Appendix H

Offset Strategy (including Offset Area Management Plan)

Spring to Phillips Creek Diversion Offsets Strategy

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DOCUMENT TRACKING

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Template 2.8.1

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Abbreviations

Abbreviation	Description
BMA	BM Alliance Coal Operations Pty Ltd
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
OAG	Offset Assessment Guide
OAMP	Offset Area Management Plan
VDec	Voluntary Declaration under the Queensland *Vegetation Management Act 1999*
VM Act	Queensland *Vegetation Management Act 1999*

1. Introduction

1.1 Background

The Spring to Phillips Creek Diversion and associated works (the Project) are located at Saraji Mine (SRM), approximately 50 km southeast of Moranbah in Central Queensland on Mining Lease (ML) 1782, ML 2410, ML 70142, and ML 70294. BM Alliance Coal Operations Pty Ltd (BMA) owns and operates SRM, which operates under the Environmental Authority (EA) EPML00862313.

The Project will improve water management at SRM through more effective separation of clean water and mine affected water; rectifying historical design issues with the existing Southern Creek diversion; and delivering a post-mining landform that is safe, stable and non-polluting. The Project involves the construction of the diversion and supporting infrastructure at SRM.

The Project was referred under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) to the Commonwealth Department of the Environment in late-2019 and was determined a controlled action requiring further assessment (EPBC2019/8576). The assessment has concluded that the Project is likely to result in significant residual impacts to koala and that offsets are therefore required.

1.2 Purpose of this offset strategy

The purpose of the offset strategy is to detail the offsets that will be delivered to counterbalance the significant residual impacts of the Project. It will ultimately demonstrate compliance with the Project's approval conditions (once set) and outline the management requirements that will ensure a net conservation gain. Specifically, the strategy:

- Describes the Project's offset property and offset area, including values, existing condition and threatening processes
- Demonstrates the Project's compliance with the Commonwealth *EPBC Act Environmental Offsets Policy 2012*
- Assesses the offset against the offset requirements of the Project in accordance with the Offsets Assessment Guide (OAG)
- Determines the overall suitability of the Project's offsets and anticipated environmental outcome
- Details how the offset will be implemented.

1.3 Offset requirements and delivery mechanism

A detailed assessment of the Project's impacts to matters of national environmental significance (MNES) has been undertaken in line with relevant policy guidance under the EPBC Act (Eco Logical Australia 2020). The assessment concluded that the Project will result in significant residual impacts to 60.6 ha of koala habitat.

Note: Assessment of the extent of significant impact to the koala was undertaken and reported in the approval submission. The Department of Agriculture, Water and the Environment (DAWE) determined the extent of significant impact to differ from the assessment outcome and this strategy has been

completed in accordance with the DAWE requirement for an approved impact extent of 74ha to Koala habitat.

These significant residual impacts will be fully offset via a direct (i.e. land-based) offset.

The Project will result in impacts to a number of other values, however these are not considered significant (Eco Logical Australia 2020) and therefore formal offsets are not required. Nevertheless and in addition to the presence of koala habitat, the proposed offset property provides habitat for a number of other threatened species and ecological communities and securing the property as an offset will provide a conservation benefit for these species. These values and the associated benefits are also discussed in this report.

2. Tay-Glen offset area

Offsets for the Project will be delivered within the Tay-Glen property. The following section provides a description of the proposed Tay-Glen offset area, its values for threatened species/communities, current condition and threatening processes.

2.1 Property location and regional context

The Tay-Glen offset area is located in Isaac Regional Council Local Government Area in central Queensland, approximately 15 km north of Dysart and in proximity to Saraji Mine. The proposed offset area is located within the larger Tay-Glen property, which extends to the north and south-east, adjacent to the mine. The offset site is connected to the disturbance area and Phillips Creek riparian corridor.

The Tay-Glen property contains a mixture of remnant and regrowth vegetation, with large cleared areas across the property, particularly in the southern area. The offset area is located within the north-western parts of the Tay-Glen property, where vegetation clearing has been less widespread.

In the regional context, the offset area is located in the lowland areas of a much larger contiguous area of remnant vegetation associated with ridgelines running in an approximately southeast–northwest direction between Tieri and Moranbah, to the west of the Dysart-Middlemount Road.

The location of the Tay-Glen offset area is shown on **Figure 1**.

2.2 Tenure and ownership

The Tay-Glen offset area is sited on Lot 101 SP310393. The land is under freehold tenure owned by the Central Queensland Coal Associate Joint Venture (CQCA JV) Partners, which is a 50/50 joint venture between BHP Coal and Mitsubishi. BMA manages operations on behalf of the CQCA JV.

BMA, on behalf of the CQCAJV, is also the Proponent for the Project, thereby negating risks of conflict between the offset area landholder and proponent/approval holder.

2.3 Offset area

The offset area is located within the north-western parts of Lot 101 SP310393.

There are currently no mining or petroleum leases over the offset area. Two mining leases held by BMA (ML70142 and ML 70249) are located directly to the east of the offset site. While the property is directly adjacent to the MLs, a buffer zone of 100 m has been designated between the MLs and the offset area to minimise the effects of disturbance related to mining activities within the offset. The same 100 m buffer has been applied to Lake Vermont Road and the Goonyella System Rail-line.

The offset area is 857.6 ha in total area, with 650.2 ha vegetated (631.7 ha remnant; 18.5 ha regrowth) and 207.4 ha cleared areas.

Vegetated areas within the surrounding buffer area are approximately 100 ha in total extent, predominantly located between the MLs and the offset area.

Figure 1: Offset Area

Legend

- Offset area
- Offset area 100m buffer
- Project area
- Mining Lease (ML)
- Railway
- Road
- Watercourses

0 250 500 1,000
Metres
Datum/Projection:
GDA 1994 MGA Zone 55

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2.4 Historical land use

The following details provide an overview of historical land use of the Tay-Glen offset area:

- BMA purchased the land in two parcels – part of Lake Vermont property in 2010 and part of the Tay-Glen property in 2012.
- Both parcels were grazing land and the purchase contract included an Agistment License so that the parcels remained grazing land until required for Mining or Ancillary purposes by BMA.
- The land has been previously fenced (for cattle containment) and includes water points for each of the four paddocks on within the offset area. The offset area is not currently boundary fenced on the southern extent.
- Parts of the land have been mechanically cleared and sown to improved pasture.
- The offset area is grazed as part of a rotation on each of the larger adjacent properties.
- Ongoing vegetation management has been undertaken over time across the non-remnant areas of the offset area and across the larger adjacent properties as part of routine agricultural clearing.

2.5 Current land use

The following provides an overview of current land use of the Tay-Glen offset area:

- The offset area is currently in use as grazing land, with two Agistment Licenses in place to long term licensees (>8 years).
- Grazing occurs in rotation with adjoining land across a total area of approximately 16,000 ha.
- Ongoing vegetation management is planned for the non-remnant areas of the offset area and across the larger adjacent properties as part of routine agricultural clearing. All vegetation management is undertaken by the relevant licensees with the approval of the BMA Land Access Team.

2.6 Existing environment

The ecological values of the offset area were ground-truthed in late May 2020. The following information provides an overview of the environmental values of the offset area and the full ecology report is provided as **Appendix A**.

It should be noted that a broader area was ground-truthed (as described in the ecology report and referred to therein as 'the study area'). The offset area was selected within the broader area, taking consideration of the location of both ecological values and surrounding land-uses.

Targeted fauna surveys of the impact area were undertaken in 2018 and identified the presence of an important population of koala (Eco Logical Australia, 2020). The targeted fauna survey was undertaken in accordance with survey guidelines and included habitat assessments, scat and scratch searches, acoustic detection, spotlighting and call playback. This area of known koala habitat is contiguous with the adjacent offset area and as a result additional targeted fauna surveys within the offset area were not required.

2.6.1 Vegetation communities

The offset area is currently shown on the Department of Natural Resources and Mines (DNRME) Regulated Vegetation Management Map as predominantly Category B remnant vegetation, with Category X non-remnant areas mapped in the south and along the south-western boundary.

The offset area was ground-truthed as predominantly remnant vegetation interspersed with non-remnant areas. A total of 14 regional ecosystems (REs) were ground-truthed across the offset area including Eucalyptus and Acacia dominated woodlands, with small areas of native grassland.

2.6.2 Fauna habitat values

Seven broad habitat types were identified within the offset area. These habitats provide a range of resources for native fauna species, including threatened species. Habitat types identified within the offset area are:

- Fringing riparian open forest
- Floodplain open forest and woodlands
- Eucalypt forest and woodlands
- Acacia forest and woodlands
- Native grasslands
- Softwood scrub regrowth
- Non-remnant areas

2.6.3 MNES

2.6.3.1 Koala

Field surveys involving targeted habitat assessments ground-truthed 568.1 ha of koala habitat within the offset area. This includes 549.6 ha of remnant vegetation and 18.5 ha of high value regrowth and regrowth vegetation (**Figure 2**). Habitat areas were validated based on the presence of preferred habitat structure and preferred food tree species that are the species habitat requirements outlined in the Commonwealth EPBC Act referral guidelines for the vulnerable koala (DoE, 2014). Suitable habitat for koala includes fringing riparian open forest, floodplain open forest and woodlands, and eucalypt forest and woodlands.

The Commonwealth referral guideline also describes refuge habitat for the species, the definition of which was utilised to identify potential habitat refuges for the species within the offset area. Refuge habitat is suitable habitat in riparian environments and other areas with reliable soil moisture and fertility, including a permanent aquifer, in a riparian zone, on upper or mid-slopes, on a fertile alluvial plain or where soil moisture / rainfall is reliable (DoE, 2014).

Refuge habitat for koala within the offset area was identified as riparian and floodplain open forests and woodlands in association with Phillips Creek in the south and two smaller tributaries in the centre of the offset area. This habitat was identified as vegetation analogous to RE11.3.25, RE11.3.2 and RE11.3.4 and occurs within an area of 80.2 ha. This vegetation has reliable year-round access to high soil moisture and provides an important refuge for koala during droughts and in periods of extreme heat. Foraging and dispersal habitat for koala within the offset area was ground-truthed as eucalypt woodlands predominantly on sand plains and coarse-grained sedimentary rocks, with vegetation analogous to RE11.4.13, RE11.5.3, RE11.5.9, RE11.8.5 and RE11.10.7. This habitat occurs within an area of 487.9 ha.

Habitat within the offset area is analogous to that of the impact area. Habitat within the impact area was ground-truthed as riparian forests and eucalypt woodlands on floodplains, sandplains and sandstone uplands (RE11.3.25, 11.3.4, 11.5.3, 11.5.9, 11.10.1), which are dominated by known food trees such as Queensland Blue Gum, River Red Gum, Poplar Box and Narrow-leaved Ironbark (Eco Logical Australia, 2020).

Remnant koala habitat within the offset area was found to have structural complexity, canopy species diversity and recruitment characteristics resembling an undisturbed community. Regrowth habitat within the study area was found to have reduced canopy species richness, height and cover relative to an undisturbed community.

Koala have been recorded within the offset area and in connecting habitat across two surveys. Surveys conducted in December 2020 encountered six koalas within the offset area, whilst 18 individuals were recorded during surveys in 2018 in habitat directly adjacent and connected to the offset area (Eco Logical Australia 2020). Surveys conducted within the offset area sighted five adults and one joey, within a broad range of habitat types including dry eucalypt woodlands, floodplain forests to woodlands and riparian woodlands. Surveys in 2018 observed 13 adults (male and female) and five joeys, the majority of which were identified within woodlands on alluvial and sand plains in the centre of the project area (refer to **Figure 2**).

The offset area and adjacent connecting habitat are well utilised by koala with a healthy breeding population observed across two surveys. The area is connected through remnant eucalypt vegetation which extends further west from the offset area and through riparian corridors, such as Phillips Creek. This allows koalas to move freely from adjacent habitat near Saraji Mine into suitable habitat areas within the offset area and beyond, reducing any potential overstocking issues. Available records show that koala utilise areas further west, with records approximately 15 km west and 5 km north-west of the offset area (**Figure 4**; ALA 2020). The offset area and surrounding suitable habitat are therefore considered important in maintaining the regional koala population.

2.6.4 Other threatened species and communities

Field surveys ground-truthed 290.2 ha of suitable habitat for squatter pigeon within the offset area, all of which is in remnant condition. Both breeding and foraging habitat was identified. Permanent water sources were identified in the surrounding area, suitable habitat within 1 km of these are considered suitable breeding habitat, the remaining is considered suitable foraging and dispersal habitat. Habitat areas consisted of eucalypt woodlands on well-draining sandy soils, dominated by *Eucalyptus crebra* (RE 11.5.9), *E. populnea* (RE 11.3.2 and RE 11.5.9) and *E. camaldulensis* (RE 11.4.4 and RE 11.3.25).

Greater glider habitat was identified along the creeks within the offset area, totalling 80.1 ha. These areas contain many hollow bearing trees suitable for shelter, and eucalyptus trees for foraging. Greater glider was confirmed within the offset area during surveys conducted in 2020, with the observation of 5 individuals along Phillips Creek corridor, records also exist within connecting habitat along Philips Creek to the east of the offset area (ELA, 2020).

Field surveys ground-truthed 10.6 ha of Brigalow TEC. This consisted of three separate patches within the study area that are analogous to RE 11.3.1, RE 11.9.1 and RE 11.9.5 and which met the key diagnostic and condition criteria for Brigalow TEC.

A single patch of Natural Grassland TEC was identified in the south of the offset area, totalling 12.2 ha. This vegetation was analogous with RE 11.4.4 was assessed as meeting best condition TEC.

The location of values described above are shown on **Figure 3**.

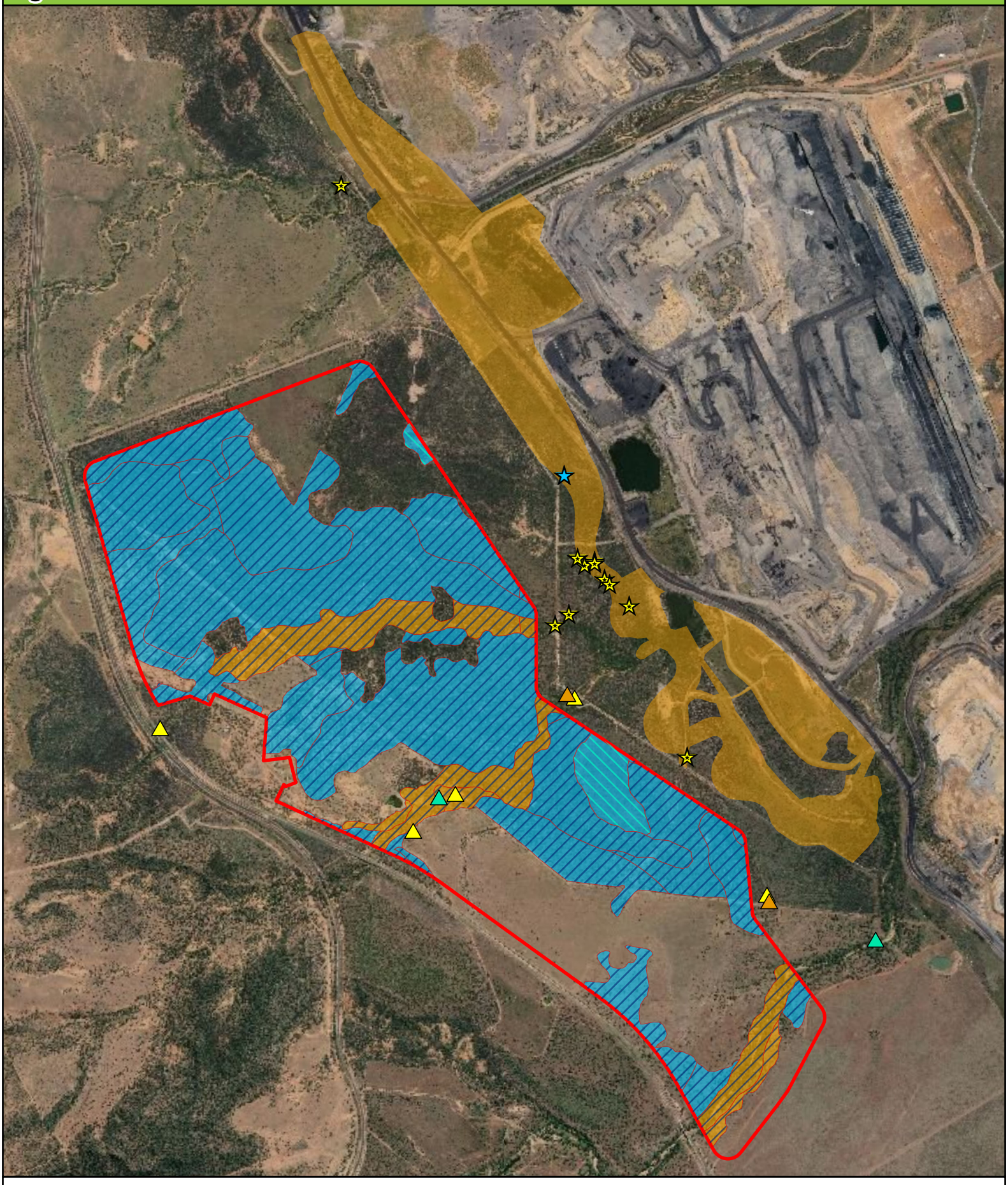
There is additional koala, squatter pigeon and greater glider habitat located adjacent to the offset site in the buffer area, as well as additional values of ornamental snake habitat and Poplar Box TEC (refer Appendix A). Two patches of ornamental snake habitat were observed to the south-east of the offset area, totalling 2.5 ha. This area was observed to have suitable microhabitat features such as cracking clay, diverse gilgais and fallen woody debris. Known records of the species occur in nearby habitat areas. A single patch of Poplar Box TEC was also identified to the south-east of the offset area, totalling 5.5 ha. This vegetation was analogous with RE 11.3.2 and was assessed as meeting Class B good condition.

2.7 Landscape connectivity values

Remnant vegetation within the offset area forms a large contiguous patch and joins the Phillips Creek riparian corridor in the south of the offset area, providing good connectivity within the offset area. In particular, the offset area is directly connected to koala habitat within the Project's impact area, where koala have been recorded at distances of less than 1 km. Connectivity between the impact and offsets sites is shown on Figure 4**.**

Phillips Creek, which intersects the offset area in the south, provides significant regional connectivity, linking the offset area to large contiguous tracts of vegetation extending to the north, south and west Figure 4. Saraji Road and rail line to the south-west, Saraji Mine to the east and clearing for agricultural purposes limit connectivity in the area immediately surrounding the offset area.

Figure 2: Koala offset area



Legend

- Offset area
- Project area

Koala records (ELA; December 2020)

- Confirmed scat
- Confirmed sighting
- Likely repeated sighting

Koala records (ELA; May 2018)

- Confirmed sighting
- Confirmed scat

Validated RE condition

- Remnant
- Regrowth

Koala habitat

- Foraging and dispersal (487.94 ha)
- Refuge (80.17 ha)

0 250 500 1,000

Metres

Datum/Projection:
GDA 1994 MGA Zone 55

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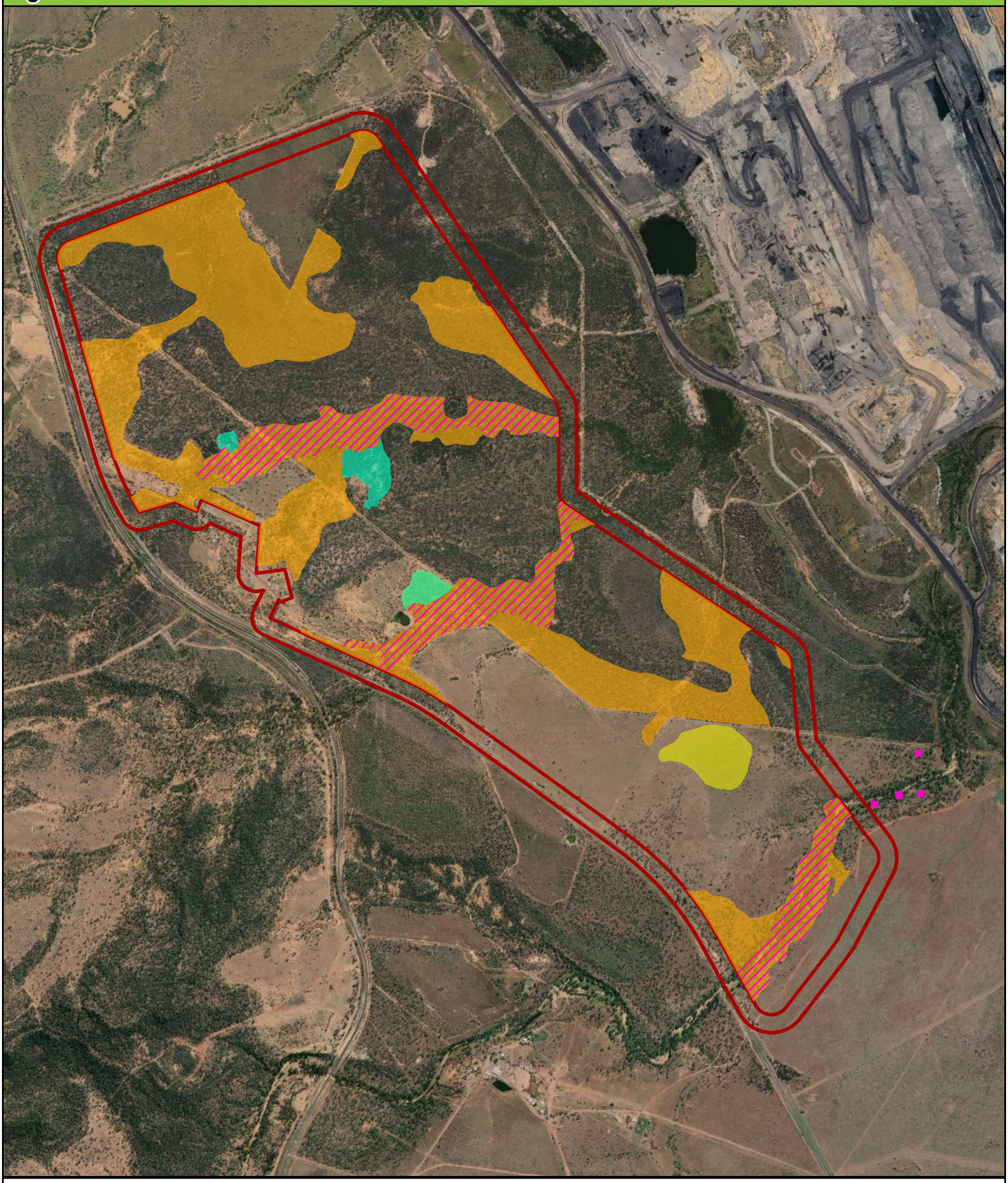
Figure 3: Other MNES habitat within the offset area



Legend

- Offset area

Threatened Ecological Community (TEC)

- Brigalow (Acacia harpophylla dominant and codominant)
- Natural Grasslands (Best condition)

Greater Glider

- Breeding, foraging & dispersal

Squatter Pigeon

- Breeding, foraging & dispersal

Threatened species records

- Greater Glider (*Petauroides volans*)

0 225 450 900

Metres

Datum/Projection:
GDA 1994 MGA Zone 55

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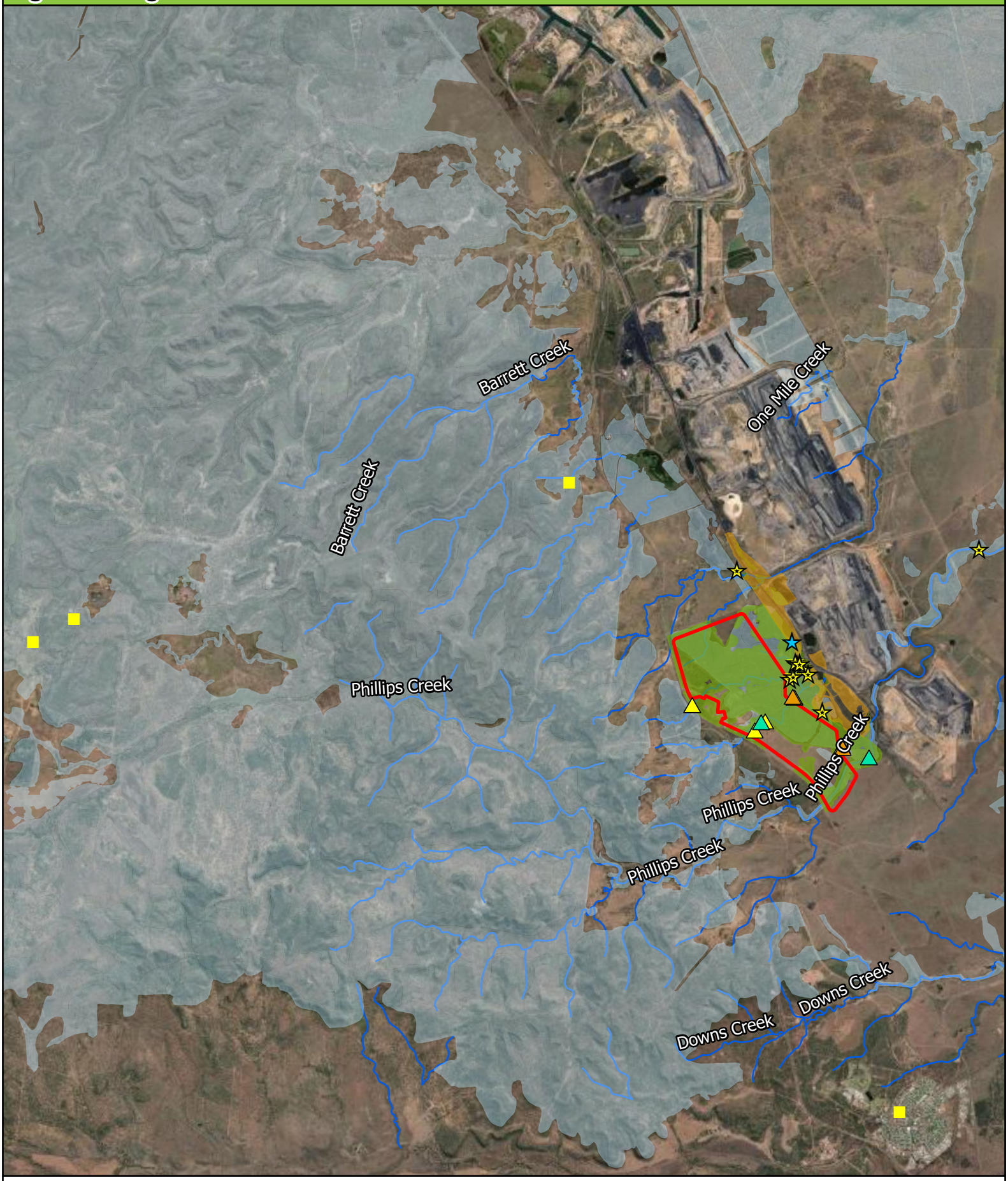
Figure 4: Regional Koala Habitat



Legend

- Offset area
- Mine impact area
- Koala habitat
- Remnant vegetation (State)

Koala records (ELA; December 2020)

- Confirmed scat
- Confirmed sighting
- Likely repeated sighting

Koala records (ELA; May 2018)

- Confirmed sighting
- Confirmed scat
- Koala records (ALA 2020)

0 500 1,000 2,000
Metres

Datum/Projection:
GDA 1994 MGA Zone 55

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2.8 Threatening processes

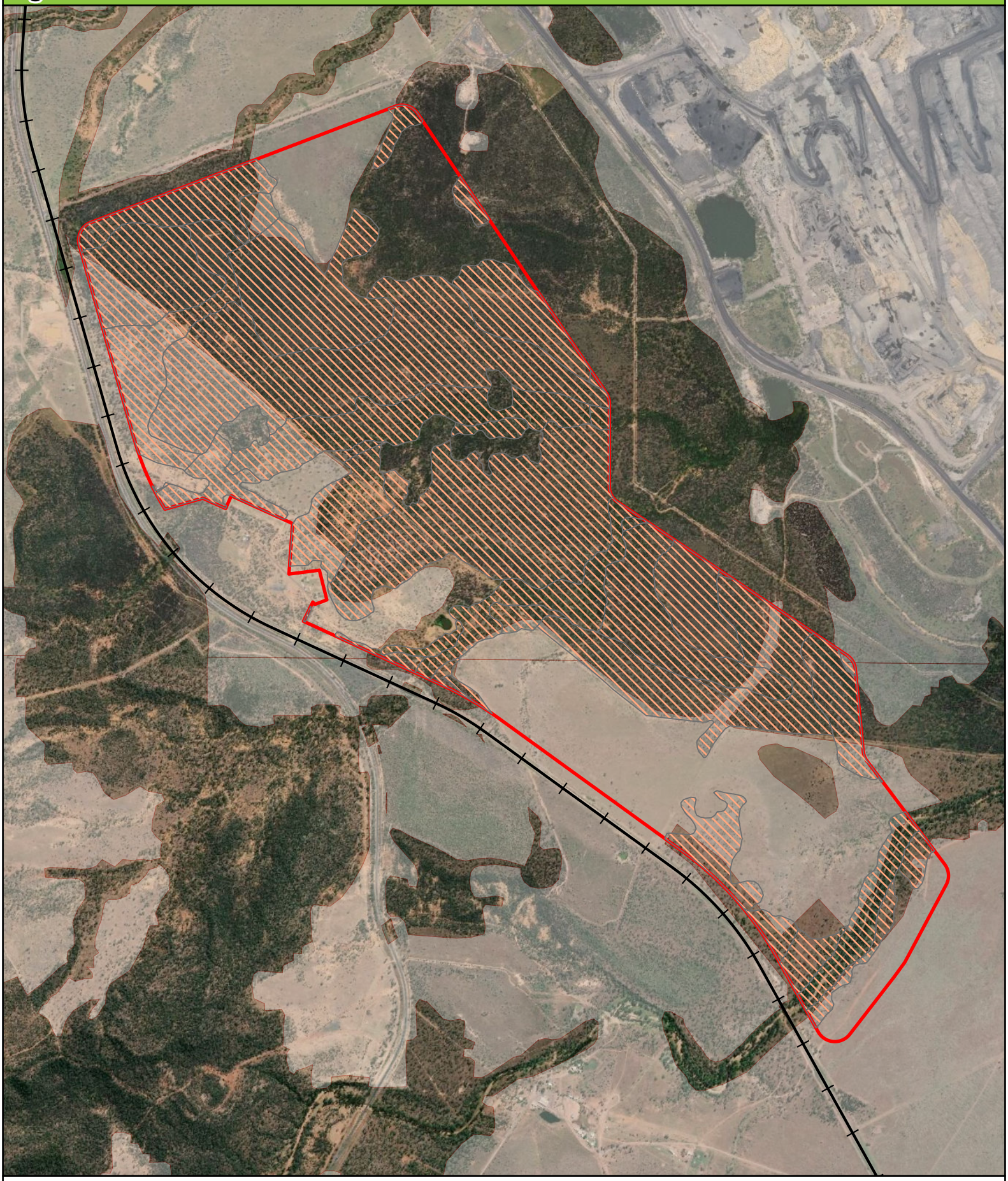
Field assessment of the study area identified the presence of numerous threatening processes. Threatening processes identified within the study area include habitat clearing, livestock grazing regimes of varying intensity, pest fauna and weeds.

A large proportion of vegetation within the offset area that has been able to mature or has remained uncleared is mapped as regulated vegetation and requires approval from the State Government prior to broadscale clearing activities being undertaken. Areas that are not currently protected from clearing activities include remnant vegetation providing habitat for koala as well as squatter pigeon and greater glider. In total, these areas cover 120.8 ha that is currently designated as Category X vegetation under the Queensland *Vegetation Management Act 1999* (VM Act; **Figure 5**) and include 107.3 ha of koala habitat. The removal of this vegetation within the offset area would currently be deemed as a lawful activity under state vegetation management laws.

Cattle grazing is currently occurring across the study area. Cattle grazing impacts including suppressing low ground layer species diversity and pugging in wet areas are evident across the study area and considered to be moderate. This is particularly relevant to koala, as refuge habitat occurs within the riparian zones of the three waterways that intersect the offset area. Grazing also impedes the regeneration of native trees species, which over time, would otherwise develop into important food resources for koala and this pressure is present across the entire offset area. Impacts of grazing are also detrimental to other MNES that are present within the offset area e.g. trampling of squatter pigeon nests, browsing of regenerating Brigalow TEC.

Field surveys identified evidence of numerous pest species within the study area, including rabbits, cats and pigs. Cane toads and dogs are also common within the region and are likely to occur within the study area. A number of exotic flora species were recorded within the study area. Flora species listed as restricted matter under the Queensland *Biosecurity Act 2014* present within the study area include *Opuntia stricta, Opuntia tomentosa, Cryptostegia grandiflora* and *Parthenium hysterophorus.* The presence of these invasive species contributes to general environmental degradation of the offset site and in the case of wild dogs, present a direct threat of injury or mortality to koala.

Figure 5: Offset Area RVM



Legend

- Offset area
- Railway
- Offset Area Koala Habitat
- Category X area

0 212.5 425 850

Metres

Datum/Projection:
GDA 1994 MGA Zone 55

N

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3. Offset suitability

The Tay-Glen offset area is considered to be highly suitable for addressing significant residual impacts from the Project. The offset area provides high quality habitat for koala, with the species being identified within the offset area as well as adjacent connected vegetation. Importantly, the proximity of the offset area to the impact site will provide a direct refuge for koala individuals that may be disturbed by the Project, allowing them to disperse easily into other habitat areas.

Formal assessment of the suitably of the offset area has been undertaken using the EPBC Act offset assessment guide (OAG), which demonstrates the area will acquit more than the 100% required to offset koala impacts. In addition to this, the offset area also contains a number of other MNES values that will benefit from the addition security and management the offset will provide.

3.1 Offset Assessment Guide (OAG) application

The offset area has been assessed against the Commonwealth OAG for koala, due to expected significant residual impacts to this species from the Project. Attributes associated with the offset area and impact area start quality (site condition, site context and species stocking rate) have been determined by utilising the methodology outlined in the Queensland Guide to Determining Terrestrial Habitat Quality. A description of the methodology, supporting field data and analysed calculations are provided in Eco Logical Australia (2020) (impact site) and **Appendix A** (offset site). Detailed habitat quality scores (HQS) for the impact and offset sites are provided in **Appendix C**.

3.1.1 Koala

Suggested attribute values for use in the Commonwealth OAG have been generated and are provided below (**Table 1** and **Table 2**). These values are based on field data collected at both the impact site and proposed offset area, including observations of threatening processes.

As demonstrated in the calculations in **Table 2**, the proposed offset area directly offsets considerably more than the area required to fully account for significant residual impacts on koala from the Project (i.e. ~108% of the requirements as per the OAG). The offset provides a net conservation gain by improving both current condition and formally protecting the extent of habitat values for the species. The proposed offset area will deliver a conservation outcome that will maintain and improve the viability of koala in the area.

Table 1: OAG values for koala at the impact site

Attribute	Score	Rationale
Area (ha)	74 ha	DAWE requirement
Condition	6	Overall habitat quality calculations based on site condition and context assessments determined the condition of koala habitat of the impact site to be six out of ten (refer to **Appendix B, Appendix C & MNES report**)
Total quantum of impact to be offset	44.40 ha	As per OAG

Table 2: OAG values for koala at the offset site

Attribute	Score		Rationale	
	Remnant	Regrowth	Remnant	Regrowth
Area (ha)	549.6 ha	18.5 ha	Area verified in field assessments conducted by ELA (2020) (refer to **Appendix A**)	Area verified in field assessments conducted by ELA (2020) (refer to **Appendix A**)
Quality				
Start quality	7	6	Start quality was assessed in May 2020 as per the Queensland Guide to Terrestrial Habitat Quality (2020). This assessment demonstrated the following: Quality & availability of food & habitat required for foraging and habitat required for shelter & breeding were each scored within koala habitat in remnant vegetation as 22/25 (average over all sites). This was due to: • Abundant food trees primarily in the Eucalyptus genus with percentage cover of >75% • Highly connect canopy that was unaffected by vegetation clearing or drought • Presence of large continuous patches of suitable habitat • Environments with access to reliable leaf moisture (i.e. riparian zones) Quality & availability of habitat required for mobility was scored within koala habitat in remnant vegetation as 25/25 (average over all sites). This was due to the presence of large, well connected patches of vegetation that were not separated by more than 200 m. Absence of threats was scored within koala habitat in remnant vegetation as 10/25. This was due to the ongoing opportunity for clearing within areas mapped on the State Regulated Vegetation Map as Category X and history of vegetation clearing for property management. Other threats are also present on the property including pest species.	Start quality was assessed in May 2020 as per the Queensland Guide to Terrestrial Habitat Quality (2020). This assessment demonstrated the following: Quality & availability of food & habitat required for foraging and habitat required for shelter & breeding were each scored within koala habitat in regrowth vegetation as 12/25 (average over all sites). This was due to: • Fewer food trees and sparser canopy cover, when compared to adjacent remnant areas • Limited canopy cover and connectivity, due to historical vegetation clearing • These habitat areas tended to be located outside of riparian zones and therefore have less reliable access leaf moisture • These areas of habitat were still part of large continuous patches of suitable habitat Quality & availability of habitat required for mobility was scored within koala habitat in regrowth vegetation as 25/25 (average over all sites). This was due to the location of these habitat areas with large, well connected patches of remnant vegetation that were not separated by more than 200 m. Absence of threats was scored within koala habitat in remnant vegetation as 10/25. This was due to the ongoing opportunity for clearing within areas mapped on the State Regulated Vegetation Map as Category X and history of vegetation clearing for property management. Other threats are also present on the property including pest species.

Attribute	Score		Rationale	
	Remnant	Regrowth	Remnant	Regrowth
			The overall offset area start quality was calculated using the DAWE Habitat Quality Score spreadsheet (**Appendix C**) and determined to be 7/10. Refer to **Appendix A** for full details and input scores and **Appendix C** for habitat quality score tables.	The overall offset area start quality was calculated using the DAWE Habitat Quality Score spreadsheet (**Appendix C**) and determined to be 6/10. Refer to **Appendix A** for full details and input scores and **Appendix C** for habitat quality score tables.
Future quality without offset	7	5	Continuation of property management activities within the offset area such as grazing, sowing of exotic pasture and vegetation clearing are threats that may affect the quality of koala habitat over time. However, given the reasonably intact and connected nature of the habitat, it is not expected that these threats would result in declines such that the habitat scores would reduce from the current 7/10.	Regrowth communities are generally on a trajectory of improvement, which can be expected to continue if no clearing activities are undertaken within the offset area. However, the continued clearing cycle and the presence of cattle grazing may cause a degradation in the site condition. Clearing and grazing activities result in the removal of vegetation layers, disturbance of soil and subsequent increase in exotic grass cover. This leads to a decrease in site condition and habitat feature parameters including vegetation structure complexity, native species abundance and diversity. Specifically, the following habitat quality attributes are expected to decline: • Tree canopy height • Tree canopy cover • Shrub canopy cover • Native plant species richness – grass • Native plant species richness – forbs • Native perennial grass cover • Non-native plant cover. It is therefore expected, that without management and protection of regrowth areas, a reduction in site quality of one point from current values may be expected.
Future quality with offset	8	8	The condition of the offset area is significantly greater than the impact area condition, reflected in the high start quality score of 7. This is primarily due to the amount of contiguous and connected vegetation across the offset site and increased distance from mining related disturbance, when compared to the	Regrowth communities are generally on a trajectory of improvement. With active management such as reduced cattle grazing and weed management this improvement can be accelerated (refer to **Section 5**). Removal of stock will limit vegetation trampling and in turn allow koala food trees to regenerate thereby increasing foraging and shelter resources. Protection from clearing will also allow for continued natural

Attribute	Score		Rationale	
	Remnant	Regrowth	Remnant	Regrowth
			impact site (refer to **Appendix C** for detailed habitat quality scores). The good condition of the offset area will be maintained. Protection and management of the area (refer to **Section 4** below) will preserve the existing site condition and remove or reduce threatening processes (described in **Section 2.8**) that have the potential to further degrade remnant areas. Importantly, the presence of the secured offset area will provide a refuge for individuals that will be disturbed by the Project, due to the regional connectivity between the impact and offset site. It is anticipated that formal protection and alleviation of threats will improve condition of the site by one point compared to start quality values. Specifically, the following habitat quality attributes are expected to improve: • Large trees • Native species richness – grass • Native plant species richness – forbs • Native perennial grass cover • Non-native plant cover. Management actions that will be implemented across the offset area to maintain a score of 8 for the life of the approval are detailed in the OAMP (see **Appendix E**).	regeneration, increasing canopy height and cover. Patch size and connectivity will also be enhanced. Due to these factors it is anticipated that this can improve that start quality of regrowth koala habitat by an order of two points compared to start quality values.
Time until ecological benefit	20	20	Remnant areas currently in good condition, with degradation occurring in only a few condition parameters. Estimated time is for improvement is therefore related to a reduction in threats over time.	Estimated time for native species to regenerate and canopy layer to mature. It also accounts for a reduction in threats over time.
Confidence in quality scores	80	80	Removal of cattle, active management exotic weeds & pest species and formal protection against vegetation clearing are all measures that will result in improved overall condition scores.	Improvement in vegetation structure is reliant on natural regeneration and therefore natural processes. However active management can effectively improve other degraded condition parameters such as weed levels, groundcover complexity, diversity and abundance. Formal

Attribute	Score		Rationale	
	Remnant	Regrowth	Remnant	Regrowth
				protection against clearing of regrowth vegetation is also important in achieving increased habitat quality.
Raw gain	1.00	3.00	As per OAG	
Adjusted gain	0.80	2.40	As per OAG	
Risk of Loss				
Risk of loss without offset	0%	15%	Based on previous discussion with the Department of the Environment, risk of loss in habitat comprised of remnant vegetation has been set at 0%. However, it is notes that 107.3 ha of koala habitat ground-truthed in remnant condition is currently mapped as Category X on the State Regulated Vegetation Map, thereby allowing clearing without approval under state vegetation clearing legislation. This has been factored into the OAG assessment in the above habitat quality scoring.	Based on previous discussion with the Department of the Environment, risk of loss in habitat comprised of regrowth vegetation has been set at 15%. Clearing of regrowth vegetation can occur without approval under state vegetation clearing legislation and there is a cycle of vegetation clearing on the property in areas where it is allowable under state legislation. A 15% risk of loss for regrowth vegetation is therefore considered reasonable. Extensive cleared areas on the Tay-Glen property and within the offset area indicate active and ongoing clearing activities.
Risk of loss with offset	0%	0%	The offset area will be legally secured and clearing activities will be prohibited. Management actions and remediation activities will be in place to assist in reducing these risks or the severity of outcomes (refer to **Section 5**). Consequently, the risk of failure and subsequent loss is extremely low.	
Time over which loss is averted	20	20	Maximum of 20 years.	
Confidence in risk scores	90%	90%	The offset area will be legally secured with clearing to be prohibited. This will effectively reduce risk of loss.	
Raw gain	0	2.78	As per OAG	
Adjusted gain	0	2.5	As per OAG	
Results				
Net present value	42.25	5.55	As per OAG	

Attribute	Score		Rationale	
	Remnant	Regrowth	Remnant	Regrowth
% of impact offset	95.15%	12.49%	As per OAG	
TOTAL % impact offset	**107.64%**		**Proposed offset area offsets significant residual impacts on koala.**	

Species stocking rate was given a score of 2 (out of 4) and was determined as per the scoring criteria. The assessment was given the highest possible score for the attributes 'presence detected on site' with multiple individuals observed during surveys in 2020, as well as the highest score of breeding for 'species usage of the site' with mother and joeys observed. The approximately density (per ha) is difficult to calculate with presence/absence data obtained from one survey, with the carrying capacity and approximate density of koalas in Central Queensland also not well known. Therefore, a conservative approach was taken and given the lowest possible score. The role/importance of species population on site scored high for all sub-attributes (source population for breeding, dispersal and maintaining genetic diversity), with a low score for the limit of the species range, which the area is not.

3.2 Additional MNES present within the offset area

The environmental impact assessment for the Project concluded that there was not likely to be significant residual impacts to other MNES (Eco Logical Australia, 2020) and therefore formal offsets for these values are not required.

However, there are a number of values present within the proposed offset area, in addition to koala. The offset area supports habitat for the following threatened species and ecological communities:

- Squatter pigeon – breeding, foraging and dispersal habitat – 290.2 ha
- Greater glider – breeding, foraging and dispersal habitat – 80.1 ha
- Brigalow TEC – 10.6 ha
- Natural grassland TEC – best condition – 12.2 ha

These areas will also be protected and managed as per the offset delivery arrangements outlined in Section 4 below, therefore providing an overall conservation benefit for a range of MNES.

3.3 Compliance with EPBC Act offset principles

The EPBC Act Environmental Offsets Policy requires that offsets must deliver an overall conservation gain that compensates for the significant residual impacts associated with the development. A suitable offset must meet the principles of the Offsets Policy. Compliance of this offset proposal is demonstrated in **Table 3**.

Table 3: Compliance with offset policy principles

Offset policy principle	Response
Deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environment law and affected by the proposed action	The offset area provides suitable habitat for koala, which is the value that is likely to experience a significant residual impact from the Project. Importantly, the offset site is connected to the areas of habitat within the impact area that are known to be occupied by koala and will provide a direct refuge for individuals that may be affected by the Project. The offset area provides offsets in excess of minimum requirements which will result in a net conservation gain and overall improvement in the viability of the values being offset. Formal protection and management of current threats will contribute to improvement in the viability of koala habitat within the offset area.
Be built around direct offsets but may include other compensatory measures	The full offset requirement will be delivered via a direct, land-based offset at the Tay-Glen offset site.
Be in proportion to the level of statutory protection that applies to the protected matter AND Be of a size and scale proportionate to the residual impacts on the protected matter	The proposed offsets will provide a direct offset and measurable conservation gain of more than 100% of the impacts associated the Project. The proposed offsets have been developed using the OAG, which uses the area of impact and the quality of habitat to assess the total quantum of impact to protected matters that needs to be offset. As such the offset area is of a size and scale that is proportionate to the unavoidable impacts on protected

Offset policy principle	Response
	MNES values and is in proportion to the level of statutory projection that applied to koala.
Effectively account for and manage the risks of the offset not succeeding	Potential risks to the success of the offsets have been identified at an overall level and are reflected in the inputs to the OAG. A detailed risk assessment has been be developed as part of the Offset Area Management Plan (OAMP). The OAMP also includes additional measures and remedial actions that will be implemented if any potential risks occur. In addition to this, a monitoring and reporting schedule is detailed in the OAMP and will be implemented in order to assess the condition of the offsets at regular intervals and trigger changes to the management strategies as required.
Be additional to what is already required, determined by law or planning regulations or agreed to under other schemes or programs	The proposed offset area does not have any existing formal conservation arrangement in place or existing requirements from other approvals that require the landowner or licensees to undertake conservation works. Current permitted land use across the offset area includes maintenance vegetation clearing, pasture improvement and cattle grazing.
Be efficient, effective, timely, transparent, scientifically robust and reasonable	Direct, land-based offsets have been selected as the preferred offset methodology for this project as it is a robust and widely accepted approach, with a high degree of confidence in outcome. The proposed offset will be implemented once approval has been granted and prior to the action occurring. Based on the OAG, ecological benefit will be achieved for koala within 20 years. This plan has been prepared to ensure the efficient and effective delivery of a conservation outcome in a timely manner.
Have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced.	The offset will be secured using a Voluntary Declaration (VDec) under the provisions of the VM Act. As per the requirements of the VDec, a detailed offset area management plan will be prepared that will incorporate the details of offset management that is included in this plan. A monitoring program and reporting schedule has also been developed and is included in the OAMP.

4. Offset delivery

4.1 Timeframes for offset delivery

The final offsets package will be agreed during the Project's assessment and it is expected that delivery of this offset strategy will be a condition of the Project's EPBC Act approval.

A draft Offset Area Management Plan (OAMP) has been developed as a component of this strategy. It is the intent that the OAMP will be further developed and finalised in collaboration with the Department during the Project's assessment. It is therefore expected that implementation of the OAMP will be a condition of the Project's EPBC Act approval.

Both this strategy and associated OAMP will be implemented as required, post approval of the Project.

The offset site will be legally secured as such within 2-years of approval. This allows adequate time for administrative arrangements to be implemented post-Project approval.

The offset will be in place for at least 20-years.

4.2 Offset legal security

The offset area will be secured via a Voluntary Declaration (VDec) under the VM Act, where it is secured for the life of the approval, for the purposes of an environmental offset.

4.3 Offset area management plan

The OAMP will guide the ongoing management and monitoring of the offset area and will be implemented for the life of the offset.

4.3.1 OAMP structure and inclusions

The OAMP includes the following and is provided in Appendix E of this strategy:

- A description of the offset area/s, including location, size, condition, environmental values present and surrounding land uses
- Details of how the offset area/s will provide connectivity with other habitats and biodiversity corridors and/or will contribute to a larger strategic offset for the relevant listed threatened species and communities
- Maps and shapefiles to clearly define the location and boundaries of the offset area/s, accompanied by the offset attributes (e.g. physical address of the offset area/s, coordinates of the boundary points in decimal degrees, the listed threatened species and communities that the environmental offset/s compensates for, and the size of the environmental offset/s in hectares)
- Specific offset completion criteria derived from the site habitat quality to demonstrate the improvement in the quality of habitat in the offset area/s over a 20 year period
- Details of the management actions, and timeframes for implementation, to be carried out to meet the offset completion criteria
- Interim milestones that set targets at 5-yearly intervals for progress towards achieving the offset completion criteria

- Details of the nature, timing and frequency of monitoring to inform progress against achieving the 5-yearly interim milestones (the frequency of monitoring must be sufficient to track progress towards each set of milestones, and sufficient to determine whether the offset area/s are likely to achieve those milestones in adequate time to implement all necessary corrective actions)
- Proposed timing for the submission of monitoring reports which provide evidence demonstrating whether the interim milestones have been achieved
- Timing for the implementation of corrective actions if monitoring activities indicate the interim milestones have not been achieved
- Risk analysis and a risk management and mitigation strategy for all risks to the successful implementation of the OAMP and timely achievement of the offset completion criteria, including a rating of all initial and post-mitigation residual risks in accordance with a risk assessment matrix
- Evidence of how the management actions and corrective actions take into account relevant approved conservation advices and are consistent with relevant recovery plans and threat abatement plans
- Details of the legal mechanism for legally securing the proposed offset area/s, such that legal security remains in force over the offset area/s for at least 20 years to provide enduring protection for the offset area/s against development incompatible with conservation.

4.3.2 Overview of proposed management and monitoring activities

The overall management objective of the proposed offset area on the Tay-Glen property is to reduce threatening processes and increase the habitat quality of the area to a level at which it provides greater conservation value than its current form and that of the current impact site. More specifically, the desired conservation outcomes for koala offsets are to protect and restore habitat in order to increase habitat extent, resources and patch connectivity so that viable populations can be sustained.

Management measures that will be undertaken are set out in detail in the OAMP and include:

- Controlled grazing of domestic livestock for the purpose of reducing fuel loads during the dry season
- Installation and maintenance of stock proof fencing to prevent unauthorised persons, vehicles or stock from accessing site
- Prohibition of timber harvesting, cultivation and general vegetation clearing impacts
- Weed and pest animal identification, prevention and control
- Maintenance of fire management infrastructure
- Inspection & repair of key infrastructure following an extreme weather event (fire, flood, drought, cyclone)

There are also a number of specific restrictions that will apply to the offset area in order to support the delivery of conservation benefits for koala and other MNES. These restrictions are:

- Vegetation clearing is prohibited unless undertaken according to limited exemptions for agricultuaral activities as specified in the VM Act
- Grazing is restricted both in location and purpose (for fuel load reduction only)
- Planned fires are prohibited
- Introduction of feral animals and weeds will be minimised and existing populations suppressed.

Monitoring of the offset management area, including the offset area will occur in accordance with the regime specified in the OAMP and across designated locations. Monitoring activities will include:

- Photo point monitoring at the commencement of the Plan, and then every five years for the remaining 20 years (to be undertaken by a suitably qualified person appointed by the landowner)
- BioCondition at the commencement (baseline), and then every five years for the remaining 20 years (to be undertaken by a suitably qualified person appointed by the landowner)
- Feral animal and weed monitoring conducted concurrently with BioCondition (to be undertaken by a suitably qualified person appointed by the landowner)
- Manager monitoring of grazing, pest plants, pest animals fencing, access and fire breaks (to be undertaken by a suitably qualified person appointed by the landowner).

All monitoring results (including leaseholder / property manager observations) are to be recorded in documented or electronic form suitable for external audit. Reports will be provided to the relevant authorities for review as required.

5. Conclusion

The Project is expected to have significant residual impacts to koala and offsets for this value will be required. BMA is proposing to use the Tay-Glen offset area to acquit these impacts and deliver an overall conservation benefit for the koala.

The Tay-Glen offset area is considered to be highly suitable for addressing significant residual impacts from the Project. The offset area provides high quality habitat for koala with the species being recorded within the offset area and in adjacent connected vegetation. Importantly, the proximity of the offset area to the impact site will provide a direct refuge for koala individuals that may be disturbed by the project, allowing them to disperse easily into suitable habitat.

Formal assessment of the suitably of the offset area has been undertaken using the EPBC Act offset assessment guide (OAG), which demonstrates the area will acquit more than the 100% required to offset koala impacts. In addition to this, the offset area also contains a number of other MNES that will benefit from the addition security and management the offset will provide.

Improvements to the koala habitat within the offset area will be delivered via active reduction in threats, such as vegetation clearing and grazing, which will also allow for natural regeneration of koala habitat within regrowth areas. Formal security via a VDec will also be provided. Ongoing management of the Tay-Glen offset site will be guided by the site's OAMP.

It is expected that the implementation of both this offsets strategy and the associated OAMP will be a condition of the Project's EPBC Act approval.

References

Atlas of Living Australia (ALA) (2020). Species records database. Available at: https://spatial.ala.org.au/

Eco Logical Australia (2020) Spring to Phillips Creek Diversion – Assessment of Matters of National Environmental Significance. Prepared for SLR Consulting.

Appendix A Ecology report – Tay Glenn offset site

Tay-Glen Offset Area Ecology Assessment

BHP

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DOCUMENT TRACKING

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Project Manager	Jessie McCudden
Prepared by	Renee Whitchurch and Jessie McCudden
Reviewed by	Ailsa Kerswell and Jessie McCudden
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Template 2.8.1

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Abbreviations

Abbreviation	Description
ALA	Atlas of Living Australia
BoM	Bureau of Meteorology
DAWE	Department of Agriculture, Water and the Environment
DES	Department of Environment and Science
DNRME	Department of Natural Resources, Mines and Energy
ELA	Eco Logical Australia
EO Act	*Environmental Offsets Act 2014*
EP Act	*Environmental Protection Act 1994*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
MNES	Matters of National Environmental Significance
NC Act	*Nature Conservation Act 1992*
OAG	Commonwealth Offset Assessment Guide
RE	Regional Ecosystem
REDD	Regional Ecosystem Description Database
SPRAT	Species Profile and Threats
TEC	Threatened Ecological Community
VM Act	*Vegetation Management Act 1999*

1. Introduction

1.1 Background

The Spring to Phillips Creek Diversion and associated works (the Project) are located at Saraji Mine (SRM), approximately 50 km southeast of Moranbah in Central Queensland on Mining Lease (ML) 1782, ML 2410, ML 70142, and ML 70294. BM Alliance Coal Operations Pty Ltd (BMA) own and operate SRM, which operates under the Environmental Authority (EA) EPML00862313.

The Project will improve water management at SRM through more effective separation of clean water and mine affected water; rectifying historical design issues with the existing Southern Creek diversion; and delivering a post-mining landform that is safe, stable and non-polluting. The Project involves the construction of the diversion and supporting infrastructure at SRM.

The Project was referred under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) to the Commonwealth Department of Agriculture, Water and the Environment (DAWE) in late-2019, reference EPBC2019/8576, and was determined a controlled action requiring further assessment by preliminary documentation on 06 March 2020. The environmental impact assessment for the Project concluded that the proposed action is likely to result in significant residual impacts to koala and that an offset is therefore required to mitigate the impact.

1.2 Objectives and scope

The objective of this assessment was to validate ecological values within the Tay-Glen property study area, with the intent of identifying areas that could be used to meet offset requirements for the Project. Field surveys targeted Matters of National Environmental Significance (MNES) including threatened species and communities, particularly targeting those known or likely to be impacted by the Project.

Specifically, the scope of work included:

- A desktop assessment to identify the potential for required offset values to occur within the study area
- Validation of the extent and condition of Regional Ecosystems (RE) within the study area
- Confirmation of the presence and absence of threatened species and associated habitats
- Identification of threatening processes and potential risk of loss to existing ecological values
- Evaluating the suitability of identified values for use as an offset
- Provision of habitat quality assessments and scoring to be input into the DAWE Offset Assessment Guide (OAG) and the Queensland Guide to Determining Terrestrial Habitat Quality (version 1.3).

1.3 Study area description and nomenclature

The following terms are used in this report:

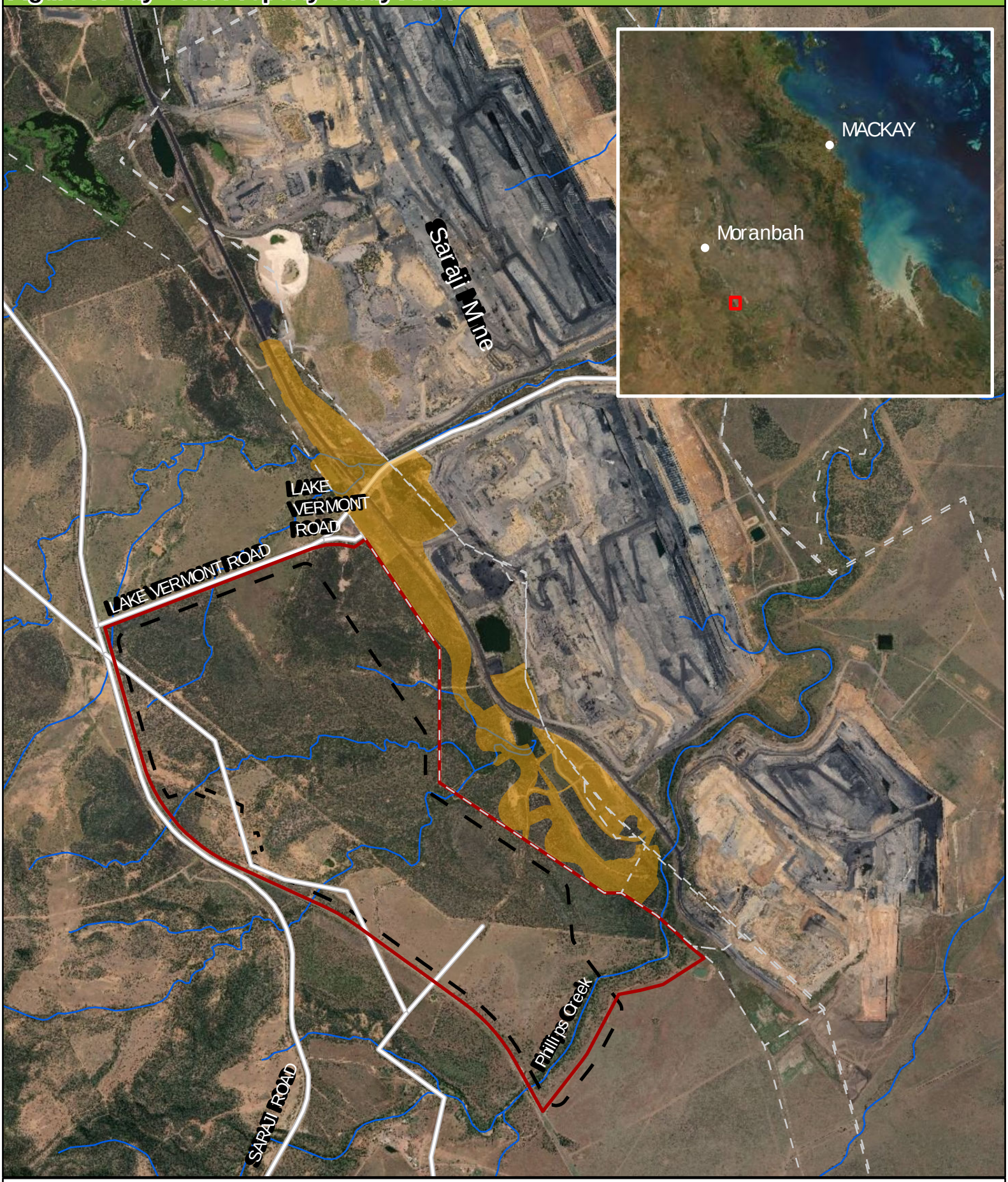
- Study area – total area ground-truthed during field assessment, encompassing 1,130.7 ha.
- Offset area – area that is proposed to address significant residual impacts from the Project to MNES; a sub-set of the study area. Refer to Spring to Phillips Creek Diversion Project Offsets Strategy, for further explanation of offset area delineation.

- Project area – the area that will be impacted by the Spring to Phillips Creek Diversion Project, located within mining leases associated with Saraji Mine and to the east of the study area.

Refer to **Figure 1** for the location of these areas.

The study area is predominantly remnant vegetation. Small patches of high value regrowth and regrowth vegetation are interspersed through the area, with non-remnant vegetation mostly confined to the southwest. Phillips Creek intersects the southern boundary of the study area, with several smaller watercourses and drainage features occurring throughout. Land use within the study area is primarily cattle grazing, with surrounding land uses include cattle grazing, coal mining and road and rail infrastructure.

Figure 1: Tay-Glen Property Study Area



Legend

- Study area
- Offset area
- Mining Lease (ML)
- Project area
- Road
- Watercourse

0 360 720 1,440
Metres
Datum/Projection:
GDA 1994 MGA Zone 55

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Prepared by: RW Date: 30/06/2020

2. Methodology

2.1 Desktop assessment

Database searches were conducted to determine potential presence of MNES. The following data was obtained and reviewed:

- Protected Matters Search Tool (PMST) Report
- Wildlife Online Report
- Map of Queensland wetland environmental values (Environmental Protection (Water and Wetland Biodiversity) Policy 2019)
- Vegetation management wetlands map – version 6.0
- Vegetation management essential habitat map – version 9.0
- Vegetation management regulated vegetation management map – version 4.0
- Vegetation management regional ecosystem map – version 11.0
- Regional Ecosystem (RE) (biodiversity status) remnant and preclearing mapping (Queensland Herbarium)
- Atlas of Living Australia (ALA) records
- Commonwealth Species Profile and Threats (SPRAT) Database
- Approved Conservation Advice, National Recovery Plan and Survey Guidelines for Matter of National Environmental Significance occurring with the study area.

A copy of the PMST report, Wildlife Online report and DNRME vegetation management report are provided as **Appendix A**.

2.2 Field survey

Targeted field surveys of the study area were undertaken by a team of two ELA ecologists across two mobilisations; the first between 26 and 31 May 2020 and the second between 1 and 4 December 2020.

The purpose of the May field survey was to validate the extent, condition and associated habitat values within the study area and to collect habitat quality data in accordance with the Queensland Guide to Determining Terrestrial Habitat Quality (DES, 2020). A targeted koala survey was undertaken in December to validate the species presence and abundance within the study area.

2.2.1 Flora survey

2.2.1.1 Tertiary assessment

Tertiary surveys were used to identify vegetation communities across the study area by capturing data on the condition and species composition. Tertiary surveys were undertaken in accordance with the '*Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland*' (Neldner *et. al.,* 2019). At each survey point, the following information was 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
- 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 Regional Ecosystem Description Database (REDD). Condition status for woody vegetation was evaluated using the definitions of remnant vegetation under the *Vegetation Management Act 1999* (VM Act.).

A total of 22 tertiary surveys were undertaken across the study area (**Figure 2**).

2.2.1.2 Quaternary assessment

Quaternary surveys were undertaken to validate the extent, classification and condition of ground-truthed vegetation communities and habitat types within the study area. Quaternary surveys were undertaken in accordance with Neldner *et al.* (2019). 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)
- ecologically dominant layer height (m) and cover (%)
- structure (dense, mid-dense, sparse, very sparse)

A total of 46 quaternary surveys were undertaken across the study area (**Figure 2**).

2.2.1.3 Threatened ecological community (TEC) assessment

Brigalow TEC

Brigalow TEC assessments were undertaken to identify vegetation communities meeting the key diagnostic and condition threshold criteria as described in the Commonwealth Approved Conservation Advice (DoE, 2013). The assessment consisted of collecting the following data at various sites within Brigalow vegetation:

- dominance or co-dominance of brigalow
- constituent brigalow regional ecosystem
- exotic perennial cover (percentage)
    - condition threshold is exotic perennial plants comprise less than 50% of the total vegetation cover of the patch, as assessed over a minimum sample area of 0.5 ha (100 m by 50 m), that is representative of the patch
- age of community
- patch size
    - condition threshold if the patch size is 0.5 ha or more in size.

Natural Grassland TEC

Natural Grassland TEC assessments were undertaken in areas mapped as grassland (RE 11.4.4) to identify areas meeting the key diagnostic and condition threshold criteria as described in the Commonwealth Listing Advice (TSSC, 2009).

The assessment consisted of collecting the following data:

- tree canopy cover
- presence of listed indicator species in the ground layer
- assessment against condition thresholds (**Table 1**)

Table 1: Condition classes for the Natural Grassland TEC

	Best quality	Good quality
Patch size	At least 1 ha	At least 5 ha
Grasses	At least 4 native perennial grass species from the list of perennial native grass indicator species	At least 3 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%
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

Poplar Box TEC

The Commonwealth Approved Conservation Advice (DoEE, 2019) outlines the key diagnostic and condition threshold criteria for the Poplar Box TEC. TEC assessments for the community include both a desktop component (to identify potential corresponding REs) and field validation to determine whether the key diagnostic criteria are met.

The field validation assessments involved collection of the following data at selected 100 m x 100 m plots within Poplar Box communities:

- Poplar Box TEC component REs
- community structure
- tree crown cover
- proportion of Poplar Box in canopy
- mid-layer (1-10 m) crown cover of shrubs and small trees
- perennial native vegetation cover in ground layer (< 1 m)
- number of native plant species in the ground layer (< 1 m)
- number of large Poplar Box (or hybrids) per hectare (≥ 30 cm diameter at breast height (dbh) and / or hollows present)
- evidence of Poplar Box recruitment.

Several areas of potential Poplar Box TEC were identified (consisting of RE 11.3.2) and condition classes was assessed as outlined in **Table 2**.

Table 2: Condition classes for Poplar Box TEC

Category	Native cover and diversity thresholds	Minimum patch size thresholds
Class A Highest Quality		
Category A1 Little to no perennial weeds and diverse native understorey	The crown cover of canopy trees in the patch is ≥ 10% AND ≥ 90% of perennial vegetation cover in the ground layer is native AND ≥ 30 native plant species per patch in the ground layer	≥ 1ha
Category A2 A large patch with low perennial weeds and diverse native understorey	The crown cover of canopy trees in the patch is ≥10% AND ≥70% of perennial vegetation cover in the ground layer is native AND ≥ 30 native plant spp. per patch in the ground layer	≥ 5 ha
Class B Good Quality		
Category B A large patch with good quality native understorey or with mature trees	The crown cover of canopy trees in the patch is ≥10% AND ≥ 50% of perennial vegetation cover in ground layer is native AND EITHER ≥ 20 perennial native plant species per patch in the ground layer OR ≥ 10 mature trees per ha with ≥ 30cm dbh (and/or hollows)	≥ 5 ha
Class C Moderate Quality		
Category C A large patch with low native cover but retains good native understorey diversity and habitat features of mature trees	The crown cover of canopy trees in the patch is ≥10% AND If < 50% of perennial vegetation cover in ground layer is native, then the patch must have: ≥ 20 native plant spp. per patch in the ground layer AND ≥ 10 mature trees per ha with ≥ 30 cm dbh (and/or hollows) AND smaller trees, saplings or seedlings suggestive of periodic recruitment	≥ 5 ha

2.2.1.4 Exotic flora

A high-level exotic flora survey was conducted within the study area. Presence and abundance recordings of the following were undertaken during the field surveys:

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

Species were identified, and a count and / or area of occupancy estimate at the location of each species detection was recorded in ArcCollector. The data collected for weed species is indicative only and is not considered a comprehensive representation of all exotic flora across the study area.

2.2.2 Fauna survey

2.2.2.1 Habitat suitability assessments

Habitat suitability assessments were conducted for the following species: koala, greater glider, squatter pigeon and ornamental snake. Habitat assessments conducted for these species were derived from available literature (including the SPRAT Database (DAWE, 2020), relevant Government documents and 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 percentage and condition
- presence of/distance to water
- soil type and landform
- species-specific threat presence and severity.

A total of 19 koala, five greater glider, 15 squatter pigeon and six ornamental snake habitat suitability assessments were conducted during the field survey (**Figure 2**).

2.2.2.2 Targeted koala survey

A targeted koala survey was undertaken using two survey methods, spotlighting and scat searches. Spotlighting was conducted over three nights by two ecologists for a total survey effort of 25 search hours. Spotlighting included two survey methods; slow driving transects to allow for maximum survey area coverage, and slow walking transects through suitable eucalypt woodland habitat. Scat searches were undertaken in areas of habitat dominated by koala food tree species.

2.2.3 Habitat quality assessment

Habitat quality assessments were undertaken in accordance with the Guide to Determining Terrestrial Habitat Quality (version 1.3) (DES, 2020). Habitat quality assessments were undertaken to determine the condition of habitat for all ground thruthed MNES. Habitat quality assessments were conducted in representative areas of potential species habitat and the field assessment included the following two assessment types:

- Site-based attributes – indicate the general vegetation condition of an area
- Species habitat attributes – determine the ability of an area to support a particular fauna species based on that species' specific habitat requirements.

Site-based attribute assessments were undertaken within designated assessment units across the study area. Assessment units are identified as relatively homogeneous areas, defined by a distinct RE and isolation from other patches of vegetation. Site-based attribute and species habitat attribute assessment methodologies are discussed in detail in the sections below.

2.2.3.1 Site-based attribute assessments

Site-based attribute assessment was undertaken as per the Guide to Determining Terrestrial Habitat Quality, which refers to the methodology described in the BioCondition Assessment Manual (Eyre *et. al.*, 2015). A BioCondition site was established and 13 site-based attributes were assessed within a 100 m x 50 m nested sampling plot:

- 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
- Non-native plant cover.

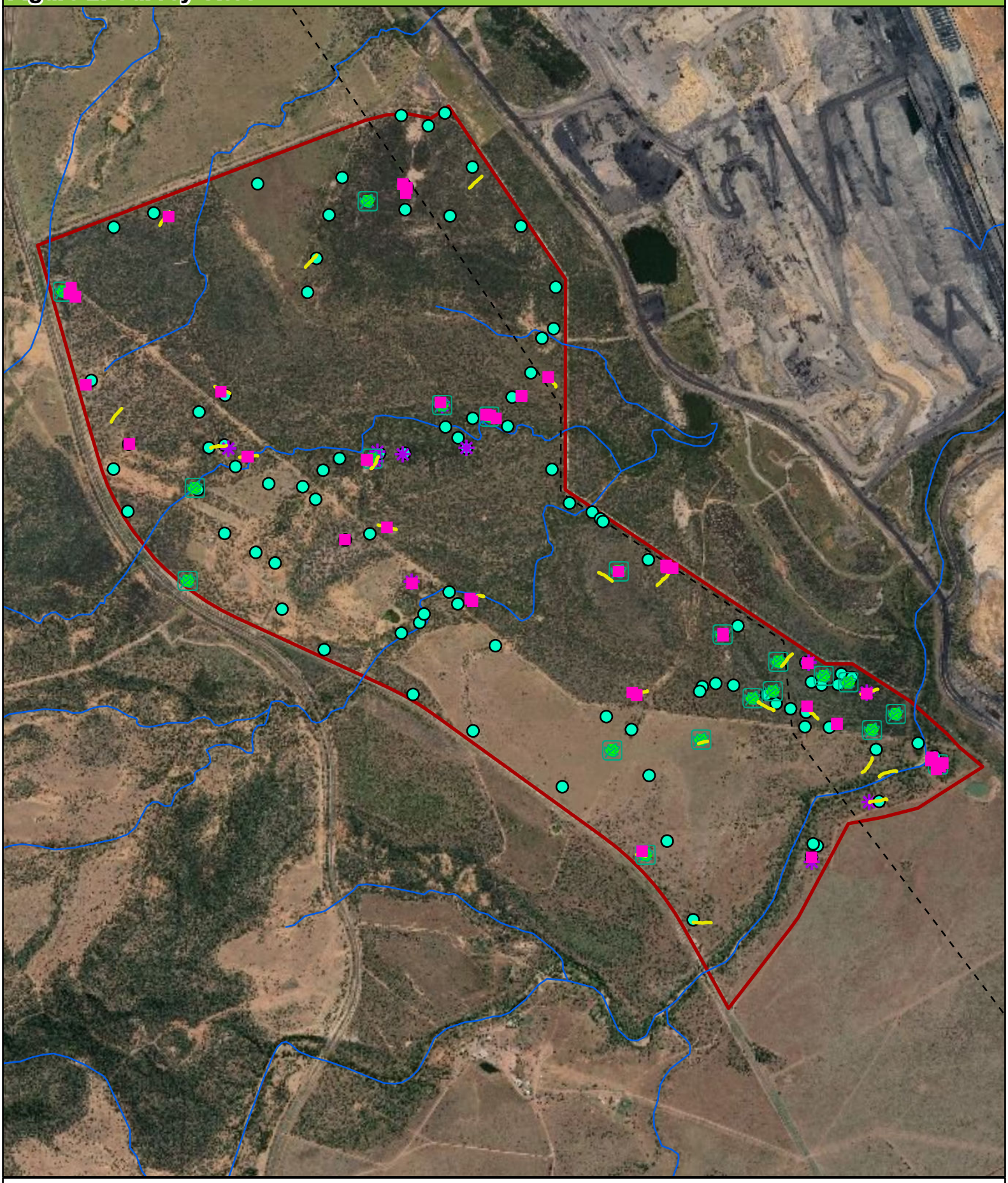
A total of 24 BioCondition assessments were conducted across the 14 assessment units (REs) identified within the study area to adequately sample each of the assessment units present (**Figure 2**).

2.2.3.2 Species habitat attribute assessments

Species specific habitat requirements were researched using available literature and the knowledge of experienced suitably qualified ecologists regarding threatened fauna species. **Table 3** provides a summary of the habitat attributes that were assessed for each species.

Habitat quality assessments were conducted at each site-based attribute assessment site (**Figure 2**).

Figure 2: Survey Sites



Legend

- Study area
- Watercourse
- Habitat assessments
- Vegetation assessments
  - Tertiary
- TEC
- Quarternary
- BioCondition

0 235 470 940

Metres

Datum/Projection:
GDA 1994 MGA Zone 55

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Prepared by: RW Date: 10/06/2020

Table 3: Summary of species habitat attributes and field indicators

Species habitat attribute	Field based indicators assessed	Justification of inclusion of field indicator
Koala		
Quality and availability of food and habitat required for foraging	Food tree abundance Canopy quality (crown cover %) Patch size (ha) Dry season refugia	Assesses of the proportion (% canopy cover) of food tree 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 (5) awarded to higher percentage cover (>75%). Assesses the quality and connectiveness of the canopy that provides food and shelter for the species. Highly connected canopies and those unaffected by drought or clearing were awarded highest scores (5), whilst impacted canopies by clearing and drought (dieback) were assigned lower scores. Evidence suggests that a breeding population of koalas will not persist in patches smaller than 50 ha. Patches below 50 ha were assigned a score of 0, whilst large contiguous patches >500 ha were assigned the highest score (5). Koala contract towards vegetation with reliable leaf moisture during times of drought and severe heat. Environments with reliable leaf moisture (riparian zones etc.) were assigned higher scores.
Quality and availability of habitat required for shelter and breeding	As above.	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 utilised to score and assess *Quality and availability of habitat required for shelter and breeding*
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, as such patches that are separated by >200m were assigned the lowest score. Patches that were closer together were awarded higher scores accordingly.
Absence of threats	Scope and severity of all species-specific threats.	Scope of threat is assessed in regard to what percentage of the population or habitat within the matter area will be affected over the next ten years or three 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 what percentage for the population, or its habitat will be affected by the threat. Higher scores being those where almost 100% of the population or its habitat will be affected.
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) received a higher score.

Species habitat attribute	Field based indicators assessed	Justification of inclusion of field indicator
		Key species in inland Queensland include *E. moluccana, E. acmenoides E. tereticornis*. *E. fibrosa* and *C. citriodora* (Smith et. al. 2007). Having a diet primarily on eucalypt leaves, areas with abundant, mature (remnant) eucalypt (75% canopy cover) provide higher quality food resources for the species compared to sparse canopies with a low abundance of food trees. Scores were scaled accordingly.
Quality and availability of habitat required for shelter and breeding	Availability of hollows with an entrance size of >8cm diameter per ha Patch size	The species is a hollow specialist that utilises 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 were awarded to areas with a higher hollow count, with a minimum of 4/ha and a minimum entrance size of 8cm. 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 (0), 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, well-connected patches to other suitable habitat received the highest scores.
Absence of threats	Scope and severity of all species-specific threats.	Scope of threat is assessed in regard to what percentage of the population or habitat within the matter area 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 what percentage for the population, or its habitat will be affected by the threat. Higher scores being those where almost 100% of the population or its habitat will be affected.
Squatter pigeon		
Quality and availability of food and habitat required for foraging	1. Food resources (groundcover) 2. Food quality (native derived) 3. Proximity to water and soil type	Assesses the availability and quality of food for foraging in terms of what percentage of the ground cover comprises of seed-bearing grasses, herbs and shrubs which the species relies upon for food. Preferred native foraging food resources for the species compromise approximately 33% ground cover. Scores closest to this groundcover percentage scored highest, whilst those further away scored lower. Assesses what proportion of the available food resources are native. High score will be assigned accordingly to food resources totally derived from native species and absent of weeds, while lower scores will reflect habitats dominated by exotic species. 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 scores of zero. 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 high score of five while regrowth or disturbed vegetation will score lower.

Species habitat attribute	Field based indicators assessed	Justification of inclusion of field indicator
Quality and availability of habitat required for shelter and breeding	Proximity to water and soil type	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 scores of zero. 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 high score of five 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 a score of 0, while patches which adjoin larges contiguous suitable habitat (Land zone 3, 5 and 7) or lack physical barrier 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 in regard to what percentage of the population or habitat within the matter area 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 weed, predation by feral cats and foxes, and inappropriate fire regimes. High scores will reflect 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 what percentage for the population, or its habitat will be affected by the threat. Higher scores being those where almost 100% of the population or its habitat will be affected.
Ornamental snake		
Quality and availability of food and habitat required for foraging	1. Availability of prey habitat 2. Microhabitat features 3. Deep soil crack 4. Gilgais	Ornamental snakes feed on frogs exclusively and hence are most frequently observed where frogs occur. If the area is ephemeral and has the ability to hold water for more than a week, it also potentially hosts frogs. These areas mostly occur in moist areas of floodplains, clay pans, near waterbodies (swamps and lakes) and along watercourses, though woodland or open forest associated with gilgai formations are preferred. Areas with a high likely of frog species diversity and abundance were assigned highest scores, whilst areas unlikely to be suitable for frogs were assigned low scores. Assesses microhabitat features such as woody debris which are able to provide shelter to species and/or its prey. Habitat which comprises of more than 25% cover are assigned a high score of five while habitats with sparse cover will reflect a lower score. Deep soil cracks offer shelter for ornamental snakes as well as additional available habitat for their prey. Habitat which comprises of deep and abundant soil cracking are assigned higher score while absent or infrequent shallow cracking soils result in lower scores. Gilgais hold water, which provides habitat for frogs which ornamental snakes exclusively feed on. Deeper more abundant gilgai formation have a greater capability to host substantial prey, hence will receive higher score while habitats where gilgais are absent or infrequent and shallow will be assigned lower score.

Species habitat attribute	Field based indicators assessed	Justification of inclusion of field indicator
Quality and availability of habitat required for shelter and breeding	1. Availability of prey habitat 2. Microhabitat features 3. Deep soil crack 4. Gilgais	Species shelter, breeding and food requirements are not fundamentally different as per available literature. Therefore, the same field-based indicators for *Quality and availability of food and habitat required for foraging* were also utilised to score and assess *Quality and availability of habitat required for shelter and breeding*.
Quality and availability of habitat required for mobility	Groundcover density	Density of groundcover vegetation is important as high density of weeds (Parthenium) will impede species ability to hunt hence these habitats will score a low score of 1, while habitats which are more open and available for transverse will be assigned a higher score of five.
Absence of threats	Scope and severity of all species-specific threats.	Scope of threat is assessed in regard to what percentage of the population or habitat within the matter area will be affected over the next ten years or three generations. Common threats can include but are not restricted to habitat loss and fragmentation, habitat degradation by overgrazing, changes to soil structure through agricultural activities and water extraction or contamination that reduces frog presence. High scores will reflect higher percentage of population or habitat being destroyed while lower scores will be assigned where a smaller proportion of the habitat or population is slightly degraded or negligibly affected. Severity of threat assesses what percentage for the population, or its habitat will be affected by the threat. Higher scores being those where almost 100% of the population or its habitat will be affected.

2.3 Data analysis

Spatial data collected during the field survey were imported into ArcGIS Pro. Vegetation and habitat boundaries were validated and refined and final ground-truthed RE and threatened species habitat mapping was produced. Ground-truthed RE mapping was produced in accordance with Neldner *et. al*., 2019 based on on-ground floristic composition, condition, and extent. Polygons were generally mapped at a 1:10,000 scale.

This mapping was used to assess landscape-scale attributes in accordance with the Guide to Determining Terrestrial Habitat Quality to provide a quantitative assessment of the landscape values of the study area (**Section 2.3.1.1**). Site-based attributes and species habitat data was also analysed in accordance with the Guide to Determining Terrestrial Habitat Quality (**Section 2.3.1.2** and **Section 2.3.1.3**). These scores provided overall habitat quality data for MNES.

2.3.1 Habitat quality data analysis

2.3.1.1 Landscape-scale attributes

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 assessment of landscape-scale attributes was undertaken as per the Guide to Determining Terrestrial Habitat Quality, which refers to the methodology described in the BioCondition Assessment Manual (Eyre *et. al.*, 2015). A landscape-scale attribute numerical score out of 20 was generated.

2.3.1.2 Site-based attributes

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

The BioCondition 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).

2.3.1.3 Species habitat attributes

Species habitat attributes were assessed and scored for the entire matter area in accordance with the Guide to Determining Terrestrial Habitat Quality. The species habitat attributes which were assessed in the field and their respective weightings are presented in **Table 4**. In the case where multiple indicators were used to determine species habitat attribute scores, indicators were averaged and then multiplied by five to achieve a score out of 25 for each attribute.

Table 4: 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

2.3.1.4 Habitat quality scoring

Habitat quality scoring was undertaken in accordance with the method described in the Guide to Determining Terrestrial Habitat Quality to generate a BioCondition score and a species habitat score for MNES (matter area) present within the study area. The following calculations were performed to generate the overall BioCondition score for each matter area:

1. Where multiple field survey sites were established within one assessment unit, BioCondition scores were averaged to generate an overall score for the assessment unit.
2. An area weighted BioCondition score was calculated for each assessment unit within a matter area by multiplying the BioCondition score by the area (ha) of the assessment unit and dividing by the total area (ha) of the matter area.
3. The overall BioCondition score for the matter area is then calculated by summing the area weighted BioCondition scores for each assessment unit within the matter area. This value is converted to a score out of ten by multiplying the matter area BioCondition score by ten.

The following calculations were performed to generate the overall species habitat score for each matter area:

1. Where multiple field species habitat attributes were undertaken within a single matter area, the scores were averaged to generate an overall score for the matter area.
2. This value was converted to a score out of ten by multiplying the matter area species habitat score by ten.

2.4 Limitations

The detection and accurate identification of plant species is dependent on the time of year, prevailing climatic conditions and available reproductive material (e.g. flowers, fruit and/or seed capsules). Weather conditions were relatively dry in the three months prior to the survey, which may have reduced the detection of some grass and forb species. However, remnants of seed heads remained on the majority of grass species and this limitation is only considered significant for the assessment of potential Natural Grassland TEC within the study area. It is recommended that additional field surveys are undertaken approximately three weeks after significant rainfall to accurately identify all species and conduct detailed TEC assessments.

Targeted survey for ornamental snake was not undertaken. Presence and utilisation of habitat by this species has been inferred based on previous surveys undertaken in adjacent areas, habitat assessments and the use of desktop information.

All fauna assessments are subject to inherent limitations in the detection success of targeted species. These limitations often result in a degree of false-absence records (i.e. a species is present, but not detected). It is important, therefore, that the limitations to surveys are identified and the survey results are viewed with these constraints in mind. The general limitations to the fauna assessment conducted in the survey area may include the following:

- Species with large home ranges may not be present in this part of their home range during the survey.
- The difficulty detecting certain species during the survey period (e.g. cryptic species and species present in the survey area in low densities).
- Biological factors such as sex, age-class, and breeding biology, which may influence species' habitat use and detectability during different times of year.

In response to the abovementioned limitations the fauna assessment was designed with a suitable survey effort to ensure every chance of detecting target species where conditions were suitable for the species.

3. Results

3.1 Survey conditions

The weather conditions leading up to and at the time of the May and December 2020 surveys are presented in **Table 5.** Weather data was obtained for Moranbah Airport (BoM, 2020), located approximately 60 km north of the study area. Overall, survey conditions were good with warm days and cool nights. Rainfall in preceding months was sufficient to allow for ground cover growth and facilitate TEC assessments.

Table 5: Survey conditions preceding and during field survey

Date	Temperature (°C)		Total rainfall (mm)	Max. wind gust (km/h)
	Minimum	Maximum		
February 2020	22.9	33.7	66.2	59
March 2020	19.9	31.8	1.6	50
April 2020	17.6	32.1	0.2	44
26 May 2020	6.7	22.8	0.0	30
27 May 2020	6.9	24.6	0.0	20
28 May 2020	7.7	25.6	0.0	24
29 May 2020	9.6	26.6	0.0	39
30 May 2020	9.5	26.2	0.0	39
31 May 2020	12.8	26.5	0.0	26
September 2020	14.8	30.1	16.0	65
October 2020	16.5	33.3	18.6	65
November 2020	19.3	35.8	4.8	61
1 December 2020	17.5	38.6	0.0	39
2 December 2020	20.2	40.4	0.0	44
3 December 2020	24.3	36.2	0.0	50
4 December 2020	20.0	38.2	0.0	44

3.2 Flora

3.2.1 Regional ecosystems

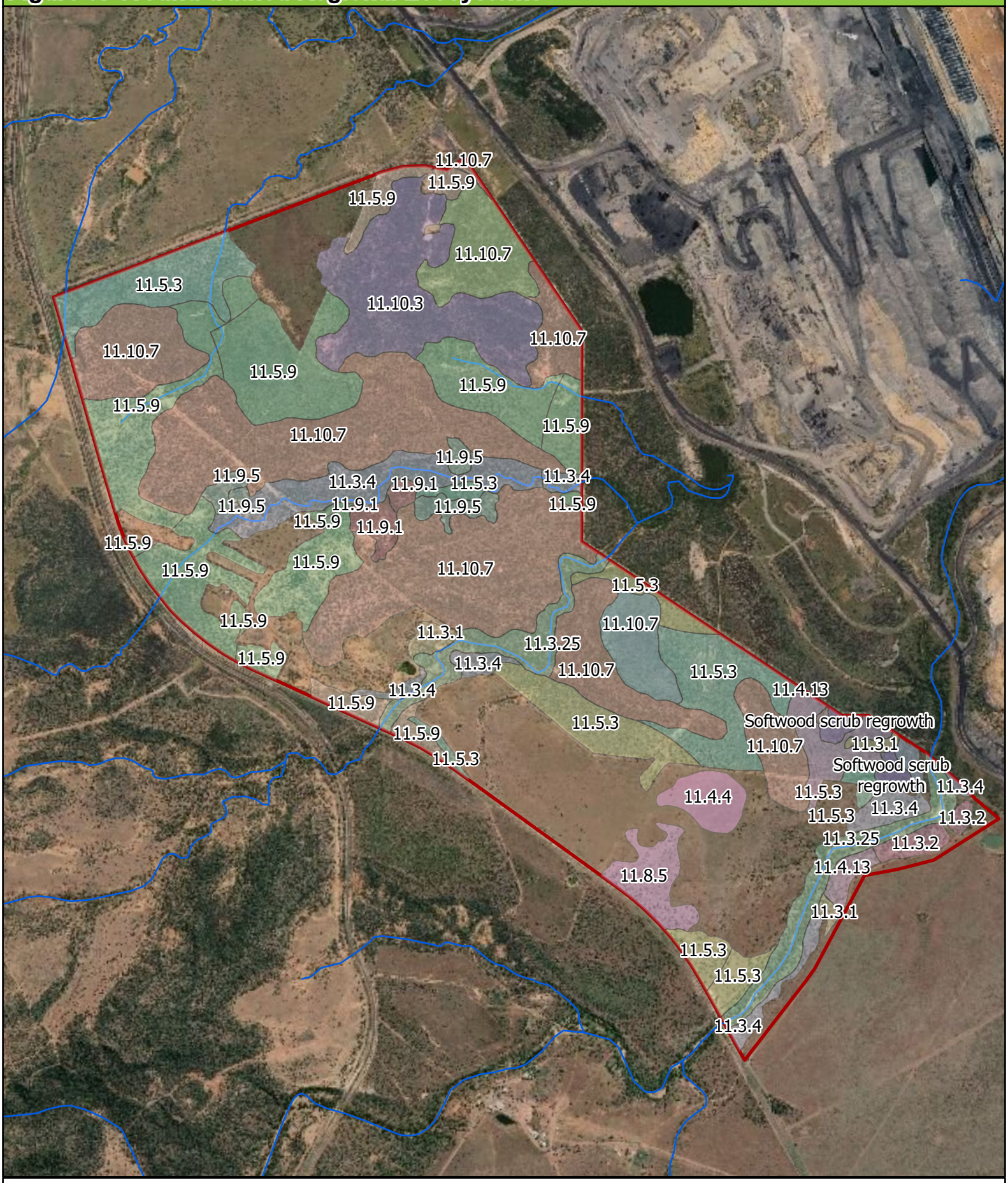
The study area is currently shown on the Department of Natural Resources and Mines (DNRME) Regulated Vegetation Management Map as predominantly Category B remnant vegetation, with Category X non-remnant areas mapped in the south and along the south-western boundary.

The study area was ground-truthed as predominantly remnant vegetation interspersed with non-remnant areas. A total of 14 REs were ground-truthed across the study area (**Table 6** and **Figure 3**).

Table 6: Field verified regional ecosystems within the study area

RE	Short description	VM Act Class	Biodiversity Status	Condition	Area (ha)
11.3.1	*Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains	Endangered	Endangered	Remnant	7.10
11.3.2	*Eucalyptus populnea* woodland on alluvial plains	Of concern	Of concern	Remnant	7.33
11.3.25	*Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines	Least concern	Of concern	Remnant	47.10
11.3.4	*Eucalyptus tereticornis* and/or *Eucalyptus* spp. woodland on alluvial plains	Of concern	Of concern	Remnant	58.84
11.4.4	*Dichanthium* spp., *Astrebla* spp. grassland on Cainozoic clay plains	Least concern	Of concern	Remnant	12.21
11.4.9	*Acacia harpophylla* shrubby woodland with *Terminalia oblongata* on Cainozoic clay plains	Endangered	Endangered	High value regrowth	0.47
11.4.13	*Eucalyptus orgadophila* open woodland on Cainozoic clay plains	Least concern	Of concern	Remnant	20.08
11.5.3	*Eucalyptus populnea* +/- *E. melanophloia* +/- *Corymbia clarksoniana* woodland on Cainozoic sand plains and/or remnant surfaces	Least concern	No concern at present	Remnant	116.04
11.5.9	*Eucalyptus crebra* and other *Eucalyptus* spp. and *Corymbia* spp. woodland on Cainozoic sand plains and/or remnant surfaces	Least concern	No concern at present	Remnant	183.09
11.8.5	*Eucalyptus orgadophila* open woodland on Cainozoic igneous rocks	Least concern	No concern at present	Remnant	16.18
11.9.1	*Acacia harpophylla-Eucalyptus cambageana* woodland to open forest on fine-grained sedimentary rocks	Endangered	Endangered	Remnant	8.32
11.9.5	*Acacia harpophylla and/or Casuarina cristata* open forest on fine-grained sedimentary rocks	Endangered	Endangered	Remnant	12.28
11.10.3	*Acacia catenulata* or *A. shirleyi* open forest on coarse-grained sedimentary rocks. Crests and scarps	Least concern	No concern at present	Remnant	73.09
11.10.7	*Eucalyptus crebra* woodland on coarse-grained sedimentary rocks	Least concern	No concern at present	Remnant	274.57
				High value regrowth	27.48
				Regrowth	18.25
-	Softwood scrub regrowth	-	-	Non-remnant	5.88
-	Non-remnant	-	-	Non-remnant	374.97
				Total:	**1,130.7**

Figure 3: Ground-truthed Regional Ecosystems



Legend

- Study area
- Watercourse

Ground-truthed Regional Ecosystems

- 11.10.3,Remnant
- 11.10.7,High Value Regrowth
- 11.10.7,Remnant
- 11.10.7,Regrowth
- 11.3.1,Remnant
- 11.3.2,Remnant
- 11.3.25,Remnant
- 11.3.4,Remnant
- 11.4.13,Remnant
- 11.4.4,Remnant
- 11.4.9,High Value Regrowth
- 11.5.3,Remnant
- 11.5.3,Remnant
- 11.5.9,Remnant
- 11.5.9,Remnant
- 11.8.5,Remnant
- 11.9.1,Remnant
- 11.9.5,Remnant
- Softwood scrub regrowth,Non-remnant

0 235 470 940

Metres

Datum/Projection:
GDA 1994 MGA Zone 55

N

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Prepared by: RW Date: 10/06/2020

3.2.2 Threatened Ecological Communities

Five TECs were identified in the desktop assessment of DAWE datasets as potentially occurring within the study area, comprising:

- Brigalow (*Acacia harpophylla* dominant and co-dominant)
- Natural Grasslands of the Queensland Central Highlands and northern Fitzroy Basin
- Poplar Box Grassy Woodland on Alluvial Plains
- Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions
- Weeping Myall Woodlands.

Field surveys confirmed the presence of the following TECs:

- Brigalow TEC – 10.6 ha
- Poplar Box TEC – 5.5 ha in Class B condition
- Natural Grasslands TEC – 12.2 ha in best condition

TECs within the study area is discussed in detail in **Section 4.3**.

3.2.3 Exotic flora

A total of four flora species listed as restricted matter under the Queensland *Biosecurity Act 2014*, were recorded within the study area (**Table 7**).

Table 7: Restricted invasive plants and WoNS identified within the study area

Species Name	Common Name	WoNS	Biosecurity Act	Occurrence within the study area
Opuntia stricta	prickly pear	✓	✓	Scattered across the study area in low abundance usually observed as individual plants.
Opuntia tomentosa	velvety tree pear	✓	✓	Scattered across the study area in low abundance usually observed as individual plants.
Cryptostegia grandiflora	rubber vine	✓	✓	Scattered across the study area in associated with riparian or alluvial floodplains in low densities.
Parthenium hysterophorus	parthenium	✓	✓	Observed in varying density throughout the study area, though often in high density when associated creeks

3.3 Fauna

3.3.1 Habitat types

Seven broad habitat types were identified within the study area. These habitats provide a range of resources for native fauna species, including threatened species as discussed in **Section 3.3.2**. Habitat types identified within the study area are:

- Fringing riparian open forest
- Floodplain open forest and woodlands
- Eucalypt forest and woodlands
- Acacia forest and woodlands
- Native grasslands
- Softwood scrub regrowth

- Non-remnant areas

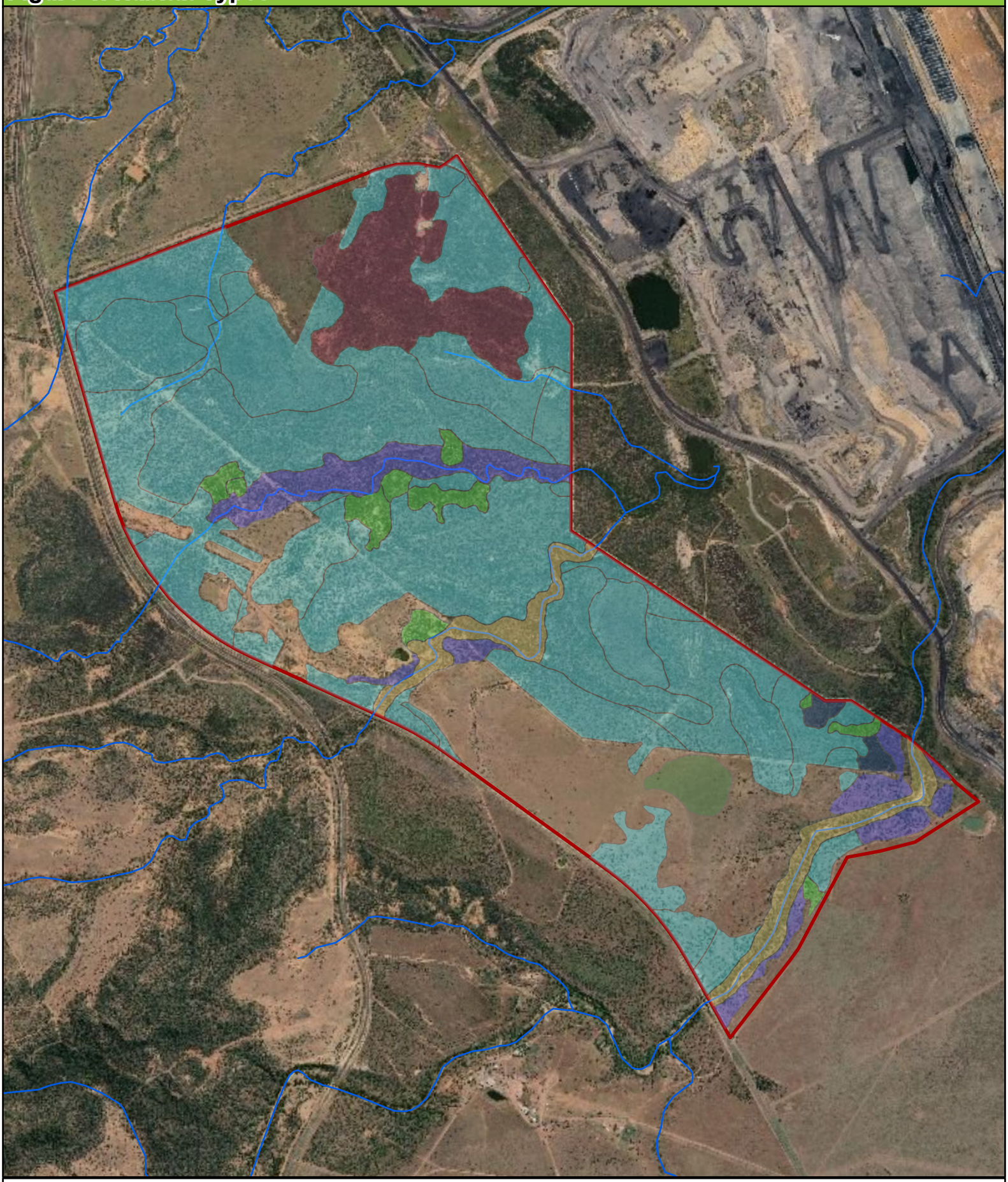
A summary of the habitat type, REs that constitute each habitat type and associated area of each habitat type within the study area are provided in **Table 8** and shown in **Figure 4**.

Table 8: Summary of broad habitat types and associated values

Broad habitat type	Description	Associated REs	Area within study area (ha)
Fringing riparian open forest and woodlands	This habitat type consists of remnant riparian open forest and woodlands occurring on fringing levees and banks of creeks (Philips Creek) and drainage lines. These areas are dominated by *Eucalyptus camaldulensis* and *Casuarina cunninghamiana* in the canopy layer, with occasional *Corymbia tessellaris*. A mid-dense low tree and shrub layer consists of *Melaleuca spp., Lysiphyllum cunninghami and Acacia salicina.* Ground layer consist of dense cover of mostly exotic species, such as *Megathyrsus maximus, Cenchrus ciliaris* and *Parthenium hysterophorus.* Given the mature nature of the vegetation, hollow-bearing *Eucalyptus camaldulensis* are abundant throughout this habitat type. These hollows provide suitable denning habitat for arboreal dwelling fauna, including greater glider. The tree species also provides a primary food tree with access to reliable soil moisture, for koala, making this habitat of high quality for both threatened species.	RE 11.3.25	47.1
Floodplain open forest and woodlands	Floodplain open forest and woodland habitat is associated with floodplains adjacent to main watercourses and drainage features. This habitat is in remnant condition throughout the study area and is dominated by an open canopy of *Corymbia tessellaris, Eucalyptus camaldulensis, E. populnea* and *E. coolabah*. A sparse mid layer consists of *Acacia salicina, Petalostigma pubescens* and *Owenia acidula*. Well connected canopy dominated by *Eucalyptus* spp. provides ideal habitat for Koala, as well as other common arboreal mammals and birds. Soils are mostly sandy and well-draining, with a sparse groundcover of exotic and native species, such as *Megathyrsus maximus, Heteropogon contortus* and *Cenchrus ciliaris,* providing habitat for ground-dwelling birds such as squatter pigeon.	RE 11.3.2 & 11.3.4	66.2
Eucalypt forest and woodlands	Eucalypt forest and woodlands is the dominant habitat type across the study area. Structure varies from woodlands to open woodlands on well-draining sandy soils, dominated by *Eucalyptus populnea* and *E. crebra*, to woodlands on sandstone dominated by *E. crebra*, with some areas containing a very dense understudy or *Melaleuca nervosa*. Other eucalypt woodlands were dominated by *Eucalyptus orgadophila*, occurring on both clay-loam to basalt soils. This habitat type is well connected to creeks and floodplain habitat within the study area and wider area, providing suitable habitat for arboreal mammals such as koalas, possums and small gliders. Well-draining sandy soils on lowlands provide habitat for squatter pigeon. Areas with dense mid-story provide habitat for woodland birds.	RE 11.5.3, 11.5.9, 11.10.7, 11.4.13 & 11.8.5	464.2
Brigalow open forests and woodlands	Brigalow open forest and woodlands most commonly occur on fine grained sedimentary soils (land zone 9) within the study area, although occasionally observed on clay plains (land zone 4) and alluvial plains (land	RE 11.3.1, 11.4.9,	28.2

Broad habitat type	Description	Associated REs	Area within study area (ha)
	zone 3). This habitat type is mostly in remnant condition, with a small area of high value regrowth. Brigalow dominates the mid-dense canopy in most areas, however small patches of *Eucalyptus cambageana* (RE 11.9.1) and *Casuarina cristata* (RE 11.9.5) dominance were observed. A moderate level of fallen woody debris was observed, making this habitat suitable for a range of reptiles and small mammals. Mid-dense woodlands also provide suitable foraging and shelter habitat for woodland birds. Brigalow on clay and alluvial plains (RE 11.3.1 and RE 11.4.9) were observed to have shallow to deep gilgai formations, with moderate fallen woody debris and soil cracks available, making it suitable habitat for ornamental snake.	11.9.1, 11.9.5	
Acacia forest and woodlands	This habitat type was observed in the north-east of the study area, occurring in a single patch. This area contained a dense to mid-dense canopy dominated by *Acacia shirleyi*. Emergent *Corymbia lamprophylla* and *Eucalyptus crebra* were observed in some areas. This habitat type contained no mid-layer and sparse groundcover, mostly consisting of native grasses and forbs such as *Enneapogon* sp., *Eragrostis* sp., and *Solanum* sp. Fallen woody debris and decorticating bark was common to abundant in this area, providing suitable habitat for a range of reptiles. Dense woodlands are suitable foraging and shelter habitat for woodland birds.	RE 11.10.3	73.1
Native grasslands	Native grassland habitat occurs as a single patch in the south-east of the study area. These areas are naturally treeless habitats in which values for fauna are restricted to the ground layer and include grass tussocks, soil cracks and organic litter. Following summer rainfall, native grasses are tall (~1 m) and seeding, providing abundant foraging resources for birds and grazing macropods, and shelter refuges for grassland birds, mammals and reptiles. This area was found to contain native grasses that are consistent with natural grasslands, such as *Dichanthium sericeum*, *Eriochloa crebra*, *Thellungia advena, Panicum decompositum* and *Astrebla squarrosa.*	RE 11.4.4	12.2
Softwood scrub regrowth	Small areas of softwood scrub regrowth occur in the south-east of the study area. These areas contain a mid-dense cover of shrubs and softwood species, such as *Acacia salicina, Eucalyptus populnea, Lysiphyllum carronii, Owenia acidula* and *Acacia harpophylla*. With the lack of mature canopy trees, these areas do not provide suitable habitat for arboreal mammals. The dense shrubby structure would be suitable for foraging woodland birds and microbats.	-	5.9
Non remnant	This habitat type comprises improved pastures grazed by cattle and is mostly confined to the south-east of the study area. Non-remnant areas were dominated by treeless paddocks with a buffel grass groundcover. In its current state, most of this habitat type provides limited habitat value for fauna species. Scattered trees and shrubs and occasional fallen logs provide some shelter for least concern birds to nest and reptiles to shelter. Open grassy paddocks provide optimal habitat for grazing macropods.	-	374.9

Figure 4: Habitat Types



Legend

- Study area
- Watercourse

Habitat Types

- Acacia forest and woodlands
- Brigalow open forests and woodlands
- Eucalypt forest and woodlands
- Floodplain open forest and woodlands
- Fringing riparian open forest
- Native grasslands
- Softwood scrub regrowth

0 240 480 960

Metres

Datum/Projection:
GDA 1994 MGA Zone 55

N

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3.3.2 Threatened species

The May 2020 survey identified suitable habitat for koala, greater glider, squatter pigeon and ornamental snake within the study area. This assessment was based on known records, species distributions and availability of suitable microhabitat features within ground-truthed habitat in the study area. December 2020 surveys confirmed the area is utilised by koala and greater glider, with six individual koalas sighted (including one joey) as well as two scat samples, and five individual greater glider sightings.

A significant proportion of the study area is considered suitable koala habitat. Large areas of well-connected eucalyptus woodlands containing koala food trees occur throughout the study area. This consists of both riparian habitat (important refuge habitat for the species) as well as foraging and dispersal habitat. Several koala sightings were recorded in connected habitat to the east of the study area in 2018 (ELA 2020), as well as several sightings within the study area across a range of habitat types during targeted surveys in December 2020 (**Figure 6**).

Well-draining sandy soils with a moderate to sparse cover of native and exotic grasses were identified across the study area. A large proportion of the area is within 1 km of the permanent water sources (i.e. dams) and would be potential suitable breeding habitat for squatter pigeon. Remaining alluvial and sand-plains vegetation is well connected to and would provide foraging and dispersal habitat for the species, with records in the wider area.

Ornamental snake habitat was identified in two small patches in the south east of the study area. Greater glider habitat was identified along major creeks and watercourses within the study area, within which five individuals were observed during December 2020 surveys (**Figure 8**).

The total area of habitat ground truthed for threatened species is provide in Table 9. **Section 4** provides further discussion on threatened species habitat within the study area and habitat condition scoring for each MNES is provided in **Appendix B**.

Table 9: Area of threatened species habitat in the study area

Threatened species	Area of habitat within study area (ha)
Koala (refuge; foraging & dispersal)	769
Squatter pigeon (breeding/foraging/dispersal)	419.5
Greater glider (breeding/foraging)	113.3
Ornamental snake (breeding/foraging)	2.5

3.4 Landscape connectivity values

Remnant vegetation within the study area forms a large contiguous patch and joins the Phillips Creek riparian corridor in the south of the study area. Saraji Road and rail line to the south-west, Saraji Mine to the east and clearing for agricultural purposes limit connectivity in the area immediately surrounding the study area. Phillips creek, which intersects the study area in the south, provides significant regional connectivity, linking the study area to large contiguous tracts of vegetation extending to the north, south and west. Regional connectivity is display on Figure 5.

3.5 Threatening processes

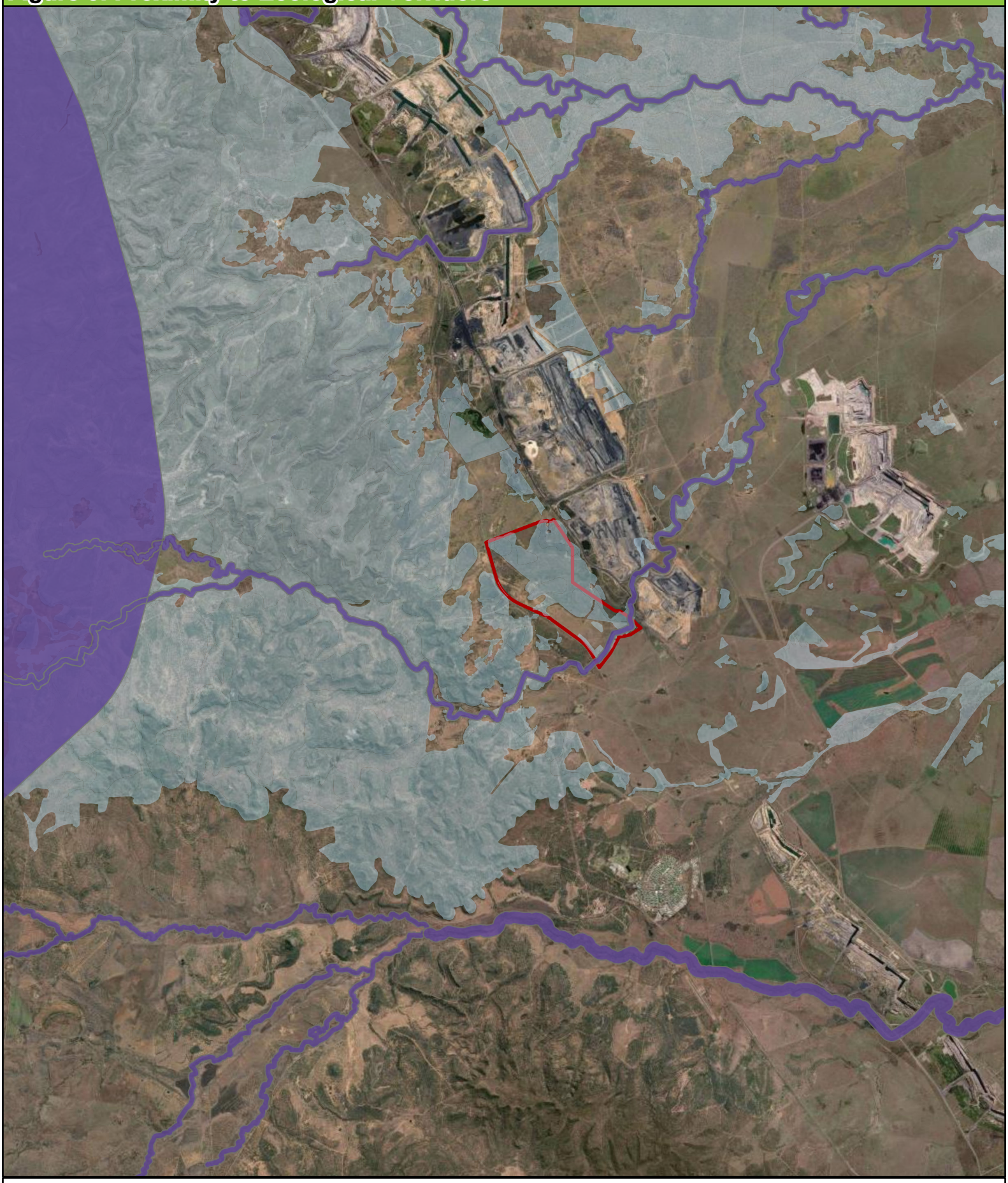
Field assessment of the study area identified the presence of numerous threatening processes. Threatening processes identified within the study area include habitat clearing, livestock grazing regimes of varying intensity, pest fauna and weeds.

A large proportion of vegetation within the study area that has been able to mature or has remained uncleared is mapped as regulated vegetation and requires approval from the State Government prior to broadscale clearing activities being undertaken. Areas that are not currently protected from clearing activities include remnant vegetation providing habitat for koala, squatter pigeon and greater glider. The removal of this vegetation within the study area is currently deemed as a lawful activity on the property.

Cattle grazing currently occurs across the study area. The overgrazing of foraging resources by livestock and the trampling of nests is listed as a threat to Squatter Pigeon under the Commonwealth conservation advice. Habitat degradation as a result of cattle grazing is also a recognised threat to Ornamental Snake as it causes soil compaction (reduced soil cracks), reduces water quality and changes the hydrology in gilgai habitat, encourages exotic pastures and weeds, destroys microhabitat features such as fallen woody debris and reduces understorey vegetation structure and diversity. Reduced understorey diversity and density as well as seedling recruitment as a result of browsing cattle and trampling are also threats to Brigalow TEC. Cattle grazing impacts including low ground layer species diversity and pugging in wet areas are evident across the study area and considered to be moderate.

Field surveys identified evidence of numerous pest species within the study area, including Rabbits (*Oryctolagus cuniculus*), Pigs (*Sus scrofa)* and Cats (*Felis catus*). Cane Toads (*Rhinella marina*) and Dogs (*Canis lupus familiaris*) are also common within the region and are likely to occur within the study area. A number of exotic flora species were recorded within the study area. Flora species listed as restricted matter under the *Queensland Biosecurity Act 2014* present within the study area include *Opuntia stricta, Opuntia tomentosa, Cryptostegia grandiflora* and *Parthenium hysterophorus* (**Section 3.2.3**).

Figure 5: Proximity to Ecological Corridors



Legend

- Study area
- Ecological Corridors (DES 2020)
- Remnant vegetation (State)

0 1,250 2,500 5,000

Metres

Datum/Projection:
GDA 1994 MGA Zone 55

N

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4. MNES within the study area

The field assessment identified a number of MNES in the study area including habitat for four threatened species and three TECs. There are large areas of habitat available for koala, which is the species for which significant residual impacts are required to be addressed.

It should be noted that that the presence and total extent of values presented below is for the entire study area. As the proposed offset area is a smaller area contained within the study area, the number of values and total extent within the offset is reduced. A summary of the values within the study and offset area is provided below.

4.1 Koala

Field surveys involving targeted habitat assessments ground-truthed 769 ha of koala habitat within the study area. This includes 723 ha of remnant vegetation and 46 ha of high value regrowth and regrowth vegetation. Habitat areas were validated based on the presence of preferred habitat structure and preferred food tree species that are the species habitat requirements outlined in the Commonwealth EPBC Act referral guidelines for the vulnerable koala (DoE, 2014). Koalas were confirmed within habitat areas in the study area during the December 2020 surveys with six individuals sighted and two confirmed scat samples.

The Commonwealth referral guideline also describes refuge habitat for the species, which was utilised to identify potential habitat refuges for the species within the study area. Refuge habitat is suitable habitat in riparian environments and other areas with reliable soil moisture and fertility, including a permanent aquifer, in a riparian zone, on upper or mid-slopes, on a fertile alluvial plain or where soil moisture / rainfall is reliable (DoE, 2014).

Refuge habitat for koala within the study area was identified as riparian and floodplain open forests and woodlands in association with Phillips Creek in the south and two smaller tributaries in the centre of the study area. This habitat was identified as vegetation analogous to RE11.3.25, RE11.3.2 and RE11.3.4 and occurs within an area of 113 ha. This vegetation has reliable year-round access to high soil moisture and provides an important refuge for koala during droughts and in periods of extreme heat. Foraging and dispersal habitat for koala within the study area was ground-truthed as eucalypt woodlands predominantly on sand plains and coarse-grained sedimentary rocks, with vegetation analogous to RE11.4.13, RE11.5.3, RE11.5.9, RE11.8.5 and RE11.10.7. This habitat occurs within an area of 656 ha.

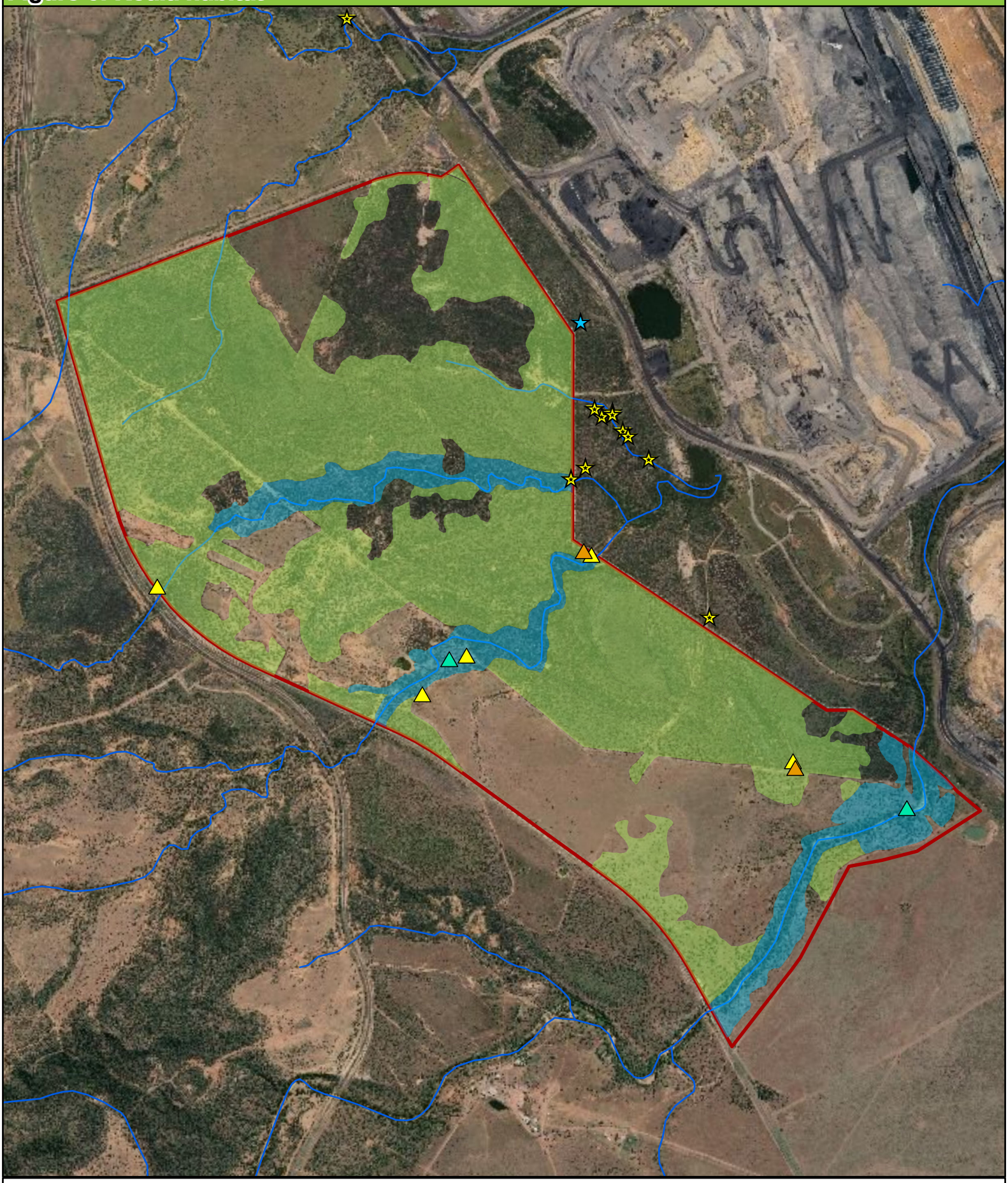
Remnant koala habitat within the study area was found to have structural complexity, canopy species diversity and recruitment characteristics resembling an undisturbed community (refer to **Appendix C**). Regrowth habitat within the study area was found to have reduced canopy species richness, height and cover relative to an undisturbed community (refer to **Appendix C**).

Presence of koala within the study area was confirmed during December 2020 surveys (**Figure 6**). A total of six individuals (including one joey) were sighted, as well as two confirmed scats. Koalas were observed foraging within a range of habitat types, including fringing riparian open forests and woodlands (RE11.3.25), floodplain open forest and woodlands (RE11.3.4), and eucalypt forest and woodlands (RE11.10.7 and RE11.5.9). Scats were sampled within fringing riparian woodlands along Phillips Creek

and lower tributaries. Koala have also been recorded in habitat adjacent to the study area (some parts of which are within the project area) during surveys in 2018. These surveys identified 18 individuals across three nights of spotlighting, which included 13 adults and five joeys (ELA, 2020, **Figure 6**).

Spotlighting surveys conducted in 2018 and 2020 indicate the area is well utilised by koala. The Spring to Phillips Creek Diversion Project and the offset area are well connected and koala are likely to disperse easily into the offset area from habitat areas that are impacted. The offset area is also well connected to additional habitat areas further west, providing dispersal opportunity for displaced individuals (**Figure 5**). Targeted koala surveys conducted in 2020 found koala to be present in low densities within the study area (approximately 1 individual / 128 ha of habitat). Therefore, the movement of individuals from the east is unlikely to cause the koala population to exceed the carrying capacity of this area, particularly with the offset area well connected through biodiversity corridors associated with Phillips Creek. With good koala habitat utilisation in the area, the offset area is considered important to maintain the regional koala population.

Figure 6: Koala habitat



Legend

- Study area
- Watercourse

Koala habitat

- Foraging and dispersal
- Refuge

Koala records (ELA; December 2020)

- Confirmed scat
- Confirmed sighting
- Likely repeated sighting

Koala records (ELA; May 2018)

- Confirmed sighting
- Confirmed scat

0 240 480 960

Metres

Datum/Projection:
GDA 1994 MGA Zone 55

N

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4.2 Other MNES

4.2.1 Threatened species

Field surveys ground-truthed 419.5 ha of suitable habitat for squatter pigeon within the study area, all of which is in remnant condition (**Figure 7**). Habitat areas were validated on presence of well-draining sandy soils (often associated with land zones 3 and 5) on gently sloping, flat to undulating plains, with patchy ground cover (up to approximately 30 % cover; DoE 2020).

Both breeding and foraging habitat was identified within the study area. Permanent water sources were identified in the surrounding area, suitable habitat within 1 km of these are considered suitable breeding habitat, the remaining is considered suitable foraging and dispersal habitat. Habitat areas consisted of eucalypt woodlands on well-draining sandy soils, dominated by *Eucalyptus crebra* (RE 11.5.9), *E. populnea* (RE 11.3.2 and RE 11.5.9) and *E. camaldulensis* (RE 11.4.4 and RE 11.3.25).

Squatter pigeon was not recorded during the survey, however there are records in the wider area (~15 km).

Greater glider habitat was identified along the creeks within the study area, totalling 113.3 ha. These areas contain many hollow bearing trees suitable for shelter, and eucalyptus trees for foraging. Greater glider was confirmed during December 2020 surveys, with the observation of 5 individuals along the Phillips Creek riparian corridor (**Figure 8**). Greater glider records also exist within connecting habitat further along Philips Creek to the east of the study area (Eco Logical Australia 2020), indicating this is an important habitat corridor for the species.

Two patches of ornamental snake habitat were observed in the south-east of the study area, totalling 2.5 ha. This area was observed to have suitable microhabitat features such as cracking clay, diverse gilgais and fallen woody debris. Known records of the species occur in nearby habitat areas.

4.2.2 TECs

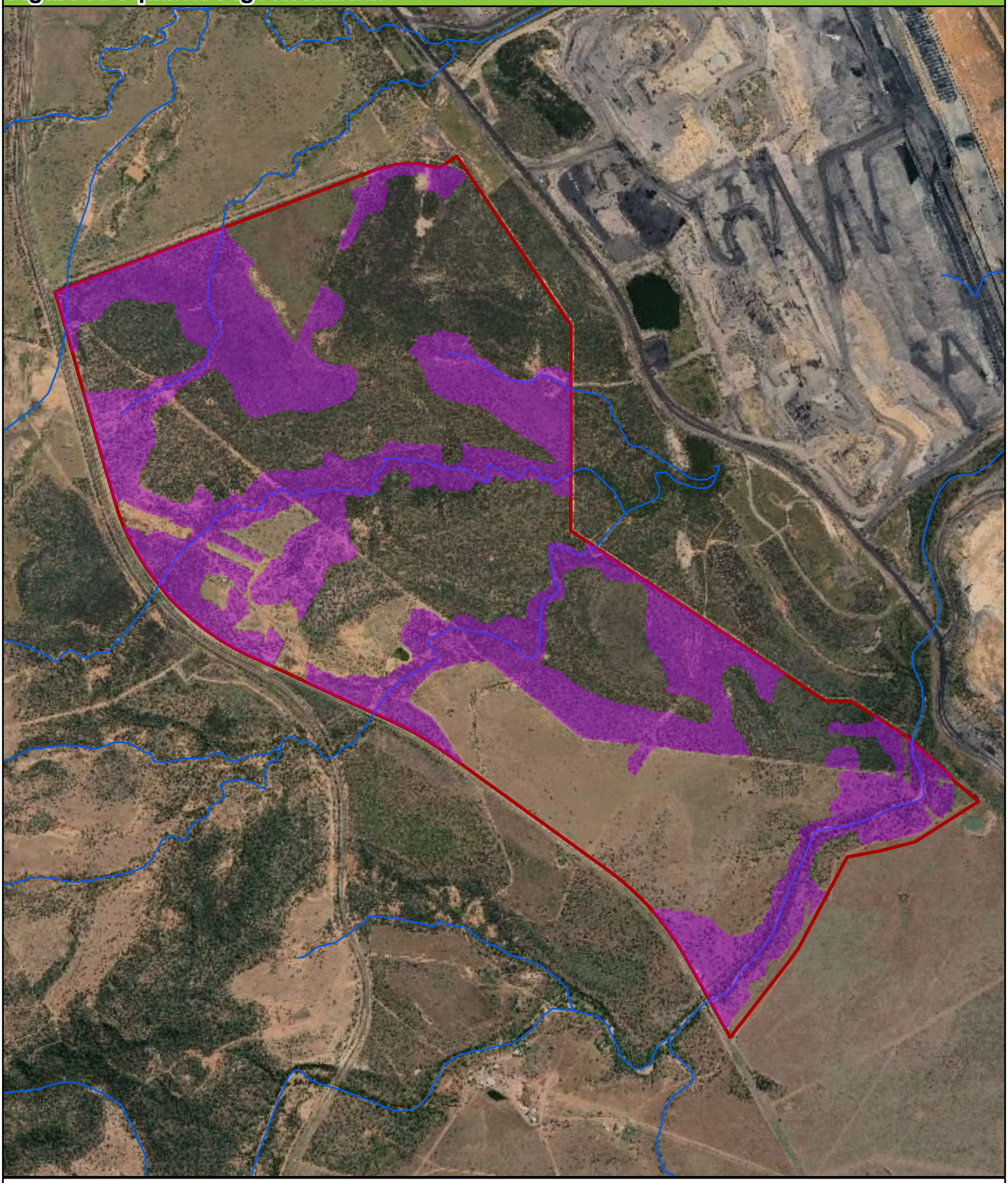
Three TECs were ground-truthed in the study area, including Brigalow TEC, Natural Grasslands TEC and Poplar Box TEC (**Figure 8**).

Field surveys ground-truthed 10.6 ha of Brigalow TEC. This consisted of three separate patches within the study area that are analogous to RE 11.3.1, RE 11.9.1 and RE 11.9.5. These areas all met the key diagnostic and condition criteria for Brigalow TEC.

A single patch of Poplar Box TEC was identified in the south-east of the study area, totalling 5.5 ha. This area was assessed as meeting Class B good condition.

A single patch of Natural Grassland TEC was identified in the south of the study area, totalling 12.2 ha. This area was assessed as meeting best condition TEC.

Figure 7: Squatter Pigeon Habitat



Legend

- Study area
- Watercourse
- Squatter Pigeon
  - Breeding, foraging & dispersal

0 240 480 960

Metres

Datum/Projection:
GDA 1994 MGA Zone 55

N

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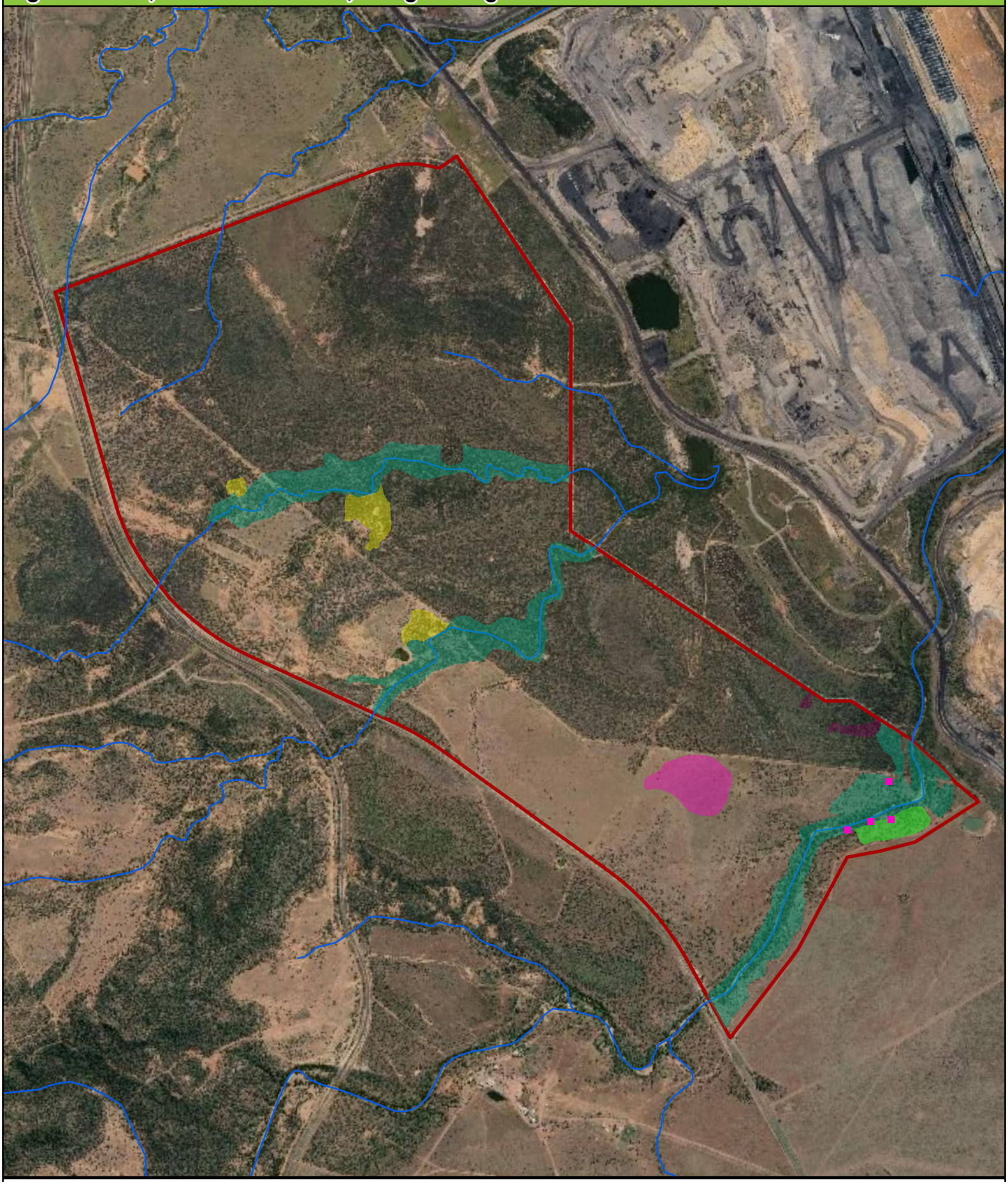
Figure 8: TEC, ornamental snake, and greater glider habitat and records



Legend

- Study area
- Watercourse

Threatened species records

- Greater Glider (*Petauroides volans*)

Greater Glider habitat

- Breeding, foraging & dispersal

Ornamental Snake habitat

- Breeding, foraging & dispersal

Threatened Ecological Community (TEC)

- Natural Grasslands (Best condition)
- Poplar Box Grassy Woodland (Class B)
- Brigalow (Acacia harpophylla dominant and codominant)

0 240 480 960

Metres

Datum/Projection:
GDA 1994 MGA Zone 55

N

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Prepared by: RW Date: 07/12/2020

4.3 Summary of MNES in the study and proposed offset area

The presence and extent of MNES within the study area and proposed offset area are summarised in Table 10.

Table 10: Presence and extent of MNES within the study area and proposed offset area

MNES	Extent in study area (ha)	Extent in proposed offset area (ha)
Koala	769	568.1
Squatter pigeon	419.5	290.2
Greater glider	113.3	80.1
Ornamental snake	2.5	Not present
Brigalow TEC	10.6	10.6
Poplar Box TEC	5.5	Not present
Natural Grasslands TEC	12.2	12.2

5. Conclusion

An ecological assessment was undertaken to validate ecological values within the Tay-Glen property study area with the intent of identifying areas that could be used to meet BHP project offset requirements. Field surveys targeted MNES values, in particular koala, occurring within the study area. Additional MNES values were also identified during the field survey.

MNES that were identified during surveys include confirmed records of koala (six) and greater glider (five), threatened species habitat for koala (769 ha), squatter pigeon (419.5 ha), ornamental snake (2.5 ha) and greater Glider (113.3 ha). Threatened Ecological Communities, including Brigalow TEC (10.6 ha), Poplar Box TEC - Class B good condition (5.5 ha) and Natural Grassland TEC – Best condition (12.2 ha).

References

Eco Logical Australia (ELA) 2020. Spring to Phillips Creek Diversion – Assessment of Matters of National Environmental Significance. Prepared for SLR Consulting

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Department of the Environment (DoE), 2020. *Geophaps scripta scripta* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed Tue, 30 Jun 2020

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 and Energy (2019). Conservation Advice (including listing advice) for the Poplar Box Grassy Woodland on Alluvial Plains. Canberra: Department of the Environment and Energy. Available from: http://www.environment.gov.au/biodiversity/threatened/communities/pubs/141pb-conservation-advice.pdf. In effect under the EPBC Act from 04-Jul-2019.

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

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Appendix A Desktop searches

Australian Government
Department of the Environment and Energy

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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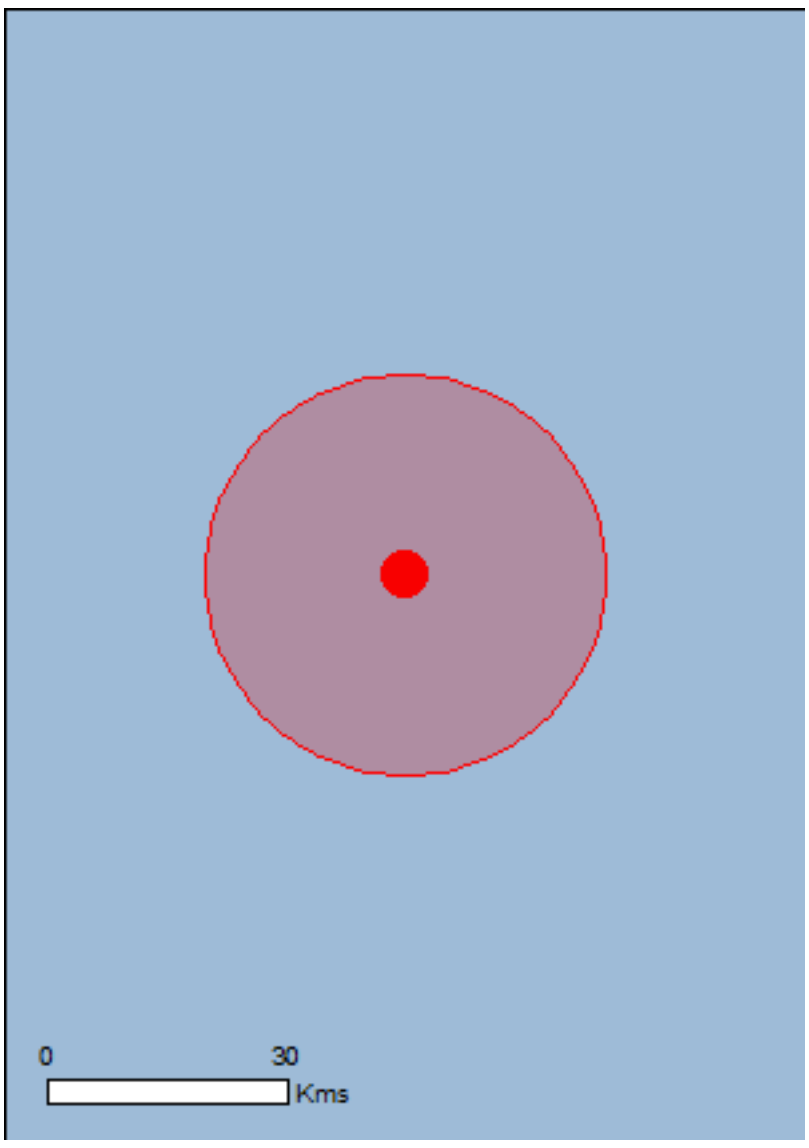

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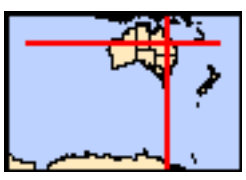

Summary

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:	5
Listed Threatened Species:	26
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:	18
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:	1
Regional Forest Agreements:	None
Invasive Species:	20
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
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

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 likely to 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
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 habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Mammals		
Dasyurus hallucatus Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat likely to occur within area
Macroderma gigas Ghost Bat [174]	Vulnerable	Species or species

Name	Status	Type of Presence
		habitat likely 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
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Plants		
Aristida annua		
[17906]	Vulnerable	Species or species habitat likely to occur within area
Cadellia pentastylis		
Ooline [9828]	Vulnerable	Species or species habitat may occur within area
Cycas ophiolitica		
[55797]	Endangered	Species or species habitat likely to occur within area
Daviesia discolor		
[3567]	Vulnerable	Species or species habitat may occur within area
Dichanthium queenslandicum		
King Blue-grass [5481]	Endangered	Species or species habitat likely to occur within area
Dichanthium setosum		
bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area
Samadera bidwillii		
Quassia [29708]	Vulnerable	Species or species habitat may occur within area
Reptiles		
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 may 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
Lerista allanae		
Allan's Lerista, Retro Slider [1378]	Endangered	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
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to 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 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
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		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

Name	Threatened	Type of Presence
		area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known 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 may 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 known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to 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 may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Coolibah	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		
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		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
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
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
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

Name	Status	Type of Presence
Cryptostegia grandiflora Rubber Vine, Rubbervine, India Rubber Vine, India Rubbervine, Palay Rubbervine, Purple Allamanda [18913]		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
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

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

-22.49634 148.31271

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

Wildlife Online Extract

Search Criteria: Species List for a Specified Point
Species: All
Type: All
Status: All
Records: All
Date: All
Latitude: -22.4963
Longitude: 148.3127
Distance: 25
Email: kateb@ecoaus.com.au
Date submitted: Friday 21 Feb 2020 15:15:01
Date extracted: Friday 21 Feb 2020 15:20:02

The number of records retrieved = 628

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Bufonidae	*Rhinella marina*	cane toad	Y			7
animals	amphibians	Hylidae	*Litoria inermis*	bumpy rocketfrog		C		1
animals	amphibians	Hylidae	*Cyclorana platycephala*	water holding frog		C		2/1
animals	amphibians	Hylidae	*Cyclorana alboguttata*	greenstripe frog		C		2
animals	amphibians	Hylidae	*Litoria latopalmata*	broad palmed rocketfrog		C		1
animals	amphibians	Hylidae	*Cyclorana verrucosa*	rough collared frog		C		2/1
animals	amphibians	Hylidae	*Cyclorana brevipes*	superb collared frog		C		2
animals	amphibians	Hylidae	*Litoria rothii*	northern laughing treefrog		C		1
animals	amphibians	Hylidae	*Cyclorana novaehollandiae*	eastern snapping frog		C		2
animals	amphibians	Hylidae	*Litoria rubella*	ruddy treefrog		C		3
animals	amphibians	Hylidae	*Litoria caerulea*	common green treefrog		C		5
animals	amphibians	Limnodynastidae	*Limnodynastes terraereginae*	scarlet sided pobblebonk		C		1
animals	amphibians	Limnodynastidae	*Limnodynastes tasmaniensis*	spotted grassfrog		C		3
animals	amphibians	Limnodynastidae	*Platyplectrum ornatum*	ornate burrowing frog		C		1
animals	amphibians	Limnodynastidae	*Limnodynastes salmini*	salmon striped frog		C		3
animals	amphibians	Limnodynastidae	*Limnodynastes peronii*	striped marshfrog		C		1
animals	amphibians	Myobatrachidae	*Uperoleia rugosa*	chubby gungan		C		1
animals	birds	Acanthizidae	*Acanthiza apicalis*	inland thornbill		C		1
animals	birds	Acanthizidae	*Gerygone olivacea*	white-throated gerygone		C		12
animals	birds	Acanthizidae	*Acanthiza reguloides*	buff-rumped thornbill		C		3
animals	birds	Acanthizidae	*Smicrornis brevirostris*	weebill		C		8
animals	birds	Accipitridae	*Accipiter fasciatus*	brown goshawk		C		1
animals	birds	Accipitridae	*Lophoictinia isura*	square-tailed kite		C		1
animals	birds	Accipitridae	*Aviceda subcristata*	Pacific baza		C		2
animals	birds	Accipitridae	*Haliastur sphenurus*	whistling kite		C		9
animals	birds	Accipitridae	*Elanus axillaris*	black-shouldered kite		C		1
animals	birds	Accipitridae	*Haliaeetus leucogaster*	white-bellied sea-eagle		C		2
animals	birds	Accipitridae	*Accipiter cirrocephalus*	collared sparrowhawk		C		3
animals	birds	Accipitridae	*Circus assimilis*	spotted harrier		C		1
animals	birds	Accipitridae	*Aquila audax*	wedge-tailed eagle		C		5
animals	birds	Accipitridae	*Milvus migrans*	black kite		C		5
animals	birds	Acrocephalidae	*Acrocephalus australis*	Australian reed-warbler		C		3
animals	birds	Aegothelidae	*Aegotheles cristatus*	Australian owlet-nightjar		C		7
animals	birds	Anatidae	*Nettapus coromandelianus*	cotton pygmy-goose		C		3
animals	birds	Anatidae	*Dendrocygna arcuata*	wandering whistling-duck		C		2
animals	birds	Anatidae	*Dendrocygna eytoni*	plumed whistling-duck		C		5
animals	birds	Anatidae	*Chenonetta jubata*	Australian wood duck		C		7
animals	birds	Anatidae	*Anas superciliosa*	Pacific black duck		C		9
animals	birds	Anatidae	*Oxyura australis*	blue-billed duck		C		1
animals	birds	Anatidae	*Aythya australis*	hardhead		C		5
animals	birds	Anatidae	*Anas gracilis*	grey teal		C		7
animals	birds	Anatidae	*Cygnus atratus*	black swan		C		3
animals	birds	Anhingidae	*Anhinga novaehollandiae*	Australasian darter		C		6
animals	birds	Ardeidae	*Egretta novaehollandiae*	white-faced heron		C		4
animals	birds	Ardeidae	*Ardea pacifica*	white-necked heron		C		2
animals	birds	Ardeidae	*Ardea intermedia*	intermediate egret		C		5

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Ardeidae	*Egretta garzetta*	little egret		C		1
animals	birds	Ardeidae	*Ardea alba modesta*	eastern great egret		C		3
animals	birds	Ardeidae	*Nycticorax caledonicus*	nankeen night-heron		C		2
animals	birds	Artamidae	*Cracticus nigrogularis*	pied butcherbird		C		17
animals	birds	Artamidae	*Artamus cinereus*	black-faced woodswallow		C		1
animals	birds	Artamidae	*Gymnorhina tibicen*	Australian magpie		C		25
animals	birds	Artamidae	*Strepera graculina*	pied currawong		C		6
animals	birds	Artamidae	*Artamus leucorynchus*	white-breasted woodswallow		C		3
animals	birds	Artamidae	*Cracticus torquatus*	grey butcherbird		C		17
animals	birds	Burhinidae	*Burhinus grallarius*	bush stone-curlew		C		2
animals	birds	Cacatuidae	*Cacatua galerita*	sulphur-crested cockatoo		C		20
animals	birds	Cacatuidae	*Nymphicus hollandicus*	cockatiel		C		3
animals	birds	Cacatuidae	*Eolophus roseicapilla*	galah		C		9
animals	birds	Campephagidae	*Coracina novaehollandiae*	black-faced cuckoo-shrike		C		13
animals	birds	Campephagidae	*Coracina papuensis*	white-bellied cuckoo-shrike		C		4
animals	birds	Campephagidae	*Lalage tricolor*	white-winged triller		C		1
animals	birds	Campephagidae	*Coracina maxima*	ground cuckoo-shrike		C		1
animals	birds	Campephagidae	*Coracina tenuirostris*	cicadabird		C		4
animals	birds	Casuariidae	*Dromaius novaehollandiae*	emu		C		6
animals	birds	Charadriidae	*Elseyornis melanops*	black-fronted dotterel		C		2
animals	birds	Charadriidae	*Vanellus miles*	masked lapwing		C		5
animals	birds	Ciconiidae	*Ephippiorhynchus asiaticus*	black-necked stork		C		1
animals	birds	Cisticolidae	*Cisticola exilis*	golden-headed cisticola		C		4
animals	birds	Columbidae	*Geopelia striata*	peaceful dove		C		7
animals	birds	Columbidae	*Ocyphaps lophotes*	crested pigeon		C		7
animals	birds	Columbidae	*Phaps chalcoptera*	common bronzewing		C		5
animals	birds	Columbidae	*Geopelia humeralis*	bar-shouldered dove		C		7
animals	birds	Columbidae	*Geophaps scripta scripta*	squatter pigeon (southern subspecies)		V	V	5
animals	birds	Coraciidae	*Eurystomus orientalis*	dollarbird		C		10
animals	birds	Corcoracidae	*Struthidea cinerea*	apostlebird		C		10
animals	birds	Corcoracidae	*Corcorax melanorhamphos*	white-winged chough		C		2
animals	birds	Corvidae	*Corvus orru*	Torresian crow		C		32
animals	birds	Cuculidae	*Chalcites basalis*	Horsfield's bronze-cuckoo		C		2
animals	birds	Cuculidae	*Cacomantis pallidus*	pallid cuckoo		C		1
animals	birds	Cuculidae	*Scythrops novaehollandiae*	channel-billed cuckoo		C		6
animals	birds	Cuculidae	*Centropus phasianinus*	pheasant coucal		C		8
animals	birds	Cuculidae	*Cacomantis variolosus*	brush cuckoo		C		1
animals	birds	Cuculidae	*Eudynamys orientalis*	eastern koel		C		2
animals	birds	Dicruridae	*Dicrurus bracteatus*	spangled drongo		C		3
animals	birds	Estrildidae	*Lonchura castaneothorax*	chestnut-breasted mannikin		C		1
animals	birds	Estrildidae	*Taeniopygia bichenovii*	double-barred finch		C		12
animals	birds	Estrildidae	*Neochmia ruficauda*	star finch		C		1
animals	birds	Estrildidae	*Neochmia temporalis*	red-browed finch		C		1
animals	birds	Eurostopodidae	*Eurostopodus mystacalis*	white-throated nightjar		C		1
animals	birds	Falconidae	*Falco longipennis*	Australian hobby		C		3
animals	birds	Falconidae	*Falco berigora*	brown falcon		C		2

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Falconidae	*Falco cenchroides*	nankeen kestrel		C		7
animals	birds	Halcyonidae	*Todiramphus sanctus*	sacred kingfisher		C		2
animals	birds	Halcyonidae	*Dacelo novaeguineae*	laughing kookaburra		C		18
animals	birds	Halcyonidae	*Dacelo leachii*	blue-winged kookaburra		C		4
animals	birds	Halcyonidae	*Todiramphus pyrrhopygius*	red-backed kingfisher		C		1
animals	birds	Halcyonidae	*Todiramphus macleayii*	forest kingfisher		C		6
animals	birds	Hirundinidae	*Hirundo neoxena*	welcome swallow		C		3
animals	birds	Hirundinidae	*Petrochelidon ariel*	fairy martin		C		2
animals	birds	Hirundinidae	*Petrochelidon nigricans*	tree martin		C		5
animals	birds	Laridae	*Chroicocephalus novaehollandiae*	silver gull		C		2
animals	birds	Maluridae	*Malurus melanocephalus*	red-backed fairy-wren		C		16
animals	birds	Megapodiidae	*Alectura lathami*	Australian brush-turkey		C		1
animals	birds	Meliphagidae	*Manorina flavigula*	yellow-throated miner		C		4
animals	birds	Meliphagidae	*Plectorhyncha lanceolata*	striped honeyeater		C		11
animals	birds	Meliphagidae	*Melithreptus albogularis*	white-throated honeyeater		C		15
animals	birds	Meliphagidae	*Philemon citreogularis*	little friarbird		C		10
animals	birds	Meliphagidae	*Manorina melanocephala*	noisy miner		C		13
animals	birds	Meliphagidae	*Caligavis chrysops*	yellow-faced honeyeater		C		1
animals	birds	Meliphagidae	*Entomyzon cyanotis*	blue-faced honeyeater		C		16
animals	birds	Meliphagidae	*Gavicalis virescens*	singing honeyeater		C		4
animals	birds	Meliphagidae	*Lichmera indistincta*	brown honeyeater		C		5
animals	birds	Meliphagidae	*Melithreptus lunatus*	white-naped honeyeater		C		1
animals	birds	Meliphagidae	*Philemon corniculatus*	noisy friarbird		C		16
animals	birds	Meropidae	*Merops ornatus*	rainbow bee-eater		C		6
animals	birds	Monarchidae	*Myiagra inquieta*	restless flycatcher		C		1
animals	birds	Monarchidae	*Myiagra rubecula*	leaden flycatcher		C		9
animals	birds	Monarchidae	*Grallina cyanoleuca*	magpie-lark		C		16
animals	birds	Motacillidae	*Anthus novaeseelandiae*	Australasian pipit		C		1
animals	birds	Nectariniidae	*Dicaeum hirundinaceum*	mistletoebird		C		6
animals	birds	Neosittidae	*Daphoenositta chrysoptera*	varied sittella		C		3
animals	birds	Oriolidae	*Oriolus sagittatus*	olive-backed oriole		C		4
animals	birds	Otididae	*Ardeotis australis*	Australian bustard		C		3
animals	birds	Pachycephalidae	*Colluricincla megarhyncha*	little shrike-thrush		C		1
animals	birds	Pachycephalidae	*Pachycephala rufiventris*	rufous whistler		C		8
animals	birds	Pachycephalidae	*Colluricincla harmonica*	grey shrike-thrush		C		9
animals	birds	Pardalotidae	*Pardalotus striatus*	striated pardalote		C		19
animals	birds	Pelecanidae	*Pelecanus conspicillatus*	Australian pelican		C		4
animals	birds	Petroicidae	*Microeca fascinans*	jacky winter		C		2
animals	birds	Petroicidae	*Petroica goodenovii*	red-capped robin		C		1
animals	birds	Phaethontidae	*Phaethon rubricauda*	red-tailed tropicbird		V		1
animals	birds	Phalacrocoracidae	*Phalacrocorax sulcirostris*	little black cormorant		C		6
animals	birds	Phalacrocoracidae	*Microcarbo melanoleucos*	little pied cormorant		C		6
animals	birds	Phalacrocoracidae	*Phalacrocorax varius*	pied cormorant		C		1
animals	birds	Phalacrocoracidae	*Phalacrocorax carbo*	great cormorant		C		1
animals	birds	Phasianidae	*Coturnix ypsilophora*	brown quail		C		2
animals	birds	Phasianidae	*Coturnix pectoralis*	stubble quail		C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Podargidae	*Podargus strigoides*	tawny frogmouth		C		4
animals	birds	Podicipedidae	*Podiceps cristatus*	great crested grebe		C		2
animals	birds	Podicipedidae	*Tachybaptus novaehollandiae*	Australasian grebe		C		5
animals	birds	Pomatostomidae	*Pomatostomus temporalis*	grey-crowned babbler		C		12
animals	birds	Psittacidae	*Aprosmictus erythropterus*	red-winged parrot		C		15
animals	birds	Psittacidae	*Trichoglossus chlorolepidotus*	scaly-breasted lorikeet		C		6
animals	birds	Psittacidae	*Platycercus adscitus*	pale-headed rosella		C		22
animals	birds	Psittacidae	*Trichoglossus haematodus moluccanus*	rainbow lorikeet		C		17
animals	birds	Ptilonorhynchidae	*Ptilonorhynchus maculatus*	spotted bowerbird		C		2
animals	birds	Rallidae	*Fulica atra*	Eurasian coot		C		3
animals	birds	Rallidae	*Porzana fluminea*	Australian spotted crake		C		1
animals	birds	Rallidae	*Gallinula tenebrosa*	dusky moorhen		C		3
animals	birds	Rallidae	*Porphyrio melanotus*	purple swamphen		C		5
animals	birds	Recurvirostridae	*Himantopus himantopus*	black-winged stilt		C		2
animals	birds	Rhipiduridae	*Rhipidura albiscapa*	grey fantail		C		3
animals	birds	Rhipiduridae	*Rhipidura leucophrys*	willie wagtail		C		11
animals	birds	Scolopacidae	*Tringa stagnatilis*	marsh sandpiper		SL		1
animals	birds	Strigidae	*Ninox boobook*	southern boobook		C		18
animals	birds	Strigidae	*Ninox connivens*	barking owl		C		1
animals	birds	Threskiornithidae	*Platalea regia*	royal spoonbill		C		4
animals	birds	Threskiornithidae	*Threskiornis spinicollis*	straw-necked ibis		C		3
animals	birds	Threskiornithidae	*Threskiornis molucca*	Australian white ibis		C		1
animals	birds	Threskiornithidae	*Plegadis falcinellus*	glossy ibis		SL		1
animals	birds	Threskiornithidae	*Platalea flavipes*	yellow-billed spoonbill		C		1
animals	birds	Timaliidae	*Zosterops lateralis*	silvereye		C		1
animals	birds	Turnicidae	*Turnix pyrrhothorax*	red-chested button-quail		C		1
animals	birds	Turnicidae	*Turnix velox*	little button-quail		C		1
animals	birds	Tytonidae	*Tyto novaehollandiae*	masked owl		C		2
animals	birds	Tytonidae	*Tyto delicatula*	eastern barn owl		C		1
animals	mammals	Bovidae	*Bos taurus*	European cattle	Y			1
animals	mammals	Canidae	*Canis familiaris (dingo)*	dingo				1
animals	mammals	Canidae	*Canis familiaris*	dog	Y			2
animals	mammals	Dasyuridae	*Planigale tenuirostris*	narrow-nosed planigale		C		1
animals	mammals	Emballonuridae	*Saccolaimus flaviventris*	yellow-bellied sheathtail bat		C		5
animals	mammals	Felidae	*Felis catus*	cat	Y			1
animals	mammals	Leporidae	*Oryctolagus cuniculus*	rabbit	Y			2
animals	mammals	Macropodidae	*Wallabia bicolor*	swamp wallaby		C		1
animals	mammals	Macropodidae	*Macropus giganteus*	eastern grey kangaroo		C		2
animals	mammals	Macropodidae	*Macropus dorsalis*	black-striped wallaby		C		2
animals	mammals	Macropodidae	*Macropus parryi*	whiptail wallaby		C		1
animals	mammals	Miniopteridae	*Miniopterus australis*	little bent-wing bat		C		1
animals	mammals	Miniopteridae	*Miniopterus schreibersii oceanensis*	eastern bent-wing bat		C		1
animals	mammals	Molossidae	*Mormopterus ridei*	eastern free-tailed bat		C		1
animals	mammals	Molossidae	*Mormopterus lumsdenae*	northern free-tailed bat		C		1
animals	mammals	Molossidae	*Chaerephon jobensis*	northern freetail bat		C		1
animals	mammals	Muridae	*Hydromys chrysogaster*	water rat		C		1

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animals	mammals	Muridae	*Pseudomys gracilicaudatus*	eastern chestnut mouse		C		2
animals	mammals	Muridae	*Rattus sp.*					2/2
animals	mammals	Peramelidae	*Isoodon macrourus*	northern brown bandicoot		C		1
animals	mammals	Petauridae	*Petaurus sp.*					1
animals	mammals	Petauridae	*Petaurus breviceps*	sugar glider		C		2
animals	mammals	Phalangeridae	*Trichosurus vulpecula*	common brushtail possum		C		1
animals	mammals	Phascolarctidae	*Phascolarctos cinereus*	koala		V	V	9
animals	mammals	Potoroidae	*Aepyprymnus rufescens*	rufous bettong		C		1
animals	mammals	Pseudocheiridae	*Petauroides volans*	greater glider		V	V	6
animals	mammals	Suidae	*Sus scrofa*	pig	Y			1
animals	mammals	Vespertilionidae	*Chalinolobus nigrogriseus*	hoary wattled bat		C		1
animals	mammals	Vespertilionidae	*Vespadelus baverstocki*	inland forest bat		C		1
animals	mammals	Vespertilionidae	*Scotorepens balstoni*	inland broad-nosed bat		C		3
animals	mammals	Vespertilionidae	*Chalinolobus picatus*	little pied bat		C		4
animals	mammals	Vespertilionidae	*Chalinolobus gouldii*	Gould's wattled bat		C		1
animals	mammals	Vespertilionidae	*Nyctophilus gouldi*	Gould's long-eared bat		C		1
animals	mammals	Vespertilionidae	*Scotorepens sp.*					3
animals	mammals	Vespertilionidae	*Nyctophilus sp.*					1
animals	mammals	Vespertilionidae	*Scotorepens sp. (Parnaby)*	central-eastern broad-nosed bat		C		1
animals	mammals	Vombatidae	*Lasiorhinus krefftii*	northern hairy-nosed wombat		E	CE	1
animals	reptiles	Agamidae	*Diporiphora nobbi*	nobbi		C		2/2
animals	reptiles	Agamidae	*Diporiphora australis*	tommy roundhead		C		4/1
animals	reptiles	Boidae	*Antaresia maculosa*	spotted python		C		2
animals	reptiles	Carphodactylidae	*Nephrurus asper*	spiny knob-tailed gecko		C		1
animals	reptiles	Diplodactylidae	*Oedura monilis sensu lato*	ocellated velvet gecko		C		6/1
animals	reptiles	Diplodactylidae	*Diplodactylus vittatus*	wood gecko		C		3/1
animals	reptiles	Diplodactylidae	*Strophurus williamsi*	soft-spined gecko		C		1
animals	reptiles	Elapidae	*Cryptophis boschmai*	Carpentaria whip snake		C		1
animals	reptiles	Elapidae	*Suta suta*	myall snake		C		1
animals	reptiles	Elapidae	*Denisonia maculata*	ornamental snake		V	V	19
animals	reptiles	Elapidae	*Brachyurophis australis*	coral snake		C		1
animals	reptiles	Elapidae	*Furina ornata*	orange-naped snake		C		1
animals	reptiles	Gekkonidae	*Heteronotia binoei*	Bynoe's gecko		C		26/1
animals	reptiles	Gekkonidae	*Gehyra dubia*	dubious dtella		C		12/1
animals	reptiles	Gekkonidae	*Gehyra versicolor*			C		2
animals	reptiles	Gekkonidae	*Gehyra catenata*	chain-backed dtella		C		1
animals	reptiles	Pygopodidae	*Paradelma orientalis*	brigalow scaly-foot		C		1
animals	reptiles	Pygopodidae	*Lialis burtonis*	Burton's legless lizard		C		2
animals	reptiles	Scincidae	*Pygmaeascincus timlowi*	dwarf litter-skink		C		2/1
animals	reptiles	Scincidae	*Glaphyromorphus punctulatus*	fine-spotted mulch-skink		C		2/1
animals	reptiles	Scincidae	*Carlia pectoralis sensu lato*			C		13/2
animals	reptiles	Scincidae	*Cryptoblepharus virgatus sensu lato*			C		5
animals	reptiles	Scincidae	*Ctenotus taeniolatus*	copper-tailed skink		C		2
animals	reptiles	Scincidae	*Morethia boulengeri*	south-eastern morethia skink		C		4
animals	reptiles	Scincidae	*Lygisaurus foliorum*	tree-base litter-skink		C		6/1
animals	reptiles	Scincidae	*Ctenotus leonhardii*	Leonhardi's ctenotus		C		1

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animals	reptiles	Scincidae	*Cryptoblepharus sp.*					1/1
animals	reptiles	Scincidae	*Tiliqua scincoides*	eastern blue-tongued lizard		C		1
animals	reptiles	Scincidae	*Ctenotus spaldingi*	straight-browed ctenotus		C		3
animals	reptiles	Scincidae	*Carlia schmeltzii*	robust rainbow-skink		C		6/1
animals	reptiles	Scincidae	*Lerista fragilis*	eastern mulch slider		C		11/1
animals	reptiles	Scincidae	*Eulamprus sp.*					1
animals	reptiles	Scincidae	*Carlia rubigo*	orange-flanked rainbow skink		C		1
animals	reptiles	Scincidae	*Carlia munda*	shaded-litter rainbow-skink		C		1
animals	reptiles	Typhlopidae	*Anilios proximus*	proximus blind snake		C		1
fungi	Agaricomycetes	Strophariaceae	*Agrocybe*					1/1
fungi	lecanoromycetes	Parmeliaceae	*Xanthoparmelia exuviata*			C		1/1
plants	land plants	Acanthaceae	*Rostellularia adscendens var. clementii*			C		1/1
plants	land plants	Acanthaceae	*Rostellularia adscendens var. hispida*			C		1/1
plants	land plants	Acanthaceae	*Pseuderanthemum variabile*	pastel flower		C		1
plants	land plants	Acanthaceae	*Rostellularia adscendens*			C		2
plants	land plants	Acanthaceae	*Brunoniella australis*	blue trumpet		C		3
plants	land plants	Aizoaceae	*Trianthema triquetra*	red spinach		C		1
plants	land plants	Aizoaceae	*Trianthema portulacastrum*	black pigweed	Y			3
plants	land plants	Amaranthaceae	*Alternanthera denticulata var. micrantha*			C		2
plants	land plants	Amaranthaceae	*Alternanthera denticulata*	lesser joyweed		C		1
plants	land plants	Amaranthaceae	*Deeringia amaranthoides*	redberry		C		1/1
plants	land plants	Amaranthaceae	*Gomphrena celosioides*	gomphrena weed	Y			2
plants	land plants	Amaranthaceae	*Achyranthes aspera*			C		2
plants	land plants	Amaranthaceae	*Alternanthera*					1
plants	land plants	Amaryllidaceae	*Proiphys cunninghamii*	Moreton Bay lily		C		1/1
plants	land plants	Apocynaceae	*Alstonia constricta*	bitterbark		C		2
plants	land plants	Apocynaceae	*Cerbera dumicola*			NT		1/1
plants	land plants	Apocynaceae	*Carissa ovata*	currantbush		C		5
plants	land plants	Apocynaceae	*Marsdenia viridiflora*			C		1
plants	land plants	Apocynaceae	*Parsonsia eucalyptophylla*	gargaloo		C		1
plants	land plants	Apocynaceae	*Marsdenia viridiflora subsp. viridiflora*			C		1/1
plants	land plants	Apocynaceae	*Marsdenia microlepis*			C		2/1
plants	land plants	Apocynaceae	*Parsonsia*					1
plants	land plants	Araliaceae	*Astrotricha biddulphiana*			C		1/1
plants	land plants	Asteraceae	*Chrysocephalum apiculatum*	yellow buttons		C		1
plants	land plants	Asteraceae	*Apowollastonia spilanthoides*			C		3/1
plants	land plants	Asteraceae	*Parthenium hysterophorus*	parthenium weed	Y			14/1
plants	land plants	Asteraceae	*Pterocaulon sphacelatum*	applebush		C		1
plants	land plants	Asteraceae	*Acanthospermum hispidum*	star burr	Y			1
plants	land plants	Asteraceae	*Euchiton involucratus*			C		1
plants	land plants	Asteraceae	*Cyanthillium cinereum*			C		3
plants	land plants	Asteraceae	*Pterocaulon redolens*			C		1
plants	land plants	Asteraceae	*Peripleura hispidula*			C		1
plants	land plants	Asteraceae	*Rutidosis leucantha*			C		1/1
plants	land plants	Asteraceae	*Bidens pilosa*		Y			2
plants	land plants	Asteraceae	*Vittadinia sulcata*	native daisy		C		1

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plants	land plants	Asteraceae	*Praxelis clematidea*		Y			1/1
plants	land plants	Asteraceae	*Blumea axillaris*			C		2/2
plants	land plants	Asteraceae	*Eclipta prostrata*	white eclipta	Y			1/1
plants	land plants	Asteraceae	*Olearia xerophila*			C		3
plants	land plants	Asteraceae	*Tridax procumbens*	tridax daisy	Y			2/1
plants	land plants	Asteraceae	*Emilia sonchifolia*		Y			2
plants	land plants	Bignoniaceae	*Pandorea pandorana*	wonga vine		C		2
plants	land plants	Boraginaceae	*Ehretia membranifolia*	weeping koda		C		2
plants	land plants	Brassicaceae	*Cardamine hirsuta*	common bittercress	Y			1/1
plants	land plants	Cactaceae	*Opuntia tomentosa*	velvety tree pear	Y			6
plants	land plants	Cactaceae	*Harrisia martinii*		Y			3
plants	land plants	Cactaceae	*Opuntia stricta*		Y			1
plants	land plants	Cactaceae	*Opuntia*					1
plants	land plants	Caesalpiniaceae	*Chamaecrista absus var. absus*			C		1/1
plants	land plants	Caesalpiniaceae	*Lysiphyllum*					1
plants	land plants	Caesalpiniaceae	*Cassia brewsteri*			C		7
plants	land plants	Caesalpiniaceae	*Senna barclayana*			C		1
plants	land plants	Caesalpiniaceae	*Lysiphyllum hookeri*	Queensland ebony		C		3
plants	land plants	Caesalpiniaceae	*Senna coronilloides*			C		1/1
plants	land plants	Caesalpiniaceae	*Lysiphyllum carronii*	ebony tree		C		2
plants	land plants	Campanulaceae	*Wahlenbergia gracilis*	sprawling bluebell		C		3
plants	land plants	Capparaceae	*Capparis anomala*			C		2
plants	land plants	Capparaceae	*Capparis umbonata*			C		1/1
plants	land plants	Capparaceae	*Capparis canescens*			C		6
plants	land plants	Capparaceae	*Capparis*					1
plants	land plants	Capparaceae	*Capparis lasiantha*	nipan		C		6
plants	land plants	Capparaceae	*Capparis loranthifolia var. bancroftii*			C		1/1
plants	land plants	Caryophyllaceae	*Polycarpaea corymbosa*			C		2/1
plants	land plants	Casuarinaceae	*Casuarina cristata*	belah		C		1
plants	land plants	Casuarinaceae	*Allocasuarina luehmannii*	bull oak		C		1
plants	land plants	Casuarinaceae	*Casuarina cunninghamiana subsp. cunninghamiana*			C		4
plants	land plants	Celastraceae	*Denhamia disperma*			C		3
plants	land plants	Celastraceae	*Denhamia bilocularis*			C		1
plants	land plants	Celastraceae	*Elaeodendron australe*			C		1
plants	land plants	Chenopodiaceae	*Dysphania melanocarpa forma melanocarpa*			C		1/1
plants	land plants	Chenopodiaceae	*Maireana*					1
plants	land plants	Chenopodiaceae	*Sclerolaena*					1
plants	land plants	Chenopodiaceae	*Einadia nutans*			C		1
plants	land plants	Chenopodiaceae	*Enchylaena tomentosa var. tomentosa*			C		6
plants	land plants	Chenopodiaceae	*Sclerolaena muricata var. muricata*			C		1/1
plants	land plants	Chenopodiaceae	*Einadia nutans subsp. linifolia*			C		1/1
plants	land plants	Chenopodiaceae	*Maireana microphylla*			C		1
plants	land plants	Chenopodiaceae	*Enchylaena tomentosa*			C		1
plants	land plants	Chenopodiaceae	*Rhagodia parabolica*			C		1/1
plants	land plants	Chenopodiaceae	*Salsola australis*			C		4
plants	land plants	Clusiaceae	*Hypericum gramineum*			C		1/1

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plants	land plants	Combretaceae	*Terminalia oblongata subsp. oblongata*			C		1
plants	land plants	Commelinaceae	*Murdannia graminea*	murdannia		C		1/1
plants	land plants	Commelinaceae	*Commelina diffusa*	wandering jew		C		2
plants	land plants	Convolvulaceae	*Evolvulus alsinoides*			C		5
plants	land plants	Convolvulaceae	*Ipomoea lonchophylla*			C		1/1
plants	land plants	Convolvulaceae	*Ipomoea plebeia*	bellvine		C		1
plants	land plants	Convolvulaceae	*Ipomoea brownii*			C		1/1
plants	land plants	Cucurbitaceae	*Cucumis argenteus*			C		1/1
plants	land plants	Cyperaceae	*Scleria sphacelata*			C		2
plants	land plants	Cyperaceae	*Cyperus exaltatus*	tall flatsedge		C		2
plants	land plants	Cyperaceae	*Cyperus gracilis*			C		1
plants	land plants	Cyperaceae	*Cyperus gilesii*			C		1
plants	land plants	Cyperaceae	*Cyperus distans*			C		2
plants	land plants	Cyperaceae	*Schoenoplectiella dissachantha*			C		2
plants	land plants	Cyperaceae	*Gahnia aspera*			C		2
plants	land plants	Cyperaceae	*Cyperus*					1
plants	land plants	Cyperaceae	*Cyperus alopecuroides*			C		1/1
plants	land plants	Cyperaceae	*Eleocharis philippinensis*			C		1/1
plants	land plants	Cyperaceae	*Cyperus isabellinus*			C		1/1
plants	land plants	Cyperaceae	*Cyperus fulvus*			C		1
plants	land plants	Ebenaceae	*Diospyros humilis*	small-leaved ebony		C		3
plants	land plants	Erythroxylaceae	*Erythroxylum australe*	cocaine tree		C		8
plants	land plants	Euphorbiaceae	*Ricinus communis*	castor oil bush	Y			1
plants	land plants	Euphorbiaceae	*Croton phebalioides*	narrow-leaved croton		C		1
plants	land plants	Euphorbiaceae	*Euphorbia drummondii*			C		2
plants	land plants	Euphorbiaceae	*Mallotus philippensis*	red kamala		C		1
plants	land plants	Euphorbiaceae	*Euphorbia hyssopifolia*		Y			1
plants	land plants	Euphorbiaceae	*Euphorbia tannensis subsp. eremophila*			C		2
plants	land plants	Euphorbiaceae	*Euphorbia hirta*		Y			1
plants	land plants	Euphorbiaceae	*Euphorbia*					2
plants	land plants	Euphorbiaceae	*Alchornea ilicifolia*	native holly		C		1
plants	land plants	Fabaceae	*Zornia*					1
plants	land plants	Fabaceae	*Tephrosia filipes var. (Mt Blackjack A.R.Bean+ 7332)*			C		1/1
plants	land plants	Fabaceae	*Tephrosia*					2/2
plants	land plants	Fabaceae	*Indigofera*					1
plants	land plants	Fabaceae	*Zornia areolata*			C		1/1
plants	land plants	Fabaceae	*Glycine tabacina*	glycine pea		C		4
plants	land plants	Fabaceae	*Lablab purpureus*	lablab	Y			1/1
plants	land plants	Fabaceae	*Vigna lanceolata*			C		1
plants	land plants	Fabaceae	*Canavalia papuana*	wild jack bean		C		1/1
plants	land plants	Fabaceae	*Hovea tholiformis*			C		1
plants	land plants	Fabaceae	*Rhynchosia minima*			C		15
plants	land plants	Fabaceae	*Crotalaria montana*			C		1
plants	land plants	Fabaceae	*Glycine tomentella*	woolly glycine		C		1/1
plants	land plants	Fabaceae	*Indigofera hirsuta*	hairy indigo		C		1/1

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plants	land plants	Fabaceae	*Zornia muelleriana*			C		1
plants	land plants	Fabaceae	*Aeschynomene indica*	budda pea		C		1
plants	land plants	Fabaceae	*Galactia tenuiflora*			C		1
plants	land plants	Fabaceae	*Stylosanthes hamata*		Y			6
plants	land plants	Fabaceae	*Stylosanthes scabra*		Y			8
plants	land plants	Fabaceae	*Alysicarpus muelleri*			C		1/1
plants	land plants	Fabaceae	*Indigofera linifolia*			C		1
plants	land plants	Fabaceae	*Pycnospora lutescens*	pycnospora		C		1/1
plants	land plants	Fabaceae	*Tephrosia flagellaris*			C		1/1
plants	land plants	Fabaceae	*Macroptilium atropurpureum*	siratro	Y			5
plants	land plants	Fabaceae	*Galactia tenuiflora var. lucida*			C		1/1
plants	land plants	Fabaceae	*Tephrosia filipes subsp. filipes*			C		1/1
plants	land plants	Fabaceae	*Sesbania cannabina var. cannabina*			C		2
plants	land plants	Fabaceae	*Zornia muriculata subsp. angustata*			C		1/1
plants	land plants	Fabaceae	*Crotalaria mitchellii subsp. mitchellii*			C		1
plants	land plants	Fabaceae	*Macroptilium lathyroides var. semierectum*		Y			2
plants	land plants	Fabaceae	*Desmodium*					1
plants	land plants	Goodeniaceae	*Goodenia*					2
plants	land plants	Goodeniaceae	*Goodenia sp. (Mt Castletower M.D.Crisp 2753)*			C		1/1
plants	land plants	Goodeniaceae	*Goodenia rotundifolia*			C		1
plants	land plants	Goodeniaceae	*Brunonia australis*	blue pincushion		C		1
plants	land plants	Hemerocallidaceae	*Dianella*					1
plants	land plants	Hemerocallidaceae	*Dianella longifolia*			C		1
plants	land plants	Hemerocallidaceae	*Dianella nervosa*			C		1
plants	land plants	Lamiaceae	*Clerodendrum*					1
plants	land plants	Lamiaceae	*Plectranthus*					2
plants	land plants	Lamiaceae	*Ocimum caryophyllinum*			C		1/1
plants	land plants	Lamiaceae	*Basilicum polystachyon*			C		2
plants	land plants	Lamiaceae	*Clerodendrum floribundum*			C		2
plants	land plants	Lauraceae	*Cassytha pubescens*	downy devil's twine		C		1
plants	land plants	Laxmanniaceae	*Laxmannia gracilis*	slender wire lily		C		1
plants	land plants	Laxmanniaceae	*Lomandra filiformis*			C		1
plants	land plants	Laxmanniaceae	*Lomandra longifolia*			C		1
plants	land plants	Laxmanniaceae	*Eustrephus latifolius*	wombat berry		C		1
plants	land plants	Laxmanniaceae	*Lomandra confertifolia subsp. pallida*			C		3
plants	land plants	Loganiaceae	*Mitrasacme micrantha*			C		1/1
plants	land plants	Malvaceae	*Sida everistiana*			C		1/1
plants	land plants	Malvaceae	*Sida sp. (Musselbrook M.B.Thomas+ MRS437)*			C		3
plants	land plants	Malvaceae	*Malvastrum americanum var. stellatum*			C		1/1
plants	land plants	Malvaceae	*Sida rohlenae subsp. rohlenae*			C		2
plants	land plants	Malvaceae	*Sida*					12
plants	land plants	Malvaceae	*Sida spinosa*	spiny sida	Y			3/2
plants	land plants	Malvaceae	*Sida corrugata*			C		1/1
plants	land plants	Malvaceae	*Sida cordifolia*		Y			6
plants	land plants	Malvaceae	*Sida trichopoda*			C		2/1
plants	land plants	Malvaceae	*Abutilon auritum*	Chinese lantern		C		1/1

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plants	land plants	Malvaceae	*Hibiscus sturtii*			C		1/1
plants	land plants	Malvaceae	*Sida hackettiana*			C		3
plants	land plants	Malvaceae	*Gossypium australe*			C		1/1
plants	land plants	Malvaceae	*Hibiscus vitifolius*			C		1/1
plants	land plants	Malvaceae	*Hibiscus meraukensis*	Merauke hibiscus		C		1
plants	land plants	Malvaceae	*Abutilon leucopetalum*			C		12
plants	land plants	Malvaceae	*Malvastrum americanum*		Y			13
plants	land plants	Marsileaceae	*Marsilea drummondii*	common nardoo		C		1
plants	land plants	Marsileaceae	*Marsilea mutica*	shiny nardoo		C		1
plants	land plants	Meliaceae	*Owenia acidula*	emu apple		C		1
plants	land plants	Menispermaceae	*Tinospora smilacina*	snakevine		C		2
plants	land plants	Mimosaceae	*Acacia leiocalyx subsp. leiocalyx*			C		1
plants	land plants	Mimosaceae	*Acacia julifera subsp. curvinervia*			C		2/2
plants	land plants	Mimosaceae	*Acacia cowleana*			C		1/1
plants	land plants	Mimosaceae	*Acacia oswaldii*	miljee		C		1/1
plants	land plants	Mimosaceae	*Acacia salicina*	doolan		C		5
plants	land plants	Mimosaceae	*Acacia shirleyi*	lancewood		C		67/2
plants	land plants	Mimosaceae	*Acacia amblygona*	fan-leaf wattle		C		2/1
plants	land plants	Mimosaceae	*Acacia fodinalis*			C		1/1
plants	land plants	Mimosaceae	*Acacia leiocalyx*			C		1
plants	land plants	Mimosaceae	*Acacia flavescens*	toothed wattle		C		4
plants	land plants	Mimosaceae	*Acacia rhodoxylon*	ringy rosewood		C		48/1
plants	land plants	Mimosaceae	*Albizia canescens*			C		2/1
plants	land plants	Mimosaceae	*Acacia burdekensis*			C		6/1
plants	land plants	Mimosaceae	*Acacia falciformis*	broad-leaved hickory		C		2
plants	land plants	Mimosaceae	*Acacia harpophylla*	brigalow		C		2
plants	land plants	Mimosaceae	*Acacia dietrichiana*			C		1/1
plants	land plants	Mimosaceae	*Vachellia bidwillii*			C		3/3
plants	land plants	Mimosaceae	*Acacia bancroftiorum*			C		1/1
plants	land plants	Mimosaceae	*Archidendropsis basaltica*	red lancewood		C		2
plants	land plants	Mimosaceae	*Archidendropsis thozetiana*			C		1
plants	land plants	Mimosaceae	*Acacia excelsa subsp. excelsa*			C		2
plants	land plants	Mimosaceae	*Acacia julifera subsp. julifera*			C		1/1
plants	land plants	Mimosaceae	*Neptunia gracilis forma gracilis*			C		6/1
plants	land plants	Moraceae	*Ficus rubiginosa forma rubiginosa*			C		1/1
plants	land plants	Moraceae	*Ficus opposita*			C		4
plants	land plants	Myrtaceae	*Myrtaceae*					1
plants	land plants	Myrtaceae	*Eucalyptus*					2
plants	land plants	Myrtaceae	*Eucalyptus crebra*	narrow-leaved red ironbark		C		44
plants	land plants	Myrtaceae	*Eucalyptus exserta*	Queensland peppermint		C		2
plants	land plants	Myrtaceae	*Eucalyptus populnea*	poplar box		C		32
plants	land plants	Myrtaceae	*Melaleuca bracteata*			C		2
plants	land plants	Myrtaceae	*Corymbia dallachiana*			C		4
plants	land plants	Myrtaceae	*Corymbia tessellaris*	Moreton Bay ash		C		15
plants	land plants	Myrtaceae	*Eucalyptus tereticornis subsp. tereticornis*			C		14
plants	land plants	Myrtaceae	*Corymbia clarksoniana*			C		33/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Myrtaceae	*Eucalyptus cambageana*	Dawson gum		C		5
plants	land plants	Myrtaceae	*Melaleuca fluviatilis*			C		1/1
plants	land plants	Myrtaceae	*Melaleuca leucadendra*	broad-leaved tea-tree		C		2
plants	land plants	Myrtaceae	*Corymbia erythrophloia*	variable-barked bloodwood		C		2/1
plants	land plants	Myrtaceae	*Eucalyptus orgadophila*	mountain coolibah		C		1
plants	land plants	Myrtaceae	*Eucalyptus apothalassica*			C		4
plants	land plants	Myrtaceae	*Lysicarpus angustifolius*	budgeroo		C		5
plants	land plants	Myrtaceae	*Corymbia citriodora subsp. citriodora*			C		45
plants	land plants	Myrtaceae	*Eucalyptus camaldulensis subsp. acuta*			C		2
plants	land plants	Myrtaceae	*Eucalyptus crebra x Eucalyptus populnea*			C		5
plants	land plants	Myrtaceae	*Melaleuca*					1
plants	land plants	Myrtaceae	*Corymbia*					1
plants	land plants	Myrtaceae	*Eucalyptus cloeziana*	Gympie messmate		C		3
plants	land plants	Nyctaginaceae	*Boerhavia*					2
plants	land plants	Orchidaceae	*Cymbidium canaliculatum*			C		3
plants	land plants	Oxalidaceae	*Oxalis*					3
plants	land plants	Phyllanthaceae	*Breynia oblongifolia*			C		1
plants	land plants	Phyllanthaceae	*Phyllanthus virgatus*			C		5
plants	land plants	Phyllanthaceae	*Phyllanthus fuernrohrii*			C		1
plants	land plants	Phyllanthaceae	*Phyllanthus sp. (Pentland R.J.Cumming 9742)*			C		2
plants	land plants	Phyllanthaceae	*Phyllanthus maderaspatensis var. maderaspatensis*			C		4
plants	land plants	Picrodendraceae	*Petalostigma pubescens*	quinine tree		C		11
plants	land plants	Pittosporaceae	*Bursaria*					2
plants	land plants	Pittosporaceae	*Bursaria spinosa subsp. spinosa*			C		4
plants	land plants	Plantaginaceae	*Scoparia dulcis*	scoparia	Y			1
plants	land plants	Poaceae	*Eremochloa bimaculata*	poverty grass		C		2/1
plants	land plants	Poaceae	*Heteropogon contortus*	black speargrass		C		7
plants	land plants	Poaceae	*Iseilema membranaceum*	small flinders grass		C		1/1
plants	land plants	Poaceae	*Sporobolus natalensis*		Y			1/1
plants	land plants	Poaceae	*Alloteropsis semialata*	cockatoo grass		C		1
plants	land plants	Poaceae	*Aristida queenslandica*			C		2
plants	land plants	Poaceae	*Arundinella nepalensis*	reedgrass		C		1
plants	land plants	Poaceae	*Bothriochloa decipiens*			C		1
plants	land plants	Poaceae	*Bothriochloa ewartiana*	desert bluegrass		C		5/1
plants	land plants	Poaceae	*Brachyachne convergens*	common native couch		C		2
plants	land plants	Poaceae	*Enneapogon polyphyllus*	leafy nineawn		C		1/1
plants	land plants	Poaceae	*Moorochloa eruciformis*		Y			1/1
plants	land plants	Poaceae	*Panicum queenslandicum*			C		1
plants	land plants	Poaceae	*Paspalidium criniforme*			C		1
plants	land plants	Poaceae	*Paspalidium globoideum*	sago grass		C		1/1
plants	land plants	Poaceae	*Urochloa mosambicensis*	sabi grass	Y			4
plants	land plants	Poaceae	*Dactyloctenium radulans*	button grass		C		1
plants	land plants	Poaceae	*Eragrostis leptostachya*			C		1
plants	land plants	Poaceae	*Eragrostis megalosperma*			C		1/1
plants	land plants	Poaceae	*Sporobolus jacquemontii*		Y			1/1
plants	land plants	Poaceae	*Walwhalleya subxerophila*			C		1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Poaceae	*Cymbopogon queenslandicus*			C		1
plants	land plants	Poaceae	*Digitaria divaricatissima*	spreading umbrella grass		C		1/1
plants	land plants	Poaceae	*Hyparrhenia rufa subsp. rufa*		Y			2/2
plants	land plants	Poaceae	*Cynodon dactylon var. dactylon*		Y			1
plants	land plants	Poaceae	*Sorghum nitidum forma aristatum*			C		1/1
plants	land plants	Poaceae	*Megathyrsus maximus var. maximus*		Y			1
plants	land plants	Poaceae	*Aristida holathera var. holathera*			C		1
plants	land plants	Poaceae	*Panicum decompositum var. tenuius*			C		1/1
plants	land plants	Poaceae	*Chloris divaricata var. divaricata*	slender chloris		C		1
plants	land plants	Poaceae	*Dichanthium sericeum subsp. sericeum*			C		3
plants	land plants	Poaceae	*Aristida queenslandica var. dissimilis*			C		1
plants	land plants	Poaceae	*Panicum queenslandicum var. acuminatum*			C		1/1
plants	land plants	Poaceae	*Aristida jerichoensis var. subspinulifera*			C		1/1
plants	land plants	Poaceae	*Panicum queenslandicum var. queenslandicum*			C		1/1
plants	land plants	Poaceae	*Poaceae*					2
plants	land plants	Poaceae	*Aristida*					6
plants	land plants	Poaceae	*Urochloa*					2
plants	land plants	Poaceae	*Digitaria*					1/1
plants	land plants	Poaceae	*Eriochloa*					1
plants	land plants	Poaceae	*Eragrostis*					3
plants	land plants	Poaceae	*Paspalidium*					2
plants	land plants	Poaceae	*Bothriochloa*					1
plants	land plants	Poaceae	*Perotis rara*	comet grass		C		1
plants	land plants	Poaceae	*Eriachne rara*			C		1/1
plants	land plants	Poaceae	*Eulalia aurea*	silky browntop		C		4/1
plants	land plants	Poaceae	*Aristida annua*			V	V	1/1
plants	land plants	Poaceae	*Chloris gayana*	rhodes grass	Y			7
plants	land plants	Poaceae	*Melinis repens*	red natal grass	Y			9
plants	land plants	Poaceae	*Aristida ramosa*	purple wiregrass		C		4/1
plants	land plants	Poaceae	*Chloris inflata*	purpletop chloris	Y			12
plants	land plants	Poaceae	*Panicum effusum*			C		4
plants	land plants	Poaceae	*Setaria surgens*			C		2
plants	land plants	Poaceae	*Aristida lignosa*			C		1/1
plants	land plants	Poaceae	*Chloris truncata*			C		1
plants	land plants	Poaceae	*Digitaria orbata*			C		2
plants	land plants	Poaceae	*Dinebra ligulata*			C		1/1
plants	land plants	Poaceae	*Eriochloa crebra*	spring grass		C		5
plants	land plants	Poaceae	*Themeda triandra*	kangaroo grass		C		9
plants	land plants	Poaceae	*Aristida calycina*			C		1
plants	land plants	Poaceae	*Aristida contorta*	bunched kerosene grass		C		1
plants	land plants	Poaceae	*Cenchrus ciliaris*		Y			20
plants	land plants	Poaceae	*Chloris pectinata*	comb chloris		C		1/1
plants	land plants	Poaceae	*Entolasia stricta*	wiry panic		C		4
plants	land plants	Poaceae	*Eriochloa procera*	slender cupgrass		C		3
plants	land plants	Poaceae	*Phalaris paradoxa*	paradoxa grass	Y			1/1
plants	land plants	Poaceae	*Sporobolus caroli*	fairy grass		C		4

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Poaceae	*Thellungia advena*	coolibah grass		C		1/1
plants	land plants	Poaceae	*Aristida benthamii*			C		2/1
plants	land plants	Poaceae	*Aristida latifolia*	feathertop wiregrass		C		2/2
plants	land plants	Poaceae	*Aristida leptopoda*	white speargrass		C		1/1
plants	land plants	Poaceae	*Aristida personata*			C		1
plants	land plants	Poaceae	*Astrebla elymoides*	hoop mitchell grass		C		1/1
plants	land plants	Poaceae	*Astrebla squarrosa*	bull mitchell grass		C		1
plants	land plants	Poaceae	*Chrysopogon fallax*			C		3
plants	land plants	Poaceae	*Digitaria bicornis*			C		1
plants	land plants	Poaceae	*Eragrostis brownii*	Brown's lovegrass		C		4
plants	land plants	Poaceae	*Eragrostis sororia*			C		3
plants	land plants	Poaceae	*Aristida gracilipes*			C		1/1
plants	land plants	Poaceae	*Cymbopogon ambiguus*	lemon grass		C		5/1
plants	land plants	Poaceae	*Digitaria ammophila*	silky umbrella grass		C		4/1
plants	land plants	Poaceae	*Enteropogon ramosus*			C		1/1
plants	land plants	Poaceae	*Eragrostis elongata*			C		1
plants	land plants	Poaceae	*Eragrostis speciosa*			C		1/1
plants	land plants	Poaceae	*Megathyrsus maximus*		Y			5
plants	land plants	Poaceae	*Paspalidium gracile*	slender panic		C		5/1
plants	land plants	Poaceae	*Sporobolus sessilis*			C		1/1
plants	land plants	Poaceae	*Urochloa humidicola*		Y			1/1
plants	land plants	Poaceae	*Bothriochloa pertusa*		Y			5
plants	land plants	Poaceae	*Cymbopogon refractus*	barbed-wire grass		C		3/1
plants	land plants	Poaceae	*Dichanthium sericeum*			C		1
plants	land plants	Poaceae	*Digitaria lanceolata*			C		1/1
plants	land plants	Poaceae	*Enneapogon truncatus*			C		1/1
plants	land plants	Poaceae	*Eragrostis tenellula*	delicate lovegrass		C		1
plants	land plants	Poaceae	*Panicum decompositum*			C		8
plants	land plants	Poaceae	*Cymbopogon bombycinus*	silky oilgrass		C		1
plants	land plants	Poaceae	*Digitaria breviglumis*			C		3
plants	land plants	Poaceae	*Elytrophorus spicatus*			C		1
plants	land plants	Poaceae	*Eragrostis parviflora*	weeping lovegrass		C		3
plants	land plants	Polygonaceae	*Fallopia convolvulus*	black bindweed	Y			1
plants	land plants	Pontederiaceae	*Monochoria cyanea*			C		2
plants	land plants	Portulacaceae	*Portulaca pilosa*		Y			2
plants	land plants	Portulacaceae	*Portulaca oleracea*	pigweed	Y			4
plants	land plants	Portulacaceae	*Portulaca*					1/1
plants	land plants	Proteaceae	*Persoonia amaliae*			C		4/2
plants	land plants	Proteaceae	*Grevillea*					2
plants	land plants	Proteaceae	*Grevillea parallela*			C		3/2
plants	land plants	Proteaceae	*Persoonia falcata*			C		6
plants	land plants	Proteaceae	*Grevillea pteridifolia*	golden parrot tree		C		2
plants	land plants	Pteridaceae	*Cheilanthes sieberi subsp. sieberi*			C		3
plants	land plants	Pteridaceae	*Cheilanthes*					1
plants	land plants	Pteridaceae	*Cheilanthes distans*	bristly cloak fern		C		1
plants	land plants	Putranjivaceae	*Drypetes deplanchei*	grey boxwood		C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Rhamnaceae	*Alphitonia excelsa*	soap tree		C		9
plants	land plants	Rhamnaceae	*Ventilago viminalis*	supplejack		C		1
plants	land plants	Rubiaceae	*Larsenaikia ochreata*			C		5
plants	land plants	Rubiaceae	*Psydrax oleifolia*			C		1
plants	land plants	Rubiaceae	*Pavetta granitica*			C		1/1
plants	land plants	Rubiaceae	*Spermacoce brachystema*			C		1
plants	land plants	Rubiaceae	*Pavetta australiensis var. australiensis*			C		1/1
plants	land plants	Rubiaceae	*Spermacoce multicaulis*			C		3
plants	land plants	Rubiaceae	*Coelospermum reticulatum*			C		2/1
plants	land plants	Rubiaceae	*Psydrax odorata subsp. australiana*			C		1/1
plants	land plants	Rutaceae	*Citrus glauca*			C		1
plants	land plants	Rutaceae	*Geijera salicifolia*	brush wilga		C		1
plants	land plants	Sapindaceae	*Alectryon diversifolius*	scrub boonaree		C		3/1
plants	land plants	Sapindaceae	*Dodonaea lanceolata*			C		2
plants	land plants	Sapindaceae	*Atalaya hemiglauca*			C		5
plants	land plants	Scrophulariaceae	*Eremophila maculata*			C		2
plants	land plants	Scrophulariaceae	*Eremophila mitchellii*			C		4
plants	land plants	Solanaceae	*Solanum seaforthianum*	Brazilian nightshade	Y			1/1
plants	land plants	Solanaceae	*Solanum parvifolium subsp. parvifolium*			C		1/1
plants	land plants	Solanaceae	*Solanum ellipticum*	potato bush		C		1
plants	land plants	Sparrmanniaceae	*Grewia retusifolia*			C		3
plants	land plants	Sparrmanniaceae	*Corchorus trilocularis*			C		10/1
plants	land plants	Sparrmanniaceae	*Grewia savannicola*			C		1/1
plants	land plants	Sparrmanniaceae	*Grewia latifolia*	dysentery plant		C		1/1
plants	land plants	Stylidiaceae	*Stylidium eglandulosum*			C		1/1
plants	land plants	Thymelaeaceae	*Pimelea haematostachya*			C		1/1
plants	land plants	Thymelaeaceae	*Wikstroemia indica*	tie bush		C		1
plants	land plants	Verbenaceae	*Lantana camara*	lantana	Y			1
plants	land plants	Violaceae	*Afrohybanthus enneaspermus*			C		2
plants	land plants	Vitaceae	*Cissus cardiophylla*			C		1/1
plants	land plants	Zygophyllaceae	*Tribulus terrestris*	caltrop		C		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 in the Wild (PE), Endangered (E), Vulnerable (V), Near Threatened (NT), Least Concern (C) or Not Protected ( ).

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

Records – The first number indicates the total number of records of the taxon for the record option selected (i.e. All, Confirmed or Specimens).
This number is output as 99999 if it equals or exceeds this value. The second number located after the / indicates the number of specimen records for the taxon.
This number is output as 999 if it equals or exceeds this value.

Appendix B Habitat quality assessment

An assessment of habitat quality within the study was undertaken in accordance with the Guide to Determining Terrestrial Habitat Quality (Version 1.3) (DES, 2020). The habitat quality assessment methodology utilises three key attributes to measure the capacity of the site to support the prescribed environmental matters (i.e. threatened species). The three attributes are:

- Landscape-scale attributes: an analysis of the site in relation to the surrounding environment
- Site-based attributes: a general condition assessment of vegetation condition against a benchmark
- Species habitat attributes: the ability of the site to support a particular species

The landscape-scale attributes, site-based attributes and species habitat attribute scores are assessed for each designated assessment unit. Assessment units are identified as relatively homogeneous areas, defined by a distinct RE and isolation from other patches of vegetation.

The assessment units, site-based attribute scores, landscape-scale attribute scores and species habitat attribute scores are presented in **Table 11** - **Table 14** below.

Table 11: Assessment units and associated REs

Assessment unit	RE	Condition	Short description	Extent within the study area (ha)
AU 1	11.3.1	Remnant	*Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains	7.10
AU 2	11.3.2	Remnant	*Eucalyptus populnea* woodland on alluvial plains	7.33
AU 3	11.3.25	Remnant	*Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines	47.10
AU 4	11.3.4	Remnant	*Eucalyptus tereticornis* and/or *Eucalyptus* spp. woodland on alluvial plains	58.84
AU 5	11.4.4	Remnant	*Dichanthium* spp., *Astrebla* spp. grassland on Cainozoic clay plains	12.21
AU 6	11.4.13	Remnant	*Eucalyptus orgadophila* open woodland on Cainozoic clay plains	20.08
AU 7	11.5.3	Remnant	*Eucalyptus populnea* +/- *E. melanophloia* +/- *Corymbia clarksoniana* woodland on Cainozoic sand plains and/or remnant surfaces	116.04
AU 8	11.5.9	Remnant	*Eucalyptus crebra* and other *Eucalyptus* spp. and *Corymbia* spp. woodland on Cainozoic sand plains and/or remnant surfaces	183.09
AU 9	11.8.5	Remnant	*Eucalyptus orgadophila* open woodland on Cainozoic igneous rocks	16.18
AU 10	11.9.1	Remnant	*Acacia harpophylla-Eucalyptus cambageana* woodland to open forest on fine-grained sedimentary rocks	8.32
AU 11	11.9.5	Remnant	*Acacia harpophylla and/or Casuarina cristata* open forest on fine-grained sedimentary rocks	12.28
AU 12	11.10.7	Remnant	*Eucalyptus crebra* woodland on coarse-grained sedimentary rocks	274.57
AU 13		High value regrowth		27.48
AU 14		Regrowth		18.25

Table 12: Site-based attribute scores for each assessment unit

Site condition attribute	Assessment unit																							
	AU 1	AU 2	AU 3		AU 4		AU 5	AU 6		AU 7			AU 8				AU 9	AU10	AU11	AU12			AU13	AU14
	SW04	SW02	SW01	SW08	SW05	SW21	SW10*	SW12	SW20	SW09	SW14	SW19	SW03	SW13	SW15	SW17	SW24	SW06	SW22	SW07	SW11	SW23	SW16	SW18
Recruitment	5	5	3	3	5	5	N/A	0	0	5	5	5	5	5	5	5	5	3	5	5	3	5	5	5
Species richness: trees	5	5	5	5	5	5	N/A	5	5	2.5	5	2.5	5	5	5	5	5	5	5	5	5	2.5	2.5	2.5
Species richness: shrubs	5	5	5	5	5	5	0	5	5	5	2.5	5	5	2.5	2.5	2.5	5	2.5	5	2.5	2.5	5	2.5	2.5
Species richness: grasses	2.5	2.5	0	2.5	2.5	5	2.5	5	5	5	5	5	2.5	5	5	2.5	5	2.5	5	5	5	5	2.5	2.5
Species richness: forbs	2.5	0	2.5	2.5	5	5	2.5	2.5	5	5	5	2.5	2.5	2.5	2.5	5	2.5	5	2.5	2.5	2.5	2.5	2.5	2.5
Canopy height	3	5	5	5	5	5	N/A	5	5	5	5	5	5	5	5	5	5	5	5	5	3	5	3	0
Canopy cover	5	5	3	3	5	3	N/A	5	2	5	5	5	5	5	5	5	5	5	5	5	2	5	2	5
Shrub canopy cover	5	3	0	0	3	0	N/A	5	3	3	5	3	3	0	3	3	3	5	3	3	0	0	3	0
Native perennial grass cover	0	5	0	0	5	0	5	5	5	3	3	5	5	5	5	5	5	5	1	0	5	3	5	5
Organic litter cover	5	5	3	5	3	3	0	0	5	5	5	5	5	3	3	3	3	5	5	3	3	5	5	3
Large trees	5	5	15	5	5	0	N/A	5	0	0	5	0	5	0	5	5	5	15	0	10	0	0	0	10
Coarse woody debris	0	5	2	5	2	5	N/A	5	2	5	5	5	2	5	5	2	2	2	5	5	2	5	2	5
Weed cover	0	5	0	0	5	3	5	3	10	10	5	5	5	10	5	10	5	5	10	10	5	10	5	10
Total	**43**	**55.5**	**43.5**	**41**	**55.5**	**44**	**15**	**50.5**	**52**	**58.5**	**60.5**	**53**	**55**	**53**	**56**	**58**	**55.5**	**65**	**56.5**	**61**	**38**	**53**	**40**	**53**
Total standardised site-based attribute score^	**0.54**	**0.69**	**0.54**	**0.51**	**0.69**	**0.55**	**0.50**	**0.63**	**0.65**	**0.73**	**0.76**	**0.66**	**0.69**	**0.66**	**0.70**	**0.73**	**0.69**	**0.81**	**0.71**	**0.76**	**0.48**	**0.66**	**0.50**	**0.66**
Assessment unit site-based attribute score	**0.54**	**0.69**	**0.53**		**0.62**		**0.50**	**0.64**		**0.72**			**0.70**				**0.69**	**0.81**	**0.71**	**0.63**			**0.50**	**0.66**

*Site-based attributes that are not applicable to grassland REs have been indicated as 'N/A'.
^Total site-based attribute score has been calculated as the sum of each site-based attribute score divided by the maximum possible score for the ecosystem type (i.e. woodland = maximum score of 80), to give a standardised total score between 0 and 1, as per the Guide to Determining Terrestrial Habitat Quality.

Table 13: Landscape-scale attribute scores for each assessment unit

Landscape-scale attribute	Assessment unit																							
	AU 1	AU 2	AU3		AU 4		AU 5	AU 6		AU 7			AU 8				AU 9	AU 10	AU 11	AU 12			AU 13	AU 14
	SW04	SW02	SW01	SW08	SW05	SW21	SW10	SW12	SW20	SW09	SW14	SW19	SW03	SW13	SW15	SW17	SW24	SW06	SW22	SW07	SW11	SW23	SW16	SW18
Size of patch	10	10	10	10	10	10	0	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Connectivity	5	4	4	5	4	5	0	5	5	4	2	5	2	2	5	5	2	5	5	5	5	5	5	5
Context	4	2	2	5	4	4	4	4	4	4	4	5	2	4	5	5	2	5	5	5	4	5	4	5
Ecological corridors*	b	c	c	b	c	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b
Total landscape-scale attributes^	**19**	**16**	**16**	**20**	**18**	**19**	**4**	**19**	**19**	**18**	**16**	**20**	**14**	**16**	**20**	**20**	**14**	**20**	**20**	**20**	**19**	**20**	**19**	**20**
Assessment unit landscape-scale attribute score	**19**	**16**	**18**		**18.5**		**4**	**19**		**18**			**17.5**				**14**	**20**	**20**	**19.7**			**19**	**20**

*The ecological corridor attribute has been scored as 'a' 'b' or 'c' as per the Guide to Determining Terrestrial Habitat Quality and is excluded from the total landscape-scale attribute score.
^Total landscape-scale attribute score has been calculated as the sum of each landscape-scale attribute score, excluding ecological corridors.

Table 14: Species habitat attribute scores for each species (matter area)

Matter	Condition	Quality & availability of food & habitat required for foraging	Quality & availability of habitat required for shelter & breeding	Quality & availability of habitat required for mobility	Absence of threats	Total matter area species habitat attribute score*
Koala	Remnant	22	22	25	10	7.8
	Regrowth	12	12	25	10	5.9
Squatter Pigeon	Remnant	20	25	25	10	8.0
Greater Glider	Remnant	18	18	25	10	7.2
Ornamental Snake	Remnant	8.8	8.8	20	10	4.8

*Species habitat attribute score calculated as the sum of each attribute divided by 10, to generate a score out of 10, as per the Guide to Determining Terrestrial Habitat Quality.

Habitat quality scores for MNES

Final habitat quality scores are calculated using the DAWE 'Qld Habitat Quality' Microsoft Excel worksheet.

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Appendix B Condition scoring for the impact site

The following information on condition scores is reproduced from Eco Logical Australia (2020) and includes sites located in and adjacent to the area to be directly impacted and comprising the significant residual impact that is required to be offset.

Table 4: BioCondition scoring details

BioCondition Scoring Sheet	Assessment site								
	SRM 03	SRM 12	SRM 08	SRM 01	SRM 10	SRM 09	SRM 13	SRM 14	SRM 15
Regional ecosystem	11.3.4	11.3.25		1.3.25b	11.5.3		11.5.9	11.10.1d	
Site condition									
Recruitment of woody perennials	5	5	3	5	5	5	3	3	5
Native plant species richness									
Trees	5	5	5	2.5	5	5	5	5	5
Shrubs	5	5	0	2.5	2.5	5	5	2.5	2.5
Grass	2.5	2.5	2.5	0	5	2.5	2.5	2.5	2.5
Forbs	0	0	0	0	0	2.5	0	0	0
Tree canopy height	5	5	5	5	5	5	5	3	3
Tree canopy cover	3	5	3	5	5	5	5	5	5
Shrub canopy cover	0	0	0	0	3	3	5	0	3
Native perennial grass cover	0	5	3	0	5	1	1	0	0
Organic litter cover	3	3	5	5	5	3	5	5	5
Large trees	10	5	15	15	0	10	0	0	0
Coarse woody debris	2	2	5	2	5	5	2	5	2
Weed cover	0	0	0	10	3	0	3	0	0
Total field-based attributes	40.5	42.5	46.5	52.0	48.5	52.0	41.5	31.0	33.0
Site Context									
Patch size	10	10	10	10	10	10	10	10	7
Connectivity	2	5	5	5	5	4	5	2	2
Context	4	4	4	4	5	4	4	4	2
Distance from Water	0	0	0	0	0	0	0	0	0
Total GIS attributes	16	19	19	19	20	18	19	16	11
BioCondition Score	**0.53**	**0.58**	**0.62**	**0.67**	**0.65**	**0.66**	**0.57**	**0.44**	**0.42**

Table 5: Calculation of weighted average (by area) condition scores for each RE and total

Habitat quality site	Koala habitat RE	Area of RE (remnant + HVR)	Condition score (out of 10)	Avg condition score for RE	Weighted avg condition score
SRM 03	11.3.4	2.5	5.3	5.3	0.09
SRM 12	11.3.25	23.4	5.8	6	0.95
SRM 08	11.3.25		6.2		
SRM 01	11.3.25b	1.3	6.7	6.7	0.06
SRM 10	11.5.3	75.9	6.5	6.55	3.36
SRM 09	11.5.3		6.6		
SRM 13	11.5.9	8.5	5.7	5.7	0.33
SRM 14	11.10.1d	36.4	4.4	4.3	1.06
SRM 15	11.10.1d		4.2		
	TOTAL AREA (ha):	148 ha		**TOTAL AVG SCORE:**	**5.84**

Appendix C Completed koala habitat quality score tables (HQS)

IMPACT AREA						
Assessment Unit (AU)	RE (remnant / regrowth)	AU Area (ha)	No. of assessment sites	Plot/site reference	Disturbance area (ha)	MNES
1	11.3.4 remnant	2.8	1	SRM03		Koala
2	11.3.25 remnant	9.3	2	SRM08, SRM12		Koala
3	11.5.3 remnant	19.5	2	SRM09, SRM10		Koala
4	11.5.9 remnant	2.5	1	SRM13		Koala
5	11.10.1d remnant	19.4	1	SRM14		Koala
6	11.10.1d HVR	7.1	1	SRM15		Koala

IMPACT AREA - Supplementary information/justification (evidence required)	
Detail current threats to species/TEC in Project Area	See MNES report
Role/importance of the **site** for the state-wide population	
Role/importance of **species/TEC** population on site	
Closest records of species/TEC off site	
Number detected on site (species only)	
Approximate density (per ha) (species only)	
Survey methodology and search effort	
FAUNA SPECIES ONLY	
Species mobility capacity considerations	
Food sources on site and approximate abundance	
Types and availability of shelter at site	

IMPACT - Fauna Species

Assessment Unit - Regional Ecosystem	AU 1 - RE 11.3.4 remnant						AU 2 - RE 11.3.25 remnant								
Site Reference	Benchmark	SRM03			Average %	Average	Benchmark	SRM08			SRM12			Average %	Average
	11.3.4	Raw Data	% Benchmark	Score	benchmar	Score	11.3.25	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	benchmar	Score
Recruitment of woody perennial species in EDL	100	100	100	5	100	5	100	50	50	3	100	100	5	75	4
Native plant species richness - trees	4	10	250	5	250	5	4	7	175	5	7	175	5	175	5
Native plant species richness - shrubs	2	6	300	5	300	5	2	0	0	0	2	100	5	50	2.5
Native plant species richness - grasses	7	4	57.1	2.5	57.1	2.5	8	2	25	2.5	5	62.5	2.5	43.75	2.5
Native plant species richness - forbes	10	2	20	0	20	0	12	1	8.3	0	0	0	0	4.15	0
Tree canopy height (average of emergent, canopy, sub-canopy)	22	19	86.4	5	86.4	5	23	24	104.3	5	24	104.3	5	104.3	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	17	38	223.5	3	223.5	3	22	93	422.7	3	28	127.3	5	275	4
Shrub canopy cover	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Native grass cover	43	0	0	0	0	0	12	7	58.3	3	16.6	138.3	5	98.3	4
Organic litter	20	73	365	3	365	3	15	18	120	5	3	20	3	70	4
Large trees (euc plus non-euc)	26	14	53.8	10	53.8	10	14	24	171.4	15	4	28.6	5	100	10
Coarse woody debris	384	125	32.6	2	32.6	2	375	200	53.3	5	50	13.3	2	33.3	3.5
Non-native plant cover		90		0		0		90		0	70		0		0
Quality and availability of food and foraging habitat				5		5				5			5		5
Quality and availability of shelter				5		5				5			5		5
Site Condition Score				50.5		50.5				56.5			52.5		54.5
MAX Site Condition Score				*100*		*100*				*100*			*100*		*100*
Site Condition Score - out of 3						**1.52**									**1.64**
Site Context															
Size of patch				10		10				10			10		10
Connectedness				2		2				5			5		5
Context				4		4				4			4		4
Ecological Corridors				4		4				4			4		4
Role of site location to species overall population in the state				5		5				5			5		5
Threats to the species				7		7				7			7		7
Species mobility capacity				7		7				7			7		7
Site Context Score				39		39				42			42		42
MAX Site Context Score				*56*		*56*				*56*			*56*		*56*
Site Context Score - out of 3						**2.09**									**2.25**

IMPACT - Fauna Species

Assessment Unit - Regional Ecosystem	AU 3 - RE 11.5.3 remnant								
Site Reference	Benchmark	SRM09			SRM10			Average %	Average
	11.5.3	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	benchmar	Score
Recruitment of woody perennial species in EDL	100	100	100	5	100	100	5	100	5
Native plant species richness - trees	6	6	100	5	8	133.3	5	116.65	5
Native plant species richness - shrubs	6	10	166.7	5	3	50	2.5	108.35	3.75
Native plant species richness - grasses	6	5	83.3	2.5	7	116.7	5	100	3.75
Native plant species richness - forbes	10	3	30	2.5	0	0	0	15	1.25
Tree canopy height (average of emergent, canopy, sub-canopy)	16	15	93.8	5	17	106.3	5	100.05	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	20	25.5	127.5	5	25.8	129	5	128.25	5
Shrub canopy cover	3	7.8	260	3	0.5	16.7	3	138.35	3
Native grass cover	19	4	21.1	1	35	184.2	5	102.65	3
Organic litter	20	56	280	3	25	125	5	202.5	4
Large trees (euc plus non-euc)	9	8	88.9	10	0	0	0	44.45	5
Coarse woody debris	314	620	197.5	5	205	65.3	5	131.4	5
Non-native plant cover		50		0	30		3		1.5
Quality and availability of food and foraging habitat				5			5		5
Quality and availability of shelter				5			5		5
Site Condition Score				62			58.5		60.25
MAX Site Condition Score				*100*			*100*		*100*
Site Condition Score - out of 3									**1.81**
Site Context									
Size of patch				10			10		10
Connectedness				4			5		4.5
Context				4			5		4.5
Ecological Corridors				4			4		4
Role of site location to species overall population in the state				5			5		5
Threats to the species				7			7		7
Species mobility capacity				7			7		7
Site Context Score				41			43		42
MAX Site Context Score				*56*			*56*		*56*
Site Context Score - out of 3									**2.25**

IMPACT - Fauna Species

Assessment Unit - Regional Ecosystem	AU 4 - RE 11.5.9 remnant				AU 5 - RE 11.10.1d remnant				AU 6 - RE 11.10.1d HVR			
Site Reference	Benchmark	SRM13			Benchmark	SRM14			Benchmark	SRM15		
	11.5.9	Raw Data	% Benchmark	Score	**11.10.1**	Raw Data	% Benchmark	Score	**11.10.1**	Raw Data	% Benchmark	Score
Recruitment of woody perennial species in EDL	100	50	50	3	100	66	66	3	100	100	100	5
Native plant species richness - trees	3	10	333.3	5	6	6	100	5	6	10	166.7	5
Native plant species richness - shrubs	6	8	133.3	5	6	5	83.3	2.5	6	4	66.7	2.5
Native plant species richness - grasses	9	6	66.7	2.5	10	5	50	2.5	10	3	30	2.5
Native plant species richness - forbes	11	0	0	0	16	1	6.3	0	16	1	6.3	0
Tree canopy height (average of emergent, canopy, sub-canopy)	17	16	94.1	5	25	14	56	3	25	9	36	3
Tree canopy cover (average of emergent, canopy, sub-canopy)	25	27.9	111.6	5	35	27.3	78	5	35	18.3	52.3	5
Shrub canopy cover	10	5.5	55	5	22	0.5	2.3	0	22	6.4	29.1	3
Native grass cover	26	9	34.6	1	21	0	59.6	0	21	0	0	0
Organic litter	30	24	80	5	52	31	0	5	52	42.4	81.5	5
Large trees (euc plus non-euc)	19	0	0	0	4	0	118.4	0	4	0	0	0
Coarse woody debris	342	120	35.1	2	321	380		5	321	130	40.5	2
Non-native plant cover		35		3		90		0		90		33
Quality and availability of food and foraging habitat				5				5				5
Quality and availability of shelter				5				5				5
Site Condition Score				51.5				41				76
MAX Site Condition Score				*100*				*100*				*100*
Site Condition Score - out of 3				**1.55**				**1.23**				**2.28**
Site Context												
Size of patch				10				10				7
Connectedness				5				2				2
Context				4				4				2
Ecological Corridors				4				4				4
Role of site location to species overall population in the state				5				5				5
Threats to the species				7				7				7
Species mobility capacity				7				7				7
Site Context Score				42				39				34
MAX Site Context Score				*56*				*56*				*56*
Site Context Score - out of 3				**2.25**				**2.09**				**1.82**

Species Stocking Rate (SSR)							
Presence detected on or adjacent to site (neighbouring property with connecting habitat)	Score	0		5		10	10
		No		Yes - adjacent		Yes - on site	
Species usage of the site (habitat type & evidenced usage)	Score	0	5	10		15	15
		Not habitat	Dispersal	Foraging		Breeding	
Approximate density (per ha)	Score	0	10	20		30	0
		0%					
Role/importance of species population on site*	Score (*Total from supplementary table below*)	0	5		10	15	10
		0	5 - 15	20 - 35		40 - 45	**35**
Total SRR score (out of 70)						35	
SRR Score (out of 4)						**2**	

*SSR Supplementary Table				
*Key source population for breeding	Score	0	10	10
		No	Yes/ Possibly	
*Key source population for dispersal	Score	0	5	5
		No	Yes/ Possibly	
*Necessary for maintaining genetic diversity	Score	0	15	15
		No	Yes/ Possibly	
*Near the limit of the species range	Score	0	15	0
		No	Yes	30

Final habitat quality score (weighted)	AU 1	AU 2	AU 3	AU 4	AU 5	AU 6	Average/Final
Site Condition score (out of 3)	1.52	1.64	1.81	1.55	1.23	2.28	
Site Context Score (out of 3)	2.09	2.25	2.25	2.25	2.09	1.82	
Species Stocking Rate Score (out of 4)	2	2	2	2	2	2	
Habitat Quality score (out of 10)	5.60	5.89	6.06	5.80	5.32	6.10	
Assessment Unit area (ha) in disturbance footprint	2.8	9.3	19.5	2.5	19.4	7.1	
Total impact area (ha) for this MNES	60.6	60.6	60.6	60.6	60.6	60.6	
Size Weighting	0.05	0.15	0.32	0.04	0.32	0.12	
Weighted Habitat Quality Score	***0.26***	***0.90***	***1.95***	***0.24***	***1.70***	***0.71***	***6***

OFFSET AREA					
Assessment Unit (AU)	RE (remnant / regrowth)	Area (ha)	No. of assessment sites	Plot/site reference	MNES
1	11.5.3 remnant	80.4	3	SW09, SW14, SW19	Koala
2	11.8.5 remnant	12.1	1	SW24	Koala
3	11.5.9 remnant	124.6	4	SW03, SW13, SW15, SW17	Koala
4	11.3.25 remnant	34.1	2	SW01, SW08	Koala
5	11.3.4 remnant	46.1	2	SW05, SW21	Koala
6	11.4.13 remnant	3.1	2	SW12, SW20	Koala
7	11.10.7 remnant	249.2	3	SW07, SW11, SW23	Koala
8	11.10.7 HVR	2.1	1	SW16	Koala
9	11.10.7 regrowth	16.5	1	SW18	Koala

OFFSET AREA - Supplementary information/justification (evidence required)	
Detail current threats to species/TEC in Project Area	See Tay-Glen offset area report
Role/importance of the **site** for the state-wide population	
Role/importance of **species/TEC** population on site	
Closest records of species/TEC off site	
Number detected on site (species only)	
Approximate density (per ha) (species only)	
Survey methodology and search effort	
FAUNA SPECIES ONLY	
Species mobility capacity considerations	
Food sources on site and approximate abundance	
Types and availability of shelter at site	
NOT CURRENTLY HABITAT/TEC	
Factors preventing the vegetation from being habitat/TEC	
How it will become habitat/TEC	
Estimated time until it becomes habitat/TEC	

Remnant – Offset Site Now

OFFSET - Fauna Species

Assessment Unit - Regional Ecosystem	AU 1 - RE11.5.3 remnant											
Site Reference	Benchmark	SW09			SW14			SW19			Average %	
	11.5.3	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	benchmark	Average Score
Site Condition												
Recruitment of woody perennial species in EDL	100	100	100	5	100	100	5	100	100	5	100.0	5
Native plant species richness - trees	6	4	66.7	2.5	9	150.0	5	5	83.3	2.5	100.0	3.33
Native plant species richness - shrubs	6	9	150.0	5	4	66.7	2.5	7	116.7	5	111.1	4.17
Native plant species richness - grasses	6	10	166.7	5	9	150.0	5	10	166.7	5	161.1	5
Native plant species richness - forbes	10	9	90.0	5	9	90.0	5	5	50.0	2.5	76.7	4.17
Tree canopy height (average of emergent, canopy, sub-canopy)	16	18	112.5	5	16	100.0	5	20	125.0	5	112.5	5.0
Tree canopy cover (average of emergent, canopy, sub-canopy)	20	14.7	73.5	5	24.2	121.0	5	11.3	56.5	5	83.7	5.0
Shrub canopy cover	3	6.6	220.0	3	2	66.7	5	8.5	283.3	3	190.0	3.7
Native grass cover	19	17	89.5	3	11	57.9	3	35	184.2	5	110.5	3.7
Organic litter	20	22.6	113.0	5	13	65.0	5	13	65.0	5	81.0	5.0
Large trees (euc plus non-euc)	10	0	0.0	0	2	20.0	5	0	0.0	0	6.7	1.7
Coarse woody debris	314	410	130.6	5	230	73.2	5	230	73.2	5	92.4	5.0
Non-native plant cover		0		10	10		5	10		5		6.7
Quality and availability of food and foraging habitat				10			10			10		10
Quality and availability of shelter				10			10			10		10
Site Condition Score				78.5			80.5			73		77.33
MAX Site Condition Score				*100*			100			100		*100*
Site Condition Score - out of 3												**2.32**
Site Context												
Size of patch				10			10			10		10
Connectedness				4			2			5		3.67
Context				4			4			5		4.33
Ecological Corridors				4			4			4		4
Role of site location to species overall population in the state				5			5			5		5
Threats to the species				7			7			7		7
Species mobility capacity				10			10			10		10
Site Context Score				44			42			46		44
MAX Site Context Score				*56*			*56*			*56*		*56*
Site Context Score - out of 3												**2.36**

OFFSET - Fauna Species

Assessment Unit - Regional Ecosystem	AU 2 - RE 11.8.5					
Site Reference	Benchmark	SW24			Average %	Average
	11.8.5	Raw Data	% Benchmark	Score	benchmark	Score
Site Condition						
Recruitment of woody perennial species in EDL	100	100	100	5	100	5
Native plant species richness - trees	2	3	150.0	5	150	5
Native plant species richness - shrubs	3	8	266.7	5	266.67	5
Native plant species richness - grasses	6	10	166.7	5	166.7	5
Native plant species richness - forbes	16	4	25.0	2.5	25	2.5
Tree canopy height (average of emergent, canopy, sub-canopy)	15	18	120.0	5	120.0	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	13	21.4	164.6	5	164.6	5
Shrub canopy cover	2	7	350.0	3	350	3
Native grass cover	60	83.4	139.0	5	139	5
Organic litter	25	3	12.0	3	12	3
Large trees (euc plus non-euc)	6	2	33.3	5	33.3	5
Coarse woody debris	250	80	32.0	2	32.0	2
Non-native plant cover		5		5	0	5
Quality and availability of food and foraging habitat				10		10
Quality and availability of shelter				10		10
Site Condition Score				75.5		75.5
MAX Site Condition Score				*100*		*100*
Site Condition Score - out of 3						**2.27**
Site Context						
Size of patch				10		10
Connectedness				2		2
Context				2		2
Ecological Corridors				4		4
Role of site location to species overall population in the state				5		5
Threats to the species				7		7
Species mobility capacity				10		10
Site Context Score				40		40
MAX Site Context Score				*56*		*56*
Site Context Score - out of 3						**2.14**

OFFSET - Fauna Species

Assessment Unit - Regional Ecosystem	AU 3 - RE 11.5.9 remnant															
Site Reference	**Benchmark**	SW03			SW13			SW15			SW17			Average %	Average
	11.5.9	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchma	Score	benchmar	Score
Site Condition															
Recruitment of woody perennial species in EDL	100	100	100	5	100	100	5	100	100	5	100	100	5	100	5
Native plant species richness - trees	3	5	166.7	5	6	200.0	5	9	300.0	5	7	233.3	5	225	5
Native plant species richness - shrubs	6	10	166.7	5	3	50.0	2.5	5	83.3	2.5	2	33.3	2.5	83.33333	3.125
Native plant species richness - grasses	9	5	55.6	2.5	10	111.1	5	10	111.1	5	8	88.9	2.5	91.66667	3.75
Native plant species richness - forbes	11	6	54.5	2.5	3	27.3	2.5	9	81.8	2.5	10	90.9	5	63.63636	3.125
Tree canopy height (average of emergent, canopy, sub-canopy)	17	15	88.2	5	16	94.1	5	18	105.9	5	16	94.1	5	95.58824	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	25	20	80.0	5	14.7	58.8	5	15	60.0	5	13.3	53.2	5	63	5
Shrub canopy cover	10	1	10.0	3	0	0.0	0	3.2	32.0	3	2	20.0	3	15.5	2.25
Native grass cover	26	66	253.8	5	78.4	301.5	5	39	150.0	5	68	261.5	5	241.7308	5
Organic litter	30	15	50.0	5	12.2	40.7	3	14.6	48.7	3	10	33.3	3	43.16667	3.5
Large trees (euc plus non-euc)	20	4	20.0	5	0	0.0	0	2	10.0	5	4	20.0	5	12.5	3.75
Coarse woody debris	342	95	27.8	2	370	108.2	5	230	67.3	5	70	20.5	2	55.92105	3.5
Non-native plant cover		10		5	2		10	10		5	2		10		7.5
Quality and availability of food and foraging habitat				10			10			10			5		8.75
Quality and availability of shelter				10			10			10			5		8.75
Site Condition Score				75			73			76			68		73
MAX Site Condition Score				*100*			100			100			*100*		*100*
Site Condition Score - out of 3															**2.19**
Site Context															
Size of patch				10			10			10			10		10
Connectedness				2			2			5			5		3.5
Context				2			4			5			5		4
Ecological Corridors				4			4			4			4		4
Role of site location to species overall population in the state				5			5			5			5		5
Threats to the species				7			1			7			7		5.5
Species mobility capacity				10			10			10			10		10
Site Context Score				40			36			46			46		42
MAX Site Context Score				*56*			*56*			*56*			*56*		*56*
Site Context Score - out of 3															**2.25**

OFFSET - Fauna Species

Assessment Unit - Regional Ecosystem	AU 4 - RE 11.3.25									AU 5 - RE 11.3.4								
Site Reference	Benchmark	SW01			SW08			Average %	Average	Benchmark	SW05			SW21			Average %	Average
	11.3.25	Raw Data	% Benchma	Score	Raw Data	% Benchma	Score	benchmar	Score	11.3.4	Raw Data	% Benchma	Score	Raw Data	% Benchma	Score	benchmar	Score
Site Condition																		
Recruitment of woody perennial species in EDL	100	25	25	3	50	50	30	37.5	16.5	100	100	100	5	100	100	5	100	5
Native plant species richness - trees	4	7	175.0	5	7	175.0	5	175	5	4	7	175.0	5	11	275.0	5	225	5
Native plant species richness - shrubs	2	6	300.0	5	6	300.0	5	300	5	2	3	150.0	5	6	300.0	5	225	5
Native plant species richness - grasses	8	1	12.5	0	3	37.5	2.5	25	1.25	7	4	57.1	2.5	9	128.6	5	92.85714	3.75
Native plant species richness - forbes	12	3	25.0	2.5	7	58.3	2.5	41.66667	2.5	10	9	90.0	5	13	130.0	5	110	5
Tree canopy height (average of emergent, canopy, sub-canopy)	23	18	78.3	5	24	104.3	5	91.3	5	22	18	81.8	5	16	72.7	5	77.27273	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	22	63	286.4	3	59	268.2	3	277.3	3	17	12.5	73.5	5	35.7	210.0	3	141.7647	4
Shrub canopy cover	1	0	0.0	0	0	0.0	0	0.0	0	1	7.3	730.0	3	0	0.0	0	365	1.5
Native grass cover	12	0	0.0	0	1	8.3	0	4.2	0	43	74.4	173.0	5	2	4.7	0	88.83721	2.5
Organic litter	15	4	26.7	3	13	86.7	5	56.7	4	20	5	25.0	3	43.6	218.0	3	121.5	3
Large trees (euc plus non-euc)	21	22	104.8	15	10	47.6	5	76.2	10	35	6	17.1	5	0	0.0	0	8.571429	2.5
Coarse woody debris	375	80	21.3	2	190	50.7	5	36.0	3.5	384	110	28.6	2	580	151.0	5	89.84375	3.5
Non-native plant cover		70		0		70.0	0		0		20		5	30		3		4
Quality and availability of food and foraging habitat				10			10		10				10			10		10
Quality and availability of shelter				10			10		10				10			10		10
Site Condition Score				63.5			88		75.75				75.5			64		69.75
MAX Site Condition Score				*100*			*100*		*100*				*100*			*100*		*100*
Site Condition Score - out of 3									**2.27**									**2.09**
Site Context																		
Size of patch				10			10		10				10			10		10
Connectedness				4			5		4.5				4			5		4.5
Context				2			5		3.5				4			4		4
Ecological Corridors				4			4		4				6			4		5
Role of site location to species overall population in the state				5			5		5				5			5		5
Threats to the species				7			7		7				7			1		4
Species mobility capacity				10			10		10				10			10		10
Site Context Score				42			46		44				46			39		42.5
MAX Site Context Score				*56*			*56*		*56*				*56*			*56*		*56*
Site Context Score - out of 3									**2.36**									**2.28**

OFFSET - Fauna Species

Assessment Unit - Regional Ecosystem	AU 6 - RE 11.4.13									AU 7 - 11.10.7 remnant										
Site Reference	Benchmark	SW12			SW20			Average %	Average	Benchmark	SW07			SW11			SW23			Average %	Average
	11.4.13	Raw Data	% Benchma	Score	Raw Data	% Benchma	Score	benchmar	Score	11.10.7	Raw Data	% Benchma	Score	Raw Data	% Benchma	Score	Raw Data	% Benchma	Score	benchmar	Score
Site Condition																					
Recruitment of woody perennial species in EDL	100	0	0	0	0	0	0	0	0	100	100	100	5	50	50	3	100	100	5	100	4.33
Native plant species richness - trees	4	6	150.0	5	6	150.0	5	150	5	6	9	150.0	5	7	116.7	5	5	83.3	2.5	116.67	4.17
Native plant species richness - shrubs	5	12	240.0	5	5	100.0	5	170	5	6	4	66.7	2.5	5	83.3	2.5	8	133.3	5	100	3.33
Native plant species richness - grasses	8	9	112.5	5	10	125.0	5	118.75	5	10	9	90.0	5	11	110.0	5	9	90.0	5	90	5
Native plant species richness - forbes	7	3	42.9	2.5	10	142.9	5	92.85714	3.75	16	9	56.3	2.5	5	31.3	2.5	12	75.0	2.5	65.625	2.5
Tree canopy height (average of emergent, canopy, sub-canopy)	20	16	80.0	5	14	70.0	5	75	5	25	20	80.0	5	14	56.0	3	22	88.0	5	84	4.33
Tree canopy cover (average of emergent, canopy, sub-canopy)	25	17.6	70.4	5	11.1	44.4	2	57.4	3.5	35	25.2	72.0	5	10	28.6	2	26.2	74.9	5	73.43	4
Shrub canopy cover	13	10	76.9	5	1.3	10.0	3	43.46154	4	22	6.6	30.0	3	0	0.0	0	1	4.5	0	17.27	1
Native grass cover	16	52	325.0	5	53	331.3	5	328.125	5	21	0	0.0	0	41	195.2	5	18	85.7	3	42.86	2.67
Organic litter	30	2.6	8.7	0	20	66.7	5	37.66667	2.5	52	24	46.2	3	24.4	46.9	3	33.4	64.2	5	55.19	3.67
Large trees (euc plus non-euc)	18	2	11.1	5	0	0.0	0	5.555556	2.5	4	2	50.0	10	0	0.0	0	0	0.0	0	25	3.33
Coarse woody debris	109	190	174.3	5	290	266.1	2	220.1835	3.5	321	210	65.4	5	160	49.8	2	230	71.7	5	68.54	4
Non-native plant cover		30		3	2		10		6.5		0		10	15		5	0		10		8.33
Quality and availability of food and foraging habitat				5			5		5				10			10			10		10
Quality and availability of shelter				5			5		5				10			10			10		10
Site Condition Score				60.5			62		61.25				81			58			73		70.67
MAX Site Condition Score				*100*			*100*		*100*				*100*			*100*			*146*		*100*
Site Condition Score - out of 3									**1.84**												**2.12**
Site Context																					
Size of patch				10			10		10				10			10			10		10
Connectedness				5			5		5				5			5			5		5
Context				4			4		4				5			4			5		4.67
Ecological Corridors				4			4		4				4			4			4		4
Role of site location to species overall population in the state				5			5		5				5			5			5		5
Threats to the species				7			7		7				7			7			7		7
Species mobility capacity				10			10		10				10			10			10		10
Site Context Score				45			45		45				46			45			46		45.67
MAX Site Context Score				*56*			*56*		*56*				*56*			*56*			*56*		*56*
Site Context Score - out of 3									**2.41**												**2.45**

Species Stocking Rate (SSR)							
Presence detected on or adjacent to site (neighbouring property with connecting habitat)	Score	0	5	10			10
		No	Yes - adjacent	Yes - on site			
Species usage of the site (habitat type & evidenced usage)	Score	0	5	10	15		15
		Not habitat	Dispersal	Foraging	Breeding		
Approximate density (per ha)	Score	0	10	20	30		0
		0%					
Role/importance of species population on site*	Score (*Total from supplementary table below*)	0	5	10	15		10
		0	5 - 15	20 - 35	40 - 45		
Total SRR score (out of 70)					35		**35**
SRR Score (out of 4)					**2**		

*SSR Supplementary Table					
*Key source population for breeding	Score	0	10	10	
		No	Yes/ Possibly		
*Key source population for dispersal	Score	0	5	5	
		No	Yes/ Possibly		
*Necessary for maintaining genetic diversity	Score	0	15	15	
		No	Yes/ Possibly		
*Near the limit of the species range	Score	0	15	0	
		No	Yes	30	

Final habitat quality score (weighted)	AU 1	AU 2	AU 3	AU 4	AU 5	AU 6	AU 7	Average/Final
Site Condition score (out of 3)	2.32	2.27	2.19	2.27	2.09	1.84	2.12	
Site Context Score (out of 3)	2.36	2.14	2.25	2.36	2.28	2.41	2.45	
Species Stocking Rate Score (out of 4)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Habitat Quality score (out of 10)	6.68	6.41	6.44	6.63	6.37	6.25	6.57	
Assessment Unit area (ha)	80.4	12.1	124.6	34.1	46.1	3.1	249.2	
Total offset area (ha) for this MNES	549.6	549.6	549.6	549.6	549.6	549.6	549.6	
Size Weighting	0.15	0.02	0.23	0.06	0.08	0.01	0.45	
Weighted Habitat Quality Score	***0.98***	***0.14***	***1.46***	***0.41***	***0.53***	***0.04***	***2.98***	***7***

Regrowth – Offset Site Now

OFFSET - Fauna Species

Assessment Unit - Regional Ecosystem	AU 8 - 11.10.7 HVR				AU 9 - 11.10.7 regrowth		
Site Reference	Benchmark	SW16			SW18		
	11.10.7	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score
Site Condition							
Recruitment of woody perennial species in EDL	100	100	100	5	100	100	5
Native plant species richness - trees	6	4	66.7	2.5	4	66.7	2.5
Native plant species richness - shrubs	6	4	66.7	2.5	3	50.0	2.5
Native plant species richness - grasses	10	7	70.0	2.5	8	80.0	2.5
Native plant species richness - forbes	16	5	31.3	2.5	9	56.3	2.5
Tree canopy height (average of emergent, canopy, sub-canopy)	25	7	28.0	3	5	20.0	0
Tree canopy cover (average of emergent, canopy, sub-canopy)	35	6.8	19.4	2	18	51.4	5
Shrub canopy cover	22	7.2	32.7	3	0	0.0	0
Native grass cover	21	29	138.1	5	64	304.8	5
Organic litter	52	34	65.4	5	16.4	31.5	3
Large trees (euc plus non-euc)	4	0	0.0	0	2	50.0	10
Coarse woody debris	321	70	21.8	2	200	62.3	5
Non-native plant cover		15		5	2		10
Quality and availability of food and foraging habitat				5			5
Quality and availability of shelter				5			5
Site Condition Score				50			63
MAX Site Condition Score				100			100
Site Condition Score - out of 3				**1.50**			**1.89**
Site Context							
Size of patch				10			10
Connectedness				5			5
Context				4			5
Ecological Corridors				4			4
Role of site location to species overall population in the state				5			5
Threats to the species				7			7
Species mobility capacity				10			10
Site Context Score				45			46
MAX Site Context Score				*56*			*56*
Site Context Score - out of 3				**2.41**			**2.46**

Species Stocking Rate (SSR)							
Presence detected on or adjacent to site (neighbouring property with connecting habitat)	Score	0		5		10	10
		No		Yes - adjacent		Yes - on site	
Species usage of the site (habitat type & evidenced usage)	Score	0	5	10		15	15
		Not habitat	Dispersal	Foraging		Breeding	
Approximate density (per ha)	Score	0	10	20		30	0
		0%					
Role/importance of species population on site*	Score (*Total from supplementary table below*)	0	5	10		15	10
		0	5 - 15	20 - 35		40 - 45	
Total SRR score (out of 70)						35	**35**
SRR Score (out of 4)						2	

*SSR Supplementary Table				
*Key source population for breeding	Score	0	10	10
		No	Yes/ Possibly	
*Key source population for dispersal	Score	0	5	5
		No	Yes/ Possibly	
*Necessary for maintaining genetic diversity	Score	0	15	15
		No	Yes/ Possibly	
*Near the limit of the species range	Score	0	15	0
		No	Yes	30

Final habitat quality score (weighted)	AU 8	AU 9	Average/Final
Site Condition score (out of 3)	1.50	1.89	
Site Context Score (out of 3)	2.41	2.46	
Species Stocking Rate Score (out of 4)	2.0	2.0	
Habitat Quality score (out of 10)	5.91	6.35	
Assessment Unit area (ha)	2.1	16.5	
Total offset area (ha) for this MNES	18.5	18.5	
Size Weighting	0.11	0.89	
Weighted Habitat Quality Score	***0.67***	***5.67***	*6*

Remnant – Without Offset

OFFSET - Fauna Species

Assessment Unit - Regional Ecosystem	AU 1 - RE11.5.3 remnant											
Site Reference	Benchmark	SW09			SW14			SW19			Average %	Average
	11.5.3	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	benchmark	Score
Site Condition												
Recruitment of woody perennial species in EDL	100	100	100	5	100	100	5	100	100	5	100.0	5
Native plant species richness - trees	6	4	66.7	2.5	9	150.0	5	5	83.3	2.5	100.0	3.33
Native plant species richness - shrubs	6	9	150.0	5	4	66.7	2.5	7	116.7	5	111.1	4.17
Native plant species richness - grasses	6	10	166.7	5	9	150.0	5	10	166.7	5	161.1	5
Native plant species richness - forbes	10	9	90.0	5	9	90.0	5	5	50.0	2.5	76.7	4.17
Tree canopy height (average of emergent, canopy, sub-canopy)	16	18	112.5	5	16	100.0	5	20	125.0	5	112.5	5.0
Tree canopy cover (average of emergent, canopy, sub-canopy)	20	14.7	73.5	5	24.2	121.0	5	11.3	56.5	5	83.7	5.0
Shrub canopy cover	3	6.6	220.0	3	2	66.7	5	8.5	283.3	3	190.0	3.7
Native grass cover	19	17	89.5	3	11	57.9	3	35	184.2	5	110.5	3.7
Organic litter	20	22.6	113.0	5	13	65.0	5	13	65.0	5	81.0	5.0
Large trees (euc plus non-euc)	10	0	0.0	0	2	20.0	5	0	0.0	0	6.7	1.7
Coarse woody debris	314	410	130.6	5	230	73.2	5	230	73.2	5	92.4	5.0
Non-native plant cover		0		10	10		5	10		5		6.7
Quality and availability of food and foraging habitat				10			10			10		10
Quality and availability of shelter				10			10			10		10
Site Condition Score				78.5			80.5			73		77.33
MAX Site Condition Score				*100*			100			100		*100*
Site Condition Score - out of 3												**2.32**
Site Context												
Size of patch				10			10			10		10
Connectedness				4			2			5		3.67
Context				4			4			5		4.33
Ecological Corridors				4			4			4		4
Role of site location to species overall population in the state				5			5			5		5
Threats to the species				7			7			7		7
Species mobility capacity				10			10			10		10
Site Context Score				44			42			46		44
MAX Site Context Score				*56*			*56*			*56*		*56*
Site Context Score - out of 3												**2.36**

OFFSET - Fauna Species

Assessment Unit - Regional Ecosystem	AU 2 - RE 11.8.5						AU 3 - RE 11.5.9 remnant									
Site Reference	Benchmark	SW24			Average %	Average	Benchmark	SW03			SW13			SW15		
	11.8.5	Raw Data	% Benchmark	Score	benchmark	Score	11.5.9	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score
Site Condition																
Recruitment of woody perennial species in EDL	100	100	100	5	100	5	100	100	100	5	100	100	5	100	100	5
Native plant species richness - trees	2	3	150.0	5	150	5	3	5	166.7	5	6	200.0	5	9	300.0	5
Native plant species richness - shrubs	3	8	266.7	5	266.67	5	6	10	166.7	5	3	50.0	2.5	5	83.3	2.5
Native plant species richness - grasses	6	10	166.7	5	166.7	5	9	5	55.6	2.5	10	111.1	5	10	111.1	5
Native plant species richness - forbes	16	4	25.0	2.5	25	2.5	11	6	54.5	2.5	3	27.3	2.5	9	81.8	2.5
Tree canopy height (average of emergent, canopy, sub-canopy)	15	18	120.0	5	120.0	5	17	15	88.2	5	16	94.1	5	18	105.9	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	13	21.4	164.6	5	164.6	5	25	20	80.0	5	14.7	58.8	5	15	60.0	5
Shrub canopy cover	2	7	350.0	3	350	3	10	1	10.0	3	0	0.0	0	3.2	32.0	3
Native grass cover	60	83.4	139.0	5	139	5	26	66	253.8	5	78.4	301.5	5	39	150.0	5
Organic litter	25	3	12.0	3	12	3	30	15	50.0	5	12.2	40.7	3	14.6	48.7	3
Large trees (euc plus non-euc)	6	2	33.3	5	33.3	5	20	4	20.0	5	0	0.0	0	2	10.0	5
Coarse woody debris	250	80	32.0	2	32.0	2	342	95	27.8	2	370	108.2	5	230	67.3	5
Non-native plant cover		5		5	0	5		10		5	2		10	10		5
Quality and availability of food and foraging habitat				10		10				10			10			10
Quality and availability of shelter				10		10				10			10			10
Site Condition Score				75.5		75.5				75			73			76
MAX Site Condition Score				*100*		*100*				*100*			100			100
Site Condition Score - out of 3						**2.27**										
Site Context																
Size of patch				10		10				10			10			10
Connectedness				2		2				2			2			5
Context				2		2				2			4			5
Ecological Corridors				4		4				4			4			4
Role of site location to species overall population in the state				5		5				5			5			5
Threats to the species				7		7				7			1			7
Species mobility capacity				10		10				10			10			10
Site Context Score				40		40				40			36			46
MAX Site Context Score				*56*		*56*				*56*			*56*			*56*
Site Context Score - out of 3						**2.14**										

OFFSET - Fauna Species

Assessment Unit - Regional Ecosystem	AU 4 - RE 11.3.25									AU 5 - RE 11.3.4								
Site Reference	Benchmark	SW01			SW08			Average %	Average	Benchmark	SW05			SW21			Average %	Average
	11.3.25	Raw Data	% Benchma	Score	Raw Data	% Benchma	Score	benchmar	Score	11.3.4	Raw Data	% Benchma	Score	Raw Data	% Benchma	Score	benchmar	Score
Site Condition																		
Recruitment of woody perennial species in EDL	100	25	25	3	50	50	30	37.5	16.5	100	100	100	5	100	100	5	100	5
Native plant species richness - trees	4	7	175.0	5	7	175.0	5	175	5	4	7	175.0	5	11	275.0	5	225	5
Native plant species richness - shrubs	2	6	300.0	5	6	300.0	5	300	5	2	3	150.0	5	6	300.0	5	225	5
Native plant species richness - grasses	8	1	12.5	0	3	37.5	2.5	25	1.25	7	4	57.1	2.5	9	128.6	5	92.85714	3.75
Native plant species richness - forbes	12	3	25.0	2.5	7	58.3	2.5	41.66667	2.5	10	9	90.0	5	13	130.0	5	110	5
Tree canopy height (average of emergent, canopy, sub-canopy)	23	18	78.3	5	24	104.3	5	91.3	5	22	18	81.8	5	16	72.7	5	77.27273	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	22	63	286.4	3	59	268.2	3	277.3	3	17	12.5	73.5	5	35.7	210.0	3	141.7647	4
Shrub canopy cover	1	0	0.0	0	0	0.0	0	0.0	0	1	7.3	730.0	3	0	0.0	0	365	1.5
Native grass cover	12	0	0.0	0	1	8.3	0	4.2	0	43	74.4	173.0	5	2	4.7	0	88.83721	2.5
Organic litter	15	4	26.7	3	13	86.7	5	56.7	4	20	5	25.0	3	43.6	218.0	3	121.5	3
Large trees (euc plus non-euc)	21	22	104.8	15	10	47.6	5	76.2	10	35	6	17.1	5	0	0.0	0	8.571429	2.5
Coarse woody debris	375	80	21.3	2	190	50.7	5	36.0	3.5	384	110	28.6	2	580	151.0	5	89.84375	3.5
Non-native plant cover		70		0		70.0	0		0		20		5	30		3		4
Quality and availability of food and foraging habitat				10			10		10				10			10		10
Quality and availability of shelter				10			10		10				10			10		10
Site Condition Score				63.5			88		75.75				75.5			64		69.75
MAX Site Condition Score				*100*			*100*		*100*				*100*			*100*		*100*
Site Condition Score - out of 3									**2.27**									**2.09**
Site Context																		
Size of patch				10			10		10				10			10		10
Connectedness				4			5		4.5				4			5		4.5
Context				2			5		3.5				4			4		4
Ecological Corridors				4			4		4				6			4		5
Role of site location to species overall population in the state				5			5		5				5			5		5
Threats to the species				7			7		7				7			1		4
Species mobility capacity				10			10		10				10			10		10
Site Context Score				42			46		44				46			39		42.5
MAX Site Context Score				*56*			*56*		*56*				*56*			*56*		*56*
Site Context Score - out of 3									**2.36**									**2.28**

OFFSET - Fauna Species

Assessment Unit - Regional Ecosystem	AU 6 - RE 11.4.13									AU 7 - 11.10.7 remnant										
Site Reference	Benchmark	SW12			SW20			Average %	Average	Benchmark	SW07			SW11			SW23			Average %	Average
	11.4.13	Raw Data	% Benchm	Score	Raw Data	% Benchm	Score	benchmar	Score	11.10.7	Raw Data	% Benchm	Score	Raw Data	% Benchm	Score	Raw Data	% Benchm	Score	benchmar	Score
Site Condition																					
Recruitment of woody perennial species in EDL	100	0	0	0	0	0	0	0	0	100	100	100	5	50	50	3	100	100	5	100	4.33
Native plant species richness - trees	4	6	150.0	5	6	150.0	5	150	5	6	9	150.0	5	7	116.7	5	5	83.3	2.5	116.67	4.17
Native plant species richness - shrubs	5	12	240.0	5	5	100.0	5	170	5	6	4	66.7	2.5	5	83.3	2.5	8	133.3	5	100	3.33
Native plant species richness - grasses	8	9	112.5	5	10	125.0	5	118.75	5	10	9	90.0	5	11	110.0	5	9	90.0	5	90	5
Native plant species richness - forbes	7	3	42.9	2.5	10	142.9	5	92.85714	3.75	16	9	56.3	2.5	5	31.3	2.5	12	75.0	2.5	65.625	2.5
Tree canopy height (average of emergent, canopy, sub-canopy)	20	16	80.0	5	14	70.0	5	75	5	25	20	80.0	5	14	56.0	3	22	88.0	5	84	4.33
Tree canopy cover (average of emergent, canopy, sub-canopy)	25	17.6	70.4	5	11.1	44.4	2	57.4	3.5	35	25.2	72.0	5	10	28.6	2	26.2	74.9	5	73.43	4
Shrub canopy cover	13	10	76.9	5	1.3	10.0	3	43.46154	4	22	6.6	30.0	3	0	0.0	0	1	4.5	0	17.27	1
Native grass cover	16	52	325.0	5	53	331.3	5	328.125	5	21	0	0.0	0	41	195.2	5	18	85.7	3	42.86	2.67
Organic litter	30	2.6	8.7	0	20	66.7	5	37.66667	2.5	52	24	46.2	3	24.4	46.9	3	33.4	64.2	5	55.19	3.67
Large trees (euc plus non-euc)	18	2	11.1	5	0	0.0	0	5.555556	2.5	4	2	50.0	10	0	0.0	0	0	0.0	0	25	3.33
Coarse woody debris	109	190	174.3	5	290	266.1	2	220.1835	3.5	321	210	65.4	5	160	49.8	2	230	71.7	5	68.54	4
Non-native plant cover		30		3	2		10		6.5		0		10	15		5	0		10		8.33
Quality and availability of food and foraging habitat				5			5		5				10			10			10		10
Quality and availability of shelter				5			5		5				10			10			10		10
Site Condition Score				60.5			62		61.25				81			58			73		70.67
MAX Site Condition Score				*100*			*100*		*100*				*100*			*100*			*146*		*100*
Site Condition Score - out of 3									**1.84**												**2.12**
Site Context																					
Size of patch				10			10		10				10			10			10		10
Connectedness				5			5		5				5			5			5		5
Context				4			4		4				5			4			5		4.67
Ecological Corridors				4			4		4				4			4			4		4
Role of site location to species overall population in the state				5			5		5				5			5			5		5
Threats to the species				7			7		7				7			7			7		7
Species mobility capacity				10			10		10				10			10			10		10
Site Context Score				45			45		45				46			45			46		45.67
MAX Site Context Score				*56*			*56*		*56*				*56*			*56*			*56*		*56*
Site Context Score - out of 3									**2.41**												**2.45**

Species Stocking Rate (SSR)								
Presence detected on or adjacent to site (neighbouring property with connecting habitat)	Score	0		5		10		10
		No		Yes - adjacent		Yes - on site		
Species usage of the site (habitat type & evidenced usage)	Score	0	5	10		15		15
		Not habitat	Dispersal	Foraging		Breeding		
Approximate density (per ha)	Score	0	10	20		30		0
		0%						
Role/importance of species population on site*	Score (*Total from supplementary table below*)	0	5		10		15	10
		0	5 - 15		20 - 35		40 - 45	
Total SRR score (out of 70)							35	**35**
SRR Score (out of 4)							2	

*SSR Supplementary Table				
*Key source population for breeding	Score	0	10	10
		No	Yes/ Possibly	
*Key source population for dispersal	Score	0	5	5
		No	Yes/ Possibly	
*Necessary for maintaining genetic diversity	Score	0	15	15
		No	Yes/ Possibly	
*Near the limit of the species range	Score	0	15	0
		No	Yes	30

Final habitat quality score (weighted)	AU 1	AU 2	AU 3	AU 4	AU 5	AU 6	AU 7	Average/Final
Site Condition score (out of 3)	2.32	2.27	2.19	2.27	2.09	1.84	2.12	
Site Context Score (out of 3)	2.36	2.14	2.25	2.36	2.28	2.41	2.45	
Species Stocking Rate Score (out of 4)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Habitat Quality score (out of 10)	6.68	6.41	6.44	6.63	6.37	6.25	6.57	
Assessment Unit area (ha)	80.4	12.1	124.6	34.1	46.1	3.1	249.2	
Total offset area (ha) for this MNES	549.6	549.6	549.6	549.6	549.6	549.6	549.6	
Size Weighting	0.15	0.02	0.23	0.06	0.08	0.01	0.45	
Weighted Habitat Quality Score	***0.98***	***0.14***	***1.46***	***0.41***	***0.53***	***0.04***	***2.98***	***7***

Regrowth – Without Offset

OFFSET - Fauna Species							
Assessment Unit - Regional Ecosystem	AU 8 - 11.10.7 HVR				AU 9 - 11.10.7 regrowth		
Site Reference	Benchmark	SW16			SW18		
	11.10.7	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score
Site Condition							
Recruitment of woody perennial species in EDL	100	100	100	5	100	100	5
Native plant species richness - trees	6	4	66.7	2.5	4	66.7	2.5
Native plant species richness - shrubs	6	4	66.7	2.5	3	50.0	2.5
Native plant species richness - grasses	10	7	70.0	0	8	80.0	0
Native plant species richness - forbes	16	5	31.3	0	9	56.3	0
Tree canopy height (average of emergent, canopy, sub-canopy)	25	7	28.0	0	5	20.0	0
Tree canopy cover (average of emergent, canopy, sub-canopy)	35	6.8	19.4	0	18	51.4	0
Shrub canopy cover	22	7.2	32.7	0	0	0.0	0
Native grass cover	21	29	138.1	0	64	304.8	0
Organic litter	52	34	65.4	5	16.4	31.5	3
Large trees (euc plus non-euc)	4	0	0.0	0	2	50.0	10
Coarse woody debris	321	70	21.8	2	200	62.3	5
Non-native plant cover		15		0	2		0
Quality and availability of food and foraging habitat				4			4
Quality and availability of shelter				4			4
Site Condition Score				25			36
MAX Site Condition Score				100			100
Site Condition Score - out of 3				**0.75**			**1.08**
Site Context							
Size of patch				10			10
Connectedness				5			5
Context				4			5
Ecological Corridors				4			4
Role of site location to species overall population in the state				5			5
Threats to the species				5			5
Species mobility capacity				10			10
Site Context Score				43			44
MAX Site Context Score				*56*			*56*
Site Context Score - out of 3				**2.30**			**2.36**

Species Stocking Rate (SSR)						
Presence detected on or adjacent to site (neighbouring property with connecting habitat)	Score	0	5		10	10
		No	Yes - adjacent		Yes - on site	
Species usage of the site (habitat type & evidenced usage)	Score	0	5	10	15	15
		Not habitat	Dispersal	Foraging	Breeding	
Approximate density (per ha)	Score	0	10	20	30	0
		0%				
Role/importance of species population on site*	Score (*Total from supplementary table below*)	0	5	10	15	10
		0	5 - 15	20 - 35	40 - 45	
Total SRR score (out of 70)					35	**35**
SRR Score (out of 4)					**2**	

*SSR Supplementary Table				
*Key source population for breeding	Score	0	10	10
		No	Yes/ Possibly	
*Key source population for dispersal	Score	0	5	5
		No	Yes/ Possibly	
*Necessary for maintaining genetic diversity	Score	0	15	15
		No	Yes/ Possibly	
*Near the limit of the species range	Score	0	15	0
		No	Yes	30

Final habitat quality score (weighted)	AU 8	AU 9	Average/Final
Site Condition score (out of 3)	0.75	1.08	
Site Context Score (out of 3)	2.30	2.36	
Species Stocking Rate Score (out of 4)	2.0	2.0	
Habitat Quality score (out of 10)	5.05	5.44	
Assessment Unit area (ha)	2.1	16.5	
Total offset area (ha) for this MNES	18.5	18.5	
Size Weighting	0.11	0.89	
Weighted Habitat Quality Score	***0.57***	***4.85***	***5***

Remnant – Future With Offset

OFFSET - Fauna Species

Assessment Unit - Regional Ecosystem	AU 1 - RE11.5.3 remnant											
Site Reference	Benchmark	SW09			SW14			SW19			Average %	Average
	11.5.3	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	benchmark	Score
Site Condition												
Recruitment of woody perennial species in EDL	100	100	100	5	100	100	5	100	100	5	100.0	5.0
Native plant species richness - trees	6	4	66.7	2.5	9	150.0	5	5	83.3	2.5	100.0	5.0
Native plant species richness - shrubs	6	9	150.0	5	4	66.7	2.5	7	116.7	5	111.1	5.0
Native plant species richness - grasses	6	10	166.7	5	9	150.0	5	10	166.7	5	161.1	5.0
Native plant species richness - forbes	10	9	90.0	5	9	90.0	5	5	50.0	2.5	76.7	5.0
Tree canopy height (average of emergent, canopy, sub-canopy)	16	18	112.5	5	16	100.0	5	20	125.0	5	112.5	5.0
Tree canopy cover (average of emergent, canopy, sub-canopy)	20	14.7	73.5	5	24.2	121.0	5	11.3	56.5	5	83.7	5.0
Shrub canopy cover	3	6.6	220.0	3	2	66.7	5	8.5	283.3	3	190.0	4.0
Native grass cover	19	17	89.5	3	11	57.9	3	35	184.2	5	110.5	5.0
Organic litter	20	22.6	113.0	5	13	65.0	5	13	65.0	5	81.0	5.0
Large trees (euc plus non-euc)	10	0	0.0	0	2	20.0	5	0	0.0	0	6.7	15.0
Coarse woody debris	314	410	130.6	5	230	73.2	5	230	73.2	5	92.4	5.0
Non-native plant cover		0		10	10		5	10		5		10.0
Quality and availability of food and foraging habitat				10			10			10		10
Quality and availability of shelter				10			10			10		10
Site Condition Score				78.5			80.5			73		99.00
MAX Site Condition Score				*100*			100			100		*100*
Site Condition Score - out of 3												**2.97**
Site Context												
Size of patch				10			10			10		10
Connectedness				4			4			5		5.00
Context				5			5			5		5.00
Ecological Corridors				4			4			4		4
Role of site location to species overall population in the state				5			5			5		5
Threats to the species				7			7			7		10
Species mobility capacity				10			10			10		10
Site Context Score				45			45			46		49
MAX Site Context Score				*56*			*56*			*56*		*56*
Site Context Score - out of 3												**2.63**

OFFSET - Fauna Species

Assessment Unit - Regional Ecosystem	AU 2 - RE 11.8.5					
Site Reference	**Benchmark**	SW24			Average %	Average
	11.8.5	Raw Data	% Benchmark	Score	benchmark	Score
Site Condition						
Recruitment of woody perennial species in EDL	100	100	100	5	100	5
Native plant species richness - trees	2	3	150.0	5	150	5
Native plant species richness - shrubs	3	8	266.7	5	266.67	5
Native plant species richness - grasses	6	10	166.7	5	166.7	5
Native plant species richness - forbes	16	4	25.0	2.5	25	2.5
Tree canopy height (average of emergent, canopy, sub-canopy)	15	18	120.0	5	120.0	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	13	21.4	164.6	5	164.6	5
Shrub canopy cover	2	7	350.0	3	350	3
Native grass cover	60	83.4	139.0	5	139	5
Organic litter	25	3	12.0	3	12	3
Large trees (euc plus non-euc)	6	2	33.3	5	33.3	15
Coarse woody debris	250	80	32.0	2	32.0	3
Non-native plant cover		5		5	0	10
Quality and availability of food and foraging habitat				10		10
Quality and availability of shelter				10		10
Site Condition Score				75.5		91.5
MAX Site Condition Score				*100*		*100*
Site Condition Score - out of 3						**2.75**
Site Context						
Size of patch				10		10
Connectedness				2		5
Context				2		5
Ecological Corridors				4		4
Role of site location to species overall population in the state				5		5
Threats to the species				7		10
Species mobility capacity				10		10
Site Context Score				40		49
MAX Site Context Score				*56*		*56*
Site Context Score - out of 3						**2.63**

OFFSET - Fauna Species

Assessment Unit - Regional Ecosystem	AU 3 - RE 11.5.9 remnant															
Site Reference	Benchmark	SW03			SW13			SW15			SW17			Average %	Average
	11.5.9	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchm	Score	benchmar	Score
Site Condition															
Recruitment of woody perennial species in EDL	100	100	100	5	100	100	5	100	100	5	100	100	5	100	5
Native plant species richness - trees	3	5	166.7	5	6	200.0	5	9	300.0	5	7	233.3	5	225	5
Native plant species richness - shrubs	6	10	166.7	5	3	50.0	2.5	5	83.3	2.5	2	33.3	2.5	83.33333	5
Native plant species richness - grasses	9	5	55.6	2.5	10	111.1	5	10	111.1	5	8	88.9	2.5	91.66667	5
Native plant species richness - forbes	11	6	54.5	2.5	3	27.3	2.5	9	81.8	2.5	10	90.9	5	63.63636	5
Tree canopy height (average of emergent, canopy, sub-canopy)	17	15	88.2	5	16	94.1	5	18	105.9	5	16	94.1	5	95.58824	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	25	20	80.0	5	14.7	58.8	5	15	60.0	5	13.3	53.2	5	63	5
Shrub canopy cover	10	1	10.0	3	0	0.0	0	3.2	32.0	3	2	20.0	3	15.5	3
Native grass cover	26	66	253.8	5	78.4	301.5	5	39	150.0	5	68	261.5	5	241.7308	5
Organic litter	30	15	50.0	5	12.2	40.7	3	14.6	48.7	3	10	33.3	3	43.16667	4
Large trees (euc plus non-euc)	20	4	20.0	5	0	0.0	0	2	10.0	5	4	20.0	5	12.5	15
Coarse woody debris	342	95	27.8	2	370	108.2	5	230	67.3	5	70	20.5	2	55.92105	5
Non-native plant cover		10		5	2		10	10		5	2		10		10
Quality and availability of food and foraging habitat				10			10			10			5		10
Quality and availability of shelter				10			10			10			5		10
Site Condition Score				75			73			76			68		97
MAX Site Condition Score				*100*			100			100			*100*		*100*
Site Condition Score - out of 3															**2.91**
Site Context															
Size of patch				10			10			10			10		10
Connectedness				2			2			5			5		5
Context				2			4			5			5		5
Ecological Corridors				4			4			5			4		4.25
Role of site location to species overall population in the state				5			5			5			5		5
Threats to the species				10			1			10			7		7
Species mobility capacity				10			10			10			10		10
Site Context Score				43			36			50			46		46.25
MAX Site Context Score				*56*			*56*			*56*			*56*		*56*
Site Context Score - out of 3															**2.48**

OFFSET - Fauna Species

Assessment Unit - Regional Ecosystem	AU 4 - RE 11.3.25									AU 5 - RE 11.3.4								
Site Reference	Benchmark	SW01			SW08			Average %	Average	Benchmark	SW05			SW21			Average %	Average
	11.3.25	Raw Data	% Benchma	Score	Raw Data	% Benchma	Score	benchmar	Score	11.3.4	Raw Data	% Benchma	Score	Raw Data	% Benchma	Score	benchmar	Score
Site Condition																		
Recruitment of woody perennial species in EDL	100	25	25	3	50	50	30	37.5	10	100	100	100	5	100	100	5	100	5
Native plant species richness - trees	4	7	175.0	5	7	175.0	5	175	5	4	7	175.0	5	11	275.0	5	225	5
Native plant species richness - shrubs	2	6	300.0	5	6	300.0	5	300	5	2	3	150.0	5	6	300.0	5	225	5
Native plant species richness - grasses	8	1	12.5	0	3	37.5	2.5	25	5	7	4	57.1	2.5	9	128.6	5	92.85714	5
Native plant species richness - forbes	12	3	25.0	2.5	7	58.3	2.5	41.66667	5	10	9	90.0	5	13	130.0	5	110	5
Tree canopy height (average of emergent, canopy, sub-canopy)	23	18	78.3	5	24	104.3	5	91.3	5	22	18	81.8	5	16	72.7	5	77.27273	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	22	63	286.4	3	59	268.2	3	277.3	3	17	12.5	73.5	5	35.7	210.0	3	141.7647	4
Shrub canopy cover	1	0	0.0	0	0	0.0	0	0.0	0	1	7.3	730.0	3	0	0.0	0	365	3
Native grass cover	12	0	0.0	0	1	8.3	0	4.2	5	43	74.4	173.0	5	2	4.7	0	88.83721	5
Organic litter	15	4	26.7	3	13	86.7	5	56.7	5	20	5	25.0	3	43.6	218.0	3	121.5	3
Large trees (euc plus non-euc)	21	22	104.8	15	10	47.6	5	76.2	15	35	6	17.1	5	0	0.0	0	8.571429	15
Coarse woody debris	375	80	21.3	2	190	50.7	5	36.0	4	384	110	28.6	2	580	151.0	5	89.84375	4
Non-native plant cover		70		0		70.0	0		10		20		5	30		3		10
Quality and availability of food and foraging habitat				10			10		10				10			10		10
Quality and availability of shelter				10			10		10				10			10		10
Site Condition Score				63.5			88		97				75.5			64		94
MAX Site Condition Score				*100*			*100*		*100*				*100*			*100*		*100*
Site Condition Score - out of 3									**2.91**									**2.82**
Site Context																		
Size of patch				10			10		10				10			10		10
Connectedness				4			5		5				4			5		5
Context				2			5		5				4			4		5
Ecological Corridors				4			4		4				6			4		5
Role of site location to species overall population in the state				5			5		5				5			5		5
Threats to the species				7			7		10				7			1		4
Species mobility capacity				10			10		10				10			10		10
Site Context Score				42			46		49				46			39		44
MAX Site Context Score				*56*			*56*		*56*				*56*			*56*		*56*
Site Context Score - out of 3									**2.63**									**2.36**

OFFSET - Fauna Species

Assessment Unit - Regional Ecosystem	AU 6 - RE 11.4.13									AU 7 - 11.10.7 remnant										
Site Reference	Benchmark	SW12			SW20			Average %	Average	Benchmark	SW07			SW11			SW23			Average %	Average
	11.4.13	Raw Data	% Benchma	Score	Raw Data	% Benchma	Score	benchmar	Score	11.10.7	Raw Data	% Benchma	Score	Raw Data	% Benchma	Score	Raw Data	% Benchma	Score	benchmar	Score
Site Condition																					
Recruitment of woody perennial species in EDL	100	0	0	0	0	0	0	0	5	100	100	100	5	50	50	3	100	100	5	100	5.00
Native plant species richness - trees	4	6	150.0	5	6	150.0	5	150	5	6	9	150.0	5	7	116.7	5	5	83.3	2.5	116.67	5.00
Native plant species richness - shrubs	5	12	240.0	5	5	100.0	5	170	5	6	4	66.7	2.5	5	83.3	2.5	8	133.3	5	100	5.00
Native plant species richness - grasses	8	9	112.5	5	10	125.0	5	118.75	5	10	9	90.0	5	11	110.0	5	9	90.0	5	90	5
Native plant species richness - forbes	7	3	42.9	2.5	10	142.9	5	92.85714	5	16	9	56.3	2.5	5	31.3	2.5	12	75.0	2.5	65.625	5
Tree canopy height (average of emergent, canopy, sub-canopy)	20	16	80.0	5	14	70.0	5	75	5	25	20	80.0	5	14	56.0	3	22	88.0	5	84	5.00
Tree canopy cover (average of emergent, canopy, sub-canopy)	25	17.6	70.4	5	11.1	44.4	2	57.4	5	35	25.2	72.0	5	10	28.6	2	26.2	74.9	5	73.43	4.8
Shrub canopy cover	13	10	76.9	5	1.3	10.0	3	43.46154	4	22	6.6	30.0	3	0	0.0	0	1	4.5	0	17.27	4.8
Native grass cover	16	52	325.0	5	53	331.3	5	328.125	5	21	0	0.0	0	41	195.2	5	18	85.7	3	42.86	5.00
Organic litter	30	2.6	8.7	0	20	66.7	5	37.66667	2.5	52	24	46.2	3	24.4	46.9	3	33.4	64.2	5	55.19	5.00
Large trees (euc plus non-euc)	18	2	11.1	5	0	0.0	0	5.555556	15	4	2	50.0	10	0	0.0	0	0	0.0	0	25	15.00
Coarse woody debris	109	190	174.3	5	290	266.1	2	220.1835	3.5	321	210	65.4	5	160	49.8	2	230	71.7	5	68.54	5
Non-native plant cover		30		3	2		10		10		0		10	15		5	0		10		10.00
Quality and availability of food and foraging habitat				5			5		10				10			10			10		10
Quality and availability of shelter				5			5		10				10			10			10		10
Site Condition Score				60.5			62		95				81			58			73		99.60
MAX Site Condition Score				*100*			*100*		*100*				*100*			*100*			*146*		*100*
Site Condition Score - out of 3									**2.85**												**2.99**
Site Context																					
Size of patch				10			10		10				10			10			10		10
Connectedness				5			5		5				5			5			5		5
Context				4			4		5				5			5			5		5.00
Ecological Corridors				4			4		4				4			4			4		4
Role of site location to species overall population in the state				5			5		5				5			5			5		5
Threats to the species				7			7		10				7			7			7		10
Species mobility capacity				10			10		10				10			10			10		10
Site Context Score				45			45		49				46			46			46		49.00
MAX Site Context Score				*56*			*56*		*56*				*56*			*56*			*56*		*56*
Site Context Score - out of 3									**2.63**												**2.63**

Species Stocking Rate (SSR)								
Presence detected on or adjacent to site (neighbouring property with connecting habitat)	Score	0		5		10		10
		No		Yes - adjacent		Yes - on site		
Species usage of the site (habitat type & evidenced usage)	Score	0	5	10		15		15
		Not habitat	Dispersal	Foraging		Breeding		
Approximate density (per ha)	Score	0	10	20		30		0
		0%						
Role/importance of species population on site*	Score (*Total from supplementary table below*)	0	5	10		15		10
		0	5 - 15	20 - 35		40 - 45		
Total SRR score (out of 70)							35	35
SRR Score (out of 4)							2	

*SSR Supplementary Table				
*Key source population for breeding	Score	0	10	10
		No	Yes/ Possibly	
*Key source population for dispersal	Score	0	5	5
		No	Yes/ Possibly	
*Necessary for maintaining genetic diversity	Score	0	15	15
		No	Yes/ Possibly	
*Near the limit of the species range	Score	0	15	0
		No	Yes	30

Final habitat quality score (weighted)	AU 1	AU 2	AU 3	AU 4	AU 5	AU 6	AU 7	Average/Final
Site Condition score (out of 3)	2.97	2.75	2.91	2.91	2.82	2.85	2.99	
Site Context Score (out of 3)	2.63	2.63	2.48	2.63	2.36	2.63	2.63	
Species Stocking Rate Score (out of 4)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Habitat Quality score (out of 10)	7.60	7.37	7.39	7.54	7.18	7.48	7.61	
Assessment Unit area (ha)	80.4	12.1	124.6	34.1	46.1	3.1	249.2	
Total offset area (ha) for this MNES	549.6	549.6	549.6	549.6	549.6	549.6	549.6	
Size Weighting	0.15	0.02	0.23	0.06	0.08	0.01	0.45	
Weighted Habitat Quality Score	***1.11***	***0.16***	***1.67***	***0.47***	***0.60***	***0.04***	***3.45***	***8***

Regrowth – Future With Offset

OFFSET - Fauna Species

Assessment Unit - Regional Ecosystem	AU 8 - 11.10.7 HVR				AU 9 - 11.10.7 regrowth		
Site Reference	Benchmark	SW16			SW18		
	11.10.7	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score
Site Condition							
Recruitment of woody perennial species in EDL	100	100	100	5	100	100	5
Native plant species richness - trees	6	4	66.7	5	4	66.7	5
Native plant species richness - shrubs	6	4	66.7	3	3	50.0	5
Native plant species richness - grasses	10	7	70.0	5	8	80.0	5
Native plant species richness - forbes	16	5	31.3	5	9	56.3	5
Tree canopy height (average of emergent, canopy, sub-canopy)	25	7	28.0	5	5	20.0	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	35	6.8	19.4	5	18	51.4	5
Shrub canopy cover	22	7.2	32.7	5	0	0.0	5
Native grass cover	21	29	138.1	5	64	304.8	5
Organic litter	52	34	65.4	5	16.4	31.5	5
Large trees (euc plus non-euc)	4	0	0.0	10	2	50.0	15
Coarse woody debris	321	70	21.8	2	200	62.3	5
Non-native plant cover		15		10	2		10
Quality and availability of food and foraging habitat				10			10
Quality and availability of shelter				10			9
Site Condition Score				90			99
MAX Site Condition Score				100			100
Site Condition Score - out of 3				**2.70**			**2.97**
Site Context							
Size of patch				10			10
Connectedness				5			5
Context				5			5
Ecological Corridors				4			4
Role of site location to species overall population in the state				5			5
Threats to the species				10			10
Species mobility capacity				10			10
Site Context Score				49			49
MAX Site Context Score				*56*			*56*
Site Context Score - out of 3				**2.63**			**2.63**

Species Stocking Rate (SSR)							
Presence detected on or adjacent to site (neighbouring property with connecting habitat)	Score	0		5		10	10
		No		Yes - adjacent		Yes - on site	
Species usage of the site (habitat type & evidenced usage)	Score	0	5	10		15	15
		Not habitat	Dispersal	Foraging		Breeding	
Approximate density (per ha)	Score	0	10	20		30	0
		0%					
Role/importance of species population on site*	Score (*Total from supplementary table below*)	0	5	10		15	10
		0	5 - 15	20 - 35		40 - 45	
Total SRR score (out of 70)						35	**35**
SRR Score (out of 4)						2	

*SSR Supplementary Table				
*Key source population for breeding	Score	0	10	10
		No	Yes/ Possibly	
*Key source population for dispersal	Score	0	5	5
		No	Yes/ Possibly	
*Necessary for maintaining genetic diversity	Score	0	15	15
		No	Yes/ Possibly	
*Near the limit of the species range	Score	0	15	0
		No	Yes	30

Final habitat quality score (weighted)	AU 8	AU 9	Average/Final
Site Condition score (out of 3)	2.70	2.97	
Site Context Score (out of 3)	2.63	2.63	
Species Stocking Rate Score (out of 4)	2.0	2.0	
Habitat Quality score (out of 10)	7.33	7.60	
Assessment Unit area (ha)	2.1	16.5	
Total offset area (ha) for this MNES	18.5	18.5	
Size Weighting	0.11	0.89	
Weighted Habitat Quality Score	***0.83***	***6.77***	***8***

Appendix D Completed koala OAG

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Koala
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	**0.2%**

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Threatened species habitat						
Area of habitat	Yes		**Area**	74	Hectares	
			Quality	**6**	Scale 0-10	
			Total quantum of impact	44.40	Adjusted hectares	
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	No				**Risk-related time horizon (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Threatened species habitat																				
Area of habitat	Yes	44.40	Adjusted hectares		**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	18.5	**Risk of loss (%) without offset**	15%	**Risk of loss (%) with offset**	0%	2.78	90%	2.50	2.40	5.55	12.49%	No	
									Future area without offset (adjusted hectares)	15.7	**Future area with offset (adjusted hectares)**	18.5								
					Time until ecological benefit	20	**Start quality (scale of 0-10)**	**6**	**Future quality without offset (scale of 0-10)**	**5**	**Future quality with offset (scale of 0-10)**	**8**	3.00	80%	2.40	2.31				
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	44.4	5.55	12.49%	**No**	$0.00	#DIV/0!	#DIV/0!
Area of community	0				$0.00		$0.00
					$0.00	**#DIV/0!**	**#DIV/0!**

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Koala
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	**0.2%**

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Threatened species habitat						
Area of habitat	Yes		**Area**	74	Hectares	
			Quality	**6**	Scale 0-10	
			Total quantum of impact	44.40	Adjusted hectares	
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	No				**Risk-related time horizon (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Threatened species habitat																				
Area of habitat	Yes	44.40	Adjusted hectares		**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	549.6	**Risk of loss (%) without offset**	0%	**Risk of loss (%) with offset**	0%	0.00	90%	0.00	0.00	42.25	95.15%	Yes		
									Future area without offset (adjusted hectares)	549.6	**Future area with offset (adjusted hectares)**	549.6								
					Time until ecological benefit	20	**Start quality (scale of 0-10)**	**7**	**Future quality without offset (scale of 0-10)**	**7**	**Future quality with offset (scale of 0-10)**	**8**	1.00	80%	0.80	0.77				
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	44.4	42.25	95.15%	**Yes**	$0.00	#DIV/0!	#DIV/0!
Area of community	0				$0.00		$0.00
					$0.00	**#DIV/0!**	**#DIV/0!**

Appendix E OAMP

BHP

Spring to Phillips Creek Diversion Project Offset Area Management Plan

Tay-Glen Property

15 February 2021

Document tracking	
Project Name	Saraji Mine Creek Diversion EPBC Act and offsets project
Company	Eco Logical Australia and v6/7&8 amendments by BHP
Project Number	20BRI-15276
Project Manager	Jessie McCudden
Prepared by	Jessie McCudden and v6/7&8 amendments by BHP
Reviewed by	Ailsa Kerswell and Mark Longbottom / BHP
Approved by	Ailsa Kerswell and Mark Longbottom / BHP
Status	Final
Version Number	9

This report should be cited as 'Eco Logical Australia 2021. Spring to Phillips Creek Diversion Project Offset Area Management Plan – Tay-Glen Property. Prepared for BHP.'

Contents

1. Introduction

1.1 Background

The Spring to Phillips Creek Diversion and associated works (the Project) is located at Saraji Mine (SRM), approximately 50 kilometres (km) southeast of Moranbah in Central Queensland on Mining Lease (ML) 1782, ML 2410, ML 70142, and ML 70294. BM Alliance Coal Operations Pty Ltd (BMA) owns and operates SRM, which operates under the Environmental Authority (EA) EPML00862313.

The Project will improve water management at SRM through more effective separation of clean water and mine affected water; rectifying historical design issues with the existing Southern Creek diversion; and delivering a post-mining landform that is safe, stable and non-polluting. The Project involves the construction of the diversion and supporting infrastructure at SRM.

The Project is approved under the *Environmental Protection and Biodiversity Act 1999* (EPBC Act), (EPBC 2019/8576). The delivery of offsets is required to address unavoidable impacts on Matters of National Environmental Significance (MNES) associated with the Project. This document comprises an Offset Area Management Plan (OAMP) prepared to address the offset requirement.

The significant residual impacts that are likely to result from the Project will be offset across one property, Tay-Glen. Tay-Glen is under freehold tenure owned by the Central Queensland Coal Associate Joint Venture Partners, which is a 50/50 joint venture between BHP Coal and Mitsubishi (the proponent and approval holder). The Tay-Glen offset site is located directly adjacent to the Project disturbance area and provides a refuge for individuals that may be directly impacted by the Project. It is 857.6 hectares (ha) in size.

1.2 Commonwealth offset conditions

[This section to be completed upon issue of approval and associated conditions]

The Commonwealth approval EPBC 2019/8576 (EPBC Act approval) outlines the approved unavoidable impacts as a result of the Project, which includes impacts to Koala (*Phascolarctus cinereus)*. The authorised impact areas for each MNES as per Condition xx of the EPBC Act approval and associated offset commitment are outlined in Table 1.

Table 1: EPBC Act approved unavoidable impacts for the Project

MNES	Approved impact	Offset commitment
Koala habitat	74ha	

Note: Assessment of the extent of significant impact to the koala was undertaken and reported in the approval submission. The Department of Agriculture, Water and the Environment (DAWE) determined the extent of significant impact to differ from the assessment outcome and this OAMP has been completed in accordance with the DAWE requirement for an approved impact extent of 74ha to Koala habitat.

1.3 Purpose & content of this OAMP

This OAMP has been prepared to address the Project's likely residual significant impacts to MNES identified in the preliminary documentation, as well as satisfy the EPBC Act approval offset conditions. It specifically focusses on the offsets provided at the Tay-Glen property, fulfilling the offset requirements for significant residual impacts to Koala habitat. The plan outlines the on-ground management of the Project's offset area to assist in the delivery of positive environmental outcomes.

The OAMP must provide certain content, as specifed by the DAWE. These requirements are detailed in Table 2 below, along with a cross-reference to where the relevant information is provided.

Table 2: Overview of this OAMP's content

Requirement	Information location
Details to demonstrate how the environmental offset/s compensate for residual significant impacts of the project on relevant listed threatened species and communities, and/or their habitat, in accordance with the principles of the Offsets Policy and all requirements of the Offsets Assessment Guide (OAG)	Offsets have been developed in accordance with both the EPBC Act Offsets Policy and the OAG. Details are provided in the Spring to Phillips Creek Diversion Project Offsets Strategy (Eco Logical Australia 2020a), Section 3 and Appendix B.
A description of the offset area/s, including location, size, condition, environmental values present and surrounding land uses	See Section 2.
Baseline data and other supporting evidence that documents the presence of the relevant listed threatened species and communities, and the quality of their habitat within the offset area/s	Two dedicated ecology surveys were undertaken to determine the values and their baseline condition at the Tay-Glen offset site in May and December 2020. Refer to Appendix A of the Spring to Phillips Creek Diversion Project Offsets Strategy (Eco Logical Australia 2020a).
An assessment of the site habitat quality for the offset area/s using the Queensland Guide to determining terrestrial habitat quality: A toolkit for assessing land based offsets under the Queensland Environmental Offsets Policy (Version 1.2, April 2017), or subsequent revision	The site habitat quality of the offset area was determined during field assessments in line with the Queensland Guide to determining terrestrial habitat quality (DES, 2020). Refer to Appendix B of Eco Logical Australia 2020a and Appendix B of this document.
Details of how the offset area/s will provide connectivity with other habitats and biodiversity corridors and/or will contribute to a larger strategic offset for the relevant listed threatened species and communities	See Section 2.4.
Maps and shapefiles to clearly define the location and boundaries of the offset area/s, accompanied by the offset attributes (e.g. physical address of the offset area/s, coordinates of the boundary points in decimal degrees, the listed threatened species and communities that the environmental offset/s compensates for, and the size of the environmental offset/s in hectares)	See Figure 1 and 2. Shapefiles are provided directly to the DAWE
Specific offset completion criteria derived from the site habitat quality to demonstrate the improvement in the quality of habitat in the offset area/s over a 20 year period	See Table 5.
Details of the management actions, and timeframes for implementation, to be carried out to meet the offset completion criteria	See Table 7.
Interim milestones that set targets at 5-yearly intervals for progress towards achieving the offset completion criteria	See Table 5.

Requirement	Information location
Details of the nature, timing and frequency of monitoring to inform progress against achieving the 5-yearly interim milestones (the frequency of monitoring must be sufficient to track progress towards each set of milestones, and sufficient to determine whether the offset area/s are likely to achieve those milestones in adequate time to implement all necessary corrective actions)	See Section 3.6.
Proposed timing for the submission of monitoring reports which provide evidence demonstrating whether the interim milestones have been achieved	See Section 4.2.
Timing for the implementation of corrective actions if monitoring activities indicate the interim milestones have not been achieved	See Table 9.
Risk analysis and a risk management and mitigation strategy for all risks to the successful implementation of the OAMP and timely achievement of the offset completion criteria, including a rating of all initial and post-mitigation residual risks in accordance with a risk assessment matrix	See summary of risks in Table 6 and Appendix A.
Evidence of how the management actions and corrective actions take into account relevant approved conservation advices and are consistent with relevant recovery plans and threat abatement plans	See Table 4.
Details of the legal mechanism for legally securing the proposed offset area/s, such that legal security remains in force over the offset area/s for at least 20 years to provide enduring protection for the offset area/s against development incompatible with conservation	The offset will be secured via a Voluntary Declaration under the Queensland *Vegetation Management Act 1999*. See Section 3.5.3.

2. Tay-Glen Property Offset Area

2.1 Property location and regional context

The Tay-Glen offset area is located in Isaac Regional Council Local Government Area in central Queensland, approximately 15 km north of Dysart and in proximity to SRM (Figure 1). The offset area is located within the larger Tay-Glen property, which extends to the north and south-east, adjacent to the mine and is adjacent to the disturbance area.

The Tay-Glen property contains a mixture of remnant and regrowth vegetation, with large cleared areas across the property, particularly in the southern portion. The offset area is located within the north-western parts of the Tay-Glen property, where vegetation clearing has been less widespread.

In the regional context, the offset area is located in the lowland areas of a much larger contiguous area of remnant vegetation associated with ridgelines running in an approximately southeast–northwest direction between Tieri and Moranbah, to the west of the Dysart-Middlemount Road.

The location of the Tay-Glen offset property is shown on Figure 1.

2.2 Tenure and ownership

The Tay-Glen offset area is sited within Lot 101 SP310393. The land is under freehold tenure owned by the Central Queensland Coal Associate Joint Venture Partners, which is a 50/50 joint venture between BHP Coal and Mitsubishi.

Figure 1: Tay-Glen Property offset area

2.3 Offset area and values

The offset area is located within the north-western parts of Lot 101 SP310393. There are currently no mining or petroleum leases over the area. Two MLs held by BMA (ML70142 and ML 70294) are located directly to the east of Tay-Glen. A buffer zone of 100 metres (m) has been designated between these MLs and the offset area to minimise the potential effects of disturbance related to mining activities within the offset. The same 100 m buffer has been applied to Lake Vermont Road and the Goonyella System Rail-line (refer to Figure 1).

The offset area is 857.6 ha in total area, with 650.2 ha vegetated (631.7 ha remnant; 18.5 ha regrowth) and 207.4 ha cleared areas.

Field surveys, involving targeted habitat assessments, ground-truthed 568.1 ha of Koala habitat within the offset area (Figure 2). This includes 549.6 ha of remnant vegetation and 18.5 ha of high value regrowth and regrowth vegetation. Habitat areas were validated based on the presence of preferred habitat structure and preferred food tree species that are the species habitat requirements outlined in the EPBC Act referral guidelines for the vulnerable Koala (DoE, 2014). Koala surveys were carried out in December 2020, which confirmed the presence of six Koala and two scat samples within the offset area. The offset area is directly adjacent to the disturbance area, forming habitat connectivity through remnant vegetation and riparian corridor of Phillips Creek. Surveys conducted in 2018 confirmed the presence of 18 Koala within habitat connected to the offset area.

The DAWE referral guideline also describes refuge habitat for the species, which was utilised to identify potential habitat refuges for the species within the offset area. Refuge habitat is suitable habitat in riparian environments and other areas with reliable soil moisture and fertility, including a permanent aquifer, in a riparian zone, on upper or mid-slopes, on a fertile alluvial plain or where soil moisture / rainfall is reliable (DoE, 2014).

Refuge habitat for Koala within the offset area was identified as riparian and floodplain open forests and woodlands in association with Phillips Creek in the south and two smaller tributaries in the centre of the offset area. This habitat was identified as vegetation analogous to RE11.3.25, RE11.3.2 and RE11.3.4 and occurs within an area of 80.2 ha. This vegetation has reliable year-round access to high soil moisture and provides an important refuge for Koala during droughts and in periods of extreme heat. Foraging and dispersal habitat for Koala within the study area was ground-truthed as eucalypt woodlands predominantly on sand plains and coarse-grained sedimentary rocks, with vegetation analogous to RE11.4.13, RE11.5.3, RE11.5.9, RE11.8.5 and RE11.10.7. This habitat occurs within an area of 487.9 ha.

Habitat within the offset area is analogous to that of the impact area. Habitat within the impact area was ground-truthed as riparian forests and eucalypt woodlands on floodplains, sandplains and sandstone uplands (RE11.3.25, 11.3.4, 11.5.3, 11.5.9, 11.10.1), which are dominated by known food trees such as Queensland Blue Gum, River Red Gum, Poplar Box and Narrow-leaved Ironbark (Eco Logical Australia 2020b).

Remnant Koala habitat within the study area was found to have structural complexity, canopy species diversity and recruitment characteristics resembling an undisturbed community. Regrowth habitat within the study area was found to have reduced canopy species richness, height and cover relative to an undisturbed community.

Koala have been recorded within the offset area and in connecting habitat across two surveys. Surveys conducted in December 2020 encountered six Koala (including one joey) within the offset area, whilst 18 individuals were recorded during surveys in 2018 in habitat directly adjacent and connected to the offset area. Surveys conducted within the offset area sighted five adults and one joey, within a broad range of habitat types including dry eucalypt woodlands, floodplain forests to woodlands and riparian woodlands. Surveys in 2018 observed 13 adults (male and female) and five joeys, the majority of which were identified within woodlands on alluvial and sand plains in the centre of the Project area (refer to Figure 2).

The offset area and adjacent connecting habitat are well utilised by Koala with a healthy breeding population observed across two surveys. The area is connected through remnant eucalypt vegetation which extends further west from the offset area and through riparian corridors, such as Phillips Creek. This allows Koala to move freely from adjacent habitat near SRM into suitable habitat areas within the offset area and beyond, reducing any potential overstocking issues. Available records (Atlas of Living Australia accessed 2020) show that Koala utilise areas further west, with records approximately 15 km west and 5 km north-west of the offset area (Figure 3). The offset area and surrounding suitable habitat are therefore considered important in maintaining the regional Koala population.

2.4 Landscape connectivity

Remnant vegetation within the offset area forms a large contiguous patch and joins the Phillips Creek riparian corridor in the south of the offset area, providing good connectivity within the offset area. In particular, the offset area is directly connected to Koala habitat within the Project's impact area, where Koala have been recorded at distances of less than 1 km from the offset area. Connectivity between the impact area and offsets area is shown on Figure 3.

Phillips Creek, which intersects the study area in the south, provides significant regional connectivity, linking the study area to large contiguous tracts of vegetation extending to the north, south and west. Saraji Road and rail line to the south-west, SRM and clearing for agricultural purposes limit connectivity in the area to the east.

2.5 Threatening processes

Field assessment of the offset area identified numerous threatening processes present within the property. These include habitat clearing, livestock grazing, pest fauna and weeds. A summary of the key threats to protected matter is provided in Table 3.

Table 3: Threatening processes for MNES values identified across the Tay-Glen property

MNES	Threat
Koala	• Clearing of regrowth habitat • Clearing of remnant habitat not currenty mapped as regulated vegetation by the Queensland Government • Clearing of understorey and recruitment trees • Impacts from grazing including trampling and over-grazing of regenerating native vegetation • Ongoing pest incursion • Potential predation of Koala by pest species in particular dogs and foxes • Fragmentation of habitat by infrastructure such as roads, fencelines, fire breaks etc.

Cattle grazing currently occurs across the offset area. Cattle grazing impacts, including low ground layer species diversity and pugging in wet areas, are evident across the offset area and considered to be moderate.

Numerous pest species are likely to occur within the offset area, including Rabbits *(Oryctolagus cuniculus*), Pigs (*Sus scrofa*) and Cats (*Felis catus*). Cane Toads (*Rhinella marina*) and Dogs (*Canis lupus familiaris*). These species are also common within the region.

Four flora species listed as restricted matter under the Queensland Biosecurity Act 2014 and as WoNS, were recorded within the offset area:

- Prickly pear (*Opuntia stricta*) Scattered across the offset area in low abundance usually observed as individual plants.

- Velvety tree pear (*Opuntia tomentosa*) Scattered across the study area in low abundance usually observed as individual plants.
- Rubber vine (*Cryptostegia grandiflora*) Scattered across the study area in associated with riparian or alluvial floodplains in low densities.
- Parthenium (*Parthenium hysterophorus*) Observed in varying density throughout the study area, though often in high density when associated creeks

Figure 2: Koala habitat across the Tay-Glen offset area

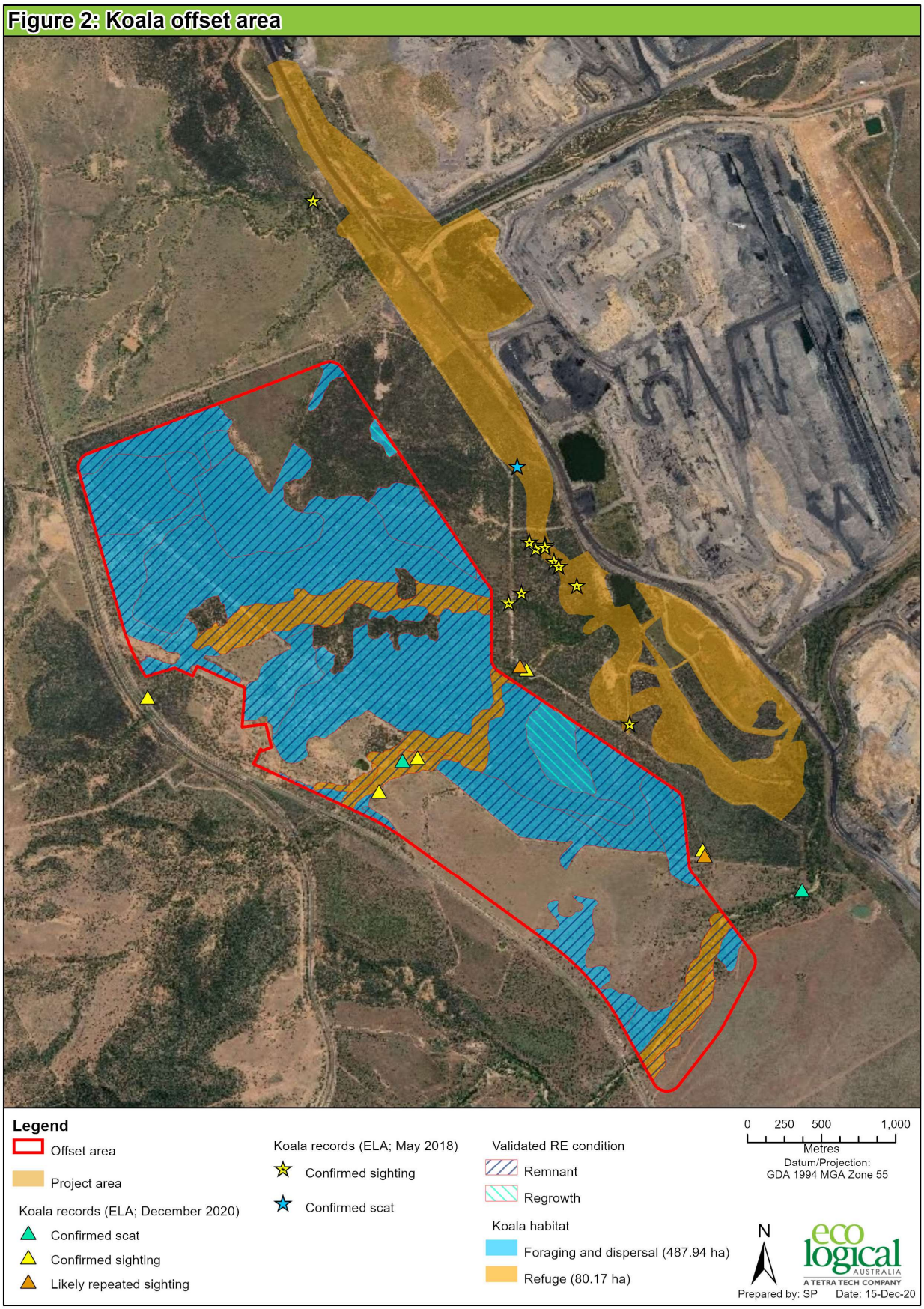
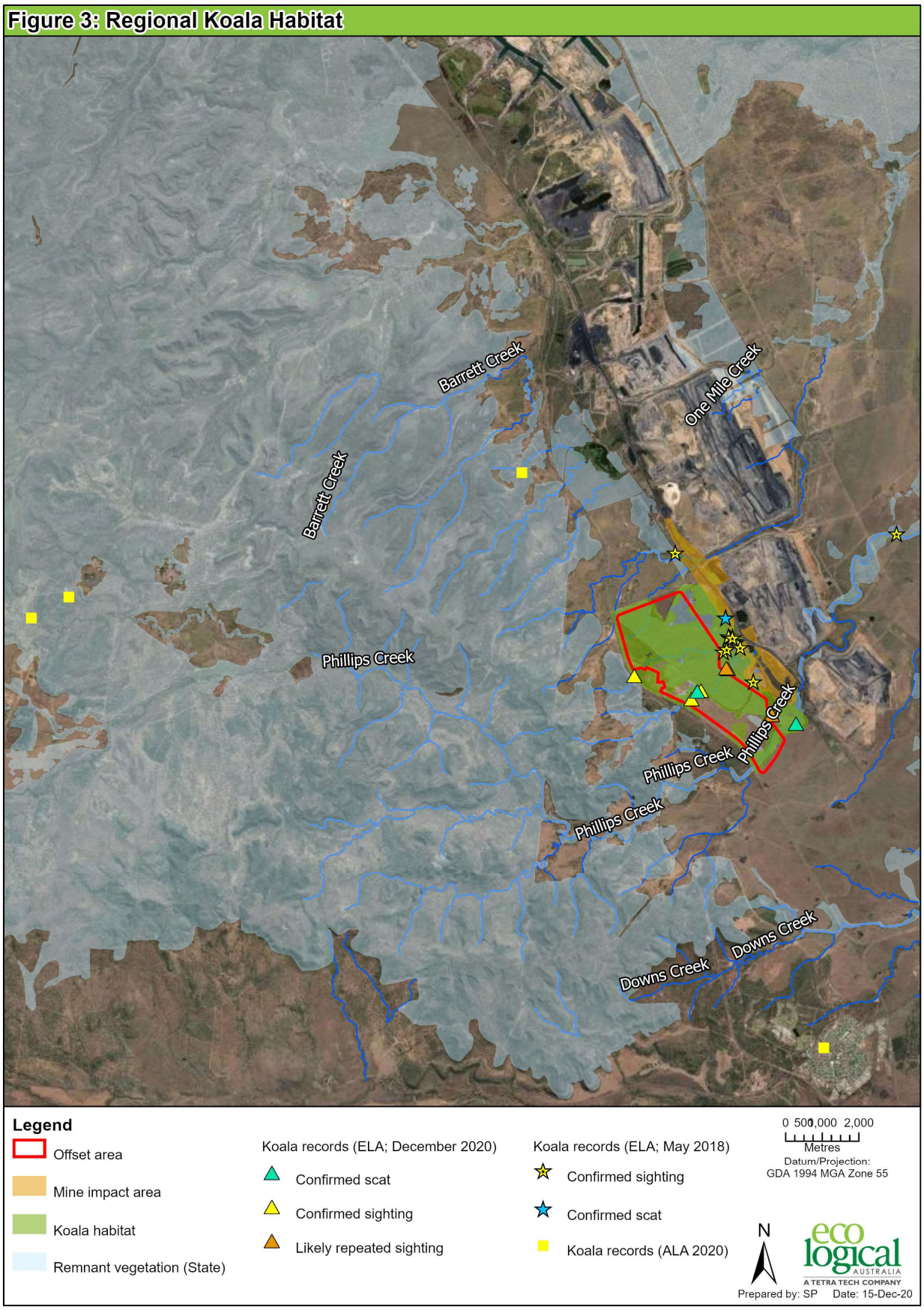


Figure 3: Landscape connectivity

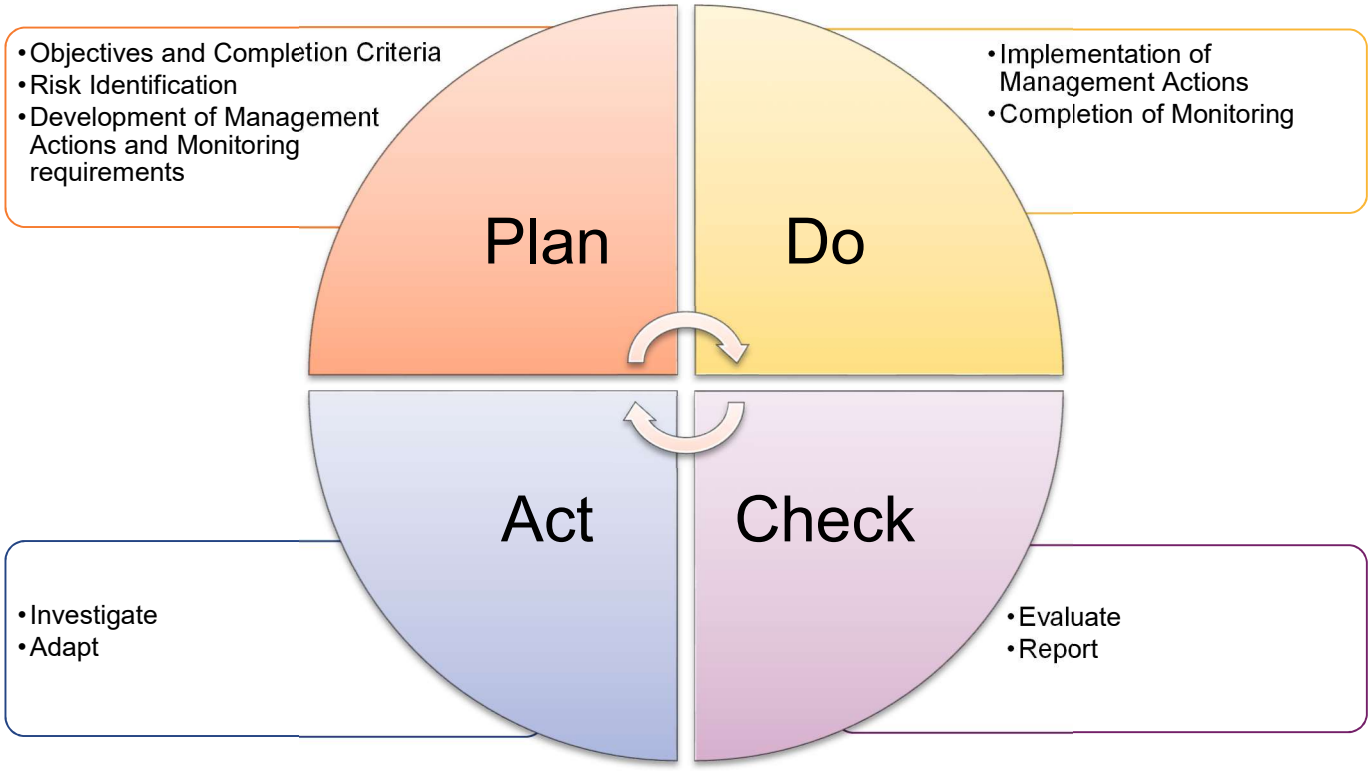


3. Offset Management Framework

3.1 Offset Management Framework

The management of the offset commitment will be implemented in accordance with an Offset Management Framework centred on an adaptive management cycle. The cycle is based on the PLAN – DO – CHECK – ACT model used in the overarching BHP EMS. The accountability for implementation of the framework will lie with BMA, however for some aspects (e.g. stock management, fence monitoring, habitat quality assessment) a suitably qualified person will be appointed and held accountable to BMA to deliver the necessary outcomes (e.g. maintenance of infrastructure, monitoring reports etc.).

A key aspect of the framework is the feedback cycle facilitated by CHECKing outcomes of monitoring, investigating contributing factors to results not considered in line with milestones or KPIs (ACT), adapting approaches to management (informed by experts where appropriate) with the aim of improving likelihood of success (ACT) and finally circling back to updating documentation and work plans (PLAN) to ensure improved actions are then incorporated and implemented (DO) in future.



The framework encompasses the following key components:

PLAN

- **Offset Management Objectives** – the understanding of the MNES values to be offset and threats to those values drives the management objectives for the site. The objectives are outlined in Section 3.2.

- **Completion Criteria** – final completion criteria specific to the management objectives have been identified. Performance targets are defined to measure performance of the management actions during the offset management period and progress toward final completion criteria. Criteria are shown in Section 3.3.
- **Risk Planning** – a risk assessment identifies threats to the management process whereby management actions and monitoring design can incorporate precautionary measures, or ensure monitoring parameters are appropriate for detection of negative results. The risk assessment is summarised in Section 3.4 and provided in detail in Appendix A.
- **Management Actions Definition** – management actions have been designed specific to the desired conservation outcomes of the offset. Actions are documented in terms of method, location, timing for implementation and responsibility. In addition, action specific performance indicators have been defined for each management action and options for corrective actions identified. Management actions and schedule are documented in Section 3.5.
- **Monitoring Program** – the monitoring requirements are documented in Section 3.6. Firstly, baseline data will be collected to establish the benchmark for reporting against. Baseline data collection will be undertaken by a suitably qualified person depending on the nature of the parameter (e.g. ecologist will be required for measuring of habitat quality whereas the location and condition of fire breaks would be assessed by a land manager).
- **Establish Process** – obligations of approval and management/monitoring commitments will be recorded in the BMA Coal Legal Obligations Register (CLOR) and Management Plan LOR. A corresponding schedule and work orders for monitoring, management actions, reporting etc. will then be incorporated into the BMA Enterprise Work Management System (SAP). Work orders will be developed to provide a detailed breakdown of tasks to be completed. The SAP provides a mechanism for tracking activity completion and assigning work orders (among other things).

Outcomes of the PLAN component of the framework are documented in the below sections of this document. The nature of the adaptive management cycle is such that the management actions and monitoring program will be updated and implemented where investigation outcomes identify a necessary amendment.

DO

- **Implementation** – management actions and the monitoring program will be implemented in accordance with the work orders as they are scheduled in SAP. Implementation will be undertaken by suitably qualified personnel depending on the nature of the task.
- **Operation** – the offset site will be operated in accordance with the management strategies defined within this OAMP. This includes land use restrictions identified to ensure the delivery of an improved environmental outcome, and the legally binding mechanism under the *Vegetation Management Act 1999* under which the offset will be secured. Offset area restrictions are shown in Section 3.5.2 and details of the legally binding mechanism described in Section 3.5.3.

CHECK

- **Evaluate** – outcomes of the monitoring undertaken will be evaluated following each monitoring event. The method of evaluation will be dependant on the parameter measured and relevant target/KPI for comparison. The monitoring schedule is shown in Table 9.
- **Report** – results of all monitoring will be captured and data collected will be maintained in an appropriate data storage format. Maintaining a record of results throughout the life of the offset will allow for trends to be identified (if relevant to measuring success) and measuring against KPIs and performance targets.

ACT

- **Record** – non-conformances (i.e. if actions were not completed within schedule) will be recorded in the BMA Event Management System, triggering an investigation. Non-conformance investigation will be completed and solutions identified and implemented.

- **Investigate -** in the event monitoring results identify performance targets or KPIs are not reached or other aspects of monitoring indicate areas of concern, an investigation will be undertaken. The investigation will:
    - Identify key drivers/parameters that relate to the monitoring result not in line with milestones or KPIs.
    - Require development of suitable mitigation or corrective actions. Where items can be solved in the short term, work order notifications will be raised within SAP for implementation (e.g. minor fencing repair). For major actions or repair works, a plan for completion will be developed in consideration of budgeting cycle or if the work is considered urgent, escalated for prioritisation. Where actions are required for impacts other than maintenance or repair activities (i.e. a change in the approach to managing the property) a koala expert will be consulted to inform the identification of appropriate corrective actions (specifically actions that are scientifically robust and targeted to the objectives of meeting completion criteria for koala conservation).

  The investigation may require multiple stakeholder input such as BHP Environment representative, the suitably qualified person appointed by landholder, ecological consultants and/or experts in specialists disciplines (e.g. koala experts) depending on the complexity of the outcome.
- **Adapt** – where investigation outcomes require a long term amendment to the OAMP (i.e. for actions or monitoring changes to be permanently implemented rather than one-time-only repair actions) relevant documents will be updated and changes to scheduling, obligations or monitoring revised in SAP (i.e. cycle back to the PLAN component) to update work orders. These updates will enable implementation of revised management and monitoring through the DO component of the framework.

Management and monitoring will continue in accordance with PLAN documentation (and subsequent updates installed as a result of the investigation process), renewing the implementation of the DO component. The framework cycle will continue until final completions criteria are determined to be reached, or for the minimum 20-year term (whichever is longer).

The OAMP will be formally reviewed every five years (at a minimum and more frequently should monitoring outputs trigger adaptive management updates). The review will consider results of all monitoring including information gathered by the suitably qualified person appointed by the landholder, results of ecological condition scoring and pest animal monitoring. The formal review will be a further opportunity for effectiveness of management actions to be assessed and amendments considered for implementation.

3.2 Offset management objectives

The management objectives of the offset area on the Tay-Glen property are to reduce threatening processes and increase the habitat quality of the area to a level at which it provides greater conservation value than its current form and that of the current impact site. The desired conservation outcomes for Koala offsets are to *protect and restore habitat in order to increase habitat extent, resources and patch connectivity so that viable populations can be sustained*.

In consideration of regional and local priority actions outlined in relevant Conservation Advice, recovery plan and threat abatement plans for the MNES value (summarised in Table 4) management actions are focussed around prohibition of disturbance activities, stock management, weed and pest management, fire management and legally securing the offset area.

Table 4: Offset management action compliance with MNES recovery plans, conservation advice and threat abatement plans

Conservation priority for MNES	Offset management actions				
	Prohibition of disturbance activities	Stock management	Weed and pest management	Fire management	Legal offset security
Koala (Approved Conservation Advice, 2012)					
Prevent habitat loss and fragmentation	✓	✓			✓
Weed and pest animal control, particularly feral dogs			✓		
Fire management to prevent mortality and habitat destruction				✓	

3.3 Completion scores and performance targets

Completion criteria developed directly relate to the management objective of increasing the habitat quality of the area for the Koala. Criteria for habitat quality and abundance of koala food trees are included.

The final completion scores for the offset area are detailed in Table 5. To increase the habitat quality score, the desired outcomes of increasing habitat extent, resources and patch connectivity as well as reducing threatening processes is the focus of management actions. Completion criteria for Koala food tree abundance have been included to ensure that the quality and availability of food resources for the species is maintained within the offset area.

To facilitate evaluation of progress toward the completion criteria, interim performance targets are provided (Table 5). These are interim target values that describe a possible path of enhancement to reach the final completion criteria. These interim target values are to help assist the management and improvement of the offset area and offset management actions. They are not criteria that must be met, rather the interim criteria used to assess progress and trigger adaptive management whereby the land manager will investigate possible causes for a lack of progress (in accordance with the Offset Management Framework).

The completion criteria for this OAMP will be met when all of the criteria (habitat quality and food tree abundance), as shown in Table 5, have achieved the required overall final completion scores listed.

Table 5: Interim and final completion criteria

Criteria / Metric	Baseline Score	Interim Performance Targets			Final Completion score (Year 20)
		Year 5	Year 10	Year 15	
Koala habitat quality score - remnant habitat area	7	7	7	8	8
Koala habitat quality score - regrowth habitat area	6	6	7	8	8
Koala food tree abundance (%) – remnant habitat*	>50%	>50%	>50%	>50%	>50%
Koala food tree abundance (%) – regrowth habitat*	<25%	<25%	26 - 50%	26 - 50%	>50%

*score calculated as the percentage of canopy vegetation that is made up of koala food trees within the habitat quality assessment plot

The baseline habitat quality scores have been calculated using the Queensland Guide to determining terrestrial habitat quality (DES, 2020). Three components contribute to the calculation of habitat quality: site condition (as per BioCondition assessment), landscape context and species habitat attributes. Offset assessments conducted under the EPBC Act also consider species stocking rate. The habitat attributes for this assessment are specifically associated with Koala habitat requirements, for example quality and availability of koala food and foraging habitat, tree canopy cover, koala mobility capacity and threats to the species; and as a result regular monitoring using this approach will provide an indication of improvement of habitat for Koala.

Each of these components consist of a number of attributes that are measured and factored into the derivation of the quality score (out of 10). The Microsoft Excel spreadsheet documenting the derivation of the baseline habitat quality score will be filed along with this OAMP for future reference (shown in Appendix B).

The interim and final habitat quality scores will be measured and calculated using the same approach (attributes, methods and analysis as documented in the Tay-Glen Offset Area Ecology Assessment Report (ELA, 2020)).

The assessment of Koala food tree abundance will be conducted concurrently with the habitat quality assessments. This assessment is a determination of the proportional cover of preferred Koala food trees within the canopy (i.e. preferred koala food tree species make up 60% of the total vegetation within the canopy layer). Suitable habitat for Koala is considered to be areas where Koala food trees comprise > 50% of total canopy cover, as per the Koala referral guidelines habitat assessment tool (DoE, 2014). As Koala food trees currently comprise > 50% of the canopy in remnant Koala habitat within the offset area, this proportion will be maintained for the life of the offset (20 years). Koala food tree abundance in regrowth areas is currently < 25% and will be increased to > 50% during the period of the offset. This increase in the abundance of koala food trees in regrowth areas will be achieved through implementation of the offset management strategies described in Section 3.5. Offset management strategies that will directly contribute to an increase in the abundance of koala food trees in regrowth areas include prevention of vegetation clearing and weed control.

3.4 Offset risks

Table 6 summarises the risks associated with achieving objectives of the OAMP. Management actions have been developed for each risk identified for incorporation into the management actions and monitoring program, and possible corrective actions have been identified if risk events are realised (see following sections). The detailed risk assessment is presented in Appendix A.

Table 6: Risks associated with management actions

Risk type	Risk	Description	Risk to koala conservation outcome
Force majeure	Drought	Dry conditions having negative ecosystem impacts by limiting ecosystem functioning as a result of a lack of water resources.	Potential to: • reduce successful recruitment of koala food tree species • limit healthy growth or sustain existing koala resource. • result in dieback leading to a reduction in canopy cover or patch connectivity
	Bushfire	Moderate to severe bushfire could cause short term degradation of the site or delay growth of established ecolosystems.	Potential to: • result in localised destruction leading to a reduction in canopy cover or patch connectivity • reduce availability of resources • create an environment suitable for opportunistic species (weeds) that may compete with koala food tree recruitment
	Cyclone or severe tropical low	Often the most significant impact from tropical cyclones or indeed tropical lows is flooding. Systems generally form between November and April.	Potential to: • result in localised destruction leading to a reduction in canopy cover or patch connectivity • reduce availability of resources • create an environment suitable for opportunistic species (weeds) that may compete with koala food tree recruitment
Standard	Overgrazing / grazing pressures	Inappropriate grazing destroys shrubs and native grass cover, and slows ecological regeneration.	Potential to: • create an environment suitable for opportunistic species (weeds) that may compete with koala food tree recruitment
	Fence failures / unauthorised access	Unauthorised access to offset area by persons, vehicles or stock.	Potential to: • lead to introduction / spread of weeds • result in damage (eg trampling) to areas suitable for recruitment of koala food tree species • result in unauthorised clearing = reduced resources, reduced patch connectivity
	Erosion	Erosion in offset area due to inadequate groundcover.	Potential to: • create an environment suitable for opportunistic species (weeds) that may compete with koala food tree recruitment • result in damage (eg trampling) to areas suitable for recruitment of koala food tree species
	Failed improvement in habitat quality	Offset site fails to achieve final completion criteria habitat quality scores, indicating the offset has not met the requirements of the offsets policy.	Conservation outcome not achieved
	Weed introduction or infestation	The extent of existing infestations of invasive weed species and exotic pasture grass expand or the weed/exotic pasture grass species	Potential to: • Limit recruitment of koala food tree species

Risk type	Risk	Description	Risk to koala conservation outcome
		become more abundant within the area.	
	Pest outbreak	Pest animal populations within the offset area increase.	Potenital to: • Lead to direct impact to resident individual koalas (eg dog attack) wherby increasing a threatened process
	High fuel loads	High fuel loads within offset area leading to increase fire risk.	See bushfire risks.

3.5 Offset management strategies

3.5.1 Offset area management actions

A range of offset management actions have been developed to ensure offset management objectives and desired conservation outcomes are achieved. Details of the offset management actions are outlined in Table 7. This includes the method, timing, location and responsibility for each management action. Specific measurable KPIs for each management action have also been developed to provide a measurable target of the offset management objectives and the overall desired conservation outcomes for the offset area.

These management actions have been designed to allow for adaptive management of the offset area (consistent with the Offset Management Framework described in Section 3.1).

Table 7: Offset area management actions and implementation schedule

Management action	Method (i.e. how the action will be implemented)	Location (i.e. where the action will be implemented)	Timing (i.e. when the action will be carried out)	Responsibility (i.e. who will be carrying out the action)
Controlled grazing of domestic livestock for the purpose of reducing grass cover and fuel loads during the dry season	Cattle will be introduced into offset area (or sub-zone of the offset area should certain areas be deemed more suitable for total exclusion of cattle to maintain habitat values) when timing and conditions are permissible. Grass cover and impacts monitored monthly when cattle grazing is occurring in the offset area to ensure progress and measurable outcomes are met. Controlled grazing will require high intensity management and cattle may need to be introduced and removed intermittently during the permissible period.	Offset area	Late dry season (from June to Dec) when grass cover exceeds 35% in regrowth vegetation and 60% in remnant vegetation and no water is present in stream order one gullies. Grass cover conditions to be monitored monthly while offset is being grazed.	Suitably qualified person appointed by landholder
Installation and maintenance of stock proof fencing to prevent unauthorised persons, vehicles or stock from accessing site	Install fencing around all external boundaries of the offset area. Where the boundary coincides with the property boundary, the fence may align with the property boundary. A fenced area may include non-offset areas and native fauna movement will be considered. Fencing will be designed and constructed to enable safe Koala movement between habitat in and outside of the offset site. Routinely inspect fencing to ensure effectiveness.	Offset area	Any required fencing of offset areas will be established within three months of the Queensland Government approving the voluntary declaration. Fencing inspected monthly during controlled grazing periods and quarterly during exclusion periods.	Suitably qualified person appointed by landholder
Prohibition of timber harvesting, cultivation and general vegetation clearing impacts	Vegetation clearing on the offset area is restricted to: a) that necessary for the removal of non-native weeds or declared pests b) ensure public safety c) construction and maintenance of access tracks, fence lines, water pipelines and firebreaks Where vegetation clearing is sought for any other purpose, the Landholder must contact the relevant department administering the VM Act (Qld) for approval. Clearing of the approved offset area (beyond premissable clearing listed above) will require additional offset areas to replace it under the EPBC Act. Native forest practice (harvesting of timber for forestry purposes) is not allowed under this Offset Area Management Plan. Cultivation is not allowed under this Offset Area Management Plan. Clearing for new fencing will be on the outside of the offset area boundary or along the property boundary. Any vegetation clearing must be undertaken in accordance with: • best practice management methods; and • any applicable legislative requirements. For example, the clearing of endangered, vulnerable or near-threatened plant species or the tampering with animal breeding places under Nature Conservation Act 1992 (Qld) Inspections of the offset area to be undertaken on a quarterly basis.	Offset area	Permissible clearing to occur as required (i.e. weed clearing, maintenance of access tracks and firebreaks). Other types of clearing prohibited for the duration term of the OAMP	Suitably qualified person appointed by landholder
Weed and pest animal baseline characterisation and ongoing monitoring	Detailed surveys will identify and map the presence, abundance and distribution of weed and pest animals to represent the baseline condition. Outcomes of baseline characterisation will be appended to the OAMP (as an appendix) for comparison following each monitoring event. Small weed infestations to be GPS marked and large infestations mapped out across the offset area. Evidence of pest animals and their activity (including key locations) will be documented and mapped. Presence and extent will be monitored (see Table 9)	Offset area	Baseline characterisation: Prior to the commencement of offset management Monitoring: for the duration of the OAMP	Suitably qualified person appointed by landholder
Weed and pest animal prevention	Implementation of good weed hygiene practices, including vehicle and machinery wash downs if equipment is coming from weed infested areas, as well as cattle quarantining	Offset area	For the duration of the OAMP	Suitably qualified person appointed by landholder

Management action	Method (i.e. how the action will be implemented)	Location (i.e. where the action will be implemented)	Timing (i.e. when the action will be carried out)	Responsibility (i.e. who will be carrying out the action)
Weed and pest animal control	Weeds: Removal of infestations of non-native weeds including invasive plants listed under the Biosecurity Act 2014 (Qld), as per the recommended controls outlined in the Department of Agriculture and Fisheries fact sheets. This includes infestations reported as part of baseline characterisation and new infestations detected during monitoring events. Buffel Grass is recognised as being a threat to the vegetation communities and habitat in the offset area; however, it is not referred to as a weed as it is not declared a restricted invasive plant under the Biosecurity Act 2014. Control measures such as grazing and increasing canopy cover of vegetation are included in this plan to decrease the extent of Buffel Grass over time. Control of Buffel Grass is best managed via grazing during the dry season and increasing tree canopy and understorey cover. Pest animals: Introduction of pest animals and control of existing populations will be minimised in accordance with the Biosecurity Act 2014 and through the development of property based feral animal management approach. Property based management will include: • Annual baiting followed by trapping targeting feral dogs • Destruction of any identified rabbit warrens	Offset area	Weed control will be undertaken as early as practicable within the natural regeneration process throughout the offset area and then periodically at the optimum time in their life cycles to control and minimise the spread of the existing weed species. Pest animal eradication (bating and trapping) will be undertaken annually during dry conditions when populations are naturally reduced or when a group of feral animals is observed.	Suitably qualified person appointed by landholder
Maintenance of fire infrastructure	Firebreaks will be maintained across the offset area. New firebreaks will be co-located with roads and fence lines where possible. Access tracks will be maintained to allow fire fighting vehicles effectively access the offset area. Inspections of the offset area to be undertaken on a quarterly basis.	Offset area	Fire control lines to be checked quarterly for condition and adequacy. Maintenance undertaken as required but on a minimum basis of every 2 years.	Suitably qualified person appointed by Landholder
Inspection & repair of key infrastructure following extreme weather event (fire, flood, cyclone)	For fire, flood or cyclone: • Determine the extent of damage to offset area infrastructure (such as fence lines) and koala habitat values caused by the event through visual inspection of infrastructure and habitat quality assessment (see habitat quality monitoring in Table 9). • Cattle will be removed from the offset area to prevent further damage to the offset area following the extreme weather event. Undertake investigation to identify a suitable time for cattle to be reintoduced – when conditions are stable and ecosystem functions have been restored. • Weed cover in areas disturbed by the weather event to be monitored to ensure progress / measure outcomes are still maintained. • Investigate to determine if additional restoration / revegetation required to maintain offset progress toward completion criteria.	Offset area	As soon as safely possible after a fire, flood or cyclone event.	Suitably qualified person appointed by the Landholder

3.5.2 Offset area restrictions

The area is managed for conservation purposes and is subject to land use restrictions to ensure the delivery of an improved environmental outcome. These restrictions are summarised in Table 8.

Table 8: Offset area restrictions

Restriction	Details
Vegetation clearing is restricted and to be undertaken only by the exemption in the Vegetation Management Act 1999 (VM Act) and EPBC Act.	1. Vegetation clearing within the offset area is restricted to: a) that necessary for the removal of non-native weeds or declared pests b) to ensure public safety c) for construction and maintenance of tracks, fence lies, water pipelnes or firebreaks d) that necessary to establish and maintain access to habitat quality assessment and photo point monitoring sites. 2. Native forest practice (harvesting timber) is not allowed under this Offset Area Management Plan. 3. Clearing for new fencing will be on the outside of the offset area boundary.
Grazing	Grazing of domestic livestock (cattle) will occur in the offset area under the following arrangements: 1. graze stock during the late dry season (June to December), at rates and times necessary to reduce the fuel load in the offset areas with a minimum grass cover to be present at the end of the dry season as follows: a) Remnant /sparse regrowth communities 60% groundcover vegetation b) Dense regrowth communities 35% groundcover vegetation. The ground cover is to be determined as per the Land Manager's Monitoring Guide published by the State of Queensland (DERM) 2010, or any subsequent published version of this document; 2. The grazing regime should allow native grasses to flower and set seed at least every two years (6-8 week period during the wet/summer season); 3. Cattle are excluded from the offset area during the wet season and during the early dry season.
Fire	Fire (apart from force majeure events) is excluded from the offset area.
Feral animals and weeds	**Feral animals** Minimise the introduction of feral animals and control of existing populations of feral animals within the offset area in accordance with the Biosecurity Act 2014 (Qld). Monitor and manage feral animal populations and subsequently adapt control effort with populations with regards to feral pigs, dogs, foxes and cats, as well as feral herbivores (e.g. rabbits). **Weeds** Keep the introduction, establishment and spread of non-native weeds including restricted invasive plants listed under the Biosecurity Act 2014 (Qld) to no more than 10% weed cover over the offset area. Control any existing infestations of non-native weeds including restricted invasive plants under the Biosecurity Act 2014 (Qld) to ensure that the non-native weeds do not cover more than 10% of the offset areas, e.g., Parkinsonia, Rubber Vine, Parthenium. Minimise the abundance and distribution of any non-native pasture species within the offset area. Note: Any weed control required will be undertaken as early as practicable within the natural regeneration process throughout the offset area and then periodically as required to treat the weeds at the optimum time in their life cycles to control and minimise the spread of the existing weed species.

3.5.3 Legally binding mechanism

The mechanism to legally secure the offset is a Voluntary Declaration (VDec) under the provisions of the *Vegetation Management Act 1999* (VM Act) where it is secured for the life of the approval, for the purposes of an environmental offset.

3.6 Monitoring

Monitoring specific to the Tay-Glen offset area will include the following components:

1. Habitat quality and food tree abundance monitoring – for assessment of progress toward completion criteria;
2. Koala population monitoring; and
3. Monitoring of implementation of management actions to inform the adaptive management approach

As described in Section 3.1 the first component of the monitoring commitment is the collection of baseline data to establish the benchmark for reporting monitoring results against. Baseline data was collected for the offset area during ecology surveys in May and December 2020. Baseline data for the offset area is available in the Spring to Phillips Creek Diversion Project Offsets Strategy (Eco Logical, 2020a).

Monitoring of the offset area will occur in accordance with Table 9 across designated locations. Monitoring and subsequent reporting is a critical component of this plan and results will require analysis against KPIs in order to trigger investigation and adaptive management where necessary.

Detailed work orders will be developed as part of the PLAN component of the Offset Management Framework. Each work order will provide detailed monitoring techniques/instruction, details of qualifications required, monitoring locations, frequency of monitoring, timing of monitoring (e.g. seasonal), parameters to be recorded and reporting requirements.

Monitoring will be undertaken in the offset area for the duration of the environmental offset or until completion criteria are met, whichever is longer. Monitoring will continue in the offset area for the duration of the environmental offset, even if completion criteria are achieved prior, to ensure the completion criteria are maintained for the 20 year period. In an instance where completion criteria are met prior to the 20 year period management actions will be re-introduced in a timely manner if monitoring detects the completion criteria are not being maintained.

All monitoring results will be recorded in documented or electronic form suitable for external audit.

Table 9: Offset management area monitoring schedule

Component	Monitoring timeframe	Attribute monitored	Frequency	Method	Location/s	KPIs	Possible corrective actions
General habitat condition	0 – 20 years	Visual reference	At the commencement of Plan (year 1), and then every 5 years for the remaining 20 years	Photopoint monitoring in accordance with Land Manager's Monitoring Guide	Each habitat quality monitoring site (see below)	No evidence of damage or degradation of habitat (eg tree dieback, pugging) when compared to baseline photographic records	Corrective actions will be determined firstly through an investigation (CHECK-ACT) to identify drivers for results, ie which attributes of habitat quality need improvement. With an understanding of which aspects of the habitat require attention, a Koala expert will be consulted to inform the development of scientifically robust management actions and possible corrective actions. Corrective actions and suitable corresponding monitoring actions will be documented and incorporated into the OAMP revisions where required (ACT-PLAN). Corrective actions will be implemented as as part of the DO component of the Offset Management Framework where the feedback loop allows for continuous improvement. Examples of corrective actions my be: • Weed removal • Livestock exclusion or change in management regime • Mechanical remediation New work orders will be developed for each new corrective action identified.
Habitat quality	0 – 20 years	Site condition: • Recruitment of woody perennial species • Native plant species richness (tree, shrub, grass, forb) • Canopy height (tree) • Canopy cover (tree, shrub) • Native grass cover • Organic litter • Large trees • Coarse woody debris • Non-native plant cover • Quality and availability of food and foraging habitat • Quality and availability of shelter	Every 5 years from the commencement of the plan, for the remaining 20 years (years 5, 10, 15 and 20). Habitat quality data collected in 2020 will constitute baseline.	Habitat quality assessment in accordance with Guide to determining terrestrial habtat quality (for fauna habitat) (DES, 2020)	19 locations of assessment units sampled for baseline of offset site (See Appendix B EcoLogical Australia 2020a)	See Section 3.3	
		Site context: • Size of patch • Connectedness • Context • Ecological corridors • Role of site to overall Qld Koala population • Threats to Koala • Koala mobility capacity					
		Species stocking rate: • presence on or adjacent to site • species usage of site • density • importance of population		As per the offsets assessment guide under the EPBC Act			
Koala food tree abundance	0 – 20 years	Koala food tree abundance	Every 5 years from the commencement of the plan, for the remaining 20 years (years 5, 10, 15 and 20). Habitat quality data collected in 2020 will constitute baseline.	Assessed as the percentage of canopy cover that comprises preferred Koala food trees.	19 locations of assessment units sampled for baseline of offset site (See Appendix B EcoLogical Australia 2020a)	See Section 3.3	

Component	Monitoring timeframe	Attribute monitored	Frequency	Method	Location/s	KPIs	Possible corrective actions
Koala population monitoring	0 - 20 years	Presence and abundance of Koalas within the offset area. Survey results will inform species stocking rates for habitat quality assessment (above).	Every five years from the commencement of the plan, for the remaining 20 years (years 5, 10, 15 and 20). Offset area Koala survey conducted in 2020 will constitute baseline data.	Field surveys to be conducted for a minimum of three consecutive nights, to include the following methods: • Direct detection: noctournal searches (spotlighting) preferrably between August and January. • Remote detection: Use of call playback, remote cameras or acoustic recording devices • Idirect detection: scat searches (Spot Assessment Technique) and scratch searches	Koala habtiat within the offset area	The number of Koalas detected within the offset area is not significanlty different the number detected during previous monitoring.	Corrective actions will be determined firstly through an investigation (CHECK-ACT) to identify drivers. If the number of koalas detected have reduced and is significantly different to previous monitoring results, an investigation into what possible changes have occurred to cause a decline, i.e. increase in feral dogs, reduction in habitat quality. With an understanding of which aspects may be causing a decline in koala population, a koala expert will be consulted to inform the development of scientifically robust management actions and possible corrective actions. Corrective actions and suitable corresponding monitoring actions will be documented and incorporated into the OAMP revisions where required (ACT-PLAN). Corrective actions will be implemented as as part of the DO component of the Offset Management Framework where the feedback loop allows for continuous improvement. Examples of corrective actions my be: • Feral animal control • Livestock exclusion or change in management regime • Mechanical remediation New work orders will be developed for each new corrective action identified.
Controlled grazing	0 – 20 years	Grass cover (%)	Monthly during controlled grazing periods	Records and photos at established monitoring points	Within offset area	At least: • 35% groundcover vegetation in dense regrowth communities; • 60% groundcover vegetation in remnant communities. Cattle removed from offset area within two weeks if grass cover falls below threshold.	Cattle to be re-instated after grass cover recovers to above threshold limits. The Offset Area Report will document the grazing periods that occurred in the offset areas during the reporting period and the correlating responsive actions that occurred as part of grazing management.
		Soil pugging	Following a large rainfall event during controlled grazing periods	Site walk over to identify pugging areas with photo records		No evidence of pugging damage in low lying wet areas or waterways. Cattle removed from offset area within 10 days of soil impacts being observed.	Cattle exclusion from impacted area. Improve surface drainage to mechanical remediation works.
		Fencing failures	Monthly during controlled grazing periods. Quaterly during exclusion periods	Site walk over to identify fencing failures with photo records		Offset area appropriately fenced. Fencing is intact and preventing unauthorised access. No breaches in fencing during cattle exclusion times.	Upon being notified or becoming aware of an unsecure offset area, the Landholder is to undertake fence maintenance and repairs to resecure the offset area as soon as possible and within a month. The Offset Area Report (section 4.2) will document the installation, maintenance and repair of fences during the reporting period.
Prohibition of disturbance (vegetation clearing)	0 – 20 years	Vegetation extent	Quarterly	Landholder observations/records and photos	Within offset area	No prohibited clearing activities undertaken in the offset area for the duration term of the OAMP. Permissible clearing to occur as required (i.e. weed clearing, maintenance of access tracks and firebreaks).	Upon being notified or becoming aware of prohibited vegetation clearing in the offset area, the Landholder is to reassess access protocols for any lessees etc. and general access within one fortnight and notifiy the relevant department administering the EPBC Act. Corrective actions

Component	Monitoring timeframe	Attribute monitored	Frequency	Method	Location/s	KPIs	Possible corrective actions
							to prevent recurrence of prohibited clearing to be implemented within one month of notification. The Offset Area Report will document any known prohibited vegetation clearing that has occurred during the reporting period and the correlating responsive actions. Permissible vegetation clearing also to be reported.
Fire (including maintenance of infrastructure)	0 – 20 years	Fuel loads	Quarterly	Landholder observations / records and photos	Within offset area	Risk of a surrounding bushfire spreading to offset area is low.	Identify key bushfire risks and develop appropriate action for example reduction of fuel loads or additional fire breaks.
		Fire infrastructure	Quarterly			Firebreaks and access tracks are well maintained. Presence of regrowth or other obstructive material is removed from firebreaks and access tracks within one month.	Presence of regrowth or other obstructive material is removed from firebreaks and access tracks within one month. The Offset Area Report will document any maintenance activities that have occurred during the reporting period.
		Incidence and extent	As required			No unplanned fire impacts the offset area.	In the event of a fire undertake an investigation regarding the incident to identify the extent of impact to the offset area and MNES values. Outcomes of the investigation will provide corrective actions options. Actions may include: • Infrastructure repairs • Review of fuel load thresholds
Weed occurrence	0 – 20 years	Presence, abundance and distribution	Bi-Annually	Surveys to compare the presence, abundance and distribution of weeds against baseline mapping (See Table 7) .	Within offset area	Presence, abundance and distriution of weeds does not exceed baseline measures. Introduction, establishment and spread of weeds listed as restricted invasive plants under the Biosecurity Act 2014 (Qld) to less than 10% weed cover in the ground, shrub and tree layers in the offset area. Annual monitoring report to be compiled (and retained) to record methods and timing of monitoring, outcomes of the weed identification activities, analysis of comparison against baseline mapping, and summary of weed treatment implemented since the previous monitoring event.	Upon being notified or becoming aware of a weed outbreak, the Landholder is to reassess weed hygiene protocols to identify aspects for improvement. Upon being notified or becoming aware of declared plants being present in greater than 10% of the baseline extent the Landholder is to implement weed control measures within one month. Corrective actions may include: • Weed removal • More frequent monitoring to identify rate of spread • Reassess weed hygiene protocols
		Weed hygiene declaration certificates	As required	Landholder observations / records		All vehicles not owned by BMA or suitably qualified person appointed by landholder (who is managing the land) to provide a weed hygiene declaration prior to site entry.	Re-education of relevant team members to encourage appropriate implementation of mangement requirement.
Pest species occurrence	0 – 20 years	Occurrence or other physical evidence observed by landholder	Quarterly collation of records	Landholder observations / records and photos	Within offset area	Presence, abundance and distribution of pest animals does not exceed baseline measures. No evidence of predation on relevant EPBC listed threatened species by feral animals.	Where presence, abundance and distribution exceed baseline measures an investigation into the severity of the exceedance will be undertaken. Upon being notified or becoming aware of pest animals being introduced or an ongoing trend of increased abundance, the Landholder is to implement pest control measures within one month.
		Presence, relative abundance and distribution	Bi-annually	Remote cameras deployed for a minimum of one week	Within representative locations of the offset area	Presence, abundance and distribution of pest animals does not exceed baseline measures for greater than three consecutive monitoring events (noting seasonal variation in abundance is expected for some species).	Upon becoming aware of pest animals being introduced or an ongoing trend of increased abundance, the Landholder is to implement pest control measures (eg. baiting and/or trapping) within one month.

Component	Monitoring timeframe	Attribute monitored	Frequency	Method	Location/s	KPIs	Possible corrective actions
Maintenance of infrastructure following extreme weather	0 – 20 years	Infrastructure conditions	As required	Landholder observations/records and photos	Within offset area	All infrastructure is re-instated as soon as practicable. Protected matter are not significantly impacted by unplanned event.	Upon being notified or becoming aware of flood and cyclone event occurring in offset area, the Landholder is to undertake fence maintenance and repairs to resecure the offset area within one month. Refer to weed and pest animal control corrective actions. Refer to cattle exclusion corrective actions. Revegetation/restoration works implemented to address impacts on protected matters from unplanned fire or weather event. In this instance a rehabilitation or revegetation specialist will be consulted to develop a works program specific to: • The nature of the habitat destruction (eg total loss or partial damage to the ecosystem) • The extent of the habitat destruction (eg widespread or localised to riparian corridors) • The seasonal conditions at the time of the planned works The duration of the works program will be dependant on the scale of the habitat destruction and will likely combine weed management aspects. The works program will follow a component of 'investigation' within the Offset Management Framework whereby the resulting program will be incorporated into the OAMP and implementation as part of the 'DO' component. Revegetation/restoration works will be completed on an as needs basis when monitoring results (as part of regular monitoring or following assessment after an extreme event) determine habitat quality is not in line with the required milestones or KPIs.

3.7 Force Majeure

The offset risk assessment identified a number of potential risks to achieving the objectives of the OAMP that may result in significant set-backs to the progress toward final completion criteria. For example, in the event of a catastrophic bushfire, severe cyclone or prolonged drought, whereby the habitat values of the site are severely impacted. The purpose of the offset is to counterbalance the significant residual impacts of the Spring to Phillips Creek Diversion Project and in the event a catastrophic event occurs BMA are committed to fulfilling the requirements of the approval.

BMA will notify DAWE as soon as it becomes aware the offset area has been affected by a Force Majeure event and will take all reasonable steps to prevent, limit and minimise the effects of the event on the habitat quality of the offset area. Depending on the severity of the event the OAMP may require a formal review and consultation with stakeholders/advisors (including experienced land managers or Koala experts) to identify appropriate course of action (in accordance with the Offset Assessment Framework approach). Identification of alternative management strategies (and corresponding monitoring) will prompt an update to the OAMP, the monitoring program and the schedule of work orders (in accordance with the PLAN – DO – CHECK – ACT approach). Updates would then be implemented in accordance.

BMA currently manages a portfolio of seven offset sites across the region. Sites secured for the sole purpose of providing compensatory measures in accordance with Queensland of Commonwealth offset requirements. In the event of a catastrophic event at Tay-Glen BMA will be able to draw on experience in managing the other offset sites. Similarly, BMA undertakes a variety of rehabilitation activities within it's operations and as a result has access to commercially available stores of seed for us in regeneration activities. As described in Table 9 revegetation/restoration works will be implemented to address impacts on protected matters from catastrophic events. A rehabilitation or revegetation specialist, as well as Koala specialist, will be consulted to develop a works program specific to the extent and nature of the impact.

4. Reporting

BMA will prepare a report on the implementation of this management plan at year 5, and then every five years for the remaining 15 years or until completion criteria are met (for a minimum of 20 years whichever is longer). The report will summarise the activities implemented under the plan, and discuss the effectiveness of mitigation measures, based on the results of monitoring activities. Reporting will be conducted through internal BMA compliance reporting and will be made available upon request.

References

Eco Logical Australia (2020a) Spring to Phillips Creek Diversion Project Offsets Strategy. Report prepared for BHP.

Eco Logical Australia (2020b) Spring to Phillips Creek Diversion – Assessment of Matters of National Environmental Significance. Prepared for SLR Consulting.

Department of Environment (2014) EPBC Act referral guidelines for the vulnerable koala.

Department of Environment and Resource Management (2010) Land Manager's Monitoring Guide.

Department of Environment and Science (2020) Guide to determining terrestrial habitat quality. Methods for assessing habitat quality under the Queensland Environmental Offsets Policy. Version 1.3 February 2020.

Department of Sustainability, Environment, Water, Population and Communities (2012) Approved Conservation Advice for *Phascolarctos cinereus* (combined populations in Queensland, New South Wales and the Australian Capital Territory).

Appendix A Risk Analysis

Risk type	Risk event	Risk description	Initial risk ranking			Management Actions	Residual risk ranking			Performance criteria	Management triggers	Corrective actions	Monitoring
			Likelihood	Conseq-uence	Result		Likelihood	Conseq-uence	Result				
Force majeure	Drought	The risk posed by drought is a decrease in groundcover, an increase in the likelihood of unplanned fire due to the dry conditions that could be started by lightning strike during storms and an increase in weed cover when rainfall does occur. There would also be lower levels of growth expected. Depending on duration, severe drought may prevent achievement of completion criteria within the 20 year period.	Likely	Minor	Low	Limited mitigation measures can be implemented. Grazing of the offset area will be in accordance with this plan to ensure that minimum grass cover requirements are met.	Likely	Minor	Low	Offset acheives interim and final completion criteria	The district or property is Drought Declared by the Qld Government. Decline in habitat quality on the offset.	Allow offset area to recover post drought. Grazing to be suspended if groundcover falls below specified levels (35% cover in dense regrowth and 60% cover in remnant communities).	Inspections by the suitably qualified person appointed by the landholder as per Table 7.
	Bushfire	Moderate to severe bushfire could cause short term degradation of the site or delay ecological regeneration to the point that the site is unable to achieve improements in ecological condition within the period of the offset.	Possible	Major	High	In the event of a fire approaching the offset site, or actually occurring on site, the landholder will coordinate with relevant fire and emergency services. To reduce the likelihood of fire occurring, fuel loads will be managed and kept as low as practicable at all times, and firebreaks will be established and maintained. Fire will not be used as a tool for management. To prevent arson, only authorised persons will be permitted on site, and site access will be restricted through fencing and other barriers as appropriate. Surveys undertaken as soon as possible following unplanned fire to measure impacts to habitat quality.	Possible	High	Medium	Groundcover will be managed and kept as low as practicable at all times. Firebreaks established and maintained. No unplanned fire occurs. MNES are not adversely impacted by unplanned fire.	Groundcover exceeds 60%. Fire impacts the offset site. Unauthorised access to the site is detected or notified to the Landholder. MNES are not adversely impacted by unplanned fire.	If fire impacts the offset site, the offset area will be destocked, fire breaks and control lines will be re-established. If unauthorised access to the site is detected (or notified to the Landholder will, within two weeks, identify the means of access and repairfencing or other barriers as needed to prevent future access via that route. Restoration/revegetation measures to support recovery of habitat quality.	Inspections by the suitably qualified person appointed by the landholder as per Table 7. The suitably qualified person appointed by the landholder will also keep themselves advised of any fires in the region.
	Cyclone or severe tropical low	Often the most significant impact from tropical cyclones or indeed tropical lows is flooding. Systems generally form between November and April.	Possible	Minor	Low	Determine the extent of damage to offset area infrastructure (such as fence lines) and habtiat quality caused by the event. Cattle to be removed from the offset area to prevent further damage to the offset area following the extreme weather event.	Possible	Minor	Low	Offset achieves interim and final completion criteria. MNES are not advesely impacted by extreme weather event.	Extreme weather event occurs. MNES are not advesely impacted by extreme weather event.	All infrastructure is re-instated as soon as practicable. No evidence of pugging damage in low lying wet areas or waterways. Cover of weeds listed as restricted invasive plants under the Biosecurity Act 2014 (Qld) reduced to less than 10% weed cover in the	Inspections by the suitably qualified person appointed by the landholder as per Table 7.

Risk type	Risk event	Risk description	Initial risk ranking			Management Actions	Residual risk ranking			Performance criteria	Management triggers	Corrective actions	Monitoring
			Likelihood	Conseq-uence	Result		Likelihood	Conseq-uence	Result				
						Weed cover in areas disturbed by the weather event to be monitored to unsure progress / measure outcomes are still maintained.						ground, shrub and tree layers in the offset area.	
Standard	Overgrazing	Inappropriate grazing destroys shrubs and native grass cover, and slows ecological regeneration.	Possible	High	Medium	Cattle introduced into offset area when timing and conditions are permissible. Grass cover and impacts monitored monthly to ensure progress and measurable outcomes are met. Controlled grazing will require high intensity management and cattle may need to be introduced and removed intermittently during the permissible period.	Unlikely	Minor	Low	Stock grazed only at permissable times and grass cover remains above threshold limits. No evidence of soil impacts (e.g. pugging) in low lying wet areas or waterwyas. Habitat quality is maintained.	Cattle in offset area outside of permissable times or grass cover thresholds not met, soil impacts evident. Habitat quality is deteriroating.	Cattle removed from offset area within two weeks if grass cover falls below threshold. Cattle to be re-instated when grass cover recovers to above threshold limits. Cattle removed from offset area within 10 days of soil impacts being observed. Localised removal of cattle where deterioration in habtiat quality is detected.	Inspections by the suitably qualified person appointed by the landholder as per Table 7.
	Fence failure	Unauthorised access to offset area by persons, vehicles or stock.	Possible	Minor	Low	Appropriate fencing installed. Fencing inspected monthly during controlled grazing periods and quarterly during exclusion periods.	Unlikely	Minor	Low	No unauthorised access to offset area.	All offset areas appropriately fenced. Fencing is intact and preventing unauthorised access. No breaches in fencing during cattle exclusion times.	Upon being notified or becoming aware of an unsecured offset area, the Landholder is to undertake fence maintenance and repairs to resecure the offset area as soon as possible and within a month.	Inspections by the suitably qualified person appointed by the landholder as per Table 7.
	Erosion	Erosion in offset area due to inadequate groundcover.	Possible	Minor	Low	Grazing and vegetation clearing is undertaken in accordance with this plan.	Unlikely	Minor	Low	No significant erosion activity is present within ofset area.	Significant erosion activity present within offset area, groundcover thresholds not met.	Cattle removed from offset area within two weeks if grass cover falls below threshold. Cattle to be re-instated when grass cover recovers to above threshold limits. Suitability of grazing regime to be reviewed if erosion is ongoing.	Inspections by the suitably qualified person appointed by the landholder as per Table 7.
	Failed regeneration	If the offset site fails to achieve final completion criteria, that will indicate that the offset has not met the requirements of the offsets policy, nor achieved the outcomes that were key to the rationale for the approval decision.	Rare	Critical	High	The VDec will ensure that the landholder remains obliged to undertake active management of the offset until all completion criteria are achieved. Therefore, the risk is that failure to achieve the criteria leads to a requirement for further management of the offset, or to provide additional offsets.	Rare	Major	Medium	Offset achieves interim and final completion criteria.	Interim completion criteria not met at designated intervals. Completion criteria not met at year 20.	Investigation to be completed in order to develop a suitable management approach for achieving completion criteria. Outcomes of the investigation to be incorporated into the OAMP for implementation. This may include revegetation/restoration works. Additional offsets sourced to make up shortfall in habitat if required.	Monitoring as per Table 9.
	Weed introduction	The extent of existing infestations of invasive weed species and exotic pasture grass expand	Likely	High	High	Access to the offset area will be restricted. Weed control undertaken in accordance with this plan.	Unlikely	Minor	Low	Introduction, establishment and spread of weeds listed as restricted invasive plants	Weed cover > 10% within offset area. Deterioration in habtiat quality score,	Upon being notified or becoming aware of declared plants being present in greater than 10% of the baseline extent the Landholder is to	Monitoring as per Table 9.

Risk type	Risk event	Risk description	Initial risk ranking			Management Actions	Residual risk ranking			Performance criteria	Management triggers	Corrective actions	Monitoring
			Likelihood	Conseq-uence	Result		Likelihood	Conseq-uence	Result				
		or the weed/exotic pasture grass species become more abundant within the area.								under the Biosecurity Act 2014 (Qld) to less than 10% weed cover in the ground, shrub and tree layers in the offset area. Habitat quality continues to meet the required completion criteria at required intervals.	including not meeting interim completion criteria.	implement weed control measures within one month.	
	Pest outbreak	Pest animal populations within the offset area increase.	Possible	Moderate	Medium	Pest animals wil be controlled in accordance with this plan. Survey for adversely impacted MNES (idividuals and habitat), i.e. evidence of dog attack	Possible	Minor	Low	No increase feral animal numbers within the offset area. Maintain pest animal control program. No evidence of new pest species. MNES are not adversely impacted by pest animals.	Increased pest animals within offset area.	Upon being notified or becoming aware of pest animals being present, the Landholder is to implement pest control measures within one month.	Monitoring as per Table 9.
	High fuel loads	High fuel loads within offset area leading to increase fire risk	Possible	Moderate	Medium	Management of fuel loads via controlled grazing within the offset area will be undertaken in accordance with this plan.	Possible	Minor	Low	Groundcover will be managed and kept within threshold limits at all times.	High fuel loads in offset area (groundcover not meeting threshold limits).	Fuel load within offset reduced via the use of grazing.	Inspections by the suitably qualified person appointed by the landholder as per Table 7.

Qualitative measure of likelihood (how likely is it that this event/circumstance will occur after management activities are implemented)	
Highly likely	Is expected to occur in most circumstances
Likely	Will probably occur during the life of the project
Possible	Might occur during the life of the project
Unlikely	Could occur but considered unlikely or doubtful
Rare	May occur in exceptional circumstances
Qualitative measure of consequences (what will be the consequence/result if the issue does occur)	
Minor	Minor incident of environmental damage that can be reversed (e.g. short-term delays to achieving plan objectives, implementing low-cost, well-characterised corrective actions)
Moderate	Isolated but substantial instances of environmental damage that could be reversed with intensive efforts (e.g. short-term delays to achieving plan objectives, implementing well-characterised, high cost/effort corrective actions)
High	Substantial instances of environmental damage that could be reversed with intensive efforts (e.g. medium-long term delays to achieving objectives, implementing uncertain, high-cost/effort corrective actions)
Major	Major loss of environmental amenity and real danger of continuing (e.g. plan objectives are unlikely to be achieved, with significant legislative, technical, ecological and/or administrative barriers to attainment that have no evidenced mitigation strategies)
Critical	Severe widespread loss of environmental amenity and irrecoverable environmental damage (*e.g. plan objectives are unable to be achieved, with no evidenced mitigation strategies*)

		Consequence				
		Minor	**Moderate**	**High**	**Major**	**Critical**
Likelihood	**Highly Likely**	Medium	High	High	Severe	Severe
	Likely	Low	Medium	High	High	Severe
	Possible	Low	Medium	Medium	High	Severe
	Unlikely	Low	Low	Medium	High	High
	Rare	Low	Low	Low	Medium	High

Appendix B Offsets Assessment Guide Content

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Koala
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	**0.2%**

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Threatened species habitat						
Area of habitat	Yes		**Area**	74	Hectares	
			Quality	**6**	Scale 0-10	
			Total quantum of impact	44.40	Adjusted hectares	
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	No				**Risk-related time horizon (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Threatened species habitat																				
Area of habitat	Yes	44.40	Adjusted hectares		**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	549.6	**Risk of loss (%) without offset**	0%	**Risk of loss (%) with offset**	0%	0.00	90%	0.00	0.00	42.25	95.15%	Yes		
									Future area without offset (adjusted hectares)	549.6	**Future area with offset (adjusted hectares)**	549.6								
					Time until ecological benefit	20	**Start quality (scale of 0-10)**	**7**	**Future quality without offset (scale of 0-10)**	**7**	**Future quality with offset (scale of 0-10)**	**8**	1.00	80%	0.80	0.77				
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	44.4	42.25	95.15%	**Yes**	$0.00	#DIV/0!	#DIV/0!
Area of community	0				$0.00		$0.00
					$0.00	**#DIV/0!**	**#DIV/0!**

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Koala
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	**0.2%**

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Threatened species habitat						
Area of habitat	Yes		**Area**	74	Hectares	
			Quality	**6**	Scale 0-10	
			Total quantum of impact	44.40	Adjusted hectares	
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	No				**Risk-related time horizon (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Threatened species habitat																				
Area of habitat	Yes	44.40	Adjusted hectares		**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	18.5	**Risk of loss (%) without offset**	15%	**Risk of loss (%) with offset**	0%	2.78	90%	2.50	2.40	5.55	12.49%	No	
									Future area without offset (adjusted hectares)	15.7	**Future area with offset (adjusted hectares)**	18.5								
					Time until ecological benefit	20	**Start quality (scale of 0-10)**	**6**	**Future quality without offset (scale of 0-10)**	**5**	**Future quality with offset (scale of 0-10)**	**8**	3.00	80%	2.40	2.31				
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	44.4	5.55	12.49%	**No**	$0.00	#DIV/0!	#DIV/0!
Area of community	0				$0.00		$0.00
					$0.00	**#DIV/0!**	**#DIV/0!**

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