythrophloia* and *Eucalyptus crebra*, with dense *Themeda triandra* understorey on basalt. Around Townsville *M. brevifolia* has been recorded to grow on granite soils in	Likely	There are 11 known records within 50 km of the Project area. The Project area is within the known species range and potential habitat is present (RE 11.8.11) (Xstrata, 2013).

Scientific name	Common name	EPBC Act	NC Act	Habitat Description	Likelihood of occurrence	Justification
				woodlands dominated by Granite Ironbark (*E. granitica*), Rustyjacket (*C. leichhardtii*) and White Mahogany (*E. acmenoides*).		
Maundia triglochinoides	-	-	V	Scattered records within south east Queensland within heavy clay soils. The species is found exclusively around swamps, lagoons, dams, channels, creeks or shallow freshwater areas 30 - 60 cm deep.	Unlikely	There are no known records within 50 km of the Project area and there is no suitable habitat (swamps / creeks etc.) present.
Sannantha brachypoda	-	-	V	Distributed across central Queensland from Townsville and into NSW. The species prefers outcrops of granite-like rocks, on skeletal soil within low shrublands. Associated vegetation includes *Leptospermum brachyandrum, Leptospermum petersonii subsp. lanceolatum, Corymbia trachyphloia* and *Melaleuca pearsonii*	Unlikely	One record known within 50 km of the Project area. However, there is no suitable habitat (granite-like rocks, on skeletal soil) mapped within the Project area.
Solanum dissectum	-	E	E	Restricted to open woodland of *Acacia harpophylla* or *Eucalyptus thozetiana* solodic clay soils. The species is only found within central Queensland between Banana, Dululu, Moura and Thangool.	Unlikely	One record known within 50 km of the Project area. However, there is no suitable habitat mapped within the Project area and it is outside of the known distribution range.
Solanum elachophyllum	-	-	E	Confined to the subcoastal regions from Middlemont to Theodor, the species prefers fertile cracking-clay soils in open forest. Associated vegetation includes *Acacia harpophylla, Casuarina cristata, Macropteranthes* or *Eucalyptus cambageana*	Unlikely	There a no known records known within 50 km of the Project area. No suitable habitat within the Project area and it is not within a subcoastal region.
Thesium australe	Austral toadflax	V	V	Found from Bundaberg to Dalby and to the NSW border within grassland and woodland. The species can grow in heavy alluvium soil within a woodland or black cracking clay that may contain basaltic rocky soils within a grassland. Often found in association with *Eucalyptus tereticornis and E. tindaliae, Dichanthium sericeum, Themeda australis, Themeda triandra* and *Heteropogon contortus.*	Unlikely	There are no known records within 50 km and the Project area is outside of the known distribution range. Potential habitat has been mapped within the Project area, RE 11.8.11, 11.8.11a and 11.8.5 (Xstrata, 2013).
Trioncinia retroflexa	-	-	E	The population is located near Clermont and Springsure in central Queensland on dark brown or black cracking clay soils. *Trioncinia retroflexa* is found within grasslands.	Likely	There are six records within 50 km of the Project area. The Project area is also within the known distribution

Scientific name	Common name	EPBC Act	NC Act	Habitat Description	Likelihood of occurrence	Justification
						range. Potential habitat, RE 11.8.11, is mapped within the Project area (Xstrata, 2013).
Tylophora linearis	-	E	E	Scattered across south and central Queensland within dry scrub, open forest, dry woodlands of *Eucalyptus fibrosa, Eucalyptus sideroxylon, Eucalyptus albens, Callitris endlicheri, Callitris glaucophylla* and *Allocasuarina luehmannii.*	Unlikely	No records are identified within 50 km of the Project area, no potential habitat is mapped, and the Project area is outside of the known distribution range.

Table 3: Likelihood of occurrence of threatened fauna species

Scientific name	Common name	EPBC Act	NC Act	Habitat Description	Likelihood of occurrence	Justification
Birds						
Actitis hypoleucos	Common sandpiper	Mi, Ma	-	Inhabits coastal and some inland wetlands, especially around muddy margins or rocky shores. The Common Sandpiper is highly opportunistic and will forage in grassland, roadsides and gardens. Mainly restricted to the wetlands during breeding seasons, when migrating the species has been recorded in central Queensland's within rainforest to desert environments.	Potential	There are no records within 50 km of the Project area. There are no wetlands within the Project area, however, there are within the surrounding areas. Grasslands have been mapped which the Common sandpiper may use for foraging.
Apus pacificus	Fork-tailed swift	Ma, Mi	SL	Inhabiting riparian woodland, swamps, low scrub, heathland, saltmarsh, grassland, Spinifex sandplains, open farmland and inland and coastal sand-dunes. It is a non-breeding visitor to all states and territories of Australia, arriving from its breeding grounds in Siberia around October, and departing in April. The species is thought to be highly mobile within Australia, moving across the country in search of suitable foraging grounds.	Likely	There is potential habitat mapped as RE 11.8.11 within the Project area and it is within the known distribution ranges of the species. There have been five records within 50 km of the Project area.
Calidris acuminata	Sharp-tailed sandpiper	Ma, Mi	-	Found in shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. The species travels to migrant to Australia August-April to forage, the	Unlikely	The Project area is within the known distribution range, however there are no records within the Project area. There is

Scientific name	Common name	EPBC Act	NC Act	Habitat Description	Likelihood of occurrence	Justification
				migration paths can cross all regions of Queensland. They roost around edges of wetlands, lakes and flooded grasslands.		not suitable habitat (wetlands) within the Project area.
Calidris ferruginea	Curlew sandpiper	CE	CR	Mainly occur in both fresh and brackish waters on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms but are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. Curlew Sandpipers forage on mudflats and nearby shallow water and generally roost on bare dry shingle, shell or sand beaches, sandspits and islets in or around coastal or near-coastal lagoons and other wetlands, occasionally roosting in dunes during very high tides and sometimes in saltmarsh	Unlikely	The species is majority a coastal occurring species, associated with water and mudflats. There is no suitable habitat mapped within the Project area. There are no known records within 50 km of the Project area.
Calidris melanotos	Pectoral sandpiper	Mi	-	Found around shallow fresh to saline wetlands, including coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. They breed in northern Russia and North America then migrates to Australia from September to June. During the migration they stop around ephemeral and permanent lakes, dams and waterholes throughout Australia.	Unlikely	There is no suitable habitat (wetlands) mapped within the Project area and known records within 50 km of the Project area.
Cuculus optatus	Oriental cuckoo	Mi	SL	Occurring in the Gulf of Carpentaria and Cape York Peninsular to the Queensland/New South Wales border, including inland areas of eastern Queensland. They inhabit monsoon forest, rainforest edges, leafy trees in paddocks, river flats, roadsides, mangroves and islands.	Unlikely	The Project area is within the known distribution range, however there is no suitable habitat mapped or known records within 50 km of the Project area.
Erythrotriorchis radiatus	Red goshawk	V	E	Occurs in coastal and sub-coastal areas in riverine, wooded and forested lands of tropical and warm-temperate Australia. Known to prefer forest and woodland with a mosaic of vegetation types, large prey populations (birds), and permanent water. The vegetation types include eucalypt woodland, open forest, tall open forest, gallery rainforest, swamp sclerophyll forest, and rainforest margins. The Red	Unlikely	The species is known to prefer intact, tall vegetation types, therefore, the dominant habitat within the Project area (grasslands) is unlikely to be suitable. Additionally, there is no permanent water within the Project area and this species

Scientific name	Common name	EPBC Act	NC Act	Habitat Description	Likelihood of occurrence	Justification
				Goshawk nests in large trees, frequently the tallest and most massive in a tall stand, and nest trees are invariably within one km of permanent water. It hunts in open forests and gallery forests, with a home range of up to 200 km2, taking mostly medium to large birds, but also snakes.		required large water sources. There is one known record within 50 km of the Project area, however, likely observed prior to broadscale clearing of the region.
Falco hypoleucos	Grey falcon	V	V	Infrequently seen over much of arid and semi-arid Australia with a range covering eastern Australia, especially arid regions, and northern Australia south to approximately 26S degrees. Inhabits open woodlands, stony plains, acacia scrublands, grasslands, and watercourses.	Potential	The majority of species records occur within the arid and semi-arid Australia, in which the Project area is not situated. However, given the species can inhabit grasslands and there are two known records within 50 km of the Project area, there is potential for the species to occasionally occur.
Gallinago hardwickii	Latham's snipe	Ma, Mi	-	Inhabiting freshwater, saline or brackish wetlands up to 2000 m above sea-level, they are usually found in freshwater swamps, flooded grasslands or heathlands. Non-breeding migrant to Australia, arriving between July-November from its breeding grounds in Japan and far-eastern Russia, and departing by late February. They can be found throughout Queensland during the migration seasons, stopping at waterholes and lakes. It feeds in mud or in very shallow water with low, dense vegetation. Roosting occurs on the ground near or in foraging areas beside or under clumps of vegetation, among dense tea-tree, in forests, in drainage ditches or plough marks, among boulders, or in shallow water if cover is unavailable.	Unlikely	There are five known records within 50 km of the Project area. However, there is no suitable habitat mapped within the Project area as this species utilises permanent watercourses or areas that are inundated with seasonal rains.
Gelochelidon nilotica	Gull-billed tern	-	SL	The Gull-billed tern is found in freshwater environments including swamps, brackish and salt lakes, beaches and estuarine mudflats, floodwaters, sewage farms, irrigated croplands and grasslands. The diet of the Gull-billed tern is very diverse consisting of small fish, reptiles, amphibians, crustaceans, small mammals, insects and their larvae.	Unlikely	There is a single known record within 50 km of the Project area. However, there is no suitable habitat within the Project area, due to the species habitat requiring large freshwater areas.

Scientific name	Common name	EPBC Act	NC Act	Habitat Description	Likelihood of occurrence	Justification
Geophaps scripta scripta	Squatter pigeon (southern)	V	V	The Squatter Pigeon (southern) occurs mainly in grassy woodlands and open forests that are dominated by eucalypts. It has also been recorded in sown grasslands with scattered remnant trees, disturbed habitats i.e. around stockyards, along roads and railways, and around settlements, in scrub and acacia growth, and remains common in heavily grazed country north of the Tropic of Capricorn. The species is commonly observed nesting in habitats that are located close to bodies of water close to an abundance of insects.	Likely	Suitable habitat (grassy woodlands) occurs across the Project area and there are 30 known records within 50 km of the Project area. There are no watercourses within the Project area, but there are in the surrounding areas.
Grantiella picta	Painted honeyeater	V	V	Sparsely distributed from southern Victoria and south-eastern South Australia to far northern Queensland and eastern Northern Territory where it inhabits forests, woodlands and dry shrublands, often with abundant mistletoe. The species is sparsely distributed from south-eastern Australia to north-western Queensland and eastern Northern Territory. The greatest concentrations and almost all records of breeding come from south of 26S degrees, on inland slopes of the Great Dividing Range between the Grampians, Victoria and Roma. The species forages on insects and nectar from mistletoe or eucalypts are occasionally eaten.	Unlikely	The species is a mistletoe specialist, often from the *Amneya* genus occurring on host trees of brigalow or eucalypts. Given the dominant habitat type within the Project area being grasslands and there are no known records within 50 km of the Project area, the species is unlikely to occur.
Hirundapus caudacutus	White-throated needletail	V	V	Occur most often over open forest and rainforest, as well as heathland, and remnant vegetation in farmland. They breed in eastern Siberia, north-eastern China and Japan and migrate over mainland Australia in September–October, and most depart by April. Only roosting temporarily in forests and woodlands, both among dense foliage in the canopy or in hollows.	Potential	The species is almost exclusively aerial when in Australia and is a non-breeding visitor. As the species forages above a variety of habitat type and there are 13 known records within 50 km of the Project area including within the adjacent Stage 1 and Stage 2 areas, potential non-breeding habitat is present.
Hydroprogne caspia	Caspian tern	Ma, Mi	SL	In Queensland the Caspian tern is widespread in coastal regions, from the southern Gul of Carpentaria to the Torres Strait, and along the eastern coast. The Caspian tern predominantly inhabits sheltered coastal embayment's preferably with sandy or muddy margins such as	Unlikely	There has been a single record within 50 km of the Project area, likely this was a record whilst the species was migrating. The Project area is outside of the species distribution range and there is no suitable

Scientific name	Common name	EPBC Act	NC Act	Habitat Description	Likelihood of occurrence	Justification
				harbours, lagoons, inlets, bays etc. They also inhabit near coastal or inland terrestrial wetlands (freshwater or saline) such as lakes, waterholes, reservoirs, rivers and creeks. Artificial wetlands area also sometimes inhabited.		habitat within the Project area due to the absence of large bodies of water.
Motacilla flava	Yellow wagtail	Ma, Mi	-	Preferring swamp margins, sewage ponds, saltmarshes, grasslands, and open woodland. They breed in Europe to Siberia and west Alaska, migrating to Australia from November to April. Foraging on small insects they are found scattered throughout Australia.	Unlikely	No known records within 50 km of the Project area and only marginal habitat (grasslands) within the Project area. Given the species preference for swamps and lack of species records in the region, the species is unlikely to occur.
Myiagra cyanoleuca	Satin flycatcher	Ma, Mi	-	Inhabiting eucalypt dominated forests, especially near wetlands, watercourses, and heavily vegetated gullies. The Satin Flycatchers move north in autumn to spend winter in northern Australia and New Guinea. They often forage in groups, usually of adults and their newly fledged young, in drier, more open forests. They usually will usually nest built in the high, exposed outer branches of a tree.	Unlikely	There are seven known records within 50 km of the Project area. However, the species prefers heavily vegetated gullies, forest near wetlands and/or watercourse. These habitats are not presence within the Project area. .
Neochmia ruficauda ruficauda	Star finch	E	E	Found across northern and central Australia in isolated geographical regions. They inhabit grasslands and sclerophyll woodlands, near permanent water, and often in or near cleared suburban areas. The Star Finch is very susceptible to habitat loss as it requires permanent flowing water sources.	Unlikely	There is some potentially suitable habitat (grassland RE 11.8.11) within the Project area, however, there are no known records within 50 km of the Project area. Additionally, there are no permanent flowing water sources within the Project area that the species requires, and many surrounding are ephemeral.
Phoephila cincta cincta	Southern black-throated finch	E	E	The current distribution of the Black-throated Finch has now largely contracted and is only locally common in Queensland at sites near Townsville and Charters Towers, with small flocks scattered throughout the Brigalow Belt North and Desert Uplands bioregions. Inhabits grassy open woodlands and forests, typically characterised by Eucalyptus, Acacia and Melaleuca. It is usually found within a few kilometres of water.	Unlikely	No known records within 50 km of the Project area and outside the species known range.

Scientific name	Common name	EPBC Act	NC Act	Habitat Description	Likelihood of occurrence	Justification
Psephotus pulcherrimus	Paradise parrot	EX	EX	Extinct in the wild the Paradise Parrot preferred native to the grassy woodlands. They use hollowed-out termite mounds near ground level for nesting.	Extinct	Two historical records, however, now extinct in the wild. The last confirmed sighting was in 1927.
Rhipidura rufifrons	Rufous fantail	Ma, Mi	-	Inhabiting wet sclerophyll forests, subtropical and temperate rainforests. Sometimes drier sclerophyll forests and woodlands with shrubby / heathy understorey. Mostly in low to middle strata of forests. During migration in March to early April they are found in central Queensland moving to coastal lowlands and offshore islands in south-east Queensland, north to Cape York Peninsula and Torres Strait Island.	Unlikely	There is a single record within 50 km of the Project area. No suitable habitat (wet sclerophyll forests / rainforest) is present within the Project area. Although the species may utilise woodlands when on passage, woodland habitat within the Project area is open without a shrubby understory and therefore is unlikely to be suitable.
Rostratula australis	Australian painted snipe	E	V	Variety of habitats but generally dependent on presence of water. Inhabits shallow terrestrial freshwater wetlands, including temporary and permanent lakes, swamps and claypans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms, bore drains, and leaking irrigation channels.	Unlikely	There is a single record within 50 km of the Project area, however, there is no wetlands or seasonally inundated areas within the Project area.
Mammals						
Chalinolobus dwyeri	Large-eared pied bat	V	V	Occurs north of Rockhampton (QLD) through to Ulladulla (NSW). Habitat includes dry sclerophyll forests, woodland, sub-alpine woodland, edges of rainforests and wet sclerophyll forests. Sandstone cliffs and fertile woodland valley habitat within proximity of each other are considered important to species. Records from south-east Queensland suggest that rainforest and moist eucalypt forest habitats on other geological substrates (rhyolite, trachyte and basalt) at high elevation, are of similar importance. Records have been found within several kilometres of cliff lines or rocky terrain within Brigalow (Acacia harpophylla dominant and co-dominant); and White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.	Unlikely	There are no known records within 50 km of the Project area and the Project area is outside the species likely range (ABS, 2021). The species requires cliff lines or rocky terrain in which in roosts in caves. These features are likely absent from the Project area and surrounding region.

Scientific name	Common name	EPBC Act	NC Act	Habitat Description	Likelihood of occurrence	Justification
Dasyurus hallucatus	Northern quoll	E	-	Found across Queensland, habitat features include high relief areas that have shallower soils, boulders and rocky areas for denning, low fire impact and close to permanent water. The species occupies a diversity of habitats across its range including eucalypt forest and woodlands, rainforests, sandy lowlands and beaches, shrubland, grasslands and desert. Habitat generally encompasses some form of rocky area for denning purposes with surrounding vegetated habitats used for foraging and dispersal. Rocky habitats are usually of high relief, often rugged and dissected but can also include tor fields or caves in low lying areas. Eucalypt forest or woodland habitats usually have a high structural diversity containing large diameter trees, termite mounds or hollow logs for denning purposes.	Unlikely	There are only four known records within 50 km of the Project area, however, and given the rapid decline of the species in the region, it is unlikely to persist in the area. Further, no suitable denning habitat (rocky areas) to support the species presence occurs within the study are or adjacent areas.
Macroderma gigas	Ghost bat	V	E	Living in Caves Ghost bats have maternity colonies that can get over 1000 individuals. The species occurs in two disjunction distributions and 4 known disjunct subpopulations throughout Queensland. Two populations occur from coastal northeast Queensland from near the tip of Cape York Peninsula to approximately Gladstone.	Unlikely	There were no caves recorded during the previous field surveys within the Project area and there are no known records within 50 km of the Project area. The Project area is outside the species known range (ABS, 2021).
Nyctophilus corbeni	Corben's long-eared bat (formerly South-eastern long-eared bat)	V	V	This species can occur in a range of inland woodland vegetation types, including box, ironbark, cypress pine woodlands, brigalow woodland and River Red Gum forests lining watercourses and lakes. Throughout inland Queensland, the species' habitat is dominated by various eucalypt and bloodwood species and is most abundant in vegetation with a distinct canopy and a dense cluttered shrub layer.	Unlikely	There are no known records within 50 km of the Project area and the Project area is outside the species potential range (ABS, 2021).
Petauroides armillatus	Central greater glider	V	V	The Central Greater Glider is largely restricted to eucalypt forest and woodlands, with a preference for old growth with abundant large tree hollows (den habitat). The species is typically found in highest abundance in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows. The greater glider's preferred feed tree species varies with season and it favours forests with a diversity of eucalypt species.	Potential	The species is known to occur in the region (>50 records within 50 km of the Project area) and requires large hollow-bearing trees for denning. Some marginal habitat may be present within larger eucalyptus associated with RE 11.8.5, 11.8.5a, 11.9.2 and 11.5.3. No hollows

Scientific name	Common name	EPBC Act	NC Act	Habitat Description	Likelihood of occurrence	Justification
						were recorded during the last field survey which is den habitat, however it was recorded within the surrounding MLs (Xstrata, 2013).
Phascolarctos cinereus (combined populations of QLD, NSW and the ACT)	Koala	V	V	Scattered populations throughout Qld, including moist forests in coastal areas, subhumid woodlands in southern and central regions, and along watercourses in semiarid eucalypt forested landscapes in the west. May also be found along non-riverine communities in semi-arid areas. Preferred habitat includes a range of temperate, sub-tropical and tropical forest, woodlands and semiarid vegetation types dominated by eucalyptus species. Also known to be limited to altitudes <800 m ASL and may be affected by temperature and leaf moisture in the western and northern parts of its range	Potential	The species is known to occur in the region with >40 records within 50 km of the Project area. Whilst the species is more readily encountered in eucalypt forests along watercourses when in central Qld, all vegetation types dominated by eucalyptus specie provides suitable species habitat. This includes eucalyptus woodlands associated with RE 11.8.5, 11.8.5a, 11.9.2 and 11.5.3 within the Project area.
Reptiles						
Acanthophis antarcticus	Common death adder	-	V	The Common Death Adders inhabit a wide range of habitats ranging from grasslands, woodlands, heaths, rocky ranges and outcrops. They require loose leaf litter and debris in woodland, shrubland and grassland to be successful.	Potential	There are known records within 50 km of the Project area. Whilst some potential habitat (grassland) occurs within the Project area, habitat present requires essential microhabitat features such as leaf litter and debris to be suitable.
Delma torquata	Collared delma	V	V	Habits rocky areas associated with dry open eucalypt and acacia woodlands with an open mid-story. The majority of records of this species are from SE Queensland, western suburbs of Brisbane and the Toowoomba ranges. They require habitat which has rocky outcrops on ridges or slopes where the vegetation is eucalypt dominated. The presence of rocks, logs, bark and other coarse woody debris, and mats of leaf litter (typically 30–100 mm thick) appears to be an essential characteristic of the collared Delma microhabitat and is always present where the species occurs.	Unlikely	There is no suitable habitat present within the Project area and there are no known records within 50 km of the Project area.

Scientific name	Common name	EPBC Act	NC Act	Habitat Description	Likelihood of occurrence	Justification
Denisonia maculata	Ornamental snake	V	V	Known from the north Brigalow Belt and parts of the Belt south dominated by *Acacia harpophylla, Acacia cambagei, Acacia argyrodendron* and Eucalyptus coolabah. Key distribution occurring in the Fitzroy and Dawson Rivers drainage system. Habitat includes areas that contain their main prey - frogs, in woodlands and open forests with moist areas. In particular areas with gilgai mounds, depressions, lake margins and wetlands	Unlikely	There is only a single known record within 50 km of the Project area. The species has a strong preference for gilgai formations where water holding capacity and associated prey species (frogs) are present. The species requires cracking clays to shelter during dry periods. Suitable habitat of this type is not present within the Project area.
Egernia rugosa	Yakka skink	V	V	The core range is the Brigalow Belt South and Mulga Lands bioregions. Other populations have been recorded throughout the Brigalow Belt North and Einasleigh Uplands Bioregions. They inhabit dry eucalypt and acacia woodlands and open woodlands, and can be found in cavities, between and under rocks, logs, tree stumps or abandoned animal burrows. Generally Yakka Skink does not live in trees or rocky areas or in cleared habitat.	Potential	The Project area is within the Brigalow Belt North region, therefore not within the species core range. However, it is within the outer range and some suitable habitat woodlands habitat on suitable habitat for burrowing occur (RE 11.5.3 and 11.9.2) within the Project area. There is a single known record within 50 km of the Project area.
Elseya albagula	White-throated snapping turtle	CE	CR	Found within the Burnett, Fitzroy, Raglan and Mary river drainages of south-east Queensland. It prefers permanent flowing water habitats where there are suitable shelters and refuges (e.g. fallen trees). Loss or alteration to main river channels in the Burnett, Fitzroy, Raglan and Mary river has restricted the population from spreading into tributaries and smaller rivers	Unlikely	There is no permanent flowing water within the Project area, which is the habitat of the White-throated snapping turtle. Additionally, there have been no records within 50 km of the study are.
Furina dunmalli	Dunmall's snake	V	V	Occurs primarily in the Brigalow Belt region in the south-eastern interior of Queensland, generally at elevations between 200–500 m above sea level. Habitat includes forests and woodlands on black alluvial cracking clay and clay loams dominated by Brigalow, other Wattles, native Cypress or Bull-oak. Also, various Blue Spotted Gum, Ironbark, White Cypress Pine and Bulloak open forest and woodland associations on sandstone derived soils. In Queensland, its range extends from	Unlikely	No known records within 50 km of the Project area. Additionally, of the few records of the species known, these have occurred on black alluvial cracking clay and clay loams dominated by Brigalow, other Wattles, native Cypress or Bull-oak or within Spotted Gum, Ironbark, White Cypress Pine and Bulloak open forest and

Scientific name	Common name	EPBC Act	NC Act	Habitat Description	Likelihood of occurrence	Justification
				Yeppoon and the Expedition Range in the north, to Oakey, Glenmorgan and Inglewood in the south.		woodland associations on sandstone derived soils, none of which occur within the Project area.
Rheodytes leukops	Fitzroy river turtle	V	V	Found in Fitzroy River with large, clear, deep pools with rocky, gravelly or sandy substrates, connected by shallow riffles. Often associated with riparian vegetation comprised of Blue Gums (*Eucalyptus tereticornis*), River Oaks (*Casuarina cunninghamiana*), Weeping Bottlebrushes (*Callistemon viminalis*) and Paperbarks (*Melaleuca linariifolia*).	Unlikely	There are no watercourses which intersect the Project area, additionally there are no known records within 50 km of the Project area.
Strophurus taenicauda	Golden-tailed gecko	-	NT	Occurs in the south-eastern portion of the Brigalow Belt. This species is arboreal, preferring dry sclerophyll forests and eucalypt and Callitris woodlands within the Darling Downs to coastal regions of central and south-eastern Qld. They require areas of low fire to shelter in loose bark and hollow limbs offer abundant shelter.	Unlikely	No suitable habitat is mapped within the Project area and there are no known records within 50 km of the Project area.

Appendix C: Desktop searches

Australian Government

Department of Agriculture, Water and the Environment

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

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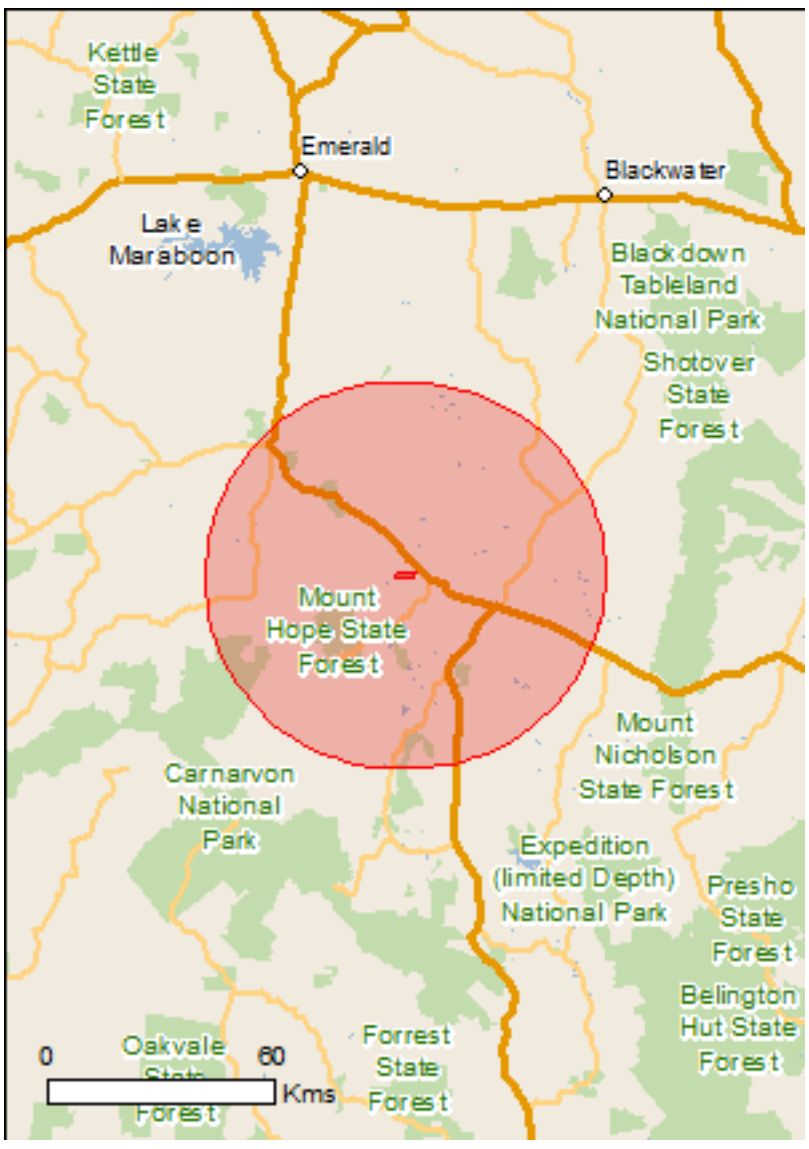
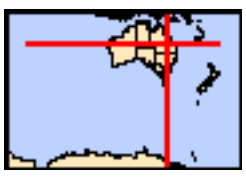


This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2015

Coordinates

Buffer: 50.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	7
Listed Threatened Species:	31
Listed Migratory Species:	12

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	17
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	8
Regional Forest Agreements:	None
Invasive Species:	29
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Brigalow (Acacia harpophylla dominant and co-dominant)	Endangered	Community known to occur within area
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	Endangered	Community likely to occur within area
Natural Grasslands of the Queensland Central Highlands and northern Fitzroy Basin	Endangered	Community likely to occur within area
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	Community likely to occur within area
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	Endangered	Community likely to occur within area
Weeping Myall Woodlands	Endangered	Community likely to occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat known to occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat known to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat may occur within area
Neochmia ruficauda ruficauda Star Finch (eastern), Star Finch (southern) [26027]	Endangered	Species or species habitat likely to occur within area
Poephila cincta cincta Southern Black-throated Finch [64447]	Endangered	Species or species

Name	Status	Type of Presence
		habitat may occur within area
[Rostratula australis](#) Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Mammals		
[Chalinolobus dwyeri](#) Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
[Dasyurus hallucatus](#) Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat known to occur within area
[Nyctophilus corbeni](#) Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may occur within area
[Petauroides volans](#) Greater Glider [254]	Vulnerable	Species or species habitat known to occur within area
[Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)](#) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Plants		
[Aristida annua](#) [17906]	Vulnerable	Species or species habitat known to occur within area
[Arthraxon hispidus](#) Hairy-joint Grass [9338]	Vulnerable	Species or species habitat likely to occur within area
[Bertya opponens](#) [13792]	Vulnerable	Species or species habitat known to occur within area
[Cadellia pentastylis](#) Ooline [9828]	Vulnerable	Species or species habitat known to occur within area
[Dichanthium queenslandicum](#) King Blue-grass [5481]	Endangered	Species or species habitat known to occur within area
[Dichanthium setosum](#) bluegrass [14159]	Vulnerable	Species or species habitat known to occur within area
[Eucalyptus virens](#) [10181]	Vulnerable	Species or species habitat likely to occur within area
[Haloragis exalata subsp. velutina](#) Tall Velvet Sea-berry [16839]	Vulnerable	Species or species habitat may occur within area
[Marsdenia brevifolia](#) [64585]	Vulnerable	Species or species habitat known to occur within area
[Thesium australe](#) Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area
[Tylophora linearis](#) [55231]	Endangered	Species or species habitat may occur within area
Reptiles		

Name	Status	Type of Presence
Delma torquata Adorned Delma, Collared Delma [1656]	Vulnerable	Species or species habitat may occur within area
Denisonia maculata Ornamental Snake [1193]	Vulnerable	Species or species habitat known to occur within area
Egernia rugosa Yakka Skink [1420]	Vulnerable	Species or species habitat known to occur within area
Elseya albagula Southern Snapping Turtle, White-throated Snapping Turtle [81648]	Critically Endangered	Species or species habitat likely to occur within area
Furina dunmalli Dunmall's Snake [59254]	Vulnerable	Species or species habitat may occur within area
Rheodytes leukops Fitzroy River Turtle, Fitzroy Tortoise, Fitzroy Turtle, White-eyed River Diver [1761]	Vulnerable	Species or species habitat likely to occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Pandion haliaetus		
Osprey [952]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Anseranas semipalmata		
Magpie Goose [978]		Species or species habitat may occur within area
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area
Chrysococcyx osculans		
Black-eared Cuckoo [705]		Species or species habitat likely to occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster		
White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
Hirundapus caudacutus		
White-throated Needletail [682]	Vulnerable	Species or species habitat may occur within area
Merops ornatus		
Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla flava		
Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca		
Satin Flycatcher [612]		Species or species habitat known to occur within area
Pandion haliaetus		
Osprey [952]		Species or species habitat may occur within area
Rhipidura rufifrons		
Rufous Fantail [592]		Species or species habitat may occur within area
Rostratula benghalensis (sensu lato)		
Painted Snipe [889]	Endangered*	Species or species habitat may occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Albinia	QLD
Albinia	QLD
Albinia	QLD
Carnarvon	QLD
Cometside	QLD
Minerva Hills	QLD
Phiara Downs	QLD
Rainbow	QLD

Invasive Species	[Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis		
Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos		
Mallard [974]		Species or species habitat likely to occur within area
Columba livia		
Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur

Name	Status	Type of Presence
		within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat known to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Equus caballus Horse [5]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Acacia nilotica subsp. indica Prickly Acacia [6196]		Species or species habitat may occur within area
Cryptostegia grandiflora Rubber Vine, Rubbervine, India Rubber Vine, India Rubbervine, Palay Rubbervine, Purple Allamanda [18913]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Hymenachne amplexicaulis Hymenachne, Olive Hymenachne, Water Stargrass, West Indian Grass, West Indian Marsh Grass [31754]		Species or species habitat likely to occur within area
Jatropha gossypifolia Cotton-leaved Physic-Nut, Bellyache Bush, Cotton-leaf Physic Nut, Cotton-leaf Jatropha, Black Physic Nut [7507]		Species or species habitat likely to occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Parkinsonia aculeata Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]		Species or species habitat likely to occur within area
Parthenium hysterophorus Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566]		Species or species habitat likely to occur within area
Vachellia nilotica Prickly Acacia, Blackthorn, Prickly Mimosa, Black Piquant, Babul [84351]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-24.39094 148.38743,-24.40399 148.38366,-24.403 148.43001,-24.39382 148.43278,-24.39094 148.38743

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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Queensland Government

WildNet species list

Search Criteria: Species List for a Specified Point
Species: All
Type: All
Queensland status: All
Records: All
Date: All
Latitude: -24.3970
Longitude: 148.4074
Distance: 50
Email: Talia.Jenner@ecoaus.com.au
Date submitted: Wednesday 01 Sep 2021 11:31:41
Date extracted: Wednesday 01 Sep 2021 11:40:02

The number of records retrieved = 1482

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Bufonidae	*Rhinella marina*	cane toad	Y			48
animals	amphibians	Hylidae	*Cyclorana alboguttata*	greenstripe frog		C		16/3
animals	amphibians	Hylidae	*Cyclorana brevipes*	superb collared frog		C		2
animals	amphibians	Hylidae	*Cyclorana cultripes*	grassland collared frog		C		2
animals	amphibians	Hylidae	*Cyclorana novaehollandiae*	eastern snapping frog		C		9
animals	amphibians	Hylidae	*Cyclorana platycephala*	water holding frog		C		2
animals	amphibians	Hylidae	*Cyclorana verrucosa*	rough collared frog		C		2/2
animals	amphibians	Hylidae	*Litoria caerulea*	common green treefrog		C		53
animals	amphibians	Hylidae	*Litoria fallax*	eastern sedgefrog		C		3
animals	amphibians	Hylidae	*Litoria inermis*	bumpy rocketfrog		C		5
animals	amphibians	Hylidae	*Litoria latopalmata*	broad palmed rocketfrog		C		25/2
animals	amphibians	Hylidae	*Litoria peronii*	emerald spotted treefrog		C		10/1
animals	amphibians	Hylidae	*Litoria rubella*	ruddy treefrog		C		20
animals	amphibians	Limnodynastidae	*Limnodynastes peronii*	striped marshfrog		C		2
animals	amphibians	Limnodynastidae	*Limnodynastes salmini*	salmon striped frog		C		34/2
animals	amphibians	Limnodynastidae	*Limnodynastes tasmaniensis*	spotted grassfrog		C		57/1
animals	amphibians	Limnodynastidae	*Limnodynastes terraereginae*	scarlet sided pobblebonk		C		13
animals	amphibians	Limnodynastidae	*Platyplectrum ornatum*	ornate burrowing frog		C		21/2
animals	amphibians	Myobatrachidae	*Pseudophryne major*	great brown broodfrog		C		4/1
animals	amphibians	Myobatrachidae	*Uperoleia rugosa*	chubby gungan		C		3/2
animals	birds	Acanthizidae	*Acanthiza apicalis*	inland thornbill		C		5
animals	birds	Acanthizidae	*Acanthiza chrysorrhoa*	yellow-rumped thornbill		C		11
animals	birds	Acanthizidae	*Acanthiza nana*	yellow thornbill		C		10
animals	birds	Acanthizidae	*Acanthiza pusilla*	brown thornbill		C		6
animals	birds	Acanthizidae	*Acanthiza reguloides*	buff-rumped thornbill		C		19
animals	birds	Acanthizidae	*Gerygone fusca*	western gerygone		C		1
animals	birds	Acanthizidae	*Gerygone olivacea*	white-throated gerygone		C		51
animals	birds	Acanthizidae	*Pyrrholaemus sagittatus*	speckled warbler		C		10
animals	birds	Acanthizidae	*Sericornis frontalis*	white-browed scrubwren		C		6
animals	birds	Acanthizidae	*Smicrornis brevirostris*	weebill		C		84
animals	birds	Accipitridae	*Accipiter cirrocephalus*	collared sparrowhawk		C		5
animals	birds	Accipitridae	*Accipiter fasciatus*	brown goshawk		C		13
animals	birds	Accipitridae	*Aquila audax*	wedge-tailed eagle		C		38
animals	birds	Accipitridae	*Aviceda subcristata*	Pacific baza		C		3
animals	birds	Accipitridae	*Circus approximans*	swamp harrier		C		1
animals	birds	Accipitridae	*Circus assimilis*	spotted harrier		C		10
animals	birds	Accipitridae	*Elanus axillaris*	black-shouldered kite		C		27
animals	birds	Accipitridae	*Haliaeetus leucogaster*	white-bellied sea-eagle		C		3
animals	birds	Accipitridae	*Haliastur sphenurus*	whistling kite		C		49
animals	birds	Accipitridae	*Hieraaetus morphnoides*	little eagle		C		2
animals	birds	Accipitridae	*Lophoictinia isura*	square-tailed kite		C		2
animals	birds	Accipitridae	*Milvus migrans*	black kite		C		20
animals	birds	Acrocephalidae	*Acrocephalus australis*	Australian reed-warbler		C		5
animals	birds	Aegothelidae	*Aegotheles cristatus*	Australian owlet-nightjar		C		48
animals	birds	Alaudidae	*Mirafra javanica*	Horsfield's bushlark		C		62
animals	birds	Alcedinidae	*Ceyx azureus*	azure kingfisher		C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Anatidae	*Anas castanea*	chestnut teal		C		1
animals	birds	Anatidae	*Anas gracilis*	grey teal		C		7
animals	birds	Anatidae	*Anas superciliosa*	Pacific black duck		C		32
animals	birds	Anatidae	*Aythya australis*	hardhead		C		7
animals	birds	Anatidae	*Chenonetta jubata*	Australian wood duck		C		12
animals	birds	Anatidae	*Cygnus atratus*	black swan		C		4
animals	birds	Anatidae	*Dendrocygna arcuata*	wandering whistling-duck		C		1
animals	birds	Anatidae	*Dendrocygna eytoni*	plumed whistling-duck		C		10
animals	birds	Anatidae	*Malacorhynchus membranaceus*	pink-eared duck		C		1
animals	birds	Anatidae	*Spatula rhynchotis*	Australasian shoveler		C		1
animals	birds	Anhingidae	*Anhinga novaehollandiae*	Australasian darter		C		9
animals	birds	Apodidae	*Apus pacificus*	fork-tailed swift		SL		5
animals	birds	Apodidae	*Hirundapus caudacutus*	white-throated needletail		V	V	2
animals	birds	Ardeidae	*Ardea alba modesta*	eastern great egret		C		15
animals	birds	Ardeidae	*Ardea intermedia*	intermediate egret		C		5
animals	birds	Ardeidae	*Ardea pacifica*	white-necked heron		C		9
animals	birds	Ardeidae	*Bubulcus ibis*	cattle egret		C		1
animals	birds	Ardeidae	*Egretta garzetta*	little egret		C		1
animals	birds	Ardeidae	*Egretta novaehollandiae*	white-faced heron		C		18
animals	birds	Ardeidae	*Ixobrychus flavicollis*	black bittern		C		1
animals	birds	Ardeidae	*Nycticorax caledonicus*	nankeen night-heron		C		7
animals	birds	Artamidae	*Artamus cinereus*	black-faced woodswallow		C		36
animals	birds	Artamidae	*Artamus cyanopterus*	dusky woodswallow		C		5
animals	birds	Artamidae	*Artamus leucorynchus*	white-breasted woodswallow		C		15
animals	birds	Artamidae	*Artamus minor*	little woodswallow		C		18
animals	birds	Artamidae	*Artamus personatus*	masked woodswallow		C		4
animals	birds	Artamidae	*Artamus superciliosus*	white-browed woodswallow		C		8
animals	birds	Artamidae	*Cracticus nigrogularis*	pied butcherbird		C		121
animals	birds	Artamidae	*Cracticus torquatus*	grey butcherbird		C		74
animals	birds	Artamidae	*Gymnorhina tibicen*	Australian magpie		C		166
animals	birds	Artamidae	*Strepera graculina*	pied currawong		C		54
animals	birds	Artamidae	*Strepera graculina graculina*	pied currawong (eastern Australia)		C		4
animals	birds	Burhinidae	*Burhinus grallarius*	bush stone-curlew		C		5
animals	birds	Cacatuidae	*Cacatua galerita*	sulphur-crested cockatoo		C		107
animals	birds	Cacatuidae	*Cacatua sanguinea*	little corella		C		1
animals	birds	Cacatuidae	*Calyptorhynchus funereus*	yellow-tailed black-cockatoo		C		4
animals	birds	Cacatuidae	*Eolophus roseicapilla*	galah		C		64
animals	birds	Cacatuidae	*Nymphicus hollandicus*	cockatiel		C		71
animals	birds	Campephagidae	*Coracina maxima*	ground cuckoo-shrike		C		6
animals	birds	Campephagidae	*Coracina novaehollandiae*	black-faced cuckoo-shrike		C		82
animals	birds	Campephagidae	*Coracina papuensis*	white-bellied cuckoo-shrike		C		28
animals	birds	Campephagidae	*Coracina tenuirostris*	cicadabird		C		11
animals	birds	Campephagidae	*Lalage leucomela*	varied triller		C		1
animals	birds	Campephagidae	*Lalage tricolor*	white-winged triller		C		9
animals	birds	Caprimulgidae	*Caprimulgus macrurus*	large-tailed nightjar		C		1
animals	birds	Casuariidae	*Dromaius novaehollandiae*	emu		C		32

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Charadriidae	*Elseyornis melanops*	black-fronted dotterel		C		3
animals	birds	Charadriidae	*Vanellus miles*	masked lapwing		C		13
animals	birds	Charadriidae	*Vanellus miles novaehollandiae*	masked lapwing (southern subspecies)		C		5
animals	birds	Charadriidae	*Vanellus tricolor*	banded lapwing		C		2
animals	birds	Ciconiidae	*Ephippiorhynchus asiaticus*	black-necked stork		C		3
animals	birds	Cisticolidae	*Cisticola exilis*	golden-headed cisticola		C		68
animals	birds	Climacteridae	*Climacteris picumnus*	brown treecreeper		C		8
animals	birds	Climacteridae	*Cormobates leucophaea*	white-throated treecreeper		C		1
animals	birds	Climacteridae	*Cormobates leucophaea metastasis*	white-throated treecreeper (southern)		C		12
animals	birds	Columbidae	*Columba livia*	rock dove	Y			3
animals	birds	Columbidae	*Geopelia cuneata*	diamond dove		C		8
animals	birds	Columbidae	*Geopelia humeralis*	bar-shouldered dove		C		41
animals	birds	Columbidae	*Geopelia striata*	peaceful dove		C		61
animals	birds	Columbidae	*Geophaps scripta scripta*	squatter pigeon (southern subspecies)		V	V	12
animals	birds	Columbidae	*Leucosarcia melanoleuca*	wonga pigeon		C		1
animals	birds	Columbidae	*Ocyphaps lophotes*	crested pigeon		C		92
animals	birds	Columbidae	*Phaps chalcoptera*	common bronzewing		C		12
animals	birds	Coraciidae	*Eurystomus orientalis*	dollarbird		C		21
animals	birds	Corcoracidae	*Corcorax melanorhamphos*	white-winged chough		C		8
animals	birds	Corcoracidae	*Struthidea cinerea*	apostlebird		C		79
animals	birds	Corvidae	*Corvus bennetti*	little crow		C		8
animals	birds	Corvidae	*Corvus coronoides*	Australian raven		C		52
animals	birds	Corvidae	*Corvus orru*	Torresian crow		C		156/1
animals	birds	Corvidae	*Corvus sp.*			C		12
animals	birds	Cuculidae	*Cacomantis flabelliformis*	fan-tailed cuckoo		C		3
animals	birds	Cuculidae	*Cacomantis pallidus*	pallid cuckoo		C		14
animals	birds	Cuculidae	*Cacomantis variolosus*	brush cuckoo		C		12
animals	birds	Cuculidae	*Centropus phasianinus*	pheasant coucal		C		66
animals	birds	Cuculidae	*Chalcites basalis*	Horsfield's bronze-cuckoo		C		16
animals	birds	Cuculidae	*Chalcites lucidus*	shining bronze-cuckoo		C		4
animals	birds	Cuculidae	*Chalcites minutillus barnardi*	Eastern little bronze-cuckoo		C		4
animals	birds	Cuculidae	*Eudynamys orientalis*	eastern koel		C		15
animals	birds	Cuculidae	*Scythrops novaehollandiae*	channel-billed cuckoo		C		32
animals	birds	Dicruridae	*Dicrurus bracteatus*	spangled drongo		C		7
animals	birds	Estrildidae	*Lonchura castaneothorax*	chestnut-breasted mannikin		C		12
animals	birds	Estrildidae	*Neochmia modesta*	plum-headed finch		C		15
animals	birds	Estrildidae	*Neochmia ruficauda*	star finch		C		1
animals	birds	Estrildidae	*Stagonopleura guttata*	diamond firetail		C		2
animals	birds	Estrildidae	*Taeniopygia bichenovii*	double-barred finch		C		86
animals	birds	Estrildidae	*Taeniopygia guttata*	zebra finch		C		14
animals	birds	Falconidae	*Falco berigora*	brown falcon		C		38
animals	birds	Falconidae	*Falco cenchroides*	nankeen kestrel		C		57
animals	birds	Falconidae	*Falco longipennis*	Australian hobby		C		8
animals	birds	Falconidae	*Falco peregrinus*	peregrine falcon		C		3
animals	birds	Falconidae	*Falco subniger*	black falcon		C		6
animals	birds	Glareolidae	*Stiltia isabella*	Australian pratincole		C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Gruidae	*Antigone rubicunda*	brolga		C		16
animals	birds	Halcyonidae	*Dacelo leachii*	blue-winged kookaburra		C		11
animals	birds	Halcyonidae	*Dacelo novaeguineae*	laughing kookaburra		C		106
animals	birds	Halcyonidae	*Todiramphus macleayii*	forest kingfisher		C		2
animals	birds	Halcyonidae	*Todiramphus pyrrhopygius*	red-backed kingfisher		C		4
animals	birds	Halcyonidae	*Todiramphus sanctus*	sacred kingfisher		C		33
animals	birds	Hirundinidae	*Cheramoeca leucosterna*	white-backed swallow		C		1
animals	birds	Hirundinidae	*Hirundo neoxena*	welcome swallow		C		10
animals	birds	Hirundinidae	*Petrochelidon ariel*	fairy martin		C		16
animals	birds	Hirundinidae	*Petrochelidon nigricans*	tree martin		C		32
animals	birds	Laridae	*Chlidonias hybrida*	whiskered tern		C		4
animals	birds	Laridae	*Gelochelidon nilotica*	gull-billed tern		SL		4
animals	birds	Laridae	*Hydroprogne caspia*	Caspian tern		SL		6
animals	birds	Maluridae	*Malurus assimilis*	purple-backed fairy-wren		C		21
animals	birds	Maluridae	*Malurus cyaneus*	superb fairy-wren		C		22
animals	birds	Maluridae	*Malurus melanocephalus*	red-backed fairy-wren		C		136
animals	birds	Maluridae	*Malurus sp.*			C		2
animals	birds	Megaluridae	*Cincloramphus cruralis*	brown songlark		C		9
animals	birds	Megaluridae	*Cincloramphus mathewsi*	rufous songlark		C		3
animals	birds	Megaluridae	*Megalurus timoriensis*	tawny grassbird		C		17
animals	birds	Megapodiidae	*Alectura lathami*	Australian brush-turkey		C		2
animals	birds	Meliphagidae	*Acanthagenys rufogularis*	spiny-cheeked honeyeater		C		7
animals	birds	Meliphagidae	*Caligavis chrysops*	yellow-faced honeyeater		C		10
animals	birds	Meliphagidae	*Entomyzon cyanotis*	blue-faced honeyeater		C		57
animals	birds	Meliphagidae	*Epthianura albifrons*	white-fronted chat		C		1
animals	birds	Meliphagidae	*Gavicalis virescens*	singing honeyeater		C		41
animals	birds	Meliphagidae	*Lichenostomus melanops*	yellow-tufted honeyeater		C		4
animals	birds	Meliphagidae	*Lichmera indistincta*	brown honeyeater		C		29
animals	birds	Meliphagidae	*Manorina flavigula*	yellow-throated miner		C		114
animals	birds	Meliphagidae	*Manorina melanocephala*	noisy miner		C		75
animals	birds	Meliphagidae	*Meliphaga lewinii*	Lewin's honeyeater		C		10
animals	birds	Meliphagidae	*Melithreptus albogularis*	white-throated honeyeater		C		38
animals	birds	Meliphagidae	*Melithreptus brevirostris*	brown-headed honeyeater		C		2
animals	birds	Meliphagidae	*Melithreptus gularis*	black-chinned honeyeater		C		3
animals	birds	Meliphagidae	*Melithreptus gularis gularis*	black-chinned honeyeater (eastern)		C		1
animals	birds	Meliphagidae	*Melithreptus lunatus*	white-naped honeyeater		C		30
animals	birds	Meliphagidae	*Myzomela sanguinolenta*	scarlet honeyeater		C		2
animals	birds	Meliphagidae	*Nesoptilotis leucotis*	white-eared honeyeater		C		19/1
animals	birds	Meliphagidae	*Philemon citreogularis*	little friarbird		C		56
animals	birds	Meliphagidae	*Philemon corniculatus*	noisy friarbird		C		55
animals	birds	Meliphagidae	*Plectorhyncha lanceolata*	striped honeyeater		C		51
animals	birds	Meliphagidae	*Ptilotula fusca*	fuscous honeyeater		C		9
animals	birds	Meliphagidae	*Ptilotula penicillata*	white-plumed honeyeater		C		15
animals	birds	Meropidae	*Merops ornatus*	rainbow bee-eater		C		21
animals	birds	Monarchidae	*Grallina cyanoleuca*	magpie-lark		C		112
animals	birds	Monarchidae	*Myiagra cyanoleuca*	satin flycatcher		SL		2

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Monarchidae	*Myiagra inquieta*	restless flycatcher		C		14
animals	birds	Monarchidae	*Myiagra rubecula*	leaden flycatcher		C		27
animals	birds	Motacillidae	*Anthus novaeseelandiae*	Australasian pipit		C		23
animals	birds	Nectariniidae	*Dicaeum hirundinaceum*	mistletoebird		C		62
animals	birds	Neosittidae	*Daphoenositta chrysoptera*	varied sittella		C		13
animals	birds	Oriolidae	*Oriolus sagittatus*	olive-backed oriole		C		35
animals	birds	Oriolidae	*Sphecotheres vieilloti*	Australasian figbird		C		22
animals	birds	Otididae	*Ardeotis australis*	Australian bustard		C		34
animals	birds	Pachycephalidae	*Colluricincla harmonica*	grey shrike-thrush		C		46
animals	birds	Pachycephalidae	*Falcunculus frontatus*	crested shrike-tit		C		1
animals	birds	Pachycephalidae	*Pachycephala pectoralis*	golden whistler		C		2
animals	birds	Pachycephalidae	*Pachycephala rufiventris*	rufous whistler		C		100
animals	birds	Pardalotidae	*Pardalotus punctatus*	spotted pardalote		C		5
animals	birds	Pardalotidae	*Pardalotus rubricatus*	red-browed pardalote		C		1
animals	birds	Pardalotidae	*Pardalotus striatus*	striated pardalote		C		151
animals	birds	Passeridae	*Passer domesticus*	house sparrow	Y			11
animals	birds	Pelecanidae	*Pelecanus conspicillatus*	Australian pelican		C		5
animals	birds	Petroicidae	*Eopsaltria australis*	eastern yellow robin		C		4
animals	birds	Petroicidae	*Melanodryas cucullata*	hooded robin		C		1
animals	birds	Petroicidae	*Microeca fascinans*	jacky winter		C		35
animals	birds	Petroicidae	*Petroica goodenovii*	red-capped robin		C		7
animals	birds	Phalacrocoracidae	*Microcarbo melanoleucos*	little pied cormorant		C		11
animals	birds	Phalacrocoracidae	*Phalacrocorax sulcirostris*	little black cormorant		C		6
animals	birds	Phalacrocoracidae	*Phalacrocorax varius*	pied cormorant		C		4
animals	birds	Phasianidae	*Coturnix pectoralis*	stubble quail		C		1
animals	birds	Phasianidae	*Coturnix ypsilophora*	brown quail		C		54
animals	birds	Podargidae	*Podargus strigoides*	tawny frogmouth		C		20
animals	birds	Podicipedidae	*Tachybaptus novaehollandiae*	Australasian grebe		C		8
animals	birds	Pomatostomidae	*Pomatostomus temporalis*	grey-crowned babbler		C		37
animals	birds	Psittacidae	*Alisterus scapularis*	Australian king-parrot		C		9
animals	birds	Psittacidae	*Aprosmictus erythropterus*	red-winged parrot		C		58
animals	birds	Psittacidae	*Melopsittacus undulatus*	budgerigar		C		11
animals	birds	Psittacidae	*Parvipsitta pusilla*	little lorikeet		C		9
animals	birds	Psittacidae	*Platycercus adscitus*	pale-headed rosella		C		112
animals	birds	Psittacidae	*Psephotus haematonotus*	red-rumped parrot		C		1
animals	birds	Psittacidae	*Psephotus pulcherrimus*	paradise parrot		PE	EX	2
animals	birds	Psittacidae	*Trichoglossus chlorolepidotus*	scaly-breasted lorikeet		C		7
animals	birds	Psittacidae	*Trichoglossus moluccanus*	rainbow lorikeet		C		122
animals	birds	Ptilonorhynchidae	*Ptilonorhynchus maculatus*	spotted bowerbird		C		20
animals	birds	Rallidae	*Fulica atra*	Eurasian coot		C		1
animals	birds	Rallidae	*Gallinula tenebrosa*	dusky moorhen		C		2
animals	birds	Rallidae	*Porphyrio melanotus*	purple swamphen		C		1
animals	birds	Recurvirostridae	*Himantopus himantopus*	black-winged stilt		C		8
animals	birds	Rhipiduridae	*Rhipidura albiscapa*	grey fantail		C		67
animals	birds	Rhipiduridae	*Rhipidura leucophrys*	willie wagtail		C		116
animals	birds	Scolopacidae	*Tringa stagnatilis*	marsh sandpiper		SL		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Strigidae	*Ninox boobook*	southern boobook		C		23
animals	birds	Strigidae	*Ninox connivens*	barking owl		C		3
animals	birds	Threskiornithidae	*Platalea flavipes*	yellow-billed spoonbill		C		6
animals	birds	Threskiornithidae	*Platalea regia*	royal spoonbill		C		4
animals	birds	Threskiornithidae	*Plegadis falcinellus*	glossy ibis		SL		1
animals	birds	Threskiornithidae	*Threskiornis molucca*	Australian white ibis		C		2
animals	birds	Threskiornithidae	*Threskiornis spinicollis*	straw-necked ibis		C		8
animals	birds	Timaliidae	*Zosterops lateralis*	silvereye		C		27
animals	birds	Turnicidae	*Turnix pyrrhothorax*	red-chested button-quail		C		1
animals	birds	Turnicidae	*Turnix varius*	painted button-quail		C		1
animals	birds	Tytonidae	*Tyto delicatula*	eastern barn owl		C		25
animals	birds	Tytonidae	*Tyto longimembris*	eastern grass owl		C		5
animals	insects	Nymphalidae	*Euploea corinna*	common crow				8
animals	mammals	Bovidae	*Bos taurus*	European cattle	Y			20
animals	mammals	Canidae	*Canis familiaris*	dog	Y			3
animals	mammals	Canidae	*Canis familiaris (dingo)*	dingo				6
animals	mammals	Canidae	*Canis sp.*		Y			1
animals	mammals	Canidae	*Vulpes vulpes*	red fox	Y			2
animals	mammals	Dasyuridae	*Dasyurus hallucatus*	northern quoll		C	E	3/1
animals	mammals	Dasyuridae	*Planigale ingrami*	long-tailed planigale		C		6/1
animals	mammals	Dasyuridae	*Planigale maculata*	common planigale		C		5
animals	mammals	Dasyuridae	*Planigale tenuirostris*	narrow-nosed planigale		C		14
animals	mammals	Dasyuridae	*Sminthopsis macroura*	stripe-faced dunnart		C		22
animals	mammals	Dasyuridae	*Sminthopsis murina*	common dunnart		C		6
animals	mammals	Emballonuridae	*Saccolaimus flaviventris*	yellow-bellied sheathtail bat		C		14
animals	mammals	Emballonuridae	*Taphozous troughtoni*	Troughton's sheathtail bat		C		1788
animals	mammals	Felidae	*Felis catus*	cat	Y			11
animals	mammals	Leporidae	*Lepus europaeus*	European brown hare	Y			1
animals	mammals	Leporidae	*Oryctolagus cuniculus*	rabbit	Y			22
animals	mammals	Macropodidae	*Lagorchestes conspicillatus*	spectacled hare-wallaby		C		19
animals	mammals	Macropodidae	*Macropus giganteus*	eastern grey kangaroo		C		53
animals	mammals	Macropodidae	*Notamacropus dorsalis*	black-striped wallaby		C		7
animals	mammals	Macropodidae	*Notamacropus parryi*	whiptail wallaby		C		11
animals	mammals	Macropodidae	*Notamacropus rufogriseus*	red-necked wallaby		C		1
animals	mammals	Macropodidae	*Osphranter robustus*	common wallaroo		C		9
animals	mammals	Macropodidae	*Petrogale herberti*	Herbert's rock-wallaby		C		6
animals	mammals	Macropodidae	*Petrogale sp.*			C		1
animals	mammals	Macropodidae	*Wallabia bicolor*	swamp wallaby		C		8
animals	mammals	Megadermatidae	*Macroderma gigas*	ghost bat		E	V	1
animals	mammals	Miniopteridae	*Miniopterus schreibersii oceanensis*	eastern bent-wing bat		C		11
animals	mammals	Molossidae	*Austronomus australis*	white-striped freetail bat		C		4
animals	mammals	Molossidae	*Chaerephon jobensis*	northern freetail bat		C		3
animals	mammals	Molossidae	*Mormopterus eleryi*	bristle-faced free-tailed bat		C		1
animals	mammals	Molossidae	*Mormopterus lumsdenae*	northern free-tailed bat		C		10
animals	mammals	Molossidae	*Mormopterus ridei*	eastern free-tailed bat		C		2
animals	mammals	Molossidae	*Mormopterus sp.*			C		3

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	mammals	Muridae	*Hydromys chrysogaster*	water rat		C		6
animals	mammals	Muridae	*Leggadina forresti*	Forrest's mouse		C		23/2
animals	mammals	Muridae	*Melomys burtoni*	grassland melomys		C		6
animals	mammals	Muridae	*Melomys cervinipes*	fawn-footed melomys		C		2
animals	mammals	Muridae	*Mus musculus*	house mouse	Y			93/1
animals	mammals	Muridae	*Pseudomys delicatulus*	delicate mouse		C		13
animals	mammals	Muridae	*Pseudomys gracilicaudatus*	eastern chestnut mouse		C		18
animals	mammals	Muridae	*Pseudomys patrius*	eastern pebble-mound mouse		C		9/1
animals	mammals	Muridae	*Rattus sordidus*	canefield rat		C		15/7
animals	mammals	Muridae	*Rattus sp. cf. villosissimus/sordidus*			C		1
animals	mammals	Muridae	*Rattus tunneyi*	pale field-rat		C		2/1
animals	mammals	Peramelidae	*Isoodon macrourus*	northern brown bandicoot		C		9
animals	mammals	Peramelidae	*Isoodon peninsulae*	Cape York brown bandicoot		C		1
animals	mammals	Petauridae	*Petaurus australis australis*	yellow-bellied glider (southern subspecies)		C		12
animals	mammals	Petauridae	*Petaurus norfolcensis*	squirrel glider		C		9
animals	mammals	Petauridae	*Petaurus notatus*	Krefft's glider		C		14
animals	mammals	Phalangeridae	*Trichosurus vulpecula*	common brushtail possum		C		45
animals	mammals	Phascolarctidae	*Phascolarctos cinereus*	koala		V	V	75
animals	mammals	Potoroidae	*Aepyprymnus rufescens*	rufous bettong		C		16
animals	mammals	Pseudocheiridae	*Petauroides armillatus*	central greater glider		V	V	41
animals	mammals	Pseudocheiridae	*Pseudocheirus peregrinus*	common ringtail possum		C		1
animals	mammals	Pteropodidae	*Pteropus scapulatus*	little red flying-fox		C		11
animals	mammals	Rhinolophidae	*Rhinolophus megaphyllus*	eastern horseshoe-bat		C		1
animals	mammals	Suidae	*Sus scrofa*	pig	Y			8
animals	mammals	Tachyglossidae	*Tachyglossus aculeatus*	short-beaked echidna		SL		22
animals	mammals	Vespertilionidae	*Chalinolobus gouldii*	Gould's wattled bat		C		12
animals	mammals	Vespertilionidae	*Chalinolobus morio*	chocolate wattled bat		C		2
animals	mammals	Vespertilionidae	*Chalinolobus nigrogriseus*	hoary wattled bat		C		3
animals	mammals	Vespertilionidae	*Chalinolobus picatus*	little pied bat		C		12
animals	mammals	Vespertilionidae	*Nyctophilus geoffroyi*	lesser long-eared bat		C		1
animals	mammals	Vespertilionidae	*Nyctophilus gouldi*	Gould's long-eared bat		C		5
animals	mammals	Vespertilionidae	*Nyctophilus sp.*			C		1
animals	mammals	Vespertilionidae	*Scotorepens balstoni*	inland broad-nosed bat		C		7
animals	mammals	Vespertilionidae	*Scotorepens greyii*	little broad-nosed bat		C		6
animals	mammals	Vespertilionidae	*Vespadelus baverstocki*	inland forest bat		C		1
animals	mammals	Vespertilionidae	*Vespadelus sp.*			C		2
animals	mammals	Vespertilionidae	*Vespadelus troughtoni*	eastern cave bat		C		3
animals	ray-finned fishes	Ambassidae	*Ambassis agassizii*	Agassiz's glassfish				9/1
animals	ray-finned fishes	Anguillidae	*Anguilla reinhardtii*	longfin eel				1
animals	ray-finned fishes	Atherinidae	*Craterocephalus stercusmuscarum*	flyspecked hardyhead				3/1
animals	ray-finned fishes	Clupeidae	*Nematalosa erebi*	bony bream				5
animals	ray-finned fishes	Eleotridae	*Hypseleotris klunzingeri*	western carp gudgeon				4
animals	ray-finned fishes	Eleotridae	*Hypseleotris sp.*					6
animals	ray-finned fishes	Eleotridae	*Hypseleotris species 1*	Midgley's carp gudgeon				2
animals	ray-finned fishes	Eleotridae	*Mogurnda adspersa*	southern purplespotted gudgeon				5

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animals	ray-finned fishes	Eleotridae	*Oxyeleotris lineolata*	sleepy cod				1
animals	ray-finned fishes	Eleotridae	*Philypnodon grandiceps*	flathead gudgeon				1
animals	ray-finned fishes	Melanotaeniidae	*Melanotaenia splendida splendida*	eastern rainbowfish				8/1
animals	ray-finned fishes	Percichthyidae	*Macquaria ambigua*	golden perch				1
animals	ray-finned fishes	Plotosidae	*Neosilurus hyrtlii*	Hyrtl's catfish				4
animals	ray-finned fishes	Plotosidae	*Tandanus tandanus*	freshwater catfish				1
animals	ray-finned fishes	Terapontidae	*Leiopotherapon unicolor*	spangled perch				12/1
animals	ray-finned fishes	Terapontidae	*Scortum hillii*	leathery grunter				1
animals	reptiles	Agamidae	*Amphibolurus burnsi*	Burns's dragon		C		6
animals	reptiles	Agamidae	*Amphibolurus sp.*			C		1
animals	reptiles	Agamidae	*Chlamydosaurus kingii*	frilled lizard		C		2
animals	reptiles	Agamidae	*Diporiphora australis*	tommy roundhead		C		4/1
animals	reptiles	Agamidae	*Diporiphora nobbi*	nobbi		C		4/2
animals	reptiles	Agamidae	*Intellagama lesueurii*	eastern water dragon		C		2
animals	reptiles	Agamidae	*Lophognathus gilberti sensu lato*	Gilbert's dragon		C		2/1
animals	reptiles	Agamidae	*Pogona barbata*	bearded dragon		C		9
animals	reptiles	Agamidae	*Tympanocryptis lineata*	lined earless dragon		C		1/1
animals	reptiles	Agamidae	*Tympanocryptis sp.*			C		5/5
animals	reptiles	Boidae	*Antaresia maculosa*	spotted python		C		7/1
animals	reptiles	Boidae	*Aspidites melanocephalus*	black-headed python		C		5
animals	reptiles	Boidae	*Morelia sp.*			C		1
animals	reptiles	Boidae	*Morelia spilota*	carpet python		C		7
animals	reptiles	Carphodactylidae	*Nephrurus asper*	spiny knob-tailed gecko		C		2
animals	reptiles	Chelidae	*Chelodina longicollis*	eastern snake-necked turtle		C		3
animals	reptiles	Chelidae	*Emydura macquarii krefftii*	Krefft's river turtle		C		2
animals	reptiles	Chelidae	*Wollumbinia latisternum*	saw-shelled turtle		C		1
animals	reptiles	Colubridae	*Boiga irregularis*	brown tree snake		C		1
animals	reptiles	Colubridae	*Dendrelaphis punctulatus*	green tree snake		C		8
animals	reptiles	Colubridae	*Tropidonophis mairii*	freshwater snake		C		4
animals	reptiles	Diplodactylidae	*Diplodactylus platyurus*	eastern fat-tailed gecko		C		1
animals	reptiles	Diplodactylidae	*Diplodactylus vittatus*	wood gecko		C		4/1
animals	reptiles	Diplodactylidae	*Lucasium steindachneri*	Steindachner's gecko		C		5
animals	reptiles	Diplodactylidae	*Oedura monilis sensu lato*	ocellated velvet gecko		C		3
animals	reptiles	Diplodactylidae	*Oedura tryoni*	southern spotted velvet gecko		C		1
animals	reptiles	Diplodactylidae	*Strophurus taenicauda*	golden-tailed gecko		NT		1
animals	reptiles	Diplodactylidae	*Strophurus williamsi*	soft-spined gecko		C		5
animals	reptiles	Elapidae	*Brachyurophis australis*	coral snake		C		2
animals	reptiles	Elapidae	*Cryptophis boschmai*	Carpentaria whip snake		C		4/1
animals	reptiles	Elapidae	*Cryptophis nigrescens*	eastern small-eyed snake		C		2
animals	reptiles	Elapidae	*Demansia psammophis*	yellow-faced whipsnake		C		6
animals	reptiles	Elapidae	*Demansia torquata*	collared whipsnake		C		1
animals	reptiles	Elapidae	*Denisonia maculata*	ornamental snake		V	V	3
animals	reptiles	Elapidae	*Furina diadema*	red-naped snake		C		1/1
animals	reptiles	Elapidae	*Hoplocephalus bitorquatus*	pale-headed snake		C		5
animals	reptiles	Elapidae	*Pseudechis australis*	king brown snake		C		2/1
animals	reptiles	Elapidae	*Pseudonaja nuchalis sensu lato*	western brown snake		C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	reptiles	Elapidae	*Pseudonaja textilis*	eastern brown snake		C		11/1
animals	reptiles	Elapidae	*Suta suta*	myall snake		C		2
animals	reptiles	Elapidae	*Vermicella annulata*	bandy-bandy		C		2/1
animals	reptiles	Gekkonidae	*Gehyra catenata*	chain-backed dtella		C		9/1
animals	reptiles	Gekkonidae	*Gehyra dubia*	dubious dtella		C		26/1
animals	reptiles	Gekkonidae	*Gehyra versicolor*			C		8
animals	reptiles	Gekkonidae	*Heteronotia binoei*	Bynoe's gecko		C		37/2
animals	reptiles	Pygopodidae	*Delma tincta*	excitable delma		C		6/1
animals	reptiles	Pygopodidae	*Lialis burtonis*	Burton's legless lizard		C		3
animals	reptiles	Pygopodidae	*Paradelma orientalis*	brigalow scaly-foot		C		4/1
animals	reptiles	Scincidae	*Anomalopus brevicollis*	short-necked worm-skink		C		3/1
animals	reptiles	Scincidae	*Anomalopus verreauxii*	three-clawed worm-skink		C		2
animals	reptiles	Scincidae	*Bellatorias frerei*	major skink		C		2
animals	reptiles	Scincidae	*Carlia munda*	shaded-litter rainbow-skink		C		10/2
animals	reptiles	Scincidae	*Carlia pectoralis*	open-litter rainbow skink		C		2
animals	reptiles	Scincidae	*Carlia pectoralis sensu lato*			C		43/1
animals	reptiles	Scincidae	*Carlia schmeltzii*	robust rainbow-skink		C		7/1
animals	reptiles	Scincidae	*Carlia vivax*	tussock rainbow-skink		C		6
animals	reptiles	Scincidae	*Concinnia brachysoma*	northern bar-sided skink		C		1
animals	reptiles	Scincidae	*Cryptoblepharus australis*	inland snake-eyed skink		C		2
animals	reptiles	Scincidae	*Cryptoblepharus pannosus*	ragged snake-eyed skink		C		10
animals	reptiles	Scincidae	*Cryptoblepharus plagiocephalus sensu lato*			C		2
animals	reptiles	Scincidae	*Cryptoblepharus pulcher pulcher*	elegant snake-eyed skink		C		30
animals	reptiles	Scincidae	*Cryptoblepharus sp.*			C		1
animals	reptiles	Scincidae	*Ctenotus ingrami*	unspotted yellow-sided ctenotus		C		1
animals	reptiles	Scincidae	*Ctenotus sp.*			C		1
animals	reptiles	Scincidae	*Ctenotus spaldingi*	straight-browed ctenotus		C		22
animals	reptiles	Scincidae	*Ctenotus taeniolatus*	copper-tailed skink		C		22
animals	reptiles	Scincidae	*Egernia rugosa*	yakka skink		V	V	2/1
animals	reptiles	Scincidae	*Eulamprus sp.*			C		1
animals	reptiles	Scincidae	*Glaphyromorphus punctulatus*	fine-spotted mulch-skink		C		3
animals	reptiles	Scincidae	*Lampropholis delicata*	dark-flecked garden sunskink		C		1
animals	reptiles	Scincidae	*Lerista fragilis*	eastern mulch slider		C		15/1
animals	reptiles	Scincidae	*Lerista punctatovittata*	eastern robust slider		C		3
animals	reptiles	Scincidae	*Lygisaurus foliorum*	tree-base litter-skink		C		38/4
animals	reptiles	Scincidae	*Menetia greyii*	common dwarf skink		C		23
animals	reptiles	Scincidae	*Morethia boulengeri*	south-eastern morethia skink		C		10
animals	reptiles	Scincidae	*Morethia taeniopleura*	fire-tailed skink		C		7
animals	reptiles	Scincidae	*Pygmaeascincus timlowi*	dwarf litter-skink		C		6
animals	reptiles	Scincidae	*Tiliqua rugosa*	shingle-back		C		2
animals	reptiles	Scincidae	*Tiliqua scincoides*	eastern blue-tongued lizard		C		4
animals	reptiles	Typhlopidae	*Anilios ligatus*	robust blind snake		C		1
animals	reptiles	Varanidae	*Varanus gouldii*	sand monitor		C		2
animals	reptiles	Varanidae	*Varanus tristis*	black-tailed monitor		C		6
animals	reptiles	Varanidae	*Varanus varius*	lace monitor		C		3
animals	uncertain	Indeterminate	*Indeterminate*	Unknown or Code Pending				2

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
fungi	arthoniomycetes	Arthoniaceae	*Stirtonia*					1/1
fungi	lecanoromycetes	Caliciaceae	*Dirinaria applanata*			C		1/1
fungi	lecanoromycetes	Caliciaceae	*Pyxine rugulosa*			C		1/1
fungi	lecanoromycetes	Lecanoraceae	*Lecidella*					1/1
fungi	lecanoromycetes	Parmeliaceae	*Xanthoparmelia subtropica*			C		1/1
fungi	lecanoromycetes	Pertusariaceae	*Pertusaria cicatricosa*			C		1/1
fungi	lecanoromycetes	Pertusariaceae	*Pertusaria subventosa*			C		1/1
plants	land plants	Acanthaceae	*Brunoniella australis*	blue trumpet		C		9/1
plants	land plants	Acanthaceae	*Dipteracanthus australasicus*			C		2
plants	land plants	Acanthaceae	*Hypoestes floribunda*			C		1
plants	land plants	Acanthaceae	*Hypoestes floribunda var. floribunda*			C		1/1
plants	land plants	Acanthaceae	*Pseuderanthemum variabile*	pastel flower		C		9/4
plants	land plants	Acanthaceae	*Rostellularia adscendens*			C		12/2
plants	land plants	Agavaceae	*Agave vivipara var. vivipara*		Y			1/1
plants	land plants	Aizoaceae	*Tetragonia tetragonoides*	New Zealand spinach		C		1
plants	land plants	Aizoaceae	*Trianthema portulacastrum*	black pigweed	Y			3
plants	land plants	Aizoaceae	*Trianthema triquetra*	red spinach		C		3
plants	land plants	Aizoaceae	*Zaleya galericulata*			C		2/2
plants	land plants	Aizoaceae	*Zaleya galericulata subsp. galericulata*			C		2/2
plants	land plants	Alismataceae	*Caldesia oligococca*			C		1/1
plants	land plants	Amaranthaceae	*Achyranthes aspera*			C		11/2
plants	land plants	Amaranthaceae	*Alternanthera denticulata*	lesser joyweed		C		5/4
plants	land plants	Amaranthaceae	*Alternanthera denticulata var. denticulata*			C		1/1
plants	land plants	Amaranthaceae	*Alternanthera denticulata var. micrantha*			C		2/2
plants	land plants	Amaranthaceae	*Alternanthera nana*	hairy joyweed		C		4/3
plants	land plants	Amaranthaceae	*Alternanthera nodiflora*	joyweed		C		5
plants	land plants	Amaranthaceae	*Alternanthera pungens*	khaki weed	Y			1/1
plants	land plants	Amaranthaceae	*Amaranthus interruptus*			C		2/1
plants	land plants	Amaranthaceae	*Amaranthus macrocarpus var. macrocarpus*			C		1/1
plants	land plants	Amaranthaceae	*Amaranthus mitchellii*	Boggabri weed		C		1/1
plants	land plants	Amaranthaceae	*Gomphrena celosioides*	gomphrena weed	Y			6/5
plants	land plants	Amaranthaceae	*Nyssanthes diffusa*	barbed-wire weed		C		2
plants	land plants	Amaranthaceae	*Nyssanthes erecta*			C		4/3
plants	land plants	Amaranthaceae	*Ptilotus decipiens*			C		1/1
plants	land plants	Amaranthaceae	*Ptilotus polystachyus*			C		1/1
plants	land plants	Amaranthaceae	*Ptilotus psilorhachis*			C		2/2
plants	land plants	Amaranthaceae	*Ptilotus semilanatus*			C		2/2
plants	land plants	Amaryllidaceae	*Crinum*					2
plants	land plants	Amaryllidaceae	*Crinum flaccidum*	Murray lily		C		3/1
plants	land plants	Apiaceae	*Cyclospermum leptophyllum*		Y			3/1
plants	land plants	Apiaceae	*Daucus glochidiatus*	Australian carrot		C		1/1
plants	land plants	Apocynaceae	*Alstonia constricta*	bitterbark		C		11/2
plants	land plants	Apocynaceae	*Alyxia ruscifolia*			C		2/2
plants	land plants	Apocynaceae	*Carissa ovata*	currantbush		C		8
plants	land plants	Apocynaceae	*Cryptostegia grandiflora*	rubber vine	Y			1/1
plants	land plants	Apocynaceae	*Cynanchum floribundum*			C		1

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plants	land plants	Apocynaceae	*Cynanchum viminale subsp. brunonianum*			C		1/1
plants	land plants	Apocynaceae	*Leichhardtia brevifolia*			V	V	4/4
plants	land plants	Apocynaceae	*Leichhardtia microlepis*			C		1
plants	land plants	Apocynaceae	*Leichhardtia viridiflora*			C		1
plants	land plants	Apocynaceae	*Leichhardtia viridiflora subsp. viridiflora*			C		2/2
plants	land plants	Apocynaceae	*Parsonsia*					1
plants	land plants	Apocynaceae	*Parsonsia eucalyptophylla*	gargaloo		C		1
plants	land plants	Apocynaceae	*Parsonsia lanceolata*	northern silkpod		C		2
plants	land plants	Apocynaceae	*Parsonsia straminea*	monkey rope		C		1
plants	land plants	Apocynaceae	*Secamone elliptica*			C		1
plants	land plants	Apocynaceae	*Vincetoxicum erectum*			C		1/1
plants	land plants	Aponogetonaceae	*Aponogeton queenslandicus*			C		1/1
plants	land plants	Araliaceae	*Hydrocotyle acutiloba*			C		2/2
plants	land plants	Araliaceae	*Polyscias elegans*	celery wood		C		1/1
plants	land plants	Archidiaceae	*Archidium elatum*			C		1/1
plants	land plants	Aristolochiaceae	*Aristolochia meridionalis subsp. centralis*			C		1/1
plants	land plants	Asphodelaceae	*Bulbine bulbosa*	golden lily		C		2/2
plants	land plants	Asteraceae	*Acmella grandiflora*			C		1
plants	land plants	Asteraceae	*Acmella grandiflora var. brachyglossa*			C		4/3
plants	land plants	Asteraceae	*Apowollastonia spilanthoides*			C		2/1
plants	land plants	Asteraceae	*Bidens bipinnata*	bipinnate beggar's ticks	Y			1/1
plants	land plants	Asteraceae	*Bidens biternata*		Y			1/1
plants	land plants	Asteraceae	*Bidens pilosa*		Y			8
plants	land plants	Asteraceae	*Brachyscome*					1/1
plants	land plants	Asteraceae	*Brachyscome basaltica*			C		2/2
plants	land plants	Asteraceae	*Brachyscome microcarpa subsp. microcarpa*			C		1/1
plants	land plants	Asteraceae	*Calotis*					4
plants	land plants	Asteraceae	*Calotis cuneata*			C		10/5
plants	land plants	Asteraceae	*Calotis cuneifolia*	burr daisy		C		2/1
plants	land plants	Asteraceae	*Calotis dentex*	white burr daisy		C		2/1
plants	land plants	Asteraceae	*Calotis hispidula*	bogan flea		C		2
plants	land plants	Asteraceae	*Calotis lappulacea*	yellow burr daisy		C		3/2
plants	land plants	Asteraceae	*Calotis squamigera*			C		1/1
plants	land plants	Asteraceae	*Camptacra barbata*			C		4/1
plants	land plants	Asteraceae	*Camptacra robusta*			C		3/3
plants	land plants	Asteraceae	*Cassinia*					1
plants	land plants	Asteraceae	*Cassinia laevis*			C		1
plants	land plants	Asteraceae	*Cassinia quinquefaria*			C		1/1
plants	land plants	Asteraceae	*Centipeda minima*			C		1
plants	land plants	Asteraceae	*Centipeda racemosa*	snuffweed		C		1/1
plants	land plants	Asteraceae	*Chrysocephalum apiculatum*	yellow buttons		C		5/1
plants	land plants	Asteraceae	*Cirsium vulgare*	spear thistle	Y			2
plants	land plants	Asteraceae	*Coreopsis*			C		1
plants	land plants	Asteraceae	*Coronidium oxylepis subsp. lanatum*			C		1/1
plants	land plants	Asteraceae	*Craspedia variabilis*			C		1
plants	land plants	Asteraceae	*Cyanthillium cinereum*			C		18/5

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Asteraceae	*Eclipta platyglossa subsp. platyglossa*			C		1/1
plants	land plants	Asteraceae	*Erigeron bonariensis*		Y			6/3
plants	land plants	Asteraceae	*Erigeron sumatrensis*		Y			1/1
plants	land plants	Asteraceae	*Euchiton sphaericus*			C		5/4
plants	land plants	Asteraceae	*Glossocardia bidens*	native cobbler's pegs		C		2/1
plants	land plants	Asteraceae	*Gynura drymophila var. drymophila*			C		1/1
plants	land plants	Asteraceae	*Gynura drymophila var. glabrifolia*			C		1/1
plants	land plants	Asteraceae	*Helianthus annuus*		Y			1/1
plants	land plants	Asteraceae	*Hemisteptia lyrata*			C		3/2
plants	land plants	Asteraceae	*Lactuca serriola forma serriola*		Y			2/2
plants	land plants	Asteraceae	*Lagenophora queenslandica*			C		1/1
plants	land plants	Asteraceae	*Leiocarpa brevicompta*			C		1/1
plants	land plants	Asteraceae	*Minuria integerrima*	smooth minuria		C		4/1
plants	land plants	Asteraceae	*Minuria leptophylla*			C		1/1
plants	land plants	Asteraceae	*Olearia canescens subsp. canescens*			C		6/6
plants	land plants	Asteraceae	*Ozothamnus cassinioides*			C		1/1
plants	land plants	Asteraceae	*Parthenium hysterophorus*	parthenium weed	Y			24/5
plants	land plants	Asteraceae	*Peripleura bicolor*			C		3/3
plants	land plants	Asteraceae	*Peripleura diffusa*			C		2/2
plants	land plants	Asteraceae	*Peripleura hispidula var. hispidula*			C		6/5
plants	land plants	Asteraceae	*Peripleura hispidula var. setosa*			C		1/1
plants	land plants	Asteraceae	*Pluchea dunlopii*			C		1/1
plants	land plants	Asteraceae	*Podolepis longipedata*	tall copper-wire daisy		C		3/3
plants	land plants	Asteraceae	*Pterocaulon ciliosum*			C		2/2
plants	land plants	Asteraceae	*Pterocaulon redolens*			C		2
plants	land plants	Asteraceae	*Pterocaulon serrulatum var. serrulatum*			C		2/2
plants	land plants	Asteraceae	*Pterocaulon sphacelatum*	applebush		C		1
plants	land plants	Asteraceae	*Rhodanthe polyphylla*			C		1/1
plants	land plants	Asteraceae	*Schkuhria pinnata*		Y			3/3
plants	land plants	Asteraceae	*Senecio brigalowensis*			C		2/2
plants	land plants	Asteraceae	*Senecio tenuiflorus*			C		1/1
plants	land plants	Asteraceae	*Sigesbeckia fugax*			C		1/1
plants	land plants	Asteraceae	*Sigesbeckia orientalis*	Indian weed		C		2/2
plants	land plants	Asteraceae	*Sonchus oleraceus*	common sowthistle	Y			10/4
plants	land plants	Asteraceae	*Sphaeromorphaea australis*			C		1/1
plants	land plants	Asteraceae	*Sphaeromorphaea subintegra*			C		1/1
plants	land plants	Asteraceae	*Symphyotrichum subulatum*		Y			1
plants	land plants	Asteraceae	*Tridax procumbens*	tridax daisy	Y			3/2
plants	land plants	Asteraceae	*Trioncinia retroflexa*			E		4/4
plants	land plants	Asteraceae	*Verbesina encelioides*	crownbeard	Y			12
plants	land plants	Asteraceae	*Verbesina encelioides var. encelioides*		Y			9/9
plants	land plants	Asteraceae	*Vittadinia*					1
plants	land plants	Asteraceae	*Vittadinia dissecta var. dissecta*			C		1/1
plants	land plants	Asteraceae	*Vittadinia pustulata*			C		1/1
plants	land plants	Asteraceae	*Vittadinia sulcata*	native daisy		C		5/3
plants	land plants	Asteraceae	*Xanthium occidentale*		Y			5

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plants	land plants	Asteraceae	*Xanthium spinosum*	Bathurst burr	Y			2/2
plants	land plants	Asteraceae	*Zinnia peruviana*	wild zinnia	Y			5/3
plants	land plants	Bignoniaceae	*Pandorea pandorana*	wonga vine		C		7
plants	land plants	Boraginaceae	*Ehretia membranifolia*	weeping koda		C		6
plants	land plants	Boraginaceae	*Heliotropium amplexicaule*	blue heliotrope	Y			1/1
plants	land plants	Boraginaceae	*Heliotropium brachygyne*			C		2/1
plants	land plants	Boraginaceae	*Heliotropium cunninghamii*			C		2/2
plants	land plants	Boraginaceae	*Heliotropium indicum*		Y			1/1
plants	land plants	Boraginaceae	*Heliotropium moorei*			C		1/1
plants	land plants	Boraginaceae	*Trichodesma zeylanicum*			C		3/1
plants	land plants	Boraginaceae	*Trichodesma zeylanicum var. zeylanicum*			C		6/6
plants	land plants	Brassicaceae	*Lepidium*					1
plants	land plants	Brassicaceae	*Lepidium africanum*	common peppercress	Y			1/1
plants	land plants	Brassicaceae	*Lepidium bonariense*	Argentine peppercress	Y			3/1
plants	land plants	Brassicaceae	*Rorippa dietrichiana*			C		1/1
plants	land plants	Brassicaceae	*Rorippa eustylis*			C		1/1
plants	land plants	Brassicaceae	*Sisymbrium irio*	london rocket	Y			1
plants	land plants	Brassicaceae	*Sisymbrium thellungii*	African turnip-weed	Y			3/3
plants	land plants	Byttneriaceae	*Commersonia johnsonii*			C		19/19
plants	land plants	Byttneriaceae	*Seringia corollata*			C		4/1
plants	land plants	Byttneriaceae	*Seringia hookeriana*			C		1/1
plants	land plants	Byttneriaceae	*Waltheria indica*			C		3/3
plants	land plants	Cactaceae	*Harrisia pomanensis*		Y			1
plants	land plants	Cactaceae	*Opuntia*					3
plants	land plants	Cactaceae	*Opuntia stricta*		Y			5
plants	land plants	Cactaceae	*Opuntia tomentosa*	velvety tree pear	Y			11
plants	land plants	Caesalpiniaceae	*Cassia brewsteri*			C		7/4
plants	land plants	Caesalpiniaceae	*Chamaecrista absus var. absus*			C		1
plants	land plants	Caesalpiniaceae	*Chamaecrista rotundifolia var. rotundifolia*		Y			1/1
plants	land plants	Caesalpiniaceae	*Haematoxylum campechianum*	logwood tree	Y			2/2
plants	land plants	Caesalpiniaceae	*Lysiphyllum carronii*	ebony tree		C		3
plants	land plants	Caesalpiniaceae	*Lysiphyllum hookeri*	Queensland ebony		C		7
plants	land plants	Caesalpiniaceae	*Parkinsonia aculeata*	parkinsonia	Y			2
plants	land plants	Caesalpiniaceae	*Petalostylis labicheoides*			C		2/2
plants	land plants	Caesalpiniaceae	*Senna*					1
plants	land plants	Caesalpiniaceae	*Senna aciphylla*	Australian senna		C		3/3
plants	land plants	Caesalpiniaceae	*Senna artemisioides*			C		2
plants	land plants	Caesalpiniaceae	*Senna barclayana*			C		7/2
plants	land plants	Campanulaceae	*Isotoma axillaris*	australian harebell		C		3/3
plants	land plants	Campanulaceae	*Lobelia concolor*			C		1/1
plants	land plants	Campanulaceae	*Wahlenbergia*					1
plants	land plants	Campanulaceae	*Wahlenbergia capillaris*			C		4/1
plants	land plants	Campanulaceae	*Wahlenbergia celata*			C		1/1
plants	land plants	Campanulaceae	*Wahlenbergia gracilis*	sprawling bluebell		C		2/2
plants	land plants	Campanulaceae	*Wahlenbergia queenslandica*			C		1
plants	land plants	Campanulaceae	*Wahlenbergia tumidifructa*			C		1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Capparaceae	*Capparis*					1
plants	land plants	Capparaceae	*Capparis anomala*			C		2/1
plants	land plants	Capparaceae	*Capparis arborea*	brush caper berry		C		1
plants	land plants	Capparaceae	*Capparis canescens*			C		5/3
plants	land plants	Capparaceae	*Capparis lasiantha*	nipan		C		6/1
plants	land plants	Capparaceae	*Capparis loranthifolia*			C		4
plants	land plants	Capparaceae	*Capparis mitchellii*			C		2
plants	land plants	Capparaceae	*Capparis shanesiana*			C		1/1
plants	land plants	Caryophyllaceae	*Polycarpaea breviflora*			C		1/1
plants	land plants	Caryophyllaceae	*Polycarpaea corymbosa*			C		1/1
plants	land plants	Caryophyllaceae	*Polycarpaea corymbosa var. corymbosa*			C		1/1
plants	land plants	Casuarinaceae	*Allocasuarina luehmannii*	bull oak		C		4/1
plants	land plants	Casuarinaceae	*Casuarina cristata*	belah		C		4
plants	land plants	Casuarinaceae	*Casuarina cunninghamiana*			C		4
plants	land plants	Celastraceae	*Denhamia cunninghamii*			C		3
plants	land plants	Celastraceae	*Denhamia oleaster*			C		11/2
plants	land plants	Celastraceae	*Elaeodendron australe*			C		1
plants	land plants	Celastraceae	*Elaeodendron australe var. australe*			C		1/1
plants	land plants	Chenopodiaceae	*Atriplex*					1
plants	land plants	Chenopodiaceae	*Atriplex muelleri*	lagoon saltbush		C		2/1
plants	land plants	Chenopodiaceae	*Atriplex semibaccata*	creeping saltbush		C		1
plants	land plants	Chenopodiaceae	*Chenopodium auricomiforme*			C		2/2
plants	land plants	Chenopodiaceae	*Dysphania carinata*			C		4/3
plants	land plants	Chenopodiaceae	*Dysphania glomulifera*			C		1/1
plants	land plants	Chenopodiaceae	*Dysphania pumilio*			C		2/1
plants	land plants	Chenopodiaceae	*Einadia hastata*			C		3/1
plants	land plants	Chenopodiaceae	*Einadia nutans*			C		5
plants	land plants	Chenopodiaceae	*Einadia nutans subsp. linifolia*			C		3/3
plants	land plants	Chenopodiaceae	*Einadia nutans subsp. nutans*			C		2/1
plants	land plants	Chenopodiaceae	*Einadia trigonos subsp. stellulata*			C		1/1
plants	land plants	Chenopodiaceae	*Enchylaena tomentosa*			C		6/1
plants	land plants	Chenopodiaceae	*Maireana*					2
plants	land plants	Chenopodiaceae	*Maireana microphylla*			C		6/3
plants	land plants	Chenopodiaceae	*Rhagodia parabolica*			C		1/1
plants	land plants	Chenopodiaceae	*Salsola australis*			C		9/1
plants	land plants	Chenopodiaceae	*Sclerolaena*					1
plants	land plants	Chenopodiaceae	*Sclerolaena anisacanthoides*	yellow burr		C		2/2
plants	land plants	Chenopodiaceae	*Sclerolaena birchii*	galvanised burr		C		2/1
plants	land plants	Chenopodiaceae	*Sclerolaena calcarata*	red burr		C		1/1
plants	land plants	Chenopodiaceae	*Sclerolaena convexula*			C		1/1
plants	land plants	Chenopodiaceae	*Sclerolaena lanicuspis*			C		1
plants	land plants	Chenopodiaceae	*Sclerolaena muricata*			C		4/1
plants	land plants	Chenopodiaceae	*Sclerolaena muricata var. muricata*			C		1/1
plants	land plants	Chenopodiaceae	*Sclerolaena muricata var. villosa*			C		2/2
plants	land plants	Chenopodiaceae	*Sclerolaena ramulosa*			C		1/1
plants	land plants	Cleomaceae	*Arivela tetrandra*			C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Cleomaceae	*Arivela viscosa*			C		1
plants	land plants	Combretaceae	*Macropteranthes leichhardtii*	bonewood		C		4/3
plants	land plants	Combretaceae	*Terminalia oblongata subsp. oblongata*			C		5/5
plants	land plants	Commelinaceae	*Commelina diffusa*	wandering jew		C		4/1
plants	land plants	Commelinaceae	*Commelina ensifolia*	scurvy grass		C		3/1
plants	land plants	Commelinaceae	*Commelina lanceolata*			C		2/2
plants	land plants	Commelinaceae	*Murdannia graminea*	murdannia		C		1/1
plants	land plants	Convolvulaceae	*Convolvulus erubescens*	Australian bindweed		C		5
plants	land plants	Convolvulaceae	*Convolvulus graminetinus*			C		5/5
plants	land plants	Convolvulaceae	*Evolvulus alsinoides*			C		6
plants	land plants	Convolvulaceae	*Evolvulus alsinoides var. decumbens*			C		1/1
plants	land plants	Convolvulaceae	*Evolvulus alsinoides var. villosicalyx*			C		2/2
plants	land plants	Convolvulaceae	*Ipomoea argillicola*			C		1
plants	land plants	Convolvulaceae	*Ipomoea lonchophylla*			C		8/5
plants	land plants	Convolvulaceae	*Ipomoea plebeia*	bellvine		C		4/3
plants	land plants	Convolvulaceae	*Ipomoea polymorpha*			C		1
plants	land plants	Convolvulaceae	*Polymeria*					1/1
plants	land plants	Convolvulaceae	*Polymeria calycina*	pink bindweed		C		2/1
plants	land plants	Convolvulaceae	*Polymeria longifolia*	polymeria		C		1/1
plants	land plants	Convolvulaceae	*Polymeria marginata*			C		1/1
plants	land plants	Convolvulaceae	*Polymeria pusilla*			C		3
plants	land plants	Crassulaceae	*Bryophyllum delagoense*		Y			2/1
plants	land plants	Crassulaceae	*Crassula tetramera*			C		1/1
plants	land plants	Cucurbitaceae	*Cucumis melo*			C		2/1
plants	land plants	Cucurbitaceae	*Cucumis myriocarpus subsp. myriocarpus*	prickly pademelon	Y			1
plants	land plants	Cucurbitaceae	*Cucumis picrocarpus*			C		1/1
plants	land plants	Cucurbitaceae	*Cucurbitaceae*					1
plants	land plants	Cucurbitaceae	*Diplocyclos palmatus*			C		1
plants	land plants	Cupressaceae	*Callitris endlicheri*	black cypress pine		C		2
plants	land plants	Cupressaceae	*Callitris glaucophylla*	white cypress pine		C		7/1
plants	land plants	Cyperaceae	*Bulbostylis barbata*			C		4/4
plants	land plants	Cyperaceae	*Carex appressa*			C		1/1
plants	land plants	Cyperaceae	*Carex breviculmis*			C		1/1
plants	land plants	Cyperaceae	*Carex inversa*	knob sedge		C		2/1
plants	land plants	Cyperaceae	*Cyperus*					2
plants	land plants	Cyperaceae	*Cyperus betchei subsp. betchei*			C		1/1
plants	land plants	Cyperaceae	*Cyperus bifax*	western nutgrass		C		9/8
plants	land plants	Cyperaceae	*Cyperus castaneus*			C		1/1
plants	land plants	Cyperaceae	*Cyperus clarus*			V		4/4
plants	land plants	Cyperaceae	*Cyperus concinnus*			C		3/3
plants	land plants	Cyperaceae	*Cyperus dactylotes*			C		1/1
plants	land plants	Cyperaceae	*Cyperus dietrichiae var. brevibracteatus*			C		1/1
plants	land plants	Cyperaceae	*Cyperus dietrichiae var. dietrichiae*			C		1/1
plants	land plants	Cyperaceae	*Cyperus difformis*	rice sedge		C		5/4
plants	land plants	Cyperaceae	*Cyperus esculentus*	yellow nutgrass	Y			1
plants	land plants	Cyperaceae	*Cyperus exaltatus*	tall flatsedge		C		2/1

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plants	land plants	Cyperaceae	*Cyperus flavidus*			C		2/1
plants	land plants	Cyperaceae	*Cyperus fulvus*			C		11/5
plants	land plants	Cyperaceae	*Cyperus gilesii*			C		3/1
plants	land plants	Cyperaceae	*Cyperus gracilis*			C		16/3
plants	land plants	Cyperaceae	*Cyperus isabellinus*			C		1/1
plants	land plants	Cyperaceae	*Cyperus javanicus*			C		1/1
plants	land plants	Cyperaceae	*Cyperus leptocarpus*			C		2/2
plants	land plants	Cyperaceae	*Cyperus microcephalus subsp. microcephalus*			C		1/1
plants	land plants	Cyperaceae	*Cyperus mirus*			C		1/1
plants	land plants	Cyperaceae	*Cyperus nutans var. eleusinoides*	flatsedge		C		2/2
plants	land plants	Cyperaceae	*Cyperus rotundus*	nutgrass	Y			6/1
plants	land plants	Cyperaceae	*Cyperus squarrosus*	bearded flatsedge		C		2/1
plants	land plants	Cyperaceae	*Cyperus victoriensis*			C		1/1
plants	land plants	Cyperaceae	*Eleocharis*					1
plants	land plants	Cyperaceae	*Eleocharis atricha*	tuber spikerush		C		1/1
plants	land plants	Cyperaceae	*Eleocharis cylindrostachys*			C		1
plants	land plants	Cyperaceae	*Eleocharis dulcis*			C		3/1
plants	land plants	Cyperaceae	*Eleocharis equisetina*			C		1
plants	land plants	Cyperaceae	*Eleocharis pallens*	pale spikerush		C		2/2
plants	land plants	Cyperaceae	*Eleocharis plana*	ribbed spikerush		C		3/3
plants	land plants	Cyperaceae	*Eleocharis sphacelata*	tall spikerush		C		2/1
plants	land plants	Cyperaceae	*Eleocharis tetraquetra*			C		1/1
plants	land plants	Cyperaceae	*Fimbristylis*					1
plants	land plants	Cyperaceae	*Fimbristylis depauperata*			C		1/1
plants	land plants	Cyperaceae	*Fimbristylis dichotoma*	common fringe-rush		C		6/2
plants	land plants	Cyperaceae	*Fimbristylis microcarya*			C		2/2
plants	land plants	Cyperaceae	*Fimbristylis sieberiana*			C		1/1
plants	land plants	Cyperaceae	*Gahnia aspera*			C		2
plants	land plants	Cyperaceae	*Scleria mackaviensis*			C		5/3
plants	land plants	Cyperaceae	*Scleria sphacelata*			C		9/2
plants	land plants	Dilleniaceae	*Hibbertia acicularis*			C		1/1
plants	land plants	Dilleniaceae	*Hibbertia cistoidea*			C		1/1
plants	land plants	Dilleniaceae	*Hibbertia linearis var. obtusifolia*			C		1
plants	land plants	Dilleniaceae	*Hibbertia oligodonta*			C		1/1
plants	land plants	Dilleniaceae	*Hibbertia stricta*			C		1
plants	land plants	Droseraceae	*Drosera lunata*			C		2/2
plants	land plants	Dryopteridaceae	*Lastreopsis tenera*			C		1/1
plants	land plants	Ebenaceae	*Diospyros australis*	black plum		C		1/1
plants	land plants	Ebenaceae	*Diospyros humilis*	small-leaved ebony		C		4/3
plants	land plants	Ericaceae	*Melichrus sp. (Isla Gorge P.Sharpe+ 601)*			C		1/1
plants	land plants	Ericaceae	*Styphelia mitchellii*			C		1/1
plants	land plants	Erythroxylaceae	*Erythroxylum australe*	cocaine tree		C		11/4
plants	land plants	Euphorbiaceae	*Acalypha*					1
plants	land plants	Euphorbiaceae	*Acalypha eremorum*	soft acalypha		C		4/2
plants	land plants	Euphorbiaceae	*Adriana tomentosa var. tomentosa*			C		3/3
plants	land plants	Euphorbiaceae	*Bertya lapicola subsp. brevifolia*			C		4/4

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plants	land plants	Euphorbiaceae	*Bertya oleifolia*			C		1/1
plants	land plants	Euphorbiaceae	*Bertya opponens*			C	V	1/1
plants	land plants	Euphorbiaceae	*Beyeria viscosa*			C		5/5
plants	land plants	Euphorbiaceae	*Croton insularis*	Queensland cascarilla		C		2/2
plants	land plants	Euphorbiaceae	*Croton phebalioides*	narrow-leaved croton		C		5/4
plants	land plants	Euphorbiaceae	*Euphorbia coghlanii*			C		5/5
plants	land plants	Euphorbiaceae	*Euphorbia dallachyana*			C		3/3
plants	land plants	Euphorbiaceae	*Euphorbia drummondii*			C		7/4
plants	land plants	Euphorbiaceae	*Euphorbia hirta*		Y			3/3
plants	land plants	Euphorbiaceae	*Euphorbia hyssopifolia*		Y			2/2
plants	land plants	Euphorbiaceae	*Euphorbia laciniloba*			C		2/2
plants	land plants	Euphorbiaceae	*Euphorbia papillifolia var. papillifolia*			C		3/3
plants	land plants	Euphorbiaceae	*Euphorbia planiticola*	plains spurge		C		1/1
plants	land plants	Euphorbiaceae	*Euphorbia prostrata*		Y			1/1
plants	land plants	Euphorbiaceae	*Euphorbia tannensis subsp. eremophila*			C		6/4
plants	land plants	Euphorbiaceae	*Monotaxis macrophylla*			C		2/2
plants	land plants	Euphorbiaceae	*Ricinocarpos linearifolius*			C		1/1
plants	land plants	Euphorbiaceae	*Ricinocarpos ruminatus*			C		1/1
plants	land plants	Fabaceae	*Aeschynomene brevifolia*			C		1/1
plants	land plants	Fabaceae	*Aeschynomene indica*	budda pea		C		4/2
plants	land plants	Fabaceae	*Alysicarpus muelleri*			C		1/1
plants	land plants	Fabaceae	*Bossiaea concolor*			C		1/1
plants	land plants	Fabaceae	*Cajanus acutifolius*			C		2/2
plants	land plants	Fabaceae	*Cajanus confertiflorus*			C		1/1
plants	land plants	Fabaceae	*Cajanus reticulatus var. reticulatus*			C		1/1
plants	land plants	Fabaceae	*Clitoria ternatea*	butterfly pea	Y			3/3
plants	land plants	Fabaceae	*Crotalaria dissitiflora subsp. dissitiflora*			C		4/3
plants	land plants	Fabaceae	*Crotalaria incana*		Y			4/1
plants	land plants	Fabaceae	*Crotalaria incana subsp. incana*		Y			2/2
plants	land plants	Fabaceae	*Crotalaria juncea*	sunhemp	Y			7/4
plants	land plants	Fabaceae	*Crotalaria medicaginea var. medicaginea*			C		1/1
plants	land plants	Fabaceae	*Crotalaria pallida*		Y			1
plants	land plants	Fabaceae	*Cullen tenax*	emu-foot		C		3/3
plants	land plants	Fabaceae	*Daviesia filipes subsp. filipes*			C		2/2
plants	land plants	Fabaceae	*Daviesia ulicifolia subsp. ulicifolia*			C		2
plants	land plants	Fabaceae	*Desmodium brachypodum*	large ticktrefoil		C		7/1
plants	land plants	Fabaceae	*Desmodium campylocaulon*			C		5/4
plants	land plants	Fabaceae	*Desmodium macrocarpum*			C		1/1
plants	land plants	Fabaceae	*Desmodium rhytidophyllum*			C		4/1
plants	land plants	Fabaceae	*Desmodium sp. (Mt Pleasant E.R.Anderson 3953)*			C		1/1
plants	land plants	Fabaceae	*Desmodium varians*	slender tick trefoil		C		2/1
plants	land plants	Fabaceae	*Erythrina vespertilio*			C		1
plants	land plants	Fabaceae	*Fabaceae*					1
plants	land plants	Fabaceae	*Galactia tenuiflora*			C		4/1
plants	land plants	Fabaceae	*Galactia tenuiflora var. lucida*			C		7/7
plants	land plants	Fabaceae	*Glycine*					2

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plants	land plants	Fabaceae	*Glycine falcata*			C		3/3
plants	land plants	Fabaceae	*Glycine latifolia*			C		7/4
plants	land plants	Fabaceae	*Glycine pescadrensis*			C		1/1
plants	land plants	Fabaceae	*Glycine sp. (Aldinga Grace+ 228)*			C		1/1
plants	land plants	Fabaceae	*Glycine sp. (Mackay S.B.Andrews+ 43)*			C		1/1
plants	land plants	Fabaceae	*Glycine syndetika*			C		1/1
plants	land plants	Fabaceae	*Glycine tabacina*	glycine pea		C		6
plants	land plants	Fabaceae	*Glycine tomentella*	woolly glycine		C		8/3
plants	land plants	Fabaceae	*Hardenbergia violacea*			C		2
plants	land plants	Fabaceae	*Hovea longipes*	brush hovea		C		4/3
plants	land plants	Fabaceae	*Hovea lorata*			C		1
plants	land plants	Fabaceae	*Hovea parvicalyx*			C		4/4
plants	land plants	Fabaceae	*Hovea planifolia*			C		1/1
plants	land plants	Fabaceae	*Hovea tholiformis*			C		1
plants	land plants	Fabaceae	*Indigofera*					1/1
plants	land plants	Fabaceae	*Indigofera australis*			C		1
plants	land plants	Fabaceae	*Indigofera brevidens*			C		3/2
plants	land plants	Fabaceae	*Indigofera colutea*	sticky indigo		C		1
plants	land plants	Fabaceae	*Indigofera ewartiana*			C		1/1
plants	land plants	Fabaceae	*Indigofera glandulosa*			C		1
plants	land plants	Fabaceae	*Indigofera hirsuta*	hairy indigo		C		2
plants	land plants	Fabaceae	*Indigofera linifolia*			C		9/6
plants	land plants	Fabaceae	*Indigofera linnaei*	Birdsville indigo		C		9/4
plants	land plants	Fabaceae	*Indigofera pratensis*			C		1/1
plants	land plants	Fabaceae	*Jacksonia scoparia*			C		2/2
plants	land plants	Fabaceae	*Lablab purpureus*	lablab	Y			1/1
plants	land plants	Fabaceae	*Leptosema chapmanii*			C		5/5
plants	land plants	Fabaceae	*Lespedeza juncea subsp. sericea*	perennial lespedeza		C		2
plants	land plants	Fabaceae	*Lotus australis*	Australian trefoil		C		6/6
plants	land plants	Fabaceae	*Macroptilium atropurpureum*	siratro	Y			1
plants	land plants	Fabaceae	*Macroptilium lathyroides*		Y			2
plants	land plants	Fabaceae	*Medicago polymorpha*	burr medic	Y			1/1
plants	land plants	Fabaceae	*Medicago scutellata*	snail medic	Y			1/1
plants	land plants	Fabaceae	*Melilotus albus*	sweet clover	Y			1/1
plants	land plants	Fabaceae	*Pultenaea petiolaris*			C		2/1
plants	land plants	Fabaceae	*Rhynchosia minima*			C		12/1
plants	land plants	Fabaceae	*Rhynchosia minima var. minima*			C		6/6
plants	land plants	Fabaceae	*Sesbania cannabina*			C		6/1
plants	land plants	Fabaceae	*Sesbania cannabina var. cannabina*			C		1/1
plants	land plants	Fabaceae	*Stylosanthes scabra*		Y			2
plants	land plants	Fabaceae	*Swainsona campylantha*			C		1/1
plants	land plants	Fabaceae	*Swainsona galegifolia*	smooth Darling pea		C		3/1
plants	land plants	Fabaceae	*Tephrosia*					3/2
plants	land plants	Fabaceae	*Tephrosia astragaloides*			C		3/3
plants	land plants	Fabaceae	*Tephrosia barbatala*			C		1/1
plants	land plants	Fabaceae	*Tephrosia brachyodon*			C		2

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plants	land plants	Fabaceae	*Tephrosia dietrichiae*			C		1/1
plants	land plants	Fabaceae	*Tephrosia filipes*			C		1/1
plants	land plants	Fabaceae	*Tephrosia filipes var. (Mt Blackjack A.R.Bean+ 7332)*			C		2/2
plants	land plants	Fabaceae	*Tephrosia gaudium-solis*			C		1/1
plants	land plants	Fabaceae	*Tephrosia juncea*			C		2/2
plants	land plants	Fabaceae	*Tephrosia rufula*			C		1
plants	land plants	Fabaceae	*Vigna lanceolata*			C		1
plants	land plants	Fabaceae	*Vigna lanceolata var. lanceolata*			C		1/1
plants	land plants	Fabaceae	*Vigna radiata var. sublobata*			C		2/1
plants	land plants	Fabaceae	*Vigna suberecta*			C		3/3
plants	land plants	Fabaceae	*Zornia dyctiocarpa*			C		1
plants	land plants	Fabaceae	*Zornia dyctiocarpa var. filifolia*			C		1/1
plants	land plants	Fabaceae	*Zornia muelleriana subsp. muelleriana*			C		1
plants	land plants	Fabaceae	*Zornia muriculata subsp. angustata*			C		1/1
plants	land plants	Fabaceae	*Zornia muriculata subsp. muriculata*			C		2/2
plants	land plants	Fabaceae	*Zornia pallida*			C		1/1
plants	land plants	Gentianaceae	*Schenkia australis*			C		1/1
plants	land plants	Goodeniaceae	*Brunonia australis*	blue pincushion		C		4
plants	land plants	Goodeniaceae	*Dampiera adpressa*			C		4/4
plants	land plants	Goodeniaceae	*Goodenia*					2/1
plants	land plants	Goodeniaceae	*Goodenia glabra*			C		4/4
plants	land plants	Goodeniaceae	*Goodenia grandiflora*			C		4/4
plants	land plants	Goodeniaceae	*Goodenia rotundifolia*			C		3/1
plants	land plants	Goodeniaceae	*Scaevola humilis*			C		4/4
plants	land plants	Gyrostemonaceae	*Codonocarpus attenuatus*			C		2/2
plants	land plants	Haloragaceae	*Gonocarpus elatus*			C		1/1
plants	land plants	Haloragaceae	*Haloragis aspera*	raspweed		C		1
plants	land plants	Haloragaceae	*Haloragis glauca*			C		1
plants	land plants	Haloragaceae	*Haloragis glauca forma glauca*			C		2/2
plants	land plants	Haloragaceae	*Haloragis heterophylla*	rough raspweed		C		3/2
plants	land plants	Haloragaceae	*Haloragis stricta*			C		11/9
plants	land plants	Hemerocallidaceae	*Dianella*					1
plants	land plants	Hemerocallidaceae	*Dianella brevipedunculata*			C		2
plants	land plants	Hemerocallidaceae	*Dianella caerulea*			C		4/3
plants	land plants	Hemerocallidaceae	*Dianella fruticans*			C		2/2
plants	land plants	Hemerocallidaceae	*Dianella longifolia*			C		5/2
plants	land plants	Hemerocallidaceae	*Dianella longifolia var. longifolia*			C		1/1
plants	land plants	Hemerocallidaceae	*Dianella revoluta*			C		2/1
plants	land plants	Hydrocharitaceae	*Ottelia ovalifolia subsp. ovalifolia*			C		1/1
plants	land plants	Hydrocharitaceae	*Vallisneria nana*			C		1/1
plants	land plants	Hypoxidaceae	*Hypoxis arillacea*			C		4/3
plants	land plants	Hypoxidaceae	*Hypoxis pratensis*			C		2/2
plants	land plants	Johnsoniaceae	*Caesia parviflora*			C		1/1
plants	land plants	Johnsoniaceae	*Tricoryne elatior*	yellow autumn lily		C		1
plants	land plants	Juncaceae	*Juncus flavidus*			C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Juncaceae	*Juncus usitatus*			C		1/1
plants	land plants	Juncaginaceae	*Cycnogeton dubius*			C		1/1
plants	land plants	Juncaginaceae	*Cycnogeton procerus*			C		1/1
plants	land plants	Lamiaceae	*Ajuga australis*	Australian bugle		C		5/4
plants	land plants	Lamiaceae	*Anisomeles moschata*			C		4/4
plants	land plants	Lamiaceae	*Basilicum polystachyon*			C		8/4
plants	land plants	Lamiaceae	*Chloanthes parviflora*			C		2/2
plants	land plants	Lamiaceae	*Clerodendrum floribundum*			C		3
plants	land plants	Lamiaceae	*Coleus australis*			C		3/2
plants	land plants	Lamiaceae	*Coleus graveolens*			C		2/2
plants	land plants	Lamiaceae	*Hemigenia*					1/1
plants	land plants	Lamiaceae	*Plectranthus*					1
plants	land plants	Lamiaceae	*Prostanthera cryptandroides subsp. euphrasioides*			C		2/2
plants	land plants	Lamiaceae	*Prostanthera ringens*			C		1/1
plants	land plants	Lamiaceae	*Prostanthera suborbicularis*			C		1/1
plants	land plants	Lamiaceae	*Salvia reflexa*		Y			3/3
plants	land plants	Lamiaceae	*Teucrium corymbosum*	forest germander		C		5/5
plants	land plants	Lamiaceae	*Teucrium daucoides*			C		1
plants	land plants	Lamiaceae	*Teucrium integrifolium*			C		6/4
plants	land plants	Lamiaceae	*Teucrium junceum*			C		2
plants	land plants	Laxmanniaceae	*Eustrephus latifolius*	wombat berry		C		5/1
plants	land plants	Laxmanniaceae	*Laxmannia gracilis*	slender wire lily		C		2/2
plants	land plants	Laxmanniaceae	*Lomandra*					2
plants	land plants	Laxmanniaceae	*Lomandra confertifolia subsp. pallida*			C		5/2
plants	land plants	Laxmanniaceae	*Lomandra filiformis*			C		4
plants	land plants	Laxmanniaceae	*Lomandra filiformis subsp. filiformis*			C		1/1
plants	land plants	Laxmanniaceae	*Lomandra glauca*	pale matrush		C		1/1
plants	land plants	Laxmanniaceae	*Lomandra leucocephala*			C		3
plants	land plants	Laxmanniaceae	*Lomandra longifolia*			C		6
plants	land plants	Laxmanniaceae	*Lomandra multiflora*			C		5/1
plants	land plants	Laxmanniaceae	*Lomandra multiflora subsp. multiflora*			C		8/1
plants	land plants	Leucobryaceae	*Leucobryum candidum*			C		1/1
plants	land plants	Linderniaceae	*Lindernia*					1/1
plants	land plants	Linderniaceae	*Lindernia procumbens*			C		1/1
plants	land plants	Loranthaceae	*Amyema congener subsp. rotundifolia*			C		1/1
plants	land plants	Loranthaceae	*Amyema miquelii*			C		2/2
plants	land plants	Loranthaceae	*Amyema pendula subsp. longifolia*			C		1
plants	land plants	Loranthaceae	*Amyema quandang*			C		2
plants	land plants	Loranthaceae	*Dendrophthoe glabrescens*			C		1/1
plants	land plants	Loranthaceae	*Lysiana*					1
plants	land plants	Loranthaceae	*Lysiana linearifolia*			C		1
plants	land plants	Loranthaceae	*Lysiana subfalcata*			C		5/4
plants	land plants	Lythraceae	*Ammannia multiflora*	jerry-jerry		C		2/2
plants	land plants	Lythraceae	*Rotala mexicana*			C		1/1
plants	land plants	Malvaceae	*Abelmoschus ficulneus*	native rosella		C		3/3
plants	land plants	Malvaceae	*Abutilon*					1/1

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plants	land plants	Malvaceae	*Abutilon calliphyllum*	velvet lanternflower		C		1/1
plants	land plants	Malvaceae	*Abutilon cunninghamii*			C		1
plants	land plants	Malvaceae	*Abutilon malvifolium*	bastard marshmallow		C		1/1
plants	land plants	Malvaceae	*Abutilon otocarpum*			C		1/1
plants	land plants	Malvaceae	*Abutilon oxycarpum*			C		6/1
plants	land plants	Malvaceae	*Abutilon oxycarpum var. incanum*			C		2/2
plants	land plants	Malvaceae	*Abutilon oxycarpum var. oxycarpum*			C		1/1
plants	land plants	Malvaceae	*Gossypium australe*			C		1/1
plants	land plants	Malvaceae	*Hibiscus divaricatus*			C		1/1
plants	land plants	Malvaceae	*Hibiscus sp. (Emerald S.L.Everist 2124)*			C		1/1
plants	land plants	Malvaceae	*Hibiscus sturtii*			C		12/6
plants	land plants	Malvaceae	*Hibiscus tridactylites*			C		3
plants	land plants	Malvaceae	*Hibiscus verdcourtii*			C		4/4
plants	land plants	Malvaceae	*Malva*			C		1
plants	land plants	Malvaceae	*Malva parviflora*	small-flowered mallow	Y			2/2
plants	land plants	Malvaceae	*Malvaceae*					1
plants	land plants	Malvaceae	*Malvastrum americanum*		Y			11
plants	land plants	Malvaceae	*Malvastrum americanum var. americanum*		Y			10/2
plants	land plants	Malvaceae	*Malvastrum americanum var. stellatum*			C		1/1
plants	land plants	Malvaceae	*Sida*					7
plants	land plants	Malvaceae	*Sida atherophora*			C		9/1
plants	land plants	Malvaceae	*Sida cordifolia*		Y			6/1
plants	land plants	Malvaceae	*Sida corrugata*			C		2
plants	land plants	Malvaceae	*Sida corrugata subsp. (Bollon S.L.Everist 3674)*			C		1/1
plants	land plants	Malvaceae	*Sida fibulifera*			C		4/3
plants	land plants	Malvaceae	*Sida hackettiana*			C		15/2
plants	land plants	Malvaceae	*Sida laevis*			C		3/3
plants	land plants	Malvaceae	*Sida platycalyx*	lifesaver burr		C		2
plants	land plants	Malvaceae	*Sida pleiantha*			C		4/4
plants	land plants	Malvaceae	*Sida rhombifolia*		Y			11/1
plants	land plants	Malvaceae	*Sida rohlenae*			C		2
plants	land plants	Malvaceae	*Sida rohlenae subsp. rohlenae*			C		1/1
plants	land plants	Malvaceae	*Sida sp. (Charters Towers E.J.THompson+ CHA456)*			C		3/3
plants	land plants	Malvaceae	*Sida sp. (Jericho E.J.Thompson+ JER117)*			C		1/1
plants	land plants	Malvaceae	*Sida sp. (Musselbrook M.B.Thomas+ MRS437)*			C		1
plants	land plants	Malvaceae	*Sida spinosa*	spiny sida	Y			3/2
plants	land plants	Malvaceae	*Sida trichopoda*			C		2
plants	land plants	Marsileaceae	*Marsilea drummondii*	common nardoo		C		2
plants	land plants	Marsileaceae	*Marsilea hirsuta*	hairy nardoo		C		2/1
plants	land plants	Maundiaceae	*Maundia triglochinoides*			V		2
plants	land plants	Meliaceae	*Melia azedarach*	white cedar		C		4/1
plants	land plants	Meliaceae	*Owenia acidula*	emu apple		C		2
plants	land plants	Meliaceae	*Owenia venosa*	crow's apple		C		3
plants	land plants	Meliaceae	*Turraea pubescens*	native honeysuckle		C		3/2
plants	land plants	Menispermaceae	*Stephania japonica*			C		1
plants	land plants	Menispermaceae	*Stephania japonica var. discolor*			C		1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Mimosaceae	*Acacia*					1
plants	land plants	Mimosaceae	*Acacia amblygona*	fan-leaf wattle		C		2/2
plants	land plants	Mimosaceae	*Acacia angusta*			C		7/7
plants	land plants	Mimosaceae	*Acacia bancroftiorum*			C		6/3
plants	land plants	Mimosaceae	*Acacia complanata*	flatstem wattle		C		3/1
plants	land plants	Mimosaceae	*Acacia conferta*			C		2
plants	land plants	Mimosaceae	*Acacia crassa*			C		4
plants	land plants	Mimosaceae	*Acacia crassa subsp. crassa*			C		13/2
plants	land plants	Mimosaceae	*Acacia cretata x Acacia fodinalis*			C		1/1
plants	land plants	Mimosaceae	*Acacia cretata x Acacia leiocalyx*			C		1/1
plants	land plants	Mimosaceae	*Acacia deanei*			C		1/1
plants	land plants	Mimosaceae	*Acacia decora*	pretty wattle		C		5/1
plants	land plants	Mimosaceae	*Acacia dietrichiana*			C		3/3
plants	land plants	Mimosaceae	*Acacia everistii*			C		3/3
plants	land plants	Mimosaceae	*Acacia falciformis*	broad-leaved hickory		C		2/1
plants	land plants	Mimosaceae	*Acacia fimbriata*	Brisbane golden wattle		C		1/1
plants	land plants	Mimosaceae	*Acacia gittinsii*			C		1/1
plants	land plants	Mimosaceae	*Acacia glaucocarpa*	hickory wattle		C		3/1
plants	land plants	Mimosaceae	*Acacia harpophylla*	brigalow		C		9
plants	land plants	Mimosaceae	*Acacia julifera subsp. curvinervia*			C		6/6
plants	land plants	Mimosaceae	*Acacia julifera subsp. julifera*			C		1/1
plants	land plants	Mimosaceae	*Acacia juncifolia*			C		2/2
plants	land plants	Mimosaceae	*Acacia leiocalyx*			C		3
plants	land plants	Mimosaceae	*Acacia leiocalyx subsp. leiocalyx*			C		3/1
plants	land plants	Mimosaceae	*Acacia leptostachya*	Townsville wattle		C		1/1
plants	land plants	Mimosaceae	*Acacia longispicata*			C		3/1
plants	land plants	Mimosaceae	*Acacia melanoxylon*	blackwood		C		1
plants	land plants	Mimosaceae	*Acacia melvillei*			C		1/1
plants	land plants	Mimosaceae	*Acacia neriifolia*	pechey wattle		C		1
plants	land plants	Mimosaceae	*Acacia oswaldii*	miljee		C		2/1
plants	land plants	Mimosaceae	*Acacia paradoxa*	kangaroo thorn		C		2/2
plants	land plants	Mimosaceae	*Acacia pendula*	myall		C		1/1
plants	land plants	Mimosaceae	*Acacia pustula*			C		1/1
plants	land plants	Mimosaceae	*Acacia salicina*	doolan		C		16/4
plants	land plants	Mimosaceae	*Acacia shirleyi*	lancewood		C		5/1
plants	land plants	Mimosaceae	*Acacia sparsiflora*			C		1
plants	land plants	Mimosaceae	*Archidendropsis basaltica*	red lancewood		C		5/1
plants	land plants	Mimosaceae	*Archidendropsis thozetiana*			C		1/1
plants	land plants	Mimosaceae	*Neptunia dimorphantha*			C		1/1
plants	land plants	Mimosaceae	*Neptunia gracilis forma gracilis*			C		10/6
plants	land plants	Mimosaceae	*Prosopis pallida*		Y			1
plants	land plants	Mimosaceae	*Vachellia bidwillii*			C		1/1
plants	land plants	Mimosaceae	*Vachellia farnesiana*		Y			5/2
plants	land plants	Molluginaceae	*Glinus oppositifolius*			C		1/1
plants	land plants	Moraceae	*Ficus coronata*	creek sandpaper fig		C		2
plants	land plants	Moraceae	*Ficus opposita*			C		5/1

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plants	land plants	Moraceae	*Ficus rubiginosa*	Port Jackson fig		C		6
plants	land plants	Moraceae	*Ficus virens var. virens*			C		3/3
plants	land plants	Myrsinaceae	*Lysimachia arvensis*		Y			1/1
plants	land plants	Myrsinaceae	*Myrsine variabilis*			C		4/4
plants	land plants	Myrtaceae	*Angophora floribunda*	rough-barked apple		C		8
plants	land plants	Myrtaceae	*Backhousia angustifolia*	narrow-leaved backhousia		C		1/1
plants	land plants	Myrtaceae	*Calytrix tetragona*	fringe myrtle		C		3/3
plants	land plants	Myrtaceae	*Corymbia bloxsomei*			C		1
plants	land plants	Myrtaceae	*Corymbia citriodora*	spotted gum		C		1
plants	land plants	Myrtaceae	*Corymbia citriodora subsp. citriodora*			C		244/1
plants	land plants	Myrtaceae	*Corymbia citriodora subsp. variegata*			C		14
plants	land plants	Myrtaceae	*Corymbia citriodora x Corymbia watsoniana subsp. capillata*			C		1/1
plants	land plants	Myrtaceae	*Corymbia clarksoniana*			C		27/2
plants	land plants	Myrtaceae	*Corymbia dallachiana*			C		1/1
plants	land plants	Myrtaceae	*Corymbia erythrophloia*	variable-barked bloodwood		C		26/5
plants	land plants	Myrtaceae	*Corymbia hendersonii*			C		3/3
plants	land plants	Myrtaceae	*Corymbia intermedia*	pink bloodwood		C		2
plants	land plants	Myrtaceae	*Corymbia leichhardtii*	rustyjacket		C		3/3
plants	land plants	Myrtaceae	*Corymbia leichhardtii x Corymbia tessellaris*			C		1/1
plants	land plants	Myrtaceae	*Corymbia scabrida*	rough-leaved yellowjacket		NT		1/1
plants	land plants	Myrtaceae	*Corymbia sp. (Springsure M.I.Brooker 9786)*			C		2/2
plants	land plants	Myrtaceae	*Corymbia tessellaris*	Moreton Bay ash		C		30
plants	land plants	Myrtaceae	*Corymbia trachyphloia subsp. trachyphloia*			C		1/1
plants	land plants	Myrtaceae	*Corymbia watsoniana subsp. capillata*			C		11/8
plants	land plants	Myrtaceae	*Corymbia watsoniana subsp. watsoniana*			C		18
plants	land plants	Myrtaceae	*Eucalyptus bakeri*	Baker's mallee		C		2/2
plants	land plants	Myrtaceae	*Eucalyptus camaldulensis*			C		3
plants	land plants	Myrtaceae	*Eucalyptus camaldulensis subsp. acuta*			C		1/1
plants	land plants	Myrtaceae	*Eucalyptus cambageana*	Dawson gum		C		6/1
plants	land plants	Myrtaceae	*Eucalyptus chloroclada*	Baradine red gum		C		4/1
plants	land plants	Myrtaceae	*Eucalyptus cloeziana*	Gympie messmate		C		9/1
plants	land plants	Myrtaceae	*Eucalyptus cloeziana x Eucalyptus portuensis*			C		1
plants	land plants	Myrtaceae	*Eucalyptus coolabah*	coolabah		C		14/2
plants	land plants	Myrtaceae	*Eucalyptus crebra*	narrow-leaved red ironbark		C		18/12
plants	land plants	Myrtaceae	*Eucalyptus decorticans*			C		10
plants	land plants	Myrtaceae	*Eucalyptus drepanophylla*			C		1
plants	land plants	Myrtaceae	*Eucalyptus exserta*	Queensland peppermint		C		7/7
plants	land plants	Myrtaceae	*Eucalyptus fibrosa subsp. nubilis*			C		43
plants	land plants	Myrtaceae	*Eucalyptus granitica*	granite ironbark		C		1
plants	land plants	Myrtaceae	*Eucalyptus grisea*			C		1/1
plants	land plants	Myrtaceae	*Eucalyptus melanophloia*			C		170
plants	land plants	Myrtaceae	*Eucalyptus melanophloia subsp. melanophloia*			C		2/2
plants	land plants	Myrtaceae	*Eucalyptus melanophloia x Eucalyptus populnea*			C		1/1
plants	land plants	Myrtaceae	*Eucalyptus moluccana*	gum-topped box		C		2/2
plants	land plants	Myrtaceae	*Eucalyptus orgadophila*	mountain coolibah		C		10/4

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plants	land plants	Myrtaceae	*Eucalyptus populnea*	poplar box		C		8
plants	land plants	Myrtaceae	*Eucalyptus sicilifolia*			V		15/15
plants	land plants	Myrtaceae	*Eucalyptus suffulgens*			C		4/3
plants	land plants	Myrtaceae	*Eucalyptus tenuipes*	narrow-leaved white mahogany		C		4/2
plants	land plants	Myrtaceae	*Eucalyptus tereticornis*			C		11
plants	land plants	Myrtaceae	*Eucalyptus tereticornis subsp. tereticornis*			C		25/1
plants	land plants	Myrtaceae	*Eucalyptus tholiformis*			C		2/2
plants	land plants	Myrtaceae	*Eucalyptus thozetiana*			C		3/3
plants	land plants	Myrtaceae	*Leptospermum lamellatum*			C		18/1
plants	land plants	Myrtaceae	*Leptospermum neglectum*			C		2/2
plants	land plants	Myrtaceae	*Leptospermum polygalifolium*	tantoon		C		1/1
plants	land plants	Myrtaceae	*Lophostemon suaveolens*	swamp box		C		8
plants	land plants	Myrtaceae	*Lysicarpus angustifolius*	budgeroo		C		44/2
plants	land plants	Myrtaceae	*Melaleuca bracteata*			C		12/2
plants	land plants	Myrtaceae	*Melaleuca linariifolia*	snow-in summer		C		3
plants	land plants	Myrtaceae	*Melaleuca montis-zamiae*			C		6/6
plants	land plants	Myrtaceae	*Melaleuca trichostachya*			C		2/2
plants	land plants	Myrtaceae	*Melaleuca viminalis*			C		5/3
plants	land plants	Myrtaceae	*Micromyrtus capricornia*			C		4/4
plants	land plants	Myrtaceae	*Sannantha brachypoda*			V		1/1
plants	land plants	Myrtaceae	*Syzygium australe*	scrub cherry		C		2/2
plants	land plants	Nephrolepidaceae	*Nephrolepis cordifolia*	fishbone fern		C		1/1
plants	land plants	Nyctaginaceae	*Boerhavia*					6/1
plants	land plants	Nyctaginaceae	*Boerhavia burbidgeana*			C		1/1
plants	land plants	Nyctaginaceae	*Boerhavia dominii*			C		8/1
plants	land plants	Nyctaginaceae	*Boerhavia paludosa*			C		1/1
plants	land plants	Nyctaginaceae	*Boerhavia pubescens*			C		3/3
plants	land plants	Nyctaginaceae	*Boerhavia sp. (St George A.Hill AQ399299)*			C		1/1
plants	land plants	Oleaceae	*Jasminum didymum*			C		4
plants	land plants	Oleaceae	*Jasminum didymum subsp. didymum*			C		3
plants	land plants	Oleaceae	*Jasminum didymum subsp. lineare*			C		3
plants	land plants	Oleaceae	*Jasminum simplicifolium subsp. australiense*			C		2/2
plants	land plants	Oleaceae	*Notelaea microcarpa*			C		4/2
plants	land plants	Oleaceae	*Notelaea sp. (Barakula A.R.Bean 7553)*			C		4/2
plants	land plants	Onagraceae	*Ludwigia octovalvis*	willow primrose		C		1
plants	land plants	Ophioglossaceae	*Ophioglossum gramineum*			C		1/1
plants	land plants	Orchidaceae	*Caladenia*					1/1
plants	land plants	Orchidaceae	*Cymbidium canaliculatum*			C		5
plants	land plants	Orchidaceae	*Pterostylis curta*	blunt greenhood		C		1/1
plants	land plants	Oxalidaceae	*Oxalis chnoodes*			C		2/2
plants	land plants	Oxalidaceae	*Oxalis corniculata*		Y			7/1
plants	land plants	Oxalidaceae	*Oxalis exilis*			C		2/2
plants	land plants	Oxalidaceae	*Oxalis perennans*			C		2/2
plants	land plants	Oxalidaceae	*Oxalis radicosa*			C		1/1
plants	land plants	Papaveraceae	*Argemone ochroleuca*		Y			1
plants	land plants	Papaveraceae	*Argemone ochroleuca subsp. ochroleuca*	Mexican poppy	Y			5/2

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plants	land plants	Passifloraceae	*Passiflora aurantia*			C		1
plants	land plants	Pedaliaceae	*Josephinia eugeniae*	josephinia burr		C		1/1
plants	land plants	Pentapetaceae	*Melhania oblongifolia*			C		5/2
plants	land plants	Phrymaceae	*Glossostigma diandrum*			C		2/2
plants	land plants	Phrymaceae	*Mimulus gracilis*	slender monkey flower		C		1/1
plants	land plants	Phrymaceae	*Peplidium foecundum*			C		1/1
plants	land plants	Phyllanthaceae	*Breynia oblongifolia*			C		7
plants	land plants	Phyllanthaceae	*Bridelia leichhardtii*			C		4/3
plants	land plants	Phyllanthaceae	*Phyllanthus*					7/2
plants	land plants	Phyllanthaceae	*Phyllanthus carpentariae*			C		2/2
plants	land plants	Phyllanthaceae	*Phyllanthus gunnii*			C		1
plants	land plants	Phyllanthaceae	*Phyllanthus lacunarius*			C		2/1
plants	land plants	Phyllanthaceae	*Phyllanthus maderaspatensis*			C		7/4
plants	land plants	Phyllanthaceae	*Phyllanthus simplex*			C		1/1
plants	land plants	Phyllanthaceae	*Phyllanthus sp. (Pentland R.J.Cumming 9742)*			C		1/1
plants	land plants	Phyllanthaceae	*Phyllanthus virgatus*			C		11/4
plants	land plants	Phyllanthaceae	*Poranthera microphylla*	small poranthera		C		1/1
plants	land plants	Phyllanthaceae	*Synostemon ramosissimus*			C		1/1
plants	land plants	Phyllanthaceae	*Synostemon rhytidospermus*			C		2/2
plants	land plants	Picrodendraceae	*Petalostigma pubescens*	quinine tree		C		30/1
plants	land plants	Pittosporaceae	*Bursaria incana*			C		4/1
plants	land plants	Pittosporaceae	*Bursaria spinosa subsp. spinosa*			C		1
plants	land plants	Pittosporaceae	*Pittosporum angustifolium*			C		2/1
plants	land plants	Pittosporaceae	*Pittosporum spinescens*			C		4/1
plants	land plants	Plantaginaceae	*Callitriche sonderi*			C		1/1
plants	land plants	Plantaginaceae	*Plantago cunninghamii*	sago weed		C		1/1
plants	land plants	Plantaginaceae	*Plantago debilis*	shade plantain		C		1/1
plants	land plants	Plantaginaceae	*Scoparia dulcis*	scoparia	Y			2/1
plants	land plants	Plantaginaceae	*Stemodia florulenta*			C		1
plants	land plants	Plantaginaceae	*Stemodia pubescens*			C		2/2
plants	land plants	Plumbaginaceae	*Plumbago zeylanica*	native plumbago		C		1
plants	land plants	Poaceae	*Alloteropsis cimicina*			C		4/3
plants	land plants	Poaceae	*Ancistrachne uncinulata*	hooky grass		C		2/2
plants	land plants	Poaceae	*Anthosachne plurinervis*			C		2/2
plants	land plants	Poaceae	*Aristida*					5
plants	land plants	Poaceae	*Aristida acuta*			C		1/1
plants	land plants	Poaceae	*Aristida annua*			V	V	4/4
plants	land plants	Poaceae	*Aristida benthamii*			C		1/1
plants	land plants	Poaceae	*Aristida benthamii var. benthamii*			C		1/1
plants	land plants	Poaceae	*Aristida calycina*			C		2
plants	land plants	Poaceae	*Aristida calycina var. calycina*			C		5/1
plants	land plants	Poaceae	*Aristida caput-medusae*			C		6/1
plants	land plants	Poaceae	*Aristida contorta*	bunched kerosene grass		C		2
plants	land plants	Poaceae	*Aristida echinata*			C		1/1
plants	land plants	Poaceae	*Aristida gracilipes*			C		8/3
plants	land plants	Poaceae	*Aristida holathera var. holathera*			C		4/2

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plants	land plants	Poaceae	*Aristida jerichoensis var. jerichoensis*			C		3/1
plants	land plants	Poaceae	*Aristida latifolia*	feathertop wiregrass		C		17/6
plants	land plants	Poaceae	*Aristida lazaridis*			C		4/4
plants	land plants	Poaceae	*Aristida leptopoda*	white speargrass		C		13/4
plants	land plants	Poaceae	*Aristida longicollis*			C		1/1
plants	land plants	Poaceae	*Aristida personata*			C		7/3
plants	land plants	Poaceae	*Aristida psammophila*			C		1/1
plants	land plants	Poaceae	*Aristida queenslandica*			C		5/1
plants	land plants	Poaceae	*Aristida queenslandica var. dissimilis*			C		4/2
plants	land plants	Poaceae	*Aristida queenslandica var. queenslandica*			C		3
plants	land plants	Poaceae	*Aristida ramosa*	purple wiregrass		C		10/3
plants	land plants	Poaceae	*Aristida vagans*			C		3/1
plants	land plants	Poaceae	*Arundinella nepalensis*	reedgrass		C		9/1
plants	land plants	Poaceae	*Astrebla lappacea*	curly mitchell grass		C		2/2
plants	land plants	Poaceae	*Astrebla squarrosa*	bull mitchell grass		C		2/1
plants	land plants	Poaceae	*Austrostipa blakei*			C		1/1
plants	land plants	Poaceae	*Austrostipa verticillata*	slender bamboo grass		C		1
plants	land plants	Poaceae	*Bothriochloa*					2
plants	land plants	Poaceae	*Bothriochloa bladhii*			C		8/1
plants	land plants	Poaceae	*Bothriochloa bladhii subsp. bladhii*			C		2/2
plants	land plants	Poaceae	*Bothriochloa decipiens*			C		5
plants	land plants	Poaceae	*Bothriochloa decipiens var. cloncurrensis*			C		3/3
plants	land plants	Poaceae	*Bothriochloa decipiens var. decipiens*			C		9/3
plants	land plants	Poaceae	*Bothriochloa erianthoides*	satintop grass		C		12/6
plants	land plants	Poaceae	*Bothriochloa ewartiana*	desert bluegrass		C		7/2
plants	land plants	Poaceae	*Bothriochloa pertusa*		Y			1/1
plants	land plants	Poaceae	*Brachyachne ciliaris*	hairy native couch		C		5
plants	land plants	Poaceae	*Brachyachne convergens*	common native couch		C		4/3
plants	land plants	Poaceae	*Brachyachne tenella*			C		1/1
plants	land plants	Poaceae	*Calyptochloa gracillima subsp. gracillima*			C		1/1
plants	land plants	Poaceae	*Capillipedium spicigerum*	spicytop		C		3/1
plants	land plants	Poaceae	*Cenchrus caliculatus*	hillside burrgrass		C		1/1
plants	land plants	Poaceae	*Cenchrus ciliaris*		Y			24/3
plants	land plants	Poaceae	*Cenchrus echinatus*	Mossman River grass	Y			1
plants	land plants	Poaceae	*Cenchrus polystachios*		Y			1/1
plants	land plants	Poaceae	*Cenchrus purpureus*		Y			1/1
plants	land plants	Poaceae	*Chionachne cyathopoda*	river grass		C		1/1
plants	land plants	Poaceae	*Chloris divaricata*			C		1/1
plants	land plants	Poaceae	*Chloris divaricata var. divaricata*	slender chloris		C		16/5
plants	land plants	Poaceae	*Chloris inflata*	purpletop chloris	Y			1
plants	land plants	Poaceae	*Chloris ventricosa*	tall chloris		C		10/4
plants	land plants	Poaceae	*Chloris virgata*	feathertop rhodes grass	Y			4/2
plants	land plants	Poaceae	*Chrysopogon fallax*			C		6
plants	land plants	Poaceae	*Chrysopogon filipes*			C		2
plants	land plants	Poaceae	*Cleistochloa subjuncea*			C		7/4
plants	land plants	Poaceae	*Cymbopogon bombycinus*	silky oilgrass		C		4/2

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plants	land plants	Poaceae	*Cymbopogon gratus*			C		2/2
plants	land plants	Poaceae	*Cymbopogon obtectus*			C		6/4
plants	land plants	Poaceae	*Cymbopogon queenslandicus*			C		1/1
plants	land plants	Poaceae	*Cymbopogon refractus*	barbed-wire grass		C		17/1
plants	land plants	Poaceae	*Cynodon dactylon*		Y			6
plants	land plants	Poaceae	*Cynodon dactylon var. dactylon*		Y			1/1
plants	land plants	Poaceae	*Dactyloctenium australe*	sweet smother grass	Y			1
plants	land plants	Poaceae	*Dactyloctenium radulans*	button grass		C		3/1
plants	land plants	Poaceae	*Dichanthium annulatum*	sheda grass	Y			3/2
plants	land plants	Poaceae	*Dichanthium aristatum*	angleton grass	Y			6/5
plants	land plants	Poaceae	*Dichanthium fecundum*	curly bluegrass		C		2/2
plants	land plants	Poaceae	*Dichanthium queenslandicum*			V	E	16/15
plants	land plants	Poaceae	*Dichanthium sericeum*			C		4
plants	land plants	Poaceae	*Dichanthium sericeum subsp. humilius*			C		1/1
plants	land plants	Poaceae	*Dichanthium sericeum subsp. sericeum*			C		18/12
plants	land plants	Poaceae	*Dichanthium setosum*			C	V	9/9
plants	land plants	Poaceae	*Dichanthium tenue*	small bluegrass		C		2/1
plants	land plants	Poaceae	*Digitaria breviglumis*			C		4
plants	land plants	Poaceae	*Digitaria brownii*			C		6/4
plants	land plants	Poaceae	*Digitaria ciliaris*	summer grass	Y			1
plants	land plants	Poaceae	*Digitaria diffusa*			C		2
plants	land plants	Poaceae	*Digitaria diminuta*			C		1/1
plants	land plants	Poaceae	*Digitaria divaricatissima*	spreading umbrella grass		C		13/8
plants	land plants	Poaceae	*Digitaria divaricatissima var. divaricatissima*			C		6/6
plants	land plants	Poaceae	*Digitaria eriantha*		Y			1/1
plants	land plants	Poaceae	*Digitaria orbata*			C		3/3
plants	land plants	Poaceae	*Digitaria porrecta*			NT		11/11
plants	land plants	Poaceae	*Digitaria ramularis*			C		2/1
plants	land plants	Poaceae	*Dinebra decipiens*			C		4
plants	land plants	Poaceae	*Dinebra decipiens var. asthenes*			C		4/3
plants	land plants	Poaceae	*Dinebra decipiens var. decipiens*			C		2/2
plants	land plants	Poaceae	*Diplachne fusca var. fusca*			C		1/1
plants	land plants	Poaceae	*Echinochloa colona*	awnless barnyard grass	Y			6/3
plants	land plants	Poaceae	*Elionurus citreus*	lemon-scented grass		C		1
plants	land plants	Poaceae	*Enneapogon*					1
plants	land plants	Poaceae	*Enneapogon cylindricus*	jointed nineawn		C		4
plants	land plants	Poaceae	*Enneapogon gracilis*	slender nineawn		C		9/4
plants	land plants	Poaceae	*Enneapogon lindleyanus*			C		14/8
plants	land plants	Poaceae	*Enneapogon polyphyllus*	leafy nineawn		C		5/5
plants	land plants	Poaceae	*Enneapogon purpurascens*			C		2
plants	land plants	Poaceae	*Enneapogon truncatus*			C		7/4
plants	land plants	Poaceae	*Enteropogon acicularis*	curly windmill grass		C		3
plants	land plants	Poaceae	*Enteropogon minutus*			C		1/1
plants	land plants	Poaceae	*Enteropogon ramosus*			C		2/2
plants	land plants	Poaceae	*Enteropogon unispiceus*			C		2/1
plants	land plants	Poaceae	*Eragrostis*					1

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plants	land plants	Poaceae	*Eragrostis brownii*	Brown's lovegrass		C		9/1
plants	land plants	Poaceae	*Eragrostis cilianensis*		Y			6/2
plants	land plants	Poaceae	*Eragrostis dielsii*	mallee lovegrass		C		1
plants	land plants	Poaceae	*Eragrostis elongata*			C		8/4
plants	land plants	Poaceae	*Eragrostis lacunaria*	purple lovegrass		C		2/1
plants	land plants	Poaceae	*Eragrostis leptocarpa*	drooping lovegrass		C		1
plants	land plants	Poaceae	*Eragrostis leptostachya*			C		5/1
plants	land plants	Poaceae	*Eragrostis megalosperma*			C		1/1
plants	land plants	Poaceae	*Eragrostis parviflora*	weeping lovegrass		C		3/3
plants	land plants	Poaceae	*Eragrostis sororia*			C		5/4
plants	land plants	Poaceae	*Eragrostis spartinoides*			C		1/1
plants	land plants	Poaceae	*Eragrostis trichophora*		Y			3/3
plants	land plants	Poaceae	*Eremochloa bimaculata*	poverty grass		C		4
plants	land plants	Poaceae	*Eriachne mucronata*			C		7/2
plants	land plants	Poaceae	*Eriachne mucronata forma (Alpha C.E.Hubbard 7882)*			C		3/3
plants	land plants	Poaceae	*Eriachne rara*			C		1
plants	land plants	Poaceae	*Eriochloa*					1
plants	land plants	Poaceae	*Eriochloa crebra*	spring grass		C		8/6
plants	land plants	Poaceae	*Eriochloa fatmensis*			C		2/1
plants	land plants	Poaceae	*Eriochloa procera*	slender cupgrass		C		4/3
plants	land plants	Poaceae	*Eriochloa pseudoacrotricha*			C		16/8
plants	land plants	Poaceae	*Eulalia aurea*	silky browntop		C		11/1
plants	land plants	Poaceae	*Heteropogon contortus*	black speargrass		C		33/3
plants	land plants	Poaceae	*Hyparrhenia rufa subsp. rufa*		Y			1/1
plants	land plants	Poaceae	*Imperata cylindrica*	blady grass		C		3
plants	land plants	Poaceae	*Iseilema macratherum*			C		1/1
plants	land plants	Poaceae	*Iseilema membranaceum*	small flinders grass		C		4/4
plants	land plants	Poaceae	*Iseilema vaginiflorum*	red flinders grass		C		13/4
plants	land plants	Poaceae	*Leptochloa digitata*			C		9/5
plants	land plants	Poaceae	*Megathyrsus maximus*		Y			7
plants	land plants	Poaceae	*Megathyrsus maximus var. maximus*		Y			1/1
plants	land plants	Poaceae	*Megathyrsus maximus var. pubiglumis*		Y			3/2
plants	land plants	Poaceae	*Melinis repens*	red natal grass	Y			23/5
plants	land plants	Poaceae	*Moorochloa eruciformis*		Y			4/4
plants	land plants	Poaceae	*Ophiuros exaltatus*			C		1/1
plants	land plants	Poaceae	*Panicum*					2
plants	land plants	Poaceae	*Panicum decompositum*			C		5/1
plants	land plants	Poaceae	*Panicum decompositum var. decompositum*			C		8/3
plants	land plants	Poaceae	*Panicum effusum*			C		15/4
plants	land plants	Poaceae	*Panicum larcomianum*			C		3/2
plants	land plants	Poaceae	*Panicum paludosum*	swamp panic		C		1/1
plants	land plants	Poaceae	*Panicum queenslandicum*			C		7
plants	land plants	Poaceae	*Panicum queenslandicum var. acuminatum*			C		1/1
plants	land plants	Poaceae	*Panicum queenslandicum var. queenslandicum*			C		7/2
plants	land plants	Poaceae	*Paspalidium*					6
plants	land plants	Poaceae	*Paspalidium albovillosum*			C		1/1

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plants	land plants	Poaceae	*Paspalidium caespitosum*	brigalow grass		C		5/2
plants	land plants	Poaceae	*Paspalidium constrictum*			C		3/3
plants	land plants	Poaceae	*Paspalidium criniforme*			C		6/5
plants	land plants	Poaceae	*Paspalidium distans*	shotgrass		C		1/1
plants	land plants	Poaceae	*Paspalidium globoideum*	sago grass		C		10/2
plants	land plants	Poaceae	*Paspalidium gracile*	slender panic		C		11/3
plants	land plants	Poaceae	*Paspalidium jubiflorum*	warrego grass		C		2/2
plants	land plants	Poaceae	*Paspalum*					2
plants	land plants	Poaceae	*Paspalum scrobiculatum*	ditch millet		C		1/1
plants	land plants	Poaceae	*Perotis rara*	comet grass		C		6/2
plants	land plants	Poaceae	*Sarga leiocladum*			C		3/3
plants	land plants	Poaceae	*Sarga plumosum*			C		1/1
plants	land plants	Poaceae	*Setaria australiensis*	scrub pigeon grass		C		2/2
plants	land plants	Poaceae	*Setaria incrassata*		Y			3/3
plants	land plants	Poaceae	*Setaria surgens*			C		7/3
plants	land plants	Poaceae	*Sorghum bicolor*	forage sorghum	Y			2/1
plants	land plants	Poaceae	*Sorghum halepense*	Johnson grass	Y			4/1
plants	land plants	Poaceae	*Sorghum nitidum*			C		1
plants	land plants	Poaceae	*Sorghum x almum*		Y			5/5
plants	land plants	Poaceae	*Sporobolus actinocladus*	katoora grass		C		1
plants	land plants	Poaceae	*Sporobolus australasicus*			C		1
plants	land plants	Poaceae	*Sporobolus caroli*	fairy grass		C		9/2
plants	land plants	Poaceae	*Sporobolus creber*			C		8/3
plants	land plants	Poaceae	*Sporobolus elongatus*			C		3
plants	land plants	Poaceae	*Sporobolus mitchellii*	rat's tail couch		C		6/2
plants	land plants	Poaceae	*Sporobolus pyramidalis*		Y			1/1
plants	land plants	Poaceae	*Sporobolus scabridus*			C		3/1
plants	land plants	Poaceae	*Thellungia advena*	coolibah grass		C		7/4
plants	land plants	Poaceae	*Themeda avenacea*			C		3/1
plants	land plants	Poaceae	*Themeda quadrivalvis*	grader grass	Y			1
plants	land plants	Poaceae	*Themeda triandra*	kangaroo grass		C		11/1
plants	land plants	Poaceae	*Thyridolepis mitchelliana*	mulga mitchell grass		C		1
plants	land plants	Poaceae	*Tragus australianus*	small burr grass		C		10/4
plants	land plants	Poaceae	*Triodia mitchellii*	buck spinifex		C		9/8
plants	land plants	Poaceae	*Tripogon*					3/3
plants	land plants	Poaceae	*Tripogon loliiformis*	five minute grass		C		5/3
plants	land plants	Poaceae	*Urochloa gilesii*			C		2
plants	land plants	Poaceae	*Urochloa holosericea subsp. holosericea*			C		1/1
plants	land plants	Poaceae	*Urochloa panicoides*		Y			1
plants	land plants	Poaceae	*Urochloa panicoides var. panicoides*		Y			3/3
plants	land plants	Poaceae	*Urochloa piligera*			C		2/1
plants	land plants	Polygalaceae	*Polygala triflora*			C		3/3
plants	land plants	Polygonaceae	*Duma florulenta*			C		6/2
plants	land plants	Polygonaceae	*Fallopia convolvulus*	black bindweed	Y			2/2
plants	land plants	Polygonaceae	*Muehlenbeckia*					1/1
plants	land plants	Polygonaceae	*Polygonum plebeium*	small knotweed		C		1/1

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plants	land plants	Polygonaceae	*Rumex brownii*	swamp dock		C		1/1
plants	land plants	Pontederiaceae	*Monochoria cyanea*			C		2/2
plants	land plants	Portulacaceae	*Calandrinia pickeringii*			C		1
plants	land plants	Portulacaceae	*Grahamia australiana*			C		2/2
plants	land plants	Portulacaceae	*Portulaca australis*			C		1/1
plants	land plants	Portulacaceae	*Portulaca bicolor*			C		1/1
plants	land plants	Portulacaceae	*Portulaca filifolia*			C		1/1
plants	land plants	Portulacaceae	*Portulaca oleracea*	pigweed	Y			7/1
plants	land plants	Portulacaceae	*Portulaca pilosa*		Y			1
plants	land plants	Pottiaceae	*Trichostomum*					1/1
plants	land plants	Proteaceae	*Grevillea cyranostigma*			C		1/1
plants	land plants	Proteaceae	*Grevillea decora subsp. decora*			C		1/1
plants	land plants	Proteaceae	*Grevillea floribunda subsp. floribunda*			C		2/1
plants	land plants	Proteaceae	*Grevillea longistyla*			C		1/1
plants	land plants	Proteaceae	*Grevillea parallela*			C		1/1
plants	land plants	Proteaceae	*Grevillea striata*	beefwood		C		2
plants	land plants	Proteaceae	*Hakea lorea subsp. lorea*			C		6/4
plants	land plants	Proteaceae	*Hakea purpurea*			C		1/1
plants	land plants	Psilotaceae	*Psilotum nudum*	skeleton fork fern		C		2/2
plants	land plants	Pteridaceae	*Adiantum hispidulum var. minus*			C		1/1
plants	land plants	Pteridaceae	*Cheilanthes distans*	bristly cloak fern		C		2/1
plants	land plants	Pteridaceae	*Cheilanthes sieberi*			C		1
plants	land plants	Pteridaceae	*Cheilanthes sieberi subsp. sieberi*			C		3/2
plants	land plants	Pteridaceae	*Pellaea*					1/1
plants	land plants	Pteridaceae	*Pellaea falcata*			C		1/1
plants	land plants	Pteridaceae	*Pellaea muelleri*			C		1/1
plants	land plants	Ranunculaceae	*Clematis decipiens*			C		3/3
plants	land plants	Ranunculaceae	*Ranunculus meristus*			C		1/1
plants	land plants	Ranunculaceae	*Ranunculus sessiliflorus var. sessiliflorus*			C		1/1
plants	land plants	Rhamnaceae	*Alphitonia excelsa*	soap tree		C		20
plants	land plants	Rhamnaceae	*Cryptandra armata*			C		1/1
plants	land plants	Rhamnaceae	*Cryptandra speciosa subsp. strigosa*			C		6/6
plants	land plants	Rhamnaceae	*Ventilago viminalis*	supplejack		C		3/1
plants	land plants	Rosaceae	*Rubus parvifolius*	pink-flowered native raspberry		C		1
plants	land plants	Rubiaceae	*Asperula conferta*			C		1/1
plants	land plants	Rubiaceae	*Coelospermum reticulatum*			C		2/1
plants	land plants	Rubiaceae	*Dentella repens*	dentella		C		1/1
plants	land plants	Rubiaceae	*Dolichocarpa coerulescens*			C		3/3
plants	land plants	Rubiaceae	*Everistia vacciniifolia*			C		2
plants	land plants	Rubiaceae	*Everistia vacciniifolia forma vacciniifolia*			C		1/1
plants	land plants	Rubiaceae	*Opercularia diphylla*			C		1
plants	land plants	Rubiaceae	*Paranotis mitrasacmoides subsp. trachymenoides*			C		2/2
plants	land plants	Rubiaceae	*Pomax umbellata*			C		1/1
plants	land plants	Rubiaceae	*Psydrax forsteri*			C		3/3
plants	land plants	Rubiaceae	*Psydrax johnsonii*			C		2
plants	land plants	Rubiaceae	*Psydrax odorata*			C		2

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plants	land plants	Rubiaceae	*Psydrax odorata forma subnitida*			C		2/2
plants	land plants	Rubiaceae	*Psydrax oleifolia*			C		4/1
plants	land plants	Rubiaceae	*Richardia brasiliensis*	white eye	Y			2/1
plants	land plants	Rubiaceae	*Scleromitrion galioides*			C		1/1
plants	land plants	Rubiaceae	*Spermacoce*					2
plants	land plants	Rubiaceae	*Spermacoce brachystema*			C		7/7
plants	land plants	Rubiaceae	*Spermacoce multicaulis*			C		4/2
plants	land plants	Rubiaceae	*Spermacoce sp. (Dislyn A.R.Bean 14098)*			C		2/2
plants	land plants	Rubiaceae	*Synaptantha tillaeacea var. tillaeacea*			C		1/1
plants	land plants	Rutaceae	*Boronia duiganiae*			C		15/13
plants	land plants	Rutaceae	*Boronia obovata*			C		2/2
plants	land plants	Rutaceae	*Citrus glauca*			C		5/1
plants	land plants	Rutaceae	*Flindersia collina*	broad-leaved leopard tree		C		1/1
plants	land plants	Rutaceae	*Flindersia dissosperma*			C		6/2
plants	land plants	Rutaceae	*Geijera parviflora*	wilga		C		21/2
plants	land plants	Rutaceae	*Geijera salicifolia*	brush wilga		C		2/1
plants	land plants	Rutaceae	*Phebalium nottii*	pink phebalium		C		3/3
plants	land plants	Rutaceae	*Philotheca difformis subsp. difformis*			C		1/1
plants	land plants	Rutaceae	*Zieria aspalathoides subsp. aspalathoides*			C		2/1
plants	land plants	Rutaceae	*Zieria cytisoides*	downy zieria		C		1/1
plants	land plants	Santalaceae	*Exocarpos cupressiformis*	native cherry		C		1
plants	land plants	Santalaceae	*Exocarpos latifolius*			C		1
plants	land plants	Santalaceae	*Santalum acuminatum*	sweet quandong		C		2
plants	land plants	Santalaceae	*Santalum lanceolatum*			C		6/2
plants	land plants	Sapindaceae	*Alectryon connatus*	grey birds-eye		C		4/4
plants	land plants	Sapindaceae	*Alectryon diversifolius*	scrub boonaree		C		7
plants	land plants	Sapindaceae	*Alectryon pubescens*			C		1/1
plants	land plants	Sapindaceae	*Atalaya hemiglauca*			C		7
plants	land plants	Sapindaceae	*Cardiospermum halicacabum*		Y			1
plants	land plants	Sapindaceae	*Cardiospermum halicacabum var. halicacabum*		Y			1/1
plants	land plants	Sapindaceae	*Dodonaea*					5
plants	land plants	Sapindaceae	*Dodonaea filifolia*			C		1/1
plants	land plants	Sapindaceae	*Dodonaea heteromorpha*			C		2/2
plants	land plants	Sapindaceae	*Dodonaea lanceolata var. subsessilifolia*			C		2/2
plants	land plants	Sapindaceae	*Dodonaea peduncularis*			C		1/1
plants	land plants	Sapindaceae	*Dodonaea stenophylla*			C		2/1
plants	land plants	Sapindaceae	*Dodonaea tenuifolia*			C		1/1
plants	land plants	Sapindaceae	*Dodonaea triangularis*			C		4
plants	land plants	Sapindaceae	*Dodonaea vestita*			C		1
plants	land plants	Sapindaceae	*Dodonaea viscosa subsp. burmanniana*			C		2/2
plants	land plants	Sapindaceae	*Dodonaea viscosa subsp. spatulata*			C		1
plants	land plants	Sapindaceae	*Elattostachys xylocarpa*	white tamarind		C		1/1
plants	land plants	Sapotaceae	*Planchonella cotinifolia var. pubescens*			C		1/1
plants	land plants	Scrophulariaceae	*Eremophila debilis*	winter apple		C		6
plants	land plants	Scrophulariaceae	*Eremophila deserti*			C		2/1
plants	land plants	Scrophulariaceae	*Eremophila latrobei subsp. glabra*			C		1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Scrophulariaceae	*Eremophila latrobei subsp. latrobei*			C		1/1
plants	land plants	Scrophulariaceae	*Eremophila longifolia*	berrigan		C		2/1
plants	land plants	Scrophulariaceae	*Eremophila maculata*			C		4
plants	land plants	Scrophulariaceae	*Eremophila maculata subsp. maculata*			C		1/1
plants	land plants	Scrophulariaceae	*Eremophila mitchellii*			C		14/2
plants	land plants	Scrophulariaceae	*Myoporum*					1
plants	land plants	Solanaceae	*Datura leichhardtii*	native thornapple	Y			1/1
plants	land plants	Solanaceae	*Nicotiana forsteri*			C		1/1
plants	land plants	Solanaceae	*Nicotiana megalosiphon*			C		1
plants	land plants	Solanaceae	*Nicotiana megalosiphon subsp. megalosiphon*			C		1/1
plants	land plants	Solanaceae	*Physalis angulata*		Y			1/1
plants	land plants	Solanaceae	*Physalis lanceifolia*		Y			4/4
plants	land plants	Solanaceae	*Physalis peruviana*		Y			1
plants	land plants	Solanaceae	*Solanum*					3
plants	land plants	Solanaceae	*Solanum americanum*		Y			1/1
plants	land plants	Solanaceae	*Solanum dissectum*			E	E	1/1
plants	land plants	Solanaceae	*Solanum elachophyllum*			E		2/2
plants	land plants	Solanaceae	*Solanum ellipticum*	potato bush		C		9/5
plants	land plants	Solanaceae	*Solanum esuriale*	quena		C		3/3
plants	land plants	Solanaceae	*Solanum mitchellianum*			C		5/5
plants	land plants	Solanaceae	*Solanum seaforthianum*	Brazilian nightshade	Y			3/2
plants	land plants	Sparrmanniaceae	*Corchorus tomentellus*			C		4/4
plants	land plants	Sparrmanniaceae	*Corchorus trilocularis*			C		7/5
plants	land plants	Sparrmanniaceae	*Grewia latifolia*	dysentery plant		C		20/1
plants	land plants	Stackhousiaceae	*Stackhousia muricata*			C		1/1
plants	land plants	Sterculiaceae	*Brachychiton australis*	broad-leaved bottle tree		C		5
plants	land plants	Sterculiaceae	*Brachychiton bidwillii*	little kurrajong		C		1
plants	land plants	Sterculiaceae	*Brachychiton rupestris*			C		3
plants	land plants	Sterculiaceae	*Brachychiton x turgidulus*			C		1/1
plants	land plants	Sterculiaceae	*Sterculia quadrifida*	peanut tree		C		1
plants	land plants	Stylidiaceae	*Stylidium eglandulosum*			C		2/2
plants	land plants	Stylidiaceae	*Stylidium eriorhizum*			C		2/2
plants	land plants	Surianaceae	*Cadellia pentastylis*	ooline		V	V	1/1
plants	land plants	Thymelaeaceae	*Pimelea decora*			C		2
plants	land plants	Thymelaeaceae	*Pimelea glauca*	smooth riceflower		C		1/1
plants	land plants	Thymelaeaceae	*Pimelea haematostachya*			C		7/5
plants	land plants	Thymelaeaceae	*Pimelea leptostachya*			C		1/1
plants	land plants	Thymelaeaceae	*Pimelea linifolia*			C		1/1
plants	land plants	Thymelaeaceae	*Pimelea strigosa*			C		2/2
plants	land plants	Ulmaceae	*Celtis sinensis*	Chinese elm	Y			1
plants	land plants	Verbenaceae	*Glandularia aristigera*		Y			2
plants	land plants	Verbenaceae	*Lantana montevidensis*	creeping lantana	Y			3/2
plants	land plants	Verbenaceae	*Verbena*					4/1
plants	land plants	Verbenaceae	*Verbena africana*			C		6/6
plants	land plants	Verbenaceae	*Verbena bonariensis*	purpletop	Y			3
plants	land plants	Verbenaceae	*Verbena gaudichaudii*			C		1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Verbenaceae	*Verbena macrostachya*			C		2/2
plants	land plants	Verbenaceae	*Verbena rigida*		Y			1/1
plants	land plants	Violaceae	*Pigea enneasperma*			C		3/2
plants	land plants	Violaceae	*Pigea stellarioides*			C		3/2
plants	land plants	Viscaceae	*Notothixos incanus*			C		3/3
plants	land plants	Viscaceae	*Viscum articulatum*	flat mistletoe		C		1/1
plants	land plants	Vitaceae	*Cissus oblonga*			C		3/3
plants	land plants	Vitaceae	*Clematicissus opaca*			C		4/1
plants	land plants	Xanthorrhoeaceae	*Xanthorrhoea johnsonii*			C		1
plants	land plants	Zamiaceae	*Macrozamia moorei*			C		26/16
plants	land plants	Zygophyllaceae	*Tribulus micrococcus*	yellow vine		C		3/3
plants	land plants	Zygophyllaceae	*Tribulus terrestris*	caltrop		C		2/1
plants	land plants	Zygophyllaceae	*Zygophyllum apiculatum*	gall weed		C		2/2

CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992.*
The codes are Extinct (EX), Extinct in the Wild (PE), Critically Endangered (CR), Endangered (E), Vulnerable (V), Near Threatened (NT), Special Least Concern (SL) and Least Concern (C).

A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999.*
The values of EPBC are Extinct (EX), Extinct in the Wild (XW), Critically Endangered (CE), Endangered (E), Vulnerable (V) and Conservation Dependent (CD).

Records - The first number indicates the total number of records of the taxon (wildlife records and species listings for selected areas).
This number is output as 99999 if it equals or exceeds this value. A second number located after a / indicates the number of specimen records for the taxon.
This number is output as 999 if it equals or exceeds this value.

Appendix B Likelihood of occurrence

Appendix B: Likelihood of occurrence assessments

Table 1: Likelihood of occurrence for TECs

TEC	Description	EPBC Act	Likelihood of occurrence	Justification
Brigalow (*Acacia harpophylla* dominant and co-dominant)	*Acacia harpophylla* is commonly the dominant species in a range of open forests and woodlands; these are collectively referred to as brigalow woodlands. The community is characterised by the presence of *A. harpophylla* as one of the most abundant tree species. *A. harpophylla* is either, dominant in the tree layer, or co-dominant with other species – notably *Casuarina cristata* (belah), other species of *Acacia*, or species of *Eucalyptus*. Occasionally these other species may be more common than *A. harpophylla* within the broad matrix of brigalow woodlands vegetation. The community has a considerable range of vegetation structure and composition united by a suite of species that tend to occur on acidic and salty clay soils.	E	Unlikely	None of the 16 associated REs to the TEC are mapped within the Project area. Additionally, no *Acacia harpophylla* dominant communities were recorded within the Project area which is a key diagnostic characteristic.
Coolibah - Black Box woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	Semi-arid to humid subtropical woodland where *Eucalyptus coolabah subsp. coolabah* (Coolibah) and/or *Eucalyptus largiflorens* (Black Box) are the dominant canopy species and where the understorey tends to be grassy. Other tree species may occur in the tree canopy but are not dominant, including *Acacia salicina* (Cooba), *Acacia stenophylla* (River Cooba), *Casuarina cristata* (Belah), *Eremophila bignoniiflora* (Eurah), *Eucalyptus camaldulensis* (River Red Gum) and *Eucalyptus populnea* (Bimble Box). The mid or shrub layer may or may not be present. Ground cover lifeforms typically comprise native graminoids, other herbs, chenopods and other low shrubs that are typically under 50 cm tall. Associated with the floodplains and drainage areas of the Darling Riverine Plains and the Brigalow Belt South bioregions. Found on the grey, self-mulching clays of periodically waterlogged floodplains, swamp margins, ephemeral wetlands, stream levees, drainage depressions and gilgai.	E	Unlikely	This TEC is only found within the Brigalow Belt South bioregion as per the listing advice, the Project area is located within the Brigalow Belt North.
Natural Grasslands of the Queensland Central Highlands and northern Fitzroy Basin	The ecological community occurs entirely within Queensland, extending from Collinsville in the north to Carnarvon National Park in the south. It typically occurs on flat ground gently undulating rises on soils formed in situ on basalt, or on fine grained sedimentary rocks. Typically, this includes the following REs: 11.3.21, 11.4.4, 11.4.11, 11.8.11, 11.9.3, 11.9.12, 11.11.17. The community is typically composed of a mixture of forbs and native grasses. Native grasses include *Dichanthium* spp. (Bluegrasses), with tropical *Aristida* spp. (Three-awned grasses) and *Panicum* spp. (Panic grasses)	E	Confirmed	Natural Grasslands TEC was confirmed in the study area and conforms to 'best quality' of the TEC. The TEC was present as remnant RE 11.8.11.

TEC	Description	EPBC Act	Likelihood of occurrence	Justification
	also a major component. Drier sites of the ecological community may include a higher proportion of *Astrebla* spp. (Mitchell grasses). Common forb species which may be present include *Commelina ensifolia* (scurvy grass), *Corchorus trilocularis* (native jute), *Ipomoea lonchophylla* (cow vine), *Vigna lanceolata* (pencil yam), *Vigna radiata* (mung bean), *Desmodium campylocaulon* (creeping tick trefoil), *Neptunia gracilis* (native sensitive plant), *Cullen tenax* (emu foot), *Rhynchosia minima* (rhyncho), *Crotalaria dissitiflora* (grey rattlepod), *Glycine latifolia* and *Hibiscus trionum* var. *vesicarius* (bladder ketmia).			
Poplar Box Grassy Woodland on Alluvial Plains	The ecological community is located west of the Great Dividing Range, typically at less than 300 m above sea level (ASL) and between latitudes 20°S to 34°S. In Queensland, it corresponds fully or partially with REs 11.3.2, 11.3.17, 11.4.7, 11.4.12 and 12.3.10. The ecological community is typically a grassy woodland with a canopy dominated by *Eucalyptus populnea* and understorey mostly of grasses and other herbs, including *Aristida* spp. (wiregrass), *Bothriochloa* spp. (Blue Grass), *Dichanthium* spp. (bluegrass), *Heteropogon* sp. (spear grass) and *Themeda* sp. (kangaroo grass).The ecological community mostly occurs in gently undulating to flat landscapes and occasionally on gentle slopes on a wide range of soil types of alluvial and depositional origin	E	Unlikely	None of the mapped REs met the key diagnostic characteristics of the Poplar Box TEC. This TEC tends to occur along watercourses or alluvial plains in Queensland and these are not present within the Project area. None of the associated REs as per the listing advice are mapped within the Project area.
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	The community is found in eastern Queensland and northern New South Wales and is considered an extreme form of dry seasonal subtropical rainforest. The community is characterised by the prominence of trees with microphyll sized leaves (i.e. leaves usually 2.5–7.6 cm long), the presence of bottle trees (Brachychiton spp.) as emergent from the vegetation, and the thickets occurring in areas with a subtropical, seasonally dry climate on soils of high to medium fertility	E	Unlikely	None of the 10 associated REs to the TEC are mapped within the Project area. Additionally, species commonly recorded within the TEC were not recorded during the the field survey, these include: *Drypetes deplanchei* (Grey Boxwood, Yellow Tulip), *Diospyros humilis, Gyrocarpus americanus, Pouteria cotinifolia* and *Strychnos psilosperma* (Strychnine) and the vine *Cissus reniformis*.

TEC	Description	EPBC Act	Likelihood of occurrence	Justification
Weeping Myall Woodlands	Open woodlands to woodlands, generally 4-12 m high, in which *Acacia pendula* (Weeping Myall) trees are the sole or dominant overstorey species. Other vegetation may include *Alectryon oleifolius subsp. elongatus* (Western Rosewood), *Eucalyptus populnea* (Poplar Box) or *Eucalyptus largiflorens* (Black Box). *Amyema quandang* (Grey Mistletoe) commonly occurs on the branches of Weeping Myall trees. The understorey often includes an open layer of shrubs above an open ground layer of grasses and herbs, though the ecological community can exist naturally either as a shrubby or a grassy woodland. Inland alluvial plains west of the Great Dividing Range. In NSW, it occurs in the Riverina, NSW South Western Slopes, Darling Riverine Plains, Brigalow Belt South, Murray-Darling Depression, Nandewar and Cobar Peneplain Bioregions. Generally occur on flat areas, shallow depressions or gilgais on raised (relict) alluvial plains. Occurs on black, brown, red-brown or grey clay or clay loam soils.	E	Unlikely	The Weeping Myall Woodlands is only located within the Darling Riverine Plains and Brigalow Belt South, therefore this is not the correct region for this TEC. Additionally, none of the two associated REs that form components of the TEC are mapped within the Project area.
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Characterised by a species-rich understorey of native tussock grasses, herbs and scattered shrubs, and the dominance, or prior dominance, of Eucalyptus albens (White Box), E. melliodora (Yellow Box) and E. blakelyi (Blakely's Red Gum). In the Nandewar Bioregion, Eucalyptus microcarpa or E. moluccana (Grey Box) may also be dominant or co-dominant. The tree-cover is generally discontinuous and consists of widely-spaced trees of medium height in which the canopies are clearly separated. Occurs in an arc along the western slopes and tablelands of the Great Dividing Range from Southern Queensland through NSW to central Victoria. In NSW, it occurs in the Brigalow Belt South, Nandewar, New England Tableland, Sydney Basin, NSW North Coast, South Eastern Highlands, South East Corner, NSW South Western Slopes and Riverina Bioregions. Areas where rainfall is between 400 and 1200 mm per annum, on moderate to highly fertile soils at altitudes of 170 m to 1200 m.	CE	Unlikely	The White Box-Yellow Box Blakely's Red Gum Grassy Woodland and Derived Native Grassland is only found in Brigalow Belt South, Nandewar and South-eastern Queensland Bioregions. The study is within the Brigalow Belt North, and therefore outside of the range. Additionally, none of the associated REs are mapped within the Project area.

Table 2: Likelihood of occurrence for threatened flora species

Scientific name	Common name	EPBC Act	NC Act	Habitat Description	Likelihood of occurrence	Justification
Aristida annua	-	V	V	Restricted to a small area in central Queensland, the northern distribution of the species occurs on the eastern slopes of Lord's Table Mountain, north of Yungaba. Other locations include Gindi Downs via Springsure. An annual tufted grass. The species has limited survey information, however known records occur within black clay soils, basalt soils and disturbed sites. Also known to occur within the Natural grasslands of the Queensland and Central Highlands TEC.	Potential	Four records within 50 km of the Project area. Additionally, there is potential habitat mapped within the study area, RE 11.8.11 (ELA, 2021). The study area is just outside of the known species range, however, given the species has limited survey information, the precautionary principle has been applied and the species deemed a potential occurrence.
Arthraxon hispidus	Hairy-joint grass	V	V	Recorded from scattered locations across Queensland and on the northern tablelands and north coast of NSW. In Queensland it occurs north to Port Douglas, and west to disjunct occurrences around springs in Carnarvon National Park. Most occurrences are from Noosa southwards. Edges of rainforest and in wet eucalypt forest, often near creeks or swamps, as well as woodlands.	Unlikely	Potential habitat may be present as woodlands along creeks, however, no rainforests or eucalypt forests area present. No known records within 50 km of the study area and it is just outside of the species known distribution range.
Bertya opponens	-	V	-	Stony mallee ridges and cypress pine forest on red soils. Often associated with *Eucalyptus chloroclada, Callitris glaucophylla* and *Eucalyptus fibrosa*. Flowering occurs between July and August, although seed formation can commence as early as July in some areas. The disturbance agents of fire and mechanical disturbance appear to trigger germination.	Unlikely	This species requires stony mallee ridges or cypress pine forests, both of which are not present in the study area, therefore there is not habitat present. There is a single record within 50 km of the study area.
Cadellia pentastylis	Ooline	V	V	Once widespread, it is now restricted in distribution from near Duaringa west of Rockhampton to the NSW border in Queensland, and on the western edge of the North West Slopes north of Gunnedah in northern NSW. Dry rainforests, semi-evergreen vine thickets and sclerophyll	Unlikely	One record known within 50 km of the study area and within the species known distribution range. However, no suitable species habitat (semi-

Scientific name	Common name	EPBC Act	NC Act	Habitat Description	Likelihood of occurrence	Justification
				communities. Usually on low to medium nutrient soils of sandy clay or clayey consistencies. Appears to flower spasmodically, during a general flowering period of October to January. Dispersal of fruit and seed is probably by "passive fall" or by birds. Has capacity to re-sprout from rootstock and coppice vigorously from stumps, a feature which may be critical for the species survival in a fire prone environment.		evergreen vine thickets) is mapped within the study area.
Corymbia scabrida	Rough-leaved yellowjacket	-	NT	Restricted to central Queensland, southwest of Springsure. Grows within woodland communities usually as a co-dominant in association with *Eucalyptus melanophloia, Corymbia clarksoniana, Angophora leiocarpa, Eucalyptus chloroclada* and *Corymbia polycarpa*. It occurs on low sandstone ridges and flat top hills on shallow, sandy or loamy soils, and occasionally on gravelly textured soils. Flowers have been recorded in October and fruits throughout the year.	Unlikely	Four known records within 50 km of the study area, however, are restricted west of the study area between Springsure and Tambo. Additionally, as the study area is comprised of basalt soils, no suitable habitat (woodlands on sandstone) are present (ELA, 2021).
Cyperus clarus	-	-	V	Found from near Emerald in central Queensland to near Delungra in NSW. Once population located within Jandowae State Forest. *Cyperus clarus* is a slender tufted perennial. The species is known to grow in grasslands and open woodlands on basalt soils.	Likely	Four records within 50 km of the study area is known and is within the known species distribution range. Potential habitat is mapped within the studyarea, RE 11.8.11 and 11.8.5 (ELA, 2021). Additionally, Cyperus Clarus was confirmed in the Meteor Downs property to the west of SCN in March 2022.
Dichanthium setosum	Blue-grass	V	-	Cleared woodland, grassy roadside remnants and highly disturbed pasture, on heavy basaltic black soils and red-brown loams with clay subsoil. Associated species include *Eucalyptus albens, Eucalyptus melanophloia, Eucalyptus melliodora, Eucalyptus viminalis, Myoporum debile, Aristida ramosa, Themeda triandra, Poa sieberiana, Bothriochloa ambigua, Medicago minima, Leptorhynchos squamatus, Lomandra* aff. *longifolia,*	Likely	Seven known records within 50 km of the study area, of which three records are within 1 km of the Project area. Potential habitat has been mapped within the study area, RE 11.8.5 (ELA, 2021).

Scientific name	Common name	EPBC Act	NC Act	Habitat Description	Likelihood of occurrence	Justification
				Ajuga australis, Calotis hispidula and *Austrodanthonia, Dichopogon, Brachyscome, Vittadinia, Wahlenbergia* and *Psoralea* species. Flowering time is mostly in summer.		
Dichanthium queenslandicum	King blue-grass	E	V	King blue-grass is known to occur as a component of Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin (Natural Grasslands TEC) and is associated with other species of blue grasses (*Dichanthium* spp. and *Bothriochloa* spp.). The grassland community occurs on fine textured soils, typically cracking clays on derived from either basalt or fine-grained sedimentary rocks, on flat or gently undulating rise, in areas with relatively high summer rainfall.	Known	16 records known within 50 km of the study area, additionally four records within 1 km. King blue-grass was recorded within the study area during the ecology survey and habitat was mapped as being present within REs 11.8.11 (ELA, 2021).
Digitaria porrecta	Finger panic grass	-	NT	In Queensland occurs in the Nebo district, south-west of Mackay; the central Highlands between Springsure and Rolleston; and from Jandowae south to Warwick. Finger panic grass is known to occur in tussock grassland and open woodland of poplar box or forest red gum. The species prefers richer heavy textured soils, typically cracking clays and can occur within alluvial plains within the Brigalow Belt bioregion. Most frequently recorded in association with *Eucalyptus albens* and *Acacia pendula.*	Likely	11 records known within 50 km of the study area, additionally four records within 1 km. The study area is within the species known range and habitat is present, RE 11.8.11 (ELA, 2021).
Eucalyptus sicilifolia	Springsure ironbark	-	V	Found exclusively within St Peter Mountain, Little St Peter Mountain and the Minerva Hills National Park within central Queensland. The species is restricted to low woodlands on the rocky hilltops and scree slopes. Associated species include *Corymbia trachyphloia, Acacia julifera subsp. curvinervia* and *Triodia mitchellii*	Unlikely	This species has a very restricted distribution, known only from St Peter Mountain, Little St Peter Mountain and Minerva Hills National Park near Springsure. The study area is just south of the known distribution range and 31 records known within 50 km, however, given the species specific habitat requirements (low woodlands on the rocky hilltops and scree slopes), the species is deemed unlikely to occur

Scientific name	Common name	EPBC Act	NC Act	Habitat Description	Likelihood of occurrence	Justification
						within the study area as habitat is not present.
Eucalyptus virens	shiny-leaved ironbark	V	V	Occurring within scattered woodland communities in southern Queensland, North of Inglewood to Injune and Nour Nour National Park. The species prefers sandy soils, along hillslopes and sandstone escarpments. The species is commonly associated with *Angophora leiocarpa, Corymbia trachyphloia, Eucalyptus exserta, Allocasuarina inophloia and Lysicarpus angustifolius. Other species occasionally recorded with E. virens include E. panda, E. apothalassica, E. sideroxylon, Allocasuarina luehmannii* and *Callitris glaucophylla*	Unlikely	No records are identified within 50 km of the study area. The study area is outside of the species known distribution range (ELA, 2021).
Haloragis exalata subsp. velutina	Tall velvet sea-berry	V	V	Recorded in the south-east Queensland, from Brisbane west to Bunya Mountains with isolated occurrence in Carnarvon National Park. The species prefers brown heavy clay, shallow rock loam, and basaltic soils near watercourses. However, has been recorded within woodland on the steep rocky slopes of gorges. Tall velvet sea-berry overlaps with the Natural Grasslands TEC associated with and is associated with other species of blue grasses *Dichanthium spp. and Bothriochloa spp.*	Unlikely	No species records occur within 50 km of the study area and is out of the species known distribution range. Additionally, there is no suitable habitat present within the study area.
Leichhardtia brevifolia	-	V	V	Restricted to south east Queensland from Neerdie State Forest and as far south as Ben Lomond. Requiring moist areas of open eucalypt forest or within grasslands atop Mt Kandanga, it has been found in both sandstone and stony soils. Associated vegetation includes *Corymbia maculata, Eucalyptus crebra, E. propinqua, E. siderophloia, E. pilularis, E. microcorys, Corymbia intermedia*	Unlikely	No known records occur within 50 km of the Project area. The Project area is within the known species distribution range. However, no suitable species habitat occurs within the study area.
Marsdenia brevifolia	-	V	V	Occurring in north and central Queensland, near Townsville, Springsure and north of Rockhampton. Plants have also been recorded at Springsure in woodlands dominated by *Corymbia erythrophloia* and *Eucalyptus crebra*, with dense *Themeda triandra* understorey on basalt. Around Townsville *M. brevifolia* has been recorded to grow on granite soils in woodlands dominated by Granite Ironbark (*E. granitica*), Rustyjacket (*C. leichhardtii*) and White Mahogany (*E. acmenoides*).	Likely	There are 11 known records within 50 km of the study area. The study area is within the known species range and potential habitat is present (RE 11.8.5) (ELA, 2021).

Scientific name	Common name	EPBC Act	NC Act	Habitat Description	Likelihood of occurrence	Justification
Maundia triglochinoides	-	-	V	Scattered records within south east Queensland within heavy clay soils. The species is found exclusively around swamps, lagoons, dams, channels, creeks or shallow freshwater areas 30 - 60 cm deep.	Unlikely	There are no known records within 50 km of the study area and there is no suitable habitat (swamps / creeks etc.) present.
Sannantha brachypoda	-	-	V	Distributed across central Queensland from Townsville and into NSW. The species prefers outcrops of granite-like rocks, on skeletal soil within low shrublands. Associated vegetation includes *Leptospermum brachyandrum, Leptospermum petersonii subsp. lanceolatum, Corymbia trachyphloia* and *Melaleuca pearsonii*	Unlikely	One record known within 50 km of the study area. However, there is no suitable habitat (granite-like rocks, on skeletal soil) mapped within the study area.
Solanum dissectum	-	E	E	Restricted to open woodland of *Acacia harpophylla* or *Eucalyptus thozetiana* solodic clay soils. The species is only found within central Queensland between Banana, Dululu, Moura and Thangool.	Unlikely	One record known within 50 km of the study area. However, there is no suitable habitat mapped within the study area and it is outside of the known distribution range.
Solanum elachophyllum	-	-	E	Confined to the subcoastal regions from Middlemont to Theodor, the species prefers fertile cracking-clay soils in open forest. Associated vegetation includes *Acacia harpophylla, Casuarina cristata, Macropteranthes* or *Eucalyptus cambageana*	Unlikely	There a no known records known within 50 km of the study area. No suitable habitat within the study area and it is not within a subcoastal region.
Thesium australe	Austral toadflax	V	V	Found from Bundaberg to Dalby and to the NSW border within grassland and woodland. The species can grow in heavy alluvium soil within a woodland or black cracking clay that may contain basaltic rocky soils within a grassland. Often found in association with *Eucalyptus tereticornis and E. tindaliae, Dichanthium sericeum, Themeda australis, Themeda triandra* and *Heteropogon contortus.*	Unlikely	There are no known records within 50 km and the study area is outside of the known distribution range.
Trioncinia retroflexa	-	-	E	The population is located near Clermont and Springsure in central Queensland on dark brown or black cracking clay soils. *Trioncinia retroflexa* is found within grasslands.	Likely	There are six records within 50 km of the study area. The study area is also within the known distribution range. Potential habitat, RE 11.8.11, is

Scientific name	Common name	EPBC Act	NC Act	Habitat Description	Likelihood of occurrence	Justification
						mapped within the study area (ELA, 2021).
Tylophora linearis	-	E	E	Scattered across south and central Queensland within dry scrub, open forest, dry woodlands of *Eucalyptus fibrosa, Eucalyptus sideroxylon, Eucalyptus albens, Callitris endlicheri, Callitris glaucophylla* and *Allocasuarina luehmannii.*	Unlikely	No records are identified within 50 km of the study area, no potential habitat is mapped, and the study area is outside of the known distribution range.

Table 3: Likelihood of occurrence of threatened fauna species

Scientific name	Common name	EPBC Act	NC Act	Habitat Description	Likelihood of occurrence	Justification
Birds						
Actitis hypoleucos	Common sandpiper	Mi, Ma	-	Inhabits coastal and some inland wetlands, especially around muddy margins or rocky shores. The Common Sandpiper is highly opportunistic and will forage in grassland, roadsides and gardens. Mainly restricted to the wetlands during breeding seasons, when migrating the species has been recorded in central Queensland's within rainforest to desert environments.	Unlikely	There are no records within 50 km of the study area. There are no wetlands or suitable habitat within the study area.
Apus pacificus	Fork-tailed swift	Ma, Mi	SL	Inhabiting riparian woodland, swamps, low scrub, heathland, saltmarsh, grassland, Spinifex sandplains, open farmland and inland and coastal sand-dunes. It is a non-breeding visitor to all states and territories of Australia, arriving from its breeding grounds in Siberia around October, and departing in April. The species is thought to be highly mobile within Australia, moving across the country in search of suitable foraging grounds.	Likely	There is potential habitat mapped as RE 11.8.11 within the study area (ELA, 2021) and it is within the known distribution ranges of the species. There have been five records within 50 km of the study area.
Calidris acuminata	Sharp-tailed sandpiper	Ma, Mi	-	Found in shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. The species travels to migrant to Australia August-April to forage, the migration paths can cross all regions of Queensland. They roost around edges of wetlands, lakes and flooded grasslands.	Unlikely	The study area is within the known distribution range, however there are no records within the study area. There is not suitable habitat (wetlands) within the study area.

Scientific name	Common name	EPBC Act	NC Act	Habitat Description	Likelihood of occurrence	Justification
Calidris ferruginea	Curlew sandpiper	CE	CR	Mainly occur in both fresh and brackish waters on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms but are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. Curlew Sandpipers forage on mudflats and nearby shallow water and generally roost on bare dry shingle, shell or sand beaches, sandspits and islets in or around coastal or near-coastal lagoons and other wetlands, occasionally roosting in dunes during very high tides and sometimes in saltmarsh	Unlikely	The species is majority a coastal occurring species, associated with water and mudflats. There is no suitable habitat mapped within the study area. There are no known records within 50 km of the Project area.
Calidris melanotos	Pectoral sandpiper	Mi	-	Found around shallow fresh to saline wetlands, including coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. They breed in northern Russia and North America then migrates to Australia from September to June. During the migration they stop around ephemeral and permanent lakes, dams and waterholes throughout Australia.	Unlikely	There is no suitable habitat (wetlands) mapped within the study area and known records within 50 km of the Project area.
Cuculus optatus	Oriental cuckoo	Mi	SL	Occurring in the Gulf of Carpentaria and Cape York Peninsular to the Queensland/New South Wales border, including inland areas of eastern Queensland. They inhabit monsoon forest, rainforest edges, leafy trees in paddocks, river flats, roadsides, mangroves and islands.	Unlikely	The Project area is within the known distribution range, however there is no suitable habitat mapped or known records within 50 km of the study area.
Erythrotriorchis radiatus	Red goshawk	V	E	Occurs in coastal and sub-coastal areas in riverine, wooded and forested lands of tropical and warm-temperate Australia. Known to prefer forest and woodland with a mosaic of vegetation types, large prey populations (birds), and permanent water. The vegetation types include eucalypt woodland, open forest, tall open forest, gallery rainforest, swamp sclerophyll forest, and rainforest margins. The Red Goshawk nests in large trees, frequently the tallest and most massive in a tall stand, and nest trees are invariably within one km of permanent water. It hunts in open forests and gallery forests, with a	Unlikely	The species is known to prefer intact, tall vegetation types, therefore, the dominant habitat within the study area (grasslands) is unlikely to be suitable. Additionally, there is no permanent water within the study area and this species required large water sources. There is one known record within 50 km of the Project area,

Scientific name	Common name	EPBC Act	NC Act	Habitat Description	Likelihood of occurrence	Justification
				home range of up to 200 km2, taking mostly medium to large birds, but also snakes.		however, likely observed prior to broadscale clearing of the region.
Falco hypoleucos	Grey falcon	V	V	Infrequently seen over much of arid and semi-arid Australia with a range covering eastern Australia, especially arid regions, and northern Australia south to approximately 26S degrees. Inhabits open woodlands, stony plains, acacia scrublands, grasslands, and watercourses.	Potential	The majority of species records occur within the arid and semi-arid Australia, in which the study area is not situated. However, given the species can inhabit grasslands and there are two known records within 50 km of the study area, there is potential for the species to occasionally occur.
Gallinago hardwickii	Latham's snipe	Ma, Mi	-	Inhabiting freshwater, saline or brackish wetlands up to 2000 m above sea-level, they are usually found in freshwater swamps, flooded grasslands or heathlands. Non-breeding migrant to Australia, arriving between July-November from its breeding grounds in Japan and far-eastern Russia, and departing by late February. They can be found throughout Queensland during the migration seasons, stopping at waterholes and lakes. It feeds in mud or in very shallow water with low, dense vegetation. Roosting occurs on the ground near or in foraging areas beside or under clumps of vegetation, among dense tea-tree, in forests, in drainage ditches or plough marks, among boulders, or in shallow water if cover is unavailable.	Unlikely	There are five known records within 50 km of the Project area. However, there is no suitable habitat mapped within the study area as this species utilises permanent watercourses or areas that are inundated with seasonal rains.
Gelochelidon nilotica	Gull-billed tern	-	SL	The Gull-billed tern is found in freshwater environments including swamps, brackish and salt lakes, beaches and estuarine mudflats, floodwaters, sewage farms, irrigated croplands and grasslands. The diet of the Gull-billed tern is very diverse consisting of small fish, reptiles, amphibians, crustaceans, small mammals, insects and their larvae.	Unlikely	There is a single known record within 50 km of the Project area. However, there is no suitable habitat within the study area, due to the species habitat requiring large freshwater areas.

Scientific name	Common name	EPBC Act	NC Act	Habitat Description	Likelihood of occurrence	Justification
Geophaps scripta scripta	Squatter pigeon (southern)	V	V	The Squatter Pigeon (southern) occurs mainly in grassy woodlands and open forests that are dominated by eucalypts. It has also been recorded in sown grasslands with scattered remnant trees, disturbed habitats i.e. around stockyards, along roads and railways, and around settlements, in scrub and acacia growth, and remains common in heavily grazed country north of the Tropic of Capricorn. The species is commonly observed nesting in habitats that are located close to bodies of water close to an abundance of insects.	Likely	Suitable habitat (grassy woodlands) occurs across the study area and there are 30 known records within 50 km of the Project area. There are no watercourses within the study area, but there are in the surrounding areas.
Grantiella picta	Painted honeyeater	V	V	Sparsely distributed from southern Victoria and south-eastern South Australia to far northern Queensland and eastern Northern Territory where it inhabits forests, woodlands and dry shrublands, often with abundant mistletoe. The species is sparsely distributed from south-eastern Australia to north-western Queensland and eastern Northern Territory. The greatest concentrations and almost all records of breeding come from south of 26S degrees, on inland slopes of the Great Dividing Range between the Grampians, Victoria and Roma. The species forages on insects and nectar from mistletoe or eucalypts are occasionally eaten.	Unlikely	The species is a mistletoe specialist, often from the *Amneya* genus occurring on host trees of brigalow or eucalypts. Given the dominant habitat type within the Project area being grasslands and there are no known records within 50 km of the Project area, the species is unlikely to occur.
Hirundapus caudacutus	White-throated needletail	V	V	Occur most often over open forest and rainforest, as well as heathland, and remnant vegetation in farmland. They breed in eastern Siberia, north-eastern China and Japan and migrate over mainland Australia in September–October, and most depart by April. Only roosting temporarily in forests and woodlands, both among dense foliage in the canopy or in hollows.	Potential	The species is almost exclusively aerial when in Australia and is a non-breeding visitor. As the species forages above a variety of habitat type and there are 13 known records within 50 km of the Project area including within the adjacent Stage 1 and Stage 2 areas, potential non-breeding habitat is present.
Hydroprogne caspia	Caspian tern	Ma, Mi	SL	In Queensland the Caspian tern is widespread in coastal regions, from the southern Gulf of Carpentaria to the Torres Strait, and along the eastern coast. The Caspian tern predominantly inhabits sheltered coastal embayment's preferably with sandy or muddy margins such as	Unlikely	There has been a single record within 50 km of the Project area, likely this was a record whilst the species was migrating. The study area is outside of the species distribution range and there is no suitable

Scientific name	Common name	EPBC Act	NC Act	Habitat Description	Likelihood of occurrence	Justification
				harbours, lagoons, inlets, bays etc. They also inhabit near coastal or inland terrestrial wetlands (freshwater or saline) such as lakes, waterholes, reservoirs, rivers and creeks. Artificial wetlands area also sometimes inhabited.		habitat within the study area due to the absence of large bodies of water.
Motacilla flava	Yellow wagtail	Ma, Mi	-	Preferring swamp margins, sewage ponds, saltmarshes, grasslands, and open woodland. They breed in Europe to Siberia and west Alaska, migrating to Australia from November to April. Foraging on small insects they are found scattered throughout Australia.	Unlikely	No known records within 50 km of the Project area and only marginal habitat (grasslands) within the study area. Given the species preference for swamps and lack of species records in the region, the species is unlikely to occur.
Myiagra cyanoleuca	Satin flycatcher	Ma, Mi	-	Inhabiting eucalypt dominated forests, especially near wetlands, watercourses, and heavily vegetated gullies. The Satin Flycatchers move north in autumn to spend winter in northern Australia and New Guinea. They often forage in groups, usually of adults and their newly fledged young, in drier, more open forests. They usually will usually nest built in the high, exposed outer branches of a tree.	Unlikely	There are seven known records within 50 km of the Project area. However, the species prefers heavily vegetated gullies, forest near wetlands and/or watercourse. These habitats are not presence within the study area. .
Neochmia ruficauda ruficauda	Star finch	E	E	Found across northern and central Australia in isolated geographical regions. They inhabit grasslands and sclerophyll woodlands, near permanent water, and often in or near cleared suburban areas. The Star Finch is very susceptible to habitat loss as it requires permanent flowing water sources.	Unlikely	There is some potentially suitable habitat (grassland RE 11.8.11) within the study area, however, there are no known records within 50 km of the Project area. Additionally, there are no permanent flowing water sources within the study area that the species requires, and many surrounding are ephemeral.
Phoephila cincta cincta	Southern black-throated finch	E	E	The current distribution of the Black-throated Finch has now largely contracted and is only locally common in Queensland at sites near Townsville and Charters Towers, with small flocks scattered throughout the Brigalow Belt North and Desert Uplands bioregions. Inhabits grassy open woodlands and forests, typically characterised by Eucalyptus, Acacia and Melaleuca. It is usually found within a few kilometres of water.	Unlikely	No known records within 50 km of the study area and outside the species known range.

Scientific name	Common name	EPBC Act	NC Act	Habitat Description	Likelihood of occurrence	Justification
Psephotus pulcherrimus	Paradise parrot	EX	EX	Extinct in the wild the Paradise Parrot preferred native to the grassy woodlands. They use hollowed-out termite mounds near ground level for nesting.	Extinct	Two historical records, however, now extinct in the wild. The last confirmed sighting was in 1927.
Rhipidura rufifrons	Rufous fantail	Ma, Mi	-	Inhabiting wet sclerophyll forests, subtropical and temperate rainforests. Sometimes drier sclerophyll forests and woodlands with shrubby / heathy understorey. Mostly in low to middle strata of forests. During migration in March to early April they are found in central Queensland moving to coastal lowlands and offshore islands in south-east Queensland, north to Cape York Peninsula and Torres Strait Island.	Unlikely	There is a single record within 50 km of the Project area. No suitable habitat (wet sclerophyll forests / rainforest) is present within the study area. Although the species may utilise woodlands when on passage, woodland habitat within the study area is open without a shrubby understory and therefore is unlikely to be suitable.
Rostratula australis	Australian painted snipe	E	V	Variety of habitats but generally dependent on presence of water. Inhabits shallow terrestrial freshwater wetlands, including temporary and permanent lakes, swamps and claypans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms, bore drains, and leaking irrigation channels.	Unlikely	There is a single record within 50 km of the Project area, however, there is no wetlands or seasonally inundated areas within the study area.
Mammals						
Chalinolobus dwyeri	Large-eared pied bat	V	V	Occurs north of Rockhampton (QLD) through to Ulladulla (NSW). Habitat includes dry sclerophyll forests, woodland, sub-alpine woodland, edges of rainforests and wet sclerophyll forests. Sandstone cliffs and fertile woodland valley habitat within proximity of each other are considered important to species. Records from south-east Queensland suggest that rainforest and moist eucalypt forest habitats on other geological substrates (rhyolite, trachyte and basalt) at high elevation, are of similar importance. Records have been found within several kilometres of cliff lines or rocky terrain within Brigalow (Acacia harpophylla dominant and co-dominant); and White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.	Unlikely	There are no known records within 50 km of the Project area and the study area is outside the species likely range (ABS, 2021). The species requires cliff lines or rocky terrain in which in roosts in caves. These features are likely absent from the study area and surrounding region.

Scientific name	Common name	EPBC Act	NC Act	Habitat Description	Likelihood of occurrence	Justification
Dasyurus hallucatus	Northern quoll	E	-	Found across Queensland, habitat features include high relief areas that have shallower soils, boulders and rocky areas for denning, low fire impact and close to permanent water. The species occupies a diversity of habitats across its range including eucalypt forest and woodlands, rainforests, sandy lowlands and beaches, shrubland, grasslands and desert. Habitat generally encompasses some form of rocky area for denning purposes with surrounding vegetated habitats used for foraging and dispersal. Rocky habitats are usually of high relief, often rugged and dissected but can also include tor fields or caves in low lying areas. Eucalypt forest or woodland habitats usually have a high structural diversity containing large diameter trees, termite mounds or hollow logs for denning purposes.	Unlikely	There are only four known records within 50 km of the Project area, however, and given the rapid decline of the species in the region, it is unlikely to persist in the area. Further, no suitable denning habitat (rocky areas) to support the species presence occurs within the study area or adjacent areas.
Macroderma gigas	Ghost bat	V	E	Living in Caves Ghost bats have maternity colonies that can get over 1000 individuals. The species occurs in two disjunction distributions and 4 known disjunct subpopulations throughout Queensland. Two populations occur from coastal northeast Queensland from near the tip of Cape York Peninsula to approximately Gladstone.	Unlikely	There were no caves recorded during the previous field surveys within the study area (Xstrata, 2013) and there are no known records within 50 km of the Project area. The Project area is outside the species known range (ABS, 2021).
Nyctophilus corbeni	Corben's long-eared bat (formerly South-eastern long-eared bat)	V	V	This species can occur in a range of inland woodland vegetation types, including box, ironbark, cypress pine woodlands, brigalow woodland and River Red Gum forests lining watercourses and lakes. Throughout inland Queensland, the species' habitat is dominated by various eucalypt and bloodwood species and is most abundant in vegetation with a distinct canopy and a dense cluttered shrub layer.	Unlikely	There are no known records within 50 km of the Project area and it is outside the species potential range (ABS, 2021).
Petauroides armillatus	Greater glider	V	E	The Central Greater Glider is largely restricted to eucalypt forest and woodlands, with a preference for old growth with abundant large tree hollows (den habitat). The species is typically found in highest abundance in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows. The greater glider's preferred feed tree species varies with season and it favours forests with a diversity of eucalypt species.	Unlikely	The species is known to occur in the region (>50 records within 50 km of the Project area) and requires large hollow-bearing trees for denning. No habitat was recorded during the field survey which is den habitat (ELA, 2021).

Scientific name	Common name	EPBC Act	NC Act	Habitat Description	Likelihood of occurrence	Justification
Phascolarctos cinereus (combined populations of QLD, NSW and the ACT)	Koala	V	V	Scattered populations throughout Qld, including moist forests in coastal areas, subhumid woodlands in southern and central regions, and along watercourses in semiarid eucalypt forested landscapes in the west. May also be found along non-riverine communities in semi-arid areas. Preferred habitat includes a range of temperate, sub-tropical and tropical forest, woodlands and semiarid vegetation types dominated by eucalyptus species. Also known to be limited to altitudes <800 m ASL and may be affected by temperature and leaf moisture in the western and northern parts of its range	Potential	The species is known to occur in the region with >40 records within 50 km of the Project area. Whilst the species is more readily encountered in eucalypt forests along watercourses when in central Queensland, all vegetation types dominated by eucalyptus species provides suitable species habitat. This includes eucalyptus woodlands associated with RE 11.8.5 and 11.9.2 within the study area.
Tachyglossus aculeatus	Short-beaked echidna	-	SL	Species is widely distributed and occurs in a range of habitat types including open woodlands, grasslands, coastal and inland regions.	Likely	Suitable habitat is available in the study area. Species is a habitat generalist and may utilise a range of habitats within the study area. Several species records exist within 50 km of the study area including a recent record (2012) (ALA, 2021).
Reptiles						
Acanthophis antarcticus	Common death adder	-	V	The Common Death Adders inhabit a wide range of habitats ranging from grasslands, woodlands, heaths, rocky ranges and outcrops. They require loose leaf litter and debris in woodland, shrubland and grassland to be successful.	Potential	There are known records within 50 km of the Project area. Whilst some potential habitat (grassland) occurs within the study area, habitat present requires essential microhabitat features such as leaf litter and debris to be suitable.
Delma torquata	Collared delma	V	V	Habits rocky areas associated with dry open eucalypt and acacia woodlands with an open mid-story. The majority of records of this species are from SE Queensland, western suburbs of Brisbane and the Toowoomba ranges. They require habitat which has rocky outcrops on ridges or slopes where the vegetation is eucalypt dominated. The presence of rocks, logs, bark and other coarse woody debris, and mats of leaf litter (typically 30–100 mm thick)	Unlikely	There is no suitable habitat present within the study area and there are no known records within 50 km of the Project area.

Scientific name	Common name	EPBC Act	NC Act	Habitat Description	Likelihood of occurrence	Justification
				appears to be an essential characteristic of the collared Delma microhabitat and is always present where the species occurs.		
Denisonia maculata	Ornamental snake	V	V	Known from the north Brigalow Belt and parts of the Belt south dominated by *Acacia harpophylla, Acacia cambagei, Acacia argyrodendron* and Eucalyptus coolabah. Key distribution occurring in the Fitzroy and Dawson Rivers drainage system. Habitat includes areas that contain their main prey - frogs, in woodlands and open forests with moist areas. In particular areas with gilgai mounds, depressions, lake margins and wetlands	Unlikely	There is only a single known record within 50 km of the Project area. The species has a strong preference for gilgai formations where water holding capacity and associated prey species (frogs) are present. The species requires cracking clays to shelter during dry periods. Suitable habitat of this type is not present within the study area.
Egernia rugosa	Yakka skink	V	V	The core range is the Brigalow Belt South and Mulga Lands bioregions. Other populations have been recorded throughout the Brigalow Belt North and Einasleigh Uplands Bioregions. They inhabit dry eucalypt and acacia woodlands and open woodlands, and can be found in cavities, between and under rocks, logs, tree stumps or abandoned animal burrows. Generally Yakka Skink does not live in trees or rocky areas or in cleared habitat.	Potential	The Project area is within the Brigalow Belt North region, therefore not within the species core range. Suitable woodlands habitat occurs within the study area. There is a single known record within 50 km of the Project area.
Elseya albagula	White-throated snapping turtle	CE	CR	Found within the Burnett, Fitzroy, Raglan and Mary river drainages of south-east Queensland. It prefers permanent flowing water habitats where there are suitable shelters and refuges (e.g. fallen trees). Loss or alteration to main river channels in the Burnett, Fitzroy, Raglan and Mary river has restricted the population from spreading into tributaries and smaller rivers	Unlikely	There is no permanent flowing water within the study area, which is the habitat of the white-throated snapping turtle. Additionally, there have been no records within 50 km of the study are.
Furina dunmalli	Dunmall's snake	V	V	Occurs primarily in the Brigalow Belt region in the south-eastern interior of Queensland, generally at elevations between 200–500 m above sea level.	Unlikely	No known records within 50 km of the Project area. Additionally, of the few records of the species known, these have

Scientific name	Common name	EPBC Act	NC Act	Habitat Description	Likelihood of occurrence	Justification
				Habitat includes forests and woodlands on black alluvial cracking clay and clay loams dominated by Brigalow, other Wattles, native Cypress or Bull-oak. Also, various Blue Spotted Gum, Ironbark, White Cypress Pine and Bulloak open forest and woodland associations on sandstone derived soils. In Queensland, its range extends from Yeppoon and the Expedition Range in the north, to Oakey, Glenmorgan and Inglewood in the south.		occurred on black alluvial cracking clay and clay loams dominated by brigalow, other wattles, native cypress or bull-oak or within spotted gum, ironbark, white cypress pine and culloak open forest and woodland associations on sandstone derived soils, none of which occur within the study area.
Rheodytes leukops	Fitzroy river turtle	V	V	Found in Fitzroy River with large, clear, deep pools with rocky, gravelly or sandy substrates, connected by shallow riffles. Often associated with riparian vegetation comprised of Blue Gums (*Eucalyptus tereticornis*), River Oaks (*Casuarina cunninghamiana*), Weeping Bottlebrushes (*Callistemon viminalis*) and Paperbarks (*Melaleuca linariifolia*).	Unlikely	There are no permanent watercourses which intersect the study area, additionally there are no known records within 50 km of the Project area.
Strophurus taenicauda	Golden-tailed gecko	-	NT	Occurs in the south-eastern portion of the Brigalow Belt. This species is arboreal, preferring dry sclerophyll forests and eucalypt and Callitris woodlands within the Darling Downs to coastal regions of central and south-eastern Qld. They require areas of low fire to shelter in loose bark and hollow limbs offer abundant shelter.	Unlikely	No suitable habitat is mapped within the study area and there are no known records within 50 km of the Project area.

Appendix C Species list

Scientific name	Common name	EPBC Act	NC Act	AU1 (11.3.25d)		AU2 (11.4.7)	AU3 (11.8.4)	AU4 (11.8.5)						AU5 (11.8.11)		
				LT4	Q1	EJ03	Q2	LT1	LT2	LT6	EJ01	EJ02	EJ04	LT3	LT5	EJ05
Abelmoschus ficulneus	Native rosella	-	-	x												
Acacia harpophylla	Brigalow	-				x	x									
Achyranthes aspera	Chaff flower	-	-	x		x										
Aristida calycina	Dark wiregrass	-	-	x						x				x	x	
Aristida holathera	Erect kerosene grass	-	-					x	x							
Aristida latifolia	Feathertop wiregrass	-	-		x	x	x	x	x	x	x	x	x	x	x	x
Aristida leptopoda	White speargrass	-	-			x		x	x	x	x	x	x	x	x	x
Aristida sp.	-	-											x			
Asteraceae sp.	-	-				x					x		x			x
Atalaya hemiglauca	Whitewood	-				x										
*Bidens pilosa**	Cobblers peg	-	-	x												
Boerhavia schomburgkiana	-	-				x					x	x				
Bothriochloa bladhii subsp. *bladhii*	Forest bluegrass	-				x							x			
Bothriochloa decipiens	Pitted bluegrass	-	-					x	x	x					x	
Bothriochloa erianthoides	Satintop grass	-	-							x				x	x	
Bothriochloa ewartiana	Desert bluegrass	-	-						x	x						
*Bothriochloa pertusa**	Couch grass	-											x			
Bothriochloa sp.	-	-									x					

Scientific name	Common name	EPBC Act	NC Act	AU1 (11.3.25d)		AU2 (11.4.7)	AU3 (11.8.4)	AU4 (11.8.5)						AU5 (11.8.11)		
				LT4	Q1	EJ03	Q2	LT1	LT2	LT6	EJ01	EJ02	EJ04	LT3	LT5	EJ05
Brunoniella australis	Blue trumpet	-	-		x	x		x	x		x	x	x			x
Caesia parviflora	Pale grass lily	-														x
Calotis cuneata	Blue burr daisy	-			x											
Calotis sp.	-	-				x										
Camptacra robusta	-	-									x					
Capparis lasiantha	Nipan	-														
*Cenchrus ciliaris**	Buffel grass	-		x		x					x	x				
Chloris divaricata	-	-	-					x								
Corymbia trachyphloia	Brown bloodwood	-	-					x	x	x						
Corymbia erythrophloia	Red bloodwood	-					x						x			
Crotalaria dissitiflora subsp. *dissitiflora*	Grey rattlepod	-										x	x			
Cyperus sp.	-	-	-					x		x				x		x
Dichanthium sericeum	Queensland bluegrass	-	-					x	x	x				x	x	
Dichanthium sericeum subsp. *humilius*	annual bluegrass	-			x						x					
Dichanthium sericeum subsp. *sericeum*	Queensland bluegrass	-			x	x						x	x			
Digitaria brownii	Cotton panic	-	-	x	x				x	x				x	x	
Ehretia membranifolia	Weeping koda	-														
Einadia nutens	Climbing saltbush	-				x										
Enneapogon truncatus	Nineawn	-														

Scientific name	Common name	EPBC Act	NC Act	AU1 (11.3.25d)		AU2 (11.4.7)	AU3 (11.8.4)	AU4 (11.8.5)						AU5 (11.8.11)		
				LT4	Q1	EJ03	Q2	LT1	LT2	LT6	EJ01	EJ02	EJ04	LT3	LT5	EJ05
Entolasia stricta	Wiry panic	-	-					x								
Eragrostis sp.	-	-						x			x		x			
Eremophila debilis	Winter apple	-				x										
Eremophila mitchellii	False sandlewood	-	-							x						
Eriochloa crebra	Spring grass	-	-					x	x	x				x	x	
Eucalyptus melanophloia	Silver ironbark	-	-				x	x	x	x			x			
Eucalyptus orgadophila	Mountain coolabah	-	-				x	x	x	x	x	x				
Eucalyptus populnea	Poplar box	-				x										
Eulalia aurea	Silky browntop	-				x				x						
Euphorbia dallachyana	Mat spurge	-														x
Evolvulus alsinoides	Slender dwarf morning-glory	-				x					x		x			
Forb sp. 1	-	-				x					x	x	x			x
Forb sp. 2	-	-									x	x	x			x
Galactia sp.	-	-			x											
Galactia tenuiflora	Snail flower	-	-							x						
Geijera parviflora	Wilga	-	-	x												
Glycine tabacina	Glycine	-									x	x	x			x
Grewia latifolia	Dysentery plant	-	-							x						
Heteropogon contortus	Black speargrass	-	-					x	x	x	x	x		x	x	x
Hibiscus verdicoutii	-	-	-						x							
Hypoxis arillacea	-	-			x											

Scientific name	Common name	EPBC Act	NC Act	AU1 (11.3.25d)		AU2 (11.4.7)	AU3 (11.8.4)	AU4 (11.8.5)						AU5 (11.8.11)		
				LT4	Q1	EJ03	Q2	LT1	LT2	LT6	EJ01	EJ02	EJ04	LT3	LT5	EJ05
Indigofera linnaei	Birdsville indigo	-				x	x									x
Lomandra sp.	-	-									x	x				
*Malvastrum americanum**	Spiked mallow	-	-						x	x				x		
*Megathyrsus maximus**	Guinea grass	-	-	x		x										
Melaleuca bracteata	Black tea-tree	-	-	x	x											
*Melinis repens**	Red natal	-	-			x				x	x	x	x	x	x	x
Myoporum acuminatum	Coastal boobialla	-	-													
Neptunia gracilis	Sensitive plant	-				x		x			x	x				
*Opuntia stricta**	Common prickly pear	-										x				
Panicum sp.	-	-									x	x	x			x
Panicum decompositum	Native panic	-		x						x		x		x	x	x
Panicum effusum	Hairy panic	-	-	x				x						x	x	
Panicum queenslandicum	Yabila grass	-	-		x					x						
*Parthenium hysterophorus**	Parthenium	-		x		x			x	x						x
Phyllanthus simplex	-	-														
Phyllanthus virgatus	-	-									x	x	x			x
*Physalis angulata**	Ground cherry	-	-	x												

Scientific name	Common name	EPBC Act	NC Act	AU1 (11.3.25d)		AU2 (11.4.7)	AU3 (11.8.4)	AU4 (11.8.5)						AU5 (11.8.11)		
				LT4	Q1	EJ03	Q2	LT1	LT2	LT6	EJ01	EJ02	EJ04	LT3	LT5	EJ05
Pimelea haematostachya	-	-			x								x			
Pittosporum angustifolium	Butterbush	-	-						x							
Psydrax odorata	Shiny-leaved canthium	-										x	x			
Rhynchosia minima	Rycho	-	-	x					x	x	x	x	x	x	x	x
*Sida acuta**	Spinyhead sida	-	-						x	x						
Sida fibulifera	Pin sida	-	-					x	x	x				x		
Sida sp. 1	-	-										x	x			x
Sida sp. 2	-	-				x										
Sida sp. 3	-	-														
Solanum ellipticum	Potato bush	-				x					x					
Solanum esuriale	Quena	-	-					x	x							
Sporobolus sp.	-	-				x										
Sporobolus caroli	Fairy grass	-	-											x		
Stylosanthes scabra	Shrubby stylo	-						x				x				
Tephrosia sp.	-	-	-					x								
Thellungia advena	Coolabah grass	-	-					x		x		x		x	x	x
Themeda avenacea	Native oatgrass	-	-					x								
Themeda triandra	Kangaroo grass	-				x		x	x	x			x			
Tragus australianus	Small burrgrass	-				x			x		x	x				
Tribulus terrestris	Caltrop	-											x			x

Scientific name	Common name	EPBC Act	NC Act	AU1 (11.3.25d)		AU2 (11.4.7)	AU3 (11.8.4)	AU4 (11.8.5)						AU5 (11.8.11)		
				LT4	Q1	EJ03	Q2	LT1	LT2	LT6	EJ01	EJ02	EJ04	LT3	LT5	EJ05
Vachellia farnesiana	Mimosa bush	-						x			x	x				
Verbena sp.	-	-			x											

Scientific name	Common name	NC Act / EPBC Act status
Birds		
Aegotheles cristatus	Australian owlet nightjar	Least concern
Aquila audax	Wedge-tailed eagle	Least concern
Cacatua galerita	Sulphur-crested cockatoo	Least concern
Cacomantis variolosus	Brush cuckoo	Least concern
Centropus phasianinus	Pheasant coucal	Least concern
Cincloramphus mathewsi	Rufous songlark	Least concern
Coracina novaehollandiae	Black-faced cuckoo-shrike	Least concern
Corvus orru	Torresian crow	Least concern
Coturnix ypsilophora	Brown quail	Least concern
Cracticus nigrogularis	Pied butcherbird	Least concern
Cracticus torquatus	Grey butcherbird	Least concern
Entomyzon cyanotis	Blue-faced honeyeater	Least concern
Eolophus roseicapilla	Galah	Least concern
Eudynamys orientalis	Eastern koel	Least concern
Falco peregrinus	Peregrine falcon	Least concern
Grallina cyanoleuca	Magpie lark	Least concern
Gymnorhina tibicen	Australian magpie	Least concern
Lichmera indistincta	Brown honeyeater	Least concern
Manorina flavigula	Yellow-throated miner	Least concern
Manorina melanocephala	Noisy miner	Least concern
Ninox boobook	Southern boobook	Least concern
Ocyphaps lophotes	Crested pigeon	Least concern
Phaps chalcoptera	Common bronzewing	Least concern
Platycercus adscitus	Pale-headed rosella	Least concern
Podargus strigoides	Tawny frogmouth	Least concern
Rhipidura leucophrys	Willie wagtail	Least concern
Scythrops novaehollandiae	Channel-billed cuckoo	Least concern
Struthidea cinerea	Apostlebird	Least concern
Todiramphus sanctus	Sacred kingfisher	Least concern
Tyto alba	Barn owl	Least concern
Vanellus miles	Masked lapwing	Least concern
Herpetofauna		
Litoria caerulea	Green tree frog	Least concern
Litoria rubella	Desert tree frog	Least concern
Pogona barbata	Bearded dragon	Least concern

Scientific name	Common name	NC Act / EPBC Act status
Mammals		
Macropus giganteus	Eastern grey kangaroo	Least concern
Macropus parryi	Whiptail wallaby	Least concern

Appendix D: Acoustic Analysis Recording Data for grey falcon, white-throated needletail and koala

Over 84 hours of recording data collected across the study area, south of Emerald by two acoustic sound recorders were analysed for the presence of *Falco hypoleucos* (grey falcon) , *Hirundapus caudacutus* (white-throated needletail) and *Phascolarctos cinereus* (koala).

1. Acoustic data analysis method

Sophisticated call analysis and clustering software (Wildlife Acoustics Kaleidoscope Pro v5.4.6) was used to assist the analysis of acoustic recordings for detection of grey falcon, white-throated needletail and koala. This software efficiently locates targeted signatures based on user defined parameters, allowing time to be spent examining potential vocalisations of target species rather than sifting through sound generated by other sources. The data was analysed by qualified ecologists experienced in acoustic analysis, bird and koala surveys and familiar with the vocalisations of the target species.

The search parameters used to search for the call signatures of each species are included in **Table 1**. These values are based on reference calls known to belong to each species from a variety of habitats and locations within the species' range to account for call types and variations (**Attachment 1**).

Table 1: Signal parameters for grey falcon, white-throated needletail and koala

	Grey falcon	White-throated needletail	koala
Minimum Frequency (Hz)	2,235	3,660	10
Maximum Frequency (Hz)	2,645	9,000	2,800
Minimum Length of Detection (s)	0.5	0.3	0.1
Maximum Length of Detection (s)	7	1	25
Maximum inter-syllable gap (s)	0.35	0.045	0.5
Cluster analysis settings (Default except):		FFT Window 21.33ms	FFT Window 21.33ms
Computer resources	1/9	1/9	1/9

Analysis for the target species occurred separately as each species requires a different set of signal parameters. Analysis for each recorder station continued until the presence of the target species was confirmed via call detections, or the end of recordings was reached. Analysis of data for a recorder station ceased for a given target species once that species was detected within recordings from that station.

1.1. Grey falcon and white-throated needletail

Kaleidoscope Pro's clustering function was used for the grey falcon and white-throated needletail analysis.

Recording data was combined with the reference call dataset and the search parameters were applied within Kaleidoscope Pro. The software builds groups of similar signals (clusters), with the most common signal type matching the search parameters grouped into the first cluster. Clusters are only built if there are enough similar signals to form a cluster so the addition of reference data assists in building clusters that are relevant to the target species, which are sometimes rare in the landscape and therefore may otherwise be missed if there aren't enough signals to form a cluster.

For efficiency, examination of results focussed on clusters that contained reference calls. We assume that clusters without reference calls are unlikely to contain calls of the target species because a cluster is a group of similar signals and calls from target species should be similar enough that they are clustered with reference calls.

1.2. Koala

Kaleidoscope Pro's spectrogram viewer was used for the koala analysis.

Twilight end in the Emerald region was around 7:00PM and sunrise was around 5:11AM during the recording period. The analysis therefore focussed on recordings between 7:00PM and 5:11AM daily as Koalas are nocturnal and most likely to be vocalising between these times.

Due to interference by anthropogenic noise (road and rail), wind and rain, the most efficient way to analyse this short dataset for Koala vocalisations was to visually scan a full screen spectrogram of each entire 10-minute recording with the y-axis set at a maximum of 2,000 Hz.

1.3. Limitations of the study

Analysis of acoustic recordings can identify the presence of a species near an acoustic recorder station. The absence of calls or other recognisable sounds emitted by a species within the recordings does not confirm the absence of the species from the study area.

2. Species accounts (acoustic signatures)

2.1. Grey falcon (*Falco hypoleucos*)

Grey falcon vocalisations can be described as cackles and whines with certain cackle calls similar in characteristics (dominant frequencies, pulse rates) to cackle calls of the *Falco peregrinus* (peregrine falcon) and *Falco subniger* (black falcon) (Baylis et al., 2015). **Attachment 2** provides visual representations (spectrograms) of grey falcon calls described by Baylis et al. (2015).

2.2. White-throated needletail (*Hirundapus caudacutus*)

White-throated needletail vocalisations can be described as a high-pitched screaming twitter. **Plate 1** provides a visual representation (spectrogram) of example white-throated needletail calls.

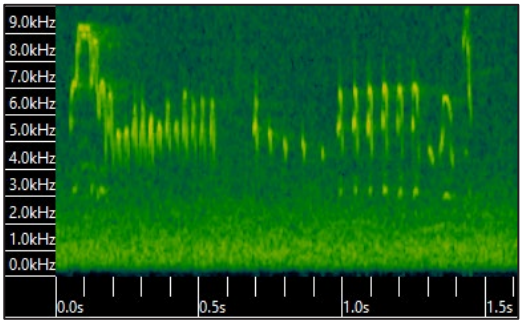


Plate 1: Spectrogram of *Hirundapus caudacutus* example viewed in Kaleidoscope Pro v5.4.6 (Wildlife Acoustics)

2.3. Koala (*Phascolarctos cinereus*)

Koala vocalisations can be described as guttural growls. **Plate 2** provides a visual representation (spectrogram) of an example koala call recorded by ELA in Central Queensland.

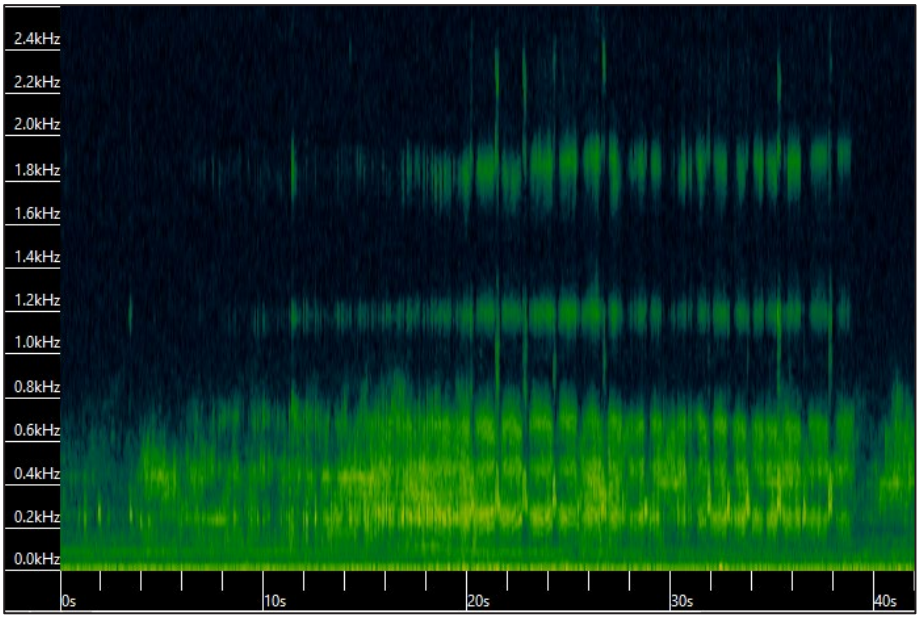


Plate 2: Spectrogram of *Phascolarctos cinereus* example viewed in Kaleidoscope Pro v5.4.6 (Wildlife Acoustics)

3. Results

Over 84 hours of recording data collected across the study area south of Emerald by two acoustic sound recorders between 23-25 November 2021, inclusive.

Table 2 summarises the data collected at each recorder station and across the project.

Table 2: Summary of recorded data

Site	Start Date	End Date	Number of Files	Total Length of Recording
20536A	23/11/2021	25/11/2021	257	1 days 18 hours 32 mins
20536B	23/11/2021	25/11/2021	255	1 days 18 hours 7 mins
All	**23/11/2021**	**25/11/2021**	**512**	**3 days 12 hours 39 mins**

3.1. Analysis for grey falcon

When all recordings, including reference calls, were scanned using the parameters in **Table 1**, 21,130 signals were used to form 43 clusters. Of these, 17 clusters contained reference calls (10,933 target signals). Of the target signals, 8,218 signals were manually checked for grey falcon calls.

Commonly encountered sounds within the target signals included those emitted by *Coturnix ypsilophora* (brown quail), *Manorina flavigula* (yellow-throated miner), *Corvus orru* (torresian crow), *Todiramphus sanctus* (sacred kingfisher), *Scythrops novaehollandiae* (channel-billed cuckoo), *Cracticus nigrofularis* (pied butcherbird), *Cincloramphus mathewsi* (rufous songlark), *Eolophus roseicapilla* (galah), *Tyto alba* (barn owl), *Aegotheles cristatus* (Australian owlet nightjar), *Cacatua galerita* (sulphur-crested cockatoo), *Vanellus miles* (masked lapwing), *Gymnorhina tibicen* (Australian magpie), *Litoria rubella* (desert tree frog) and fruit bats.

Grey falcon was not detected.

3.2. Analysis for White-throated needletail

When all recordings, including reference calls, were scanned using the parameters in **Table 1**, 8,042 signals were used to form 74 clusters. Of these, 15 clusters contained reference calls (2,257 target signals). Of the target signals, 1,710 signals were manually checked for white-throated needletail calls.

Commonly encountered sounds within the target signals included those emitted by bats, insects, rufous songlark and fairywrens.

White-throated needletail was not detected.

3.3. Analysis for Koala

Commonly encountered sounds included those emitted by vehicles and machinery, flying insects, Australian owlet nightjar, *Centropus phasianinus* (pheasant coucal), *Ninox boobook* (southern boobook), *Litoria caerulea* (green tree frog), cow, channel-billed cuckoo, *Podargus strigoides* (tawny frogmouth), *Eudynamys orientalis* (eastern koel), *Cacomantis variolosus* (brush cuckoo), desert tree frog and people. Wind and rain interference was extreme at times, likely impeding the detection of koala.

Koala was not detected.

4. Conclusion

Over 84 hours of recording data collected across the study area south of Emerald by two acoustic sound recorders were analysed for the presence of grey falcon, white-throated needletail and koala. No targeted species were detected.

Analysis of acoustic recordings can identify the presence of a species near an acoustic recorder station. The absence of calls or other recognisable sounds emitted by a species within the recordings does not confirm the absence of the species from the study area.

5. References

Baylis, T., Gessel, F.W. van, Debus, S.J.S., 2015. Some vocalisations of the Grey falcon Falco hypoleucos. Corella 39, 73–76.

ATTACHMENT 1: REFERENCE CALLS

Grey falcon reference calls were sourced from the following:

Baylis, T., Gessel, F.W. van, Debus, S.J.S., 2015. Some vocalisations of the Grey falcon Falco hypoleucos. Corella 39, 73–76.

Schoenjahn, J., 2010. Field Identification of the Grey falcon Falco hypoleucos. Aust. F. Ornithol. 27, 49–58.

- eBird.org contributors
    - James (Jim) Holmes
- xeno-canto.org contributors
    - Jim Holmes
- AudioWings No. 27, June 2012 by Australian Wildlife Sound Recording Group
    - Track 17 Tony Baylis
    - Track 19 Tony Baylis

White-throated needletail reference calls were sourced from the following:

- Bird Observers Club of Australia, 2007. A Field Guide to Australian Birdsong (CD Edition)
- xeno-canto.org contributors
    - Jim Holmes
    - Tom Tarrant
    - Anon Torimi
    - Klaas Felix Jachmann
    - Louis A. Hansen
    - Murtaza Khalil Hassan
    - Frank Lambert

Koala reference calls were sourced from ELA's call library and the following references assisted with parameter definition:

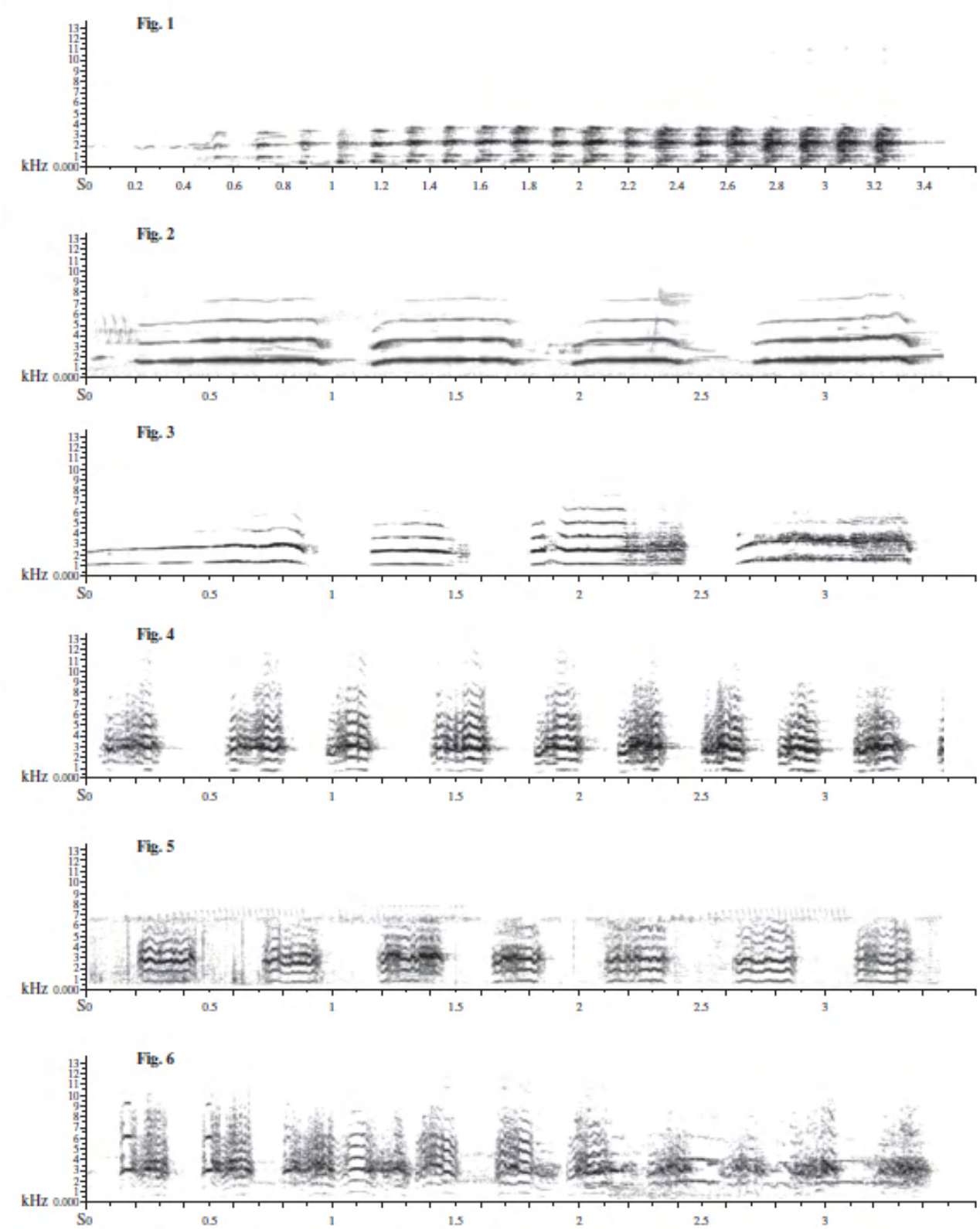
Charlton, B.D., 2015. The Acoustic Structure and Information Content of Female Koala Vocal Signals. PLoS One 10, e0138670. https://doi.org/10.1371/journal.pone.0138670

Charlton, B.D., Ellis, W.A.H., McKinnon, A.J., Brumm, J., Nilsson, K., Fitch, W.T., 2011. Perception of Male Caller Identity in Koalas (Phascolarctos cinereus): Acoustic Analysis and Playback Experiments. PLoS One 6, e20329. https://doi.org/10.1371/journal.pone.0020329

Ellis, W., FitzGibbon, S., Pye, G., Whipple, B., Barth, B., Johnston, S., Seddon, J., Melzer, A., Higgins, D., Bercovitch, F., 2015. The Role of Bioacoustic Signals in Koala Sexual Selection: Insights from Seasonal Patterns of Associations Revealed with GPS-Proximity Units. PLoS One 10, e0130657. https://doi.org/10.1371/journal.pone.0130657

ATTACHMENT 2: GREY FALCON CALLS

Excerpt from Baylis et al. (2015)



Figures 1–6. *Spectrograms of calls of Grey Falcon: (1) adult male fast greeting cackle; (2, 3) juvenile food-begging whine; (4) adult slower cackle; (5) adult female squeaky cackle; (6) adult female cackle as approaching nest. Northern Territory, October–November 2011; spectrograms prepared using Raven Lite 1.0.*

Appendix E BioCondition assessments and habitat quality

Assessment unit (RE)	AU7 (11.3.25d)		AU11 (11.4.7)		AU8 (11.8.4)		AU9 (11.8.5)									
Site ID	LT4		EJ03		EJ04		LT1		LT2		LT6		EJ01		EJ02	
Ecosystem Type	Woodland / Remnant		Woodland / Regrowth		Woodland / Remnant		Woodland / Remnant									
Value Type	Field value	Score	Field value	Score	Field value	Score	Field value	Score	Field value	Score	Field value	Score	Field value	Score	Field value	Score
Field based attributes																
Recruitment	66	3	75	5	100	5	33	3	75	5	50	3	100	5	100	5
Native tree sp. richness	3	2.5	4	5	1	2.5	3	5	4	5	4	5	1	2.5	0	0
Native shrub sp. richness	2	5	4	5	1	0	0	0	1	2.5	1	2.5	0	0	1	2.5
Native grass sp. richness	5	2.5	8	5	6	5	16	5	14	5	16	5	9	5	8	5
Native forb sp. richness	4	2.5	14	5	12	5	6	2.5	6	2.5	5	2.5	14	2.5	11	2.5
Tree Canopy Height	8	3	12	3	13	5	14	5	14	5	16.5	5	16	5	15	5
Tree Canopy Cover	38	5	45	5	7	2	8.5	5	22.2	5	12	5	9	5	12.5	5
Shrub canopy cover	4.2	3	4.5	3	0	0	0	0	0.3	3	0	0	0	0	0	0
Native perennial grass cover	8	3	8.6	5	18.4	1	31.2	3	13.4	1	32.4	3	38	3	46	3
Organic litter cover	8.6	5	46.8	5	25.6	5	16.8	5	17	5	13.6	5	26	5	39.2	5
Large trees	56	15	6	5	0	0	2	5	2	5	0	0	10	15	6	10
Coarse woody debris	320	5	0	0	230	5	120	2	190	5	350	5	80	2	60	2
Weed cover	75	0	5	5	30	3	2	10	3	10	20	5	2	10	7	5
Total Field based attributes		54.5		56		38.5		50.5		59		46		60		50
GIS based attributes																
Fragmented - Patch size		2		2		5		10		10		10		10		10

Assessment unit (RE)	AU7 (11.3.25d)	AU11 (11.4.7)	AU8 (11.8.4)	AU9 (11.8.5)				
Fragmented - Connectivity	4	2	5	5	5	5	5	5
Fragmented - Context	5	4	4	5	5	5	5	5
Distance from water (km)	0	0	0	0	0	0	0	0
Ecological Corridors	4	4	4	4	4	4	4	4
Total GIS attributes	15	12	18	24	24	24	24	24
Total BioCondition Score	**69.5**	**68**	**56.5**	**74.5**	**83**	**70**	**84**	**74**
Weighted Ecosystem Score	**0.695**	**0.68**	**0.565**	**0.745**	**0.83**	**0.7**	**0.84**	**0.74**
Final Classification	**2**	**2**	**3**	**2**	**1**	**2**	**1**	**2**

Assessment unit (RE)	AU11 (11.8.11)					
Site ID	LT3		LT5		EJ05	
Ecosystem Type	Grassland / Remnant					
Value Type	Field value	Score	Field value	Score	Field value	Score
Field based attributes						
Recruitment	0	0	0	0	100	0
Native tree sp. richness	0	0	0	0	0	0
Native shrub sp. richness	0	0	0	0	0	0
Native grass sp. richness	13	5	11	5	7	2.5
Native forb sp. richness	3	0	1	0	13	2.5
Tree Canopy Height	0	0	0	0	0	0
Tree Canopy Cover	0	0	0	0	0	0
Shrub canopy cover	0	0	0	0	0	0

Assessment unit (RE)	AU11 (11.8.11)					
Native perennial grass cover	46.4	5	45.6	5	13	1
Organic litter cover	31	3	40.4	3	14	5
Large trees	0	0	0	0	0	0
Coarse woody debris	0	0	0	0	20	0
Weed cover	5	5	5	5	30	3
Total Field based attributes	18		18		14	
GIS based attributes						
Fragmented - Patch size	7		7		10	
Fragmented - Connectivity	5		5		5	
Fragmented - Context	5		5		5	
Distance from water (km)	0		0		0	
Ecological Corridors	4		4		4	
Total GIS attributes	21		21		24	
Total BioCondition Score	**39**		**39**		**38**	
Weighted Ecosystem Score	**0.78**		**0.78**		**0.76**	
Final Classification	**2**		**2**		**2**	

Assessment unit	Site Condition score (out of 3)	Site Context Score (out of 3)	Species Stocking Rate Score (out of 4)	Habitat Quality score (out of 10)
Koala				
AU9	1.94	1.67	3.14	6.75
AU11	1.77	1.20	3.14	6.11
Final Score	1.29	1.01	3.14	3.72
Weighted average				**6.43**
Squatter pigeon				
AU7	1.95	1.58	2.57	6.10
AU9	1.86	1.69	2.57	6.12
AU10	1.34	1.58A	2.57	5.49
AU11	2.10	1.26	2.57	5.93
Final Score	1.63	1.36	2.57	3.32
Weighted average				**5.91**
Grey falcon				
AU7	1.49	0.99	0.29	2.76
AU9	1.57	1.54	0.29	3.40
AU10	0.59	0.79	0.29	1.66
AU11	1.29	0.47	0.29	2.05
Final Score	1.17	0.90	0.29	0.80
Weighted average				**2.61**
Common death adder				
AU7	1.49	0.79	0.29	2.56
AU9	1.41	1.11	0.29	2.80
AU10	1.18	1.00	0.29	2.46
AU11	1.91	1.00	0.29	3.19
Final Score	1.37	0.92	0.29	0.86
Weighted average				**2.76**
Yakka skink				
AU7	1.32	0.64	0.29	2.24
AU9	1.59	1.26	0.29	3.14
AU10	1.03	0.92	0.29	2.23
Final Score	1.22	0.80	0.29	0.79
Weighted score				**2.54**

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