



MIDDLEMOUNT COAL MINE

SOUTHERN EXTENSION PROJECT EPBC Act Preliminary Assessment Documentation (EPBC 2021/8920)

Attachment G Middlemount Coal Mine Offset Management Plan and Vegetation Management Plan Addendum



MIDDLEMOUNT COAL MINE

OFFSET MANAGEMENT PLAN/
VEGETATION MANAGEMENT PLAN
ADDENDUM



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Appendix C	Risk Analysis
Appendix D	Peer Review Letter
Appendix E	Weed and Animal Pest Management

EXECUTIVE SUMMARY

The Middlemount Coal Mine is an existing mine located approximately 90 kilometres (km) north-east of Emerald and approximately 3 km to the south-west of the Middlemount Township, Queensland (Qld).

This addendum to the Middlemount Coal Mine Offset Management Plan/Vegetation Management Plan provides for the management of offset areas proposed for the Southern Extension Project. The offset areas are located immediately west of the mine on freehold land owned by Middlemount Coal Pty Ltd (MCPL) (ABN 49 122 348 412).

The offset areas proposed for the Southern Extension Project cover an area of approximately 1,554.7 hectares (ha). The desired outcome is generally that the extent and condition of the habitat values of threatened species and communities within the offset area are protected and enhanced, including currently degraded areas reaching remnant status.

This addendum to the Middlemount Coal Mine Offset Management Plan/Vegetation Management Plan has been prepared to guide the management of the offset areas proposed for the Southern Extension Project to fulfil the relevant offset obligations. If the performance criteria are not met then the relevant management measures will be reviewed consistent with an adaptive management framework (plan, do, check and review).

Similar to the existing offset areas, the offset areas proposed for the Southern Extension Project will be secured through a voluntary declaration (VDec) of an area of high nature conservation value under the *Qld Vegetation Management Act 1999*.

1 INTRODUCTION

1.1 BACKGROUND

The Middlemount Coal Mine is an existing mine located approximately 90 kilometres (km) north-east of Emerald and approximately 3 km to the south-west of the Middlemount Township, Queensland (Qld) (Figures 1 and 2). The offset areas provided for the Middlemount Coal Mine are located immediately west of the mine on freehold land owned by Middlemount Coal Pty Ltd (MCPL) (ABN 49 122 348 412) (Figures 3, 4a and 4b).

The *Middlemount Coal Mine Offset Management Plan/Vegetation Management Plan* was originally approved by the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) (now the Commonwealth Department of Climate Change, Energy, the Environment and Water [Cth DCCEEW]) on 30 November 2012 for the management of the Middlemount Coal (Stage 2) Project Commonwealth Offset Area under the Commonwealth *Environment Protection and Biodiversity Act 1999* (EPBC Act) (EPBC 2010/5394).

In early 2013, the *Middlemount Coal Mine Offset Management Plan/Vegetation Management Plan* was revised to describe how MCPL will manage offset areas established for other various components of the Middlemount Coal Mine, namely the Rail Loop and Spur Offset Area, Parrot Quarry Offset Area and Thirteen Mile Gully Diversion Offset Area.

In 2018, the plan was revised again to include the following:

- a modified Middlemount Coal (Stage 2) Project Commonwealth Offset Area;
- a modified Rail Loop and Spur Offset Area;
- the North-eastern Extension Commonwealth Offset Area;
- the North-eastern Extension State Offset Area;
- the Western Extension Commonwealth Offset Area; and
- the Western Extension State Offset Area.

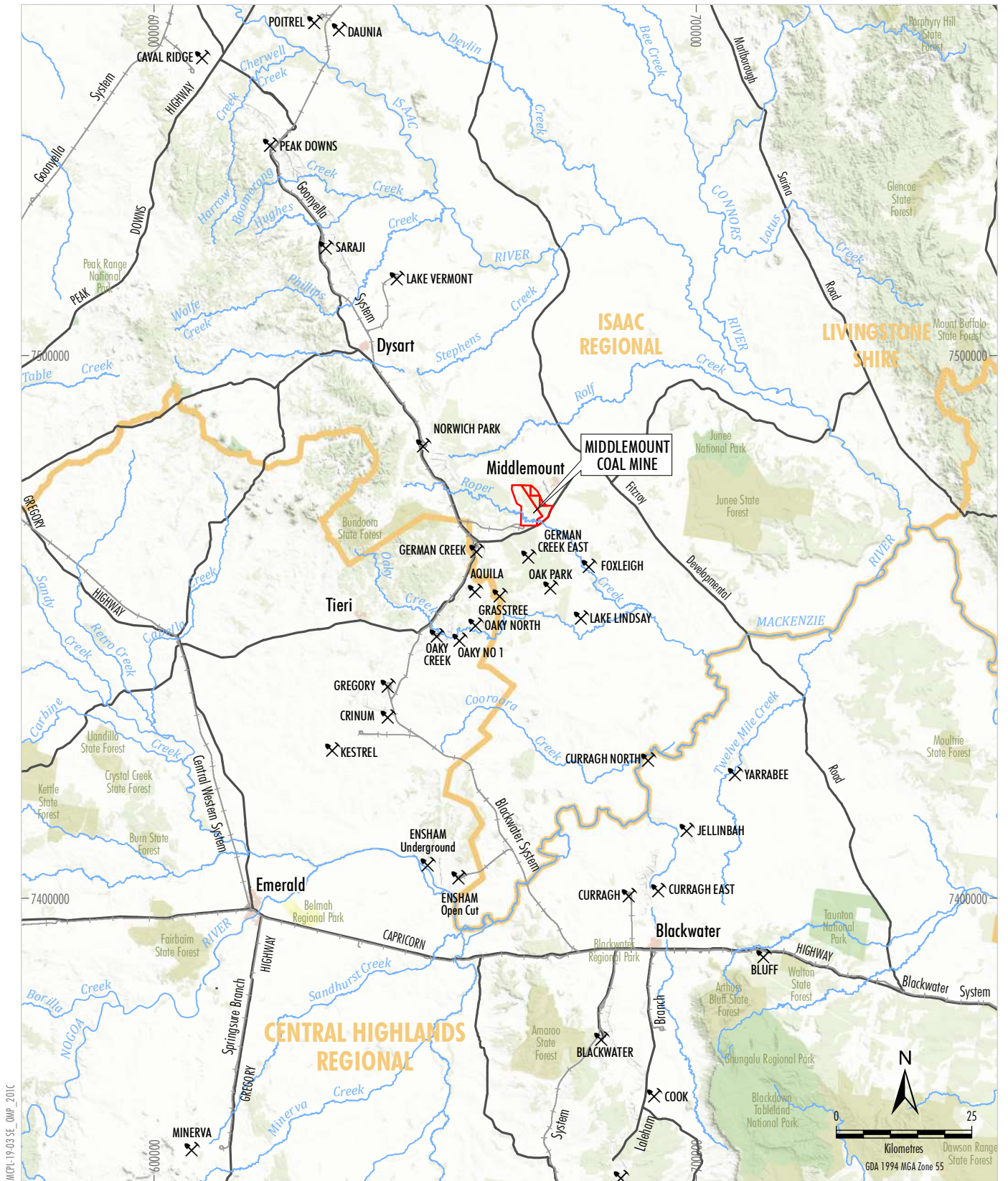
This addendum to the *Middlemount Coal Mine Offset Management Plan/Vegetation Management Plan* provides for the management of offset areas proposed for the Southern Extension Project.

1.2 ENDURING PROTECTION OF THE OFFSET AREAS – VOLUNTARY DECLARATION MANAGEMENT PLAN REQUIREMENTS

The offset areas proposed for the Southern Extension Project are located on freehold land owned by MCPL (Lot 2, SP248577 and Lot 3, SP282156). The offset areas will be secured through a voluntary declaration of an area of high nature conservation value (VDec) under the *Qld Vegetation Management Act, 1999* (VM Act).

The desired outcome is generally that the extent and condition of the habitat values of threatened species and communities within the offset area are protected and enhanced, including currently degraded areas reaching remnant status.

The *Guide to Voluntary Declarations under the Queensland Vegetation Management Act, 1999* (Department of Natural Resources and Mines [DNRM], 2017) provides requirements for Vegetation Management Plans under a VDec. Table 1 provides a cross reference between the relevant requirements and the corresponding sections of this plan.



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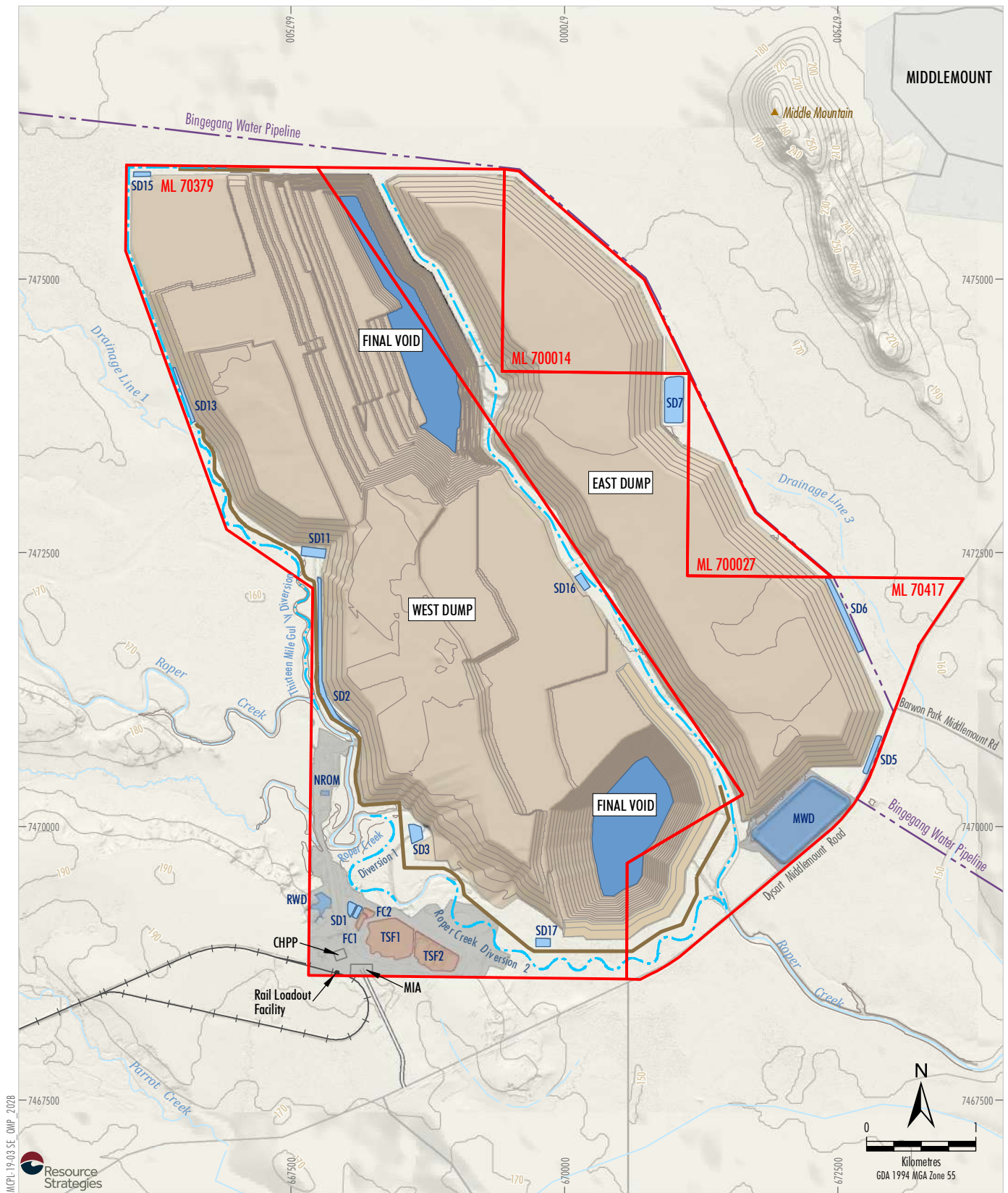
Source: Geoscience Australia (2025); Queensland Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development (2024)



- LEGEND**
- Middlemount Mining Lease Boundary
 - Local Government Area Boundary
 - Road
 - Railway
 - National Park
 - State Forest
 - Conservational Park
 - Mine Site

SOUTHERN EXTENSION PROJECT
Regional Location

Figure 1



Source: MCPL (2022); The State of Queensland (2022)

middlemount coal
 OFFSET MANAGEMENT PLAN
 Middlemount Coal Mine

Figure 2

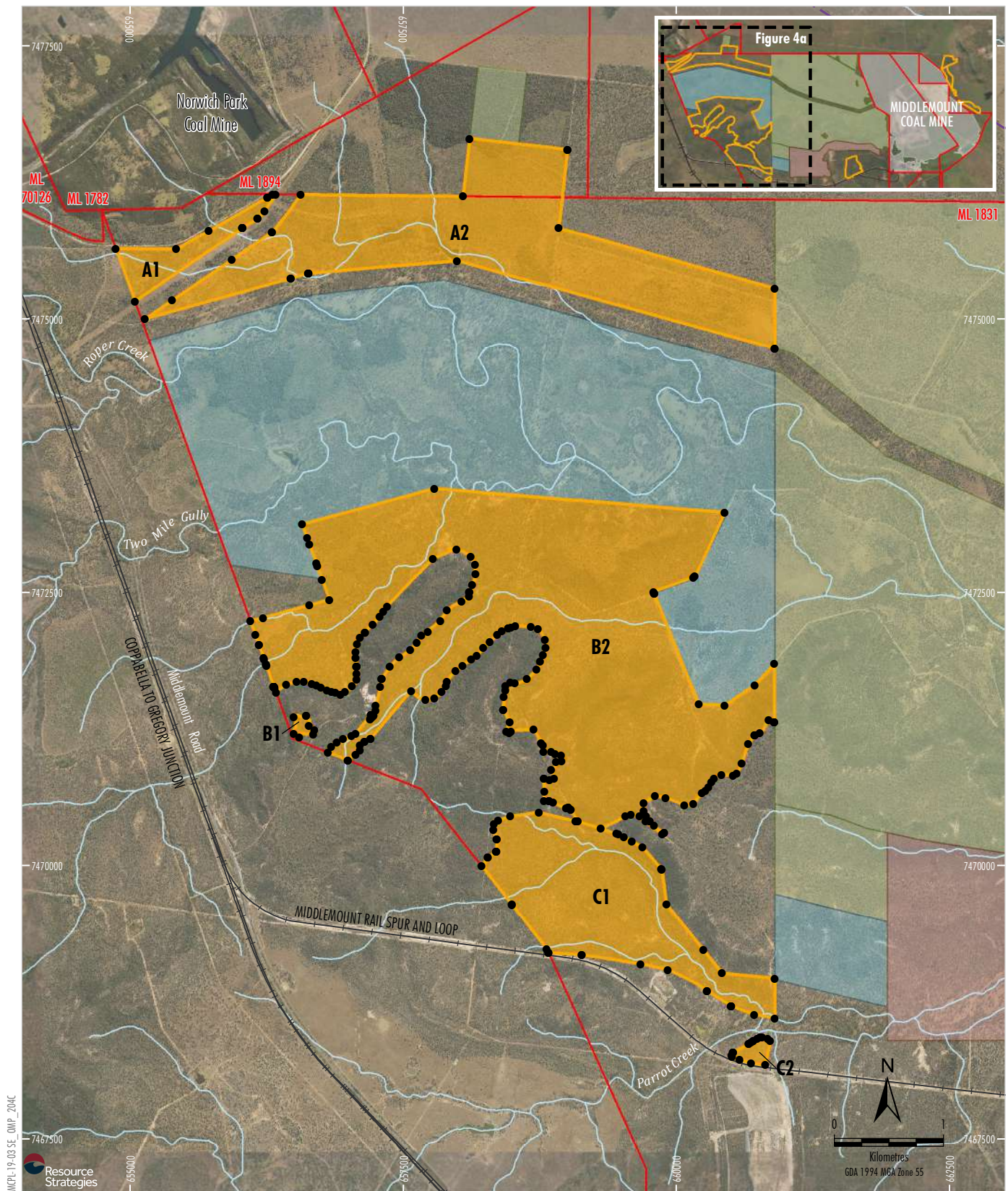
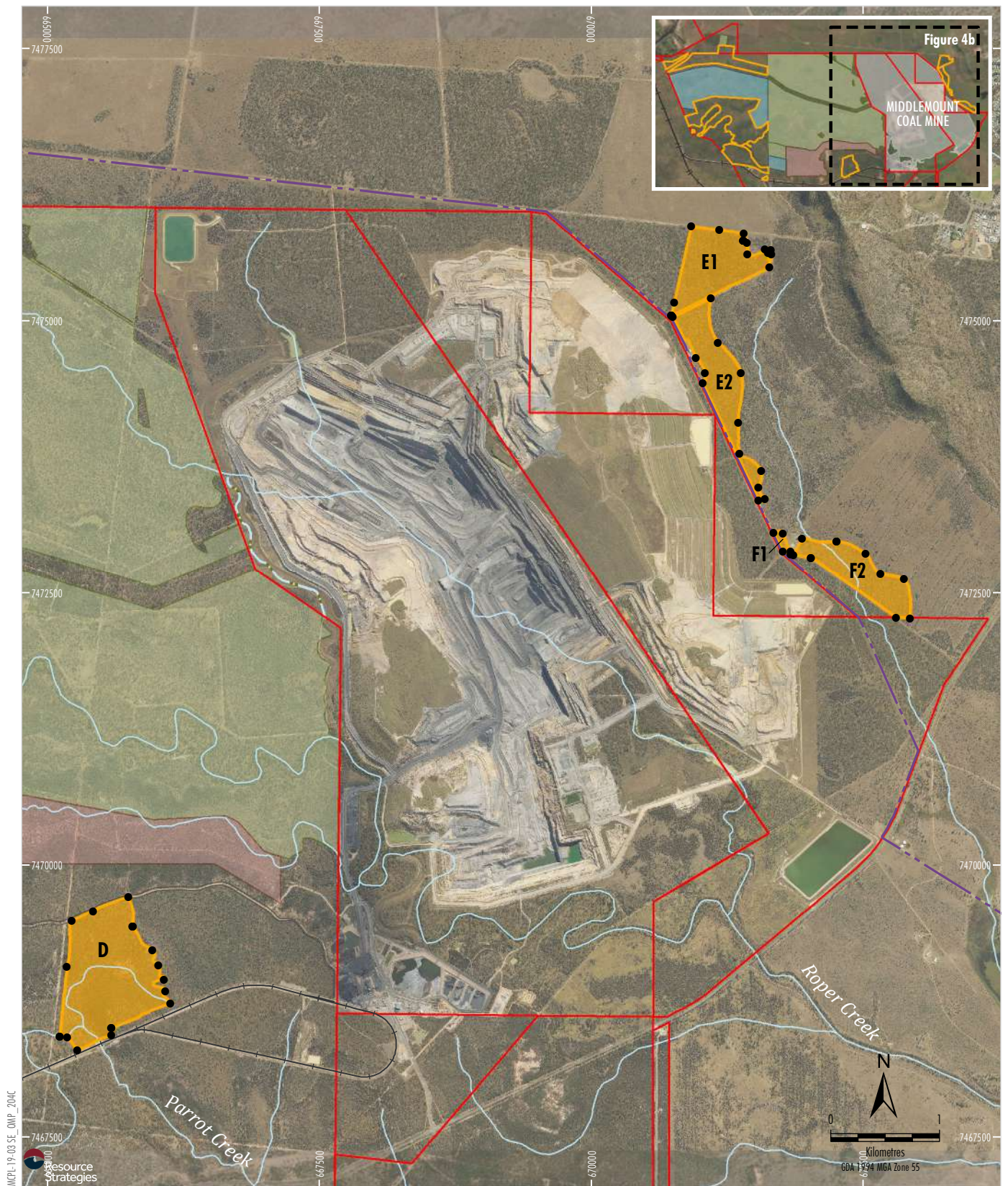


Figure 4a



LEGEND

- Mining Lease Boundary (ML)
- Proposed Southern Extension
- Commonwealth Offset Area (EPBC 2021/8920)
- Reference Point
- Existing Offset Areas
- North-eastern Extension
- Commonwealth Offset Area (EPBC 2016/7717)
- Middlemount Coal (Stage 2) Project
- Commonwealth Offset Area (EPBC 2010/5394)

Source: MCPL (2025); Biodiversity Australia (2025);
The State of Queensland (2022)
Orthophoto: MCPL (2025); ESRI Basemap (2024)



OFFSET MANAGEMENT PLAN

Aerial Photograph
with Reference Points

Figure 4b

Table 1
Vegetation Management Plan Requirements from the *Guide to Voluntary Declarations*

Requirement	Relevant Section that Addresses the Requirement
<i>The management plan must be signed by the proponent.</i>	Following the Table of Contents.
<i>The management plan must include sufficient information to allow DNRM to map the boundary of the stated area.</i>	Figures 4a and 4b
<i>The management plan must state the proponent's management intent and proposed outcome for the conservation of the high nature conservation value of the area or the prevention of land degradation in the area.</i>	Section 1.2
<i>The management plan must state the activities that the proponent intends to carry out or refrain from carrying out to achieve the management outcomes for the conservation of the high nature conservation value of the area or the prevention of land degradation in the area.</i>	Section 3
<i>The management plan must state the restrictions, if any, to be imposed on the use of, or access to, the area by other persons to achieve the management outcomes for the conservation of high nature conservation value of the area or the prevention of land degradation in the area.</i>	Section 3.9

1.3 REPORT STRUCTURE

The structure of this plan is as follows:

Section 2	Offset Area Details
Section 3	Management Actions
Section 4	Performance and Completion Criteria
Section 5	Monitoring Plan
Section 6	Contingency Measures
Section 7	Timing and Responsibilities
Section 8	Reporting, Audit and Review
Section 9	References Cited in this Offset Management Plan/Vegetation Management Plan

The following documents are appended to this plan:

Appendix A	Southern Extension Project Offset Study Area Baseline Assessment
Appendix B	Queensland Herbarium (2024) Regional Ecosystem Fire Guidelines
Appendix C	Risk Analysis
Appendix D	Peer Review Letter
Appendix E	Weed and Animal Pest Management

2 OFFSET AREA DETAILS

The offset areas proposed for the Southern Extension Project are located in the Isaac Regional Council area of the Brigalow Belt Bioregion. The closest reserves are Bundorra State Forest located approximately 10 km south-west and June National Park located approximately 20 km north-east (Figure 1).

The offset areas are in a relatively high rainfall area located approximately 120 km inland from the Qld coast. The closest Commonwealth Bureau of Meteorology (BoM) weather station to the offset areas are the Emerald Post Office (035027). Mean maximum temperature at the offset areas ranges from 22.4 degrees Celsius (°C) in July to 34.8°C in December (BoM, 2018). Mean minimum temperature ranges from 6.9°C in July to 21.4°C in January (BoM, 2018). Mean rainfall is approximately 640.3 millimetres (mm), with the most rain occurring in January (mean rainfall 103.4 mm) and the least amount of rainfall occurring in August (mean rainfall 20.7 mm) (BoM, 2018).

2.1 PROPERTY AND OWNERSHIP DETAILS AND REGISTERED INTERESTS

The offset areas proposed for the Southern Extension Project are located on freehold land owned by MCPL (Lot 2, SP248577 and Lot 3, SP282156 – Booroondarra Station). There are no other registered interest holders under the *Land Act 1994* or *Land Title Act, 1994*.

The offset areas have a history of clearing and cattle grazing. The land outside of the offset areas is currently agisted and will be subject to grazing. A travelling stock reserve and pipeline easement occur outside of the offset areas (Figure 3). There is no Strategic Cropping Land mapped in the vicinity of the offset areas.

The offset areas are overlying ML 1831 and ML 1894 held by Anglo Coal (German Creek) Pty Ltd (Anglo Coal). Anglo Coal does not hold surface rights over the part of ML 1831, where the offset areas are located. Anglo Coal's ML 1831 is for sub-surface rights only in the vicinity of the offset areas. Any future mining proposals from Anglo Coal will need to account for the impacts to the offset areas (Section 6.2).

2.2 ECOLOGICAL SURVEYS

Biodiversity Australia (2025a) undertook flora and fauna surveys in accordance with Qld and Commonwealth survey guidelines to assess the suitability of the offset areas. Field surveys were undertaken in March and June 2020 and November 2023.

The flora surveys were undertaken by Biodiversity Australia (2025a) in accordance with the Qld Herbarium vegetation survey methods described in Neldner *et al.* (2017). Survey techniques included quaternary surveys, identification of threatened ecological communities, targeted searches for conservation significant species and random meanders.

Habitat Quality Assessments were also undertaken across the offset areas by Biodiversity Australia (2025a) in accordance with the *Guide to Determining Terrestrial Habitat Quality Version 1.3* (DES, 2020), which involved the use of BioCondition plots to collect field data.

2.3 NATIVE VEGETATION

REs ground-truthed by Biodiversity Australia (2025a; 2025b) within the Southern Extension Offset Area are listed in Table 2 and shown in Figures 5a and 5b.

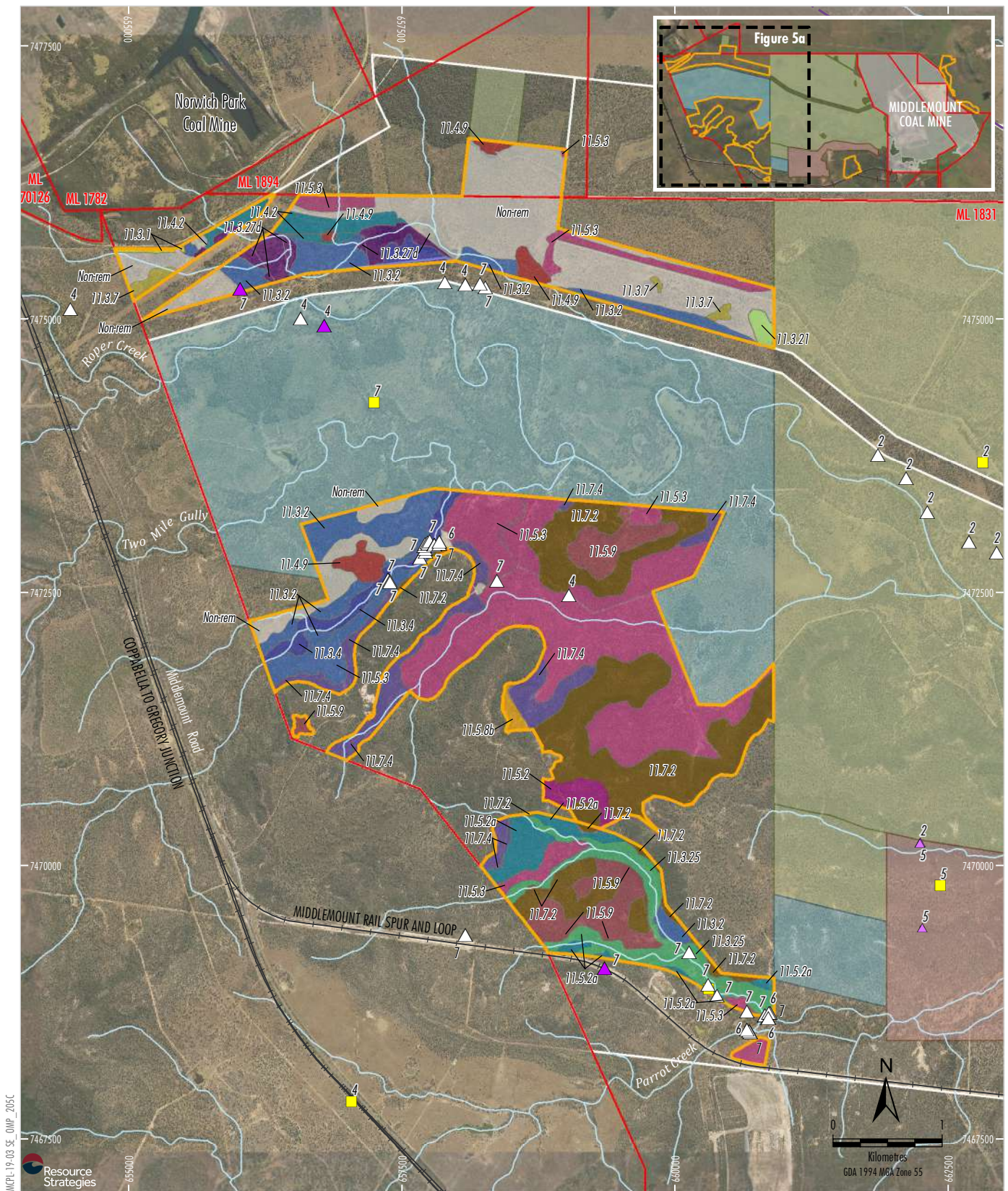
Table 2
Regional Ecosystems – Southern Extension Offset Area

RE ID	Short Description	Status ¹			Area (ha)
		VM Act	Biodiversity Status	EPBC Act	
11.3.1	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on alluvial plains	E	E	-	2.21
11.3.2	<i>Eucalyptus populnea</i> woodland on alluvial plains	OC	OC	E	166.61
11.3.4	<i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus</i> spp. Woodland on alluvial plains	OC	OC	-	35.84
11.3.4a	<i>Corymbia tessellaris</i> woodland on alluvial sandridges	OC	OC	-	0.23
11.3.7	<i>Corymbia</i> spp. open woodland on alluvial plains	LC	OC	-	8.47
11.3.21	<i>Dichanthium sericeum</i> and/or <i>Astrelba</i> spp. grassland on alluvial plains. Cracking clay soils	OC	E	-	5.95
11.3.25	<i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines	LC	OC	-	66.18
11.3.27d	<i>Eucalyptus camaldulensis</i> and/or <i>E. tereticornis</i> woodland fringing large lakes	LC	OC	-	30.63
11.4.2	<i>Eucalyptus</i> spp. and/or <i>Corymbia</i> spp. grassy or shrubby woodland on Cainozoic clay plains	OC	OC	-	26.53
11.4.8	<i>Eucalyptus cambageana</i> woodland to open forest with <i>Acacia harpophylla</i> or <i>A. argyrodendron</i> on Cainozoic clay plains	E	E	-	18.62
11.4.9	<i>Acacia harpophylla</i> shrubby woodland with <i>Terminalia oblongata</i> on Cainozoic clay plains	E	E	-	21.2
11.5.2	<i>Eucalyptus crebra</i> , <i>Corymbia</i> spp., with <i>E. moluccana</i> woodland on lower slopes of Cainozoic sand plains and/or remnant surfaces	LC	NC	-	73.15
11.5.2a	<i>Allocasuarina luehmannii</i> low tree layer with or without emergent woodland	LC	NC	-	32.57
11.5.3	<i>Eucalyptus populnea</i> +/- <i>E. melanophloia</i> +/- <i>Corymbia clarksoniana</i> woodland on Cainozoic sand plains and/or remnant surfaces	LC	NC	-	425.44
11.5.8b	<i>Melaleuca</i> spp., <i>Eucalyptus crebra</i> , <i>Corymbia intermedia</i> woodland on Cainozoic sand plains and/or remnant surfaces	LC	NC	-	5.13
11.5.9	<i>Eucalyptus crebra</i> and other <i>Eucalyptus</i> spp. and <i>Corymbia</i> spp. woodland on Cainozoic sand plains and/or remnant surfaces	LC	NC	-	71.42
11.7.2	<i>Acacia</i> spp. Woodland on Cainozoic lateritic duricrust. Scarp retreat zone	LC	NC	-	236.41
11.7.4	<i>Eucalyptus decorticans</i> and/or <i>Eucalyptus</i> spp., <i>Corymbia</i> spp., <i>Acacia</i> spp., <i>Lysicarpus angustifolius</i> woodland on Cainozoic lateritic duricrust	LC	NC	-	77.17
Sub-total					1,303.76
Regrowth					250.94
Total					1,554.7

Source: Biodiversity Australia (2025b) (Appendix A).

¹ Conservation status of REs listed under the VM Act and/or EPBC Act (current at August 2025):

E = Endangered, OC = Of Concern, LC = Least Concern, NC = No Concern at Present.



MCPL-19-03 SE_OWP_205C

- LEGEND**
- Mining Lease Boundary (ML)
 - Middlemount Coal Owned Land
 - Proposed Southern Extension Commonwealth Offset Area (EPBC 2021/8920)
 - Existing Offset Areas
 - North-eastern Extension
 - Commonwealth Offset Area (EPBC 2016/7717)
 - Middlemount Coal (Stage 2) Project
 - Commonwealth Offset Area (EPBC 2010/5394)
 - Western Extension
 - Commonwealth Offset Area (EPBC 2017/8130)

- Ground-truthed Regional Ecosystems**
- | | |
|----------|-------------|
| 11.3.1 | 11.4.9 |
| 11.3.2 | 11.5.2 |
| 11.3.21 | 11.5.2a |
| 11.3.25 | 11.5.3 |
| 11.3.27d | 11.5.8b |
| 11.3.4 | 11.5.9 |
| 11.3.4a | 11.7.2 |
| 11.3.7 | 11.7.4 |
| 11.4.2 | Non-remnant |

- Threatened Species Records**
- Squatter Pigeon (Southern)
 - Greater Glider (Southern and Central)
 - Koala
 - Koala Scats

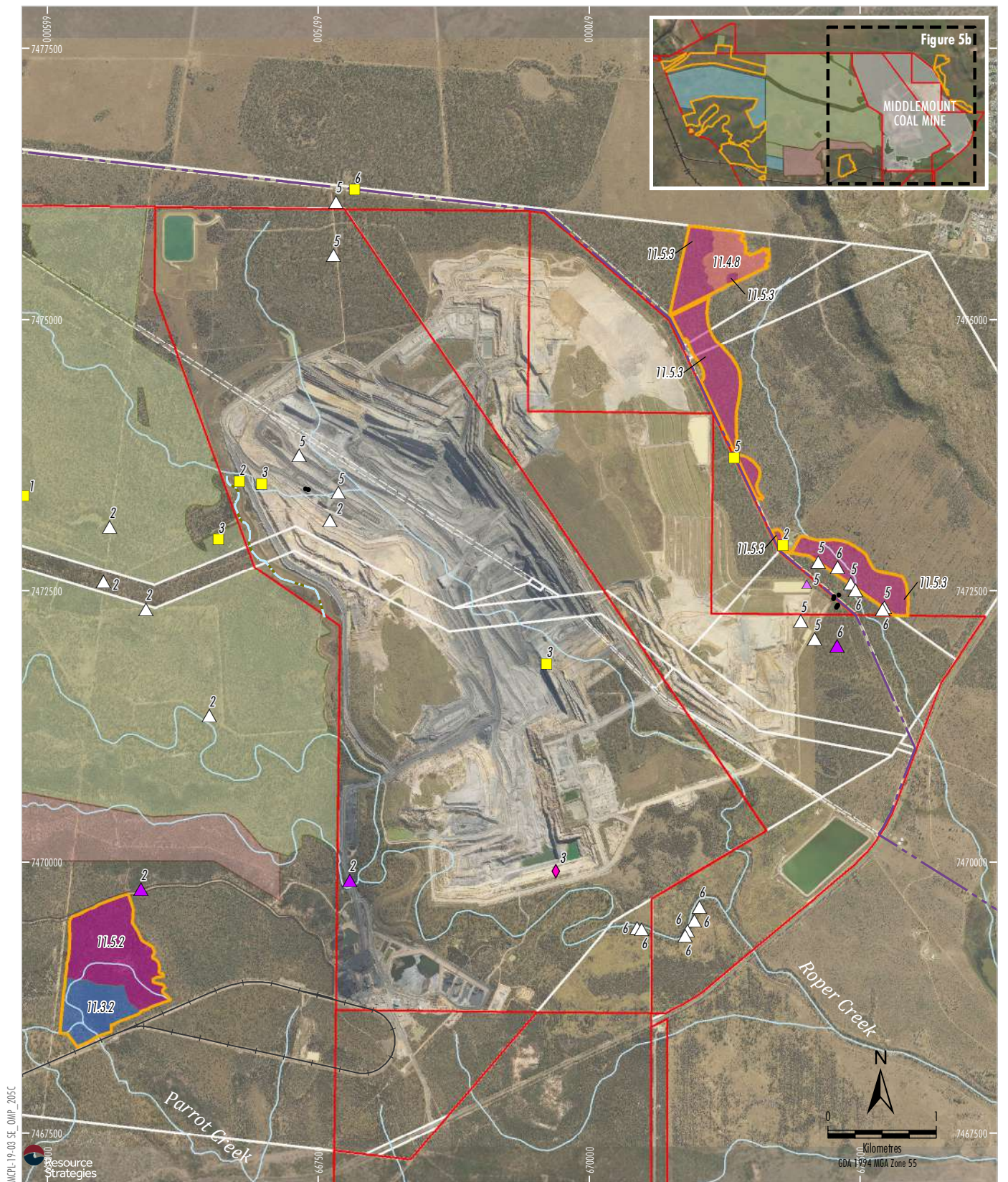
Source: MCPL (2025); Biodiversity Australia (2025); The State of Queensland (2022)
Orthophoto: MCPL (June 2025); ESRI Basemap (2024)



SOUTHERN EXTENSION PROJECT
Regional Ecosystem Mapping
- Proposed Offset Areas

- Reference:**
- | | |
|--|-----------------------------------|
| 1 Ecology and Heritage Partners (2012) | 5 Naturecall Environmental (2017) |
| 2 Naturecall Environmental (2014) | 6 Biodiversity Australia (2020) |
| 3 Parsons Brinkerhoff (2010) | 7 Biodiversity Australia (2021) |
| 4 Biodiversity Australia (2018) | |

Figure 5a



- LEGEND**
- Mining Lease Boundary (ML)
 - Middlemount Coal Owned Land
 - Proposed Southern Extension Commonwealth Offset Area (EPBC 2021/8920)
 - Existing Offset Areas
 - North-eastern Extension
 - Commonwealth Offset Area (EPBC 2016/7717)
 - Middlemount Coal (Stage 2) Project
 - Commonwealth Offset Area (EPBC 2010/5394)

- Ground-truthed Regional Ecosystems**
- 11.3.2
 - 11.4.8
 - 11.5.2
 - 11.5.3

- Threatened Species Records**
- Squatter Pigeon (Southern)
 - Ornamental Snake
 - Greater Glider (Southern and Central)
 - Koala
 - Koala Scats

Source: MCPL (2025); Biodiversity Australia (2025); The State of Queensland (2022)
Orthophoto: MCPL (June 2025); ESRI Basemap (2024)



SOUTHERN EXTENSION PROJECT
Regional Ecosystem Mapping
- Proposed Offset Areas

- Reference:**
- 1 Ecology and Heritage Partners (2012)
 - 2 Naturecall Environmental (2014)
 - 3 Parsons Brinkerhoff (2010)
 - 4 Biodiversity Australia (2018)
 - 5 Naturecall Environmental (2017)
 - 6 Biodiversity Australia (2020)
 - 7 Biodiversity Australia (2021)

Figure 5b

2.4 WEEDS AND ANIMAL PESTS

The main weeds present are Buffel Grass, and Red Natal Grass (Biodiversity Australia, 2025a). There are also a number of animal pests present within the offset area which include feral cats, wild dogs, foxes, and rabbits which significantly impact native fauna species and land condition (Biodiversity Australia, 2021a).

2.5 MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

MNES relevant to the Southern Extension Offset Area are listed in Table 3.

Table 3
Matters of National Environmental Significance – Southern Extension Offset Area

Scientific Name	Common Name	EPBC Act Status ¹	Current Extent and Condition
Threatened Ecological Community			
Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant)		E	The Southern Extension Offset Area contains approximately 84.93 ha of Brigalow EEC (represented by remnant RE 11.3.1 and non-remnant REs 11.3.1 and 11.4.9) (Figures 5a and 5b). The condition of the Brigalow EEC in the offset areas is generally good.
Poplar Box Grassy Woodland on Alluvial Plains		E	The Southern Extension Offset Area contains approximately 238.49 ha of Brigalow EEC (represented by remnant and non-remnant RE 11.3.2) (Figures 5a and 5b). The condition of the Poplar Box EEC in the offset areas is generally good (average condition).
Fauna			
<i>Denisonia maculata</i>	Ornamental Snake	V	The Southern Extension Offset Area contains approximately 84.93 ha of potential habitat for the Ornamental Snake (represented by remnant REs 11.3.1, 11.4.2 and 11.4.9, and non-remnant REs 11.3.1 and 11.4.9) (Figures 5a and 5b).
<i>Geophaps scripta scripta</i>	Squatter Pigeon (southern)	V	The Southern Extension Offset Area contains approximately 1,497.42 ha of potential habitat for the Squatter Pigeon (southern), comprising approximately 1,256.5 ha of remnant and 240.92 ha of regrowth vegetation. Squatter Pigeons are able to use a range of vegetation associations including non-remnant vegetation.
<i>Phascolarctos cinereus</i> (combined Qld, NSW and the ACT)	Koala (combined Qld, NSW and the Australian Capital Territory)	E*	Approximately 1,178.29 ha of potential habitat for the Koala, comprising approximately 980.27 ha of remnant and 198.02 ha of regrowth vegetation will be enhanced and conserved as part of the Southern Extension Offset Area. The following REs in the Southern Extension Offset Area (Figures 5a and 5b) represent potential habitat for the Koala: RE 11.3.2, RE 11.3.4, RE 11.3.7, RE 11.3.25, RE 11.5.2a, RE 11.5.3, RE 11.5.9, RE 11.7.4 and regrowth RE 11.3.2, RE 11.3.27d, and RE 11.5.3.
<i>Petauroides volans</i>	Greater Glider (southern and central)	E*	Approximately 975.1 ha of potential habitat for the Greater Glider will be enhanced and conserved as part of the Southern Extension Offset Area. Six Greater Gliders were observed during a spotlighting survey within the proposed Southern Extension Offset Area. The Greater Gliders were recorded in open woodland habitats adjacent to ephemeral drainage features, in vegetation comprising of RE 11.3.25 and RE 11.3.4.

Source: Biodiversity Australia (2025a).

¹ Conservation status under the EPBC Act (current at August 2025):

V = Vulnerable, E = Endangered.

* Species was listed as 'Vulnerable' under the EPBC Act at the time of the controlled action decision (17/06/2021) and is therefore assessed as 'Vulnerable' not 'Endangered'.

3 MANAGEMENT ACTIONS

The following management measures are described in this section:

- management of EPBC Act listed threatened species (Section 3.1);
- setting up the offset areas on the ground (Section 3.2);
- regeneration (Section 3.3);
- weed management strategy (Section 3.4);
- pest animal management strategy (Section 3.5);
- fire management (Section 3.6);
- erosion and sediment control (Section 3.7);
- management of livestock (Section 3.8);
- restrictions to access (Section 3.9);
- removal of barbed wire (Section 3.10);
- education (Section 3.11); and
- management schedule (Section 3.12).

3.1 MANAGEMENT OF EPBC ACT LISTED THREATENED SPECIES

Table 4 provides management measures relevant to MNES as described in this Offset Management Plan/Vegetation Management Plan. The section of this Offset Management Plan/Vegetation Management Plan that addresses the management measure is also provided.

The management measures provided in this Offset Management Plan/Vegetation Management Plan consider the threat abatement and recovery information, such as:

- *Conservation Advice for Phascolarctos cinereus (Koala) Combined Populations of Queensland, New South Wales and the Australian Capital Territory* (DAWE, 2022a);
- *National Recovery Plan for the Koala Phascolarctos cinereus (Combined Populations of Queensland, New South Wales and the Australian Capital Territory)* (DAWE, 2022b);
- *Approved Conservation Advice for the Brigalow (Acacia harpophylla Dominant and Co-dominant) Ecological Community* (Department of the Environment [DotE], 2013);
- *Approved Conservation Advice for Denisonia maculata (Ornamental Snake)* (DotE, 2014);
- *Commonwealth Conservation Advice for Brigalow Ecological Community* (Threatened Species Scientific Committee [TSSC], 2013);
- *Conservation Advice Geophaps scripta scripta Squatter Pigeon (southern)* (TSSC, 2015); and
- *Conservation Advice Petauroides volans (Greater Glider (Southern and Central))* (DCCEEW, 2022).

Table 4
Specific Management Measures Relevant to Matters of National Environmental Significance

Matter of National Environmental Significance	Management Measures	Section
Southern Extension Offset Area		
Ornamental Snake	- Livestock will be managed in the offset areas. - A pest animal management strategy to control pest animals (such as Feral Pig).	Section 3.8 Section 3.5
Squatter Pigeon (southern)	- Livestock will be managed in the offset areas. - A pest animal management strategy to control pest animals (such as European Red Fox and Feral Cat). - A weed management strategy (Buffel Grass). - Regeneration of already cleared land will be allowed by preventing regrowth clearing, minimising fire and by managing grazing in the offset areas.	Section 3.8 Section 3.5 Section 3.4 Section 3.3
Greater Glider	- Livestock will be managed in the offset areas. - Regeneration of already cleared land will be allowed by preventing regrowth clearing, minimising fire and by managing grazing in the offset areas.	Section 3.8 Section 3.3
Koala (<i>combined Qld, NSW and the Australian Capital Territory</i>)	- Livestock will be managed in the offset areas. - A pest animal management strategy to control pest animals (such as Feral Dog). - Regeneration of already cleared land will be allowed by preventing regrowth clearing, minimising fire and by managing grazing in the offset areas.	Section 3.8 Section 3.5 Section 3.3
Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant) Community	- Livestock will be managed in the offset areas. - A weed management strategy. - A pest animal management strategy to control pest animals (such as Feral Pig, European Red Fox and Feral Cat). - Fire management.	Section 3.8 Section 3.4 Section 3.5 Section 3.6

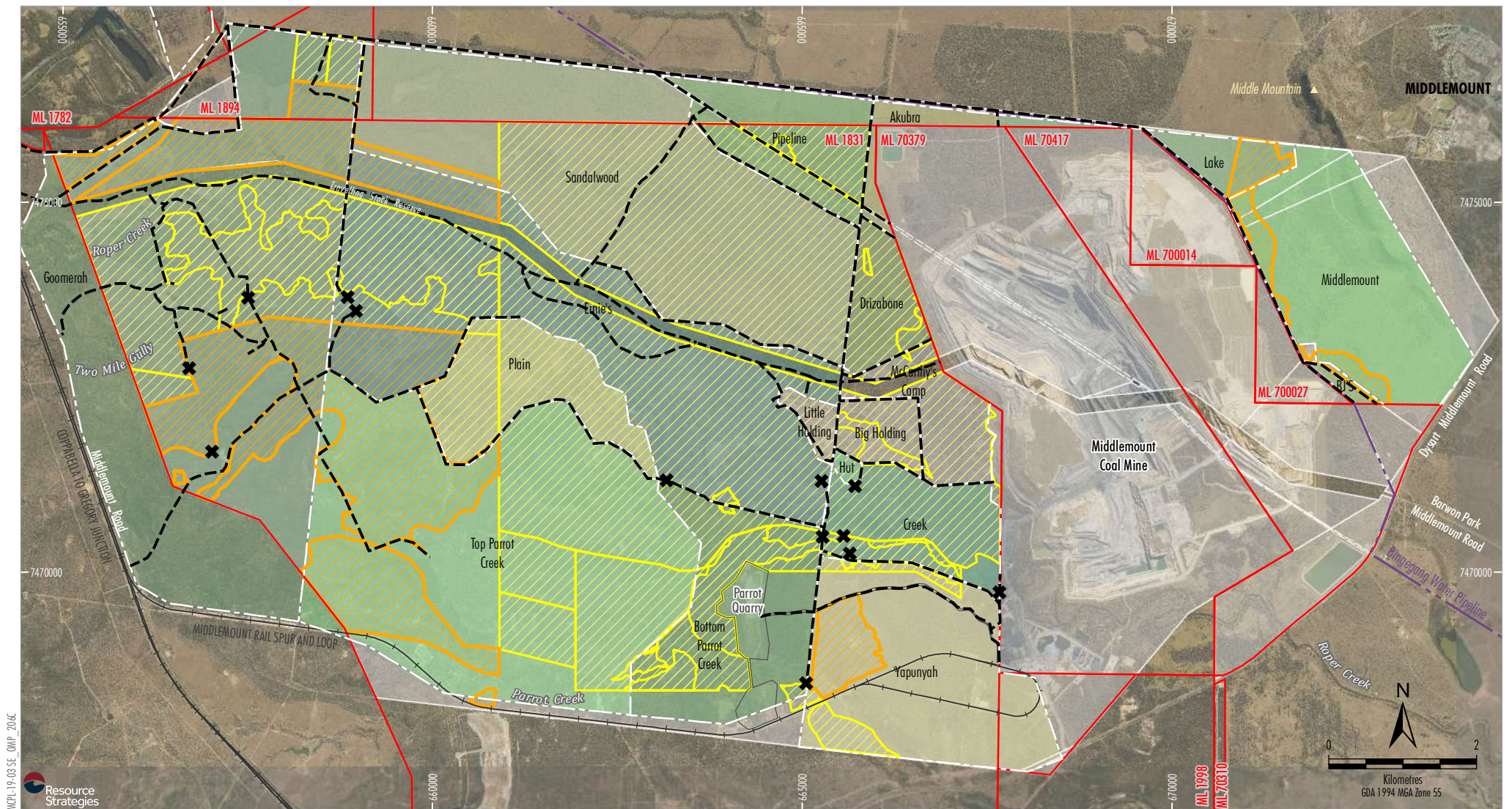
3.2 SETTING UP THE OFFSET AREAS

After enduring protection of the offset areas has been established (Section 1.2), the offset areas proposed for the Southern Extension Project will be set-up on the ground by:

- identifying/establishing fire trails/access tracks required for fire management or other management purposes;
- fencing the perimeter of the group of offset areas or a wider extent on the property around the offset areas to manage grazing livestock in the offset areas;
- installing locks on gates into the offset areas; and
- installing signage along main access roads which recognise that the area is protected for conservation purposes to deter third party access into the area.

An operational review of road and fire trail construction is to be completed in order to set up the offset areas. The tracks in the offset areas are shown on Figure 6. If any new tracks are required, the tracks will avoid conservation significant vegetation and flora.

Any existing access tracks not necessary for management purposes will be ripped and revegetated (Section 3.3). Excess fencing inside of the offset areas which is not required will be removed and recycled where practicable. Access tracks across drainage lines in the offset areas will be repaired and stabilised.



- LEGEND**
- Mining Lease Boundary (ML)
 - Middlemount Coal Owned Land
 - Railway
 - Existing Middlemount Coal Offset Area
 - Southern Extension Commonwealth Offset Area (EPBC 2021/8920)
 - Fence Line
 - Access Track
 - ✕ No Access
 - Paddock



OFFSET MANAGEMENT PLAN Paddocks

Figure 6

3.3 REGENERATION

Two main types of management areas are relevant to the offset area, namely, Enhancement Areas and Regeneration Areas (Table 5).

Table 5
Management Areas

Management Area	Description
Enhancement Areas	Existing woodland/forest habitats will be managed to improve its condition.
Regeneration Areas	Cleared land (non-remnant vegetation – Figures 5a and 5b) will be allowed to regenerate.

The Enhancement Areas comprise existing woodland/forest habitats and will not need specific revegetation measures. On the other hand, the Regeneration Areas comprise land which has been cleared in the past and is now at various stages of regeneration (non-remnant). The non-remnant vegetation in these areas are likely to contain varying quantities of the surrounding vegetation communities, including Brigalow.

The land is considered to have moderate to high resilience despite the past disturbance, evidenced by regrowth of trees and native understorey. The below photographs (Plate 1) provided by Biodiversity Australia provide examples of the vegetation in the early stages of regrowth across the proposed offset areas which encompass several vegetation types including Brigalow and Poplar Box. Monitoring data from Biodiversity Australia since 2014 of the existing offset areas shows an improvement of habitat quality with respect to increased native vegetation recruitment, increased canopy height, and decreased weed cover.

Active planting and seeding is not considered necessary (at this stage) as natural regeneration is occurring with trees and shrubs being established. However, if identified that tree and shrub regeneration is not to an acceptable level and density, MCPL would conduct active regeneration works to achieve offset objectives.



Source: Biodiversity Australia.

Plate 1 – Non-remnant Regrowth Vegetation within the Proposed Offset Areas

Therefore, the primary method for regenerating the offset areas will be through management of threatening processes that inhibit natural regeneration (e.g. weeds [Section 3.4], pest animals [Section 3.5], erosion [Section 3.7] and grazing livestock [Section 3.8]). Specific monitoring of the vegetation and natural regeneration in the offset areas would occur on an annual basis and is described further in Section 5.1. If annual inspections identify that regeneration in these areas is 'not readily occurring', MCPL would undertake active seeding and supplementary planting as needed. The term where natural regeneration is 'not readily occurring' is defined as "a patch (>1 ha) where no overstorey species are regenerating".

Access tracks not necessary for management purposes will be ripped and revegetated according to the method in Section 6.1.1. Areas of excessive erosion will be treated according to the method outlined in Section 3.7.

In the unlikely event that natural regeneration is not readily occurring or species composition is poor, contingency measures are described in Section 6.1, including active seeding/planting or disturbance to reduce competition.

3.4 WEED MANAGEMENT STRATEGY

Purpose

The purpose of the weed management strategy is to reduce the presence of environmental weeds/restricted invasive plants which will impact on the desired conservation outcomes.

Table E-1 provides a reconciliation of the standard landholder and state requirements for weed management of the offset areas and proposed management measures that are additional to these standard obligations (Appendix E).

Frequency, Timing and Duration

The procedure for controlling and monitoring environmental weeds/restricted invasive plants will be implemented annually, during spring to early summer.

Procedure for Controlling and Monitoring Weeds

The spread and introduction of environmental weeds/restricted invasive plants to and within the offset areas will be minimised by restricting vehicles to designated access tracks.

The implementation of measures that favour the restoration of healthy native vegetation is also an effective method of weed management. The introduction, establishment and spread of environmental weeds/restricted invasive plants will be minimised through regular monitoring and treatment activities.

The procedure for controlling and monitoring environmental weeds/restricted invasive plants will be as follows:

1. Monitor the location and density of environmental weeds/restricted invasive plants through inspections, including annual monitoring events.
2. Identification of suitable control methods for target environmental weeds/restricted invasive plants.
3. Implementation of the selected control methods on the target environmental weeds/restricted invasive plants.
4. Follow-up site inspections to evaluate the effectiveness of the weed control (within 2 weeks of control).

5. Follow-up control where previous control has been sub-optimal (within 2 weeks of point 4).

In regard to weed management measures, physical removal and chemical application are the main weed control methods available. Appropriately qualified persons will be engaged to undertake weed control.

Control methods will target the following species listed as restricted invasive plants under the *Biosecurity Act, 2014*¹:

- Cactus (*Harrisia* sp.) (Category 3);
- Rats Tail Grass (*Sporobolus* sp.) (Category 3);
- Parthenium (*Parthenium hysterophorus*) (Category 3);
- Velvety Tree Pear (*Opuntia tormentosa*) (Category 3);
- Prickly Acacia (*Acacia nilotica*) (Category 3);
- Tiger Pear (*Opuntia aurantiaca*) (Category 3); and
- Prickly Pear (*Opuntia stricta*) (Category 3).

Specific weed control methods will be in accordance with those specified by the Department of Agriculture, Fisheries and Forestry (DAFF) (2018).

Harrisia Cactus, Prickly Pear and Rats Tail Grass were found to have a patchy distribution across the offset areas. These species will be controlled in accordance with DAFF (2018) weed control specifications (Table 6).

Table 6
Weed Control Methods

Species	Control Methods ¹
Cactus (<i>Harrisia</i> sp.)	• Mechanical control to dig out plants (including tubers) and destroy. • Herbicide control with chemicals and application rates in accordance with the Harrisia Cactus fact sheet.
Parthenium	• Maintain pastures in good condition with high levels of ground and grass cover. • Herbicide control with chemicals and application rates in accordance with the Parthenium fact sheet. • Spray in a time of year before Parthenium sets seed. • Herbicide control will involve a knockdown herbicide to kill plants that are present and a residual herbicide to control future germinations. • Repeated spraying may be required even within a single growing season to prevent further seed production.
Velvety Tree Pear	• Herbicide control with chemicals and application rates in accordance with the prickly pear identification and control fact sheet.
Rats Tail Grass	• Herbicide control through spraying or wick wiping in accordance with the Rat's Tail Grasses identification and control fact sheet

¹ Source: Department of Agriculture, Fisheries and Forestry (2018).

Single or multiple combinations of treatments will be applied. The selected treatments employed will be documented and monitored.

¹ **Category 3** – includes weeds, vertebrate pest animals and noxious fish (e.g. gambusia, dingoes, yellow crazy ants). You must not distribute this restricted matter unless the distribution or disposal is authorised in a regulation or under a permit.

Buffel Grass is a widespread introduced pasture species which is dominant over large areas of the offset areas and surrounds. Buffel Grass is readily spread by the wind, overland water flow, animals and human activities. Buffel Grass has an extensive root system that enables the grass to bind soil particles to reduce erosion and dust generation. Uncontrolled Buffel Grass growth suppresses regrowth of native plant species (Franks, 2002; Grice *et al.*, 2012; Marshall *et al.*, 2012).

Buffel Grass in the offset areas will be managed with the aim of suppressing its dominance and to reduce the fire risk posed by high fuel loads. Buffel Grass growth in the offset areas can be managed by the following options:

- encouraging growth of overstorey vegetation (to form a canopy and shade-out Buffel Grass);
- strategic grazing in the offset areas to control biomass and reduce fuel load; and
- mosaic fire management to reduce Buffel Grass cover/old growth fuel load.

These possible treatments are further discussed below. One or multiple combinations of treatments will be applied. The selected treatments employed will be documented and monitored.

Rotational livestock grazing will be used as a method of managing Buffel Grass and reducing fuel loads in the offset management area. It is noted that inappropriate livestock grazing can pose a risk to native vegetation, though strategic grazing is likely to be an effective method of reducing Buffel Grass fuel loads over large areas (Butler and Fairfax, 2003). Grazing management is described in Section 3.8.

3.5 PEST ANIMAL MANAGEMENT STRATEGY

Aim

The aim of the Pest Animal Management Strategy is to reduce and minimise the presence of vertebrate pest species within the offset site, including by not limited to European Rabbit, Feral Cat and European Red Fox.

Table E-1 also outlines the standard landholder and state requirements for pest management of the offset areas and proposed management measures that are additional to these standard obligations (Appendix E).

Frequency, Timing and Duration

Appropriately qualified persons will be engaged to undertake pest animal control annually or more frequently as required. Monitoring of vertebrate pest animals is to be undertaken every 3 years by a suitably qualified practitioner using the most current best-practice methods.

Procedure for Controlling Vertebrate Pest Animals

Removing available feed and maintaining a clean, rubbish-free environment in order to discourage scavenging and reduce the potential for colonisation of these areas by non-endemic fauna (e.g. introduced rodents, predators and birds) will be undertaken.

The procedure for controlling vertebrate pest animals is as follows:

1. Identification of suitable control methods for target vertebrate pest animals (e.g. trapping, systematic 1080 baiting and/or shooting).
2. Implementation of the selected control methods on the target vertebrate pest animals (focusing on high activity areas).

3. Follow-up control where previous control has been sub-optimal.

Control measures will be implemented by mine staff or by an appropriate Pest Control Contractor(s) annually or as required. Control measures will consider the guidelines found on the Department of Agriculture, Fisheries and Forestry website. A selection of these techniques or additional techniques will be undertaken depending on the vertebrate pest animal species which is in an abundance that requires control (as determined through monitoring) and the success of these control techniques. The control of vertebrate pest animals is intended to be adaptive and will be informed/reviewed based on monitoring.

Control methods will target the following species listed under the *Biosecurity Act, 2014*²:

- Feral Pigs (Categories 3, 4 and 6);
- Wild Dogs (Categories 3, 4 and 6);
- European Rabbit (Categories 3, 4, 5 and 6);
- Feral Cats (Categories 3, 4 and 6); and
- European Red Fox (Categories 3, 4, 5 and 6).

Relevant threat abatement plans will be considered (e.g. DotE, 2015; Department of the Environment and Energy [DEE], 2016; and DEE, 2017).

3.6 FIRE MANAGEMENT

Fire Prevention

The current management regime is to exclude fire from the offset areas (Biodiversity Australia, 2018). Fire can adversely affect some vegetation communities and destroy habitat components such as coarse woody debris. Hot crown fires can also lead to mortality of arboreal mammals. However, fire can also provide important ecosystem benefits, such as reduce Buffel grass biomass (in some instances) and assist natural regeneration. As such, opportunities for trial management burns are proposed.

Bushfire preventative measures will include:

- Educating employees and contractors on general fire awareness and response procedures.
- Creation and maintenance of fire tracks (fire breaks) for fire control.
- Fire will be excluded from Brigalow communities and non-remnant areas with regenerating saplings. Ground fuel loads will be controlled through the strategic rotational grazing of cattle to prevent thick grass biomass from accumulating over time. Reducing the fuel load will minimise the impact of uncontrolled fires (e.g. from lightning strike).
- When necessary, fuel management (e.g. hazard reduction burns prior to the dry season) will be undertaken in consultation with the Qld Rural Fire Service.
- Local fire wardens will be consulted and fire permits will be obtained prior to hazard reduction burns.

² Category descriptions are as follows:

- **Category 3** – includes weeds, pest animals and noxious fish (e.g. gambusia, dingoes, yellow crazy ants). You must not distribute this restricted matter unless the distribution or disposal is authorised in a regulation or under a permit.
- **Category 4** – includes specific weeds, pest animals and noxious fish such as the bitou bush, feral pig or giant cichlid. You must not move this restricted matter to ensure that it does not spread into other areas of the state.
- **Category 5** – includes weeds, pest animals and noxious fish such as Mexican feather grass, rabbits and carp. You must not possess or keep this restricted matter under your control without a permit under the *Biosecurity Act, 2014* or another Act.
- **Category 6** – includes invasive animals such as feral deer, foxes, rabbits and wild dogs and noxious fish such as carp, gambusia and tilapia. You must not feed this category of restricted matter.

Uncontrolled Wildfire

In the event of a wild fire occurring within the offset management area, back burning from the established fire breaks will be undertaken, if appropriate, to prevent the spread of the wild fire. If the established fire breaks do not provide effective suppression of the wild fire then additional fire management lines will be cleared to control the wild fire.

Management Burn Trials

Management burn trial plots are proposed within both areas of remnant vegetation and non-remnant areas. The purpose of these trials is to determine if fire is an effective tool for stimulating natural regeneration and reducing weed biomass, or if the risks posed by burning outweigh the potential benefits.

The general methodology for trail burns is as follows:

- Identify location of trial plots in consideration of risks, access and vegetation types;
- Establish boundaries of trial plots on the ground, record vegetation attributes within plots (e.g. Biocondition plot), and take photographs;
- Identify timing of burns e.g. late wet season when soil moisture is high;
- Notify local fire wardens and obtain necessary approvals, consult with Rural Fire Service;
- Carry out risk assessments;
- Carry out burn in conjunction with Rural Fire Service in suitable conditions;
- Record vegetation attributes and take photographs within trial plots at 3, 6 and 12 months following the fire; and
- Compare vegetation attributes and weed cover results of burnt areas against an unburnt area of the same RE type.

Guidance to conducting management burns can be found in the Brigalow Planned Burn Guideline (Department of National Parks, Recreation, Sport and Racing, 2013).

If the management burn trials are found to be effective in improving ecosystem health and diversity and enhancing regeneration of non-remnant vegetation, a fire management strategy should be developed. This would allow for more widespread management burns across the offset areas as per Regional Ecosystem fire guidelines. Management burns may also be used as a contingency method if regeneration outcomes across the offset areas are poor.

The Qld Herbarium (2024) Regional Ecosystem Fire Guidelines for relevant REs in the offset areas is provide in Appendix B.

3.7 EROSION AND SEDIMENT CONTROL

Erosion potential in the offset areas will be reduced by grazing management (Section 3.8), restricting vehicle access to the offset areas (Section 3.9) and control of animal pests (such as the European Rabbit) (Section 3.5).

Erosion control may be required in areas observed to be displaying relevant characteristics (e.g. gullyng), through visual monitoring (Section 5.6). Visual observations will focus on drainage areas and disturbed areas (e.g. access tracks including creek crossings).

Erosion in the offset areas is primarily restricted to access tracks and has the effect of impeding access rather than impacting biodiversity (Biodiversity Australia, 2018).

The following measures will be used to control erosion within the offset area:

- selective plantings/direct seeding of local endemic species to stabilise the soil;
- surface water management structures (e.g. contour banks and temporary sediment traps [such as hay bales]);
- grading of tracks and creek crossings after the wet season to minimise track degradation and erosion;
- whoa-boy earth banks constructed on roads to manage runoff and reduce erosion and sedimentation; and/or
- Maintaining high groundcover (>60%) through grazing management.

3.8 MANAGEMENT OF LIVESTOCK

Extended periods of intense grazing of livestock can suppress native plant species which can hinder the performance of regeneration. Long-term intense grazing of livestock is a recognised threat to Brigalow (*Acacia harpophylla* dominant and co-dominant) community (DSEWPaC, 2011a).

Ultimately, it is intended to exclude grazing from the offset areas in the long-term once derived grassland communities have established canopy cover and grazing is not required for management of Buffel Grass. In the interim, strategic grazing will be used to manage Buffel Grass fuel load.

Rotational livestock grazing will be used as a method of managing Buffel Grass and reducing fuel loads in the offset areas. Rotational grazing is where a period of grazing is followed by an extended period of rest which, depending on pasture growth and season conditions, may be up to a few months. Rotating livestock will provide periods throughout the year when there will be no grazing pressure in selected areas.

It is intended that the offset areas will progressively change from a grassland dominated system to woodland/forest. Grazing will be used in a way to still enable regeneration of native plant species in the offset areas. This will be achieved by maintaining high ground cover (i.e. greater than 60% [or as dictated by future monitoring]).

The rotation of stock will be undertaken in association with the livestock owner and will be dependent upon seasonal conditions, maintaining ground cover above 60%. Ground cover above 60% is considered “high cover”, which minimises soil loss from erosion and prevents declines in land condition (Fitzroy Basin Association, 2006). The areas grazed will be mapped annually and the intensity of grazing (number of cattle and duration) will be recorded.

Stocking rates in the offset areas will be highly dependent upon seasonal conditions and will fluctuate from year to year, so a precise set stocking rate cannot be established. Publicly available literature indicates set stocking rates may not be the best tool for managing grazing pressure, due to the variability in seasonal conditions. During years with above average rainfall in the offset areas, higher stocking rates will be required for Buffel Grass and fire fuel load management. Conversely, lower stocking rates will be utilised during years with below average rainfall when Buffel pasture growth has been limited (e.g. grazing a sustainable/safe level of pasture utilisation). At no time will stocking rates exceed 1 adult equivalent animal per 10 acres (annualised) and the stocking rate will be dependent upon maintaining the ground cover above 60%, the Fitzroy Basin Association recommendations (Fitzroy Basin Association, 2006).

Stocking rates in the offset areas (in each paddock) will be documented annually.

As described above, it is intended that grazing is excluded from the offset areas once it is not required for management of Buffel Grass. The offset areas are divided up into a number of paddocks in which stock is managed (Figure 6). The need for grazing will be assessed on an individual paddock basis with the intention of progressively excluding livestock (Section 5.8). The assessment will consider the sensitivity of the native vegetation and landform (e.g. watercourses) to grazing livestock and the need to fence natural watering locations to exclude cattle. The assessment will also need to consider the location of stock watering points (troughs). Stock watering points (troughs) should be non-permanent and moved (rotated) regularly (every 3 months).

As described in Section 5.8, if grazing is excluded from an individual paddock, monitoring will still continue to assess whether there is a need for management of fuel loads either through re-introduction of short-term grazing or controlled burns.

3.9 RESTRICTIONS TO ACCESS

Access into the offset areas will be restricted to authorised personnel. Locks will be installed on gates into the offset areas. Vehicles will be restricted to designated access tracks. Access tracks through the offset areas will be maintained for fire management. Speed limits of 60 km per hour will be imposed on vehicles using access tracks.

Signage will be installed along main access roads which recognised that the area is protected for conservation purposes. The signs will describe:

- the area is a conservation area;
- access is restricted to authorised personnel only; and
- contact details for MCPL (Open Cut Examiner).

3.10 REMOVAL OF BARBED WIRE

Barbed wire use in fencing is a recognised threat to a range of fauna (e.g. bats and gliders) and is particularly hazardous when used in new fences and across fauna movement paths.

Barbed wire fencing within the offset areas will be removed upon exclusion of grazing. Where practical, the top two wire strands will be replaced with plain wire. Visual inspections of the fencing will be undertaken and any breaches rectified. If livestock from outside the offset areas are found to be eluding the fence, the design of the fence will be modified as required.

3.11 EDUCATION

Contractors/MCPL staff entering the offset areas will receive an induction in regard to:

- threatened species present and their conservation value;
- understanding of the requirements of this management plan and the activity proposed to be undertaken by the individual;
- requirement of vehicles to stay on designated tracks;
- fire awareness and emergency response procedures; and
- prohibition of smoking in the offset areas (fire risk).

MCPL will maintain a register of training conducted including individual, date, trainer and a summary of training.

3.12 MANAGEMENT SCHEDULE

Table 7 provides the broad management schedule and Table 8 provides the detailed management schedule.

Table 7
Broad Management Schedule

Management Activity	How the Activity will be Undertaken	Where the Activity will be Undertaken	Timing of these Activities over the Life of the Offset	Who will Undertake the Activity
On-ground set up of the offset areas	Installation of fencing, locked gates, signage and maintenance of access tracks.	Within the offset areas as required	During initial set up of the offset areas	MCPL
Control of environmental weeds/restricted invasive plants	Physical removal, chemical application.	Within the offset areas as required	Annual, spring to early summer	MCPL
Control of vertebrate pest animals	As required, depending on pest animal, in consideration with animal ethics.	Within the offset areas as required	Annual	MCPL
Fire management	Preventative measures (e.g. fire track maintenance, controlled grazing to reduce ground fuel loads).	Within the offset areas as required	Ongoing	MCPL
Management of livestock	Controlled grazing through the installation of fencing and locked gates.	Within the offset areas as required	Ongoing	MCPL

Table 8
Detailed Management Schedule

Action	Section	Southern Extension Offset Area
Enduring protection to be provided for the offset areas.	1.2	January 2026
Operational review of road and fire trail construction to be completed.	3.2	December 2026
Additional access tracks (fire trails) to be constructed/repared.	3.2	December 2026
Signage of the offset areas to be provided.	3.2 and 3.9	December 2026
Appropriate fencing of the offset areas to be provided for grazing management.	3.2 and 3.8	December 2026
Excess fencing inside of the offset areas to be removed.	3.2 and 3.8	December 2026
Gates with locks to be installed to restrict entry into the offset areas.	3.2 and 3.9	December 2026
Access tracks not necessary for management purposes to be ripped and revegetated.	3.2 and 3.3	December 2026
Barbed wire to be removed where no longer required for stock management.	3.10	December 2026
Erosion areas to be identified.	3.7	December 2026
Weed control to be undertaken.	3.4	October to December 2026
Animal pest control to be undertaken.	3.5	October to December 2026
Year 2 (January to December 2027)		
Maintenance of all access tracks, fences and gates.	3.6, 3.8 and 3.9	December 2027
Weed control to be undertaken.	3.4	October to December 2027
Animal pest control to be undertaken.	3.5	December 2027
Fire management activities to be undertaken.	3.6	As required
Restoration thinning to be undertaken if required.	5.7	June-September 2027
Annually from January 2025 until Completion Criteria are Met		
Maintenance of all access tracks, fences and gates to be undertaken.	3.6, 3.8 and 3.9	Continue - Annually
Weed control to be undertaken.	3.4	Continue - Annually
Animal pest control to be undertaken.	3.5	Continue - Annually
Fire management activities to be undertaken.	3.6	Continue - Annually
Assessment of the requirement for restoration thinning to be undertaken.	5.7	Continue - Annually

4 PERFORMANCE AND COMPLETION CRITERIA

The performance criteria for the Southern Extension Offset Area is provided in Table 9.

Table 9
Performance Criteria - Southern Extension Offset Area

Benchmarks	Years																			
	1*	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Infrastructure has been set up (fencing, locked gates, signage and access tracks)																				
Existing Remnant Vegetation/Habitat - Weed Cover																				
Existing remnant vegetation must have a weed cover of 50% or less.																				
Existing remnant vegetation must have a weed cover of 40% or less.																				
Existing remnant vegetation must have a weed cover of 30% or less.																				
Existing remnant vegetation must have a weed cover of 20% or less.																				
Cleared Land likely to have been formerly Brigalow Woodland and Ornamental Snake Habitat																				
Dominant canopy of the Brigalow Woodland and Ornamental Snake Habitat must have greater than 35% of the height and greater than 25% of the cover relative to the undisturbed height and cover of that stratum and is dominated by species characteristic of the vegetation's undisturbed canopy, where Acacia is the dominant canopy species.																				
The Brigalow Woodland and Ornamental Snake Habitat will be of a condition that is eligible to be mapped as a remnant woody regional ecosystem (<i>dominant canopy must have greater than 70% of the height and greater than 50% of the cover relative to the undisturbed height and cover of that stratum and is dominated by species characteristic of the vegetation's undisturbed canopy</i>), where Acacia is the dominant canopy species.																				
Regrowth habitat for the Squatter Pigeon (southern)																				
Dominant canopy of the regrowth habitat for the Squatter Pigeon (southern) must have greater than 35% of the height and greater than 25% of the cover relative to the undisturbed height and cover of that stratum and is dominated by species characteristic of the vegetation's undisturbed canopy, where Eucalyptus, Corymbia, Acacia or Callitris spp. are the dominant canopy species.																				
Squatter Pigeon (southern) regrowth habitat will be of a condition that is eligible to be mapped as a remnant woody regional ecosystem (<i>dominant canopy must have greater than 70% of the height and greater than 50% of the cover relative to the undisturbed height and cover of that stratum and is dominated by species characteristic of the vegetation's undisturbed canopy</i>).																				

Table 9 (Continued)
Performance Criteria - Southern Extension Offset Area

Benchmarks	Years																			
	1*	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<i>Cleared Land likely to have been formerly Koala and Greater Glider Habitat</i>																				
Dominant canopy of the Koala and Greater Glider Habitat must have greater than 35% of the height and greater than 25% of the cover relative to the undisturbed height and cover of that stratum and is dominated by species characteristic of the vegetation's undisturbed canopy, where Eucalyptus, Corymbia, Acacia or Callitris spp. are the dominant canopy species.																				
The Koala and Greater Glider Habitat will be of a condition that is eligible to be mapped as a remnant woody regional ecosystem (<i>dominant canopy must have greater than 70% of the height and greater than 50% of the cover relative to the undisturbed height and cover of that stratum and is dominated by species characteristic of the vegetation's undisturbed canopy</i>) , where Eucalyptus, Corymbia, Acacia or Callitris spp. are the dominant canopy species.																				

* Year 1 is the start of January 2026 to end of December 2026.

4.1 COMPLETION CRITERIA

This Offset Management Plan/Vegetation Management Plan will be binding on current and future owners and occupiers under the terms of a VDec. This Offset Management Plan/Vegetation Management Plan will continue to have effect until the objectives have been achieved. This Offset Management Plan/Vegetation Management Plan and monitoring requirements will conclude once the completion criteria in Table 10 have been achieved.

MCPL will demonstrate to the Commonwealth Minister that the completion criteria have been met prior to concluding management and monitoring outlined in this Offset Management Plan/Vegetation Management Plan.

Table 10
Completion Criteria

Aspect	Criteria
Enduring Security	Enduring protection for protection for the offset areas has been provided as described in Section 1.2.
Regeneration Areas (Non-remnant Areas) (Figures 5a and 5b)	Non-remnant areas have achieved RE remnant status ¹ .
Minimum period of time	The Southern Extension Offset Area is to be maintained for the life of the approval (EPBC 2017/8130).

¹ For non-remnant vegetation to achieve woody vegetation remnant status the dominant canopy must have greater than 70% of the height and greater than 50% of the cover relative to the undisturbed height and cover of that stratum and is dominated by species characteristic of the vegetation's undisturbed canopy.

The desired outcome of the offsets is that the land in the offset areas will be enhanced so as the currently degraded areas (non-remnant – Figures 5a and 5b) reach remnant status through increasing the structural integrity and extent of vegetation in the area. Once the requirements of the development approval (if applicable), legally binding mechanism and offset area management plan have been achieved, the offset areas will be mapped by the Qld administering authority as remnant vegetation on a region map.

4.1.1 Commonwealth Criteria

In addition to the general completion criteria outlined in Section 4.1, there are specific completion criteria for the Southern Extension Offset Area. The following condition targets are to be met by the 15 year anniversary of commencement of the action:

- i. Existing remnant vegetation in the Southern Extension Offset Area (Figure 5) must have a weed cover of 20% or less;
- ii. Approximately 42.9 ha of cleared land likely to have been formerly Brigalow Woodland (Figures 7a and 7b) must be of a condition that is eligible to be mapped as Brigalow TEC;
- iii. Approximately 71.88 ha of cleared land likely to have been formerly Poplar Box (Figures 7a and 7b) must be of a condition that is eligible to be mapped as Poplar Box TEC;
- iv. Approximately 42.9 ha of regrowth habitat for the Ornamental Snake (Figures 8a and 8b) must be of a condition that is eligible to be mapped as Brigalow TEC;
- v. Approximately 240.92 ha of regrowth habitat for the Squatter Pigeon (southern) (Figures 9a and 9b) must be of a condition that is eligible to be mapped as a remnant woody regional ecosystem (as defined under the VM Act); and
- vi. Approximately 198.02 ha of cleared land likely to have been formerly Koala habitat (Figures 10a and 10b) must be of a condition that is eligible to be mapped as a remnant woody regional ecosystem (as defined under the VM Act).

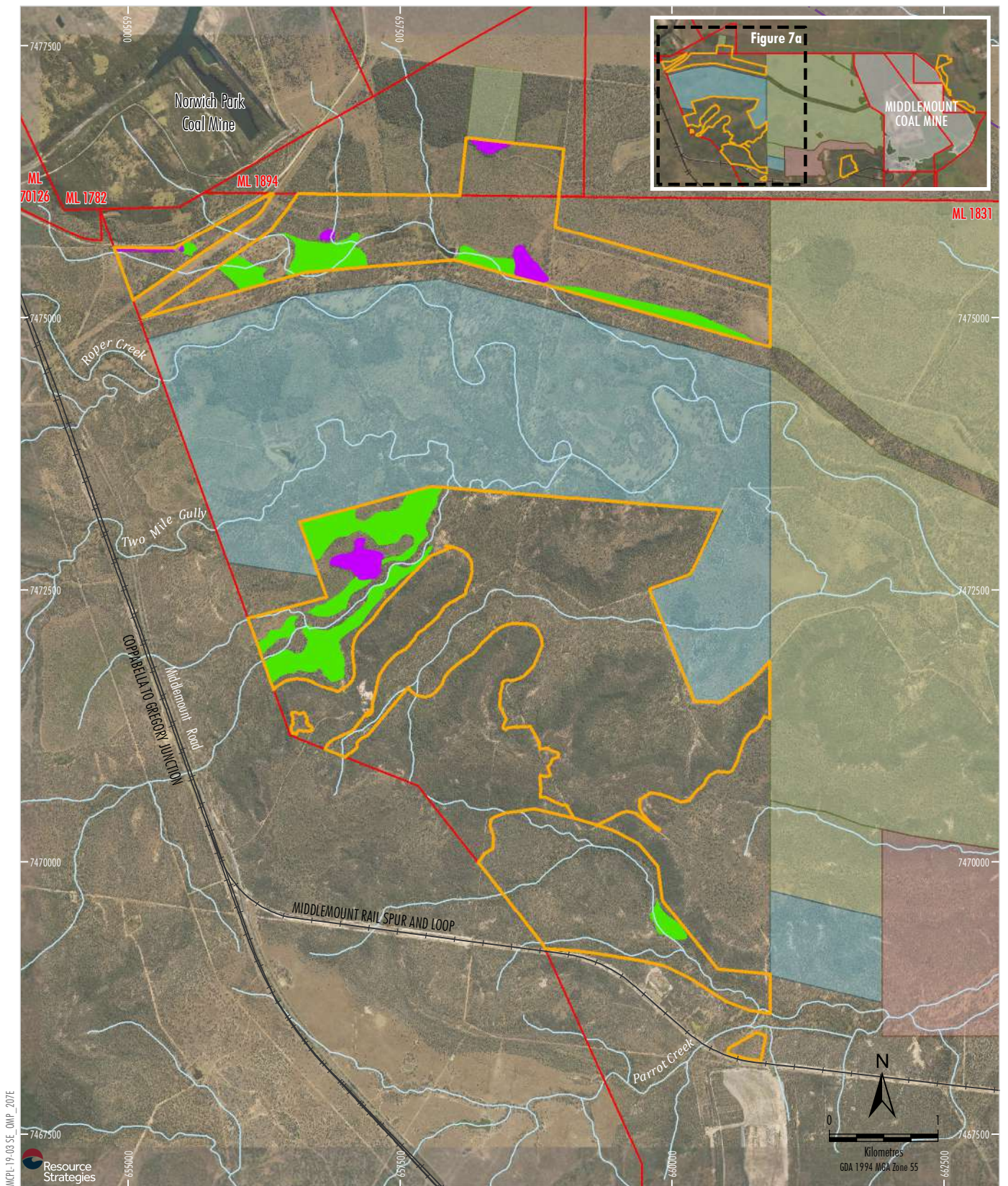
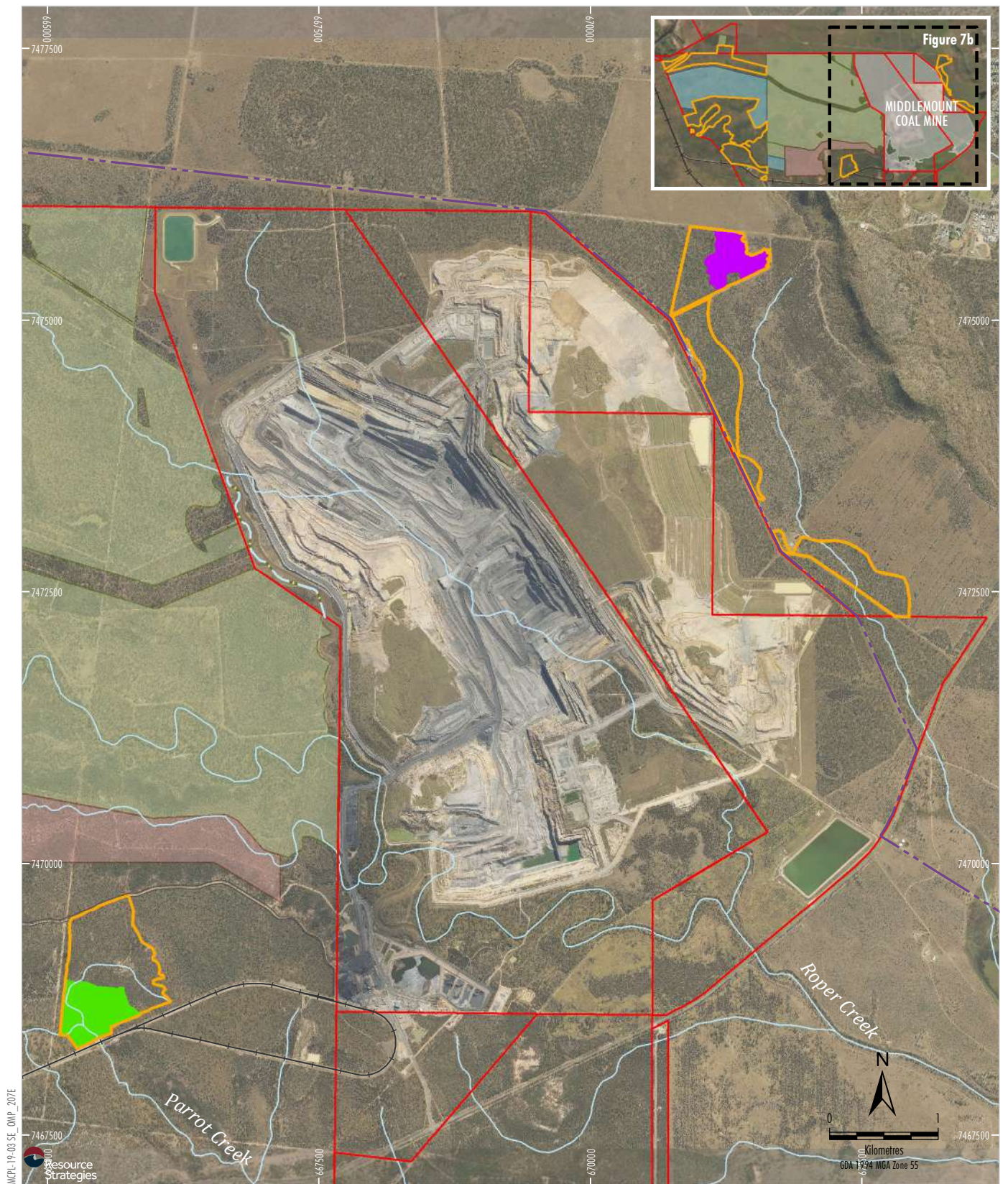


Figure 7a



LEGEND

- Mining Lease Boundary (ML)
- Proposed Southern Extension
- Commonwealth Offset Area (EPBC 2021/8920)
- Existing Offset Areas
- North-eastern Extension
- Commonwealth Offset Area (EPBC 2016/7717)
- Middlemount Coal (Stage 2) Project
- Commonwealth Offset Area (EPBC 2010/5394)

Threatened Ecological Communities

- Brigalow (*Acacia harpophylla* dominant and co-dominant)
- Poplar Box Grassy Woodland on Alluvial Plains

Source: MCPL (2025); Biodiversity Australia (2025);
The State of Queensland (2022)
Orthophoto: MCPL (June 2025); ESRI Basemap (2024)



SOUTHERN EXTENSION PROJECT

Threatened Ecological Community - Proposed Offset Areas

Figure 7b

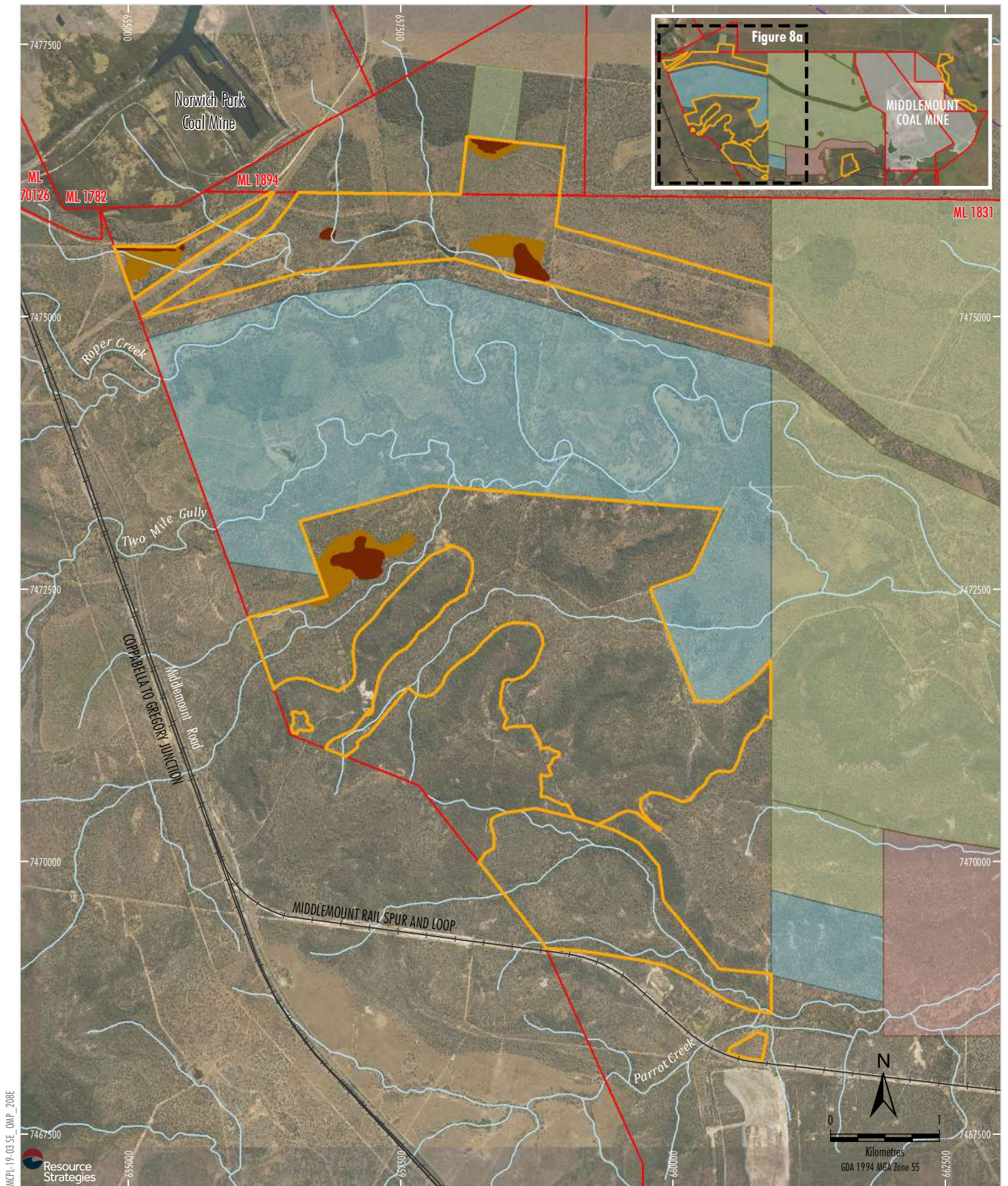
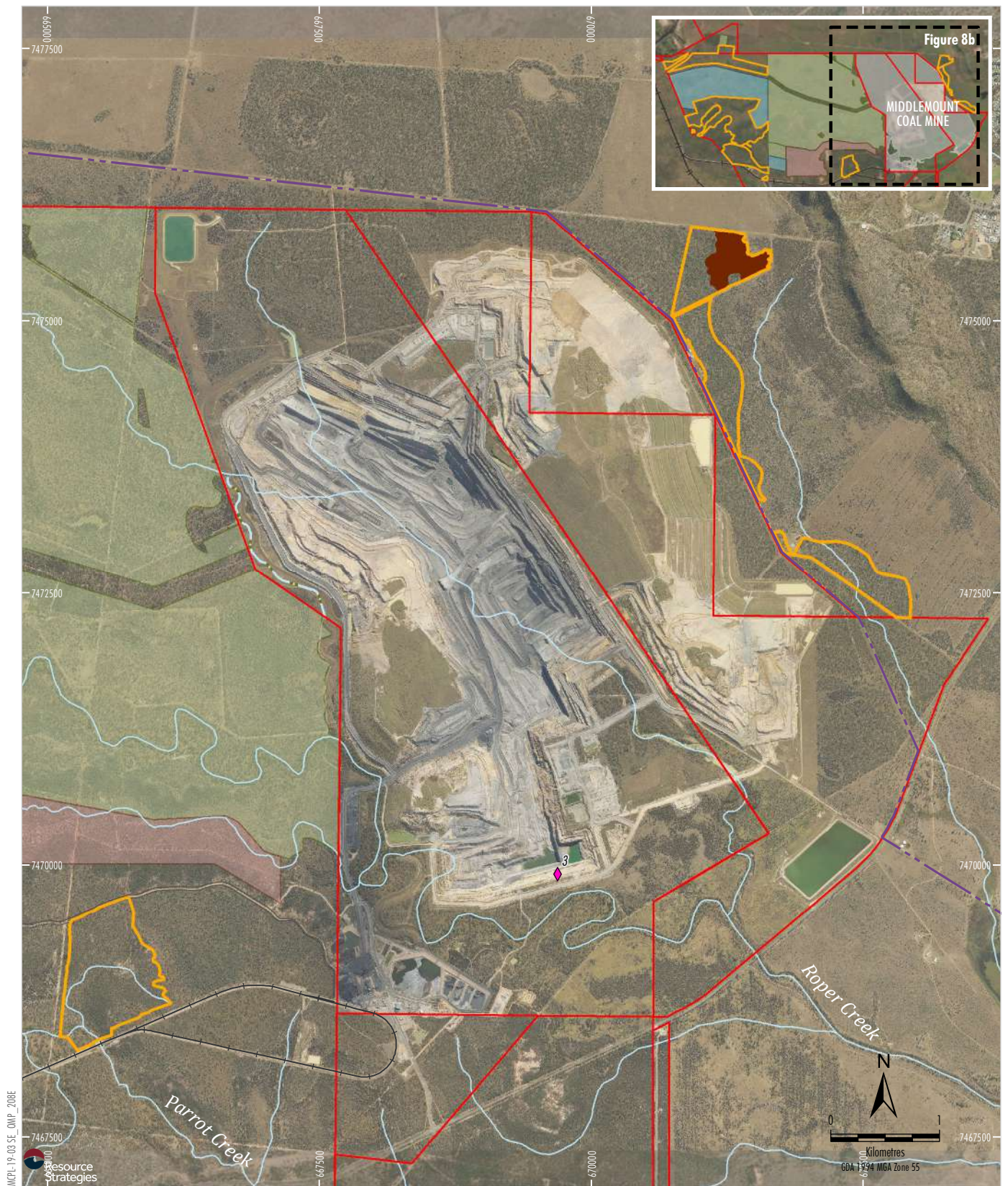


Figure 8a



LEGEND

- Mining Lease Boundary (ML)
- Proposed Southern Extension
- Commonwealth Offset Area (EPBC 2021/8920)
- Existing Offset Areas
- North-eastern Extension
- Commonwealth Offset Area (EPBC 2016/7717)
- Middlemount Coal (Stage 2) Project
- Commonwealth Offset Area (EPBC 2010/5394)

- Listed Threatened Species
- Potential Remnant Ornamental Snake Habitat
- ◆ Threatened Species Records
- ◆ Ornamental Snake Record

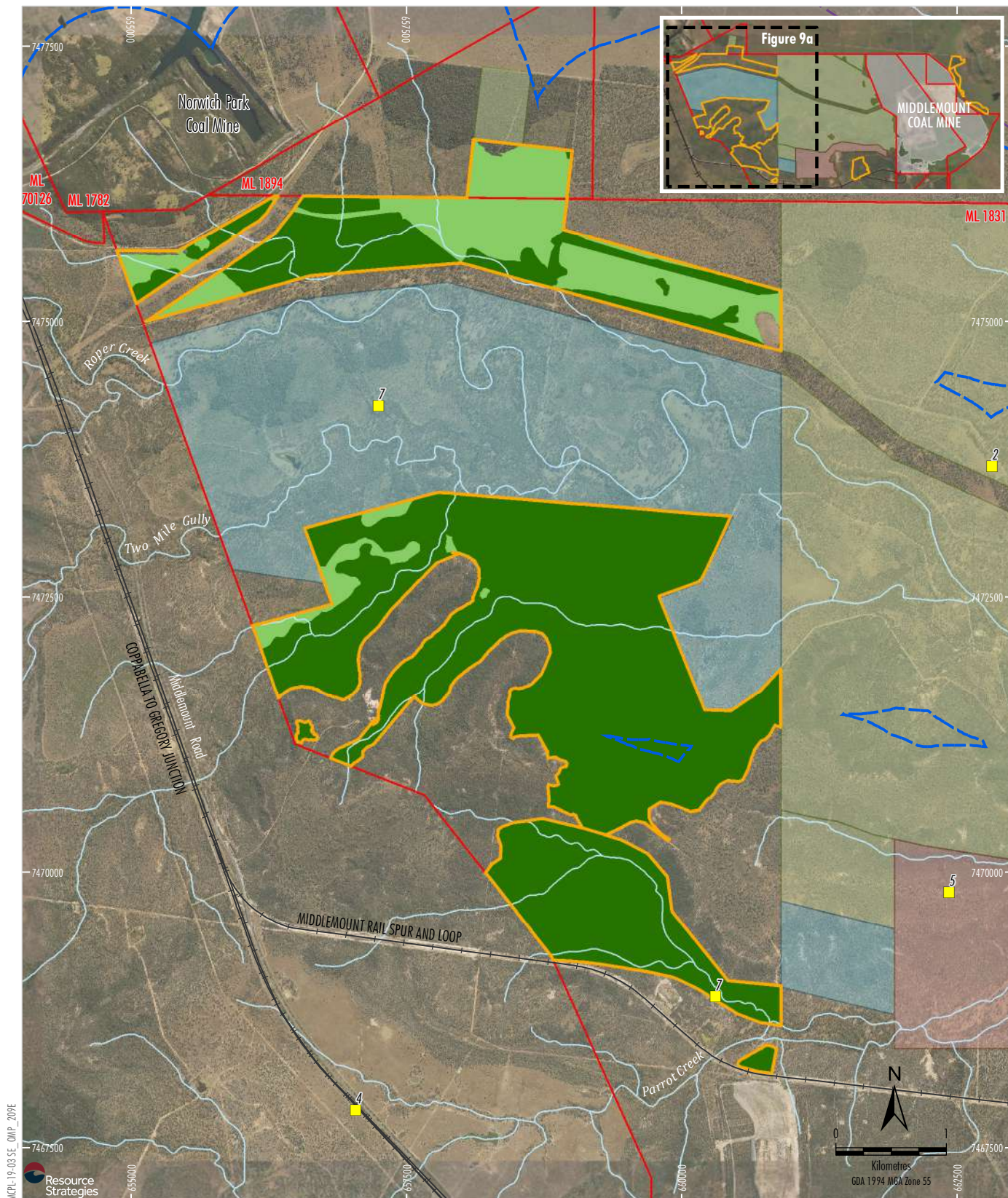
Reference: 3 Parsons Brinkerhoff (2010)

Source: MCPL (2025); Biodiversity Australia (2025);
The State of Queensland (2022)
Orthophoto: MCPL (2025); ESRI Basemap (2024)



SOUTHERN EXTENSION PROJECT
Ornamental Snake Habitat
- Proposed Offset Areas

Figure 8b



LEGEND

- Mining Lease Boundary (ML)
- Proposed Southern Extension
- Commonwealth Offset Area (EPBC 2021/8920)
- Existing Offset Areas
- North-eastern Extension
- Commonwealth Offset Area (EPBC 2016/7717)
- Middlemount Coal (Stage 2) Project
- Commonwealth Offset Area (EPBC 2010/5394)
- Western Extension
- Commonwealth Offset Area (EPBC 2017/8130)

- Seasonal Watercourse (VM Act)
- 1 km Buffer from a Seasonal Watercourse or Wetland
- Listed Threatened Species**
- Squatter Pigeon (Southern) Potential Breeding and Foraging Habitat
- Squatter Pigeon (Southern) Potential Foraging Habitat
- 7 Squatter Pigeon (Southern) Recorded Location

Reference: 1 Ecology and Heritage Partners (2012)
 2 Naturecall Environmental (2014)
 3 Parsons Brinkerhoff (2010)
 5 Naturecall Environmental (2017)
 6 Biodiversity Australia (2020)

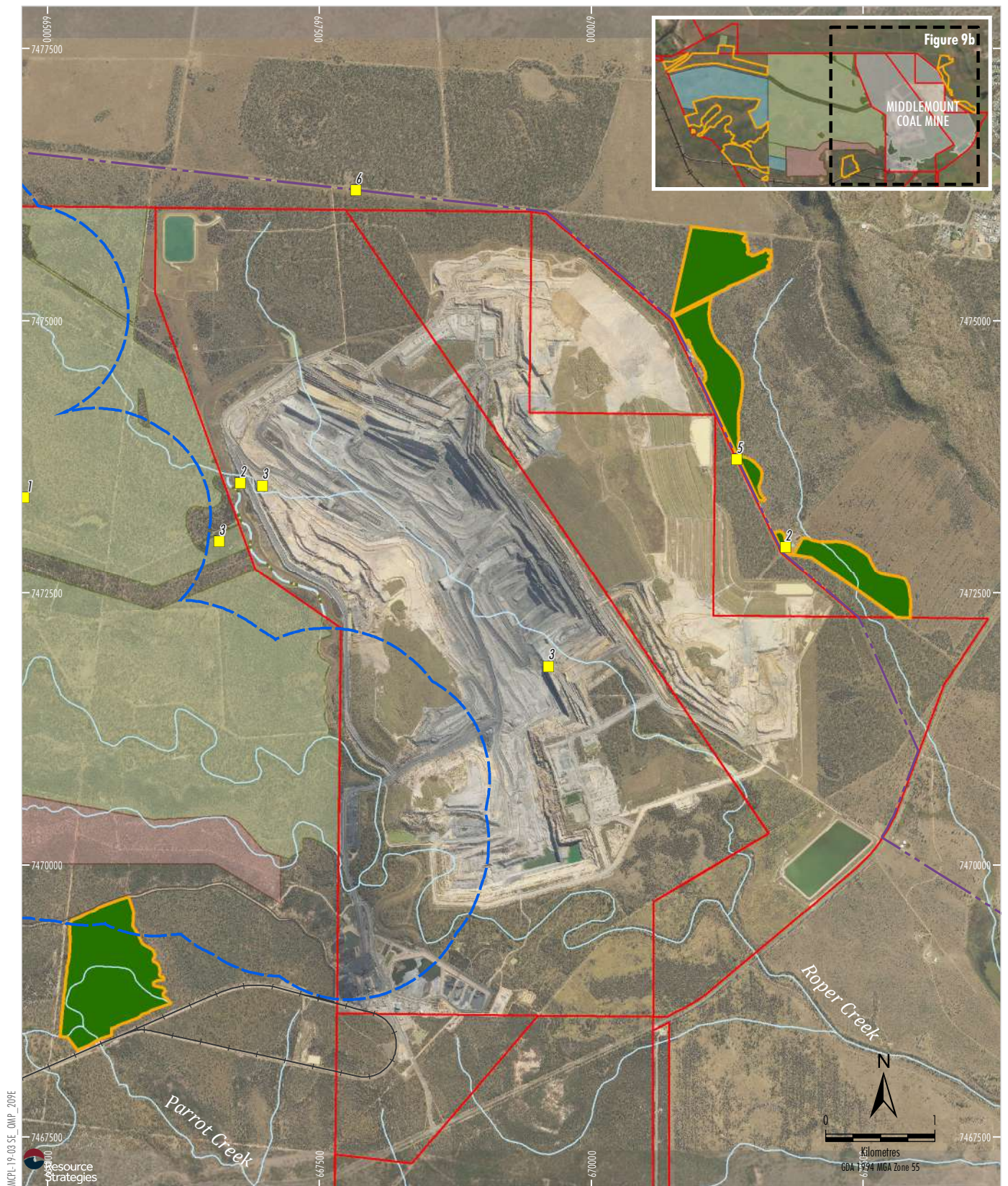
Source: MCPL (2025); Biodiversity Australia (2025);
 The State of Queensland (2022)
 Orthophoto: MCPL (June 2025); ESRI Basemap (2024)



SOUTHERN EXTENSION PROJECT

Squatter Pigeon (Southern) Habitat - Proposed Offset Areas

Figure 9a



LEGEND

- Mining Lease Boundary (ML)
- Proposed Southern Extension
- Commonwealth Offset Area (EPBC 2021/8920)
- Existing Offset Areas
- North-eastern Extension
- Commonwealth Offset Area (EPBC 2016/7717)
- Middlemount Coal (Stage 2) Project
- Commonwealth Offset Area (EPBC 2010/5394)

- Seasonal Watercourse (VM Act)
- 1 km Buffer from a Seasonal Watercourse or Wetland
- Listed Threatened Species
- Squatter Pigeon (Southern) Potential Breeding and Foraging Habitat
- Squatter Pigeon (Southern) Recorded Location

Reference: 1 Ecology and Heritage Partners (2012)
 2 Naturecall Environmental (2014)
 3 Parsons Brinkerhoff (2010)
 4 Naturecall Environmental (2017)
 5 Biodiversity Australia (2020)

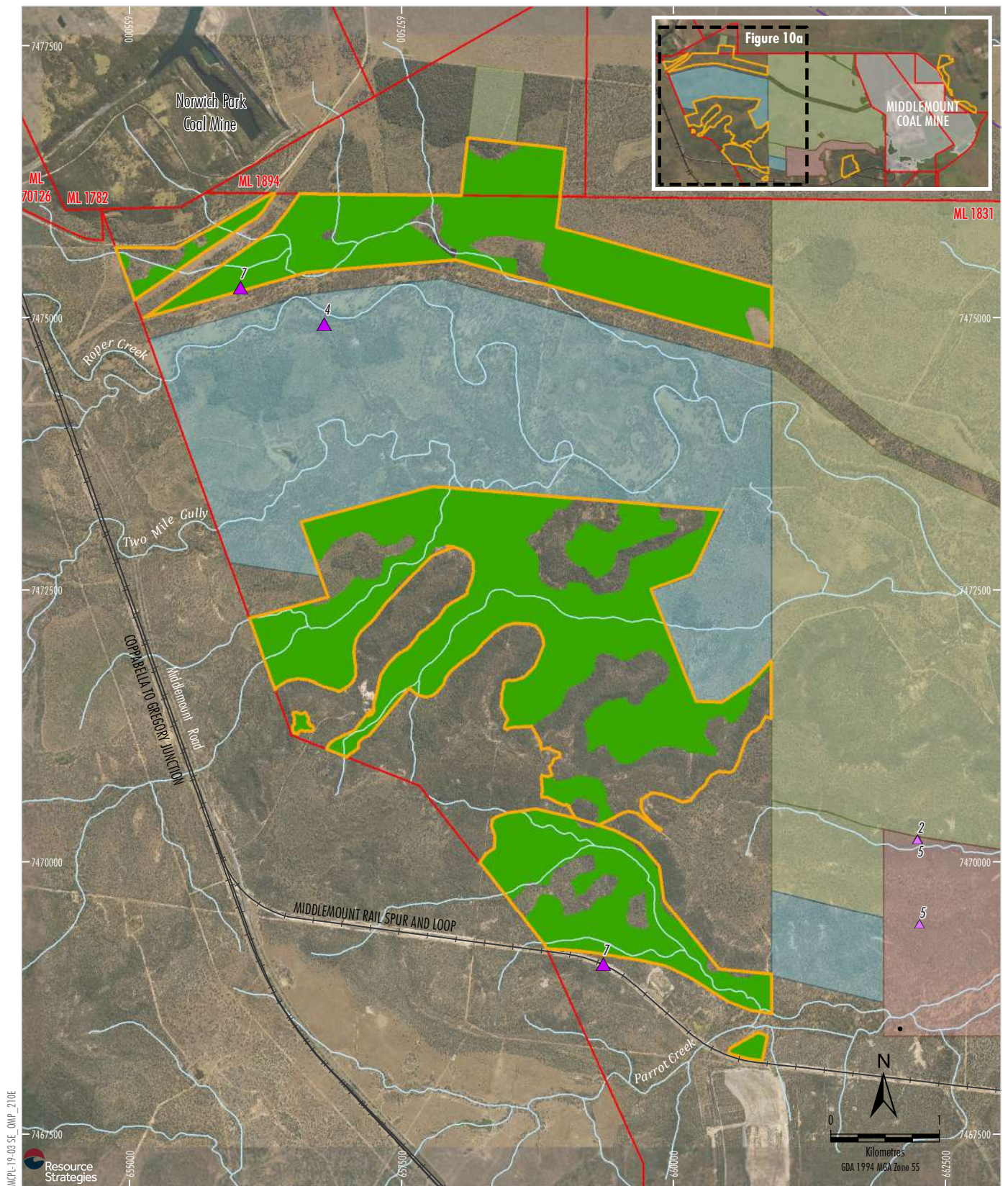
Source: MCPL (2025); Biodiversity Australia (2025);
 The State of Queensland (2022)
 Orthophoto: MCPL (June 2025); ESRI Basemap (2024)



SOUTHERN EXTENSION PROJECT

Squatter Pigeon (Southern) Habitat - Proposed Offset Areas

Figure 9b



LEGEND

- Mining Lease Boundary (ML)
- Proposed Southern Extension
- Commonwealth Offset Area (EPBC 2021/8920)
- Existing Offset Areas
- North-eastern Extension
- Commonwealth Offset Area (EPBC 2016/7717)
- Middlemount Coal (Stage 2) Project
- Commonwealth Offset Area (EPBC 2010/5394)
- Western Extension
- Commonwealth Offset Area (EPBC 2017/8130)

Listed Threatened Species

- Koala Potential Habitat
- ▲ Koala Recorded Location
- ▲ Koala Scats

- Reference: 2 Naturecall Environmental (2014)
 4 Biodiversity Australia (2018)
 5 Naturecall Environmental (2017)
 7 Biodiversity Australia (2022)

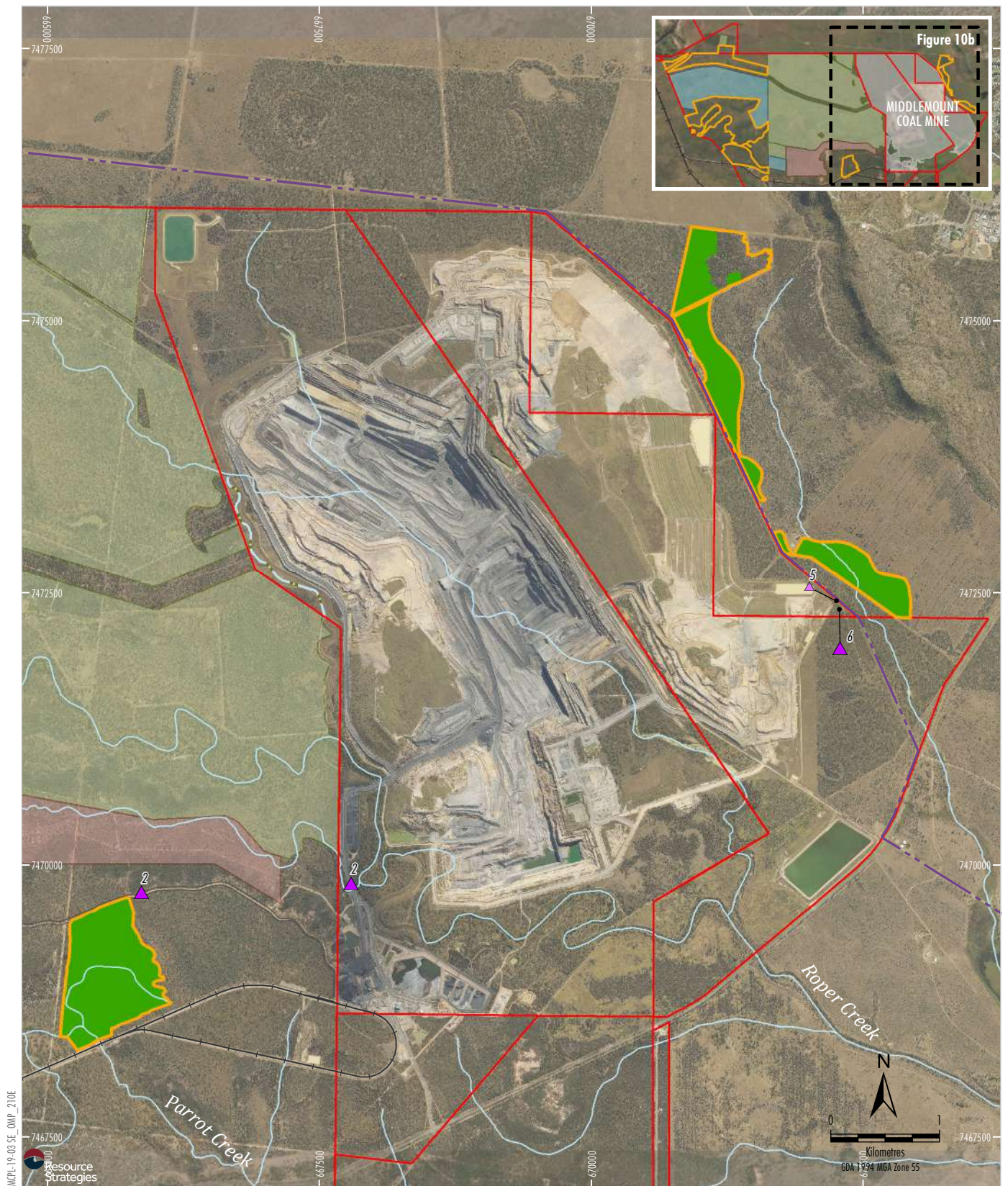
Source: MCPL (2025); Biodiversity Australia (2025);
 The State of Queensland (2022)
 Orthophoto: MCPL (June 2025); ESRI Basemap (2024)



SOUTHERN EXTENSION PROJECT

Koala Habitat
 - Proposed Offset Areas

Figure 10a



LEGEND

- Mining Lease Boundary (ML)
- Proposed Southern Extension
- Commonwealth Offset Area (EPBC 2021/8920)
- Existing Offset Areas
- North-eastern Extension
- Commonwealth Offset Area (EPBC 2016/7717)
- Middlemount Coal (Stage 2) Project
- Commonwealth Offset Area (EPBC 2010/5394)

Listed Threatened Species

- Koala Potential Habitat
- ▲ Koala Recorded Location
- ▲ Koala Scats

- Reference: 2 Naturecall Environmental (2014)
 4 Biodiversity Australia (2018)
 5 Naturecall Environmental (2017)
 7 Biodiversity Australia (2022)

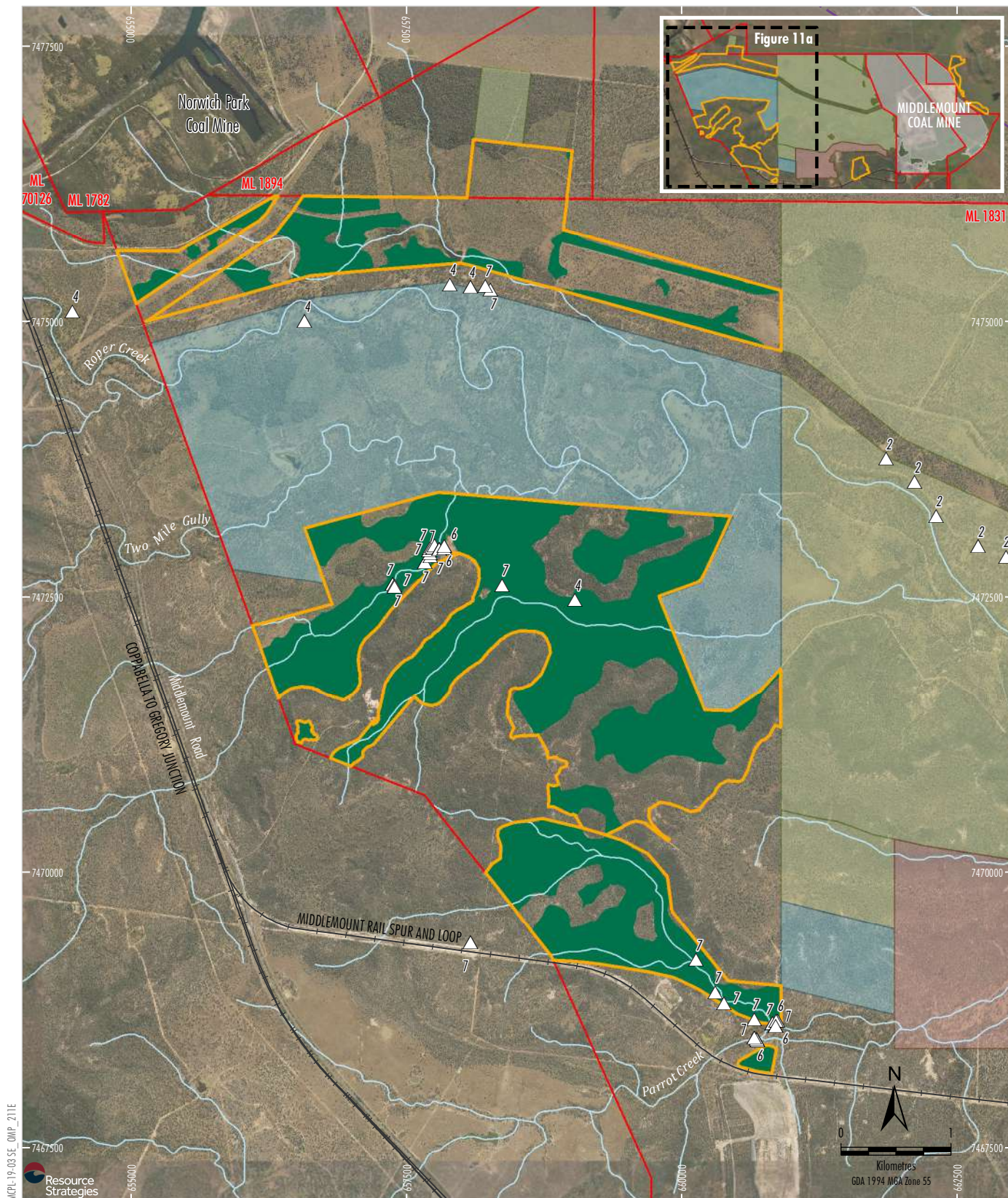
Source: MCPL (2025); Biodiversity Australia (2025);
 The State of Queensland (2022)
 Orthophoto: MCPL (June 2025); ESRI Basemap (2024)



SOUTHERN EXTENSION PROJECT

Koala Habitat
 - Proposed Offset Areas

Figure 10b



LEGEND

- Mining Lease Boundary (ML)
- Proposed Southern Extension
- Commonwealth Offset Area (EPBC 2021/8920)
- Existing Offset Areas
- North-eastern Extension
- Commonwealth Offset Area (EPBC 2016/7717)
- Middlemount Coal (Stage 2) Project
- Commonwealth Offset Area (EPBC 2010/5394)
- Western Extension
- Commonwealth Offset Area (EPBC 2017/8130)

Listed Threatened Species

- Greater Glider (Southern and Central) Habitat
- Greater Glider (Southern and Central) Recorded Location

Reference: 2 Naturecall Environmental (2014)
 4 Biodiversity Australia (2018)
 6 Biodiversity Australia (2020)
 7 Biodiversity Australia (2021)

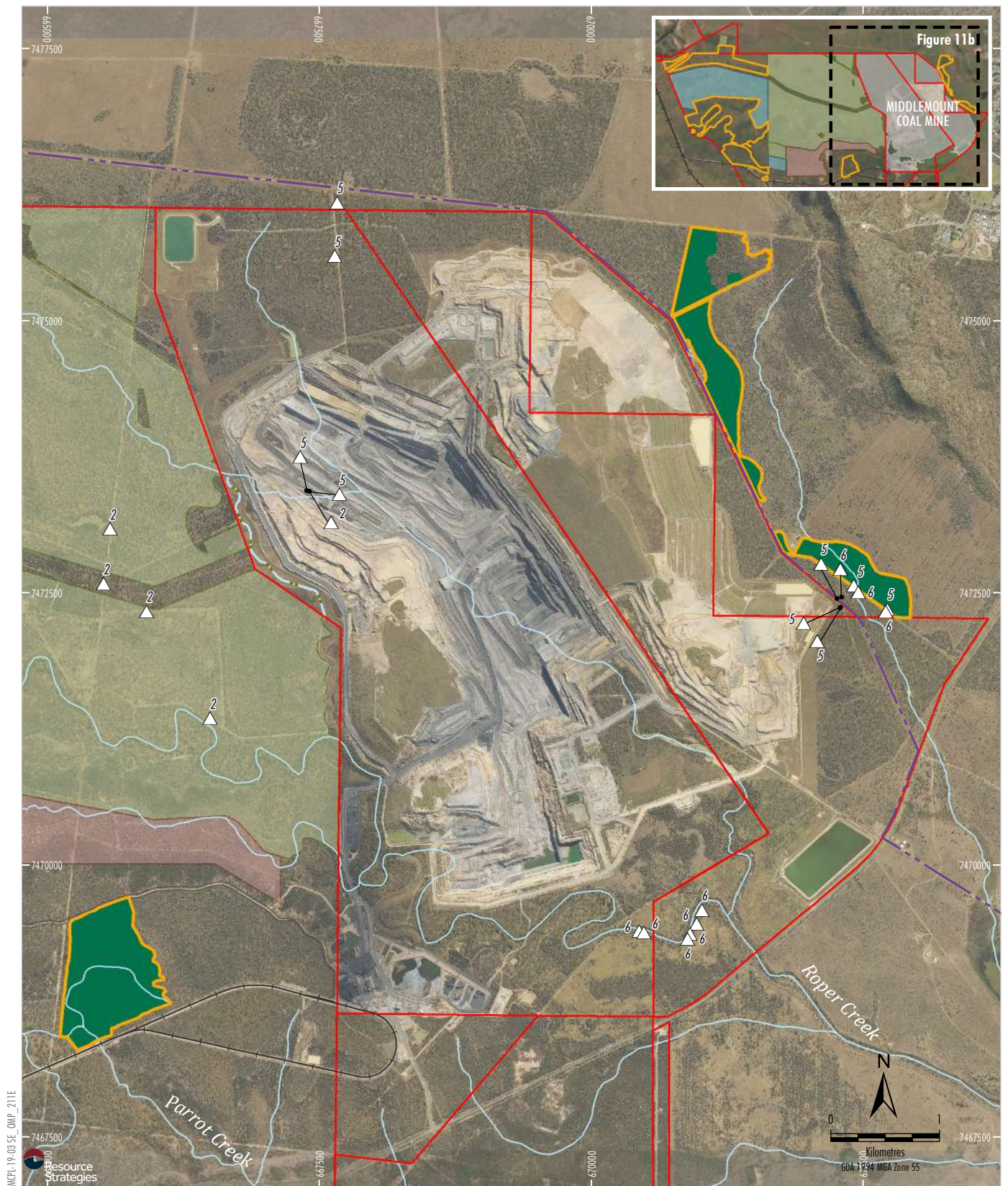
Source: MCPL (2025); Biodiversity Australia (2025);
 The State of Queensland (2022)
 Orthophoto: MCPL (2025); ESRI Basemap (2024)



SOUTHERN EXTENSION PROJECT

Greater Glider
 (Southern and Central) Habitat
 - Proposed Offset Areas

Figure 11a



LEGEND

- Mining Lease Boundary (ML)
- Proposed Southern Extension
- Commonwealth Offset Area (EPBC 2021/8920)
- Existing Offset Areas
- North-eastern Extension
- Commonwealth Offset Area (EPBC 2016/7717)
- Middlemount Coal (Stage 2) Project
- Commonwealth Offset Area (EPBC 2010/5394)

Listed Threatened Species

- Greater Glider (Southern and Central) Habitat
- △ Greater Glider (Southern and Central) Recorded Location

Reference: 2 Naturecall Environmental (2014)
 4 Biodiversity Australia (2018)
 6 Biodiversity Australia (2020)
 7 Biodiversity Australia (2021)

Source: MCPL (2025); Biodiversity Australia (2025);
 The State of Queensland (2022)
 Orthophoto: MCPL (2025); ESRI Basemap (2024)



SOUTHERN EXTENSION PROJECT

Greater Glider
 (Southern and Central) Habitat
 - Proposed Offset Areas

Figure 11b

4.1.2 State Criteria

In addition to the general completion criteria outlined in Section 4.1, there are specific completion criteria for the Southern Extension State Offset Area. The performance criteria for the Southern Extension State Offset Area is provided in Table 9. After 20 years, the intended conservation outcome for remnant and non-remnant vegetation within the Southern Extension State Offset Area is the regeneration and re-vegetation (where needed) of approximately 250.94 ha of non-remnant vegetation to achieve:

- a habitat quality score at least 1 point greater than the impact site habitat quality score (at the time of impact) (non-remnant vegetation);
- a habitat quality score gain of 2 points (remnant vegetation); and
- remnant status.

5 MONITORING PLAN

A programme will be undertaken to monitor and report the effectiveness of the measures and the performance of the regeneration in the biodiversity offset areas. MCPL have committed to carry out summary reporting annually (Section 8.1) which would describe the outcomes of both quantitative and qualitative monitoring including the results of annual permanent transect monitoring, annual weed control monitoring, biannual permanent photo monitoring, and quarterly visual inspections. Additional monitoring that would be undertaken on a less frequent basis would include fauna usage monitoring undertaken every three years, pest control monitoring undertaken every three years, and habitat quality assessments undertaken every 5 years. Monitoring will be undertaken by a suitably qualified person(s). The monitoring plan is summarised in Table 11. This monitoring plan will commence in 2023 and conclude once the completion criteria have been met.

The existing fauna survey monitoring methodology implemented by Biodiversity Australia Pty Ltd is rigorous and repeatable. The frequency of the existing established fauna monitoring is every three years as this allows more time for regenerating vegetation to improve and continue to establish. Vegetation monitoring occurs annually, but changes to fauna occurrence occurs over a longer period of time which is why fauna are monitored every three years.

Table 11
Monitoring Plan

Offset Area	Permanent Photo Monitoring	Permanent Transect Monitoring	Habitat Quality Assessments	Usage of the Offset Areas by Fauna	Effectiveness of the Weed Control	Effectiveness of the Pest Animal Control	Visual Inspections
Southern Extension Offset Area	Biannually (autumn and spring)	Annually (autumn)	Every 5 years	2026 (then every three years)	Annually (spring/early summer)	2026 (then every three years)	Quarterly

5.1 MONITORING THE EFFECTIVENESS OF REGENERATION IN THE OFFSET AREAS

Monitoring activities are linked to the offset area objectives, performance criteria defined in Section 4.1 and completion criteria. They measure the progression of the offset areas towards achieving those outcomes.

Permanent Photo Monitoring

Photo monitoring will be undertaken within the offset areas to provide a visual documentation of the performance of the offset area over time. Photos will be taken on a biannual basis, during the spring (September to mid-November) and autumn (March to mid-May) (Middlemount Coal Pty Ltd [MCPL], 2017).

Photo monitoring will be undertaken at each transect monitoring location. Photo monitoring will be undertaken across representative REs (including Brigalow EEC and potential habitat for species listed in Table 4) and cleared/non-remnant areas within each offset area.

Photos will be taken in a consistent direction, location (at global positioning system [GPS] points), height above the ground and time of day. These aspects and the date will be recorded for each photo taken (north, south, east and west).

After the photographic monitoring event the photos will be compared to the photos from the previous monitoring periods. Natural regeneration of native understorey and overstorey species, the occurrence of habitat complexity (e.g. logs, litter), plant establishment and the status of environmental weeds/restricted invasive plants will all be noted.

Aerial photographs may also be used to show enhancement of vegetation connectivity.

Permanent Transect Monitoring

Transect monitoring will be undertaken within the offset areas to provide a measure of the progress of the offset area towards the completion criteria. Transect monitoring will be undertaken annually, during autumn (March to mid-May).

Transect monitoring will be undertaken across representative REs (including Brigalow EEC and potential habitat for species listed in Table 4) and cleared/non-remnant areas within each offset area. The monitoring sites will be placed within a number of paddocks across the offset areas.

As described in Section 4.1, the general objective is for current non-remnant areas to achieve remnant status. For non-remnant vegetation to achieve woody vegetation remnant status, the dominant canopy must have greater than 70% of the height and greater than 50% of the cover relative to the undisturbed height and cover of that stratum and is dominated by species characteristic of the vegetation's undisturbed canopy.

Transect monitoring will be undertaken annually within representative areas to assess the effectiveness of restoration and to assess performance, focusing on:

- canopy cover;
- average stem diameter at breast height (DBH) of canopy species (existing trees over 20 centimetres DBH cannot be utilised for this assessment);
- signs of canopy and shrub layer recruitment present;
- average height (and species composition) of each vegetation stratum;
- native plant species richness for four life-forms (trees, shrubs, grasses, forbs/other);
- shrub cover;
- non-native (weed) cover; and
- correct labelling with date, location, GPS points for end points of transect and any other observations.

Monitoring will focus on non-remnant areas of vegetation, as the objective is for these areas to reach remnant status. Detailed monitoring within non-remnant areas will allow any potential issues to be highlighted and will track the progress of regeneration over time to demonstrate completion criteria timeframes are met.

The above attributes will be monitored using the plot and transect layout within Eyre *et al.*, (2015). After each monitoring event the data for these attributes will be compared to the data from the previous monitoring periods.

If any non-remnant/regrowth areas qualify as remnant vegetation then the vegetation will be progressively mapped according to standard vegetation mapping methods in Qld (e.g. Nelder, *et al*, 2017). This mapping will occur on an assessment of a particular area (not solely on the data from monitoring points).

5.2 HABITAT QUALITY ASSESSMENTS

The non-remnant areas in the Southern Extension Offset Area have specific completion criteria based on a habitat quality score measured by the *Guide to Determining Terrestrial Habitat Quality Version 1.3* (DES, 2020 or its revision) (Sections 4.1.1 and 4.1.2).

Habitat quality assessments will be undertaken at each monitoring location in the non-remnant areas every five years. The *Guide to Determining Terrestrial Habitat Quality - Version 1.3* (DES, 2020 or its revision) will be applied.

5.3 USAGE OF THE OFFSET AREAS BY FAUNA

MNES fauna relevant to each offset area will be monitored over time to document their usage of the relevant offset area(s). The monitoring will target existing potential habitat in the first instance and then non-remnant areas as habitat resources in the non-remnant area increase over time. There are no performance or completion criteria based on the occurrence of fauna due to the variable factors influencing the detection of fauna species.

The next fauna surveys will be conducted in spring/summer 2024 and every three years thereafter.

Ornamental Snake

Targeted surveys for the Ornamental Snake will be undertaken within the Southern Extension Offset Area. Targeted searches will be undertaken in consideration of the relevant survey guidelines (e.g. DEE, 2018; DSEWPac, 2011b and 2011c). Methods will include herpetofauna searches and spotlighting.

Squatter Pigeon (southern)

Targeted surveys will be undertaken for the Squatter Pigeon (southern) within the Southern Extension Offset Area. Targeted searches will be undertaken in consideration of the relevant survey guidelines (e.g. Commonwealth Department of the Environment, Water, Heritage and the Arts, 2010). Methods will include diurnal bird surveys.

Greater Glider

Targeted surveys for the Greater Glider (southern and central) will be undertaken within the Southern Extension Offset Area. Methods will include spotlighting and scat searches.

Koala

Targeted surveys for the Koala will be undertaken within the Southern Extension Offset Area. Targeted searches will be undertaken in consideration of the relevant survey guidelines (e.g. DEE, 2018; Department of Planning and Environment [DPE], 2022). Methods will include spotlighting, call playback and scat searches.

Other Fauna Species

Other fauna species recorded during the monitoring will be documented.

5.4 EFFECTIVENESS OF THE WEED CONTROL

Weed control will be undertaken within the offset areas annually, during spring (September to mid-November) (Section 3.4). Follow-up inspections will be undertaken to assess the effectiveness of the weed management measures implemented (within 2 weeks of control) and the requirement for any additional management measures.

Weed occurrence/cover is also monitored during the permanent transect monitoring (Section 5.1) and quarterly inspection of the offset areas (Section 5.6).

5.5 EFFECTIVENESS OF THE PEST ANIMAL CONTROL

Pest animal control will be undertaken within the offset areas (Section 3.5). Monitoring of pest animals (Feral Pig, Wild Dog, European Rabbit, European Red Fox and Feral Cat) is to be undertaken every three years by a suitably qualified practitioner.

An estimate of the abundance of pest animals will be obtained using best practice monitoring techniques (e.g. the vehicle spotlight method [Mitchell and Balogh, 2007a to c], passive infra-red cameras). Quarterly inspections of the offset areas will also be undertaken, noting requirements for pest animal control (Section 5.6).

5.6 VISUAL INSPECTIONS

A quarterly visual inspection of the offset areas will be undertaken to identify:

- risks to achieving the management outcomes;
- implementation difficulties;
- weeds species, particularly Prickly Pear, Velvet Tree Pear, Harrisia Cactus and Rats Tail Grass (also covered by Section 5.4);
- requirements for pest animal control (also covered by Section 5.5);
- current fire fuel loads and the risk they present to the offset;
- erosion or sedimentation as an impediment to meeting offset area objectives;
- effectiveness of erosion or sediment control (if used);
- fencing and track maintenance (including erosion of tracks);
- uncontrolled presence of livestock in the offset areas;
- illegal access and vandalism;
- effects of flood and fire events if they occur; and
- general notes regarding enhancing success and reducing failure.

Visual inspections will be undertaken by a land manager who (as a minimum) will drive all access tracks in the offset area and along each fence in order to identify the above. All offset areas will be visually inspected.

5.7 ASSESSMENT OF THE REQUIREMENT FOR RESTORATION THINNING

An assessment of Brigalow regrowth and the requirement for restoration thinning will be made annually by a suitably qualified ecologist. The assessment will consider:

- tree density;
- species diversity; and
- remnant status

If thinning is to occur, secondary suckering will be monitored and controlled. Detailed methods for Brigalow restoration thinning are described in Section 6.1.2.

5.8 IMPACTS OF GRAZING ON MANAGEMENT OBJECTIVES

Stocking rates in the offset areas (in each paddock) will be documented annually within the annual monitoring report.

Monitoring will be undertaken to assess the impacts of grazing on achieving management outcomes. Monitoring methods will include transect monitoring (Section 5.1) and visual inspections (Section 5.6). The outcomes of these assessments will be used to assess if grazing pressure in a paddock is preventing MCPL achieving the performance and completion criteria.

As described in Section 3.8, it is intended that grazing is excluded from the offset areas once it is not required for management of Buffel Grass. The offset areas are divided up into a number of paddocks in which stock is managed (Figure 6). The need for grazing will be assessed on an individual paddock basis with the intension of progressively excluding livestock. The assessment will consider the sensitivity of the native vegetation and landform (e.g. watercourses).

If grazing is excluded from an individual paddock, monitoring will still continue to assess whether there is a need for management of fuel loads either through re-introduction of short-term grazing or controlled burns.

6 CONTINGENCY MEASURES

6.1 POTENTIAL RISKS AND CONTINGENCY MEASURES

An analysis of potential risks is provided in Appendix C. Table 12 outlines some potential risks to successful management of the offset areas and a description of possible contingency measures that could be implemented to mitigate the risk. Risk management has been built into management specifications, but some unforeseen events may still restrict prescribed management outcomes.

Table 12
Potential Risks and Contingency Measures

Risk	Contingency
Consistent increase in weed extent	The weed control program provides for the control and monitoring of any new incursions of environmental weeds/restricted invasive plants. In the event that a consistent increase in weed extent is recorded, additional strategies to control the problematic weed species will be reviewed (e.g. changing the weed control method or increasing the frequency of weed control).
Consistent increase in vertebrate pest animals	In the event that a consistent increase in vertebrate pest animals is recorded, additional strategies to control the problematic vertebrate pest animal species will be reviewed (e.g. changing the control method or increasing the frequency of control).
Unplanned fires	- The Qld Rural Fire Service will be called for assistance if a significant bushfire was to occur within or move towards the offset areas. - Inspect and remedy issues with fences, gates or access.
Inappropriate grazing regimes	- Modify fencing. - Incorporate electric fencing. - Inspect and remedy issues. - Modify rotational grazing regime.
Illegal access and potential vandalism	Inspect and remedy issues.
Natural regeneration not occurring or if occurring seedlings have low survival rate	- Assess the requirement of cattle removal followed by chemical application of weeds immediately around natural regenerating seedlings. - Further active revegetation (Section 6.1.1).
Lock regrowth in Brigalow	Restoration thinning (Section 6.1.2).
Poor access for management/monitoring (e.g. due to adverse weather)	Wait until access is possible.

6.1.1 Active Seeding/Planting

Active seeding/planting will be a contingency measure in the event that natural regeneration is not readily occurring after at least three successive annual monitoring events. Active revegetation will be undertaken using appropriate plantings, brush mulching or seeding of local seed sources. The procedure is provided in Table 13.

Table 13
Revegetation Methods

Method	Description
Seed Collection	A key aim of seed collection is to collect local provenance seed stock for propagation purposes. Required approvals are identified, sought and obtained from relevant authorities. All seed collection is to be conducted under the framework of the 'Florabank Guidelines'. This includes best practice in collection activities, cleaning, data collection, germination testing and storage.
Site Preparation	Site preparation involves stabilising and preparing the surface of the rehabilitation area so that it can absorb water and nutrients. A large proportion of weeds are also removed during site preparation to allow space for new seedlings and plantings. Weed removal may have to occur more than once to reduce the weed management measures needed during implementation of the revegetation programme.
Revegetation Method	The revegetation method will change site to site depending on the structure and floristic characteristics of each site. A combination of tubestock planting, brush mulching and direct seeding may be used, depending on the circumstances. These methods may also be used in conjunction with management burns to increase seed germination rates and competition with exotic grasses.
Timing	Revegetation will be undertaken during suitable climactic conditions, such as during and immediately after sufficient rainfall.

6.1.2 Brigalow Regrowth Restoration Thinning

Brigalow trees are capable of prolific resprouting after clearing which can result in regrowth with high stem densities (e.g. greater than 10,000 stems per hectare (stems/ha) [University of Queensland, 2011]). These densely spaced trees have slower growth and structural development as they compete for resources. With less resources for other plant species (light, water, etc.), Brigalow regrowth monocultures can have a lower floral diversity than mature Brigalow. A recent study has shown that restoration thinning can accelerate structural development in Brigalow as well as improve carbon sequestration (Dwyer *et al.*, 2010).

Brigalow regrowth occurs in the offset areas that does not currently meet the criteria of the Brigalow (*Acacia harpophylla* dominant and co-dominant) community under the EPBC Act. An assessment of the Brigalow regrowth and the requirement for restoration thinning will be made by a suitably qualified ecologist (Section 5.6).

If required, Brigalow regrowth restoration thinning will involve:

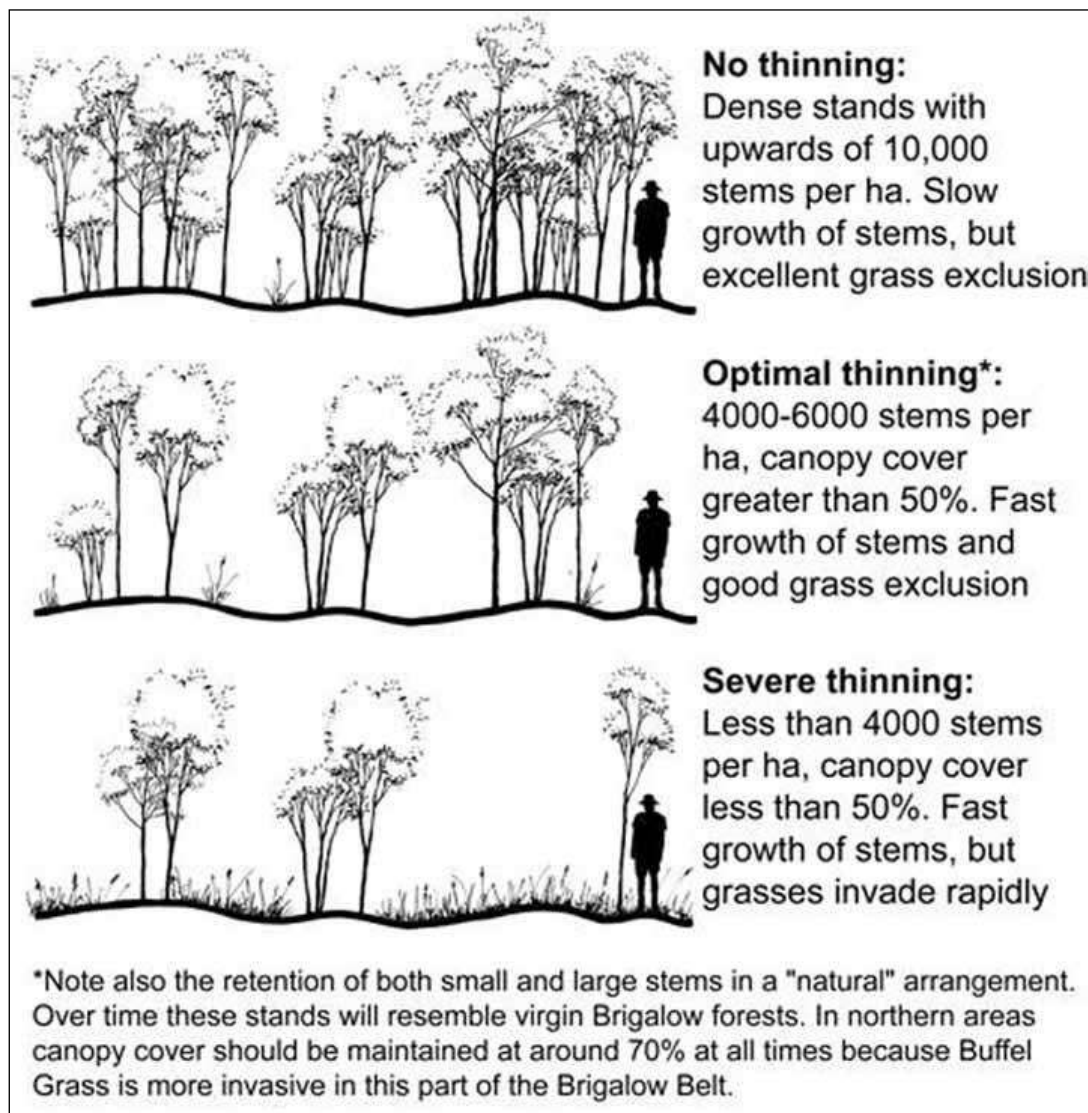
- Select thinning of Brigalow trees via ringbarking.
- Thinning Brigalow regrowth to a density of approximately 6,000 stems/ha (predicted to be the optimal thinning density for structural development [after Dwyer *et al.*, 2010] [Figure 12]).
- Thinning random Brigalow stems to mimic a natural ecosystem.
- Thinning Brigalow regrowth when the soil moisture is high to reduce the risk of prolific secondary suckering.
- Retaining buffers of dense stems (approximately 10 m wide) along boundaries of existing non-remnant areas to help reduce the spread of Buffel Grass, as required (after Dwyer *et al.*, 2010).
- Retaining dead stags in-situ.
- Monitoring (Section 5.6) and controlling secondary suckering via this method.

Grass cover is another aspect that needs to be considered. Less tree canopy provides greater sunlight to the understorey and higher grass growth (Figure 12). High grass cover can increase the risk of grass fires that present a risk to the Brigalow (*Acacia harpophylla* dominant and co-dominant) community. Dwyer *et al.* (2010) indicates that from their studies, the canopy cover should maintain at least 50% cover, but higher cover may be required to manage thick grass growth.

Any Brigalow regrowth restoration thinning will be conducted in accordance with relevant Qld environmental approvals. The following will be documented:

- the area that has been selectively thinned;
- species diversity prior to thinning;
- rate of selectively thinning and the density (stems/ha); and
- method of thinning (i.e. mechanical methods).

Restoration thinning of other vegetation communities is not proposed at this time and will only be considered if it can be demonstrated that there is a need for thinning and relevant Qld environmental approvals are obtained.



Source: University of Queensland (2011).

Figure 12 - Restoration Thinning Guide

6.2 IMPACTS FROM A THIRD PARTY

The offset areas will be fenced, locks will be installed on the gates and signage will be installed along main access roads (Sections 3.8 and 3.9). These provisions will deter third party access into the offset areas.

In the event that a third party impacts the offset areas, MCPL will notify Cth DCCEEW with the following details (where known):

- who has impacted the offset areas;
- the nature and extent of the impact;
- when the impact occurred;
- why the impact occurred; and
- if there is a proposal from the third party to remedy the impact.

The offset areas are overlying ML 1831 and ML 1894 held by Anglo Coal. There is no current proposal to mine (underground or open cut) within the offset area. Any future mining proposals within the offset areas will need to account for the impacts to the offset areas. MCPL will notify Cth DCCEEW of any future mining proposal received from Anglo Coal or other party.

7 TIMING AND RESPONSIBILITIES

A schedule of timing for management activities and monitoring is provided in Sections 3.12 and 5.

If MCPL elect a third party to take on responsibilities for the management measures, MCPL will obtain agreement from the third parties responsible for management measures and provide details of the responsible parties, including their position or status as a separate contractor, to Cth DCCEE.

The MCPL Environmental Manager will be responsible for the monitoring, reviewing and implementation of this Offset Management Plan. The MCPL Environmental Manager will be responsible for the implementation of any revisions of this Offset Management Plan/Vegetation Management Plan in consultation with the Cth DCCEE.

8 REPORTING, AUDIT AND REVIEWING

8.1 DOCUMENTATION

MCPL will comply with Commonwealth Approval Conditions issued under EPBC 2017/8130, including any relating to documentation. Monitoring reports for the Southern Extension Offset Area will contain, at a minimum, the same information as listed in Section 5.1.

8.1.1 Weed Monitoring Report

A weed monitoring report (which may include all MCPL offset area) will be prepared annually by a suitably qualified person and will include:

- a map indicating the location and estimated abundance of noxious and/or environmental weeds recorded during monitoring;
- control methods, effort and timing;
- weeds controlled (species, area); and
- effectiveness of the weed control.

8.1.2 Pest Animal Monitoring Report

A pest animal monitoring report (which may include all MCPL offset area) will be prepared annually by a suitably qualified person and will include:

- the location and abundance of pest animals recorded during monitoring;
- control methods, effort and timing;
- pest animals controlled (species, sex, number); and
- effectiveness of the control methods.

8.2 COMPLIANCE REPORTING

MCPL will comply with Commonwealth Approval Conditions issued under EPBC 2017/8130, including any relating to compliance reporting.

8.3 PUBLISHING OF THIS PLAN

MCPL will publish this Offset Management Plan / Vegetation Management Plan addendum on their website.

8.4 INDEPENDENT AUDIT

MCPL will comply with Commonwealth Approval Conditions issued under EPBC 2017/8130, including any relating to independent audits of compliance.

8.5 REVIEW AND REVISION OF THIS PLAN

Once a VDec is established over the offset areas, any amendments to this Offset Management Plan / Vegetation Management Plan are to be made by agreement between MCPL and the chief executive of DNRM.

MCPL will comply with Commonwealth Approval Conditions issued under EPBC 2017/8130, including any relating to review and revision of this plan.

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APPENDIX A
SOUTHERN EXTENSION PROJECT OFFSET STUDY AREA BASELINE
ASSESSMENT

LEADING THE WAY
IN ENVIRONMENTAL
MANAGEMENT

**MIDDLEMOUNT COAL MINE
SOUTHERN EXTENSION
PROJECT OFFSET STUDY
AREA - BASELINE
ASSESSMENT**
July 2025

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Abbreviations

AU	Assessment Unit
BA	Biodiversity Australia
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DES	Department of Environment and Science (now DETSI)
DETSI	Department of Environment, Tourism, Science and Innovation
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act</i>
MNES	Matter of National Environmental Significance
NC Act	<i>Nature Conservation Act</i>
VMA Act	<i>Vegetation Management Act</i>
RE	Regional Ecosystem
TEC	Threatened Ecological Community



1. Executive Summary

Biodiversity Australia Pty Ltd has been requested by Middlemount Coal Pty Ltd (MCPL) to undertake a baseline survey and assessment of vegetation and habitat of areas which would form offset areas required for the Middlemount Coal Mine Southern Extension Project (The Project). The areas which were surveyed and would form the offset are herein referred to as the Study Area.

MCPL intends to offset unavoidable impacts on the following target Matters of State Environmental Significance (MSES) listed under the Queensland *Nature Conservation Act 1992* (NC Act) and Matters of National Environmental Significance (MNES) listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act):

Listed Threatened Species:

- Greater glider (southern and central) (*Petauroides volans*) listed as Endangered¹ under both the NC Act and EPBC Act;
- Koala (*Phascolarctos cinereus*) listed as Endangered² under both the NC Act and EPBC Act;
- Squatter pigeon (southern) (*Geophaps scripta scripta*) listed as Vulnerable under both the NC Act and EPBC Act; and
- Ornamental snake (*Denisonia maculata*) listed as Vulnerable under both the NC Act and EPBC Act.

Listed Threatened Ecological Communities:

- Brigalow (*Acacia harpophylla* dominant and co-dominant); and
- Poplar Box Grassy Woodland on Alluvial Plains.

One additional listed threatened fauna species was considered to potentially occur within the Southern Extension Project Offset Area based on local species records (identified through a desktop study), namely:

- White-throated needletail (*Hirundapus caudacutus*) listed as Vulnerable under both the NC Act and EPBC Act.

Flora and fauna surveys were undertaken throughout Study Area from the 22nd – 27th of October 2020 and follow up flora surveys were undertaken between 18th – 22nd November 2023. Terrestrial habitat quality assessments in accordance with the *Guide to Determining Terrestrial Habitat Quality Version 1.3* (Department of Environment and Science 2020) were completed at a total of 61 locations spread across the proposed Southern Extension Project Offset Area, with an additional 93 rapid plots also undertaken. Fauna surveys comprised habitat suitability assessments, opportunistic surveys for threatened species, track, scat and secondary evidence searches, as well as spotlighting and call play back and opportunistic fauna observations.

Pre-clearing Regional Ecosystems (REs) were ground-truthed in 2020 and 2023 (Biodiversity Australia 2020a) and identified a total of 15 distinct REs across the Southern Extension Project Offset Area. Three of these REs are listed as Endangered and five are listed as Of Concern under the Queensland *Vegetation Management Act 1999* (VM Act).

¹ The Greater Glider (southern and central) (*Petauroides volans*) was listed as 'Vulnerable' under the EPBC Act and NC Act at the time of the controlled action decision (17/06/2021) and is therefore assessed as 'Vulnerable' and not 'Endangered'.

² The Koala (*Phascolarctos cinereus*) species was listed as 'Vulnerable' under the EPBC Act and NC Act at the time of the controlled action decision (17/06/2021) and is therefore assessed as 'Vulnerable' and not 'Endangered'.



Remnant vegetation communities covered 1,303.76 hectares (ha) (approximately 84%) of the Study Area. The less disturbed remnant areas displayed attributes with similar values to the published benchmarks for those respective REs, however grass and forb diversity was generally lower, potentially due to a drought within the region over the preceding years and / or the current land use practice of cattle grazing.

Non-remnant vegetation communities covered 250.94 ha (approximately 16%) of the Study Area. While non-remnant areas generally contained more weed species, they showed positive signs of natural regeneration with high recruitment of canopy species and diversity of shrub and understory species present.

Target MNES and MSES were successfully identified during field surveys of the Study Area and are summarised in the table below (Table ES 1).

Table ES 1: MNES & MSES Identified within Study Area.

Matter		Field Verified Area (ha)
MNES		
Greater Glider (southern and central) Habitat (Remnant Habitat) ¹		975.1
Koala Habitat ¹	Remnant Habitat	980.27
	Regrowth/Non-remnant Habitat	198.02
Squatter Pigeon (southern) Habitat ¹	Remnant Habitat	1256.50
	Regrowth/Non-remnant Habitat	240.92
Ornamental Snake Habitat ¹	Remnant Habitat	42.03
	Regrowth/Non-remnant Habitat	42.90
Poplar Box TEC (Remnant Vegetation)		166.61
Brigalow TEC (Remnant Vegetation)		42.03
MSES		
Endangered Regional Ecosystem		47.98
Of Concern Regional Ecosystem		229.21
Regional Ecosystems within a defined distance of a watercourse		161.79
Connectivity		250.94



2. Introduction

Middlemount Coal Pty Ltd (MCPL) owns and operates the Middlemount Coal Mine (MCM), an existing open cut coal mine located approximately 3 kilometres (km) to the south-west of the Middlemount Township, Queensland (Qld).

The MCM operates under Environmental Authority (EA) EPML00716913

MCPL is also seeking approval under the Commonwealth *Environmental Protection and Biodiversity Act 1999* (EPBC Act). On 20 May 2021, MCPL lodged a referral for the Southern Extension Project (the Action) with the then Department of Agriculture, Water and the Environment (DAWE) to determine whether the Action needed formal assessment and approval under the EPBC Act. On 17 June 2021, a delegate of the Commonwealth Minister declared the Action to be a controlled action due to, among other things, the likelihood of impacts on listed threatened species and communities which constitute Matters of National Environmental Significance (MNES). The following threatened species and communities are the target for this report:

- Greater Glider (southern and central) (*Petauroides volans*) listed as Endangered³ under both the Queensland *Nature Conservation Act 1992* (NC Act) and EPBC Act;
- Koala (*Phascolarctos cinereus*) listed as Endangered⁴ under both the NC Act and EPBC Act;
- Squatter pigeon (southern) (*Geophaps scripta scripta*) listed as Vulnerable under both the NC Act and EPBC Act;
- Ornamental Snake (*Denisonia maculata*) listed as Vulnerable under both the NC Act and EPBC Act;
- Brigalow (*Acacia harpophylla* dominant and co-dominant); and
- Poplar Box Grassy Woodland on Alluvial Plains.

Biodiversity Australia Pty Ltd was commissioned by MCPL to validate vegetation mapping and undertake terrestrial habitat quality assessments within the Study Area of the proposed offset area to be established for the Middlemount Coal Mine Southern Extension Project.

The Study Area is split into a number of areas which are located adjacent to existing offset areas to the west of the MCM (Figure 1), and to the east of the MCM on freehold land owned by MCPL, identified as:

- Lot 2 on SP248577
- Lot 3 on SP282156

A portion of Lot 2 on SP248577 has previously been dedicated to environmental offsets as part of previous extensions to the MCM.

This report presents the results of field surveys undertaken from the 22nd – 27th of October 2020 and 18th – 22nd November 2023, which assessed the vegetation and habitat values within the Study Area and provides detailed information of potential offset values.

³ The Greater Glider (southern and central) (*Petauroides volans*) was listed as 'Vulnerable' under the EPBC Act and NC Act at the time of the controlled action decision (17/06/2021) and is therefore assessed as 'Vulnerable' and not 'Endangered'.

⁴ The Koala (*Phascolarctos cinereus*) species was listed as 'Vulnerable' under the EPBC Act and NC Act at the time of the controlled action decision (17/06/2021) and is therefore assessed as 'Vulnerable' and not 'Endangered'.



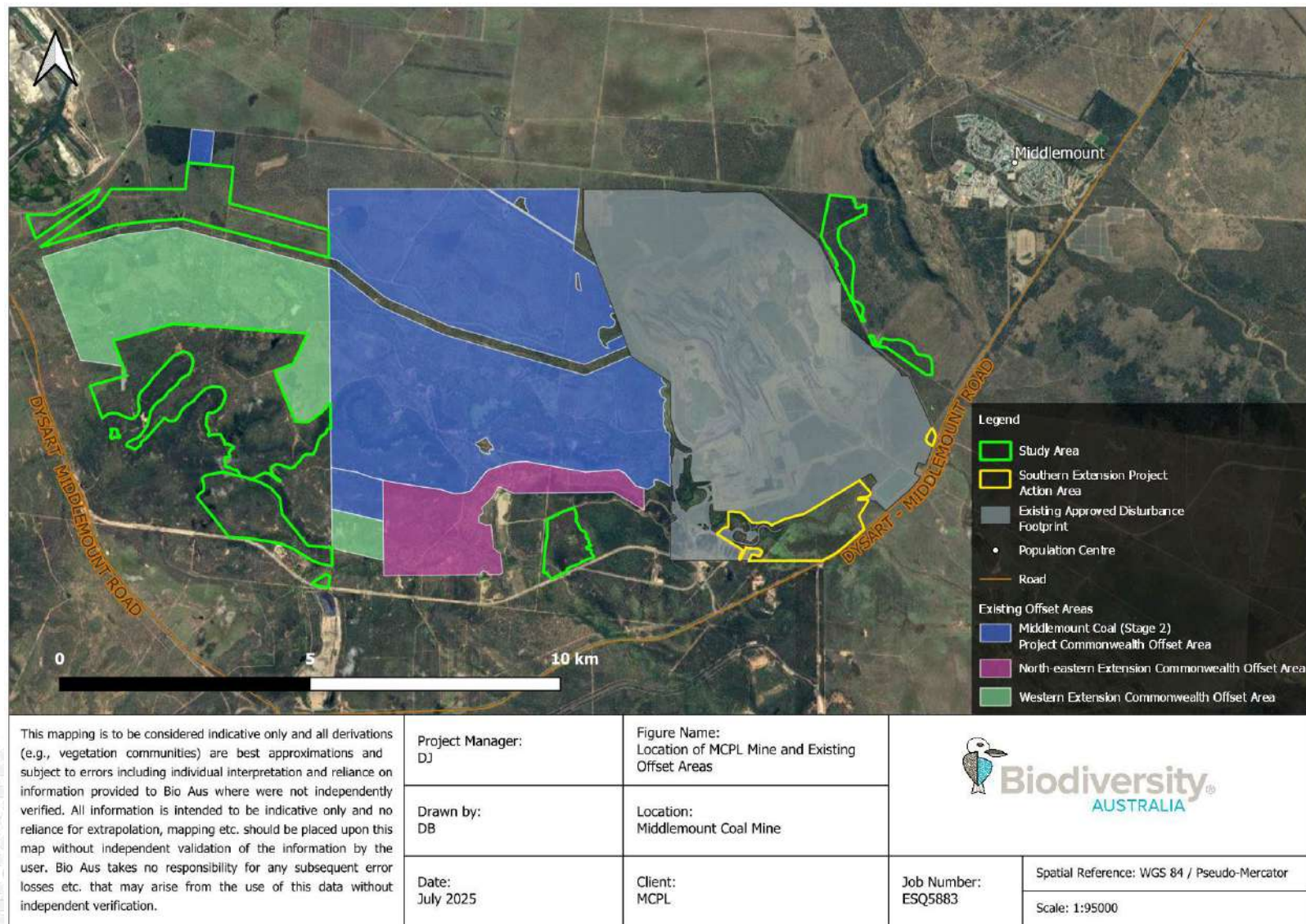


Figure 1: Location of the MCPL Mine, proposed offset areas and existing offset areas



3. Suitably Qualified and Experienced Persons

The field surveys, reporting and assessments were undertaken by Suitably Qualified and Experienced Persons comprising:

- Senior Review by Daniel Joyce (Principal Ecologist) and Natalie May (Senior Ecologist).
- Reporting by Dominic Barbagallo (Ecologist) and Daniel Joyce (Principal Ecologist).
- Data Analysis / Scoring by Dominic Barbagallo (Ecologist) and Daniel Joyce (Principal Ecologist).
- Field Surveys by Daniel Joyce (Principal Ecologist) and Dominic Barbagallo (Ecologist)

Curricula vitae for the team are presented in Appendix A-7.

4. Background Information

4.1 Location of the Potential Offset Area

The Study Area is located approximately 5 kilometres (km) west of Middlemount township, a small portion of the Study Area is located immediately to the east of the existing MCM, with most of the Study Area located immediately to the west and south of the existing offset areas for the MCM (Figure 1). The area falls within the Brigalow Belt Bioregion.

The Study Area is located on freehold land owned by MCPL and totals approximately 1551.16 hectares. The offset area includes a combination of remnant and regrowth woodland areas and cleared grazing land/non-remnant vegetation, tracks and fence lines.

5. Existing Environment

5.1 Soils, Topography and Geology

The Survey Area is generally comprised of gently undulating lowlands with slopes ranging from <5 to 30 degrees. The Survey Area also contains areas of ironstone jump ups, plateaus and escarpments. The surface geology of the comprises several formation including alluvium associated with non-perennial watercourses of Parrot and Roper Creek (clay, silt, sand and gravel), sedimentary rocks and felsites (lavas, clastics and high levels intrusives). The dominant underlying geology is Duaringa Formation which comprises sedimentary rocks including mudstone, siltstone and conglomerate.

Soil types within the vary widely depending on the topographic location and underlying geology. The most prevalent soil types within the Study Area are comprised of silty to sandy loams and clays.

A total of four land zones are mapped over the comprising:

- Land Zone 3: Recent Quaternary alluvial systems.
- Land Zone 4: Tertiary-early Quaternary clay plains.
- Land Zone 5: Tertiary-early Quaternary loamy and sandy plains and plateaus.
- Land zone 7: Ironstone Jump-ups – Cainozoic Duricrusts

5.2 Drainage Features

The study site is located in the Fitzroy River Basin which drains an area of approximately 150 000 km²(DNRM, 2015). Minor ephemeral drainage features pass through the Study Area include first and second order tributaries from Roper Creek and Parrot Creek.

These drainage features are predominately ephemeral (i.e., flow is restricted to periods after rainfall) and were not flowing during the field surveys. However, rainfall events prior to field surveys resulted in several waterholes within the drainage features. The northern portion of the Study Area contains a large farm dam that commonly holds water.

The Western Extension Offset Area contains a large dam in the west and several smaller dams that would provide a permanent water source for native fauna and habitat for a range of bird species.

5.3 Pre-clearing Regional Ecosystems

Vegetation mapping as detailed in DETSI Regional Ecosystem Mapping (QGLOBE, 2025) indicates 20 REs within the Study Area (Figure 2). These include:

- 11.3.1 - *Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains
- 11.3.2 - *Eucalyptus populnea* woodland on alluvial plains
- 11.3.3 - *Eucalyptus coolabah* woodland on alluvial plains
- 11.3.4 - *Eucalyptus tereticornis* and/or *Eucalyptus spp.* woodland on alluvial plains
- 11.3.7 - *Corymbia spp.* open woodland on alluvial plains
- 11.3.21 - *Dichanthium sericeum* and/or *Astrebla spp.* grassland on alluvial plains. Cracking clay soils
- 11.3.25 - *Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines
- 11.4.2 - *Eucalyptus spp.* and/or *Corymbia spp.* grassy or shrubby woodland on Cainozoic clay plains

- 11.4.8 - *Eucalyptus cambageana* woodland to open forest with *Acacia harpophylla* or *A. argyrodendron* on Cainozoic clay plains
- 11.4.9 - *Acacia harpophylla* shrubby woodland with *Terminalia oblongata* on Cainozoic clay plains
- 11.5.2 - *Eucalyptus crebra*, *Corymbia* spp., with *E. moluccana* woodland on lower slopes of Cainozoic sand plains and/or remnant surfaces
- 11.5.2a - *Allocasuarina luehmannii* low tree layer with or without emergent woodland.
- 11.5.3 - *Eucalyptus populnea* +/- *E. melanophloia* +/- *Corymbia clarksoniana* woodland on Cainozoic sand plains and/or remnant surfaces
- 11.5.9b - *Eucalyptus crebra*, *E. tenuipes*, *Lysicarpus angustifolius* +/- *Corymbia* spp. woodland.
- 11.5.18 - *Micromyrtus capricornia* open shrubland on Cainozoic sand plains and/or remnant surfaces
- 11.7.1 - *Acacia harpophylla* and/or *Casuarina cristata* and *Eucalyptus thozetiana* or *E. microcarpa* woodland on lower scarp slopes on Cainozoic lateritic duricrust
- 11.7.2 - *Acacia* spp. woodland on Cainozoic lateritic duricrust. Scarp retreat zone
- 11.7.4 - *Eucalyptus decorticans* and/or *Eucalyptus* spp., *Corymbia* spp., *Acacia* spp., *Lysicarpus angustifolius* woodland on Cainozoic lateritic duricrust
- 11.10.7 - *Eucalyptus crebra* woodland on coarse-grained sedimentary rocks
- 11.10.12 - *Eucalyptus populnea* woodland on medium to coarse-grained sedimentary rocks

Pre-clearing RE mapping assisted with identifying former/potential REs occurring within areas of non-remnant vegetation throughout the Study Area. Pre-clearing mapping indicated that the REs listed above also formerly occurred within areas of non-remnant vegetation.

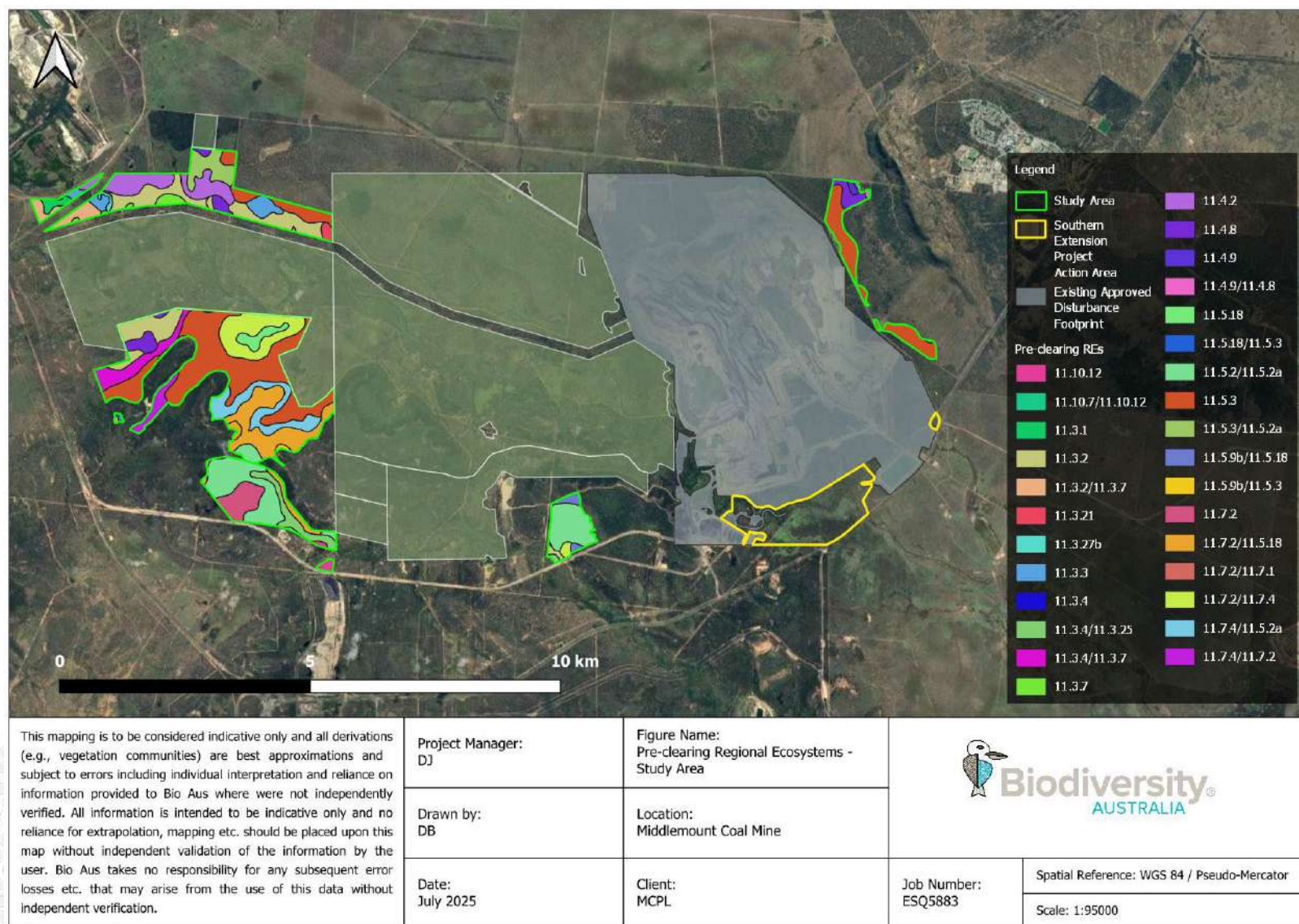


Figure 2: Pre-clearing Regional Ecosystems (QGLOBE)



5.4 Verified Regional Ecosystems

Field based vegetation surveys conducted within the Study Area confirmed and refined the RE mapping for the area. Data collected whilst conducting BioCondition plots, and rapid vegetation assessments was utilised to verify the REs within the Study Area in line with the methodology described in successive versions of Neldner *et al.* 'Methodology for surveying and mapping regional ecosystems and vegetation communities in Queensland' (2012, 2019, 2021). The methods for these vegetation investigations and the results are further discussed in Section 6.2.1 and Section 7.1.2 respectively.

5.5 Land Use and Disturbance History

The Study Area does not contain any developed areas such as dwellings or farm infrastructure, however, access tracks and fence lines occur throughout and there are five (5) small dams across the Study Area. The primary current land use is beef cattle grazing. The entire area is fenced for use, however, observations during survey indicated that cattle congregate along ephemeral waterways associated with Parrot and Roper Creek, and graze within other cleared areas. No other agricultural activities are conducted on site.

Historically the main disturbance activities within the locality were related to land clearing associated with cattle grazing, which has occurred extensively in low-lying areas including creek flats and clay pans. Grazing and trampling by cattle has suppressed regeneration over some cleared areas, however natural regeneration is occurring extensively throughout the Study Area.

No recent fires are known to have occurred on the Study Area and no charcoal was observed on any tree trunks during the field assessment.

5.6 Summary of Previous Threatened Species Recorded

A number of flora and fauna surveys have been undertaken in areas surrounding the Study Area (Parsons Brinckerhoff, 2010; Ecology and Heritage Partners [EHP], 2012; 2013a, 2013b, 2013c; Naturecall, 2013, 2014a, 2014b, 2014c, 2015, 2016, 2017a, 2017b, 2017c; Biodiversity Australia 2018, 2019, 2020; GHD, 2012). These surveys have resulted in the detection of a number of flora and fauna species listed under the NC Act and/or EPBC Act, which include:

- *Cerbera dumicola* which is listed as 'Near Threatened' under the NC Act (Parsons Brinckerhoff, 2010; EHP, 2012; Naturecall, 2013, 2016,
- Koala (*Phascolarctos cinereus*), which is listed as 'Endangered' under the NC Act and EPBC Act (Parsons Brinckerhoff, 2010; Naturecall, 2014b, 2016, 2017a; EHP, 2012)
- Greater glider (southern and central) (*Petauroides volans*), which is listed as 'Endangered' under the NC Act and EPBC Act (Naturecall, 2014b, 2017a, 2017b)
- Squatter pigeon (southern) (*Geophaps scripta scripta*), which is listed as 'Vulnerable' under the NC Act and EPBC Act (Parsons Brinckerhoff, 2010; EHP, 2012; Naturecall, 2013, 2014a, 2014c, 2017a)
- Ornamental snake (*Denisonia maculata*), which is listed as 'Vulnerable' under the NC Act and EPBC Act (Parsons Brinckerhoff, 2010).



6. Methodology

The ecological assessment comprised two components, a desktop analysis, and the field survey. These are described in detail below.

6.1 Desktop Assessment and Literature Review

A desktop study was completed to gather relevant information and data prior to field surveys. The following databases and Geographic Information System (GIS) layers were searched/obtained:

- Department of Climate Change, Energy, the Environment and Water (DCCEEW) Protected Matters Search Tool (DCCEEW 2025).
- Department of Environment, Tourism Science and Innovation (DETSI) Wildlife Online database (DETSI, 2025a).
- DETSI Regional Ecosystems Mapping digital data layer (DETSI, 2025b).
- DETSI Pre-clearing Regional Ecosystems digital data layer (DETSI, 2025b).

In addition to the above, the following literature was also reviewed:

- Biodiversity Australia (2020a). *Southern Extension Offset Investigations*. Unpublished report to Middlemount Coal Pty Ltd.
- Biodiversity Australia (2020b). *Middlemount Coal Southern Extension Terrestrial Ecology*. Unpublished report to Middlemount Coal Pty Ltd.
- Ecology and Heritage Partners (2012). *Ecological Investigations within the Offset Area for Stage 2 of the Middlemount Coal Mine, Queensland*. Queensland, Australia. Middlemount Coal Pty Ltd.
- Ecology and Heritage Partners (2013a). *Vegetation Offsets for Middlemount Rail Spur and Loop*.
- Ecology and Heritage Partners (2013b). *Vegetation Offsets for Parrot Quarry*.
- Ecology and Heritage Partners (2013c). *Vegetation Offsets for Middlemount Coal Mine Thirteen Mile Gully Diversion*.
- MCPL (2013a). *Middlemount Coal Mine Rail Loop and Spur Vegetation Offset Proposal*.
- MCPL (2013b). *Parrot Quarry Vegetation Offset Proposal*.
- MCPL (2013c). *Thirteen Mile Gully Diversion Vegetation Offset Proposal*.
- MCPL (2013d). *Middlemount Coal Mine Offset Management Plan/Vegetation Management Plan*. Queensland, Australia. Middlemount Coal Pty Ltd.
- Naturecall (2013). *Ecological Monitoring for Offset Area*. Unpublished report to Middlemount Coal Pty Ltd.
- Naturecall (2014a). *Ecological Assessment Report for Bingegang Pipeline Relocation, Middlemount Coal Mine*.
- Naturecall (2014b). *Ecological Monitoring for Offset Area: Use of the Offset Area by Fauna*. Unpublished report to Middlemount Coal Pty Ltd.
- Naturecall (2014c). *Ecological Monitoring for Offset Area Year 2*. Unpublished report to Middlemount Coal Pty Ltd.
- Naturecall (2015). *Terrestrial Ecology Impact Assessment: Western Extension, Middlemount Coal Mine*. Unpublished report to Middlemount Coal Pty Ltd.
- Naturecall (2016). *Vegetation Validation and Terrestrial Habitat Assessment, Middlemount Coal Mine*. Unpublished report to Middlemount Coal Pty Ltd.



- Naturecall (2017a). *Ecological Impact Assessment: Western Extension*, Middlemount Coal Mine.
- Naturecall (2017b). *Ecological Monitoring for Offset Area Year 4*. Unpublished report to Middlemount Coal Pty Ltd.
- Naturecall (2017c). *North-eastern Extension Offset Area - Offset Baseline Report*, Middlemount Coal Mine. Unpublished report to Middlemount Coal Pty Ltd.
- Parsons Brinckerhoff (2010). *Middlemount Coal Project (Stage 2) Terrestrial Ecological Impact Assessment*.

Existing Regional Ecosystem mapping, and previous mapping on adjoining land (Parsons Brinckerhoff, 2010; Ecology and Heritage Partners, 2012, Naturecall 2016, Biodiversity Australia, 2020a) was obtained and used in conjunction with satellite imagery to identify the broad vegetation types present within the Study Area. This preliminary mapping assisted with survey design and allowed comparison to the floristic data collected during the field surveys.



6.2 Field Surveys

Field surveys were undertaken across the Study Area by Biodiversity Australia's suitably qualified and experienced ecologists to achieve the Study Objectives (Section 2). Field work was undertaken across two periods within the Study Area, the first survey period was between the 22nd - 27th of October 2020 and the second survey period was between 13th – 18th of November 2023. These surveys assessed two separate areas referred to in this report as:

- 2020 Survey Area
- 2023 Survey Area

A detailed summary of the survey methods utilised within the Study Area is provided in the following sub sections.

6.2.1 Regional Ecosystem and Non-remnant Vegetation and Verification

Both field surveys were undertaken in accordance with Neldner *et al.* (2012, 2019, 2022) for RE mapping and in accordance with BioCondition- *A Condition Assessment Framework for Terrestrial Biodiversity in Queensland Assessment Manual* (Eyre *et al.* 2015) (BioCondition Manual).

A total of 61 quaternary survey sites and 93 rapid assessment sites were completed across the Study Area. This allowed accurate mapping of REs, and validation of vegetation status (i.e., remnant/non-remnant) as well as accurate assessment of the BioCondition values of the identified Vegetation Units based on the RE classifications.

The following information was recorded at each quaternary survey site in accordance with Eyre *et al.* 2015:

- | | |
|---|--|
| • Date. | • Large trees (count). |
| • Structural Code. | • Recruitment of canopy species. |
| • Ecologically Dominant Layer (EDL) Height. | • Tree canopy cover (%). |
| • EDL Cover. | • Shrub layer cover (%). |
| • Land Zone. | • Coarse woody debris. |
| • Regional Ecosystem Map Unit. | • Native plant species richness for four lifeforms. |
| • Collector/s. | • Non-native plant cover Native perennial grass cover (%). |
| • X/Y Coordinate. | • Leaf litter cover. |
| • Remnant Vegetation Cover. | |

The location of survey sites is shown in Figure 3. In addition to undertaking BioCondition transects, Rapid BioCondition assessments were undertaken within each AU to confirm homogenous vegetation represented by the BioCondition plots. Detailed sampling methodologies are outlined below.



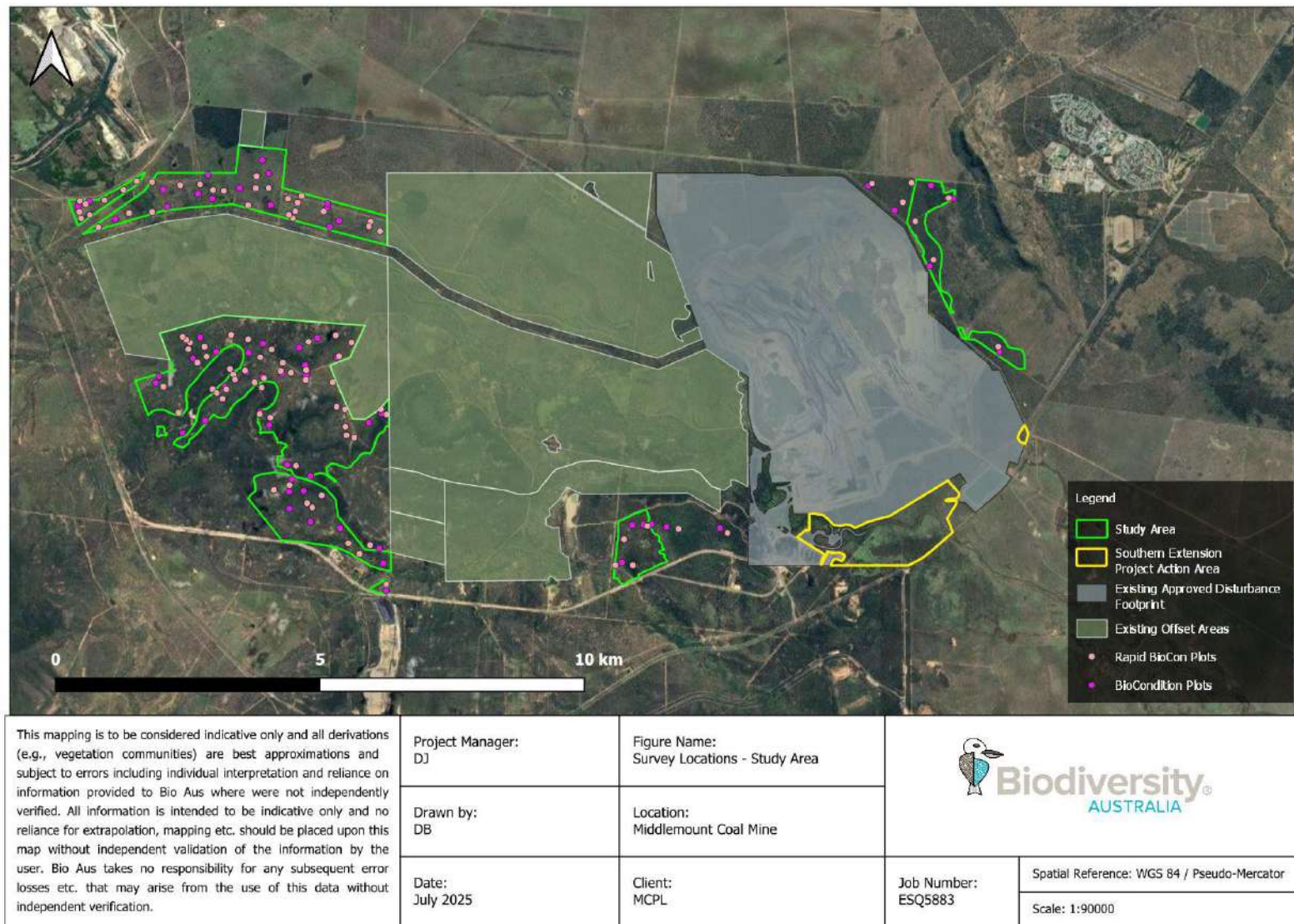


Figure 3: Location of BioCondition Plots (including full and rapid plots)



6.2.2 Threatened Fauna Surveys

Opportunistic fauna surveys were carried out during the field surveys which comprised the following:

- Habitat suitability assessment;
- Diurnal bird survey;
- Track, scat, secondary evidence and physical habitat searches;
- Spotlighting transects; and
- Opportunistic fauna observations.

Further details are provided in the following sections.

6.2.3 Habitat Suitability Assessment

The condition and features of the various habitat types within the Study Area were recorded during the field surveys (e.g., hollows, fallen logs, foraging resources, and leaf litter). Any permanent and seasonal water sources were also recorded and photographed.

Detailed data on habitat features such as groundcover density and composition, vegetation structure, coarse woody debris and weed cover were also collected as part of the site condition assessment.

6.2.4 Diurnal Bird Surveys

Diurnal bird surveys undertaken at a different location each morning of the survey period and consisted of specific censuses of at least 30 minutes duration. Bird species were generally surveyed by detecting calls and searching with binoculars at specific points or along a walking transect. The surveys targeted permanent water sources, roads/tracks and other areas of suitable habitat for the Squatter Pigeon (southern).

6.2.5 Track, Scat, Secondary Evidence and Physical Habitat Searches

Searches for scats and tracks were undertaken opportunistically throughout the Study Area in conjunction with other surveys and when traversing between vegetation survey sites.

The sandy roads and dry creek beds within and around the Study Area provided ideal locations for track searches, and any tracks found were photographed and identified using Triggs (1996) as a reference text.

Physical habitat searches of the site involved:

- Lifting of debris to search for reptiles and frogs;
- Inspection of dense vegetation for bird nests;
- Observation of likely basking sites for reptiles and frogs; and
- Searching for scats, tracks, digging and scratches across the study site as they could indicate the presence of numerous native species (e.g. Koala).

6.2.6 Spotlighting Transects

Spotlighting was undertaken throughout the Study Area over three nights during the October survey period 22nd – 27th of October 2020 for a total of nine hours. This involved:



- Driving transects from a vehicle - moving at walking pace along roads and tracks using two hand held light emitting diode (LED) spotlights and a thermal imagery camera.
- Walking transects – predominantly along creek lines and adjacent to existing tracks targeting the greater glider and ornamental snake.

All habitat components (i.e. understorey/canopy trees, dense vegetation, logs), were searched for terrestrial and arboreal fauna.



6.3 Habitat Quality Assessment

Habitat Quality Assessments were conducted by Biodiversity Australia throughout the Study Area in accordance with Eyre *et al.* 2015 and in line with the *Guide to Determining Terrestrial Habitat Quality Version 1.3* (DES 2020). The following sub-sections describe the procedures involved in the surveys.

6.3.1 Defining Assessment Units

Assessment units for the site condition assessments were defined according to the ground-truthed Regional Ecosystems, and the requirements set out in the *Guide to Determining Terrestrial Habitat Quality Version 1.3* (DES 2020a).

Based on the desktop assessment of the Study Area (Section 6.1) and minimum effort requirements described in Eyre *et al.* 2015, a minimum of 61 plots/transects were suggested as shown in Table 1 and Table 2 below.

A total of 54 full BioCondition plots and 64 Rapid BioCondition Assessments were undertaken. Site selection was targeted to sample a representative coverage of the site vegetation within the Study Area. Figure 3 shows the location of select survey sites.

The Study Area was assessed over two survey periods in 2020 and 2023, the boundaries of the areas surveyed within the proposed Study Area is presented in Figure 4. Separate AUs were devised for each survey period. Throughout this report reference will be made to the 2020 Survey Area and the 2023 Survey Area to delineate between the AUs associated with each survey.

It is noted that not all Regional Ecosystems field verified within the Study Area were assigned an Assessment Unit. The following REs were not assigned an AU; 11.3.7, 11.3.21, 11.3.27d. Furthermore, due to the lack of an established benchmark for RE11.5.2b, REs 11.5.2 and 11.5.2a were assessed in the same AU according to the same benchmark, REs 11.3.4 and 11.3.4a were similarly assessed in their own AU according to the same benchmark.

The AUs for the 2023 Survey Area are presented in Table 1, with the AUs for the 2020 Survey Area presented in Table 2.

Table 1: Summary of Assessment Units – 2023 Survey Area

Assessment Unit Name	Regional Ecosystem	Area (ha)	Suggested no. of sampling sites	Full BioCondition Plots	Rapid BioCondition Assessments
AU1	11.5.3	314.15	4	5	15
AU2	11.4.8	18.62	2	2	1
AU3	11.5.3	33.61	2	2	2
AU4	11.7.2	194.95	4	2	2
AU5	11.5.8	5.13	2	1	1
AU6	11.5.9	29.02	2	2	2
AU7	11.5.2	73.11	3	4	3
AU8	11.7.4	51.93	3	3	4
AU9	11.3.2	29.39	2	1	2



Table 2: Summary of Assessment Units – 2020 Survey Area

Assessment Unit Name	Regional Ecosystem	Area (ha)	Suggested no. of sampling sites	Full BioCondition Plots	Rapid BioCondition Assessments
AU1	11.3.2	137.22	4	4	3
AU2	11.3.4	36.07	2	2	1
AU3	11.3.25	66.18	3	2	4
AU4	11.4.2	26.53	2	1	3
AU5	11.4.9	21.20	2	2	2
AU6	11.5.2a	32.61	2	1	1
AU7	11.5.3	77.68	3	4	3
AU8	11.5.9	42.40	2	1	1
AU9	11.7.2	41.46	2	3	1
AU10	11.7.4	25.24	2	1	1
AU11 (Non-Rem)	11.3.1	10.45	2	1	2
AU12 (Non-Rem)	11.3.2	71.88	3	4	4
AU13 (Non-Rem)	11.4.9	32.45	2	1	2
AU14 (Non-Rem)	11.5.3	126.14	4	4	3
AU15	11.3.1	2.21	2	1	1

6.3.2 Site Condition Assessment

The following information was recorded at each of the terrestrial habitat quality assessment sites using a combination of measured plots and transects:

- Observer, location and date
- Regional Ecosystem (i.e. AU)
- Photographic record of vegetation
- Habitat description (e.g. presence of habitat resources for native fauna)
- Canopy and subcanopy height (measured using stick method)
- Canopy and subcanopy percentage cover
- Native plant species richness (as a percentage) in each layer
- Number of large trees located within a 100m x 50m plot
- Recruitment of woody perennial species (i.e. proportion of dominant layer regenerating)
- Coarse woody debris within a 50m x 20m plot
- Non-native plant cover percentage
- Groundcover composition

The values for each habitat quality attribute were recorded in the field on BioCondition data sheets (Eyre *et al.*, 2015) and later input into the Habitat Quality Scoring Template, Version 1.3 (DES, 2020).



For AUs which had multiple sampling sites, the values for each attribute were totalled and then averaged to have one value for each attribute. This approach was confirmed with DES.

For each AU the values recorded at each sampling sites were then compared against the relevant RE benchmark data (for each attribute) to give an overall score for each attribute. Summing these scores determined the overall score for Site Condition for each Assessment Unit. This was all calculated utilising the Habitat Quality Scoring Template (DES, 2020).

6.3.3 Site Context Assessment

Site context attributes were measured via the desktop assessment (Section 6.1), GIS mapping and spatial analysis as per the methods provided by DES (2020). QGIS was used for all GIS mapping and spatial analysis.

Site context attribute data was then inputted into the Habitat Quality Scoring Template (DES, 2020), which automatically compares the site context attributes to the Site Context Scoring sheet to determine the overall site context score for each AU.

It is important to note that the “Distance to permanent watering point” was not calculated as this attribute is measured for intact Bioregions only and the Brigalow Belt Bioregion is considered fragmented.

6.3.4 Fauna Species Habitat Assessment

A desktop review was completed prior to the field surveys to gather relevant information and data on the MNES species squatter pigeon, greater glider, koala and ornamental snake (Section 6.1).

Opportunistic surveys and habitat suitability assessment for these species were undertaken within the Survey Area (Section 6.2.2) during field surveys. Using the information gathered and expert knowledge of the site and area, the Species Habitat Index scores were determined using the Species Habitat Index Scoring Guide provided by DES (2020).

6.3.5 Final Habitat Quality Score

The final Habitat Quality Score was automatically calculated within the Habitat Quality Scoring Template provided by DETSI. Each of the above three indicators (Sections 6.3.2, 6.3.3 and 6.3.4) are scored then summed and translated to a final score out of 10, where a score of 10 represents a fully intact ecosystem and 1 represents a totally cleared area (Eyre *et al.* 2015).



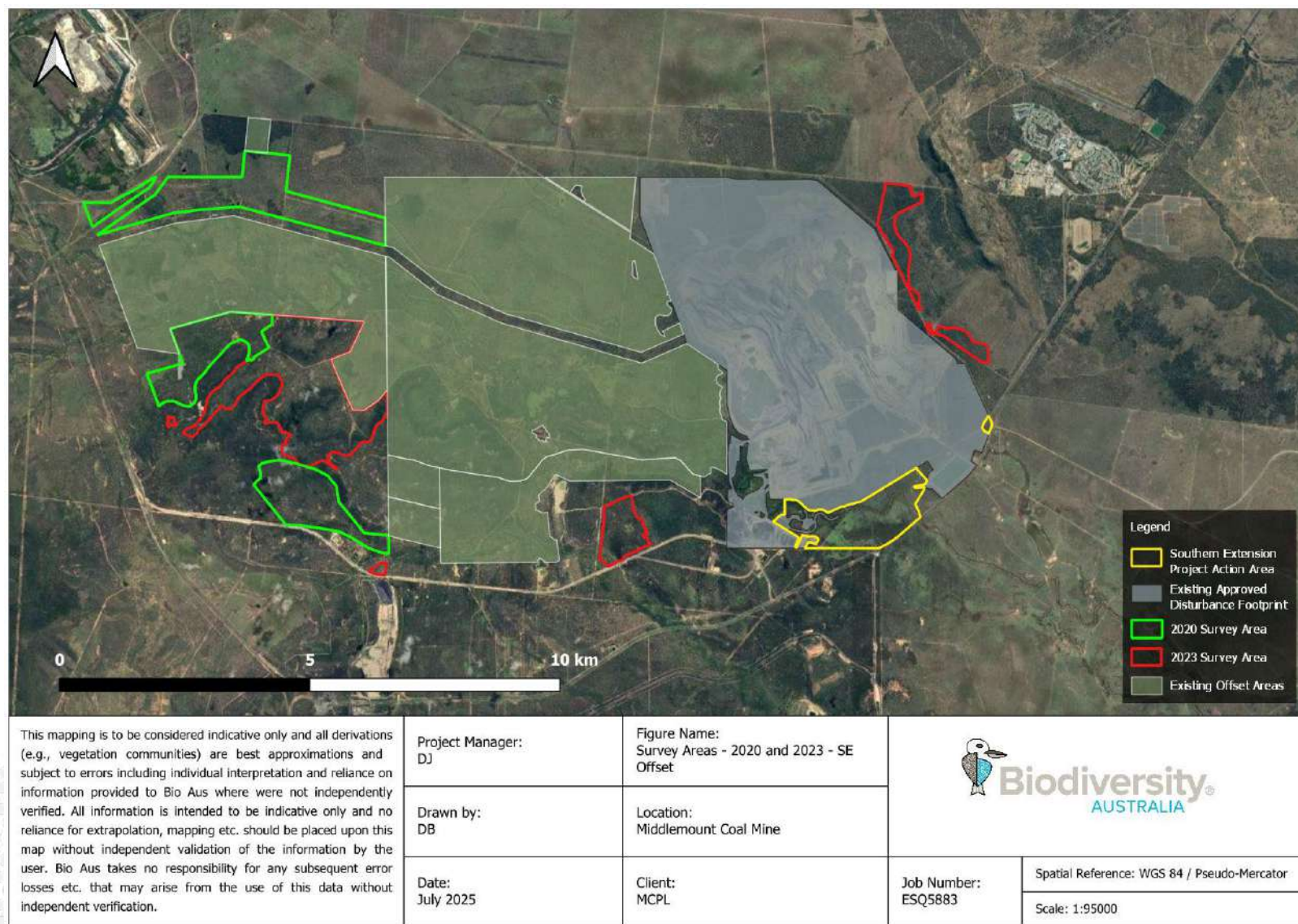


Figure 4 Location of areas surveyed in 2020 and 2023 within the Study Area



7. Results

7.1 Vegetation Survey Results

7.1.1 Floristics

The Study Area was found to have similar native plant richness to the Benchmark REs in remnant areas. Species richness was lower for forbs and grasses; however, this is likely to be due to minimal rainfall in the months prior to field surveys and the region being in drought for a significant period (since 2015 leading up to surveys in 2020 and 2023). Additionally, weeds and naturalised pasture species such as buffel grass (*Cenchrus ciliaris*) were present over large areas. The comprehensive flora list for the Study Area is presented in Appendix A-1.

A total of 91 flora species were recorded during field surveys, including 15 introduced species. The highest diversity was found at less disturbed sites where an intact ground layer was present and there was less evidence of disturbance from cattle grazing.

7.1.2 Regional Ecosystems

The RE validation process identified a total of fifteen distinct REs and 3 sub-ecosystems across the proposed Study Area. Approximately 84% of the Study Area (approximately 1,303.76 ha) qualified as remnant vegetation, with the remaining 16% (250.94 ha) determined to be non-remnant. RE mapping results are detailed in the following sub-sections and within, Table 3, Figure 5 and Figure 6.

7.1.3 Pre-clearing Regional Ecosystems in Non-remnant Areas

The pre-clearing RE validation process refined the pre-clearing RE mapping (Figure 2) for non-remnant areas. This identified that 7 REs are likely to have occurred within the 250.94 ha non-remnant portion of the proposed Study Area. The 2020 and 2023 field surveys (Section 6.2) verified and confirmed these results. Table 3 presents the results of the non-remnant REs surveyed.



Table 3: Verified Regional Ecosystems within the Study Area

Regional Ecosystem	Remnant area (ha)	Non-remnant area (ha)	VM Act Status
11.3.1	2.21	10.45	E
11.3.2	166.61	71.88	OC
11.3.21	5.95	-	OC
11.3.25	66.18	-	LC
11.3.27d	30.63	10.02	LC
11.3.4	35.84	-	OC
11.3.4a	0.23	-	OC
11.3.7	8.47	-	LC
11.4.2	26.53	-	OC
11.4.8	18.62	-	E
11.4.9	21.20	32.45	E
11.5.2	73.15	-	LC
11.5.2a	32.57	-	LC
11.5.3	425.44	126.14	LC
11.5.8b	5.13	-	LC
11.5.9	71.42	-	LC
11.7.2	236.41	-	LC
11.7.4	77.17	-	LC



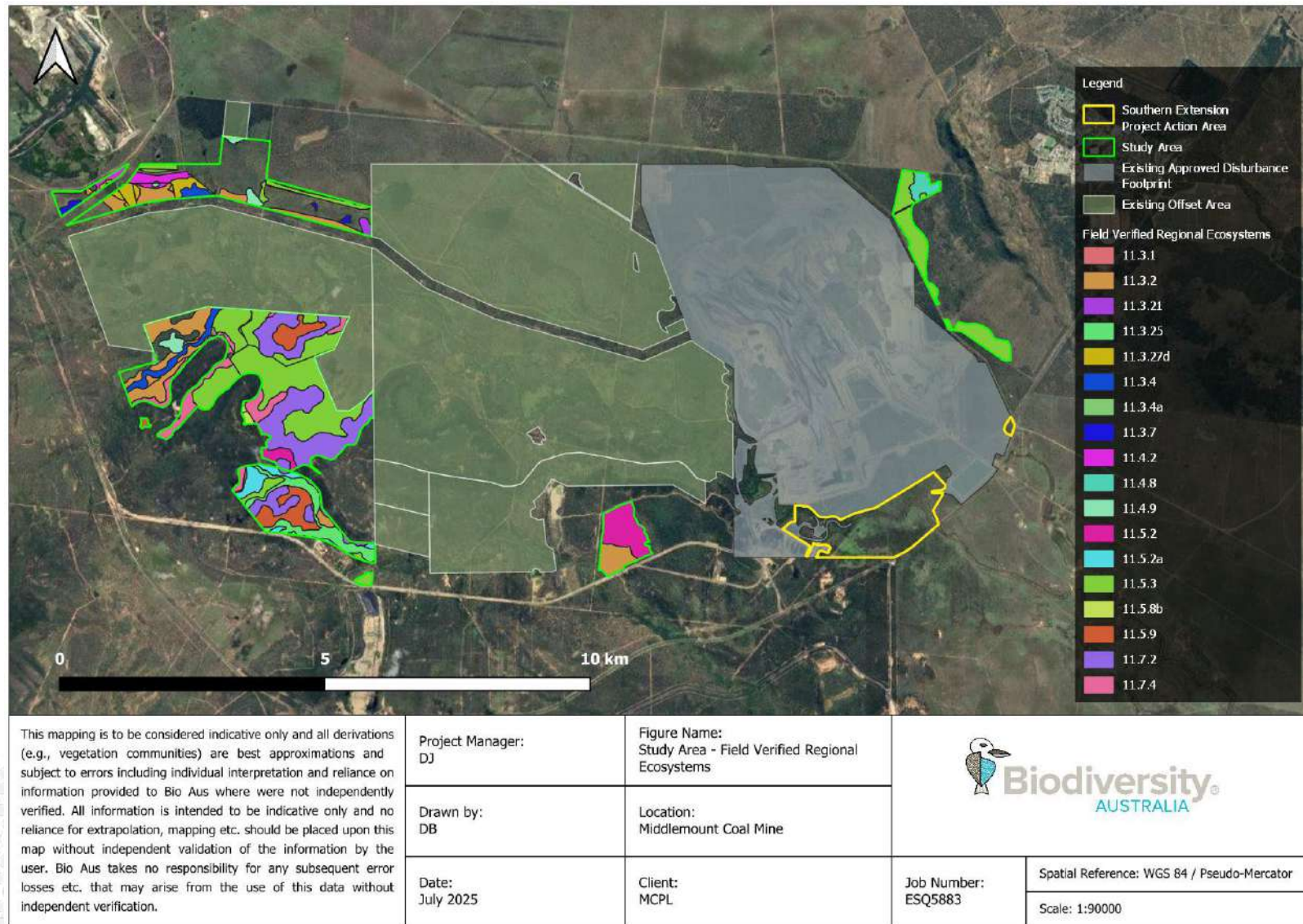


Figure 5 Field Verified Regional Ecosystems



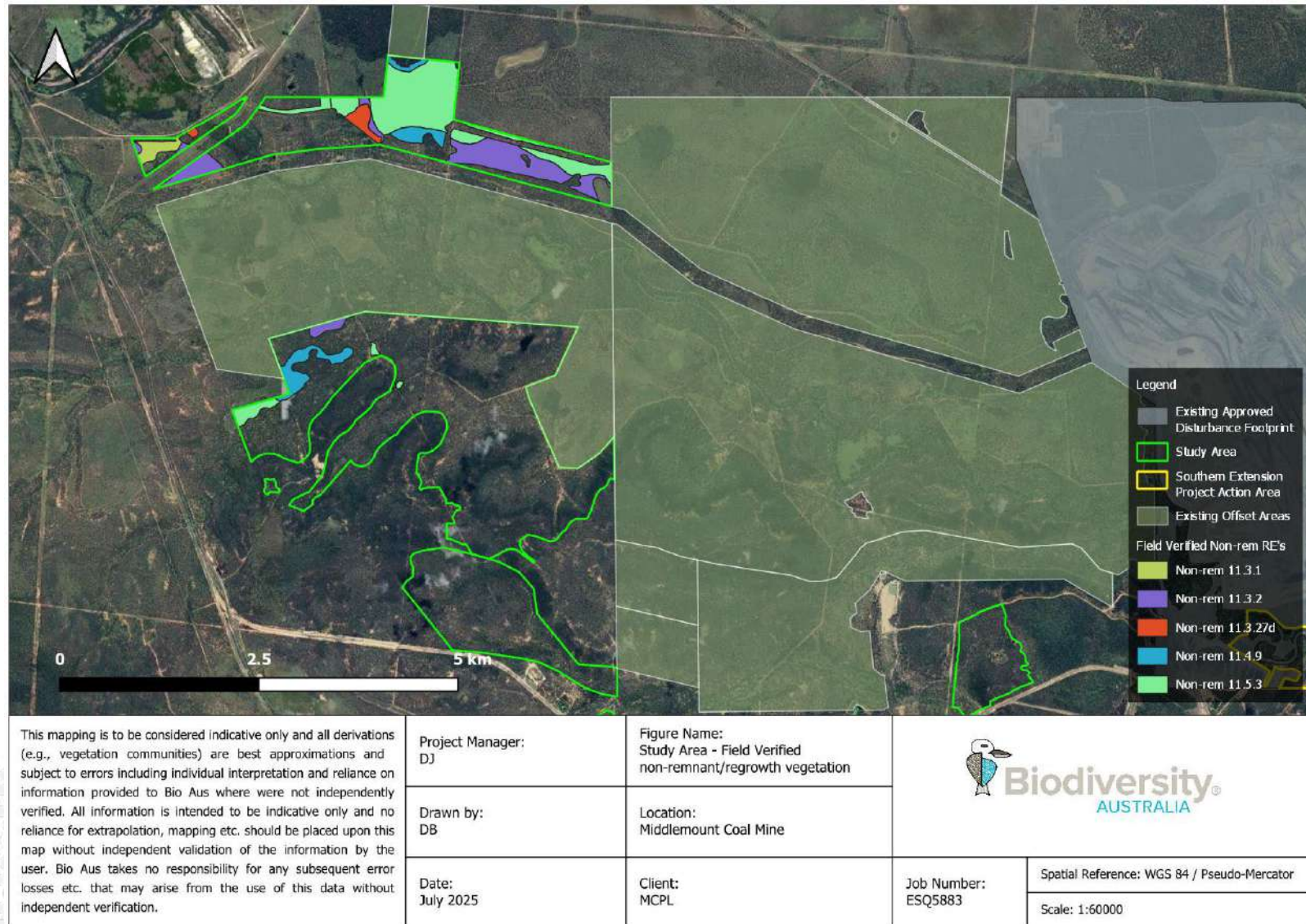


Figure 6 Field Verified Non-remnant Regional Ecosystems



7.1.4 Listed Threatened Ecological Communities and Threatened Regional Ecosystems

Three Endangered Threatened Ecological Communities (TECs) were identified and ground-truthed within the proposed Study Area, *Natural Grasslands of the Queensland Central Highlands and Northern Fitzroy Basin*, *Brigalow (Acacia harpophylla dominant and co-dominant)* and *Poplar Box Grassy Woodland on Alluvial Plains*. Eight Regional Ecosystems listed as Endangered or Of Concern were also verified within the Study Area. The Regional Ecosystems associated with each of these listed Threatened Ecological Communities and the area (ha) is presented in Table 4, the listed threatened RE's are listed in Table 5 and their location within the Study Area is illustrated in Figure 7.

Table 4: Ground-truthed TECs within the Study Area

Regional Ecosystem	TEC	Area (ha) (remnant)	Area (ha) (non-remnant)
11.3.1 11.4.8 11.4.9	Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant)	42.09	42.90
11.3.2	Poplar Box Grassy Woodland on Alluvial Plains	166.61	71.88
11.3.21	Natural Grasslands TEC	5.95	0

Table 5 Ground-truthed threatened Regional Ecosystems within the Study Area

Regional Ecosystem	Short Description	Area (ha)	VMA Status	Biodiversity Status
11.3.1	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on alluvial plains	2.21	Endangered	Endangered
11.3.2	<i>Eucalyptus populnea</i> woodland on alluvial plains	166.61	Of Concern	Of Concern
11.3.4	<i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus</i> spp. woodland on alluvial plains; and <i>Corymbia tessellaris</i> woodland.	35.84	Of Concern	Of Concern
11.3.4a	<i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus</i> spp. woodland on alluvial plains; and <i>Corymbia tessellaris</i> woodland.	0.23	Of Concern	Of Concern
11.3.7	<i>Corymbia</i> spp. open woodland on alluvial plains	8.47	Least Concern	Of Concern
11.3.25	<i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines	66.18	Least Concern	Of Concern
11.3.21	<i>Dichanthium sericeum</i> and/or <i>Astrebla</i> spp. grassland on alluvial plains. Cracking clay soils	5.95	Of Concern	Endangered
11.3.27d	<i>Eucalyptus camaldulensis</i> and/or <i>E. tereticornis</i> woodland. Occurs fringing large lakes. Palustrine wetland (e.g. vegetated swamp)	30.63	Least Concern	Of Concern
11.4.2	<i>Eucalyptus</i> spp. and/or <i>Corymbia</i> spp. Grassy or shrubby woodland on Cainozoic plains	26.53	Of Concern	Of Concern



11.4.8	<i>Eucalyptus cambageana</i> woodland to open forest with <i>Acacia harpophylla</i> on Cainozoic clay plains	18.62	Endangered	Endangered
11.4.9	<i>Acacia harpophylla</i> shrubby open forest to woodland with <i>Terminalia oblongata</i> on Cainozoic clay plains	21.20	Endangered	Endangered

7.1.5 EPBC Act Status

Regional Ecosystems conforming to three TECs were identified and accurately verified during field work. This included the Natural grasslands TEC, Brigalow TEC and the Poplar Box TEC. The areas of the REs conforming to the TECs are presented in Table 4 and their locations are illustrated in Figure 7.

The REs conforming to the Natural grasslands TEC include:

- 11.3.21 - *Dichanthium sericeum* and/or *Astrebla* spp. grassland on alluvial plains.

The REs conforming to the Brigalow TEC include:

- 11.3.1 - *Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains
- 11.4.8 - *Eucalyptus cambageana* woodland to open forest with *Acacia harpophylla* on Cainozoic clay plains
- 11.4.9 - *Acacia harpophylla* shrubby woodland with *Terminalia oblongata* on Cainozoic clay plains

The R.E conforming to the Poplar Box Grassy Woodland on Alluvial Plains TEC include:

- 11.3.2 - *Eucalyptus populnea* woodland on alluvial plains

7.1.6 Exotic Flora Species

A total of eight exotic flora species were recorded within the Study Area. Weed invasion is common throughout, especially in disturbed areas, however it is largely limited to the groundcover stratum. Naturalised introduced pasture species such as Buffel Grass (*Cenchrus ciliaris*), Sabi Grass (*Urochloa mosambicensis*) and Red Natal Grass (*Melinis repens*) along with herbs including *Sida* spp. Cobblers Pegs (*Bidens pilosa*), Gomphrena Weed (*Gomphrena celosioides*) and Stylo (*Stylosanthes scabra*) were the most common weeds encountered. These species dominated the ground layer in the derived grassland habitats, and incursions of these species into adjacent eucalypt woodlands was common.

Table 6 lists the noxious weeds declared Weeds of National Significance (WoNS) under the *Biosecurity Act 2014* recorded within the Study Area. Occasional Prickly Pear (*Opuntia stricta*) and Harrisia Cactus (*Harrisia martinii*) were recorded during field surveys. The distribution of these noxious weed species was patchy, and these species are unlikely to pose a significant risk to the ecological integrity of the Study Area due to their low density.

Table 6 WoNS within the Study Area

Scientific Name	Common Name	Biosecurity Act Category	WoNS	Abundance
<i>Opuntia tomentosa</i>	Velvety tree pear	Class 3	Yes	Low
<i>Harrisia martinii</i>	Harrisia cactus	Class 3	No	Low



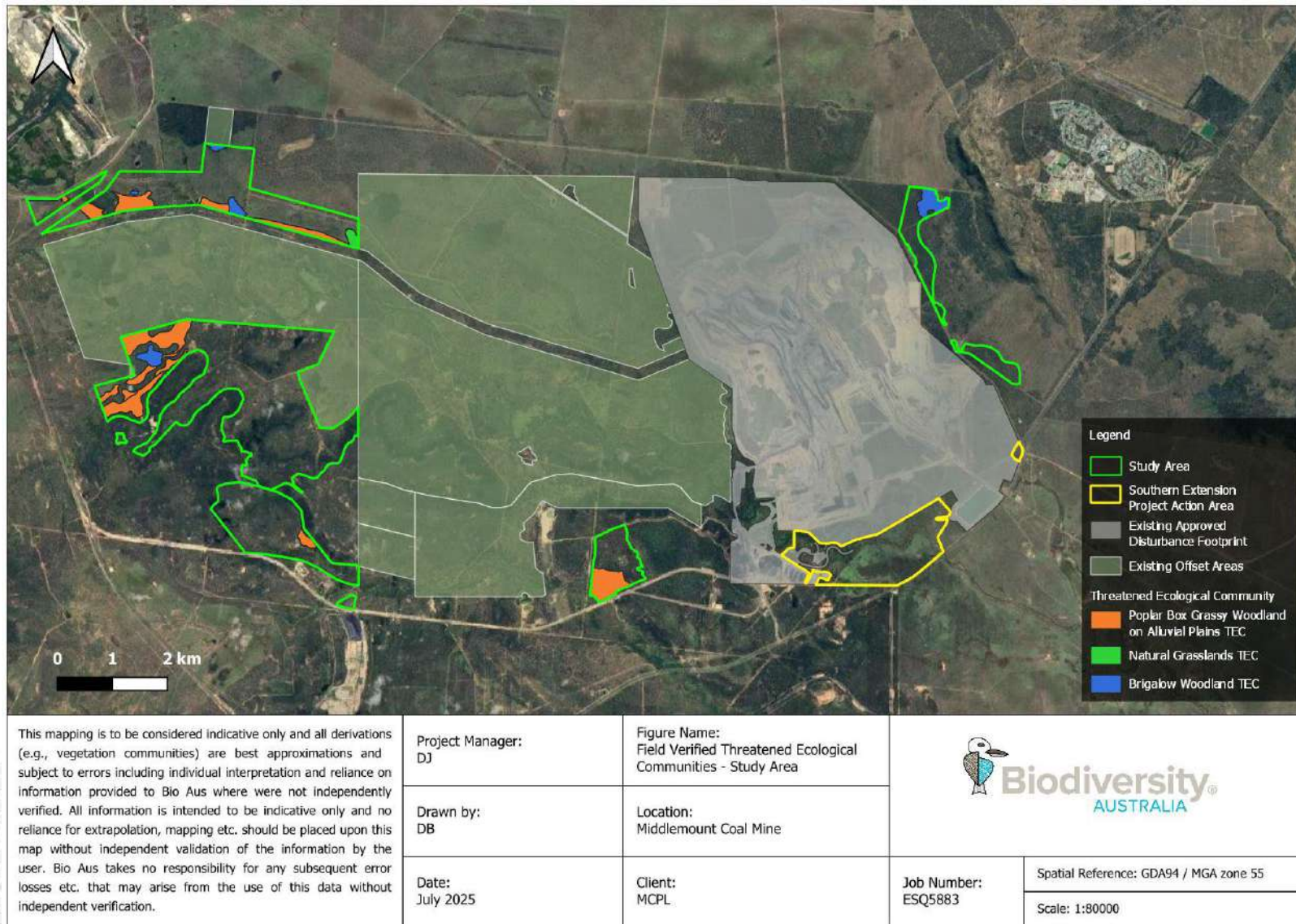


Figure 7 Field Verified Threatened Ecological Communities within the Proposed



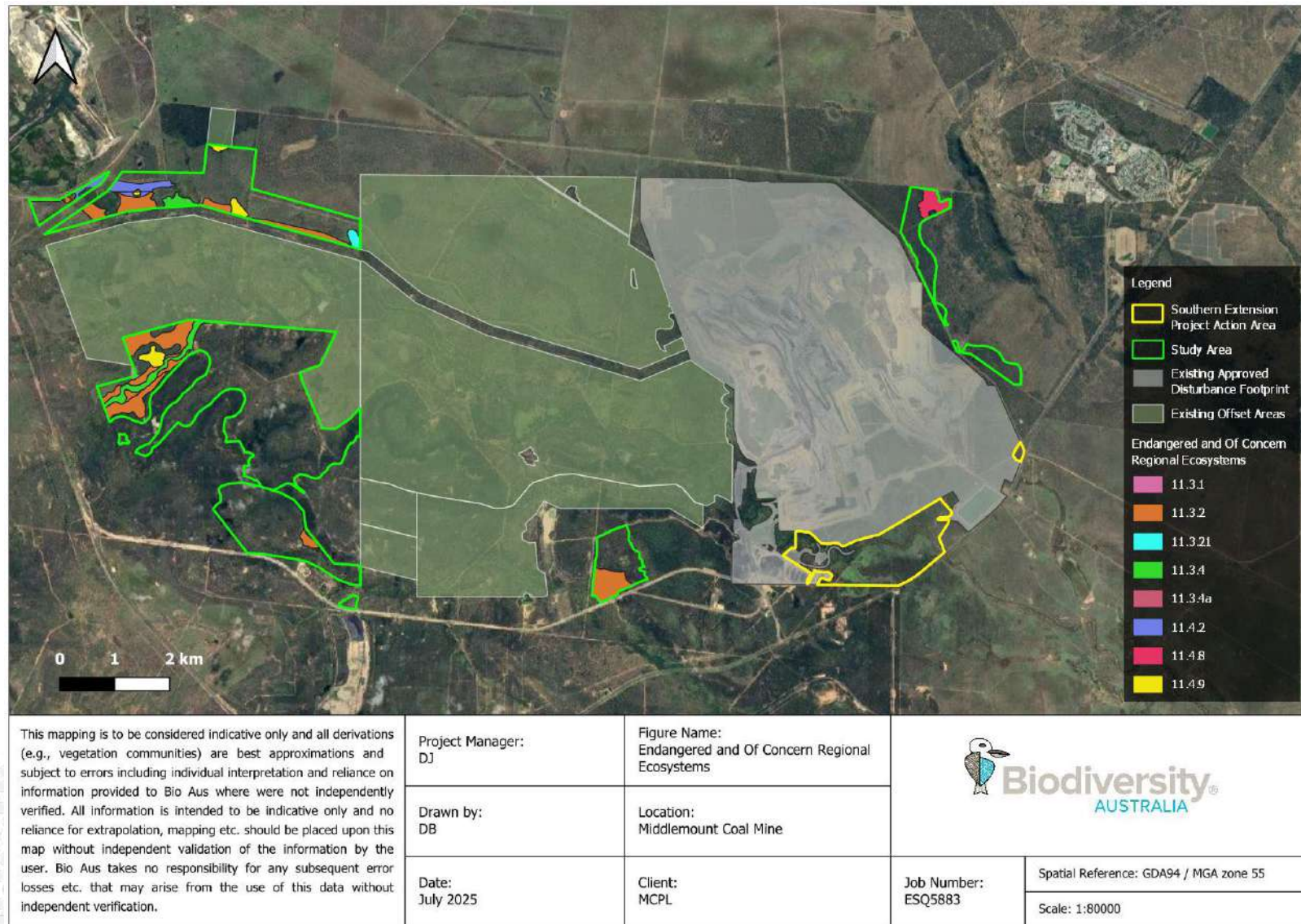


Figure 8 Endangered and Of Concern Regional Ecosystems (VM Act 1999)



7.1.7 Remnant Vegetation

The baseline conditions of the RE types surveyed within the Study Area are described in Table 7 below using qualitative scoring of the baseline health and quality of each RE.

Table 7 Baseline Condition of Regional Ecosystems

Regional Ecosystem	Condition	Health and Quality Score
11.3.1	This RE was characterised as Brigalow, <i>Acacia harpophylla</i> was dominant across the RE and the diversity was lower than the benchmark site value. Similarly, the richness of native forbs, grasses and shrubs was lower than the benchmark site value. There were no large trees recorded across this RE. The benchmark for coarse woody debris was determined to exceed the average counts recorded within the survey sites.	Average
11.3.2	This RE was dominated primarily by <i>E. populnea</i> , and other eucalypt species including <i>Corymbia dallachiana</i> and <i>C. clarksoniana</i> . Across the survey sites, the midstory was well developed, and shrubs were consistently present. Tree and shrub diversity met the benchmark site values, but native forb and grass species were far less diverse than the benchmark sites. The number of large trees were generally far lower also. Weed cover was determined on average to be much higher than benchmark sites, with Buffel Grass being the most consistently observed species. This RE was assessed as conforming to the Poplar Box Grassy Woodlands TEC.	Average
11.3.4	This RE was characterised by <i>Eucalyptus populnea</i> , <i>E. tessellaris</i> and <i>E. tereticornis</i> . A diverse midstory was present within this RE, with both tree richness and shrub richness exceeding the benchmark site value. Native forb and grass richness fell below the benchmark site value. The canopy height measures for this RE met the benchmark site value, as did coarse woody debris, and organic matter. Native perennial cover was lower than the benchmark site value, as was the number of large trees. Weed cover was moderate across this RE and determined to exceed the benchmark measure.	High
11.3.4a	This RE was characterised by <i>C. tessellaris</i> and <i>E. melanophloia</i> within the Survey Area. Tree richness did not exceed the benchmark site values however, richness of shrubs, native forbs and grasses were determined to be lower than the benchmark site values. Similarly, the tree canopy measures, number of large trees and native perennial grass cover did not meet the benchmark site values. Weed cover was moderate across this RE.	Average
11.3.21	This RE was characterised by a disturbed groundcover layer that included <i>Dicanthium sericeum</i> and <i>Astrelba spp.</i> tussocky grassland, mixed with improved pasture grass species occurring on cracking clay soils. The richness of native forbs and grasses was determined to be lower than benchmark site values, the tree canopy values generally matched those of the benchmark. Weed cover was substantial across this RE, and impacts from cattle grazing were clear. This RE was assessed as conforming to the Natural Grassland TEC.	Below Average
11.3.25	Within the Survey Area this RE occurs along waterways (immediately fringing waterways). The BioCondition plots have also recorded data for adjacent RE 11.3.4 due to the meandering of the creek lines through the rectangular plot. For example, <i>Corymbia tessellaris</i> was dominant over <i>E. tereticornis</i> and <i>E. camaldulensis</i> however the vegetation fringing the waterway is dominated by <i>E. camaldulensis</i> . This area has been mapped as RE 11.3.25 due to the presence of this vegetation type along the fringing waterways with the surrounding areas representing an ecotone with RE 11.3.4.	High
11.3.27d	This RE was characterised as a palustrine wetland dominated with <i>E. camaldulensis</i> open woodland, on land zone 5. There was very limited mid and understory, primarily due to its location and definition, as the RE occurred over an ephemeral water body. At the time of field surveys there was no surface water present. This RE type did not have a listed BioCondition Benchmark, so benchmark measures were compared to a similar RE (RE 11.3.27f). Species richness was below the benchmark values for all vegetation types except native grass. Native perennial grass cover and organic matter exceeded the relevant benchmark values. The average tree canopy height scored average according to the benchmark. Non-native plant cover was above the benchmark value.	High
11.3.7	This RE was characterised as an open woodland on alluvial plains dominated by <i>Corymbia spp.</i> including: <i>C. clarksoniana</i> , <i>C. tessellaris</i> and <i>C. dallachiana</i> , with a secondary tree layer of <i>Acacia</i>	Average



Regional Ecosystem	Condition	Health and Quality Score
	<i>salicina</i> and a highly disturbed groundlayer with many native forbs and grasses displaced by pasture grasses including Buffel grass. At the time of assessment – there was no benchmark developed for RE11.3.7, however the quality of the RE was noted to be average considering the canopy and sub-canopy layers, and below average considering the disturbed ground layer.	
11.4.2	This RE was dominated by <i>Eucalyptus melanophloia</i> and <i>E. populnea</i> within the Survey Area. Tree richness was high within this RE, exceeding the benchmark value, but was determined to be below the benchmark value in all other measures of species richness, including native forb, grass and shrub richness. Weed cover was determined to be low within this RE. Median canopy height was close to reaching benchmark site values, and shrub layer cover was determined to exceed the benchmark site value. Perennial grass cover was below the benchmark value, as was coarse woody debris cover.	Average
11.4.8	This RE was characterised as Brigalow, <i>Acacia harpophylla</i> woodland to open forest, with a dense canopy of <i>A. harpophylla</i> and a sparse emergent canopy of <i>Eucalyptus cambageana</i> occurring on undulating clay soils, that were wetter than surrounding soils. The RE when compared to the benchmark was at benchmark levels or below them in every category – representative of a young woodland that is below the benchmark in quality.	Below Average
11.4.9	This RE was characterised as Brigalow, <i>Acacia harpophylla</i> . Across the Survey Area, several other species of trees occurred within this RE type, however on average the diversity was lower than the benchmark site value. Similarly, the richness of native forbs, grasses and shrubs was lower than the benchmark site value. There were no large trees recorded across this RE. The benchmark for coarse woody debris was determined to exceed the average counts recorded within the survey sites.	Average to high
11.5.2	This RE was characterised by stands of <i>Acacia rhodoxylon</i> with <i>Eucalyptus crebra</i> . At this RE, all values except organic matter were determined to be below the benchmark threshold. Weed cover was low across this RE, but determined to be above the benchmark value.	Average
11.5.2a	This RE was characterised by stands of <i>Acacia rhodoxylon</i> and <i>Allocasuarina luehmannii</i> with <i>Eucalyptus crebra</i> . As there were no benchmark values for this RE type, the site was compared with benchmark values developed from a previous survey of RE 11.5.2a, and the established benchmarks for 11.5.2. At this RE, all values except organic matter were determined to be below the benchmark threshold. Weed cover was low across this RE, but determined to be above the benchmark value.	Average
11.5.3	This RE was generally dominated by <i>Eucalyptus populnea</i> and <i>Corymbia tessellaris</i> , with other occurrences of <i>E. cambageana</i> . On average across all survey sites plant species richness scored lower than the benchmark, particularly the presence of native forbs and grasses. Perennial grass cover was on average similar to the benchmark, and non-native Buffel Grass and Red Natal Grass were recorded at moderate densities. The number of large trees was also significantly lower than the benchmark site value.	Average
11.5.8b	This RE was characterised by an open <i>Corymbia spp.</i> and <i>Eucalyptus spp.</i> woodland on gentle rising sedimental soils. <i>Corymbia clarksoniana</i> , <i>Eucalyptus crebra</i> and <i>E. tereticornis</i> dominated the canopy and the subcanopy was largely absent, however characterised by a mixed grouping of small <i>Melaleuca</i> , <i>Allocasuarina</i> and <i>Acacia</i> individuals when present. This RE scored higher than the benchmark for all categories other than tree species richness, non-native plant cover, native perennial grass cover and coarse woody debris.	Average to high
11.5.9	This RE was characterised by open <i>Eucalyptus crebra</i> woodland with <i>Allocasuarina luehmannii</i> (Bullock) and <i>Acacias</i> . Within this RE, tree species richness, canopy cover and height, and organic litter all were determined to be above the benchmark values. All other values were measured below the benchmark values for this RE. Weed cover at this RE was low.	High
11.7.2	This RE was characterised by mono specific stands of <i>Acacia rhodoxylon</i> (Rosewood), with some emergent eucalypts also present including <i>E. crebra</i> . In some areas this RE harboured an endangered shrub species, <i>Cerbera dumicola</i> . Tree species richness, organic matter and coarse woody debris all scored higher than the benchmark. All other values for this RE were determined to be below the benchmark.	Average
11.7.4	This RE was dominated by <i>Eucalyptus populnea</i> woodland. Other eucalypt species present across this RE included <i>E. crebra</i> , <i>Corymbia clarksoniana</i> , and an area of <i>Melaleuca nervosa</i> also occurred. Tree species richness, canopy height, and native perennial grass cover were the only values that scored higher than the benchmark site values.	Average to high



7.1.8 Non-Remnant Vegetation

According to Neldner *et al.* (2022), "Woody vegetation is vegetation for which the predominant stratum is composed mainly of woody vegetation such as trees or shrubs. The Herbarium assesses and maps woody dominated vegetation as remnant if it meets the definition used in the Vegetation Management Act 1999, which is:

- a) 'vegetation, part of which forms the predominant canopy of the vegetation;
- b) covering more than 50% of the undisturbed predominant canopy; and
- c) averaging more than 70% of the vegetation's undisturbed height; and
- d) composed of species characteristic of the vegetation's undisturbed predominant canopy.'

According to these definitions the field surveys identified that approximately 250.94 ha of the Study Area does not meet this definition and as such are classified as non-remnant vegetation.

Classified non-remnant areas have been previously cleared, are grazed by cattle, and displayed high levels of weed invasion dominated by *Cenchrus ciliaris* (buffel grass).

7.1.9 Assessment Units

Assessment Units were developed to assess the Remnant and Non-remnant vegetation within the Study Area in line with methods described by Eyre *et al.* (2015) in *Guide to Determining Terrestrial Habitat Quality Version 1.3*. Within the Study Area the 2020 Survey Area and 2023 Survey Area were assessed for habitat quality separately, and consequently each have their own set of Assessment Units. The Assessment Units and associated MNES for the 2020 Survey Area and the 2023 Survey Area are described in Table 8 and Table 9 respectively.

It should be noted that three Regional Ecosystems identified within the Study Area were not allocated an Assessment Unit as no correlating benchmark for these REs could be established, or the areas were not assessed for the provision of offset. The three REs not assigned an AU were 11.3.27d, 11.3.7, and 11.3.21. All other identified REs were assigned an AU. The location of the Assessment Units in the 2020 Survey Area and the 2023 Survey Area can be seen in Figure 9 and Figure 10 respectively.



Table 8 2020 Survey Area - Assessment Units

Assessment Units	RE	Assessment Unit Area (ha)	MNES					
			Brigalow	Poplar Box	Ornamental Snake	Koala	Greater Glider	Squatter Pigeon
1	11.3.2	137.72		✓		✓	✓	✓
2	11.3.4*	36.07				✓	✓	✓
3	11.3.25	66.18				✓	✓	✓
4	11.4.2	26.53				✓	✓	✓
5	11.4.9	21.20	✓		✓			✓
6	11.5.2a*	32.61				✓	✓	✓
7	11.5.3	77.68				✓	✓	✓
8	11.5.9	42.39				✓	✓	✓
9	11.7.2	41.46						✓
10	11.7.4	25.24				✓	✓	✓
11	NR 11.3.1	10.45	✓		✓			✓
12	NR 11.3.2	71.88		✓		✓	✓	✓
13	NR 11.4.9	32.45	✓		✓			✓
14	NR 11.5.3	126.14				✓	✓	✓
15	11.3.1	2.21	✓		✓			

*RE 11.3.4 and RE 11.3.4a were assessed in the same unit, as were RE 11.5.2 and RE 11.5.2a

Table 9 2023 Survey Area - Assessment Units

Assessment Units	RE	Assessment Unit Area (ha)	MNES					
			Brigalow	Poplar Box	Ornamental Snake	Koala	Greater Glider	Squatter Pigeon
1	11.5.3	314.15				✓	✓	✓
2	11.4.8	18.62	✓		✓			✓
3	11.5.3	33.61				✓	✓	✓
4	11.7.2	194.95						✓
5	11.5.8b	5.13				✓		✓
6	11.5.9	29.02				✓	✓	✓
7	11.5.2	73.11				✓	✓	✓
8	11.7.4	51.93				✓	✓	✓
9	11.3.2	29.39		✓		✓	✓	✓



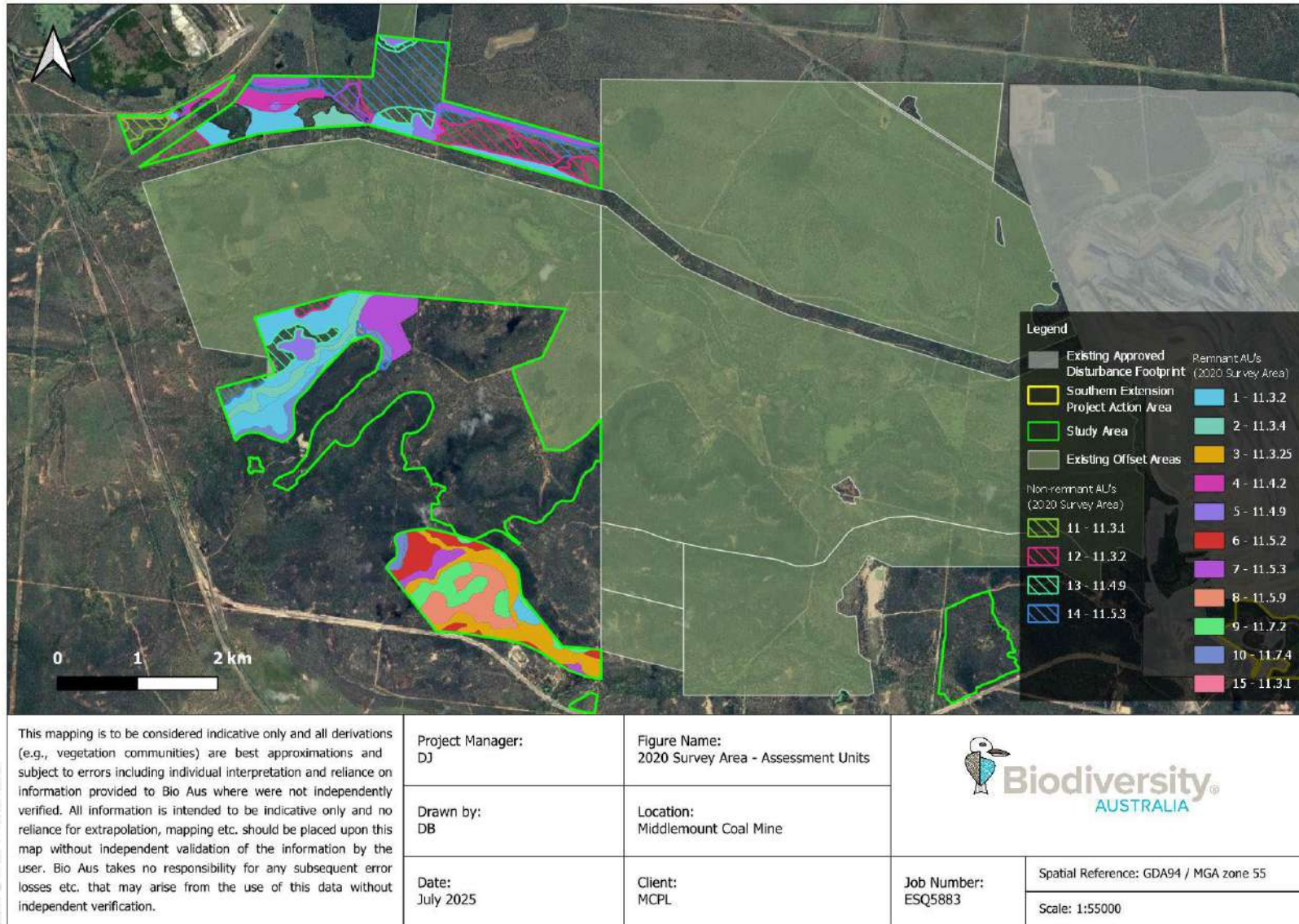


Figure 9 2020 Survey Area Assessment Units



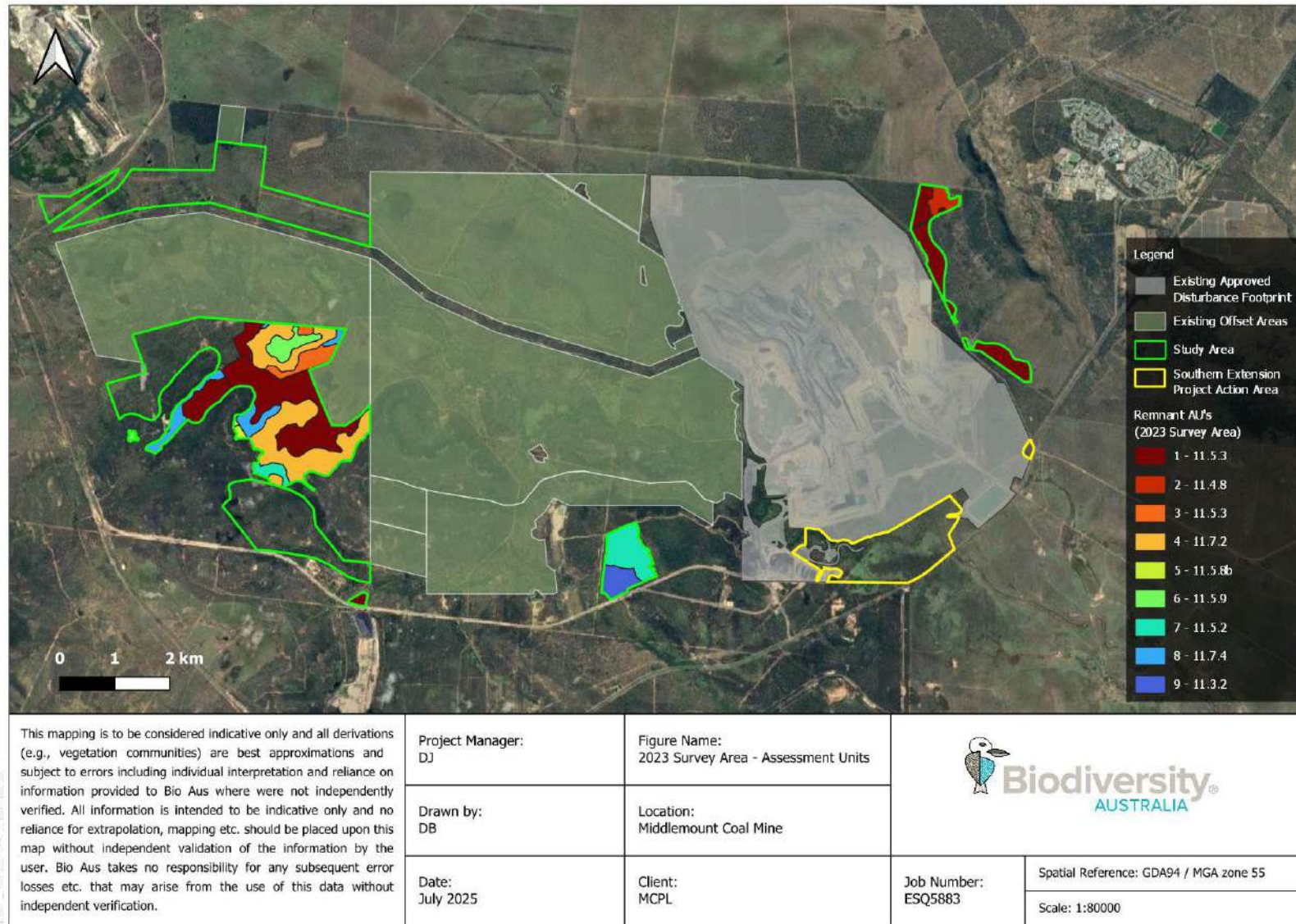


Figure 10 2023 Survey Area Assessment Units



7.2 Habitat Quality Assessment

7.2.1 Site Condition

The vegetation throughout the Study Area was determined to be in average to high condition overall (Table 7, Table 11 and Table 12). Regional ecosystems 11.5.3 and 11.7.2, showed minimal signs of disturbance with Habitat Quality Attributes of 60.16 and 57.5 respectively in the 2020 Survey Area, and 56.6 and 53.4 in the 2023 survey area.

Remnant vegetation communities covered 1,303.76 ha (84%) of the Study Area while non-remnant vegetation communities covered the remaining 250.94 ha (16%).

The less disturbed remnant areas displayed attributes with similar or higher values to the published benchmarks (QLD Herbarium, 2024) specifically for species richness of trees and shrubs, tree canopy height and coarse woody debris, however forb and grass species richness was consistently low, potentially due to the significant and prolonged dry period within the area (Appendix A-3 BioCondition Scores).

Vegetation condition throughout the non-remnant REs varied but overall showed some positive signs of natural regeneration. Several areas that have been previously cleared and are grazed by cattle all displayed high levels of weed invasion during field surveys, however most weeds were naturalised pasture grasses. Many of these non-remnant areas recorded positive signs of native tree recruitment and natural regeneration. However, it was noted that regeneration of non-remnant areas dominated by Poplar Box showed greater recruitment than those areas of Brigalow dominated communities, especially in those areas where cattle grazing appears to be minimising Brigalow regrowth.

Across the Study Area, AUs (remnant vegetation) scored between 31.8 and 62.8 (out of a possible 80) for overall site condition (Table 10 and Table 11). Within remnant vegetation areas, RE 11.5.3 had the highest site condition with a score of 60.16, in the 2020 Survey Area and 62.81 in the 2023 Survey Area. AUs 15 and 6 in the 2020 Survey Area (RE 11.3.1 and RE 11.5.2) and AU2 (RE 11.4.8) in the 2023 Survey Area scored the lowest for overall site condition with a score of 41.85, 43.57 and 31.56 respectively.

7.2.2 Site Context

The landscape scores for the koala, greater glider (southern and central), ornamental snake and squatter pigeon (southern) are found below in Table 11 and Table 12, with the site context scores ranging between 8 and 26.

7.2.3 Species Habitat Index

Species habitat index scores were calculated for the squatter pigeon (southern), greater glider (southern and central), koala and ornamental snake across the Study Area and are summarised below (out of a possible score of 50):

2020 Survey Area:

- Squatter pigeon (southern): Across the Offset Area, the species habitat index scored 28.
- Greater glider (southern and central): Across the Offset Area, the species habitat index scored 38.
- Koala: Across the Offset Area, the species habitat index scored between 11 and 25.
- Ornamental snake: Across the Offset Area, the species habitat index scored 19.

2023 Survey Area:

- Koala: Across the Offset Area, the species habitat index scored between 25 and 35.



- Squatter pigeon: Across the Offset Area, the species habitat index scored 28.
- Greater glider: Across the Offset Area the species habitat index scored 38.
- Ornamental snake: Across the Offset Area, the species habitat index scored 15.

7.2.4 Assessment Unit Habitat Quality Scores

The site condition, site context and species habitat index scores for each AU using the squatter pigeon (southern), greater glider (southern and central), koala, and ornamental snake species habitat index data is presented in detail in Table 11 and Table 12.

The final habitat quality scores for each AU are presented in detail in Table 11 and Table 12. These scores are presented in relation to the habitat index data for the squatter pigeon (southern), greater glider (southern and central), koala and ornamental snake species for the assessment units that are considered suitable habitat for the species.

The final Total Habitat Quality Score for the Study Area is summarised in Table 10 below for each MNES species in the Study Area based on their Assessment Units.



Table 10 Habitat Quality Scores - MNES - 2020 and 2023 Survey Areas

Habitat Quality Score	Koala	Greater Glider (southern and central)	Ornamental Snake	Squatter Pigeon (southern)
2020 Survey Area Remnant AUs	6.2	6.69	5.26	6.29
2020 Survey Area Non-remnant AUs	4.0	4.0	4.4	4.41
2023 Survey area Remnant AUs	6.36	6.76	5.35	6.45



Table 11: Habitat Quality Scores – 2023 Survey Area - Assessment Units

Relevant Species				Koala		Squatter Pigeon (southern)		Greater Glider (southern and central)		Ornamental Snake	
AU	RE	Site Condition Score	Site Context	Species Habitat Index Score	Assessment Unit Habitat Quality Score	Species Habitat Index Score	Assessment Unit Habitat Quality Score	Species Habitat Index Score	Assessment Unit Habitat Quality Score	Species Habitat Index Score	Assessment Unit Habitat Quality Score
AU1	11.5.3	56.6	23	25	6.28	28	6.45	38	6.56	-	-
AU2	11.4.8	31.56	22	-	-	28	5.88	-	-	15	5.35
AU3	11.5.3	62.81	26	25	7.28	25	7.25	38	7.16	-	-
AU4	11.7.2	53.44	26	-	-	22	6.67	-	-	-	-
AU5	11.5.8b	57.5	26	25	6.66	28	6.66	-	-	-	-
AU6	11.5.9	62.5	26	25	6.34	28	6.45	38	7.07	-	-
AU7	11.5.2	46.25	25	30	6.34	28	6.22	38	6.96	-	-
AU8	11.7.4	65.4	26	35	6.89	28	6.19	38	7.08	-	-
AU9	11.3.2	51.88	25	25	5.50	28	5.80	38	7.09	-	-



Table 12: Habitat Quality Scores – 2020 Survey Area – Assessment Units

Relevant Species				Squatter Pigeon (southern)		Greater Glider (southern and central)		Koala		Ornamental Snake	
AU	RE	Site Condition Score	Site Context Score	Species Habitat Index Score	Assessment Unit Habitat Quality Score	Species Habitat Index Score	Assessment Unit Habitat Quality Score	Species Habitat Index Score	Assessment Unit Habitat Quality Score	Species Habitat Index Score	Assessment Unit Habitat Quality Score
AU1	11.3.2	52.65	21	28	6.83	38	6.51	25	5.93	-	-
AU2	11.3.4	46.88	18	28	6.38	38	6.70	25	5.32	-	-
AU3	11.3.25	52.5	21	28	6.83	38	6.51	25	5.93	-	-
AU4	11.4.2	56.88	19	28	5.99	38	6.41	25	-	-	-
AU5	11.4.9	52.19	18	28	6.09	-	-	-	-	19	5.42
AU6	11.5.2	43.75	21	28	6.38	38	6.76	25	5.54	-	-
AU7	11.5.3	60.16	23	28	7.28	38	6.89	25	6.31	-	-
AU8	11.5.9	54.38	21	28	6.86	38	7.18	25	5.96	-	-
AU10	11.7.2	59.17	26	28	6.38	-	-	-	-	-	-
AU11	11.7.4	59.38	20	28	6.73	38	7.02	25	5.83	-	-
AU12 (Non-Rem)	11.3.1	32.5	14	16	3.78	-	-	-	-	11	3.62
AU13 (Non-Rem)	11.3.2	36.41	17	16	4.42	11	4.04	11	4.04	-	-
AU14 (Non-Rem)	11.4.9	53.75	19	16	4.81	-	-	-	-	11	4.65
AU15 (Non-Rem)	11.5.3	31.88	19	16	4.36	11	3.97	11	3.97	-	-
AU16	11.3.1	41.85	8	-	-	-	-	-	-	11	4.01



7.3 Fauna Survey Results

7.3.1 Fauna Habitat Types

Fauna habitats within the Study Area were categorised and mapped into six broad habitat types using the same classifications as Parsons Brinckerhoff (2010) (Figure 11). The broad fauna habitat types include (Table 13):

- Eucalypt woodland;
- *Acacia harpophylla* woodland/forest;
- *Acacia shirleyi* forest;
- Regrowth grassland;
- Riparian habitat; and
- Wetlands (natural/artificial).

Figure 10 and Table 13 detail the REs which make up each broad fauna habitat type along with the corresponding area (in ha). These are presented in Figure 11.

Table 13 describes the habitat values of each broad fauna habitat type, with focus on habitat value and suitability for foraging, nesting, roosting, and breeding requirements for potentially occurring threatened species listed under the NC Act and EPBC Act.

Table 13 Broad Fauna Habitat Types

Broad Fauna Habitat Type	Regional Ecosystem	2020 Survey AUs	2023 Survey AUs	Field Verified Area (ha)
Eucalypt Woodland	11.3.2	1	9	166.61
	11.3.4	2	-	35.84
	11.3.4a	2	-	0.23
	11.3.7	-	-	8.47
	11.4.2	4	-	26.53
	11.5.2/11.5.2a	6	7	105.72
	11.5.3	7	1 & 3	425.44
	11.5.8b	-	5	5.13
	11.5.9	8	6	71.42
	11.7.4	11	8	77.17
Total				951.56
<i>Acacia harpophylla</i> woodland / forest	11.3.1	15	-	2.21
	11.4.8	-	2	18.62
	11.4.9	5	-	21.20
Total				42.03
<i>Acacia shirleyi</i> forest	11.7.2	10	4	236.41
Regrowth Grassland	-	11, 12, 13, 14,	-	240.92



Broad Fauna Habitat Type	Regional Ecosystem	2020 Survey AUs	2023 Survey AUs	Field Verified Area (ha)
Riparian habitat	11.3.25	3	-	66.18
Wetlands	11.3.27d, 11.3.21	-	-	36.58



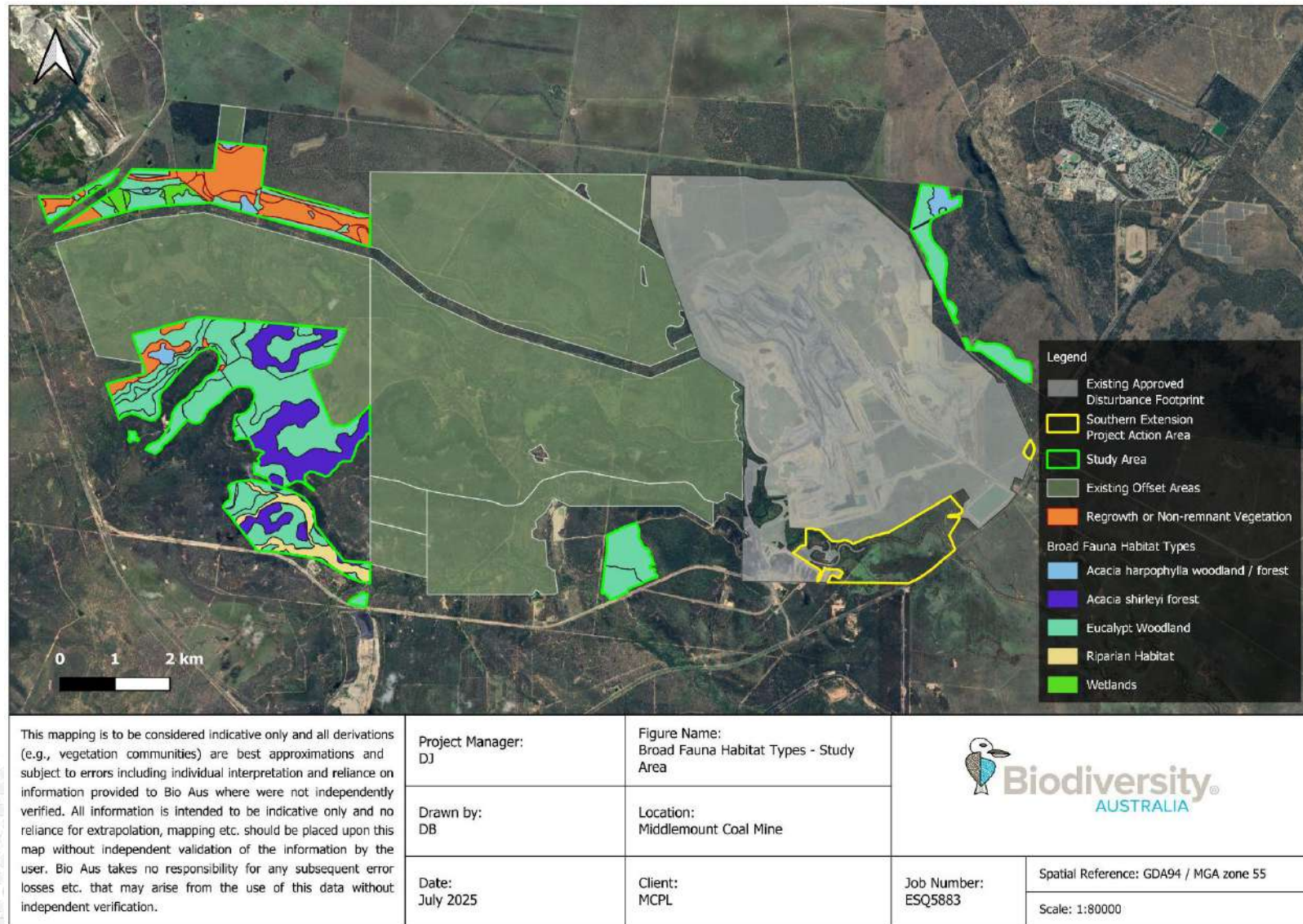


Figure 11: Broad fauna habitat types present in the Study Area



Table 14: Fauna Habitat Assessment

Habitat Attribute Category	Site Values					
	Eucalypt Woodland	<i>Acacia harpophylla</i> Woodland and/Forest	<i>Acacia shirleyi</i> Forest	Regrowth Grassland	Riparian Habitat	Wetlands
Groundcover	Variable density and composition depending on disturbance history e.g. rotational grazing regime. Some areas feature a moderately dense cover of exotic grasses while some are more open and dominated by native grasses and shrubs. A number of native grass species provide a potential food resource for the Squatter Pigeon. Some areas also have a mosaic of open sandy areas and native grasses which is preferred habitat for this species.	Sparse to open ground cover of mostly native grasses, with areas of bare ground. Invasive grasses (buffel) have impacted some areas Provides potential shelter and prey habitat for threatened reptiles.	Sparse to open ground cover of native grasses, with areas of bare ground.	Dominant ground cover composition of exotic grasses with native grasses and herbs being less common. Areas with a higher percentage of native grass species would provide food resources for the Squatter Pigeon. A majority of this vegetation die back had occurred – while bare ground wasn't present vegetation within this habitat was predominantly dead.	Generally a good cover of native grasses, sedges and herbs. Some areas dominated by Buffel Grass.	Dominated by native grasses, sedges and herbs. Buffel Grass dominates in many areas.
Leaf Litter	High under canopy trees, and scattered throughout the mixed grass undergrowth.	Mature Brigalow habitats contained dense accumulations of leaf litter which would provide shelter and prey habitat for a range of small reptiles.	Density of leaf litter was low overall with some small accumulations noted.	Sparse leaf litter.	Generally thin leaf litter throughout due to open canopy.	Sparse leaf litter if any



Habitat Attribute Category	Site Values					
	Eucalypt Woodland	<i>Acacia harpophylla</i> Woodland and/Forest	<i>Acacia shirleyi</i> Forest	Regrowth Grassland	Riparian Habitat	Wetlands
Logs and Debris	Reasonable abundance of hollow logs and debris present due to the nature of eucalypts shedding limbs. Larger logs provide shelter and prey habitat for ground dwelling reptiles.	High density of coarse woody debris, which is typical of this habitat type.	High density of coarse woody debris, which is typical of this habitat type.	Very few logs observed. Some log and debris piles as a result of past clearing occur.	Some accumulations of coarse woody debris and logs under canopy trees. Potential habitat values for threatened fauna overall.	Some coarse woody debris and logs present. Gilgie in non remnant brigalow vegetation continued significant logs and debris
Rocky Outcrops	Only some small to medium surface rock present.	Absent	Rocky outcrops are very common in this habitat type. Provide potential shelter, basking sites and prey habitat for a range of common reptiles and small mammals.	Absent	Absent	Absent
Aquatic Habitat	Aquatic habitats in this habitat type were largely limited to small ephemeral creeks and soaks (that would only hold water for short periods) or constructed dams.	Brigalow habitats contain small depressions and melon holes that would hold water during the wet season.	Absent	A few large dams were located within non-remnant areas. One large dam in the south of the site contained established aquatic vegetation, while others that had been excavated more recently were devoid of aquatic vegetation. Dams on site attracted a range of wetland birds and provided permanent water sources for a range of	The ephemeral creeks and drainage lines were largely dry during the survey, however some had small pools of water remaining. Semi-permanent billabongs and pools in the creek bed would provide water sources for the Squatter Pigeon.	Wetlands within the site were predominantly dry during the survey.



Habitat Attribute Category	Site Values					
	Eucalypt Woodland	<i>Acacia harpophylla</i> Woodland and/Forest	<i>Acacia shirleyi</i> Forest	Regrowth Grassland	Riparian Habitat	Wetlands
				fauna including the Squatter Pigeon.		
Hollows	Hollow-bearing trees and stags were common within this habitat type. A range of hollow-sizes are present i.e. <5cm to >20cm diameter cavities. Hollows provide nesting/denning/roosting habitat for a number of threatened fauna species such as the Greater Glider.	Low occurrence of tree hollows in occasional eucalyptus species present.	Absent.	No hollow bearing trees present due to previous clearing history	Hollow-bearing trees were generally uncommon in this habitat type and would largely be occupied by common birds such as Galahs and Lorikeets.	RE 11.3.27d is characterised as a palustrine wetland dominated with <i>E. camaldulensis</i> open woodland. This are contains significant hollows
Nectar Sources	Woodland habitats contain a range of nectar producing species e.g. eucalypts, <i>Acacias</i> and <i>Grevilleas</i> .	<i>Acacia harpophylla</i> is the primary nectar source and would provide foraging resources for fauna when in flower.	<i>Acacia shirleyi</i> is the primary nectar source and would provide foraging resources for fauna when in flower.	This habitat type does not provide a significant nectar source due to the lack of mature trees.	Nectar sources in riparian habitats include eucalypts and Melaleucas, some of which were flowering during the survey.	Nectar sources in riparian habitats include eucalypts and Melaleucas, some of which were flowering during the survey
Koala Food Trees	Moreton Bay Ash, Poplar Box and Narrow-leaved Ironbark are the main Koala browse species in this community (DCCEEW, 2024). A Koala was recorded in this habitat type near Roper Creek (Photo 3).	<i>Eucalyptus cambageana</i> is located within this habitat type and, although a less common food source for the Koala, meets the definition of a Koala food tree (DCCEEW, 2024).	Absent	Absent aside from occasional areas of regrowth <i>Eucalypts</i> and <i>Corymbia spp.</i>	This community is dominated by Queensland Blue Gum which is a preferred browse species for Koalas.	A number of the palustrine wetlands are dominated by Eucalyptus species which are preferred species for Koalas.



Habitat Attribute Category	Site Values					
	Eucalypt Woodland	<i>Acacia harpophylla</i> Woodland and/Forest	<i>Acacia shirleyi</i> Forest	Regrowth Grassland	Riparian Habitat	Wetlands
Connectivity Values	Provides strong habitat links and connectivity values across the site, especially north-south connections with adjacent habitat in the east and west of the site. Some areas of woodland are fragmented by roads and cleared areas. This habitat type would benefit the local movements of a range of fauna species, including arboreal species such as the Koala.	The Brigalow habitats would contribute to the connectivity values of the other site habitats. Patches provide good 'stepping stone' habitats for birds.	This habitat type is generally surrounded by woodland habitats and would provide similar connectivity values. Rocky scarp habitats are likely to assist local movements of reptiles and small mammals.	Continued regeneration of non-remnant areas over time would help re-establish linkages for flora and fauna across the site and broader landscape.	Riparian habitats provide connectivity along Roper Creek. Due to the open nature of this habitat type, it is only likely to be used by mobile species capable of crossing open ground. Important connectivity values for the Koala.	Provide stepping stones for fauna movement with the presence of water and shelter



7.3.2 Fauna Species Detected

A total of 44 fauna species were detected during field surveys. A list of fauna species detected is provided in Appendix A-2. Birds were the most common fauna group observed with a total of 35 species detected. Six mammals, one reptile and two amphibians were also detected.

The species assemblage within the Survey Area is considered typical for the general area based on results of previous surveys on adjacent and nearby areas (e.g. Parsons Brinckerhoff, 2010; Ecology and Heritage Partners, 2012; Naturecall 2013, 2014b, 2015, 2016).

7.3.3 Threatened Fauna Species (MNES)

The Koala (*Phascolarctos cinereus*), listed as Endangered under the NC Act and EPBC Act, was not visually observed however scats were observed at one location within the Study Area during spotlighting surveys. Observation of Koalas in the immediate surrounding existing offset areas have occurred regularly during fauna monitoring.

The Greater Glider (southern and central) (*Petauroides volans*), listed as Endangered under the NC Act and EPBC Act, was observed at four locations within the Study Area during spotlighting surveys.

The Squatter Pigeon (southern) (*Geophaps scripta scripta*), listed as Vulnerable under the NC Act and EPBC Act, was not observed during field surveys, however has been observed in the immediate surrounding areas within the existing offset areas regularly during field surveys.

The Ornamental Snake (*Denisonia maculata*), listed as Vulnerable under the NC Act and EPBC Act, was not observed during field surveys.

Further information on each of these species is provided in the sub-sections below.

7.3.3.1 Koala (*Phascolarctos cinereus*)

Koala scats were observed at the base of a Queensland Blue Gum within vegetation equivalent to RE 11.3.4 within the Study Area.

Koalas have also been recorded in the past on adjacent land to the north of the Study Area by Ecology and Heritage Partners (2012), adjacent to Parrot Quarry Road by Naturecall (2014b) and immediately to the north of the Study Area in the Western Offset area (Figure 12).

A large portion of the REs mapped within the Study Area would provide known and potential habitat for the Koala based on the occurrence of Koala food and shelter trees. This includes RE 11.3.2, RE 11.3.4, RE 11.3.4a, RE 11.3.7, RE 11.3.25, RE 11.5.2/a, RE 11.5.3, RE 11.5.9 and RE 11.7.4, which have been identified for use as the Koala habitat offset. These RE's total approximately 980.27 ha of suitable RE habitat for the Koala within the Study Area, with an additional 198.02 ha of non-remnant vegetation assessed as future potential Koala habitat (Figure 12 Koala Habitat).

In addition, these areas would provide beneficial movement corridors (i.e. connectivity) for the Koala throughout the landscape, particularly along creek lines.



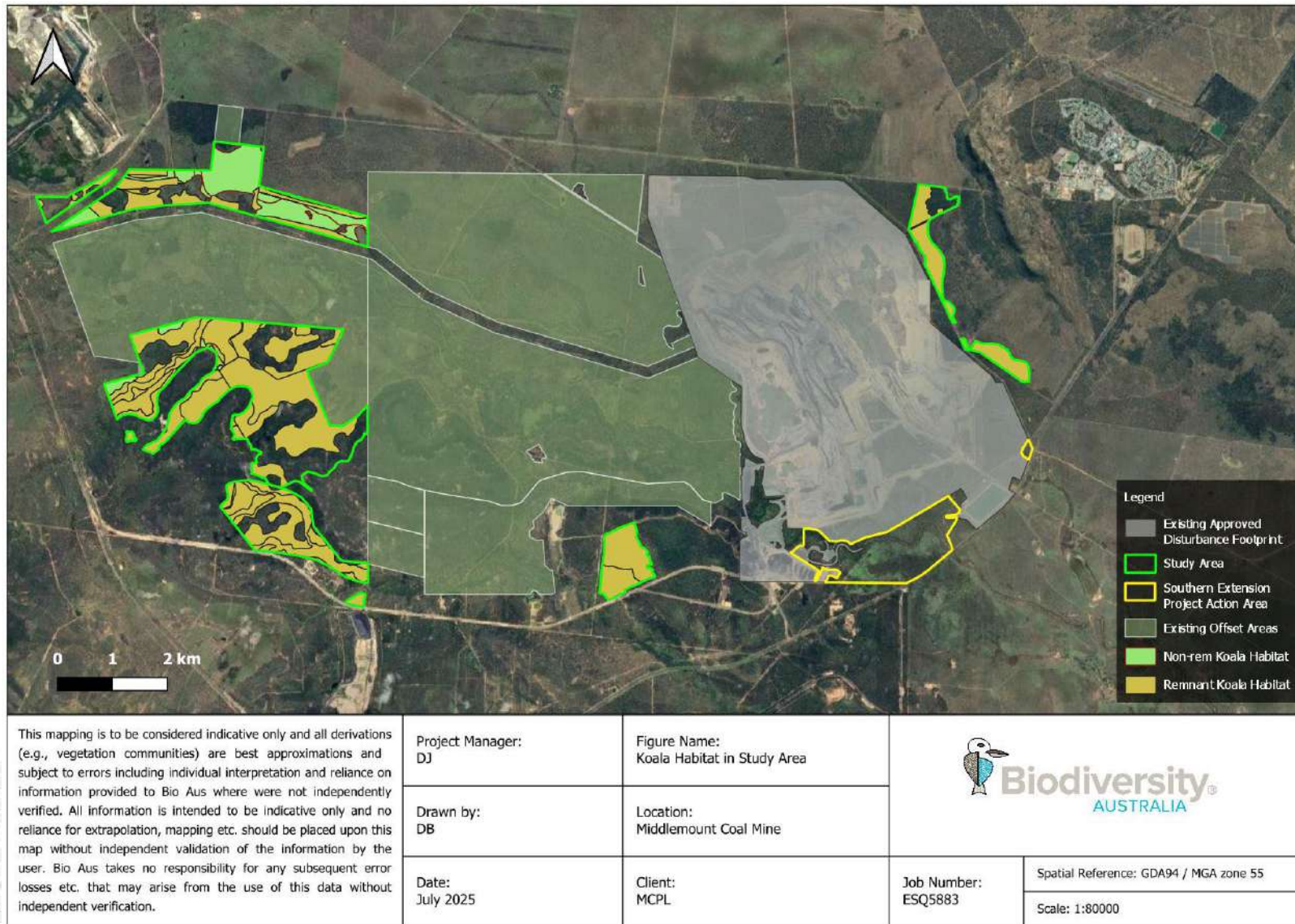


Figure 12 Koala Habitat in Study Area



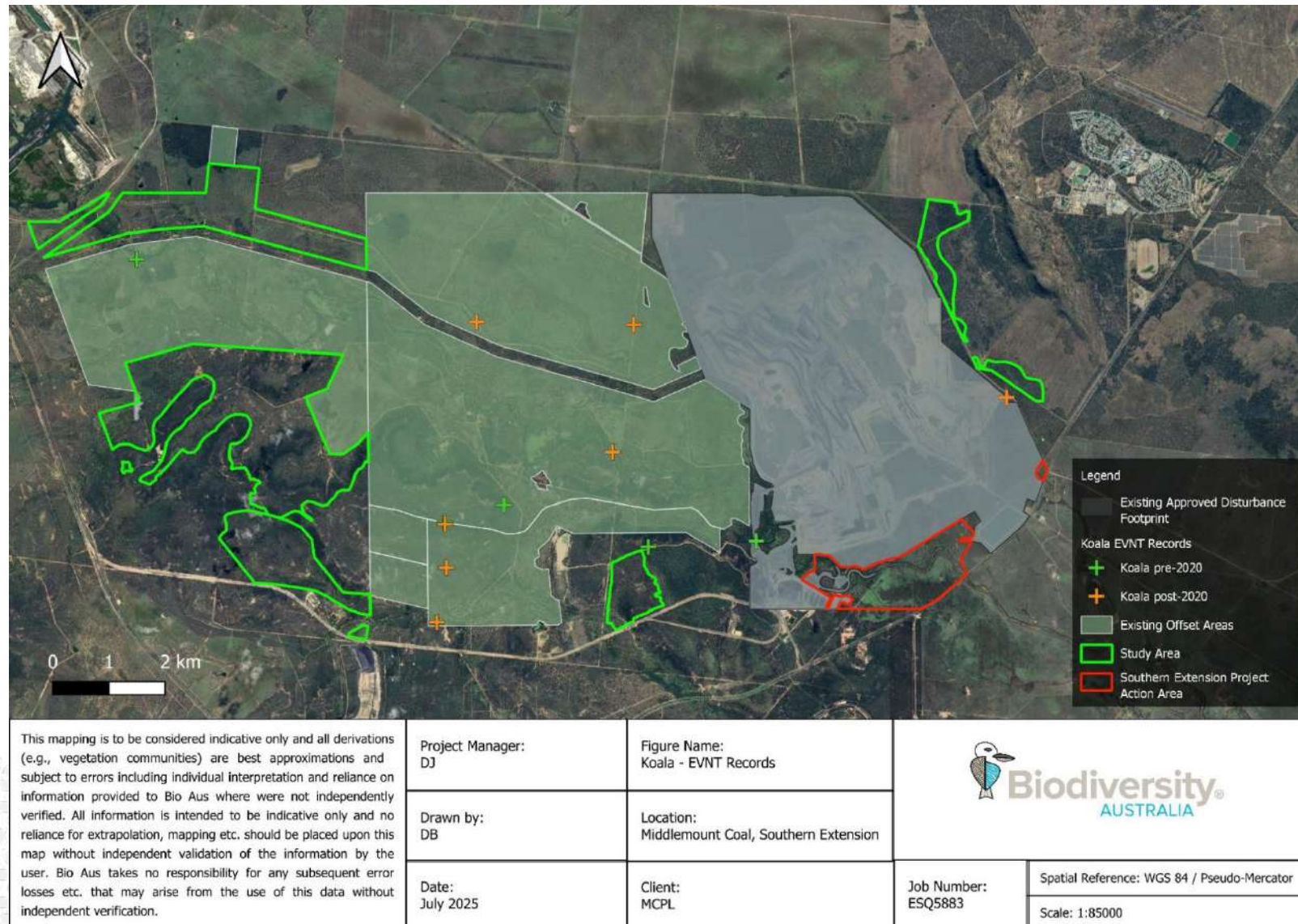


Figure 13 Previous records of Koala (2021)



7.3.3.2 Greater Glider (southern and central) (*Petauroides volans*)

Six Greater Gliders were observed during spotlighting surveys on the 23rd and 25th October 2020. Two were recorded within the very southern section of the Study Area along a waterway in RE 11.3.25 adjacent (within 100 m) to Quaternary Sampling Site 1 (Figure 14).

Four Greater Gliders were identified during spotlighting along a waterway on the northern portion of the Study Area in RE 11.3.4. They were all recorded in open woodland habitats immediately adjacent to the water way (Figure 14).

The Study Area contains extensive suitable habitat for the Greater Glider, and it has been demonstrated to occur here during the field surveys. Habitats that are known to support this species include woodland dominated by Blue Gum, Clarkson's Bloodwood, Silver-leaved Ironbark, Poplar Box and Moreton Bay Ash in riparian zones and creek flats associated with waterways. This includes RE 11.3.2, RE 11.3.25, RE 11.3.4/11.3.4a, , RE 11.4.2, RE 11.5.2/11.5.2a, RE 11.5.3, RE 11.5.9 and RE 11.7.4. Approximately 975.1 ha of suitable RE habitat for the Greater Glider was mapped within the Study Area (Figure 14).



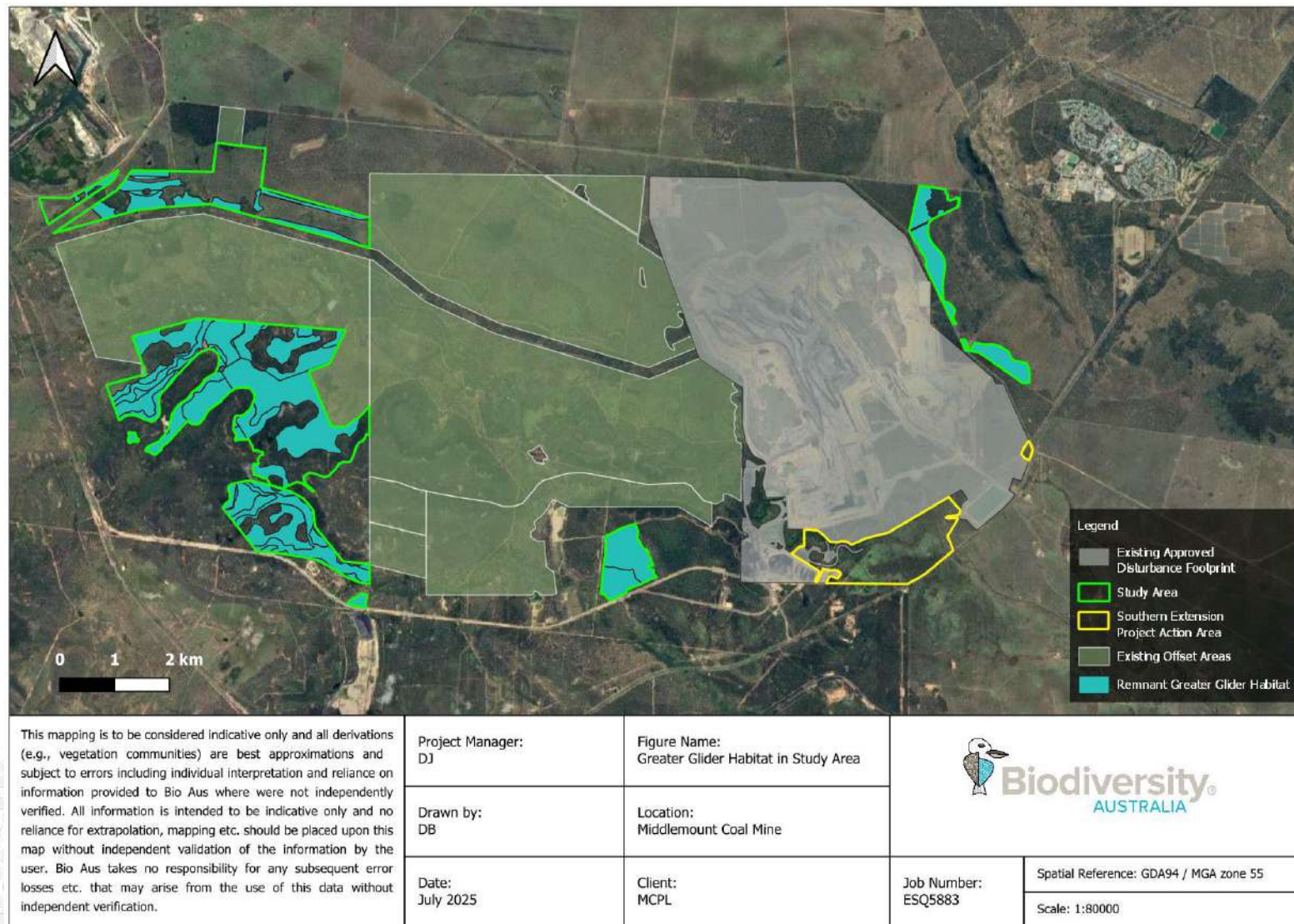
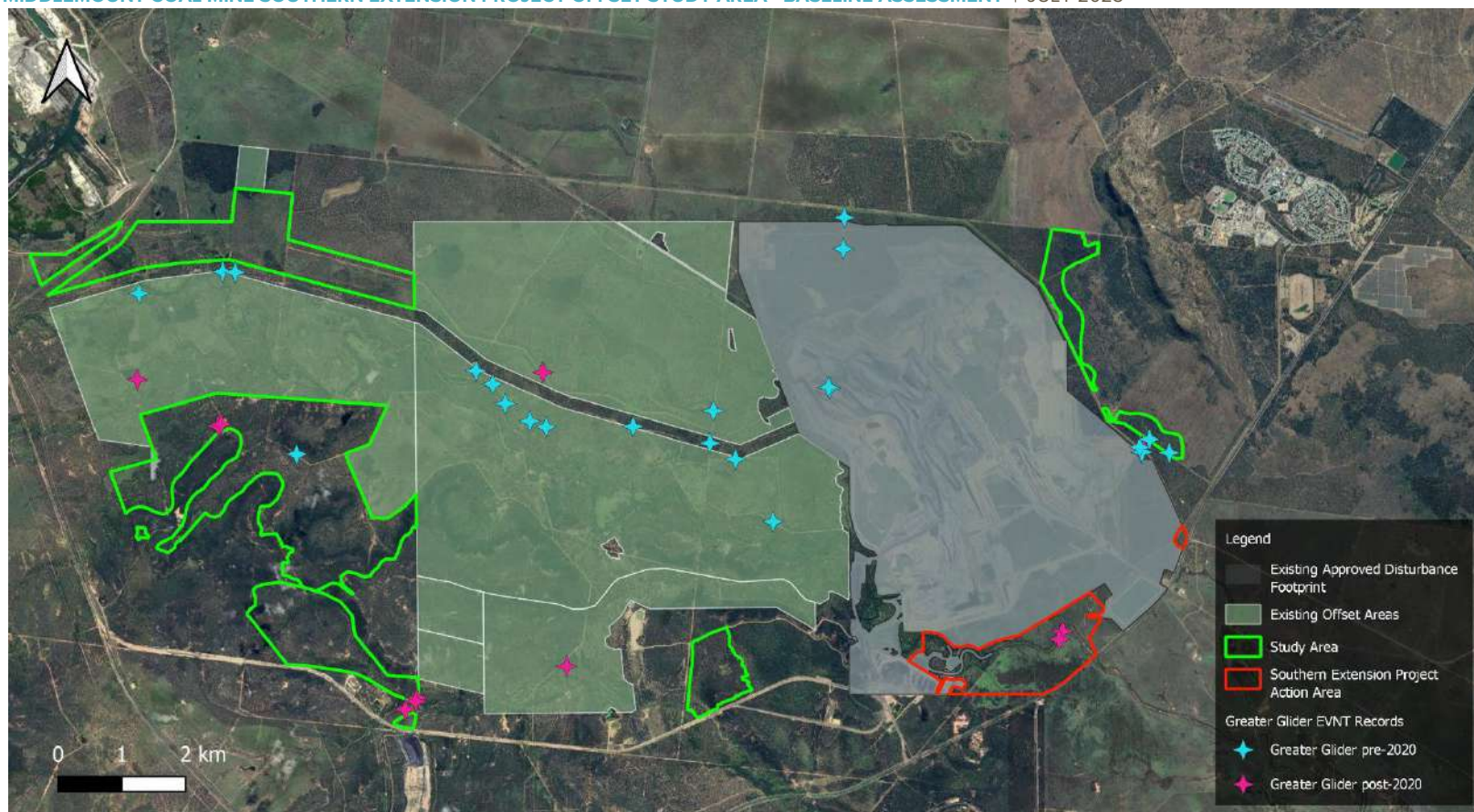


Figure 14 Greater Glider Habitat in Study Area





This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.

Project Manager:
DJ

Drawn by:
DB

Date:
July 2025

Figure Name:
Greater Glider - EVNT Records

Location:
Middlemount Coal, Southern Extension

Client:
MCPL



Biodiversity
AUSTRALIA

Job Number:
ESQ5883

Spatial Reference: WGS 84 / Pseudo-Mercator

Scale: 1:85000

Figure 15 Previous records of Greater Glider (2021)



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

The Squatter Pigeon (southern) was not recorded within the Study Area during the field survey.

This species has been previously recorded on MCPL lands to the north. As identified in Table 14 several habitat attributes which would provide suitable habitat for the Squatter Pigeon (southern) are present. These include several native grass species, permanent water resources and a mosaic of open sandy areas.

As identified by DCCEEW (2025b), the Squatter Pigeon (southern) is known to utilise habitat located on land zones 3, 4, 5, and 7 which occur across the Study Area.

These regional ecosystems provide good quality habitat for the Squatter Pigeon (southern) as they contain a number of native grass species which would provide a potential food resource. In addition, there a number of permanent water bodies immediately surrounding the Study Area as well as waterways that appear to contain pools even in dry periods within the local region which would provide a suitable water source.

Approximately 1256.50 ha of suitable remnant habitat for the Squatter Pigeon (southern) was mapped within the Study Area, alongside 240.92 ha of regrowth/non-remnant habitat. All habitat was identified as Breeding (within 1 km of a seasonal or permanent water source) and located on Land Zones 3, 4 and 5 comprising both remnant and re-growth vegetation, or as foraging habitat.



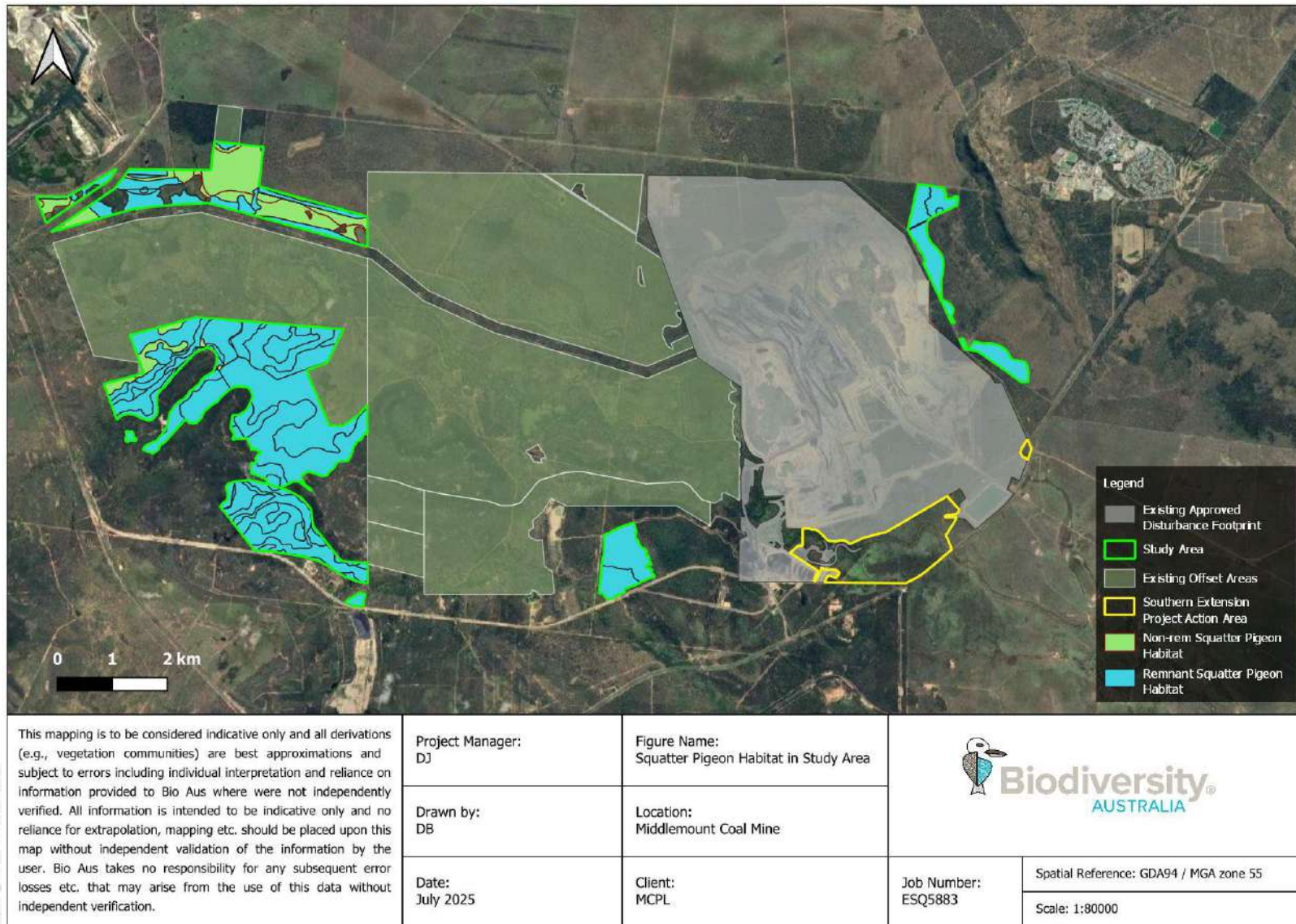


Figure 16 Squatter Pigeon Habitat in Study Area



7.3.3.4 Ornamental Snake (*Denisonia maculata*)

The Ornamental Snake prefers Brigalow, Gidgee, Blackwood or Coolabah dominated vegetation communities or grasslands associated with gilgais (DEE 2021c). It is often associated with wetlands and moist areas where preferred prey species (frogs) are common.

This species was previously recorded by Parsons Brinkerhoff in 2010 in a degraded patch of Brigalow woodland that contained gilgai, thick leaf litter and abundant fallen timber (Parsons Brinkerhoff 2010).

Ornamental snake was not recorded during field surveys within the Study Area, however approximately 42.03 ha of suitable remnant and 42.90 ha of non-remnant/regrowth habitat for this species was mapped (Figure 17). Larger patches of suitable remnant Brigalow were found to be in good condition and contained the necessary microhabitat features for the Ornamental Snake, such as leaf litter, fallen timber, cracking clay soils and gilgai.



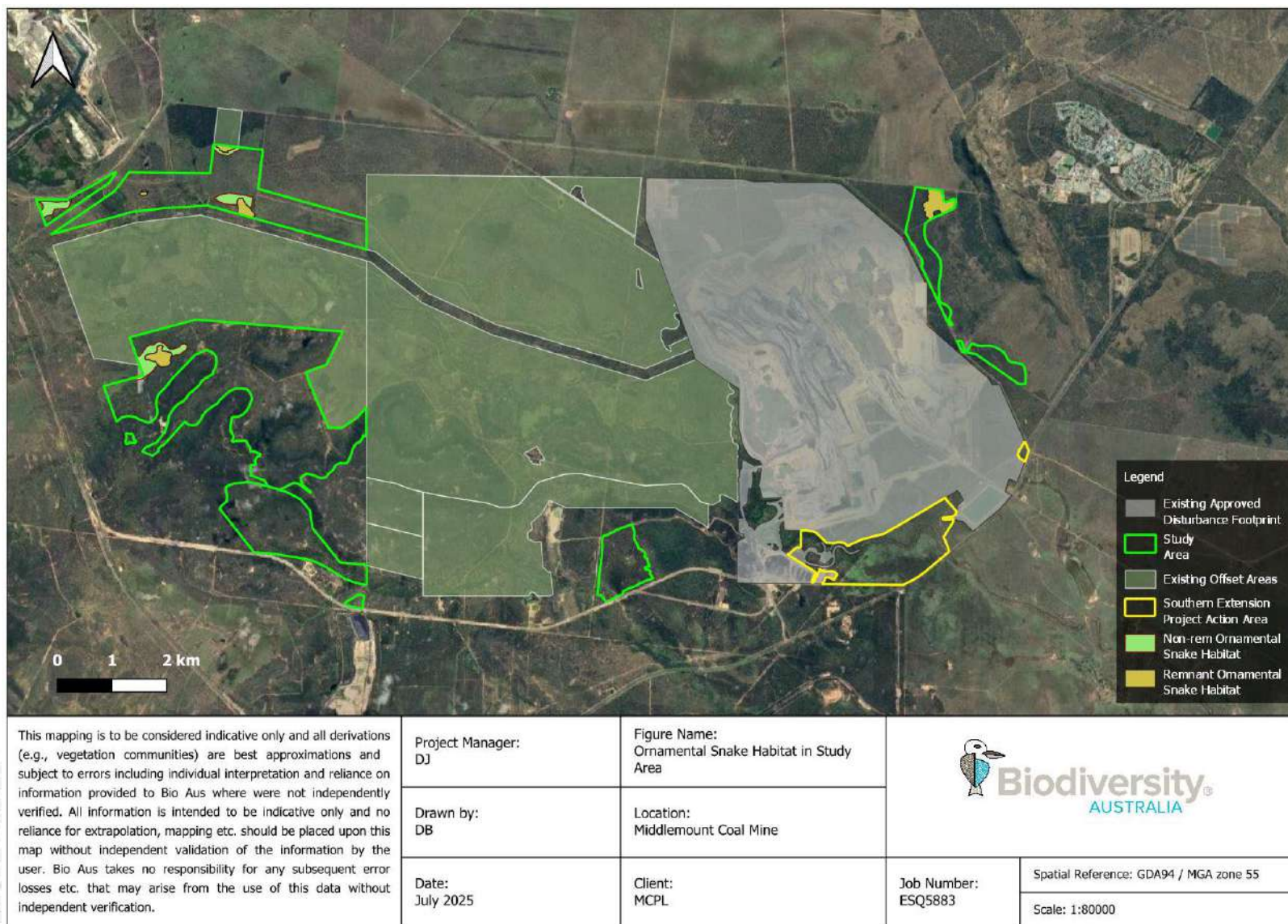


Figure 17 Ornamental Snake Habitat in Study Area



7.3.3.5 Migratory Fauna Species

Whilst the EPBC search undertaken during the desktop assessment indicated several migratory species as potentially occurring within the Study Area, none were detected during field surveys.

7.3.3.6 Introduced Fauna Species

No feral cats or dogs were observed during field surveys of the Study Area, MCPL currently implement a feral species control program within in existing offset areas (e.g. the Western Offset Area) located immediately adjacent to the Study Area.



8. Offset

The Study Area is being dedicated to offset the impacts on six (6) MNES within the Southern Extension Project Action Area. The amount of habitat associated with each MNES in the Action Area is detailed in Table 15 below.

Table 15 Southern Extension Project Action Area - MNES Habitat Impacted

MNES	Koala	Squatter Pigeon (southern)	Greater Glider (southern and central)	Ornamental Snake	Poplar Box TEC	Brigalow TEC
Remnant area (ha)	81.70	86.03	81.70	3.48	43.88	3.48
Non-remnant area (ha)	101.30	164.19	0	13.73	0	0
Total area (ha)	183.0	250.22	81.70	17.21	43.88	3.48

The available area proposed for offset within the Study Area for each of the six (6) identified MNES is presented below in Table 16.

Table 16 Offset Identified for MNES in Study Area

MNES	Koala	Squatter Pigeon (southern)	Greater Glider (southern and central)	Ornamental Snake	Poplar Box TEC	Brigalow TEC
Remnant area (ha)	980.27	1256.50	975.1	42.03	166.61	42.03
Non-remnant area (ha)	198.02	240.92	-	42.90	71.88	42.90
Total area (ha)	1178.29	1497.42	975.1	84.93	238.49	84.93

The Offset Assessment Guide (OAG) (DCCEEW, 2025b) tool was utilised as directed by DCCEEW to determine the required offsets for each MNES under the EPBC Act. The OAG relies on a number of assumptions pertaining to the details of the offset including:

- Time over which loss is averted;
- Time until ecological benefit; and
- Improvement in habitat quality score.

The justifications for these assumptions are presented in *A-5 Justification for Inputs to Commonwealth OAG Calculator* and *A-6 Justification for the Proposed Management Measures and Subsequent Increase in Habitat Quality Score*. The OAG tool demonstrated that there is sufficient habitat within the Study Area to



offset all impact on MNES within the Southern Extension Project Action Area. Table 17 to Table 22 detail the percentage of impact offset for each MNES.

Table 17 Offset Summary - Koala

MNES	Koala Habitat in Impact Area	Surveyed area proposed for offset	% of Impact Offset
Remnant area (ha)	81.70	700 ha Remnant habitat	107.46
Non-remnant area (ha)	101.30	280.27 ha remnant habitat	41.64
		198.02 ha non-remnant habitat	58.85

Table 18 Offset Summary - Ornamental Snake

MNES	Ornamental Snake Habitat in Impact Area	Surveyed area proposed for offset	% of Impact Offset
Remnant area (ha)	3.48	20.0 ha remnant	100.37
Non-remnant area (ha)	13.73	22.03 ha remnant	34.99
		42.90 ha non-remnant	68.23

Table 19 Offset Summary - Squatter Pigeon

MNES	Squatter Pigeon (southern) Habitat in Impact Area	Surveyed area proposed for offset	% of Impact Offset
Remnant area (ha)	86.03	756.5 ha remnant	109.72
Non-remnant area (ha)	164.19	500 ha remnant	53.20
		240.92 ha non-remnant	51.26

Table 20 Offset Summary - Greater Glider

MNES	Greater Glider (southern and central) Habitat in Impact Area	Surveyed area proposed for offset	% of Impact Offset
Remnant area (ha)	81.70	975.1 ha remnant	149.70



Table 21 Offset Summary - Poplar Box Grassy Woodland on Alluvial Plains

MNES	Poplar Box TEC in Impact Area	Surveyed area proposed for offset	% of Impact Offset
Remnant area (ha)	43.88	166.61 ha remnant 71.88 ha non-remnant	81.64 35.22

Table 22 Offset Summary - Brigalow Woodland

MNES	Brigalow TEC in Impact Area	Surveyed area proposed for offset	% of Impact Offset
Remnant area (ha)	3.48	42.03 ha remnant	151.40



9. Conclusion

Field surveys undertaken in October 2020 and November 2023 by Biodiversity Australia identified a total of 15 distinct remnant REs and five sub-ecosystems within the Study Area. These were assessed as assessment units over the two field survey periods (Table 1 and Table 2). Three additional units were also surveyed, namely 11.3.7, 11.3.27d and 11.3.21, however these units were not utilised in any offset calculations and were not assigned assessment units.

Remnant vegetation communities covered approximately 1300.26 ha (84%) of the Study Area. The less disturbed remnant areas displayed attributes with similar values to the published benchmarks with the exception of forbs and grasses which had lower diversity. Non-remnant vegetation communities covered approximately 250.94 ha (16%) of the Study Area. While non-remnant areas generally contained more weed species than remnant areas, natural regeneration was occurring.

A total of eight REs were identified as Endangered or Of Concern under the VM Act (Table 3). Additionally three separate TECs under the EBPC Act were also confirmed during field surveys, namely Poplar Box TEC, Natural Grasslands TEC and Brigalow TEC (Table 4 and Figure 7).

Six broad fauna habitat types (i.e. eucalypt woodland/forest, riparian habitat, Acacia shirleyi forest, Wetlands, Acacia harpophylla woodland/forest, and regrowth/derived grassland) were identified on site. Eucalypt woodland was the most common habitat type in the Study Area.

The assessment units were evaluated for site condition and site context. Species habitat index scores were calculated for the squatter pigeon, greater glider, koala and ornamental snake for each assessment unit within the Study Area. The overall Habitat Quality Scores ranged between 4 and 7.5.

Koala scats were observed at one location within the southern portion of the Study Area, and greater glider was observed at two locations within the Study Area. The squatter pigeon was not observed during field surveys however suitable habitat was identified within the Study Area.

Suitable habitat was identified during field surveys for each of the target MNES (Table 10).

Matter	Regional Ecosystem	Area Mapped within the Study Area (ha)
Matter of State Environmental Significance		
Endangered Regional Ecosystem	11.3.1	2.21
	11.3.21	5.95
	11.4.8	18.62
	11.4.9	21.2
	Sub Total	47.98
Of Concern Regional Ecosystem	11.3.2	166.61
	11.3.4	35.84
	11.3.4a	0.23
	11.4.2	26.53
	Sub Total	229.21
Regional Ecosystems within the defined distance of a watercourse	11.3.1	0.47
	11.3.2	29.44



Matter	Regional Ecosystem	Area Mapped within the Study Area (ha)
	11.3.25	38.95
	11.3.27d	13.14
	11.3.4	18.09
	11.3.4a	0.23
	11.3.7	1.13
	11.4.2	2.91
	11.4.9	1.52
	11.5.2	9.43
	11.5.2a	4.24
	11.5.3	31.57
	11.5.9	0.19
	11.7.2	2.00
	11.7.4	8.48
	Sub Total	161.79
Connectivity	Non-remnant RE's (11.3.1, 11.3.2, 11.3.27d, 11.3.7, 11.4.2, 11.4.9, 11.5.18, 11.5.3, 11.7.2 and 11.7.4)	250.94
	Sub Total	250.94
Matter of National Environmental Significance		
Koala Habitat ¹	11.3.2	166.61
	11.3.25	66.18
	11.3.4	35.84
	11.3.4a	0.23
	11.4.2	26.53
	11.5.2/11.5.2a	105.72
	11.5.3	425.44
	11.5.8b	5.13
	11.5.9	71.42
	11.7.4	77.17
	11.3.2 (non-rem)	71.88
	11.5.3 (non-rem)	126.14
	Sub Total	1178.29
Greater Glider Habitat ¹	11.3.2	166.61
	11.3.25	66.18
	11.3.4	35.84
	11.3.4a	0.23
	11.4.2	26.53



Matter		Regional Ecosystem	Area Mapped within the Study Area (ha)
		11.5.2/11.5.2a	105.72
		11.5.3	425.44
		11.5.9	71.42
		11.7.4	77.17
		Sub Total	975.1
Ornamental Snake Habitat ¹		11.3.1	2.22
		11.4.8	18.62
		11.4.9	21.20
		11.3.1 (non-rem)	10.45
		11.4.9 (non-rem)	32.44
		Sub Total	84.93
Squatter Pigeon ¹	Breeding Habitat	11.3.2	166.61
		11.3.25	66.18
		11.3.4	35.84
		11.3.4a	0.23
		11.4.2	26.53
		11.4.8	18.62
		11.4.9	21.20
		11.5.2/11.5.2a	105.72
		11.5.3	425.44
		11.5.8b	5.13
		11.5.9	71.42
		11.7.2	236.41
		11.7.4	77.17
		Sub Total	1256.5
	Foraging Habitat	11.3.1 (non-rem)	10.45
		11.3.2 (non-rem)	71.88
		11.4.9 (non-rem)	32.45
		11.5.3 (non-rem)	126.14
		Sub Total	240.92
Poplar Box TEC ¹		11.3.2	166.61
		11.3.2 (non-rem)	71.88
		Sub Total	238.49
Brigalow TEC ¹		11.3.1 (non-rem)	10.45
		11.4.9 (non-rem)	32.45
		11.3.1	2.21
		11.4.8	18.62



Matter	Regional Ecosystem	Area Mapped within the Study Area (ha)
	11.4.9	21.20
	Sub Total	84.93

1 MSES also



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11. Appendices

A-1 Flora Species List

Table 23 Flora Species identified on the site

Species Name	Common Name	Form	EPBC Status	NC Act Status
<i>Acacia catenulata</i>	bendee	S	-	LC
<i>Acacia harpophylla</i>	brigalow	T	-	LC
<i>Acacia leiocalyx</i>	black wattle	T	-	LC
<i>Acacia rhodoxylon</i>	rosewood	T	-	LC
<i>Acacia salicina</i>	sally wattle	T	-	LC
<i>Acacia shirleyi</i>	lancewood	T	-	LC
<i>Allocasuarina luehmannii</i>	bull oak	T	-	LC
<i>Alloteropsis semialata</i>	cockatoo grass	G	-	LC
<i>Alphitonia excelsa</i>	red ash	T	-	LC
<i>Alstonia constricta</i>	bitter bark	T	-	LC
<i>Aristida calycina</i>	dark wiregrass	G	-	LC
<i>Aristida holathera</i>	erect kerosene grass	G	-	LC
<i>Aristida latifolia</i>	feathertop wiregrass	G	-	LC
<i>Aristida personata</i>	purple wire-grass	G	-	LC
<i>Aristida</i> spp.	-	G	-	LC
<i>Atriplex semibaccata</i>	creeping saltbush	F	-	LC
<i>Bidens pilosa</i> *	cobblers pegs	F	-	-
<i>Breynia oblongifolia</i>	coffee bush	S	-	LC
<i>Callitris</i> sp.	-	S	-	-
<i>Capparis canescens</i>	wild orange	S	-	LC
<i>Capparis mitchelli</i>	bumble tree	S	-	LC
<i>Carrisia ovata</i>		S	-	
<i>Cassia brewsteri</i>	Leichhardt bean	T	-	LC
<i>Cenchrus ciliaris</i> *	buffel grass	G	-	-
<i>Cerbera dumicola</i>	-	S	-	LC
<i>Cheilanthes sieberi</i>	mulga fern	F	-	LC
<i>Chloris</i> spp.	-	G	-	-
<i>Chloris truncata</i>	windmill-grass	G	-	LC
<i>Chrysopogon fallax</i>	ribbon grass	G	-	LC
<i>Citrus glauca</i>	desert lime	S	-	LC
<i>Conyza bonariensis</i> *	flaxleaf fleabane	G	-	-
<i>Corymbia clarksoniana</i>	long-fruited bloodwood	T	-	LC
<i>Corymbia dallachiana</i>	Dallachy's ghost gum	T	-	LC
<i>Corymbia tessellaris</i>	Moreton Bay ash	T	-	LC



Species Name	Common Name	Form	EPBC Status	NC Act Status
<i>Crotalaria lanceolata</i> subsp. <i>laceolata</i>	lance-leaved rattlepod	F	-	LC
<i>Crotalaria mitchellii</i>	yellow rattlepod	F	-	LC
<i>Cymbopogon refractus</i>	barbed wiregrass	G	-	LC
<i>Denhamia cunninghamii</i>	yellowberry bush	T	-	LC
<i>Diospyros humilis</i>	native ebony	T	-	LC
<i>Dodonaea viscosa</i>	sticky hop bush	S	-	LC
<i>Eragrostis leptostachya</i>	paddock lovegrass	G	-	LC
<i>Eragrostis</i> spp.	-	G	-	-
<i>Eremophila latrobei</i>	crimson turkey bush	S	-	LC
<i>Eremophila mitchellii</i>	false sandalwood	T, S	-	LC
<i>Erigeron bonariensis</i> *			-	LC
<i>Erythroxylum australe</i>	turkey bush	S	-	LC
<i>Eucalyptus camaldulensis</i>	river red gum	T	-	LC
<i>Eucalyptus cambageana</i>	Dawson's gum	T	-	LC
<i>Eucalyptus crebra</i>	narrow-leaved ironbark	T	-	LC
<i>Eucalyptus exserta</i>	Queensland peppermint	T	-	LC
<i>Eucalyptus melanophloia</i>	silver-leaved ironbark	T	-	LC
<i>Eucalyptus populnea</i>	poplar box	T	-	LC
<i>Eucalyptus tereticornis</i>	Queensland blue gum	T	-	LC
<i>Fern</i> sp.	-	S	-	LC
<i>Flindersia maculosa</i>	leopardwood	T	-	LC
<i>Geijera parvifolia</i>	wilga	S	-	LC
<i>Grevilia striata</i>	beefwood	T	-	LC
<i>Grewia latifolia</i>	dogs balls	S, F	-	LC
<i>Hakea lorea</i>	bootlace oak	S	-	LC
<i>Harrisia martinii</i> *	harissa cactus	F	-	-
<i>Heteropogon contortus</i>	black speargrass	G	-	LC
<i>Holly</i> sp.	-	S	-	-
<i>Hypoxis hygrometrica</i>	golden weather-grass	G	-	LC
<i>Leucaena leucocephala</i> *	leucaena	S	-	-
<i>Lomandra longifolia</i>	spiny-headed mat-rush	F	-	LC
<i>Lysiphyllum carronii</i>	red bauhinia	S	-	LC
<i>Melaleuca nervosa</i>	fibre bark	T	-	LC
<i>Melaleuca quinquenervia</i>	five-veined paperbark	T	-	LC
<i>Melaleuca viridiflora</i>	broad-leaved teatree	S	-	LC
<i>Melinis repens</i> *	red natal	G	-	-
<i>Opuntia stricta</i>	prickly pear	F	-	-
<i>Opuntia tomentosa</i> *	velvety tree pear	F	-	-



Species Name	Common Name	Form	EPBC Status	NC Act Status
<i>Owenia acidula</i>	emu apple	S	-	LC
<i>Paspalidium caespitosum</i>	brigalow grass	G	-	LC
<i>Petalostigma pubescens</i>	quinine tree	S	-	LC
<i>Petalostigma triloculare</i>	long-leaved bitterbark	S	-	LC
<i>Pittosporum angustifolium</i>	cattle bush	S	-	LC
<i>Portulaca oleracea</i>	pigweed	F	-	LC
<i>Santalum lanceolatum</i>	sandalwood	T	-	LC
<i>Seteria</i> spp.*	-	G	-	-
<i>Sida cordifolia</i> *	flannel weed	F	-	-
<i>Sida hackettiana</i> *	spiked sida	F	-	LC
<i>Sida</i> sp.	-	F	-	-
<i>Sporobolus caroli</i>	fairy grass	G	-	-
<i>Sporobolus</i> sp.	-	G	-	-
<i>Wahlenbergia</i> spp.	-	F	-	-
<i>Xylomelum pyriforme</i>	native pear	S	-	LC
* species is non-native or introduced species				

A-2 Fauna species List

Table 24 Fauna species identified on site

Species Name	Common Name	EPBC Status	NC Act Status
Amphibians			
<i>Litoria inermis</i>	bumpy rocket frogs	-	LC
<i>Rhinella marinus</i>	cane toad	-	-
Aves			
<i>Aquila audax</i>	wedge-tailed eagle	-	LC
<i>Ardeotis australis</i>	bustard	-	LC
<i>Cacatua galerita</i>	sulphur-crested cockatoo	-	LC
<i>Centropus phasianinus</i>	pheasant coucal	-	LC
<i>Corcorax melanorhamphos</i>	white-winged chough	-	LC
<i>Corvus orru</i>	torresian crow	-	LC
<i>Cracticus nigrogularis</i>	pied butcherbird	-	LC
<i>Dacelo leachii</i>	blue-winged kookaburra	-	LC
<i>Dacelo novaeguineae</i>	laughing kookaburra	-	LC
<i>Dromaius novaehollandiae</i>	emu	-	-
<i>Entomyzon cyanotis</i>	blue-faced honeyeater	-	LC
<i>Eudynamys orientalis</i>	pacific koel	-	LC
<i>Geopelia humeralis</i>	bar-shouldered dove	-	LC



Species Name	Common Name	EPBC Status	NC Act Status
<i>Grallina cyanoleuca</i>	magpie-lark	-	LC
<i>Grus rubicunda</i>	brolga	-	LC
<i>Gymnorhina tibicen</i>	Australian magpie	-	LC
<i>Haliaeetus leucogaster</i>	white-bellie see eagle	-	LC
<i>Haliastur sphenurus</i>	whistling kite	-	LC
<i>Lichenostomus chrysops</i>	yellow-faced honeyeater	-	LC
<i>Malurus cyaneus</i>	superb fairywren	-	LC
<i>Malurus melanocephalus</i>	red-backed fairywren	-	LC
<i>Manorina melanocephala</i>	noisy miner	-	LC
<i>Milvus migrans</i>	black kite	-	LC
<i>Ocyphaps lophotes</i>	crested pigeon	-	LC
<i>Philemon citreogularis</i>	little friarbird	-	LC
<i>Philemon corniculatus</i>	noisy friarbird	-	LC
<i>Platycercus adscitus</i>	pale-headed rosella	-	LC
<i>Pomatostomus superciliosus</i>	white-browed babbler	-	LC
<i>Rhipidura leucophrys</i>	willy wagtail	-	LC
<i>Scythrops novaehollandiae</i>	channel-billed cuckoo	-	LC
<i>Sphecotheres vieilloti</i>	Australasian figbird	-	LC
<i>Struthidea cinerea</i>	apostlebird	-	LC
<i>Taeniopygia bichenovii</i>	double-barred finch	-	LC
<i>Threskiornis moluccus</i>	Australian white ibis	-	LC
<i>Todiramphus macleayi</i>	forest kingfisher	-	LC
Mammals			
<i>Aepyprymnus rufescens</i>	rufous bettong	-	LC
<i>Macropus giganteus</i>	grey kangaroo	-	LC
<i>Macropus rufogriseus</i>	red-necked wallaby	-	LC
<i>Petauroides volans</i>	greater glider	E	E
<i>Tachyglossus aculeatus</i>	short-beaked echidna	-	LC
<i>Trichosurus vulpecula</i>	common brushtail possum	-	LC
Reptiles			
<i>Pogona barbata</i>	Eastern bearded dragon	-	LC



A-3 BioCondition Scores

2020 Survey Area – AUs

Table 25 Assessment Unit 1 (AU1) BioCondition Results

Site ID	BC1S1				BC13S1				BC7S2				BC4S3			
RE	11.3.2				11.3.2				11.3.2				11.3.2			
Attribute	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring
Number of large eucalypts per hectare	18	3	6		18	0	0		18	1	2		18	1	2	
Number of large non-eucalypts per hectare	na	0	0		na	0	0		na	0	0		na	0	0	
Total Number of Large Trees	18	3	6	5	18	0	0	0	18	1	2	5	18	1	2	5
Median canopy height (m):	18	20	111%	5	18	18	100%	5	18	21	117%	5	18	24	133%	5
Median sub-canopy height (m):	9	18	200%	5	9	8	89%	5	9	0	0%	0	9	9	100%	5
Median emergent canopy height (m)	na	0	N/A	N/A	na	0	N/A	N/A	na	0	N/A	N/A	na	0	N/A	N/A
Avg. Tree Canopy Height Score				5				5				2.5				5
Percentage of canopy species with recruitment	100	40	40%	3	100	50	50%	3	100	20	20%	3	100	40	40%	3
Canopy cover (%):	37	41.3	112%	5	37	16.8	45%	2	37	64.3	174%	5	37	68.6	185%	5



MIDDLEMOUNT COAL MINE SOUTHERN EXTENSION PROJECT OFFSET STUDY AREA - BASELINE ASSESSMENT | JULY 2025

Site ID	BC1S1				BC13S1				BC7S2				BC4S3			
RE	11.3.2				11.3.2				11.3.2				11.3.2			
Attribute	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring
Sub-canopy cover (%):	7	16.6	na	na	7	29.2	na	na	7	35.8	na	na	7	11.1	na	na
Emergent canopy cover (%):	na	0	na	na	na	0	na	na	na	0	na	na	na	0	na	na
Avg. Tree Canopy Layer Score				5				2				5				5
Shrub layer cover (%):	4	3.4	85%	5	4	41	1025%	3	4	25.6	640%	3	4	14.6	365%	3
Coarse woody debris (m/ha):	281	86.2	31%	2	281	46	16%	2	281	13.8	5%	0	281	13.9	5%	0
Native Plant Richness:																
Tree:	2	8	400%	5	2	3	150%	5	2	5	250%	5	2	9	450%	5
Shrub:	2	1	50%	2.5	2	3	150%	5	2	6	300%	5	2	3	150%	5
Grass:	9	3	33%	2.5	9	0	0%	0	9	3	33%	2.5	9	4	44%	2.5
Forbs / others:	15	3	20%	0	15	0	0%	0	15	1	7%	0	15	2	13%	0
Non-native plant cover (%):	0	60		0	0	10		5	0	15		5	0	0		10
Groundcover:																
Native perennial grasses (%):	26	0	0%	0	26	0	0%	0	26	17	65%	3	26	19	73%	3
Organic litter (%):	35	40	114%	5	35	17	49%	3	35	32	91%	5	35	53	151%	5
Total:	40				33				44				51.5			
BioCondition Score:	50.00				41.25				55.00				64.38			



Table 26 Assessment Unit 2 (AU2) BioCondition Results

Site ID	BC6S2				BC14S1			
RE	11.3.4				11.3.4			
Attribute	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring
Number of large eucalypts per hectare	26	1	2		26	1	2	
Number of large non-eucalypts per hectare	9	0	0		9	0	0	
Total Number of Large Trees	35	1	2	5	35	1	2	5
Median canopy height (m):	22	22	100%	5	22	18	82%	5
Median sub-canopy height (m):	12	0	0%	0	12	8	67%	3
Median emergent canopy height (m)	na	0	N/A	N/A	na	0	N/A	N/A
Avg. Tree Canopy Height Score				2.5				4
Percentage of canopy species with recruitment	100	30	30%	3	100	80	80%	5
Canopy cover (%):	17	49.2	289%	3	17	40.6	239%	3
Sub-canopy cover (%):	5	16.5	na	na	5	8.6	na	na
Emergent canopy cover (%):	na	0	na	na	na	0	na	na
Avg. Tree Canopy Layer Score				3				3
Shrub layer cover (%):	1	8.7	870%	3	1	3.8	380%	3
Coarse woody debris (m/ha):	384	37.7	10%	0	384	84	22%	2
Native Plant Richness:								
Tree:	4	9	225%	5	4	6	150%	5
Shrub:	2	10	500%	5	2	2	100%	5
Grass:	7	4	57%	2.5	7	1	14%	0
Forbs / others:	10	2	20%	0	10	2	20%	0
Non-native plant cover (%):	0	50		0	0	30		3
Groundcover:								
Native perennial grasses (%):	43	18	42%	1	43	0	0%	0
Organic litter (%):	20	55	275%	5	20	25	125%	5
Total:	35				40			
BioCondition Score:	43.75				50.00			



Table 27: Assessment Unit 3 (AU 3) BioCondition Results

Site ID	BC1S3				BC7S3			
RE	11.3.25				11.3.25			
Attribute	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring
Number of large eucalypts per hectare	19	4	8		19	6	12	
Number of large non-eucalypts per hectare	13	0	0		13	0	0	
Total Number of Large Trees	32	4	8	5	32	6	12	5
Median canopy height (m):	23	29.5	128%	5	23	25	109%	5
Median sub-canopy height (m):	11	10	91%	5	11	8	73%	5
Median emergent canopy height (m)	na	0	N/A	N/A	na	0	N/A	N/A
Avg. Tree Canopy Height Score				5				5
Percentage of canopy species with recruitment	100	70	70%	3	100	40	40%	3
Canopy cover (%):	34	69.8	205%	3	34	29.7	87%	5
Sub-canopy cover (%):	12	2.1	na	na	12	71	na	na
Emergent canopy cover (%):	na	0	na	na	na	0	na	na
Avg. Tree Canopy Layer Score				3				5
Shrub layer cover (%):	7	0	0%	0	7	0.4	6%	0
Coarse woody debris (m/ha):	473	58.5	12%	2	473	82.7	17%	2
Native Plant Richness:								
Tree:	4	8	200%	5	4	2	50%	2.5
Shrub:	4	1	25%	2.5	4	0	0%	0
Grass:	8	5	63%	2.5	8	3	38%	2.5
Forbs / others:	13	2	15%	0	13	1	8%	0
Non-native plant cover (%):	0	70		0	0	10		5
Groundcover:								
Native perennial grasses (%):	35	2.6	7%	0	35	57	163%	5
Organic litter (%):	21	47	224%	5	21	38	181%	5
Total:	33				40			
BioCondition Score:	41.25				50.00			



Table 28 Assessment Unit 4 (AU4) BioCondition Results

Site ID	BC11S1			
RE	11.4.2			
Attribute	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring
Number of large eucalypts per hectare	9	0	0	
Number of large non-eucalypts per hectare	9	0	0	
Total Number of Large Trees	18	0	0	
Median canopy height (m):	20	16	80%	5
Median sub-canopy height (m):	8	8	100%	5
Median emergent canopy height (m)	na	0	N/A	N/A
Avg. Tree Canopy Height Score				5
Percentage of canopy species with recruitment	100	80	80%	5
Canopy cover (%):	25	17.6	70%	5
Sub-canopy cover (%):	5	3.3	na	na
Emergent canopy cover (%):	na	0	na	na
Avg. Tree Canopy Layer Score				5
Shrub layer cover (%):	13	31.1	239%	3
Coarse woody debris (m/ha):	109	78.4	72%	5
Native Plant Richness:				
Tree:	4	5	125%	5
Shrub:	5	2	40%	2.5
Grass:	8	2	25%	2.5
Forbs / others:	7	2	29%	2.5
Non-native plant cover (%):	0	5		5
Groundcover:				
Native perennial grasses (%):	16	0	0%	0
Organic litter (%):	30	28	93%	5
Total:	45.5			
BioCondition Score:	56.88			



Table 29 Assessment Unit 5 (AU5) BioCondition Results

Site ID	BC4S2				BC8S2			
RE	11.4.9				11.4.9			
Attribute	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring
Number of large eucalypts per hectare	na	0	0		na	0	0	
Number of large non-eucalypts per hectare	47	0	0		47	0	0	
Total Number of Large Trees	47	0	0	0	47	0	0	0
Median canopy height (m):	10	12	120%	5	10	16	160%	5
Median sub-canopy height (m):	6	4	67%	3	6	6	100%	5
Median emergent canopy height (m)	na	0	N/A	N/A	na	0	N/A	N/A
Avg. Tree Canopy Height Score				4				5
Percentage of canopy species with recruitment	100	90	90%	5	100	100	100%	5
Canopy cover (%):	25	80.3	321%	3	25	73.1	292%	3
Sub-canopy cover (%):	11	0	na	na	11	0	na	na
Emergent canopy cover (%):	na	0	na	na	na	0	na	na
Avg. Tree Canopy Layer Score				3				3
Shrub layer cover (%):	5	0	0%	0	5	11.8	236%	3
Coarse woody debris (m/ha):	980	38.6	4%	0	980	103.7	11%	2
Native Plant Richness:								
Tree:	2	2	100%	5	2	5	250%	5
Shrub:	5	2	40%	2.5	5	3	60%	2.5
Grass:	5	2	40%	2.5	5	2	40%	2.5
Forbs / others:	10	4	40%	2.5	10	1	10%	0
Non-native plant cover (%):	0	0		10	0	10		5
Groundcover:								
Native perennial grasses (%):	16	4	25%	1	16	16	100%	5
Organic litter (%):	45	46	102%	5	45	37	82%	5
Total:		40.5				43		
BioCondition Score:		50.63				53.75		



Table 30 Assessment Unit 6 (AU6) BioCondition Results

Site ID	BC3S3			
RE	11.5.2a			
Attribute	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring
Number of large eucalypts per hectare	11	2	4	5
Number of large non-eucalypts per hectare	3	0	0	
Total Number of Large Trees	14	2	4	
Median canopy height (m):	20	13	65%	3
Median sub-canopy height (m):	9	0	0%	0
Median emergent canopy height (m)	na	0	N/A	N/A
Avg. Tree Canopy Height Score				1.5
Percentage of canopy species with recruitment	100	10	10%	0
Canopy cover (%):	24	56.6	236%	3
Sub-canopy cover (%):	13	1.3	na	na
Emergent canopy cover (%):	na	0	na	na
Avg. Tree Canopy Layer Score				3
Shrub layer cover (%):	7	0	0%	0
Coarse woody debris (m/ha):	240	74.7	31%	2
Native Plant Richness:				
Tree:	5	5	100%	5
Shrub:	10	4	40%	2.5
Grass:	9	0	0%	0
Forbs / others:	16	1	6%	0
Non-native plant cover (%):	0	2		10
Groundcover:				
Native perennial grasses (%):	38	7.4	19%	1
Organic litter (%):	25	66.6	266%	5
Total:	35			
BioCondition Score:	43.75			



Table 31 Assessment Unit 7 (AU7) BioCondition Results

Site ID	BC4S1				BC3S2				BC9S2				BC8S3			
RE	11.5.3				11.5.3				11.5.3				11.5.3			
Attribute	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring
Number of large eucalypts per hectare	9	0	0		9	2	4		9	7	14		9	9	18	
Number of large non-eucalypts per hectare	1	0	0		1	0	0		1	1	2		1	1	2	
Total Number of Large Trees	10	0	0	0	10	2	4	5	10	8	16	5	10	10	20	5
Median canopy height (m):	16	19	119%	5	16	20	125%	5	16	23	144%	5	16	23	144%	5
Median sub-canopy height (m):	na	6	N/A	N/A	na	0	N/A	N/A	na	6	N/A	N/A	na	6	N/A	N/A
Median emergent canopy height (m)	na	0	N/A	N/A	na	0	N/A	N/A	na	0	N/A	N/A	na	0	N/A	N/A
Avg. Tree Canopy Height Score				5				5				5				5
Percentage of canopy species with recruitment	100	75	75%	5	100	20	20%	3	100	40	40%	3	100	50	50%	3
Canopy cover (%):	20	59.2	296%	3	20	28.5	143%	5	20	74.1	371%	3	20	23.1	116%	5
Sub-canopy cover (%):	na	15.5	na	na	na	0	na	na	na	40.4	na	na	na	23.5	na	na
Emergent canopy cover (%):	na	0	na	na	na	0	na	na	na	0	na	na	na	0	na	na



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Site ID	BC4S1				BC3S2				BC9S2				BC8S3			
RE	11.5.3				11.5.3				11.5.3				11.5.3			
Attribute	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring
Avg. Tree Canopy Layer Score				3				5				3				5
Shrub layer cover (%):	3	15.3	510%	3	3	22.7	757%	3	3	41.5	1383%	3	3	3	100%	5
Coarse woody debris (m/ha):	314	64.6	21%	2	314	15	5%	0	314	114.3	36%	2	314	38.2	12%	2
Native Plant Richness:																
Tree:	6	11	183%	5	6	6	100%	5	6	10	167%	5	6	5	83%	2.5
Shrub:	6	2	33%	2.5	6	6	100%	5	6	5	83%	2.5	6	5	83%	2.5
Grass:	6	6	100%	5	6	6	100%	5	6	4	67%	2.5	6	3	50%	2.5
Forbs / others:	10	1	10%	0	10	10	100%	5	10	3	30%	2.5	10	0	0%	0
Non-native plant cover (%):	0	20		5	0	10		5	0	10		5	0	10		5
Groundcover:																
Native perennial grasses (%):	19	0	0%	0	19	21	111%	5	19	21	111%	5	19	34	179%	5
Organic litter (%):	20	38	190%	5	20	20	100%	5	20	41	205%	5	20	35	175%	5
Total:	40.5				56				48.5				47.5			
BioCondition Score:	50.63				70				60.63				59.38			



Table 32 Assessment Unit 8 (AU8) BioCondition Results

Site ID	BC5S3			
RE	11.5.9			
Attribute	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring
Number of large eucalypts per hectare	19	2	4	5
Number of large non-eucalypts per hectare	1	0	0	
Total Number of Large Trees	20	2	4	
Median canopy height (m):	17	18	106%	5
Median sub-canopy height (m):	8	6	75%	5
Median emergent canopy height (m)	na	0	N/A	N/A
Avg. Tree Canopy Height Score				5
Percentage of canopy species with recruitment	100	25	25%	3
Canopy cover (%):	25	23.8	95%	5
Sub-canopy cover (%):	5	34.4	na	na
Emergent canopy cover (%):	na	0	na	na
Avg. Tree Canopy Layer Score				5
Shrub layer cover (%):	10	0	0%	0
Coarse woody debris (m/ha):	342	29	8%	0
Native Plant Richness:				
Tree:	3	7	233%	5
Shrub:	6	3	50%	2.5
Grass:	9	2	22%	0
Forbs / others:	11	1	9%	0
Non-native plant cover (%):	0	3		10
Groundcover:				
Native perennial grasses (%):	26	21	81%	3
Organic litter (%):	30	28	93%	5
Total:	43.5			
BioCondition Score:	54.38			



Table 33 Assessment Unit 9 (AU9) BioCondition Results

Site ID	BC2S3				BC1S2				BC6S3			
RE	11.7.2				11.7.2				11.7.2			
Attribute	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring
Number of large eucalypts per hectare	10	3	6		10	5	10		10	3	6	
Number of large non-eucalypts per hectare	26	2	4		26	1	2		26	0	0	
Total Number of Large Trees	36	5	10	5	36	6	12	5	36	3	6	5
Median canopy height (m):	15	12.7	85%	5	15	17	113%	5	15	10	67%	3
Median sub-canopy height (m):	5	6	120%	5	5	0	0%	0	5	4	80%	5
Median emergent canopy height (m)	na	0	N/A	N/A	na	0	N/A	N/A	na	0	N/A	N/A
Avg. Tree Canopy Height Score				5				2.5				4
Percentage of canopy species with recruitment	100	15	15%	0	100	75	75%	5	100	40	40%	3
Canopy cover (%):	40	75.7	189%	5	40	67	168%	5	40	39	98%	5
Sub-canopy cover (%):	4	0	na	na	4	0	na	na	4	12.9	na	na
Emergent canopy cover (%):	na	0	na	na	na	0	na	na	na	0	na	na
Avg. Tree Canopy Layer Score				5				5				5
Shrub layer cover (%):	4	0	0%	0	4	7.5	188%	5	4	0	0%	0
Coarse woody debris (m/ha):	1214	70.5	6%	0	1214	142.9	12%	2	1214	124	10%	2



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Site ID	BC2S3				BC1S2				BC6S3			
RE	11.7.2				11.7.2				11.7.2			
Attribute	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring
Native Plant Richness:												
Tree:	3	10	333%	5	3	7	233%	5	3	10	333%	5
Shrub:	4	5	125%	5	4	4	100%	5	4	1	25%	2.5
Grass:	5	1	20%	0	5	2	40%	2.5	5	2	40%	2.5
Forbs / others:	5	0	0%	0	5	1	20%	0	5	1	20%	0
Non-native plant cover (%):	0	0		10	0	0		10	0	5		5
Groundcover:												
Native perennial grasses (%):	15	11	73%	3	15	11	73%	3	15	14	93%	5
Organic litter (%):	20	64	320%	5	20	82	410%	5	20	61	305%	5
Total:	43				55				44			
BioCondition Score:	53.75				68.75				55.00			



Table 34 Assessment Unit 10 (AU10) BioCondition Results

Site ID	BC2S2			
RE	11.7.4			
Attribute	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring
Number of large eucalypts per hectare	14	1	2	5
Number of large non-eucalypts per hectare	7	0	0	
Total Number of Large Trees	21	1	2	
Median canopy height (m):	18	14	78%	5
Median sub-canopy height (m):	9	0	0%	0
Median emergent canopy height (m)	na	0	N/A	N/A
Avg. Tree Canopy Height Score				2.5
Percentage of canopy species with recruitment	100	15	15%	0
Canopy cover (%):	29	19.9	69%	5
Sub-canopy cover (%):	8	17.9	na	na
Emergent canopy cover (%):	na	0	na	na
Avg. Tree Canopy Layer Score				5
Shrub layer cover (%):	7	3.7	53%	5
Coarse woody debris (m/ha):	320	15.6	5%	0
Native Plant Richness:				
Tree:	4	8	200%	5
Shrub:	6	2	33%	2.5
Grass:	7	3	43%	2.5
Forbs / others:	9	0	0%	0
Non-native plant cover (%):	0	0		10
Groundcover:				
Native perennial grasses (%):	12	12	100%	5
Organic litter (%):	50	34	68%	5
Total:	47.5			
BioCondition Score:	59.38			



Table 35 Assessment Unit 11 (AU11) BioCondition Results

Site ID	BC15S1			
RE	NR 11.3.1			
Attribute	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring
Number of large eucalypts per hectare	na	0	0	0
Number of large non-eucalypts per hectare	53	0	0	
Total Number of Large Trees	53	0	0	
Median canopy height (m):	15	3	20%	0
Median sub-canopy height (m):	7	2	29%	3
Median emergent canopy height (m)	na	0	N/A	N/A
Avg. Tree Canopy Height Score				1.5
Percentage of canopy species with recruitment	100	90	90%	5
Canopy cover (%):	35	0	0%	0
Sub-canopy cover (%):	15	0	na	na
Emergent canopy cover (%):	na	0	na	na
Avg. Tree Canopy Layer Score				0
Shrub layer cover (%):	15	17.4	116%	5
Coarse woody debris (m/ha):	1530	160.2	10%	2
Native Plant Richness:				
Tree:	4	3	75%	2.5
Shrub:	4	4	100%	5
Grass:	6	1	17%	0
Forbs / others:	10	1	10%	0
Non-native plant cover (%):	0	10		5
Groundcover:				
Native perennial grasses (%):	33	0	0%	0
Organic litter (%):	30	2	7%	0
Total:	26			
BioCondition Score:	32.50			



Table 36 Assessment Unit 12 (AU12) BioCondition Results

Site ID RE	BC2S1 NR11.3.2				BC9S1 NR11.3.2				BC12S1 NR11.3.2				BC5S2 NR11.3.2			
Attribute	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring
Number of large eucalypts per hectare	18	0	0		18	0	0		18	0	0		18	0	0	
Number of large non-eucalypts per hectare	na	0	0		na	0	0		na	0	0		na	0	0	
Total Number of Large Trees	18	0	0	0	18	0	0	0	18	0	0	0	18	0	0	0
Median canopy height (m)	18	5	28%	3	18	3	17%	0	18	3.5	19%	0	18	2	11%	0
Median sub-canopy height (m)	9	2	22%	0	9	2	22%	0	9	0	0%	0	9	0	0%	0
Median emergent canopy height (m)	na	0	N/A	N/A	na	0	N/A	N/A	na	0	N/A	N/A	na	0	N/A	N/A
Avg. Tree Canopy Height Score				1.5				0				0				0
Percentage of canopy species with recruitment	100	80	80%	5	100	100	100%	5	100	100	100%	5	100	100	100%	5
Canopy cover (%):	37	21	57%	5	37	0	0%	0	37	8.3	22%	2	37	0	0%	0
Sub-canopy cover (%):	7	0	na	na	7	0	na	na	7	0	na	na	7	0	na	na



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Site ID	BC2S1 NR11.3.2				BC9S1 NR11.3.2				BC12S1 NR11.3.2				BC5S2 NR11.3.2			
RE	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring
Emergent canopy cover (%):	na	0	na	na	na	0	na	na	na	0	na	na	na	0	na	na
Avg. Tree Canopy Layer Score				5				0				2				0
Shrub layer cover (%):	4	0.2	5%	0	4	29.7	743%	3	4	29.2	730%	3	4	66.1	1653%	3
Coarse woody debris (m/ha):	281	63	22%	2	281	225.8	80%	5	281	126.8	45%	2	281	86.2	31%	2
Native Plant Richness:																
Tree:	2	5	250%	5	2	6	300%	5	2	5	250%	5	2	5	250%	5
Shrub:	2	1	50%	2.5	2	4	200%	5	2	4	200%	5	2	6	300%	5
Grass:	9	2	22%	0	9	1	11%	0	9	4	44%	2.5	9	1	11%	0
Forbs / others:	15	1	7%	0	15	0	0%	0	15	2	13%	0	15	0	0%	0
Non-native plant cover (%):	0	70		0	0	10		5	0	10		5	0	20		5
Groundcover:																
Native perennial grasses (%):	26	0	0%	0	26	0	0%	0	26	0	0%	0	26	0	0%	0
Organic litter (%):	35	18	51%	5	35	5	14%	3	35	23	66%	5	35	0	0%	0
Total:	26				31				34.5				25			
BioCondition Score:	32.50				38.75				43.13				31.25			



Table 37 Assessment Unit 13 (AU13) BioCondition Results

Site ID RE	BC7S1 NR11.4.9			
Attribute	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring
Number of large eucalypts per hectare	na	0	0	0
Number of large non-eucalypts per hectare	47	0	0	
Total Number of Large Trees	47	0	0	
Median canopy height (m):	10	12	120%	5
Median sub-canopy height (m):	6	4	67%	3
Median emergent canopy height (m)	na	0	N/A	N/A
Avg. Tree Canopy Height Score				4
Percentage of canopy species with recruitment	100	75	75%	5
Canopy cover (%):	25	81.8	327%	3
Sub-canopy cover (%):	11	0	na	na
Emergent canopy cover (%):	na	0	na	na
Avg. Tree Canopy Layer Score				3
Shrub layer cover (%):	5	49.1	982%	3
Coarse woody debris (m/ha):	980	106.7	11%	2
Native Plant Richness:				
Tree:	2	3	150%	5
Shrub:	5	3	60%	2.5
Grass:	5	4	80%	2.5
Forbs / others:	10	1	10%	0
Non-native plant cover (%):	0	0		10
Groundcover:				
Native perennial grasses (%):	16	6	38%	1
Organic litter (%):	45	23	51%	5
Total:	43			
BioCondition Score:	53.75			



Table 38 Assessment Unit 14 (AU14) BioCondition Results

Site ID RE	BC3S1 NR11.5.3				BC5S1 NR11.5.3				BC6S1 NR11.5.3				BC8S1 NR11.5.3			
Attribute	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring
Number of large eucalypts per hectare	9	0	0		9	0	0		9	0	0		9	0	0	
Number of large non-eucalypts per hectare	1	0	0		1	0	0		1	0	0		1	0	0	
Total Number of Large Trees	10	0	0	0	10	0	0	0	10	0	0	0	10	0	0	0
Median canopy height (m):	16	4	25%	3	16	4	25%	3	16	3.5	22%	0	16	1	6%	0
Median sub-canopy height (m):	na	2	N/A	N/A	na	0	N/A	N/A	na	2	N/A	N/A	na	2	N/A	N/A
Median emergent canopy height (m)	na	0	N/A	N/A	na	0	N/A	N/A	na	0	N/A	N/A	na	0	N/A	N/A
Avg. Tree Canopy Height Score				3				3				0				0
Percentage of canopy species with recruitment	100	90	90%	5	100	100	100%	5	100	100	100%	5	100	100	100%	5
Canopy cover (%):	20	13.5	68%	5	20	0	0%	0	20	0	0%	0	20	0	0%	0
Sub-canopy cover (%):	na	0	na	na	na	0	na	na	na	0	na	na	na	0	na	na
Emergent canopy cover (%):	na	0	na	na	na	0	na	na	na	0	na	na	na	0	na	na
Avg. Tree Canopy Layer Score				5				0				0				0
Shrub layer cover (%):	3	0	0%	0	3	37.4	1247%	3	3	10.4	347%	3	3	37.8	1260%	3



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Site ID	BC3S1 NR11.5.3				BC5S1 NR11.5.3				BC6S1 NR11.5.3				BC8S1 NR11.5.3			
RE	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring
Coarse woody debris (m/ha):	314	43.2	14%	2	314	215.8	69%	5	314	121.6	39%	2	314	145.5	46%	2
Native Plant Richness:																
Tree:	6	3	50%	2.5	6	3	50%	2.5	6	5	83%	2.5	6	4	67%	2.5
Shrub:	6	1	17%	0	6	5	83%	2.5	6	2	33%	2.5	6	5	83%	2.5
Grass:	6	0	0%	0	6	1	17%	0	6	1	17%	0	6	3	50%	2.5
Forbs / others:	10	1	10%	0	10	0	0%	0	10	2	20%	0	10	1	10%	0
Non-native plant cover (%):	0	10		5	0	20		5	0	40		3	0	20		5
Groundcover:																
Native perennial grasses (%):	19	0	0%	0	19	0	0%	0	19	0	0%	0	19	0	0%	0
Organic litter (%):	20	13	65%	5	20	14	70%	5	20	7	35%	3	20	8	40%	3
Total:	27.5				31				21				25.5			
BioCondition Score:	34.38				38.75				26.25				31.88			



Table 39 Assessment Unit 15 (AU15) BioCondition Results

Site ID	SE-1			
RE	11.3.1			
Attribute	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring
Number of large eucalypts per hectare	na	0	0	0
Number of large non-eucalypts per hectare	53	0	0	
Total Number of Large Trees	53	0	0	
Median canopy height (m):	15	10.5	70%	5
Median sub-canopy height (m):	7	0	0%	0
Median emergent canopy height (m)	na	0	N/A	N/A
Avg. Tree Canopy Height Score				2.5
Percentage of canopy species with recruitment	100	100	100%	5
Canopy cover (%):	35	83.4	238%	3
Sub-canopy cover (%):	15	0	na	na
Emergent canopy cover (%):	na	0	na	na
Avg. Tree Canopy Layer Score				3
Shrub layer cover (%):	15	10	67%	5
Coarse woody debris (m/ha):	1530	123.8	8%	0
Native Plant Richness:				
Tree:	4	2	50%	2.5
Shrub:	4	3	75%	2.5
Grass:	6	5	83%	2.5
Forbs / others:	10	6	60%	2.5
Non-native plant cover (%):	0	25		3
Groundcover:				
Native perennial grasses (%):	33	0	0%	0
Organic litter (%):	30	30.6	102%	5
Total:	33.5			
BioCondition Score:	41.88			



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Table 40 Assessment Unit 1 (AU1) BioCondition Results (part 1)

Site ID	O2SE03				O2SE04				O2SE05				O2SE06				O2SE14			
RE	11.5.3				11.5.3				11.5.3				11.5.3				11.5.3			
Attribute	Benchm ark	Surv ey Site Raw	Scale d to 1ha or %	Scorin g	Benchm ark	Surv ey Site Raw	Scale d to 1ha or %	Scorin g	Benchm ark	Surv ey Site Raw	Scale d to 1ha or %	Scorin g	Benchm ark	Survey Site Raw	Scale d to 1ha or %	Scorin g	Benchm ark	Surv ey Site Raw	Scale d to 1ha or %	Scorin g
Number of large eucalypts per hectare	9	0	0		9	4	8		9	16	32		9	6	12		9	14	28	
Number of large non-eucalypts per hectare	1	0	0		1	0	0		1	0	0		1	0	0		1	0	0	
Total Number of Large Trees	10	0	0	0	10	4	8	5	10	16	32	5	10	6	12	5	10	14	28	5
Median canopy height (m):	16	18.5	116%	5	16	22	138%	5	16	25	156%	5	16	19	119%	5	16	20	125%	5
Median sub-canopy height (m):	na	0	N/A	N/A	na	0	N/A	N/A	na	3	N/A	N/A	na	0	N/A	N/A	na	0	N/A	N/A
Avg. Tree Canopy Height Score				5				5				5				5				5
Percentage of canopy species with recruitment	100	100	100%	5	100	100	100%	5	100	100	100%	5	100	100	100%	5	100	0	0%	0
Canopy cover (%):	20	35.2	176%	5	20	31.8	159%	5	20	67.5	338%	3	20	56	280%	3	20	33.7	169%	5



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Site ID	O2SE03				O2SE04				O2SE05				O2SE06				O2SE14			
RE	11.5.3				11.5.3				11.5.3				11.5.3				11.5.3			
Attribute	Benchm ark	Surv ey Site Raw	Scale d to 1ha or %	Scorin g	Benchm ark	Surv ey Site Raw	Scale d to 1ha or %	Scorin g	Benchm ark	Surv ey Site Raw	Scale d to 1ha or %	Scorin g	Benchm ark	Survey Site Raw	Scale d to 1ha or %	Scorin g	Benchm ark	Surv ey Site Raw	Scale d to 1ha or %	Scorin g
Sub- canopy cover (%):	na	0	na	na	na	0	na	na	na	0	na	na	na	0	na	na	na	0	na	na
Emergent canopy cover (%):	na	0	na	na	na	0	na	na	na	0	na	na	na	0	na	na	na	0	na	na
Avg. Tree Canopy Layer Score				5				5				3				3				5
Shrub layer cover (%):	3	4.2	140%	5	3	9.2	307%	3	3	0	0%	0	3	0	0%	0	3	47.7	1590 %	3
Coarse woody debris (m/ha):	314	26.8	9%	0	314	62.5	20%	2	314	105	33%	2	314	48.5	15%	2	314	0	0%	0
Native Plant Richness:																				
Tree:	6	5	83%	2.5	6	4	67%	2.5	6	11	183%	5	6	3	50%	2.5	6	3	50%	2.5
Shrub:	6	5	83%	2.5	6	4	67%	2.5	6	6	100%	5	6	3	50%	2.5	6	2	33%	2.5
Grass:	6	4	67%	2.5	6	4	67%	2.5	6	3	50%	2.5	6	3	50%	2.5	6	4	67%	2.5
Forbs / others:	10	0	0%	0	10	0	0%	0	10	0	0%	0	10	0	0%	0	10	0	0%	0
Non-native plant cover (%):	0	15		5	0	30		3	0	10		5	0	40		3	0	0		10
Groundco ver: Native perennial grasses (%):																				
	19	66	347%	5	19	23.75	125%	5	19	21	111%	5	19	31.666 67	167%	5	19	26.2 5	138%	5



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Site ID	O2SE03				O2SE04				O2SE05				O2SE06				O2SE14			
RE	11.5.3				11.5.3				11.5.3				11.5.3				11.5.3			
Attribute	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring
Organic litter (%):	20	17	85%	0	20	27	135%	0	20	32	160%	5	20	31	155%	5	20	24	120%	5
Total:	37.5				40.5				47.5				40.5				45.5			
BioCondition Score:	46.88				50.63				59.38				50.63				56.88			



Table 41 Assessment Unit 1 (AU1) Biocondition results (part 2)

Site ID	O2SE20				O2SE21				O2SE22				O2SE29			
RE	11.5.3				11.5.3				11.5.3				11.5.3			
Attribute	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring
Number of large eucalypts per hectare	9	4	8		9	4	8		9	4	8		9	2	4	
Number of large non-eucalypts per hectare	1	0	0		1	0	0		1	0	0		1	0	0	
Total Number of Large Trees	10	4	8	5	10	4	8	5	10	4	8	5	10	2	4	5
Median canopy height (m):	16	19	119%	5	16	19	119%	5	16	19	119%	5	16	19	119%	5
Median sub-canopy height (m):	na	0	N/A	N/A	na	0	N/A	N/A	na	0	N/A	N/A	na	0	N/A	N/A
Avg. Tree Canopy Height Score				5				5				5				5
Percentage of canopy species with recruitment	100	100	100%	5	100	0	0%	0	100	100	100%	5	100	100	100%	5
Canopy cover (%):	20	47.4	237%	3	20	71.2	356%	3	20	51.7	259%	3	20	23.4	117%	5
Sub-canopy cover (%):	na	0	na	na	na	0	na	na	na	0	na	na	na	0	na	na



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Site ID	O2SE20				O2SE21				O2SE22				O2SE29			
RE	11.5.3				11.5.3				11.5.3				11.5.3			
Attribute	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring
Emergent canopy cover (%):	na	0	na	na	na	0	na	na	na	0	na	na	na	0	na	na
Avg. Tree Canopy Layer Score				3				3				3				5
Shrub layer cover (%):	3	15	500%	3	3	24.1	803%	3	3	22.1	737%	3	3	3.4	113%	5
Coarse woody debris (m/ha):	314	90	29%	2	314	38.5	12%	2	314	117.5	37%	2	314	37.5	12%	2
Native Plant Richness:																
Tree:	6	7	117%	5	6	3	50%	2.5	6	7	117%	5	6	5	83%	2.5
Shrub:	6	7	117%	5	6	4	67%	2.5	6	9	150%	5	6	2	33%	2.5
Grass:	6	4	67%	2.5	6	4	67%	2.5	6	5	83%	2.5	6	3	50%	2.5
Forbs / others:	10	2	20%	0	10	1	10%	0	10	0	0%	0	10	0	0%	0
Non-native plant cover (%):	0	2		10	0	15		5	0	10		5	0	15		5
Groundcover:																
Native perennial grasses (%):	19	39	205%	5	19	50	263%	5	19	36.25	191%	5	19	25	132%	5
Organic litter (%):	20	19	95%	5	20	29	145%	5	20	45	225%	5	20	37	185%	5
Total:	55.5				40.5				50.5				49.5			
BioCondition Score:	69.38				50.63				63.13				61.88			



Table 42 Assessment Unit 2 (AU2) BioCondition Results

Site ID	O2SE01				O2SE02			
RE	11.4.8				11.4.8			
Attribute	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring
Number of large eucalypts per hectare	28	8	16		28	0	0	
Number of large non-eucalypts per hectare	42	0	0		42	0	0	
Total Number of Large Trees	70	8	16	5	70	0	0	0
Median canopy height (m):	17	9	53%	3	17	7.9	46%	3
Median sub-canopy height (m):	na	0	N/A	N/A	na	0	N/A	N/A
Avg. Tree Canopy Height Score				3				3
Percentage of canopy species with recruitment	100	100	100%	5	100	0	0%	0
Canopy cover (%):	40	89.1	223%	3	40	44.8	112%	5
Sub-canopy cover (%):	na	0	na	na	na	0	na	na
Emergent canopy cover (%):	na	5.9	na	na	na	5.7	na	na
Avg. Tree Canopy Layer Score				3				5
Shrub layer cover (%):	5	0	0%	0	5	0	0%	0
Coarse woody debris (m/ha):	813	67.2	8%	0	813	98.5	12%	2
Native Plant Richness:								
Tree:	3	4	133%	5	3	5	167%	5
Shrub:	10	4	40%	2.5	10	3	30%	2.5
Grass:	9	5	56%	2.5	9	4	44%	2.5
Forbs / others:	7	1	14%	0	7	2	29%	2.5
Non-native plant cover (%):	0	70		0	0	60		0
Groundcover:								
Native perennial grasses (%):	20	5	25%	1	20	8.75	44%	1
Organic litter (%):	37	20	54%	0	37	27	73%	0
Total:	27				23.5			
BioCondition Score:	33.75				29.38			



Table 43 Assessment Unit 3 (AU3) BioCondition Results

Site ID	O2SE18				O2SE19			
RE	11.5.3				11.5.3			
Attribute	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring
Number of large eucalypts per hectare	9	8	16		9	10	20	
Number of large non-eucalypts per hectare	1	0	0		1	0	0	
Total Number of Large Trees	10	8	16	5	10	10	20	5
Median canopy height (m):	16	23	144%	5	16	25	156%	5
Median sub-canopy height (m):	na	0	N/A	N/A	na	6	N/A	N/A
Avg. Tree Canopy Height Score				5				5
Percentage of canopy species with recruitment	100	100	100%	5	100	100	100%	5
Canopy cover (%):	20	84.6	423%	3	20	45.8	229%	3
Sub-canopy cover (%):	na	0	na	na	na	6.6	na	na
Emergent canopy cover (%):	na	0	na	na	na	0	na	na
Avg. Tree Canopy Layer Score				3				3
Shrub layer cover (%):	3	41.6	1387%	3	3	0	0%	0
Coarse woody debris (m/ha):	314	147.5	47%	2	314	87.5	28%	2
Native Plant Richness:								
Tree:	6	3	50%	2.5	6	7	117%	5
Shrub:	6	6	100%	5	6	6	100%	5
Grass:	6	4	67%	2.5	6	4	67%	2.5
Forbs / others:	10	1	10%	0	10	2	20%	0
Non-native plant cover (%):	0	3		10	0	5		5
Groundcover:								
Native perennial grasses (%):	19	47	247%	5	19	33	174%	5
Organic litter (%):	20	20	100%	5	20	30	150%	5
Total:	53				47.5			
BioCondition Score:	66.25				59.38			



Table 44 Assessment Unit4 (AU4) BioCondition Results

Site ID	O2SE15				O2SE17			
RE	11.7.2				11.7.2			
Attribute	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring
Number of large eucalypts per hectare	10	4	8		10	0	0	
Number of large non-eucalypts per hectare	26	0	0		26	0	0	
Total Number of Large Trees	36	4	8	5	36	0	0	0
Median canopy height (m):	15	7	47%	3	15	16	107%	5
Median sub-canopy height (m):	5	0	0%	0	5	1.8	36%	3
Avg. Tree Canopy Height Score				1.5				4
Percentage of canopy species with recruitment	100	100	100%	5	100	0	0%	0
Canopy cover (%):	40	88.2	221%	3	40	74.1	185%	5
Sub-canopy cover (%):	4	0	0%	0	4	0	0%	0
Emergent canopy cover (%):	na	9.6	na	na	na	0	na	na
Avg. Tree Canopy Layer Score				1.5				2.5
Shrub layer cover (%):	4	10.9	273%	3	4	40	1000%	3
Coarse woody debris (m/ha):	1214	65.5	5%	0	1214	118.5	10%	0
Native Plant Richness:								
Tree:	3	6	200%	5	3	4	133%	5
Shrub:	4	3	75%	2.5	4	3	75%	2.5
Grass:	5	4	80%	2.5	5	6	120%	5
Forbs / others:	5	0	0%	0	5	4	80%	2.5
Non-native plant cover (%):	0	0		10	0	5		5
Groundcover:								
Native perennial grasses (%):	15	34	227%	5	15	43	287%	5
Organic litter (%):	20	39	195%	5	20	37	185%	5
Total:	46				39.5			
BioCondition Score:	57.50				49.38			



Table 45 Assessment Unit 5 (AU5) BioCondition Results

Site ID	O2SE25			
RE	11.5.8b			
Attribute	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring
Number of large eucalypts per hectare	8	4	8	5
Number of large non-eucalypts per hectare	24	4	8	
Total Number of Large Trees	32	8	16	
Median canopy height (m):	11	17	155%	5
Median sub-canopy height (m):	8	0	0%	0
Avg. Tree Canopy Height Score				2.5
Percentage of canopy species with recruitment	100	100	100%	5
Canopy cover (%):	48	66.8	139%	5
Sub-canopy cover (%):	11	0	0%	0
Emergent canopy cover (%):	4	0	na	na
Avg. Tree Canopy Layer Score				2.5
Shrub layer cover (%):	6	16.1	268%	3
Coarse woody debris (m/ha):	261	107.5	41%	2
Native Plant Richness:				
Tree:	6	5	83%	2.5
Shrub:	2	4	200%	5
Grass:	7	2	29%	2.5
Forbs / others:	18	1	6%	0
Non-native plant cover (%):	0	0		10
Groundcover:				
Native perennial grasses (%):	44	11	25%	1
Organic litter (%):	23	45	196%	5
Total:	46			
BioCondition Score:	57.50			



Table 46 Assessment Unit 6 (AU6) BioCondition Results

Site ID	O2SE12				O2SE16			
RE	11.5.9				11.5.9			
Attribute	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring
Number of large eucalypts per hectare	19	6	12		19	2	4	
Number of large non-eucalypts per hectare	1	0	0		1	0	0	
Total Number of Large Trees	20	6	12	5	20	2	4	5
Median canopy height (m):	17	22	129%	5	17	17	100%	5
Median sub-canopy height (m):	8	14	175%	5	8	2	25%	3
Avg. Tree Canopy Height Score				5				4
Percentage of canopy species with recruitment	100	75	75%	5	100	50	50%	3
Canopy cover (%):	25	30	120%	5	25	25	100%	5
Sub-canopy cover (%):	5	20	400%	3	5	20	400%	3
Emergent canopy cover (%):	na	0	na	na	na	15	na	na
Avg. Tree Canopy Layer Score				4				4
Shrub layer cover (%):	10	20	200%	3	10	15	150%	5
Coarse woody debris (m/ha):	342	50.5	15%	2	342	29.5	9%	0
Native Plant Richness:								
Tree:	3	6	200%	5	3	5	167%	5
Shrub:	6	4	67%	2.5	6	3	50%	2.5
Grass:	9	4	44%	2.5	9	4	44%	2.5
Forbs / others:	11	2	18%	0	11	2	18%	0
Non-native plant cover (%):	0	10		5	0	3		10
Groundcover:								
Native perennial grasses (%):	26	55	212%	5	26	55	212%	5
Organic litter (%):	30	19	63%	5	30	19	63%	5
Total:		49				51		
BioCondition Score:		61.25				63.75		



Table 47 Assessment Unit 7 (AU7) BioCondition Results

Site ID	O2SE10				O2SE11				O2SE27				O2SE28			
RE	11.5.2				11.5.2				11.5.2				11.5.2			
Attribute	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring
Number of large eucalypts per hectare	11	0	0		11	0	0		11	2	4		11	4	8	
Number of large non-eucalypts per hectare	3	0	0		3	0	0		3	0	0		3	0	0	
Total Number of Large Trees	14	0	0	0	14	0	0	0	14	2	4	5	14	4	8	5
Median canopy height (m):	20	20	100%	5	20	0	0%	0	20	20	100%	5	20	21	105%	5
Median sub-canopy height (m):	9	11	122%	5	9	0	0%	0	9	0	0%	0	9	0	0%	0
Avg. Tree Canopy Height Score				5				0				2.5				2.5
Percentage of canopy species with recruitment	100	100	100%	5	100	100	100%	5	100	0	0%	0	100	100	100%	5
Canopy cover (%):	24	25.3	105%	5	24	28.8	120%	5	24	24.7	103%	5	24	33.1	138%	5
Sub-canopy cover (%):	13	56.7	436%	3	13	55	423%	3	13	0	0%	0	13	45.5	350%	3
Emergent canopy cover (%):	na	0	na	na	na	0	na	na	na	0	na	na	na	0	na	na
Avg. Tree Canopy Layer Score				4				4				2.5				4
Shrub layer cover (%):	7	0	0%	0	7	0	0%	0	7	23.9	341%	3	7	16	229%	3



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Site ID	O2SE10				O2SE11				O2SE27				O2SE28			
RE	11.5.2				11.5.2				11.5.2				11.5.2			
Attribute	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring
Coarse woody debris (m/ha):	240	65.5	27%	2	240	0	0%	0	240	0	0%	0	240	82.5	34%	2
Native Plant Richness:																
Tree:	5	5	100%	5	5	3	60%	2.5	5	7	140%	5	5	7	140%	5
Shrub:	10	3	30%	2.5	10	3	30%	2.5	10	4	40%	2.5	10	3	30%	2.5
Grass:	9	4	44%	2.5	9	4	44%	2.5	9	2	22%	0	9	2	22%	0
Forbs / others:	16	0	0%	0	16	0	0%	0	16	1	6%	0	16	1	6%	0
Non-native plant cover (%):	0	15		5	0	20		5	0	0		10	0	5		5
Groundcover:																
Native perennial grasses (%):	38	39	103%	5	38	39	103%	0	38	34	89%	3	38	25	66%	3
Organic litter (%):	25	15	60%	5	25	15	60%	5	25	45	180%	5	25	36	144%	5
Total:	41				26.5				38.5				42			
BioCondition Score:	51.25				33.13				48.13				52.50			



Table 48 Assessment Unit 8 (AU8) BioCondition Results

Site ID	O2SE23				O2SE24				O2SE26			
RE	11.7.4				11.7.4				11.7.4			
Attribute	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring
Number of large eucalypts per hectare	14	8	16		14	8	16		14	6	12	
Number of large non-eucalypts per hectare	7	0	0		7	0	0		7	0	0	
Total Number of Large Trees	21	8	16	5	21	8	16	5	21	6	12	5
Median canopy height (m):	18	25	139%	5	18	23	128%	5	18	25	139%	5
Median sub-canopy height (m):	9	0	0%	0	9	0	0%	0	9	16	178%	5
Avg. Tree Canopy Height Score				2.5				2.5				5
Percentage of canopy species with recruitment	100	100	100%	5	100	100	100%	5	100	8	8%	0
Canopy cover (%):	29	47.4	163%	5	29	20.6	71%	5	29	33.5	116%	5
Sub-canopy cover (%):	8	0	na	na	8	0	na	na	8	0	na	na
Emergent canopy cover (%):	na	0	na	na	na	0	na	na	na	0	na	na
Avg. Tree Canopy Layer Score				5				5				5
Shrub layer cover (%):	7	26.2	374%	3	7	19.6	280%	3	7	12.3	176%	5
Coarse woody debris (m/ha):	320	78.5	25%	2	320	43	13%	2	320	76.5	24%	2
Native Plant Richness:												
Tree:	4	9	225%	5	4	7	175%	5	4	8	200%	5
Shrub:	6	7	117%	5	6	6	100%	5	6	5	83%	2.5



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Site ID	O2SE23				O2SE24				O2SE26			
RE	11.7.4				11.7.4				11.7.4			
Attribute	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring
Grass:	7	4	57%	2.5	7	4	57%	2.5	7	3	43%	2.5
Forbs / others:	9	1	11%	0	9	1	11%	0	9	1	11%	0
Non-native plant cover (%):	0	15		5	0	0		10	0	0		10
Groundcover:												
Native perennial grasses (%):	12	37	308%	5	12	34	283%	5	12	20	167%	5
Organic litter (%):	50	41	82%	5	50	34	68%	5	50	46	92%	5
Total:	50				55				52			
BioCondition Score:	62.50				68.75				65.00			



Table 49 Assessment Unit9 (AU9) BioCondition Results

Site ID	O2SE13			
RE	11.3.2			
Attribute	Benchmark	Survey Site Raw	Scaled to 1ha or %	Scoring
Number of large eucalypts per hectare	18	2	4	5
Number of large non-eucalypts per hectare	na	0	0	
Total Number of Large Trees	18	2	4	
Median canopy height (m):	18	21	117%	5
Median sub-canopy height (m):	9	6	67%	3
Median emergent canopy height (m)	na	0	N/A	N/A
Avg. Tree Canopy Height Score				4
Percentage of canopy species with recruitment	100	60	60%	3
Canopy cover (%):	37	6.3	17%	2
Sub-canopy cover (%):	7	19.1	na	na
Emergent canopy cover (%):	na	0	na	na
Avg. Tree Canopy Layer Score				2
Shrub layer cover (%):	4	4.2	105%	5
Coarse woody debris (m/ha):	281	0	0%	0
Native Plant Richness:				
Tree:	2	5	250%	5
Shrub:	2	5	250%	5
Grass:	9	4	44%	2.5
Forbs / others:	15	0	0%	0
Non-native plant cover (%):	0	15		5
Groundcover:				
Native perennial grasses (%):	26	38	146%	0
Organic litter (%):	35	22	63%	5
Total:	41.5			
BioCondition Score:	51.88			



A-4 Terrestrial Habitat Quality Data

Squatter Pigeon

Terrestrial Habitat Quality Data was collected and assessed according to *the Guide to Determining Terrestrial Habitat Quality Version 1.3* (DES 2020), Table 50 shows the Terrestrial Habitat Quality Data for the Squatter Pigeon in the Action Area, Table 52 and Table 53 show the Terrestrial Habitat Quality Data for the 2020 and 2023 survey areas within the Study Area respectively.



Table 50 Terrestrial Habitat Quality Data - Action Area - Squatter Pigeon

Squatter Pigeon AUs – Action Area	1	2	3	4	5	6	7	8	9
RE	11.3.1	11.3.2/11.3.2b	11.3.25	11.3.7	11.7.2	11.7.4	NR 11.3.1	NR 11.3.2	NR 11.5.3
Assessment Unit Area (ha)	3.481	45.052	16.221	18.414	0.852	2.162	62.638	96.933	4.192
Recruitment of wood perennial species in EDL (%)	100	83.3	75	100	100	75	100	100	100
Native plant species richness- trees	5	7	8	6	6	13	2	5	9
Native plant species richness- shrubs	3	2	4	2	2	2	3	4	2
Native plant species richness- grasses	0	3	0	3	3	5	2	3	3
Native plant species richness- forbs	10	4	8	6	12	12	6	5	6
Tree canopy height	13	18.7	25	24	16	20	1.5	3.25	6
Subcanopy height	8	NA	NA	12	NA	10	0	NA	0
Tree canopy cover (%)	51.5	38.7	60.9	32	32	47.3	0	1.45	4.65
Subcanopy cover (%)	0	NA	NA	35.8	0	0	0	NA	0
Shrub canopy cover (%)	2.6	1.3	8.8	9	0	9.6	36.6	2.5	6.8
Native perennial grass cover (%)	0	5.7	0	0	25	6	0	2	18
Organic litter cover (%)	52	20.7	29	43	59	69	41.5	41.5	34
Large Trees	0	16	16	14	14	12	0	0	4
Coarse woody debris (m)	218	301.7	172	276	1882	437	475	298.75	1212
Non-native plant cover (%)	40	66.7	70	70	5	5	62.5	83.75	80
Size of patch	7	7	7	7	7	7	5	5	7
Connectedness	2	4	5	5	5	4	0	4	4
Context	5	5	4	4	4	5	4	4	4
Ecological corridors	6	6	6	6	6	6	6	6	6
Threats to species	7	7	7	7	7	7	7	7	7
Quality and availability of foraging habitat	10	10	10	10	10	5	5	5	5
Quality and availability of shelter	10	10	10	10	10	5	1	1	1
Species mobility category	10	10	10	10	10	7	10	10	10
Role of the site location to species overall population in the state	1	1	1	1	1	1	1	1	1
Final Score	7.22						4.99		



The following notes are made in relation to Table 50 pertaining to the Squatter Pigeon:

- The 'threats to the species' was assessed as 'Moderate Threat Level' due to presence of feral cats, road strike risk and habitat fragmentation present.
- The 'quality and availability of foraging habitat' was assessed as 'high' in remnant areas due to the abundance and accessibility of preferred foraging habitat
 - 'The quality and availability of foraging habitat' assessed as 'moderate' in non-remnant areas due to the lower availability of preferred foraging habitat and higher levels of disturbance
- The 'quality and availability of shelter' was assessed as 'high' in remnant areas due to extent of shelter available and the connectivity to other populations to maintain genetics.
 - The 'quality and availability of shelter' was assessed as poor in non-remnant areas due to high levels of disturbance and absence of habitat features necessary for shelter
- The 'species mobility category' was assessed as '10 (i.e. *Minor Restriction [0-25% Reduction]*)' due to the connectivity of habitat and that limited barriers to movement exist in this area.
- The 'role of the site location to species overall population in the state' was assessed as '1 (i.e. *Not or Unlikely to be Critical to Species' Survival*)' as the impact site is unlikely to provide habitat critical to the survival of this species in a state-wide context.

The Species Habitat Index Scoring Guide developed from *The Guide to Determining Terrestrial Habitat Quality v1.3* (DES 2020) is provided in Table 51, this index scoring guide was utilised to score all MNES species identified within the Action and Offset area.



Table 51 Species Habitat Index Scoring Guide

1 Threats to Species	Score	1	7	15	-
	Description	High Threat Level (i.e. likely to result in death, irreversible damage)	Moderate Threat Level	Low Threat Level (i.e. likely to survive)	-
2 Quality and Availability of Food and Foraging Habitat	Score	1	5	10	-
	Description	Poor	Moderate	High	-
3 Quality and Availability of Shelter	Score	1	5	10	-
	Description	Poor	Moderate	High	-
4 Species Mobility Capacity	Score	1	4	7	10
	Description	Severely Restricted (76-100% reduction)	Highly Restricted (51-75% Reduction)	Moderately Restricted (26-50% Reduction)	Minor Restriction (0-25% Reduction)
5 Role of Site Location to Species Overall Population in the State	Score	1	4	5	-
	Description	Not or Unlikely to be Critical to Species' Survival	Likely to be Critical to Species' Survival	Critical to Species' Survival	-



Table 52 Terrestrial Habitat Quality Data - 2020 Survey Area Offset Study Area - Squatter Pigeon

Squatter Pigeon AUs (2020 Survey Area)	1	2	3	4	5	6	7	8	9	10	11	12	13	14
RE	11.3.2	11.3.4	11.3.25	11.4.2	11.4.9	11.5.2a	11.5.3	11.5.9	11.7.2	11.7.4	NR 11.3.1	NR 11.3.2	NR 11.4.9	NR 11.5.3
Assessment Unit Area (ha)	137.72	36.07	66.18	26.53	21.20	32.56	77.68	42.39	41.14	25.242	10.45	71.88	32.45	126.34
Recruitment of wood perennial species in EDL (%)	37.5	30.0	55.0	80.0	95.0	10.0	46.3	25.0	43.3	15.0	90.0	95.0	75.0	97.5
Native plant species richness- trees	6.3	9.0	9.0	7.0	3.5	5.0	7.8	7.0	9.0	8.0	3.0	5.3	3.0	3.8
Native plant species richness- shrubs	3.3	10.0	2.0	3.0	2.0	3.0	4.0	3.0	3.3	2.0	4.0	3.8	3.0	3.3
Native plant species richness- grasses	2.5	4.0	4.5	0.0	2.0	2.0	3.3	2.0	1.7	3.0	1.0	2.0	4.0	1.3
Native plant species richness- forbs	1.5	2.0	2.0	0.0	3.0	1.0	1.3	1.0	1.0	0.0	1.0	0.8	1.0	1.0
Tree canopy height	20.8	20.0	27.3	16.0	14.0	12.0	21.3	18.0	13.2	14.0	3.0	3.4	12.0	3.1
Subcanopy height	8.8	4.0	9.0	8.0	5.0	5.0	6.0	6.0	3.3	0.0	2.0	1.0	4.0	1.5
Tree canopy cover (%)	47.8	49.2	49.8	17.6	76.6	56.6	46.2	23.8	60.6	19.9	0.0	7.3	8.2	3.4
Subcanopy cover (%)	23.2	16.5	46.0	3.3	0.0	1.3	19.9	34.4	4.3	17.9	0.0	0.0	0.0	0.0
Shrub canopy cover (%)	21.2	8.7	0.2	31.1	5.9	0.0	20.6	0.0	2.5	3.7	17.4	31.3	49.1	21.4
Native perennial grass cover (%)	9.0	18.0	29.8	0.0	10.0	7.4	19.0	21.0	12.0	12.0	0.0	0.0	6.0	0.0
Organic litter cover (%)	35.5	55.0	42.5	28.0	41.5	66.6	33.5	28.0	69.0	34.0	2.0	11.5	23.0	10.5
Large Trees	2.5	2.0	10.0	0.0	0.0	4.0	6.5	4.0	9.3	2.0	0.0	0.0	0.0	0.0
Coarse woody debris (m)	399.8	377.0	706.0	784.0	711.5	747.0	580.3	290.0	112.5	156.0	160.2	124.5	106.7	131.5
Non-native plant cover (%)	21.3	50.0	40.0	5.0	5.0	2.0	12.3	3.0	1.7	0.0	10.0	27.5	0.0	16.7
Size of patch	7.0	2.0	5.0	5.0	2.0	5.0	7.0	5.0	10.0	5.0	2.0	5.0	5.0	7.0
Connectedness	4.0	5.0	5.0	4.0	5.0	4.0	5.0	5.0	5.0	4.0	2.0	2.0	4.0	2.0
Context	4.0	5.0	5.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0	4.0	4.0	4.0
Ecological corridors	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Threats to species	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Quality and availability of foraging habitat	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	1.0	1.0	1.0	1.0
Quality and availability of shelter	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	1.0	1.0	1.0	1.0
Species mobility category	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	7.0	7.0	7.0	7.0
Role of the site location to species overall population in the state	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Final Score	6.29										4.41			



Table 53 Terrestrial Habitat Quality Data - 2023 Survey Area Offset Study Area - Squatter Pigeon

Squatter Pigeon AUs – 2023 Survey Area	1	2	3	4	5	6	7	8	9
RE	11.5.3	11.4.8	11.5.3	11.7.2	11.5.8b	11.5.9	11.5.2	11.7.4	11.3.2
Assessment Unit Area (ha)	314.15	18.62	33.61	194.95	5.132	29.023	73.105	51.933	29.391
Recruitment of wood perennial species in EDL (%)	77.8	50.0	100.0	50.0	100.0	62.5	75.0	69.3	60.0
Native plant species richness- trees	5.3	4.5	5.0	5.0	5.0	5.5	5.5	8.0	5.0
Native plant species richness- shrubs	4.7	3.5	6.0	3.0	4.0	3.5	3.3	6.0	5.0
Native plant species richness- grasses	3.8	4.5	4.0	5.0	2.0	4.0	3.0	3.7	4.0
Native plant species richness- forbs	0.3	1.5	1.5	2.0	1.0	2.0	0.5	1.0	0.0
Tree canopy height	20.1	8.5	24.0	11.5	17.0	19.5	15.3	24.3	21.0
Subcanopy height	0.3	0.0	3.0	0.9	0.0	8.0	2.8	5.3	6.0
Tree canopy cover (%)	46.4	67.0	65.2	81.2	66.8	27.5	28.0	33.8	6.3
Subcanopy cover (%)	0.0	0.0	3.3	0.0	0.0	20.0	39.3	0.0	19.1
Shrub canopy cover (%)	14.0	0.0	20.8	25.5	16.1	17.5	10.0	19.4	4.2
Native perennial grass cover (%)	35.4	6.9	40.0	38.5	11.0	55.0	34.3	30.3	38.0
Organic litter cover (%)	29.0	23.5	25.0	38.0	45.0	19.0	27.8	40.3	22.0
Large Trees	6.0	4.0	9.0	2.0	8.0	4.0	1.5	7.3	2.0
Coarse woody debris (m)	584.8	828.5	1175.0	920.0	1075.0	400.0	370.0	660.0	120.0
Non-native plant cover (%)	15.2	65.0	4.0	2.5	0.0	6.5	10.0	5.0	15.0
Size of patch	7.0	5.0	10.0	10.0	10.0	10.0	10.0	10.0	7.0
Connectedness	5.0	4.0	5.0	5.0	5.0	5.0	4.0	5.0	4.0
Context	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Ecological corridors	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Threats to species	7	7	7	7	7	7	7	7	7
Quality and availability of foraging habitat	5	5	5	5	5	5	5	5	5
Quality and availability of shelter	5	5	5	5	5	5	5	5	5
Species mobility category	10	10	7	4	10	10	10	10	10
Role of the site location to species overall population in the state	1	1	1	1	1	1	1	1	1
Final Score	6.45								



The following notes are made in relation to the data in Table 52 and Table 53 pertaining to the Squatter Pigeon:

- The 'threats to the species' was assessed as 'Moderate Threat Level' due to presence of feral cats and risk of fires.
- The 'quality and availability of foraging habitat' was assessed as 'moderate' in the remnant areas due to presence of areas of moderate quality foraging habitat, but 'poor' in the regrowth habitat due to the overabundance of buffel grass.
- The 'quality and availability of shelter' was assessed as 'moderate' in the remnant zone due to presence of areas of suitable shelter habitat, but 'poor' in the regrowth zone due to the lack of sufficient habitat present.
- The 'species mobility category' was assessed as '10 (i.e. *Minor Restriction [0-25% Reduction]*)' in remnant zones due to the high mobility of this species and with no significant barriers to movement present. The regrowth areas however have moderate barriers.
- The 'role of the site location to species overall population in the state' was assessed as '1 (i.e. *Not or Unlikely to be Critical to Species' Survival*)' as the offset site is unlikely to provide habitat critical to the survival of this species in a state-wide context.

The species index scoring for a future without the offset has been assessed as:

- A reduction in the 'quality and availability of foraging habitat' due to the presences of recognised threats to this species (loss and fragmentation of habitat due to clearing for agricultural purposes, the degradation of habitat by livestock and the degradation of habitat by invasive weeds, such as buffel grass).
- A reduction in the 'quality and availability of shelter habitat' due to the presences of recognised threats to this species (loss and fragmentation of habitat due to clearing for agricultural purposes, the degradation of habitat by livestock, the degradation of habitat by invasive weeds (such as buffel grass) and predation by pest animals.
- A reduction in the 'species mobility category' due to the presences of recognised threats to this species (loss and fragmentation of habitat due to clearing for agricultural purposes)

The species index scoring for a future with the offset has been assessed as follows:

- A decrease in the 'threats to the species' to 'low threat level' due to management of threats relevant to this species, namely management of livestock and management of weeds (including buffel grass).
- An increase in the 'quality and availability of foraging habitat' to 'high' due to management of threats relevant to this species, namely management of livestock and management of weeds (including buffel grass), and installation of new permanent watering points increasing suitable areas of habitat in close proximity to water
- An increase in the 'quality and availability of shelter habitat' to 'high' due to management of threats relevant to this species, namely management of livestock and management of weeds (including buffel grass), and installation of new permanent watering points increasing suitable areas of habitat in close proximity to water



Koala

Terrestrial Habitat Quality Data was collected and assessed according to *the Guide to Determining Terrestrial Habitat Quality Version 1.3* (DES 2020), Table 54 shows the Terrestrial Habitat Quality Data for the Koala in the Action Area, Table 55 and Table 56 show the Terrestrial Habitat Quality Data for the 2020 and 2023 survey areas within the Study Area respectively.

Table 54 Terrestrial Habitat Quality Data - Action Area - Koala

Action Area Koala AUs	2	3	4	6	8	9
RE	11.3.2/11.3.2b	11.3.25	11.3.7	11.7.4	NR 11.3.2	NR 11.5.3
Assessment Unit Area (ha)	45.052	16.221	18.414	2.162	96.933	4.192
Recruitment of wood perennial species in EDL (%)	83.3	75	100	75	100	100
Native plant species richness- trees	7	8	6	13	5	9
Native plant species richness- shrubs	2	4	2	2	4	2
Native plant species richness- grasses	3	0	3	5	3	3
Native plant species richness- forbs	4	8	6	12	5	6
Tree canopy height	18.7	25	24	20	3.25	6
Subcanopy height	NA	NA	12	10	NA	0
Tree canopy cover (%)	38.7	60.9	32	47.3	1.45	4.65
Subcanopy cover (%)	NA	NA	35.8	0	NA	0
Shrub canopy cover (%)	1.3	8.8	9	9.6	2.5	6.8
Native perennial grass cover (%)	5.7	0	0	6	2	18
Organic litter cover (%)	20.7	29	43	69	41.5	34
Large Trees	16	16	14	12	0	4
Coarse woody debris (m)	301.7	172	276	437	298.75	1212
Non-native plant cover (%)	66.7	70	70	5	83.75	80
Size of patch	7	7	7	7	5	7
Connectedness	4	5	5	4	4	4
Context	5	4	4	5	4	4
Ecological corridors	6	6	6	6	6	6
Threats to species	7	7	7	7	7	7
Quality and availability of foraging habitat	5	5	5	5	1	1
Quality and availability of shelter	5	5	5	5	1	1
Species mobility category	7	7	7	7	7	7
Role of the site location to species overall population in the state	1	1	1	1	1	1
Final Score	6.47				4.95	



The following notes are made in relation to the data in Table 54 pertaining to the Koala:

- The 'threats to the species' was assessed as 'Moderate Threat Level' due to presence of cleared land, risk of vehicle strike and presence of feral predators.
- The 'quality and availability of foraging habitat' was assessed as 'moderate' in the remnant areas due to presence of forest/woodland habitat and some preferred food trees, and as 'poor' in the non-remnant areas due to a lack of mature preferred food trees.
- The 'quality and availability of shelter' was assessed as 'moderate' due to moderate abundance of shelter trees, patch size and connectivity to other populations.
- The 'species mobility category' was assessed as '7 (i.e. Moderately Restricted [26-50% Reduction])' due to relatively narrow corridor width and connectivity to other areas and the risk of car strike or dog attack when mobile.
- The 'role of the site location to species overall population in the state' was assessed as '1 (i.e. *Not or Unlikely to be Critical to Species' Survival*)' as the impact site is unlikely to provide habitat critical to the survival of this species in a state-wide context.



Table 55 Terrestrial Habitat Quality Data 2020 Survey Area Offset Study Area - Koala

Koala Assessment Unit (2020 Survey Area)	1	2	3	4	6	7	8	10	12	14
4	11.3.2	11.3.4	11.3.25	11.4.2	11.5.2a	11.5.3	11.5.9	11.7.4	NR 11.3.2	NR 11.5.3
Assessment Unit Area (ha)	137.72	36.07	66.18	26.53	32.56	77.68	42.39	25.24	71.88	126.34
Recruitment of wood perennial species in EDL (%)	37.5	30.0	55.0	80.0	10.0	46.3	25.0	15.0	95.0	97.5
Native plant species richness- trees	6.3	9.0	9.0	7.0	5.0	7.8	7.0	8.0	5.3	3.8
Native plant species richness- shrubs	3.3	10.0	2.0	3.0	3.0	4.0	3.0	2.0	3.8	3.3
Native plant species richness- grasses	2.5	4.0	4.5	0.0	2.0	3.3	2.0	3.0	2.0	1.3
Native plant species richness- forbs	1.5	2.0	2.0	0.0	1.0	1.3	1.0	0.0	0.8	1.0
Tree canopy height	20.8	20.0	27.3	16.0	12.0	21.3	18.0	14.0	3.4	3.1
Subcanopy height	8.8	4.0	9.0	8.0	5.0	6.0	6.0	0.0	1.0	1.5
Tree canopy cover (%)	47.8	49.2	49.8	17.6	56.6	46.2	23.8	19.9	7.3	3.4
Subcanopy cover (%)	23.2	16.5	46.0	3.3	1.3	19.9	34.4	17.9	0.0	0.0
Shrub canopy cover (%)	21.2	8.7	0.2	31.1	0.0	20.6	0.0	3.7	31.3	21.4
Native perennial grass cover (%)	9.0	18.0	29.8	0.0	7.4	19.0	21.0	12.0	0.0	0.0
Organic litter cover (%)	35.5	55.0	42.5	28.0	66.6	33.5	28.0	34.0	11.5	10.5
Large Trees	2.5	2.0	10.0	0.0	4.0	6.5	4.0	2.0	0.0	0.0
Coarse woody debris (m)	399.8	377.0	706.0	784.0	747.0	580.3	290.0	156.0	124.5	131.5
Non-native plant cover (%)	21.3	50.0	40.0	5.0	2.0	12.3	3.0	0.0	27.5	16.7
Size of patch	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	5.0	7.0
Connectedness	4.0	5.0	5.0	4.0	4.0	5.0	4.0	4.0	2.0	2.0
Context	4.0	5.0	5.0	4.0	5.0	5.0	5.0	5.0	4.0	4.0
Ecological corridors	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Threats to species	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Quality and availability of foraging habitat	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	1.0	1.0
Quality and availability of shelter	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	1.0	1.0
Species mobility category	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Role of the site location to species overall population in the state	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Final Score	6.2								4.00	



Table 56 Terrestrial Habitat Quality Data - 2023 Survey Area Offset Study Area - Koala

Koala Assessment Unit (2023 Survey Area)	1	3	5	6	7	8	9
RE	11.5.3	11.5.3	11.5.8b	11.5.9	11.5.2	11.7.4	11.3.2
Assessment Unit Area (ha)	314.15	33.61	5.132	29.023	73.105	51.933	29.391
Recruitment of wood perennial species in EDL (%)	77.8	100.0	100.0	62.5	75.0	69.3	60.0
Native plant species richness- trees	5.3	5.0	5.0	5.5	5.5	8.0	5.0
Native plant species richness- shrubs	4.7	6.0	4.0	3.5	3.3	6.0	5.0
Native plant species richness- grasses	3.8	4.0	2.0	4.0	3.0	3.7	4.0
Native plant species richness- forbs	0.3	1.5	1.0	2.0	0.5	1.0	0.0
Tree canopy height	20.1	24.0	17.0	19.5	15.3	24.3	21.0
Subcanopy height	0.3	3.0	0.0	8.0	2.8	5.3	6.0
Tree canopy cover (%)	46.4	65.2	66.8	27.5	28.0	33.8	6.3
Subcanopy cover (%)	0.0	3.3	0.0	20.0	39.3	0.0	19.1
Shrub canopy cover (%)	14.0	20.8	16.1	17.5	10.0	19.4	4.2
Native perennial grass cover (%)	35.4	40.0	11.0	55.0	34.3	30.3	38.0
Organic litter cover (%)	29.0	25.0	45.0	19.0	27.8	40.3	22.0
Large Trees	6.0	9.0	8.0	4.0	1.5	7.3	2.0
Coarse woody debris (m)	584.8	1175.0	1075.0	400.0	370.0	660.0	120.0
Non-native plant cover (%)	15.2	4.0	0.0	6.5	10.0	5.0	15.0
Size of patch	7.0	10.0	10.0	10.0	7.0	10.0	7.0
Connectedness	5.0	5.0	5.0	5.0	4.0	5.0	4.0
Context	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Ecological corridors	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Threats to species	7	7	7	7	7	7	7
Quality and availability of foraging habitat	5	5	5	5	5	10	5
Quality and availability of shelter	5	5	5	5	10	10	5
Species mobility category	7	7	7	7	7	7	7
Role of the site location to species overall population in the state	1	1	1	1	1	1	1
Final Score	6.36						



The following notes are made in relation to the data in Table 55 and Table 56 pertaining to the Koala:

- The 'threats to the species' was assessed as 'moderate' in remnant areas and as 'high' in non-remnant areas due to presence of feral dogs, fragmented shelter habitat and risk of vehicle strike.
- The 'quality and availability of foraging habitat' was assessed as 'moderate' in most assessment units due to presence of forest/woodland habitat and some preferred food trees. AU 8 was assessed as 'high' due to the common presence of preferred food trees, and generally higher availability and quality of foraging habitat.
- The 'quality and availability of shelter' was assessed as 'moderate' due to presence of koala habitat trees, varying patch sizes and connectivity for breeding area.
- The 'species mobility category' was assessed as '7 (i.e. *Moderately Restricted [25-50% Reduction]*)' due to corridor width, presence of local barriers, and connectivity between sites.
- The 'role of the site location to species overall population in the state' was assessed as '1 (i.e. *Not or Unlikely to be Critical to Species' Survival*)' as the offset site is unlikely to provide habitat critical to the survival of this species in a state-wide context.

The species index scoring for a future without the offset has been assessed as:

- A reduction in the 'quality and availability of foraging habitat' due to the presences of recognised threats to this species (loss and fragmentation of habitat due to clearing for agricultural purposes, the degradation of habitat and suppression of recruitment by livestock and the degradation of habitat by invasive weeds, such as buffel grass).
- A reduction in the 'quality and availability of shelter habitat' due to the presences of recognised threats to this species (loss and fragmentation of habitat due to clearing for agricultural purposes, the degradation of habitat by livestock, the degradation of habitat by invasive weeds (such as buffel grass) and predation by pest animals.
- A reduction in the 'species mobility category' due to the presences of recognised threats to this species (loss and fragmentation of habitat due to clearing for agricultural purposes)

The species index scoring for a future with the offset has been assessed as follows:

- A decrease in the 'threats to the species' due to a reduction in the current level of fragmentation and feral predators.
- An increase in the 'quality and availability of foraging habitat' to 'high' due to natural regeneration of food trees.
- An increase in the 'quality and availability of shelter habitat' to 'high' due to reduction in the current level of fragmentation and feral predators.

Greater Glider

Terrestrial Habitat Quality Data was collected and assessed according to *the Guide to Determining Terrestrial Habitat Quality Version 1.3* (DES 2020), Table 57 shows the Terrestrial Habitat Quality Data for the Greater Glider in the Action Area, Table 58 and Table 59 show the Terrestrial Habitat Quality Data for the 2020 and 2023 survey areas within the Study Area respectively.



Table 57 Terrestrial Habitat Quality Data - Action Area - Greater Glider

Greater Glider Assessment Units – Action Area		2	3	4	5	6
RE		11.3.2/11.3.2b	11.3.25	11.3.7	11.7.2	11.7.4
Assessment Unit Area (ha)		45.052	16.221	18.414	0.852	2.162
Recruitment of wood perennial species in EDL (%)		83.3	75	100	100	75
Native plant species richness- trees		7	8	6	6	13
Native plant species richness- shrubs		2	4	2	2	2
Native plant species richness- grasses		3	0	3	3	5
Native plant species richness- forbs		4	8	6	12	12
Tree canopy height		18.7	25	24	16	20
Subcanopy height		NA	NA	12	NA	10
Tree canopy cover (%)		38.7	60.9	32	32	47.3
Subcanopy cover (%)		NA	NA	35.8	0	0
Shrub canopy cover (%)		1.3	8.8	9	0	9.6
Native perennial grass cover (%)		5.7	0	0	25	6
Organic litter cover (%)		20.7	29	43	59	69
Large Trees		16	16	14	14	12
Coarse woody debris (m)		301.7	172	276	1882	437
Non-native plant cover (%)		66.7	70	70	5	5
Size of patch		7	7	7	7	7
Connectedness		4	5	5	5	4
Context		5	4	4	4	5
Ecological corridors		6	6	6	6	6
Threats to species		7	7	7	7	7
Quality and availability of foraging habitat		5	5	5	5	5
Quality and availability of shelter		5	5	5	5	5
Species mobility category		7	7	7	7	7
Role of the site location to species overall population in the state		1	1	1	1	1
Final Score		6.47				



The following notes are made in relation to the data in Table 57 pertaining to the Greater Glider:

- The 'threats to the species' was assessed as 'Moderate Threat Level' due to presence of feral predators, barbed wire fences and fragmented habitat.
- The 'quality and availability of foraging habitat' was assessed as 'moderate' due to presence of some areas of preferred foraging habitat and the extent of preferred riparian habitat.
- The 'quality and availability of shelter' was assessed as 'moderate' due to a moderate abundance of tree hollows and areas of woodland habitat.
- The 'species mobility category' was assessed as '7 (i.e. Moderately Restricted [26-50% Reduction])' due to level of fragmentation in the impact site, size of corridors between patches, presence of local barriers and level of threats present when mobile.
- The 'role of the site location to species overall population in the state' was assessed as '1 (i.e. *Not or Unlikely to be Critical to Species' Survival*)' as the impact site is unlikely to provide habitat critical to the survival of this species in a state-wide context.



Table 58 Terrestrial Habitat Quality Data - 2020 Survey Area Offset Study Area - Greater Glider

Greater Glider Assessment Unit (2020 Survey Area)	1	2	3	4	6	7	8	10
RE	11.3.2	11.3.4	11.3.25	11.4.2	11.5.2a	11.5.3	11.5.9	11.7.4
Assessment Unit Area (ha)	137.72	36.07	66.181	26.53	32.56	77.68	42.39	25.24
Recruitment of wood perennial species in EDL (%)	37.5	30.0	55.0	80.0	10.0	46.3	25.0	15.0
Native plant species richness- trees	6.3	9.0	9.0	7.0	5.0	7.8	7.0	8.0
Native plant species richness- shrubs	3.3	10.0	2.0	3.0	3.0	4.0	3.0	2.0
Native plant species richness- grasses	2.5	4.0	4.5	0.0	2.0	3.3	2.0	3.0
Native plant species richness- forbs	1.5	2.0	2.0	0.0	1.0	1.3	1.0	0.0
Tree canopy height	20.8	20.0	27.3	16.0	12.0	21.3	18.0	14.0
Subcanopy height	8.8	4.0	9.0	8.0	5.0	6.0	6.0	0.0
Tree canopy cover (%)	47.8	49.2	49.8	17.6	56.6	46.2	23.8	19.9
Subcanopy cover (%)	23.2	16.5	46.0	3.3	1.3	19.9	34.4	17.9
Shrub canopy cover (%)	21.2	8.7	0.2	31.1	0.0	20.6	0.0	3.7
Native perennial grass cover (%)	9.0	18.0	29.8	0.0	7.4	19.0	21.0	12.0
Organic litter cover (%)	35.5	55.0	42.5	28.0	66.6	33.5	28.0	34.0
Large Trees	2.5	2.0	10.0	0.0	4.0	6.5	4.0	2.0
Coarse woody debris (m)	399.8	377.0	706.0	784.0	747.0	580.3	290.0	156.0
Non-native plant cover (%)	21.3	50.0	40.0	5.0	2.0	12.3	3.0	0.0
Size of patch	7.0	2.0	5.0	5.0	5.0	7.0	5.0	5.0
Connectedness	4.0	5.0	5.0	4.0	5.0	4.0	5.0	4.0
Context	4.0	5.0	5.0	4.0	5.0	5.0	5.0	5.0
Ecological corridors	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Threats to species	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Quality and availability of foraging habitat	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Quality and availability of shelter	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Species mobility category	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Role of the site location to species overall population in the state	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Final Score	6.69							



Table 59 Terrestrial Habitat Quality Data - 2023 Survey Area Offset Study Area - Greater Glider

Greater Glider Assessment Unit (2023 Survey Area)	1	3	6	7	8	9
RE	11.5.3	11.5.3	11.5.9	11.5.2	11.7.4	11.3.2
Assessment Unit Area (ha)	314.15	33.61	29.02	73.11	51.933	29.39
Recruitment of wood perennial species in EDL (%)	77.8	100.0	62.5	75.0	69.3	60.0
Native plant species richness- trees	5.3	5.0	5.5	5.5	8.0	5.0
Native plant species richness- shrubs	4.7	6.0	3.5	3.3	6.0	5.0
Native plant species richness- grasses	3.8	4.0	4.0	3.0	3.7	4.0
Native plant species richness- forbs	0.3	1.5	2.0	0.5	1.0	0.0
Tree canopy height	20.1	24.0	19.5	15.3	24.3	21.0
Subcanopy height	0.3	3.0	8.0	2.8	5.3	6.0
Tree canopy cover (%)	46.4	65.2	27.5	28.0	33.8	6.3
Subcanopy cover (%)	0.0	3.3	20.0	39.3	0.0	19.1
Shrub canopy cover (%)	14.0	20.8	17.5	10.0	19.4	4.2
Native perennial grass cover (%)	35.4	40.0	55.0	34.3	30.3	38.0
Organic litter cover (%)	29.0	25.0	19.0	27.8	40.3	22.0
Large Trees	6.0	9.0	4.0	1.5	7.3	2.0
Coarse woody debris (m)	584.8	1175.0	400.0	370.0	660.0	120.0
Non-native plant cover (%)	15.2	4.0	6.5	10.0	5.0	15.0
Size of patch	7.0	10.0	10.0	7.0	10.0	7.0
Connectedness	5.0	5.0	5.0	4.0	5.0	4.0
Context	5.0	5.0	5.0	5.0	5.0	5.0
Ecological corridors	6.0	6.0	6.0	6.0	6.0	6.0
Threats to species	7.0	7.0	7.0	7.0	7.0	7.0
Quality and availability of foraging habitat	10.0	10.0	10.0	10.0	10.0	10.0
Quality and availability of shelter	10.0	10.0	10.0	10.0	10.0	10.0
Species mobility category	7.0	7.0	7.0	7.0	7.0	7.0
Role of the site location to species overall population in the state	4.0	4.0	4.0	4.0	4.0	4.0
Final Score	6.76					



The following notes are made in relation to the data in Table 58 and Table 59 pertaining to the Greater Glider:

- The 'threats to the species' was assessed as 'Moderate Threat Level' due to presence of pest species and barbed wire fences.
- The 'quality and availability of foraging habitat' was assessed as 'high' due to the abundance of preferred foraging species and extent of riparian habitat in the remnant zones. Regrowth areas were assessed as 'low' due to the low variability of foraging species and low access to foraging areas.
- The 'quality and availability of shelter' was assessed as 'high' in remnant zones due to a high abundance of tree hollows and large patch sizes. Regrowth areas were assessed as 'low' due to absence of decent hollows and small patch sizes.
- The 'species mobility category' was assessed as '7 (i.e. *Moderately Restricted [25-50% Reduction]*)' in remnant zones and '1' (i.e. *Severely restricted [76-100% Reduction]*)' in regrowth due to connectivity and corridor width between habitat areas, and the threat level when mobile.
- The 'role of the site location to species overall population in the state' was assessed as '1 (i.e. *Not or Unlikely to be Critical to Species' Survival*)' as the offset site is unlikely to provide habitat critical to the survival of this species in a state-wide context.

The species index scoring for a future without the offset has been assessed as:

- A reduction in the 'quality and availability of foraging habitat' due to the presences of recognised threats to this species (loss and fragmentation of habitat due to clearing for agricultural purposes, the degradation of habitat by livestock and the degradation of habitat by invasive weeds, such as buffel grass).
- A reduction in the 'quality and availability of shelter habitat' due to the presences of recognised threats to this species (loss and fragmentation of habitat due to clearing for agricultural purposes, the degradation of habitat by livestock, the degradation of habitat by invasive weeds (such as buffel grass) and predation by pest animals.
- A reduction in the 'species mobility category' due to the presences of recognised threats to this species (loss and fragmentation of habitat due to clearing for agricultural purposes)

The species index scoring for a future with the offset has been assessed as follows:

- A decrease in the 'threats to the species' due to removal of barbed wire fences and management of feral pests.
- An increase in the 'quality and availability of foraging habitat' due to natural regeneration of food trees.
- An increase in the 'quality and availability of shelter habitat' due to reduction in the current level of fragmentation and feral predators, and the natural development of hollows in mature and developing trees.



Ornamental Snake

Terrestrial Habitat Quality Data was collected and assessed according to *the Guide to Determining Terrestrial Habitat Quality Version 1.3* (DES 2020), Table 60 shows the Terrestrial Habitat Quality Data for the Ornamental Snake in the Action Area, Table 61 and Table 62 show the Terrestrial Habitat Quality Data for the 2020 and 2023 Survey Areas within the Study Area respectively.



Table 60 Terrestrial Habitat Quality Data - Ornamental Snake - Action Area

Action Area Ornamental Snake AUs	1	7
RE	11.3.1	NR 11.3.1
Assessment Unit Area (ha)	3.481	13.73
Recruitment of wood perennial species in EDL (%)	100	100
Native plant species richness- trees	5	2
Native plant species richness- shrubs	3	3
Native plant species richness- grasses	0	2
Native plant species richness- forbs	10	6
Tree canopy height	13	1.5
Subcanopy height	8	0
Tree canopy cover (%)	51.5	0
Subcanopy cover (%)	0	0
Shrub canopy cover (%)	2.6	36.6
Native perennial grass cover (%)	0	0
Organic litter cover (%)	52	41.5
Large Trees	0	0
Coarse woody debris (m)	218	475
Non-native plant cover (%)	40	62.5
Size of patch	7	5
Connectedness	2	0
Context	5	4
Ecological corridors	6	6
Threats to species	7	7
Quality and availability of foraging habitat	5	5
Quality and availability of shelter	5	5
Species mobility category	1	1
Role of the site location to species overall population in the state	1	1
Final Score	5.23	4.17



The following notes have been made in relation to data in Table 60 pertaining to the Ornamental Snake:

- The 'threats to the species' was assessed as 'moderate' due to presence of feral predators, risk of road strike and high habitat fragmentation.
- The 'quality and availability of foraging habitat' was assessed as 'moderate' due to presence of patchy areas of suitable habitat including gilgai presence and relative prey abundance.
- The 'quality and availability of shelter' was assessed as 'moderate' due to presence of some areas of suitable shelter habitat.
- The 'species mobility category' was assessed as 'severely restricted' due to the level of fragmentation of potential habitat on the impact site, width of corridors between patches and presence of local barriers.
- The 'role of the site location to species overall population in the state' was assessed as '1 (i.e. *Not or Unlikely to be Critical to Species' Survival*)' due to as the impact site is unlikely to provide habitat critical to the survival of this species in a state-wide context.



Table 61 Terrestrial Habitat Quality data - 2020 Survey Area Offset Study Area - Ornamental Snake

Ornamental Snake Assessment Unit (2020 Survey Area)	5	16	12	14
RE	11.4.9	11.3.1	NR 11.3.1	NR 11.4.9
Assessment Unit Area (ha)	21.20	2.214	10.45	32.45
Recruitment of wood perennial species in EDL (%)	95.0	100.0	90.0	75.0
Native plant species richness- trees	3.5	2.0	3.0	3.0
Native plant species richness- shrubs	2.0	3.0	4.0	3.0
Native plant species richness- grasses	2.0	5.0	1.0	4.0
Native plant species richness- forbs	3.0	6.0	1.0	1.0
Tree canopy height	14.0	10.5	3.0	12.0
Subcanopy height	5.0	0.0	2.0	4.0
Tree canopy cover (%)	76.6	83.4	0.0	8.2
Subcanopy cover (%)	0.0	0.0	0.0	0.0
Shrub canopy cover (%)	5.9	10.0	17.4	49.1
Native perennial grass cover (%)	10.0	0.0	0.0	6.0
Organic litter cover (%)	41.5	30.6	2.0	23.0
Large Trees	0.0	0.0	0.0	0.0
Coarse woody debris (m)	711.5	123.8	160.2	106.7
Non-native plant cover (%)	5.0	25.0	10.0	0.0
Size of patch	2.0	0.0	2.0	5.0
Connectedness	5.0	0.0	2.0	4.0
Context	5.0	2.0	4.0	4.0
Ecological corridors	6.0	6.0	6.0	6.0
Threats to species	7.0	7.0	7.0	7.0
Quality and availability of foraging habitat	5.0	1.0	1.0	1.0
Quality and availability of shelter	5.0	1.0	1.0	1.0
Species mobility category	7.0	7.0	7.0	7.0
Role of the site location to species overall population in the state	1.0	1.0	1.0	1.0
Final Score	5.26		4.4	



Table 62 Terrestrial Habitat Quality Data - 2023 Survey Area Offset Study Area - Ornamental Snake

Ornamental Snake Assessment Unit (2023 Survey Area)	2
RE	11.4.8
Assessment Unit Area (ha)	18.62
Recruitment of wood perennial species in EDL (%)	50.0
Native plant species richness- trees	4.5
Native plant species richness- shrubs	3.5
Native plant species richness- grasses	4.5
Native plant species richness- forbs	1.5
Tree canopy height	8.5
Subcanopy height	0.0
Tree canopy cover (%)	67.0
Subcanopy cover (%)	0.0
Shrub canopy cover (%)	0.0
Native perennial grass cover (%)	6.9
Organic litter cover (%)	23.5
Large Trees	4.0
Coarse woody debris (m)	828.5
Non-native plant cover (%)	65.0
Size of patch	5.0
Connectedness	4.0
Context	5.0
Ecological corridors	6.0
Threats to species	7.0
Quality and availability of foraging habitat	1.0
Quality and availability of shelter	5.0
Species mobility category	7.0
Role of the site location to species overall population in the state	1.0
Final Score	5.35



The following notes are made in relation to the data in Table 61 and Table 62 pertaining to the Ornamental Snake:

- The 'threats to the species' was assessed as 'moderate' due to presence of threats including cane toads and other pest species as well as the high degree of habitat fragmentation and risk of vehicle strike.
- The 'quality and availability of foraging habitat' was assessed as 'poor' in non-remnant regions of the offset due to lack of areas of suitable foraging habitat, extent of gilgai habitat, and prey abundance.
- The 'quality and availability of habitat for shelter' was assessed as 'poor' due to low availability of suitable shelter components in the regrowth area.
- The 'species mobility category' was assessed as '7 (i.e. Moderately Restricted [26-50% Reduction])' due to the low connectivity, width of corridors and level of habitat fragmentation in the offset site.
- The 'role of the site location to species overall population in the state' was assessed as '1 (i.e. *Not or Unlikely to be Critical to Species' Survival*)' due to as the offset site is unlikely to provide habitat critical to the survival of this species in a state-wide context.

The species index scoring for a future without the offset has been assessed as:

- A reduction in the 'quality and availability of foraging habitat' due to the presences of recognised threats to this species (loss and fragmentation of habitat due to clearing for agricultural purposes, the degradation of habitat by livestock and the degradation of habitat by invasive weeds, such as buffel grass).
- A reduction in the 'quality and availability of shelter habitat' due to the presences of recognised threats to this species (loss and fragmentation of habitat due to clearing for agricultural purposes, the degradation of habitat by livestock, the degradation of habitat by invasive weeds (such as buffel grass) and predation by pest animals.
- A reduction in the 'species mobility category' due to the presences of recognised threats to this species (loss and fragmentation of habitat due to clearing for agricultural purposes, increased pest animal presence

The species index scoring for a future with the offset has been assessed as follows:

- A decrease in the 'threats to the species' to due to management of threats relevant to this species, namely grazing livestock and pests.
- An increase in the 'quality and availability of foraging habitat' due to management of threats relevant to this species, namely grazing livestock and pests.
- An increase in the 'quality and availability of shelter habitat' due to management of threats relevant to this species, namely grazing livestock and pests



Brigalow Woodland TEC

The Terrestrial Habitat Quality Data for Brigalow Woodland in the Action Area is provided in Table 63, the data for the 2020 Survey Area and 2023 Survey Area is provided in Table 64 and Table 65 respectively.

Table 63 Terrestrial Habitat Quality Data - Brigalow Woodland - Action Area

Brigalow Woodland Action Area Assessment Unit	1
RE	11.3.1
Assessment Unit Area (ha)	3.481
Recruitment of wood perennial species in EDL (%)	100
Native plant species richness- trees	5
Native plant species richness- shrubs	3
Native plant species richness- grasses	0
Native plant species richness- forbs	10
Tree canopy height	13
Subcanopy height	8
Tree canopy cover (%)	51.5
Subcanopy cover (%)	0
Shrub canopy cover (%)	2.6
Native perennial grass cover (%)	0
Organic litter cover (%)	52
Large Trees	0
Coarse woody debris (m)	218
Non-native plant cover (%)	40
Size of patch	7
Connectedness	2
Context	5
Ecological corridors	6
Final Score	5.94



Table 64 Terrestrial Habitat Quality Data - 2020 Survey Area Offset Study Area - Brigalow Woodland

Assessment Unit (2020 Survey Area)	5	16	12	14
RE	11.4.9	11.3.1	NR 11.3.1	NR 11.4.9
Assessment Unit Area (ha)	21.20	2.214	10.45	32.45
Recruitment of wood perennial species in EDL (%)	95.0	100.0	90.0	75.0
Native plant species richness- trees	3.5	2.0	3.0	3.0
Native plant species richness- shrubs	2.0	3.0	4.0	3.0
Native plant species richness- grasses	2.0	5.0	1.0	4.0
Native plant species richness- forbs	3.0	6.0	1.0	1.0
Tree canopy height	14.0	10.5	3.0	12.0
Subcanopy height	5.0	0.0	2.0	4.0
Tree canopy cover (%)	76.6	83.4	0.0	8.2
Subcanopy cover (%)	0.0	0.0	0.0	0.0
Shrub canopy cover (%)	5.9	10.0	17.4	49.1
Native perennial grass cover (%)	10.0	0.0	0.0	6.0
Organic litter cover (%)	41.5	30.6	2.0	23.0
Large Trees	0.0	0.0	0.0	0.0
Coarse woody debris (m)	711.5	123.8	160.2	106.7
Non-native plant cover (%)	5.0	25.0	10.0	0.0
Size of patch	2.0	0.0	2.0	5.0
Connectedness	5.0	0.0	2.0	4.0
Context	5.0	2.0	4.0	4.0
Ecological corridors	6.0	6.0	6.0	6.0
Final Score	6.04		5.43	



Table 65 Terrestrial Habitat Quality Data - 2023 Survey Area Offset Study Area - Brigalow Woodland

Assessment Unit (2023 Survey Area)	2
RE	11.4.8
Assessment Unit Area (ha)	18.62
Recruitment of wood perennial species in EDL (%)	50.0
Native plant species richness- trees	4.5
Native plant species richness- shrubs	3.5
Native plant species richness- grasses	4.5
Native plant species richness- forbs	1.5
Tree canopy height	8.5
Subcanopy height	0.0
Tree canopy cover (%)	67.0
Subcanopy cover (%)	0.0
Shrub canopy cover (%)	0.0
Native perennial grass cover (%)	6.9
Organic litter cover (%)	23.5
Large Trees	4.0
Coarse woody debris (m)	828.5
Non-native plant cover (%)	65.0
Size of patch	5.0
Connectedness	4.0
Context	5.0
Ecological corridors	6.0
Final Score	6.46



With respect to the future quality scores with/without the offset, the following changes were assumed to the biometric values to justify the increase/decrease in quality scores:

- Future quality without the offset has been assessed as follows:
 - Decrease in recruitment of wood perennial species;
 - Decrease in native grass species richness;
 - Decrease in native forb species richness;
 - Decrease in native grass cover;
 - Decrease in organic litter cover; and
 - Increase in non-native plant cover
- Future quality with the offset has been assessed as follows:
 - Increase in recruitment of wood perennial species;
 - Increase in native grass species richness;
 - Increase in native forb species richness;
 - Increase in native grass cover;
 - Increase in organic litter cover;
 - Increase in tree canopy height;
 - Increase in tree canopy cover;
 - Decrease in non-native plant cover; and
 - Increase in patch size, connectedness and context;



Poplar Box Grassy Woodland on Alluvial Plains TEC

The terrestrial habitat quality data for Poplar Box Grassy Woodland on Alluvial Plains is presented in Table 66 for the Action area and Table 67 and Table 68 for the 2020 and 2023 survey areas respectively.

Table 66 Terrestrial Habitat Quality Data - Poplar Box Grassy Woodland on Alluvial Plains - Action Area

Action Area Poplar Box Assessment Unit	2
RE	11.3.2
Assessment Unit Area (ha)	43.88
Recruitment of wood perennial species in EDL (%)	83.3
Native plant species richness- trees	7
Native plant species richness- shrubs	2
Native plant species richness- grasses	3
Native plant species richness- forbs	4
Tree canopy height	18.7
Subcanopy height	NA
Tree canopy cover (%)	38.7
Subcanopy cover (%)	NA
Shrub canopy cover (%)	1.3
Native perennial grass cover (%)	5.7
Organic litter cover (%)	20.7
Large Trees	16
Coarse woody debris (m)	301.7
Non-native plant cover (%)	66.7
Size of patch	7
Connectedness	4
Context	5
Ecological corridors	6
Final Score	7.36



Table 67 Terrestrial Habitat Quality Data - 2020 Survey Area Offset Study Area - Poplar Box Grassy Woodland

Assessment Unit (2020 Survey Area)	1	13
RE	11.3.2	NR 11.3.2
Assessment Unit Area (ha)	137.72	71.88
Recruitment of wood perennial species in EDL (%)	37.5	95.0
Native plant species richness- trees	6.3	5.3
Native plant species richness- shrubs	3.3	3.8
Native plant species richness- grasses	2.5	2.0
Native plant species richness- forbs	1.5	0.8
Tree canopy height	20.8	3.4
Subcanopy height	8.8	1.0
Tree canopy cover (%)	47.8	7.3
Subcanopy cover (%)	23.2	0.0
Shrub canopy cover (%)	21.2	31.3
Native perennial grass cover (%)	9.0	0.0
Organic litter cover (%)	35.5	11.5
Large Trees	2.5	0.0
Coarse woody debris (m)	399.8	124.5
Non-native plant cover (%)	21.3	27.5
Size of patch	5.0	5.0
Connectedness	4.0	2.0
Context	4.0	4.0
Ecological corridors	6.0	6.0
Final Score	6.37	4.62



Table 68 Terrestrial Habitat Quality Data - 2023 Survey Area Offset Study Area - Poplar Box Grassy Woodlands

Assessment Unit (2023 Survey Area)	9
RE	11.3.2
Assessment Unit Area (ha)	29.39
Recruitment of wood perennial species in EDL (%)	60.0
Native plant species richness- trees	5.0
Native plant species richness- shrubs	5.0
Native plant species richness- grasses	4.0
Native plant species richness- forbs	0.0
Tree canopy height	21.0
Subcanopy height	6.0
Tree canopy cover (%)	6.3
Subcanopy cover (%)	19.1
Shrub canopy cover (%)	4.2
Native perennial grass cover (%)	38.0
Organic litter cover (%)	22.0
Large Trees	2.0
Coarse woody debris (m)	120.0
Non-native plant cover (%)	15.0
Size of patch	5.0
Connectedness	4.0
Context	5.0
Ecological corridors	6.0
Final Score	6.32



With respect to the future quality scores with/without the offset, the following changes were assumed to the biometric values to justify the increase/decrease in quality scores:

- Future quality without the offset has been assessed as follows:
 - Decrease in recruitment of wood perennial species;
 - Decrease in native grass species richness;
 - Decrease in native forb species richness;
 - Decrease in native grass cover;
 - Decrease in organic litter cover; and
 - Increase in non-native plant cover
- Future quality with the offset has been assessed as follows:
 - Increase in recruitment of wood perennial species;
 - Increase in native grass species richness;
 - Increase in native forb species richness;
 - Increase in native grass cover;
 - Increase in organic litter cover;
 - Increase in tree canopy height;
 - Increase in tree canopy cover;
 - Decrease in non-native plant cover; and
 - Increase in patch size, connectedness and context;



A-5 Justification for Inputs to Commonwealth OAG Calculator

Squatter Pigeon

Table 69 Calculator input and output - Remnant Habitat in the Offset proposed to become Squatter Pigeon Habitat to Offset Impact on Remnant Squatter Pigeon Habitat

Aspect	Input	Justification
Impact		
Species Status	Vulnerable	-
Area of Habitat to be Impacted	86.03 ha	Habitat area defined by Biodiversity Australia (2020a) during field surveys.
Quality (0 to 10)	7	In consideration of the site condition and context, a quality value of 7 is considered appropriate for the Squatter Pigeon (southern) because: - this species has been recorded in one location within the Action area - much of the potential habitat to be cleared has been subject to past disturbances (e.g. logging). The habitat quality score has been calculated using the <i>Guide to Determining Terrestrial Habitat Quality Version 1.3</i> (DES, 2020).
Offset		
Time over which loss is averted (max. 20 years)	20 years	An arrangement would be made for the enduring protection and management of the offset area.
Time until ecological benefit	15 years	Within the offset areas, the present woodland/forest would be protected from clearance that would otherwise occur in the next five years for grazing purposes. Management of the offset areas is expected to improve the quality, composition and extent of patches of habitat for the Squatter Pigeon (southern). Management of the offset areas would include the following measures relevant to the Squatter Pigeon (southern): - No vegetation in or adjacent patches of suitable habitat would be cleared, unless required for management purposes (e.g. fire breaks) Regeneration and active seeding/planting (if required) - Weed management strategy - Pest animal management strategy - Management of livestock (i.e. rotational grazing) - Buffel grass management It is considered that ecological benefits are likely to conservatively occur within 15 years.
Start area (ha) (Size of the offset)	756.5 ha	Area defined during field survey, consisting of 756.5 ha of Woodland habitat vegetation mapped by Biodiversity Australia (2020 & 2023).
Start Quality (0 to 10)	6	The habitat quality score has been calculated using the <i>Guide to Determining Terrestrial Habitat Quality Version 1.3</i> (DES, 2020).



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Aspect	Input	Justification
Risk of loss (%) without offset	0%	Within the next 20 years, without the offset, a probability of loss for agricultural purposes exists. Current clearing practices within QLD indicate a loss of 32% of Category X habitat and 7% of category B habitat in the Brigalow region for a 20 year period. It would not be unreasonable to assume at least a 5% risk of loss over the period of the offset if the offset is not put in place. However, at the direction of DCCEEW 0% risk of ecological values will be lost.
Future quality without offset (scale of 0-10)	6	Without the offset, it is not unreasonable to assume a likelihood of quality reduction through continued existing grazing practices. At DCCEEW direction it is conservatively assumed that there is no change to the future quality of either remnant or non-remnant habitat offset areas
Risk of loss (%) with offset	0%	Within the next 20 years, with the offset, it is conservatively assumed that there is a 0% risk that the ecological values will be lost in reflection of no anticipated loss without offset.
Future quality with offset (scale of 0-10)	7	With the offset, an increase in habitat quality is anticipated to occur through natural regeneration and protection of existing vegetation. A quality value of 7 is considered appropriate as the starting quality is 6, and management of the offset areas would include, but are not limited to, the following management measures relevant to the Squatter Pigeon (southern): • no vegetation in or adjacent patches of suitable habitat would be cleared, unless required for management purposes (e.g. fire breaks) • regeneration and active seeding/planting (if required) • Pest animal management strategy. • Management of livestock (i.e. rotational grazing). • Management of weeds (namely Buffel Grass). The habitat quality score has been calculated by using predicted inputs into the <i>Guide to Determining Terrestrial Habitat Quality Version 1.3 (DES 2020)</i>.
Confidence in the result	90%	There is a high level of confidence (90%) that loss of habitat values in the offset areas would be averted because an arrangement would be made for the enduring protection and management of the offset areas. MCPL has a positive history in regard to meeting offsetting requirements. For example, in accordance with Conditions 1 and 2 of the Commonwealth Approval Decision (EPBC 2010/5394), appropriate long-term security for the Stage 2 Biodiversity Offset Area was established by securing a voluntary declaration of the area under the <i>QLD Vegetation Management Act, 1999</i>. Further, it is noted that the proposed offset area is located on freehold land owned by MCPL and as a result, there is certainty regarding the management commitments.
Calculator Output - % of Impact Offset		109.72%



Table 70 Calculator input and output – Remnant and Non-remnant Habitat in the Offset proposed to become Squatter Pigeon Habitat to Offset Impact on non-remnant Squatter Pigeon Habitat

Aspect	Input	Justification
Impact		
Species Status	Vulnerable	-
Area of Habitat to be Impacted	164.19 ha	Habitat area defined by Biodiversity Australia (2020) during field surveys.
Quality (0 to 10)	5	In consideration of the site condition and context, a quality value of 5 is considered appropriate for the Squatter Pigeon (southern) because: - this species has been recorded in one location within the Action area - the Non-remnant and regrowth areas of habitat for this species have previously been cleared and subject to agricultural practice The habitat quality score has been calculated using the <i>Guide to Determining Terrestrial Habitat Quality Version 1.3</i> (DES, 2020).
Offset		
Time over which loss is averted (max. 20 years)	20 years	An arrangement would be made for the enduring protection and management of the offset area.
Time until ecological benefit	15 years	Within the offset areas, the present woodland/forest would be protected from clearance that would otherwise occur in the next five years for grazing purposes. Management of the offset areas is expected to improve the quality, composition and extent of patches of habitat for the Squatter Pigeon (southern). Management of the offset areas would include the following measures relevant to the Squatter Pigeon (southern): - no vegetation in or adjacent patches of suitable habitat would be cleared, unless required for management purposes (e.g. fire breaks) - regeneration and active seeding/planting (if required) - No vegetation in or adjacent patches of suitable habitat would be cleared, unless required for management purposes (e.g. fire breaks) Regeneration and active seeding/planting (if required) - Weed management strategy - Pest animal management strategy - Management of livestock (i.e. rotational grazing) It is considered that ecological benefits are likely to conservatively occur within 15 years.
Start area (ha) (Size of the offset)	500 ha remnant habitat And 240.92 ha non-rem habitat	Area defined during field survey, consisting of 500 ha of remnant habitat and 240.92 of non-rem habitat vegetation mapped by Biodiversity Australia (2020 & 2023).



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Aspect	Input	Justification
Start Quality (0 to 10)	6 for the remnant habitat 4 for the non-remnant habitat	The habitat quality score has been calculated using the <i>Guide to Determining Terrestrial Habitat Quality Version 1.3</i> (DES, 2020).
Risk of loss (%) without offset	0%	Within the next 20 years, without the offset, a probability of loss for agricultural purposes exists. Current clearing practices within QLD indicate a loss of 32% of Category X habitat and 7% of category B habitat in the Brigalow region for a 20 year period. It would not be unreasonable to assume at least a 5% risk of loss over the period of the offset if the offset is not put in place. However, at the direction of DCCEEW 0% risk of ecological values will be lost.
Future quality without offset (scale of 0-10)	6 (remnant) 4 (non-remnant)	Without the offset, it is not unreasonable to assume a likelihood of quality reduction through continued existing grazing practices. At DCCEEW direction it is conservatively assumed that there is no change to the future quality of either remnant or non-remnant habitat offset areas
Risk of loss (%) with offset	0%	Within the next 20 years, with the offset, it is conservatively assumed that there is a 0% risk that the ecological values will be lost.
Future quality with offset (scale of 0-10)	7 (remnant area) 6 (non-remnant area)	With the offset, an increase in habitat quality is anticipated to occur through natural regeneration and protection of existing vegetation. A future quality value of 7 for remnant the is considered appropriate because the starting quality is 6 in remnant areas and 4 in non-remnant, and management of the offset areas would include, but are not limited to, the following management measures relevant to the Squatter Pigeon (southern): - no vegetation in or adjacent patches of suitable habitat would be cleared, unless required for management purposes (e.g. fire breaks) - regeneration and active seeding/planting (if required) - Pest animal management strategy. - Management of livestock (i.e. rotational grazing). - Management of weeds (namely Buffel Grass). The habitat quality score has been calculated by using predicted inputs into the <i>Guide to Determining Terrestrial Habitat Quality Version 1.3</i> (DES 2020).
Confidence in the result	90%	There is a high level of confidence (90%) that loss of habitat values in the offset areas would be averted because an arrangement would be made for the enduring protection and management of the offset areas. MCPL has a positive history in regard to meeting offsetting requirements. For example, in accordance with Conditions 1 and 2 of the Commonwealth Approval Decision (EPBC 2010/5394), appropriate long-term security for the Stage 2 Biodiversity Offset Area was established by securing a voluntary declaration of the area under the QLD <i>Vegetation Management Act, 1999</i>. Further, it is noted that the proposed offset area is located on freehold land owned by MCPL and as a result, there is certainty regarding the management commitments.
Calculator Output - % of Impact Offset		104.46% (51.26% offset by non-rem area, 53.20% offset by remnant area)



Koala

Table 71 Calculator Inputs and Output – Koala Remnant Habitat in the Offset Area proposed to become Koala Habitat to offset impact on Koala habitat

Aspect	Input	Justification
Impact		
Species Status	Endangered	-
Area of Habitat to be Impacted	81.70 ha	Habitat area defined by Biodiversity Australia (2020) during field surveys.
Quality (0 to 10)	6	The habitat quality score has been calculated using the <i>Guide to Determining Terrestrial Habitat Quality Version 1.3</i> (DES, 2020).
Offset		
Time over which loss is averted (max. 20 years)	20 years	An arrangement would be made for the enduring protection and management of the offset area.
Time until ecological benefit	15 years	Areas of habitat within the proposed offset areas contain important food trees for the Koala. Natural regeneration is likely to further increase the extent of potential habitat over time.
Start area (ha) (Size of the offset)	700 ha	Area defined during field survey, consisting of 700 ha of woodland habitat mapped by Biodiversity Australia (2020).
Start Quality (0 to 10)	6	The habitat quality score has been calculated by using predicted inputs into the <i>Guide to Determining Terrestrial Habitat Quality Version 1.3</i> (DES, 2020).
Risk of loss (%) without offset	0%	Within the next 20 years, without the offset, a probability of loss for agricultural purposes exists. Current clearing practices within QLD indicate a loss of 32% of Category X habitat and 7% of category B habitat in the Brigalow region for a 20 year period. It would not be unreasonable to assume at least a 5% risk of loss over the period of the offset if the offset is not put in place. However, at the direction of DCCEEW 0% risk of ecological values will be lost.
Future quality without offset (scale of 0-10)	6	Without the offset, it is not unreasonable to assume a likelihood of quality reduction through continued existing grazing practices. At DCCEEW direction it is conservatively assumed that there is no change to the future quality of either remnant or non-remnant habitat offset areas
Risk of loss (%) with offset	0%	Within the next 20 years, with the offset, it is conservatively assumed that there is a 0% risk that the ecological values will be lost.
Future quality with offset (scale of 0-10)	7	With the offset, an increase in habitat quality is anticipated to occur through natural regeneration and protection of existing vegetation. A quality value of 7 is considered appropriate because the starting quality is 6 and management of the offset areas would include, but are not limited to, the following threat management measures relevant to the Koala: • Weed control • Pest animal management strategy • Livestock control The habitat quality score has been calculated by using predicted inputs into the <i>Guide to Determining Terrestrial Habitat Quality Version 1.3</i> (DES 2020).



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Aspect	Input	Justification
Confidence in the result	90%	There is a high level of confidence (90%) that loss of habitat values in the offset areas would be averted because an arrangement would be made for the enduring protection and management of the offset areas. MCPL has a positive history in regards to meeting offsetting requirements. For example, in accordance with Conditions 1 and 2 of the Commonwealth Approval Decision (EPBC 2010/5394), appropriate long-term security for the Stage 2 Biodiversity Offset Area was established by securing a voluntary declaration of the area under the QLD Vegetation Management Act, 1999. Further, it is noted that the proposed offset area is located on freehold land owned by MCPL and as a result, there is certainty regarding the management commitments.
Calculator Output - % of Impact Offset		107.46



Table 72 Calculator Inputs and Output – Remnant and Non-remnant habitat in the Offset Proposed to Become Koala Habitat to offset impact on non-remnant Koala habitat

Aspect	Input	Justification
Impact		
Species Status	Endangered	-
Area of Habitat to be Impacted	101.30 ha	Habitat area defined by Biodiversity Australia (2020) during field surveys.
Quality (0 to 10)	5	The habitat quality score has been calculated using the <i>Guide to Determining Terrestrial Habitat Quality Version 1.3</i> (DES, 2020).
Offset		
Time over which loss is averted (max. 20 years)	20 years	An arrangement would be made for the enduring protection and management of the offset area.
Time until ecological benefit	15 years	It is considered that ecological benefit is likely to occur within 15 years given that there are already signs of natural regeneration occurring within existing offset areas, and monitoring data indicates positive trends in recruitment and canopy height.
Start area (ha) (Size of the offset)	280.27 ha remnant habitat 198.02 ha non-remnant habitat	Area defined during field survey, consisting of 198.02 ha of cleared land and 280.27 ha of remnant woodland habitat mapped by Biodiversity Australia (2020).
Start Quality (0 to 10)	4 (non-remnant areas) 6 (remnant areas)	The habitat quality score has been calculated by using predicted inputs into the <i>Guide to Determining Terrestrial Habitat Quality Version 1.3</i> (DES 2020).
Risk of loss (%) without offset	0%	Within the next 20 years, without the offset, a probability of loss for agricultural purposes exists. Current clearing practices within QLD indicate a loss of 32% of Category X habitat and 7% of category B habitat in the Brigalow region for a 20 year period. It would not be unreasonable to assume at least a 5% risk of loss over the period of the offset if the offset is not put in place. However, at the direction of DCCEEW 0% risk of ecological values will be lost.
Future quality without offset (scale of 0-10)	4 (non-rem) 6 (remnant)	Without the offset, it is not unreasonable to assume a likelihood of quality reduction through continued existing grazing practices. At DCCEEW direction it is conservatively assumed that there is no change to the future quality of either remnant or non-remnant habitat offset areas
Risk of loss (%) with offset	0%	Within the next 20 years, with the offset, it is conservatively assumed that there is a 0% risk that the ecological values will be lost.



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Aspect	Input	Justification
Future quality with offset (scale of 0-10)	6 (non-rem) 7 (remnant)	With the offset, an increase in habitat quality is anticipated to occur through natural regeneration and protection of existing vegetation. A quality value of 7 is considered appropriate because the starting quality is 4 in non-remnant areas and 6 in remnant areas, and there are already signs in the existing offset of areas showing positive trends in recruitment and canopy height. Management measures implemented within offset areas would result in natural regeneration of food trees, threat management including control of feral predators and reduction in fragmentation. In addition, regeneration of cleared land/regrowth vegetation that would occur if the offset is established would allow for greater connectivity between the patches of woodland vegetation, thereby increasing the habitat quality and availability for this species whilst limiting the risk of vehicle strike. The habitat quality score has been calculated by using predicted inputs into the <i>Guide to Determining Terrestrial Habitat Quality Version 1.3</i> (DES, 2020).
Confidence in the result	90%	There is a high level of confidence (90%) that loss of habitat values in the offset areas would be averted because an arrangement would be made for the enduring protection and management of the offset areas. For example, with the offset, the regrowth present would be protected from clearance that would otherwise occur in the next five years for grazing purposes. MCPL has a positive history in regards to meeting offsetting requirements. For example, in accordance with Conditions 1 and 2 of the Commonwealth Approval Decision (EPBC 2010/5394), appropriate long-term security for the Stage 2 Biodiversity Offset Area was established by securing a voluntary declaration of the area under the QLD <i>Vegetation Management Act, 1999</i>. Further, it is noted that the proposed offset area is located on freehold land owned by MCPL and as a result, there is certainty regarding the restriction of vegetation clearance activities, the limitation and control of grazing activities and the general access and use of the land.
Calculator Output - % of Impact Offset		100.49% (41.64% remnant habitat, 58.85% non-remnant habitat)



Greater Glider

Table 73 Calculator Inputs and Output – Greater Glider Remnant Habitat in the Offset comprising Woodland/Forest proposed to offset impact to remnant Greater Glider habitat

Aspect	Input	Justification
Impact		
Species Status	Endangered	-
Area of Habitat to be Impacted	81.70 ha	Habitat area defined by Biodiversity Australia (2020) during field surveys.
Quality (0 to 10)	6	The habitat quality score has been calculated using the <i>Guide to Determining Terrestrial Habitat Quality Version 1.3</i> (DES 2020).
Offset		
Time over which loss is averted (max. 20 years)	20 years	An arrangement would be made for the enduring protection and management of the offset area.
Time until ecological benefit	15 years	Areas of habitat within the offset areas contain potential foraging and roosting habitat for the Greater Glider. Natural regeneration is likely to further increase the extent of potential habitat over time. Within the offset, the present regrowth would be protected from clearance that would otherwise occur in the next five years for grazing purposes. Management of the offset areas is expected to improve the quality, composition and extent of patches of habitat for the Greater Glider. Management of the offset areas would include the following measures relevant to the Greater Glider: • no vegetation within offset patches of habitat would be cleared, unless required for management purposes (e.g. fire breaks); • management of livestock (i.e. rotational grazing); and • removal of barbed wire. It is considered that ecological benefits are likely to conservatively occur within 5 years, with additional benefits comprising increased breeding habitat likely to occur within 15 years.
Start area (ha) (Size of the offset)	975.1	Area defined during field survey, consisting of 975.1 ha of woodland/forest habitat mapped by Biodiversity Australia (2020 and 2023).
Start Quality (0 to 10)	7	The habitat quality score has been calculated using the <i>Guide to Determining Terrestrial Habitat Quality Version 1.3</i> (DES, 2020).
Risk of loss (%) without offset	0%	Within the next 20 years, without the offset, a probability of loss for agricultural purposes exists. Current clearing practices within QLD indicate a loss of 32% of Category X habitat and 7% of category B habitat in the Brigalow region for a 20 year period. It would not be unreasonable to assume at least a 5% risk of loss over the period of the offset if the offset is not put in place. However, at the direction of DCCEEW it is assumed 0% risk of ecological values will be lost.
Future quality without offset (scale of 0-10)	7	Without the offset, it is not unreasonable to assume a likelihood of quality reduction through continued existing grazing practices. At DCCEEW direction it is conservatively assumed that there is no change to the future quality of either remnant or non-remnant habitat offset areas



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Aspect	Input	Justification
Risk of loss (%) with offset	0%	Within the next 20 years, with the offset, it is conservatively assumed that there is a 0% risk that the ecological values will be lost.
Future quality with offset (scale of 0-10)	8	A habitat quality value of 8 is considered appropriate because the starting quality is 7. Management measures implemented within offset areas would result in natural regeneration of food trees, threat management including control of feral predators and reduction in fragmentation. In addition, regeneration of cleared land/regrowth vegetation that would occur if the offset is established would allow for greater connectivity between the patches of woodland vegetation, thereby increasing the habitat quality and availability for this species whilst limiting the risk of vehicle strike. The habitat quality score has been calculated by using predicted inputs into the <i>Guide to Determining Terrestrial Habitat Quality Version 1.3</i> (DES, 2020).
Confidence in the result	90%	There is a high level of confidence (90%) that loss of habitat values in the offset areas would be averted because an arrangement would be made for the enduring protection and management of the offset areas. MCPL has a positive history in regard to meeting offsetting requirements. For example, in accordance with Conditions 1 and 2 of the Commonwealth Approval Decision (EPBC 2010/5394), appropriate long-term security for the Stage 2 Biodiversity Offset Area was established by securing a voluntary declaration of the area under the QLD <i>Vegetation Management Act, 1999</i>. Further, it is noted that the proposed offset area is located on freehold land owned by MCPL. As a result, there is certainty regarding the restriction of vegetation clearance activities, the limitation and control of grazing activities and the general access and use of the land.
Calculator Output - % of Impact Offset		149.70%



Ornamental Snake

Table 74 Calculator Inputs and Output – Ornamental Snake Remnant Habitat in the Offset Currently Comprising Woodland/Forest proposed to offset impact on Remnant Ornamental Snake Habitat

Aspect	Input	Justification
Impact		
Species Status	Vulnerable	-
Area of Habitat to be Impacted	3.48	Habitat area defined by Biodiversity Australia (2020) during field surveys.
Quality (0 to 10)	5	The habitat quality score has been calculated using the <i>Guide to Determining Terrestrial Habitat Quality Version 1.3</i> (DES 2020).
Offset		
Time over which loss is averted (max. 20 years)	20 years	An arrangement would be made for the enduring protection and management of the offset area.
Time until ecological benefit	15 years	It is considered that ecological benefits are likely to occur within 15 years given there are already signs of natural regeneration occurring within the existing offset areas and monitoring data indicate positive trends in recruitment and canopy cover.
Start area (ha) (Size of the offset)	20.0	Area defined during field survey, consisting of 20.0 ha of woodland habitat mapped by Biodiversity Australia (2020).
Start Quality (0 to 10)	5	The habitat quality score has been calculated using the <i>Guide to Determining Terrestrial Habitat Quality Version 1.3</i> (DES 2020)
Risk of loss (%) without offset	0%	Within the next 20 years, without the offset, a probability of loss for agricultural purposes exists. Current clearing practices within QLD indicate a loss of 32% of Category X habitat and 7% of category B habitat in the Brigalow region for a 20 year period. It would not be unreasonable to assume at least a 5% risk of loss over the period of the offset if the offset is not put in place. However, at the direction of DCCEEW it is assumed 0% risk of ecological values will be lost.
Future quality without offset (scale of 0-10)	5	Without the offset, it is not unreasonable to assume a likelihood of quality reduction through continued existing grazing practices. At DCCEEW direction it is conservatively assumed that there is no change to the future quality of either remnant or non-remnant habitat offset areas
Risk of loss (%) with offset	0%	Within the next 20 years, with the offset, it is conservatively assumed that there is a 0% risk that the ecological values will be lost.



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Aspect	Input	Justification
Future quality with offset (scale of 0-10)	6	With the offset, an increase in quality is anticipated to occur through natural regeneration and protection of existing vegetation. A quality value of 6 is considered appropriate given the starting quality is 5. The quality of the offset area for the ornamental snake will improve when there is greater development of an understory, hollow logs and woody debris, and improvement in soil condition. This will mostly be achieved through management measures. Management measures implemented within offset areas including the management of livestock, weed control and feral animal control will also significantly reduce the likelihood of further habitat degradation. The habitat quality score has been calculated by using predicted inputs into the <i>Guide to Determining Terrestrial Habitat Quality Version 1.3</i> (DES 2020).
Confidence in the result	90%	There is a high level of confidence (90%) that loss of habitat values in the offset areas would be averted because an arrangement would be made for the enduring protection and management of the offset areas. MCPL has a positive history in regards to meeting offsetting requirements. For example, in accordance with Conditions 1 and 2 of the Commonwealth Approval Decision (EPBC 2010/5394), appropriate long-term security for the Stage 2 Biodiversity Offset Area was established by securing a voluntary declaration of the area under the <i>QLD Vegetation Management Act, 1999</i>. Further, it is noted that the proposed offset area is located on freehold land owned by MCPL. As a result, there is certainty regarding the restriction of vegetation clearance activities, the limitation and control of grazing activities and the general access and use of the land.
Calculator Output - % of Impact Offset		100.37%



Table 75 Calculator Inputs and Output – Regrowth in the Offset Proposed to Become Ornamental Snake Habitat to offset impact to non-remnant Ornamental Snake habitat

Aspect	Input	Justification
Impact		
Species Status	Vulnerable	-
Area of Habitat to be Impacted	13.73	Habitat area defined by Biodiversity Australia (2018) during field surveys.
Quality (0 to 10)	4	The habitat quality score has been calculated using the <i>Guide to Determining Terrestrial Habitat Quality Version 1.3</i> (DES 2020).
Offset		
Time over which loss is averted (max. 20 years)	20 years	An arrangement would be made for the enduring protection and management of the offset area.
Time until ecological benefit	15 years	It is considered that ecological benefits are likely to occur within 15 years given there are already signs of natural regeneration occurring within the existing offset areas and monitoring data indicate positive trends in recruitment and canopy cover.
Start area (ha) (Size of the offset)	42.90 (non-rem) 22.03 (remnant)	Area defined during field survey, consisting of 42.90 ha of regrowth and 22.03 ha of remnant woodland habitat mapped by Biodiversity Australia (2020).
Start Quality (0 to 10)	4 (non-rem) 5 (rem)	The habitat quality score has been calculated using the <i>Guide to Determining Terrestrial Habitat Quality Version 1.3</i> (DES 2020).
Risk of loss (%) without offset	0%	Within the next 20 years, with the offset, it is conservatively assumed that there is a 0% risk that the ecological values will be lost.
Future quality without offset (scale of 0-10)	4	Within the next 20 years, without the offset, a probability of loss for agricultural purposes exists. Current clearing practices within QLD indicate a loss of 32% of Category X habitat and 7% of category B habitat in the Brigalow region for a 20 year period. It would not be unreasonable to assume at least a 5% risk of loss over the period of the offset if the offset is not put in place. However, at the direction of DCCEEW it is assumed 0% risk of ecological values will be lost.
Risk of loss (%) with offset	0%	Without the offset, it is not unreasonable to assume a likelihood of quality reduction through continued existing grazing practices. At DCCEEW direction it is conservatively assumed that there is no change to the future quality of either remnant or non-remnant habitat offset areas
Future quality with offset (scale of 0-10)	5 (non-rem) 6 (remnant)	With the offset, an increase in quality is anticipated to occur through natural regeneration and protection of existing vegetation. A quality value of 5 is considered appropriate given the starting quality is 4 and there are already signs of natural regeneration occurring within existing offset areas, and monitoring data indicates positive trends in recruitment and canopy cover over a 5 year period. Management measures implemented within offset areas including the management of livestock, weed control and feral animal control will also significantly reduce the likelihood of further habitat degradation. The habitat quality score has been calculated by using predicted inputs into the <i>Guide to Determining Terrestrial Habitat Quality Version 1.3</i> (DES 2020).



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Aspect	Input	Justification
Confidence in the result	90%	There is a high level of confidence (80%) that loss of habitat values in the offset areas would be averted because an arrangement would be made for the enduring protection and management of the offset areas. MCPL has a positive history in regards to meeting offsetting requirements. For example, in accordance with Conditions 1 and 2 of the Commonwealth Approval Decision (EPBC 2010/5394), appropriate long-term security for the Stage 2 Biodiversity Offset Area was established by securing a voluntary declaration of the area under the <i>QLD Vegetation Management Act, 1999</i>. Further, it is noted that the proposed offset area is located on freehold land owned by MCPL. As a result, there is certainty regarding the restriction of vegetation clearance activities, the limitation and control of grazing activities and the general access and use of the land.
Calculator Output - % of Impact Offset		103.22% (68.23% (non-rem) + 34.99% (remnant))



Brigalow Woodland TEC

Table 76 Calculator Inputs and Outputs - Brigalow Woodland TEC

Aspect	Input	Justification
Impact		
Species Status	Endangered	-
Area of Habitat to be Impacted	3.48	Habitat area defined by Biodiversity Australia (2020) during field surveys.
Quality (0 to 10)	6	The habitat score has been calculated using the <i>Guide to Determining Terrestrial Habitat Quality Version 1.3</i> (DES 2020).
Offset		
Time over which loss is averted (max. 20 years)	20 years	An arrangement would be made for the enduring protection and management of the offset area.
Time until ecological benefit	15 years	It is considered that the ecological benefit is likely to occur within 15 years given monitoring data from the existing offset areas show positive trends in the recruitment and canopy cover trends over 5 years. Natural regeneration is likely to further increase the extent of Brigalow Woodland over time.
Start area (ha) (Size of the offset)	42.03 ha	Area defined by Biodiversity Australia (2020) during field surveys.
Start Quality (0 to 10)	6	Areas of habitat within the offset areas are considered to have a similar starting quality as the habitat in the impact area. The habitat quality score has been calculated using the <i>Guide to Determining Terrestrial Habitat Quality Version 1.3</i> (DES 2020).
Risk of loss (%) without offset	0%	Within the next 20 years, without the offset, it is conservatively assumed that there is a 0% risk that the ecological values will be lost.
Future quality without offset (scale of 0-10)	6	Within the next 20 years, without the offset, a probability of loss for agricultural purposes exists. Current clearing practices within QLD indicate a loss of 32% of Category X habitat and 7% of category B habitat in the Brigalow region for a 20 year period. It would not be unreasonable to assume at least a 5% risk of loss over the period of the offset if the offset is not put in place. However, at the direction of DCCEEW it is assumed 0% risk of ecological values will be lost.
Risk of loss (%) with offset	0%	Without the offset, it is not unreasonable to assume a likelihood of quality reduction through continued existing grazing practices. At DCCEEW direction it is conservatively assumed that there is no change to the future quality of either remnant or non-remnant habitat offset areas
Future quality with offset (scale of 0-10)	7	With the offset, an increase in habitat quality is anticipated to occur through an increase in the connectivity of habitat and reduced edge effects on existing patches, less weeds due to improved weed management. Further to this, management measures, in particular the grazing management strategy, would enable recruitment of native plant species and the area will maintain a good cover of litter and woody debris including logs and fallen tree limbs. The habitat quality score has been calculated by using predicted inputs into the <i>Guide to Determining Terrestrial Habitat Quality Version 1.3</i> (DES 2020).



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Aspect	Input	Justification
Confidence in the result	90%	There is a high level of confidence (90%) that loss of habitat values in the offset areas would be averted because an arrangement would be made for the enduring protection and management of the offset areas. MCPL has a positive history in regards to meeting offsetting requirements. For example, in accordance with Conditions 1 and 2 of the Commonwealth Approval Decision (EPBC 2010/5394), appropriate long-term security for the Stage 2 Biodiversity Offset Area was established by securing a voluntary declaration of the area under the QLD <i>Vegetation Management Act, 1999</i>. Further, it is noted that the proposed offset area is located on freehold land owned by MCPL. As a result, there is certainty regarding the restriction of vegetation clearance activities, the limitation and control of grazing activities and the general access and use of the land.
Calculator Output - % of Impact Offset		151.40



Poplar Box Grassy Woodland on Alluvial Plains TEC

Table 77 Calculator Inputs and Output – Remnant Poplar Box Grassy Woodland on Alluvial Plains proposed as Offset

Aspect	Input	Justification
Impact		
Species Status	Endangered	-
Area of Habitat to be Impacted	43.88	Habitat area defined by Biodiversity Australia (2020) during field surveys.
Quality (0 to 10)	7	The habitat quality score has been calculated using the <i>Guide to Determining Terrestrial Habitat Quality Version 1.3</i> (DES, 2020).
Offset		
Time over which loss is averted (max. 20 years)	20 years	An arrangement would be made for the enduring protection and management of the offset area.
Time until ecological benefit	15 years	It is considered that the full ecological benefits are likely to occur within 15 years given monitoring data from the existing offset areas indicates positive trends in the recruitment and canopy cover trends over 5 years. Given the presence of large trees throughout the majority of these areas, improvement will mostly be observed in the further development of hollows, and increasing complexity within the mid and understorey.
Start area (ha) (Size of the offset)	166.61	Area defined during field survey, consisting of 166.61 ha of Poplar Box TEC mapped by Biodiversity Australia (2020).
Start Quality (0 to 10)	6	The habitat quality score has been calculated using the <i>Guide to Determining Terrestrial Habitat Quality Version 1.3</i> (DES, 2020).
Risk of loss (%) without offset	0%	Within the next 20 years, without the offset, a probability of loss for agricultural purposes exists. Current clearing practices within QLD indicate a loss of 32% of Category X habitat and 7% of category B habitat in the Brigalow region for a 20 year period. It would not be unreasonable to assume at least a 5% risk of loss over the period of the offset if the offset is not put in place. However, at the direction of DCCEEW it is assumed 0% risk of ecological values will be lost.
Future quality without offset (scale of 0-10)	6	Without the offset, it is not unreasonable to assume a likelihood of quality reduction through continued existing grazing practices. At DCCEEW direction it is conservatively assumed that there is no change to the future quality of either remnant or non-remnant habitat offset areas
Risk of loss (%) with offset	0%	Within the next 20 years, with the offset, it is conservatively assumed that there is a 0% risk that the ecological values will be lost.
Future quality with offset (scale of 0-10)	8	With the offset, an increase in habitat quality is anticipated to occur through natural recruitment remnant areas which is likely to increase once cattle are managed on site. Further to this, management measures will be implemented to assist with facilitating an increase in connectivity, recruitment, species richness, a reduction in edge effects, and to reduce the prevalence of weeds. A quality value of 8 is considered appropriate because the starting quality is 6 and existing offset areas have shown positive trends in natural recruitment and canopy cover over a 5 year period. The habitat quality score has been calculated by using predicted inputs into the <i>Guide to Determining Terrestrial Habitat Quality Version 1.3</i> (DES, 2020).



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Aspect	Input	Justification
Confidence in the result	90%	There is a high level of confidence (90%) that loss of habitat values in the offset areas would be averted because an arrangement would be made for the enduring protection and management of the offset areas. MCPL has a positive history in regards to meeting offsetting requirements. For example, in accordance with Conditions 1 and 2 of the Commonwealth Approval Decision (EPBC 2010/5394), appropriate long-term security for the Stage 2 Biodiversity Offset Area was established by securing a voluntary declaration of the area under the <i>QLD Vegetation Management Act, 1999</i>. Further, it is noted that the proposed offset area is located on freehold land owned by MCPL. As a result, there is certainty regarding the restriction of vegetation clearance activities, the limitation and control of grazing activities and the general access and use of the land.
Calculator Output - % of Impact Offset		81.64%



Table 78 Calculator Inputs and Output – Regrowth Poplar Box Grassy Woodland on Alluvial Plains proposed as Offset

Aspect	Input	Justification
Impact		
Species Status	Endangered	-
Area of Habitat to be Impacted	43.88	Habitat area defined by Biodiversity Australia (2020) during field surveys.
Quality (0 to 10)	7	The habitat quality score has been calculated using the <i>Guide to Determining Terrestrial Habitat Quality Version 1.3</i> (DES, 2020).
Offset		
Time over which loss is averted (max. 20 years)	20 years	An arrangement would be made for the enduring protection and management of the offset area.
Time until ecological benefit	15 years	It is considered that the full ecological benefits are likely to occur within 15 years given monitoring data from the existing offset areas indicates positive trends in the recruitment and canopy cover trends over 5 years. Given the presence of large trees throughout the majority of these areas, improvement will mostly be observed in the further development of hollows, and increasing complexity within the mid and understory.
Start area (ha) (Size of the offset)	71.88	Area defined during field survey, consisting of 71.88 ha of Poplar Box TEC regrowth mapped by Biodiversity Australia (2020).
Start Quality (0 to 10)	5	The habitat quality score has been calculated using the <i>Guide to Determining Terrestrial Habitat Quality Version 1.3</i> (DES, 2020).
Risk of loss (%) without offset	0%	Within the next 20 years, without the offset, a probability of loss for agricultural purposes exists. Current clearing practices within QLD indicate a loss of 32% of Category X habitat and 7% of category B habitat in the Brigalow region for a 20 year period. It would not be unreasonable to assume at least a 5% risk of loss over the period of the offset if the offset is not put in place. However, at the direction of DCCEEW it is assumed 0% risk of ecological values will be lost.
Future quality without offset (scale of 0-10)	5	Without the offset, it is not unreasonable to assume a likelihood of quality reduction through continued existing grazing practices. At DCCEEW direction it is conservatively assumed that there is no change to the future quality of either remnant or non-remnant habitat offset areas
Risk of loss (%) with offset	0%	Within the next 20 years, with the offset, it is conservatively assumed that there is a 0% risk that the ecological values will be lost.
Future quality with offset (scale of 0-10)	7	With the offset, an increase in habitat quality is anticipated to occur through natural recruitment within regrowth areas which is likely to increase once cattle are managed on site. Further to this, management measures will be implemented to assist with facilitating an increase in connectivity, a reduction in edge effects, and to reduce the prevalence of weeds. A quality value of 6 is considered appropriate because the starting quality is 5 and existing offset areas have shown positive trends in natural recruitment and canopy cover over a 5 year period. The habitat quality score has been calculated by using predicted inputs into the <i>Guide to Determining Terrestrial Habitat Quality Version 1.3</i> (DES, 2020).



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Aspect	Input	Justification
Confidence in the result	90%	There is a high level of confidence (90%) that loss of habitat values in the offset areas would be averted because an arrangement would be made for the enduring protection and management of the offset areas. MCPL has a positive history in regards to meeting offsetting requirements. For example, in accordance with Conditions 1 and 2 of the Commonwealth Approval Decision (EPBC 2010/5394), appropriate long-term security for the Stage 2 Biodiversity Offset Area was established by securing a voluntary declaration of the area under the <i>QLD Vegetation Management Act, 1999</i>. Further, it is noted that the proposed offset area is located on freehold land owned by MCPL. As a result, there is certainty regarding the restriction of vegetation clearance activities, the limitation and control of grazing activities and the general access and use of the land.
Calculator Output - % of Impact Offset		35.22%



A-6 Justification for the Proposed Management Measures and Subsequent Increase in Habitat Quality Score

Recognised Management Actions as per the DAWE SPRAT Profile	MCPL Proposed Management Actions	Specific Habitat Requirements of the MNES being Affected by the Proposed Management Actions	Change in Habitat Quality Score
Brigalow EEC			
<i>Limiting disturbance/ clearing in or adjacent to remnants to minimise weed incursion</i>	No vegetation in or adjacent remnant vegetation would be cleared, unless required for management purposes (e.g. fire breaks).	All Brigalow EEC habitat components would benefit.	The management action would minimise weed incursion (as acknowledged by the Brigalow TEC SPRAT profile) and therefore result in a decrease in non-native plant cover and increase in habitat quality score. Management measures would also result in an increase in the connectedness of existing Brigalow patches by avoiding loss of remnants through disturbance.
<i>Making regular checks and carrying out appropriate treatment to avoid weed invasion</i>	The procedure for controlling and monitoring environmental weeds/restricted invasive plants will be implemented annually, during spring to early summer.	Improve the quality of the understorey of the Brigalow EEC.	The management action would minimise weed incursion (as acknowledged by the Brigalow TEC SPRAT profile) and therefore result in a decrease in non-native plant cover and increase in habitat quality score.
<i>Managing grass fuel loads to avoid hot fires in remnants</i>	Ground fuel loads will be controlled through the strategic rotational grazing of cattle to prevent thick grass biomass from accumulating over time.	All Brigalow EEC habitat components would benefit.	The management action would likely result in a decrease in non-native plant cover and an increase in habitat quality.
<i>Maintaining fire breaks to avoid hot fires in remnants</i>	Creation and maintenance of fire tracks (fire breaks) for fire control.	All Brigalow EEC habitat components would benefit.	Management actions would result in an increase in the connectedness of the existing Brigalow patches by avoiding loss of some remnants through bushfire.
<i>Managing grazing in a way that enables recruitment of native plant species and maintains a good cover of litter and woody debris including logs and fallen tree limbs</i>	Ground fuel loads will be controlled through the strategic rotational grazing of cattle to prevent thick grass biomass from accumulating over time.	Improve the quality of the understorey and groundcover of the Brigalow EEC.	Management actions would result in a decrease in non-native plant cover and increase in habitat quality.



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Recognised Management Actions as per the DAWE SPRAT Profile	MCPL Proposed Management Actions	Specific Habitat Requirements of the MNES being Affected by the Proposed Management Actions	Change in Habitat Quality Score
<i>Avoid use of Brigalow ecological community for stock feed during droughts</i>	Cattle to be rotated out of Brigalow ecological community areas during droughts. If not possible supplement feed will be provided to mitigate impact on TEC.	Improve the quality of the understory and groundcover of the Brigalow EEC.	Management actions would result in the maintenance of brigalow TEC quality during drought periods.
<i>Avoid damage to Brigalow and other native plants from aerial application of herbicides to control crop weeds</i>	Given the MCPL owned lands do not include cropped areas, aerial application of herbicides would not occur, rather weed treatments would be carried out by ground teams.	Improve the quality of the understory and groundcover of the Brigalow EEC.	Management actions would ensure the maintenance of brigalow TEC quality and minimise damage to native plant species by aerial spraying.
Squatter Pigeon (southern)			
<i>Protect sub-populations of the subspecies through the development of covenants and conservation agreements, or by including them in reserve tenure.</i>	Species habitat in the proposed offset area would be secured under a voluntary declaration.	All Squatter Pigeon (southern) habitat components would benefit.	The management measures that accompany the Voluntary declaration, when implemented, would result in an f the habitat quality.
<i>Manage threats to areas of vegetation that support important sub-populations of the Squatter Pigeon (southern).</i> Recognised threats include: - Loss of habitat; - degradation of habitat by invasive weeds; - predation from feral cats	No vegetation in or adjacent patches of suitable habitat would be cleared, unless required for management purposes (e.g. fire breaks). The procedure for controlling and monitoring environmental weeds/restricted invasive plants will be implemented annually, during spring to early summer. Appropriately qualified persons will be engaged to undertake pest animal control annually or more frequently as required.	All Squatter Pigeon (southern) habitat components would benefit.	Management actions would result in a decrease in non-native plant cover, an increase in squatter pigeon habitat quality, an increase in availability of foraging and shelter habitat and a reduction in threats.
<i>Protect and rehabilitate areas of vegetation that support important sub-populations.</i>	The primary method for regenerating the offset areas will be through management of threatening processes that inhibit natural regeneration. In the unlikely event that natural regeneration is not readily occurring or species composition is poor, contingency measures include active seeding/planting or disturbance to reduce competition.	All Squatter Pigeon (southern) habitat components would benefit.	Management actions would result in an increased level of connectedness between areas of suitable habitat, an improvement in habitat quality and an increased availability of foraging and shelter habitat.
<i>Develop and implement a stock management plan for key sites.</i>	Rotational grazing of cattle will be implemented within the offset area.	Improve the quality of the understory habitat for the Squatter Pigeon (southern).	Management actions would result in an increase in habitat quality and an increase in availability of foraging habitat.



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Recognised Management Actions as per the DAWE SPRAT Profile	MCPL Proposed Management Actions	Specific Habitat Requirements of the MNES being Affected by the Proposed Management Actions	Change in Habitat Quality Score
<i>Develop and implement a management plan, or nominate an existing plan to be implemented, for the control and eradication of feral herbivores in areas inhabited by the squatter pigeon (southern).</i>	An Offset Management Plan has been developed for the offset areas and contains measures for feral animal control. Appropriately qualified persons will be engaged to undertake pest animal control annually or more frequently as required.	Improve the quality of the understory habitat for the Squatter Pigeon (southern).	Management actions would result in an increase in habitat quality and increase in availability of foraging habitat.
<i>Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them, if necessary.</i>	MNES fauna relevant to each offset area will be monitored over time to document their usage of the relevant offset area(s) and determine the success of the management actions being implemented.	All Squatter Pigeon (southern) habitat components would benefit.	Monitoring would confirm the success of management actions and allow MCPL to make adjustments as and if required.
Koala			
<i>Development plans should explicitly address ways to mitigate risk of vehicle strike when development occurs adjacent to, or within, Koala habitat.</i>	Access into the offset areas will be restricted to authorised personnel. Locks will be installed on gates into the offset areas and vehicles will be restricted to designated access tracks. Speed limits of 60 km per hour will be imposed on vehicles using access tracks.	All Koala habitat components would benefit.	Management actions would result in decrease in the threats to the Koala and increase in habitat quality score.
<i>Develop and implement a management plan to control the adverse impacts of predation on Koalas by dogs in urban, peri-urban and rural environments.</i>	Appropriately qualified persons will be engaged to undertake pest animal control annually or more frequently as required.	All Koala habitat components would benefit.	Management actions would result in a decrease of threats to the Koala and an increase in habitat quality score.
<i>Manage any other known, potential or emerging threats such as a Bell Miner (Manorina melanophrys) Associated Dieback or Eucalyptus rust.</i>			
<i>Develop and implement options of vegetation recovery and re-connection in regions containing fragmented Koala populations, including inland regions in which Koala populations were diminished by drought and coastal regions where development pressures have isolated Koala populations.</i>	The primary method for regenerating the offset areas will be through management of threatening processes that inhibit natural regeneration. In the unlikely event that natural regeneration is not readily occurring or species composition is poor, contingency measures include active seeding/planting or disturbance to reduce competition.	All Koala habitat components would benefit.	Management actions would result in an increase in context and connectedness of suitable habitat, improvements to habitat quality and increased availability of foraging and shelter habitat.
<i>Investigate formal conservation arrangements, management agreements and covenants on private land, and, for both Crown and private</i>	The species' habitat in the proposed offset area would be secured under a voluntary declaration.	All Koala habitat components would benefit.	Management measures that accompany the voluntary declaration,



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Recognised Management Actions as per the DAWE SPRAT Profile	MCPL Proposed Management Actions	Specific Habitat Requirements of the MNES being Affected by the Proposed Management Actions	Change in Habitat Quality Score
<i>land, investigate and/or secure inclusion of habitat critical to the survival of the Koala in reserve tenure, if possible.</i>			when implemented, would result in an improvement in habitat quality.
<i>Develop and implement a development planning protocol to be used in areas of Koala sub-populations or sub-population fragments to prevent loss of Koala sub-populations, habitat critical to the survival of the species and vital habitat connectivity.</i>	MNES fauna relevant to each offset area will be monitored over time to document their usage of the relevant offset area(s) and determine the success of the management actions being implemented.	All Koala habitat components would benefit.	Monitoring would confirm the success of management actions and allow MCPL to make adjustments, as and if required.
<i>Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them, if necessary.</i>			
Greater Glider (southern and central)			
<i>Removal of barbed wire fencing to avoid entanglement</i>	Barbed wire fencing within the offset areas will be removed upon exclusion of grazing.	All Greater Glider habitat components would benefit.	Management actions would result in a decrease in threats to the Greater Glider and an increase in habitat quality score.
<i>Reduce the frequency and intensity of prescribed burns.</i>	Ground fuel loads will be controlled through the strategic rotational grazing of cattle to prevent thick grass biomass from accumulating over time. In addition, creation and maintenance of fire tracks (fire breaks) for fire control will be undertaken.	All Greater Glider habitat components would benefit.	Management actions would result in an increase in habitat quality, improved availability of foraging and shelter habitat and a reduction in the threats.
<i>Constrain clearing in forests with significant subpopulations, to retain hollow-bearing trees and suitable habitat.</i>	No vegetation in or adjacent patches of suitable habitat would be cleared to retain hollow bearing trees, unless required for management purposes (e.g. fire breaks).	All Greater Glider habitat components would benefit.	Management actions would result in an increase in context and connectedness of suitable habitat, improvements to habitat quality and increased availability of foraging and shelter habitat.
<i>Avoid fragmentation and habitat loss due to development and upgrades of transport corridors.</i>			
<i>Develop conservation covenants on lands with high value for this species.</i>	The species' habitat in the proposed offset area would be secured under a voluntary declaration.	All Greater Glider habitat components would benefit.	The management actions that accompany the voluntary declaration, when implemented, would result in an improvement in habitat quality.
Ornamental Snake			
<i>Avoid habitat fragmentation and loss through clearing (roads, ploughing, railways, mining-related activities, pipeline constructions)</i>	No vegetation in or adjacent patches of suitable habitat would be cleared, unless	All Ornamental Snake habitat components would benefit.	Management actions would result in an increase in context and connectedness of suitable habitat, improvements in habitat quality and



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Recognised Management Actions as per the DAWE SPRAT Profile	MCPL Proposed Management Actions	Specific Habitat Requirements of the MNES being Affected by the Proposed Management Actions	Change in Habitat Quality Score
	required for management purposes (e.g. fire breaks).		increased availability of foraging and shelter habitat.
<i>Reduce habitat degradation by overgrazing by stock, especially cattle, or grazing of gilgais during the wet season leads to soil compaction and compromising of soil structure</i>	Rotational grazing of cattle will be implemented within the offset area.	Improve the quality of the understory habitat for the Ornamental Snake.	Management actions would result in improvements in habitat quality and an increase in availability of foraging and shelter habitat, and a reduction in the threats.
<i>Control of invasive weeds.</i>	The procedure for controlling and monitoring environmental weeds/restricted invasive plants will be implemented annually, during spring to early summer. The spread and introduction of environmental weeds/restricted invasive plants to and within the offset areas will be minimised by restricting vehicles to designated access tracks.	Improve the quality of the understory habitat for the Ornamental Snake.	Management actions would result in a decrease in non-native plant cover, improvements in habitat quality, an increase in foraging and shelter habitat, and a reduction in the threats.
<i>Control introduced pests such as pigs to manage threats at known sites.</i>	Appropriately qualified persons will be engaged to undertake pest animal control annually or more frequently as required.	Improve the quality of the understory habitat for the Ornamental Snake.	Management actions would result in a reduction of threats, and increase in habitat quality.
<i>Develop and implement a management plan for the control of Cane Toads in the region.</i>			
<i>Negotiate management agreements and voluntary conservation agreements with landholders, on whose land the Ornamental Snake occurs, in line with the recommended management guidelines.</i>	The species' habitat in the proposed offset area would be secured under a voluntary declaration.	All Ornamental Snake habitat components would benefit.	Management actions that accompany the voluntary declaration, when implemented, would result in an improvement of the habitat quality.
<i>Implement recommended fire management guidelines in property and reserve designs.</i>	Ground fuel loads will be controlled through the strategic rotational grazing of cattle to prevent thick grass biomass from accumulating over time. In addition, creation and maintenance of fire tracks (fire breaks) for fire control will be undertaken.	All Ornamental Snake habitat components would benefit.	Management actions would result in an increase in quality of foraging and shelter habitat and increase in habitat quality.
<i>Monitor and evaluate recovery actions applying an adaptive management approach.</i>	MNES fauna relevant to each offset area will be monitored over time to assess the success of the management actions being implemented.	All Ornamental Snake habitat components would benefit.	Monitoring would confirm the success of management actions and allow MCPL to make adjustments to as and if required.



A-7 Suitably Qualified and Experienced Ecologists CVs



Our people

Daniel Joyce (BSc. ENV)

Business Manager Ecology



Professional profile

As a Senior Ecologist / Project Manager with Biodiversity Australia, Daniel has undertaken numerous ecological and environmental consulting projects. Daniels experience is across a wide variety of sectors including mining, oil and gas, land development and transport corridors. While he has been based in South East Qld since 2005, his project experience is throughout Australia, the South Pacific and Africa.

Having worked on local, remote, and international projects, Daniel understands the complex environmental, ecological and logistic issues of various size projects. He also understands that no matter the size of the project, every project requires a high level of technical expertise and must be delivered on time and on budget.

Daniel has undertaken a range of ecological and environmental assessments, including ecological impact assessments; vegetation management, rehabilitation and restoration, habitat and vegetation offsets. Daniel has significant experience working under the Environmental Protection and Biodiversity Act, Vegetation Management Act, Nature Conservation Act, Biosecurity Act and various environmental policies within Australia and Queensland.

Daniel has demonstrated his ability to undertake native and exotic flora survey on numerous occasions and can readily identify QLD Regional Ecosystems and Federal - Threatened Ecological Communities. Daniel has significant experience working throughout Queensland's environments from Stanthorpe Granite Belt to Burketown Gulf Plains and the Wild Rivers, through the Gas fields and Brigalow country to the east coast rainforests.

His experience on a variety of projects has allowed him to grow his core skills of flora, fauna and habitat surveys into compiling complex high-level technical reports and management plans, in accordance with relevant legislation, for development approvals and ongoing environmental management.

Daniel has also managed large multi-discipline consulting and field investigation teams in remote areas for State Significant Projects. Daniel has managed and undertaken ecological, acid sulphate soils, noise, vibration, air quality, groundwater, surface water and contaminated land investigations. Daniel has undertaken the field investigations, been a part of the technical reporting team as well as managing these works for baseline assessments to post construction monitoring.

Daniel has extensive experience leading teams in remote environments and managing challenging logistic projects, driving high levels of health, safety and environmental team cultures and systems.

Qualifications, Certifications and Memberships

- Bachelor of Science Environmental Science (USC 2000)
- Regional Ecosystem Assessment Under the VMA (2003)
- BioCondition Assessment Training
- Using Animals in Science, Department of Agriculture and Fisheries
- Vegetation Structure and Remnant Status under the VMA (2003)
- Construction Industry Induction OH&S (White card)
- First Aid and CPR
- Various 4WD – driving and recovery
- The Standard 11 (S11) Mining Induction

Key Skills

- All aspects of fauna and flora surveys including targeted surveys and nocturnal surveys
- Environmental assessments
- Protected Plant Surveys
- Species ID (flora/fauna)
- Threatened species management
- Rapid weed assessments
- Project management of multi-disciplinary environmental teams
- Remote projects team management
- Developing and driving high level health, safety and quality team culture

Relevant Project Experience

Project	Key Role / Tasks
Coomera Connector 1 North	Engaged by Acciona Georgiou, scope included marine plant and seagrass surveys, terrestrial habitat and weed surveys, fauna management, and pre-clearance assessments.
Steve Irwin Way to Caboolture Bruce Highway Upgrade	Led a team of ecologists undertaking pre-clearance surveys (Habitat and weed). Significant species (Wallum frogs) surveys and relocation.
Middlemount Coal Mine	Targeted MNES surveys as part of offset vegetation monitoring.
Stanwell-Gladstone Infrastructure Corridor SDA	Engaged by the Minister for Economic Development QLD to conduct a comprehensive baseline survey to assess existing land conditions, infrastructure, and vegetation.
Middlemount Coal Mine	BioCondition assessments and classification for proposed offset area and ongoing monitoring of existing offset areas. Significant species (MNES) surveys (Greater Glider, Ornamental Snake, Squatter Pigeon).
Gladstone Mt Larcom Euroa Circuit Transmission Line EA	Engaged by the Economic Minister of Queensland to provide an ecological assessment for a proposed transmission line from the Mt Larcom Sub Station development to Euroa circuit.
Carmichael Rail Network	Ecological assessments including undertaking all field verification and ecological baseline studies to gain final state and federal approvals
Surat Basin – Ruby Jo and Southern and Central Gas Fields	Engaged by QGC/Shell to conduct ongoing ecological surveys, providing assessment reports and compliance data against Key Performance Indicator (KPI) criteria for multiple offset rehabilitation sites.
Deception Bay Interchange Bruce Highway upgrade	Protected plant survey and report for south extension clearing.
Kraft Road, Pallara, QLD	High Risk Species Management plan colonial breeders.
Brentwood Estate, Bellbird Park QLD	Protected Plant Survey and habitat assessment. Development of High-Risk Species Management plan for Powerful Owl and Colonial Breeders.
Hillside Stage 2, Mooloolah QLD	Comprehensive pre-clear surveys and load reductions including trapping programs.
Varsity Lakes to Burleigh - Pacific Motorway upgrade	Protected plant surveys and ecological surveys for extensions outside of existing clearing approvals.

Project	Key Role / Tasks
Carmichael Rail Network	Senior Ecologist and Project Manager overseeing a total of 48 staff on roster rotation for 4 separate clients across 300 + kms of green field rail line clearing and development.
Burleigh to Palm Beach - Pacific Motorway upgrade	Senior Ecologist and Project Manager – for a team of ecologists undertaking pre-clearance surveys (Habitat and weed) and undertaking Protected Plants Survey.
Palm Beach to Tugun- Pacific Motorway upgrade	Senior Ecologist with team of ecologists undertaking pre-clearance surveys (Habitat and weed), Protected Plants Survey and Marine Plant Survey.
Deception Bay Interchange Bruce Highway upgrade	Senior Ecologist Development of colonial breeders High Risk SMP including Anabat surveys and risk habitat assessment. Acid Frog surveying and reporting.
Adani – Carmichael Rail Network	Senior Ecologist undertaking detailed Ecological assessments as part of Pre-clearance surveys for the Carmichael Rail project. Assessments include identification of Threatened Ecological Communities, MNES, MSES, Protected Plant Surveys and detailed habitat values mapping.
Deception Bay M1 interchange Upgrade	Senior Ecologist undertaking targeted fauna surveys as part of pre-clearing assessments. Identification of roosting micro-bats onsite and development of high-risk Species Management Program
QGC – Surat Basin (Secondment)	Senior Ecologist on pegging parties undertaking flora and habitat surveys for proposed infrastructure including TEC mapping and MNES / MSES flora species surveys and habitat assessments
Sunshine Coast University Hospital – Lead Environmental Consultant and Project Manager	Lead consultant and project manager of Acid Sulfate Soils, Groundwater, Surface water, Contaminated Land baseline investigations preconstruction. Author of baseline reports and Environmental management plans. Managed monitoring and compliance from greenfield to post construction over 5 years working closely with Lend Lease construction team.
The Shore Marcoola – Residential Development	Senior Ecologist – Ecological assessment of the site including targeted fauna and protected plant surveys including acid frogs. Project managed surface water, groundwater, acid Sulfate Soil and contaminated land investigations of the site. Protected Plant Survey.
Abbot Point Rail Loop – Proposed Gravel Extraction Site	Environmental Assessment and Ecological Assessment including TEC, MNES and MSES. Targeted species survey and protected plant survey.
Onshore Spoil Disposal – Abbott Point	Ecological assessment and flora survey of wetland. On site project manager of groundwater, surface water and Acid Sulfate Soil investigation. Project included ASS Management Plan development and Environmental Management Plan for investigation works.
Sumitomo Nickel Mine St. Isabell Island Solomon Islands	Lead Author and Supervisor of terrestrial ecology component of Environmental Impact Assessment of proposed Nickel mine located in the remote Solomon Islands. Responsible for fieldwork, data collection, investigation design and health and safety of the terrestrial ecology field team. Targeted fauna surveys for a wide variety of species utilizing a number of survey techniques.
Mozambique LNG - Mozambique	Site supervisor team of 25 subcontracted to Total to undertake initial site investigation of extremely remote site in northern part of Mozambique. Working closely with the client I was based in our Johannesburg office for 6 months overseeing the development of Health, Safety, Environmental and logistics plans before mobilizing to site with the team and subcontractors to assist Total on site team to undertake the preliminary environmental and geotechnical investigations.

Project	Key Role / Tasks
Barrow Island – Gorgon LNG Plant	Lead field team undertaking various field monitoring activities as part of the construction phase field including groundwater, surface water, contaminated land and ecology surveys pre and during construction
Sekisui House QLD, Australia	Preliminary Ecological Assessment of a proposed development along Coolum Beach foreshore. Protected Plant Survey. Expert advice was provided on habitat and ecological values associated with the site. Targeted fauna surveys for acid frogs and Protected Plant survey. Development of Environmental Management Plans to minimize impacts on surrounding environmental values.
Burrum Heads QLD, Australia	An assessment of habitat and tidal wetlands within a proposed development site was undertaken with Environmental Management and Rehabilitation Plans compiled.
Collinsville QLD, Australia	Vegetation and ecological assessments of proposed power station sites and power line routes to pumping sites for Burdekin Pipeline.
Sunshine Coast Airport QLD, Australia	Ecological Impact Assessment of heath and wetland vegetation as part of a proposed flight school extension of the Sunshine Coast Airport. The assessment included the development of an Environmental Management Plan and referral to the Department of Environment and Heritage
Burdekin River / Moranbah QLD, Australia	Vegetation and Ecological Assessment of proposed new water pipeline from the Gorge Weir on the Burdekin River to Moranbah 230 km to the south. The project involved ground truthing Regional Ecosystem Mapping and providing ecological advice for the planning of the route. Part of this project included completing a referral to the Department of Environmental and Heritage under the Commonwealth Environmental Protection and Biodiversity Act 1999.
Cairns Region QLD, Australia	Numerous habitat and flora assessments across the region for proposed developments. Investigations generally involve desktop and site assessments of the vegetation and habitat values, and provide recommendation regarding the requirements of further investigations.
Kingsgate NSW, Australia	Intensive flora and fauna survey to establish baseline data for proposed Molybdenum mine site situated in Northern New South Wales.
Ben Lomond QLD, Australia	Preliminary Ecological Assessment for base line survey for proposed mine site
Covey Associates - Unit Development	Acid Sulfate Soil investigation and reporting for a proposed basement excavation for a six story unit complex
Dillion Folker Stephens - Residential Development	Extensive Acid Sulfate Soil investigation, reporting and management plan development for a proposed housing estate.
Eenie Creek Road	Acid Sulfate Soil investigation, base line water quality assessment, an Environmental Management Plan for operational works stage and an Environmental Management Plan for operational stage.
Glass House Estate	Assess the requirements of a agricultural buffer zone between existing agricultural land and a proposed housing development
Grinsteads Road	Acid Sulfate Soil Investigation for residential development, lake excavation and filling across the 50 ha site. Projected included ASS, GW, SW and Construction Environmental Management plan development for a proposed housing estate.
Hutchinson Builders Unit Development	Acid Sulfate Soil investigation, reporting and Management Plan for a proposed basement excavation.
Hyatt Coolum	Preliminary Ecological Assessment of a proposed bike track located along Coolum Beach foreshore. Expert advice was provided on habitat and ecological values associated with the site.

Our people



Dominic Barbagallo

Ecologist – Project Manager

Professional profile

Dominic has been with the Biodiversity Australia team for over 4 years and is equipped with well-rounded experience gained from a combination of industry appointments and formal qualifications. Dominic has completed a Bachelor of Arts, along with a Bachelor of Environmental Science with a focus on Ecology, GIS, and Soil science. Dominic works extensively in the Biodiversity Credits Market in NSW and has experience assessing and managing Biodiversity Stewardship Agreements.

Additionally, Dominic has proven his skills in the field with hands on experience on local projects within Queensland in the SEQ and Northern regions, and within NSW in the New England Plateau and North Coast regions. Dominic is a competent team member with ability to capture, identify and release wildlife, conduct pre and post clearing fauna and habitat surveys, vegetation mapping surveys, and is qualified to safely capture and release venomous snakes. Dominic understands and operates within legislative requirements and can report accurately within frameworks, along with ESRI and GIS software applications.

Qualifications, Certifications and Memberships

- Bachelor of Environmental Science, Ecology, GIS and Soil Science, University of Queensland
- Venomous Snake Handling and Relocation Certificate
- Bachelor of Arts, German and Linguistics, University of Queensland
- Course in General Safety Induction (Construction Industry White Card)
- Manual driver licence

Key Skills

- Ethical wildlife capture, handling, restraint, and release
- Wildlife handling, non-venomous snakes, lizards, and native birds
- Fauna and Flora identification skills (intermediate)
- 4x4 driving, Sand and Scrub -bushland experience
- Spatial analysis ESRI and GIS software
- Data collection, entry, and analysis
- Academic writing and reporting
- Advanced German, written and verbal
- Client relations (liaising with management and construction)
- Working safely in teams conducting ecological field work, including First Aid

Career summary

Ecologist / Project Manager	Biodiversity Australia	Jul. 2024 - Present
Graduate Ecologist	Biodiversity Australia	2023 – Jul. 2024
Fauna Spotter / Catcher	Biodiversity Australia	2021 - Present
Senior Consultant	Flight Centre Travel Group	2018 - 2021
Field Hand and Packer	Westfresh Banana Farm	2012- 2016

Professional Experience

Project Manager/Ecologist (Previously Graduate Ecologist and Fauna Spotter / Catcher)

Biodiversity Australia, QLD (2021-present)

- Project manage Biodiversity Stewardship Site and Biodiversity Development Site Assessments

- Undertake BAM complaint fauna and flora surveys including targeted EVNT species.
- Data collection to satisfy legislation and approval conditions.
- Report writing and GIS analysis.
- Animal dispersal, capture and rehabilitation (terrestrial and aquatic) – including non-venomous snakes.
- Fauna surveys
- Analysed and interpreted research data
- Species Identification – Flora and Fauna (native and pest)
- Fauna Potential Occurrence Assessments.

Senior Consultant

Flight Centre travel Group, QLD (2018-2021)

- Consultation with clients both retail and individual and sales activity to achieve business KPI and targets.
- Liaise with customers including sales consultation, needs analysis, compile professional quote documents, sales close, payments and travel documents issued.

Field Hand and Packer

Westfresh Banana farm, QLD (2012-2016)

- Harvest bananas and removal of fauna from banana bunches (mainly pythons) prior to transporting for packaging.
- Identification of invasive pests and weeds that have potential to threaten farm biosecurity.
- Operate farm vehicle and equipment over a variety of terrain including 4WD vehicles, tractors, and quad bikes.

Relevant Project Experience

Date	Project	Key Role / Tasks
November 2023 – Current	Bundabah and Goodyers	<i>Project Manager/Ecologist</i> Managing the Biodiversity Stewardship Site Assessment, Reporting and Application process for two properties to enter into a Biodiversity Stewardship Agreement. Undertaking fieldwork and ensuring the assessment is a complaint with the required BAM methodology.
November 2023 – Current	Bowen Rail Company – Fig Tree Offset	<i>Ecologist</i> Undertook field surveys to assess vegetation and habitat quality, survey for MNES flora and fauna, and assess biosecurity and environmental issues pertaining to the offset area. Assisted in producing reports to meet offset monitoring requirements.
November 2023 – Current	Middlemount Coal – Offset Monitoring and Impact Assessment	<i>Ecologist</i> Undertook field surveys to assess vegetation and habitat quality. Assisted in producing baseline and annual reporting to satisfy offset monitoring obligations.
January 2024 – Current	South Coast Region Ibis Management Strategy	<i>Ecologist</i> Undertook field habitat assessment of Ibis breeding locations within the South Coast Region. Produced a strategy and management document to mitigate the hazard of ibis motorist interactions within the region due to large scale Ibis breeding near road corridors.
June 2023 – November 2023	Breeza and Tambar Springs BSA Assessment	<i>Ecologist</i> Undertook BAM Compliant vegetation condition, Fauna and Flora surveys. Ensured data collected was compliant, correctly stored, and achieved overall project goals
May 2023	McIlwain – Environmental Services for the South Coast region emergency response program	<i>Fauna Spotter Catcher</i> Conducted a preclear survey to assess compliant vegetation removal. Ensured adequate cautionary disturbance prior to clearing, with subsequent inspection to guarantee no adverse interactions with fauna.
Jan 2022 - Current	BMD Constructions – Deception Bay Vegetation Clearing	<i>Fauna Spotter Catcher / Vegetation Management</i> Preclearance surveys and reporting Vegetation surveys for verification of vegetation density Development of vegetation management plans Wildlife management services across the project extent such as the handling and relocation of fauna, including nonvenomous snakes
Nov 2021 – June 2022	Healthy Land and Water - WOW	<i>Vegetation Management</i> Vegetation identification, inspection, and survey GIS mapping

Date	Project	Key Role / Tasks
		Biosecurity matter control
June 2021	DP Civil – Millstream Road Veresdale Scrub Environmental Service	<i>Fauna Spotter Catcher</i> Field surveys and fauna management strategy Preclearance surveys handling and relocation of fauna
May 2021 – April 2022	Fulton Hogan C2SIW	<i>Fauna Spotter Catcher and Dewatering</i> Field surveys and reporting Preclearance surveys Handling and relocation of fauna including dewatering activities
April 2021 - Current	SMA Infrastructure	<i>Fauna Spotter Catcher and Dewatering</i> Field surveys and fauna management strategy Preclearance surveys handling and relocation of fauna including dewatering activities

References

Name	Position	Organization	Phone Number
Daniel Joyce	Manager	Biodiversity Australia	0417 732 915
Connor Dumenil	Manager	Flight Centre	0414 326 714

Anita Marks

Ecologist and PhD Candidate

Professional profile

Anita has been working as an ecologist for 5 years, with experience in Protected Plants surveying and reporting in accordance with the Flora Survey Guidelines. Although not yet defined as a SQP, she has the capacity to operate to a high standard beneath the guidance of an SQP. She is experienced in biodiversity assessments in relation to Matters of State Environmental Significance (MSES) and Matters of National Environmental Significance (MNES) and regularly performs surveys and reports within these constraints. She similarly has extensive experience conducting BioCondition assessments, particularly in the Brigalow Belt region of QLD. She has experience in flora ID throughout the Brigalow region of western Qld. She has extensive understanding of Regional Ecosystem mapping, Threatened Ecological Communities (TECs) and has undertaken RE verification in Brigalow areas. She is very experienced in animal trapping techniques including Elliot trapping, pitfalls, anabat, PIR cameras, and bird surveying.

She also has recent experience in Offset Management, including identifying residual significant impacts, as well as working on offset management reports and EPBC referrals.

Anita is a PHD candidate undertaking research on threatened species population in managed urban environment. Anita was hired as the first graduate to participate in Biodiversity Australia's Indigenous Graduate Program in 2017. Through the support of Biodiversity Australia, Anita is currently working towards obtaining her doctorate with her final thesis expected to be submitted in early 2022.

Anita has experience as a Vegetation Team Leader having worked on sites with vary degrees of environmental and restricted weed infestations. Anita has utilised integrated weed management techniques in order to provide quality environmental outcomes for our Clients.

Anita has a thorough understanding of threatened species population dynamics in urban environments and associated impact of ecological processes as well as significant experience designing and undertaking population surveys.

Additionally, with Biodiversity Australia Anita has gained knowledge and experience in Australian native flora and fauna identification and surveying methods, and state and federal surveying types including BioCondition Monitoring and Protected Plants surveys. She has worked throughout the Brigalow Belt in offset management, biocondition monitoring, regional ecosystem verification, pest control and weed management. She has experience surveying and monitoring fauna throughout southeast Queensland, western Queensland and northern NSW. Anita has also conducted vegetation surveys in the gulf country of northern Queensland. She also has experience consulting the installation and design of fauna road crossing structures in Queensland and NSW, particularly for gliding mammals. Anita has been a consultant on squirrel glider population conservation in Brisbane for several years. Other field experience Anita has includes camera trapping, water quality testing, weed identification and treatment, and fauna spotter catching.

Anita has experience writing a variety of highly technical reports including protected plants surveys, offset management, fauna habitat reports, and weed management reports. With her PhD, she is writing several scientific papers covering such topics as population monitoring and modelling, genetic analysis of mammal populations, and stress hormone analysis. She is highly proficient in research skills, and has a range of statistical skills pertinent to population ecology. Anita is also a confident oral communicator, having presented at several scientific conferences including the Australian Mammal Society (2019 and 2020), and the Australian Limnology Society (2016).

Qualifications, certifications and memberships

- Bachelor of Science (Ecology and Conservation Biology), Griffith University (2015)
- Bachelor of Science Honours, Griffith University (2016)

- Doctorate of Philosophy (Science) (2018-Ongoing)
- Standard 11 Surface Induction
- CPCCOHS1001A Work Safely in the Construction Industry (White Card)
- RIWHS204D Work Safely at Heights
- AHCARB205A Operate and Maintain a Chainsaw

Key Skills

Scientific and Field:

- Population assessment sampling plan development, field assessment and reporting
- Koala SATs and spotting
- BioCondition Assessment
- Habitat evaluation and assessment
- Fauna survey techniques (aquatic and terrestrial)
- Fauna and flora identification
- Fauna spotter/catcher experience
- Weed identification and treatment
- Water quality testing

Computer:

- GIS mapping: Desktop applications including ArcGIS and QGIS, and tablet applications including GIS and MAPinr.
- Data analysis: Understanding of statistical techniques and software
- Desktop analyses: Regional Ecosystems, Wildlife Online (DEHP), Protected Plants Trigger Mapping (DEHP), Koala SPRP and SPP (DEHP), MNES (EPBC), MSES, Environmental Reports (DEHP)
- Microsoft suite programs including Word, Excel, PowerPoint, Visio

Communication:

- Professional report writing, including technical and scientific reports
- Confident oral communicator, ability to build relationships with clients and stakeholders

Career summary

PhD Candidate	Southern Cross University / Biodiversity Australia	Sept 2018- Present
Ecologist	Biodiversity Australia	2018- Present
Graduate Ecologist	Biodiversity Australia	Jan 2017 – Dec 2017
Honours Degree	Griffith University	2016
Bachelor's Degree	Griffith University	2013 - 2015

Professional experience & achievements

PHD research

Anita has been monitoring several populations of squirrel gliders in urban Brisbane since 2018. Her PhD is focussing on the conditions of these populations, and examining whether they have been in a state of decline for the last decade. The field work component of this study involves trapping squirrel gliders several times each year, using a mark-recapture method of determining population size. Anita has been modelling the size and survival probabilities of these populations, with data dating back to 2004. Anita is also investigating the genetic condition of the populations, to understand whether inbreeding is impacting the survival of the populations over the years. In addition, squirrel glider fur is being analysed for levels of cortisol, a stress hormone, which may indicate the physiological condition of individuals.

Overall, this PhD project is aiming to understand how best we can manage and conserve urban populations of gliding mammals, when urban encroachment continues to remove and degrade habitat. It is hoped this study will help inform conservation strategies for other related threatened species.

Middlemount Coal – Offset Area BioCondition monitoring

Middlemount Coal Pty Ltd (MCPL)

Anita is involved in the annual monitoring of the offset areas for MCPL, undertaking BioCondition monitoring across large offset areas with a variety of habitat types. Anita has been involved in both the field surveying, as well as compiling the data, and calculating the BioCondition scores for each site (in accordance to legislative guidelines). She currently also manages the writing of the reports for the annual biocondition monitoring. Throughout this project Anita has developed her vegetation identification skills within Brigalow ecosystems.

Wyaralong Dam Fauna Monitoring

SEQ Water

Anita led a two-man team in this project. The project involved fauna trapping (using Elliot Traps), setting up PIR cameras and analysing photographs, undertaking targeted fauna surveys (for Koalas and Eastern Grey Kangaroos), and roadkill surveys. Anita compiled and analysed data, created a series of detailed maps in ArcGIS, identified a number of Australian mammals, and wrote a report detailing the results of the study.

Prawn White Spot Disease – Analysis of data and report writing

Biosecurity Queensland

Anita was engaged on this project to analyse large amounts of data, to identify trends and to carry out statistical analyses for the purpose of writing scientific reports on the outcome of the project.

Fauna Habitat Survey

SEE Civil

Anita carried out detailed a habitat survey on a large tract of land to identify the potential presence of native fauna within the site and the habitat value of the land. Various mapping tools were also used to plot the location of habitat features for the purpose of developing detailed maps in future.

Bushland Rehabilitation

Augility

Extensive treatment of Lantana camara outbreaks using a variety of vegetation control techniques including splatter gun, foliar spray, cut stump and paint, and manual removal. This project gave Anita the opportunity to broaden her weed identification skills and knowledge of weed control techniques relevant to plant species.

APPENDIX B

QUEENSLAND HERBARIUM (2024) REGIONAL ECOSYSTEM FIRE GUIDELINES

Table B1
Queensland Herbarium (2024) Regional Ecosystem Fire Guidelines

Regional Ecosystem	Description Label	Fire Guidelines
11.3.1	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on alluvial plains	<i>INTERVAL:</i> n/a. b, d: Occasional fires 5 - 10 years. <i>STRATEGY:</i> Maintain fire management of surrounding country so that wildfires will be very limited in extent. Frequent fire at the edge of this RE keeps fuel loads low. Protection from fire is necessary. <i>ISSUES:</i> <i>Casuarina cristata</i> is fire sensitive, although germination can be good in bare areas. <i>Brigalow</i> is soft-seeded, so germination is not promoted by fire. <i>Buffel</i> grass invasion will increase risk from fire. High intensity fires will cause damage to overstorey. Grazing may be an option for reducing fuel loads where exotic grass such as <i>buffel</i> have invaded.
11.3.2	<i>Eucalyptus populnea</i> woodland on alluvial plains	<i>SEASON:</i> Late wet to early dry season when there is good soil moisture. Early storm season or after good spring rains. <i>INTENSITY:</i> Low to moderate. <i>INTERVAL:</i> 6-10 years (shorter in north of bioregion: 2-7 years). <i>STRATEGY:</i> Restrict to less than 30% in any year. Burn under conditions of good soil moisture and when plants are actively growing. Sometimes a small amount of wind may move the fire front quickly so that burn intensity is not too severe to destroy habitat trees. <i>ISSUES:</i> Burn interval for conservation purposes will differ from that for grazing purposes; the latter being much shorter. Management of this vegetation type should be based on maintaining vegetation composition, structural diversity, fauna habitats (in particular hollow-bearing trees and logs) and preventing extensive wildfire. Maintaining a fire mosaic will help ensure protection of habitat and mitigate against wildfires. Fire can control shrub invasives (e.g., <i>Eremophila</i> spp. and <i>A. stenophylla</i> in the red soil country in particular). Fire will also control cypress. Low to moderate intensity burns with good soil moisture are necessary to minimise loss of hollow trees. Avoid burning riparian communities as these can be critical habitat for some species. Culturally significant (scar) trees may need protection, such as rake removal of ground fuels. Planned burns have traditionally been carried out in the winter dry season; further research required.
11.3.4	<i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus</i> spp. woodland on alluvial plains	<i>SEASON:</i> Late wet to early dry season when there is good soil moisture. Early storm season or after good spring rains. <i>INTENSITY:</i> Low to moderate. <i>INTERVAL:</i> 6-10 years (shorter in north of bioregion: 2 - 7 years). <i>STRATEGY:</i> Restrict to less than 30% in any year. Burn under conditions of good soil moisture and when plants are actively growing. Sometimes a small amount of wind may move the fire front quickly so that burn intensity is not too severe to destroy habitat trees. <i>ISSUES:</i> Burn interval for conservation purposes will differ from that for grazing purposes; the latter being much shorter. Management of this vegetation type should be based on maintaining vegetation composition, structural diversity, fauna habitats (in particular hollow-bearing trees and logs) and preventing extensive wildfire. Maintaining a fire mosaic will help ensure protection of habitat and mitigate against wildfires. Fire can control shrub invasives (e.g., <i>Eremophila</i> spp. and <i>A. stenophylla</i> in the red soil country in particular). Fire will also control cypress. Low to moderate intensity burns with good soil moisture are necessary to minimise loss of hollow trees. Avoid burning riparian communities as these can be critical habitat for some species. Culturally significant (scar) trees may need protection, such as rake removal of ground fuels. Planned burns have traditionally been carried out in the winter dry season; further research required.

Table B1 (Continued)
Queensland Herbarium (2024) Regional Ecosystem Fire Guidelines

Regional Ecosystem	Description Label	Fire Guidelines
11.3.7	<i>Corymbia</i> spp. woodland on alluvial plains	SEASON: Early dry season when there is good soil moisture, with some later fires in the early storm season or after good spring rains. INTENSITY: Primarily low to moderate, with occasional high intensity fires. INTERVAL: Typically 2 - 7 years, with some areas longer unburnt. STRATEGY: A predominance of early dry season fires is recommended, although there is value in occasional late dry season fires, or storm burns, over small areas. Burning should begin very soon after the wet season, to secure boundaries and adjacent fire-sensitive vegetation. Subsequent repeat ignitions can be used within the same section of land weeks or months after the boundaries have been secured by early burning, to produce a mixture of burnt areas with multiple ignition dates. Use topographical features to ignite areas as soon as they dry out. This will create a mosaic of areas that were burnt at different dates and unburnt sections within the same area of woodland. Burn away from riparian communities, which can be critical habitat for some species. Approximately 25% of the grassy woodlands within a landscape should receive patchy fires in most years. ISSUES: These woodlands have a diverse native grass and herb layer that is maintained and promoted by regular fire. Burning that starts immediately after the wet season, with follow up small fires ignited progressively over multiple dates can increase the availability of grass and herb seed, which is a critical food source for many birds and small mammals. Recently burnt grass clumps tend to produce more seed than unburnt clumps and the earlier burnt grass usually seeds earlier than later burnt grass. Maintaining a fire mosaic will help ensure protection of habitat and mitigate against wildfires. Low to moderate intensity burns with good soil moisture minimise the risk of losing hollow trees. An occasional late season burn will promote grasses and legumes. Ensure a diverse grass layer; maintenance of hollow-bearing trees and vegetation structure.
11.3.21	<i>Dichanthium sericeum</i> and/or <i>Astrebla</i> spp. grassland on alluvial plains. Cracking clay soils	INTERVAL: Fire return interval not relevant. STRATEGY: Do not burn deliberately. The grasses and forbs of <i>Astrebla</i> spp. dominated communities do not require fire for regeneration. Protection relies on management of fire in the surrounding country to prevent running fires entering <i>Astrebla</i> spp. communities, particularly at times of low soil moisture. ISSUES: Fire can sometimes be used as a tool to control woody thickening and woody weeds in grasslands. Moderate intensity fire is required for a successful kill of the woody species but good moisture levels are required to ensure recovery of the ground layer. Large scale germination of woody species is most likely to occur in high rainfall years. The best management opportunity is usually after storms at the end of the subsequent dry season, although exclusion of grazing pressure may still be required to ensure sufficient fuel loads.
11.3.25	<i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines	SEASON: Primarily early dry season. INTENSITY: Low. INTERVAL: 3 - 5 years. STRATEGY: Protection relies on broad-scale management of surrounding country with numerous small fires throughout the year so that wildfires will be very limited in extent. c-g: Depending on position in the landscape, protection depends on broad-scale management of surrounding country, with numerous small fires throughout the year so that wildfires will be very limited in extent. ISSUES: Fringing communities are critical habitat. In some situations it may be best not to burn. Intense and extensive fires degrade vegetation structure and destroy fauna habitats. Restrict the extent and intensity of fires. Hollow trees are critical habitat. Green panic may be an issue and an intensive grazing regime for very short periods, may be necessary to limit potential of wildfire. c-g: If burning is to occur then implement when water level is deep enough to protect the bases of aquatic plants. Sedges are disadvantaged by repeated fires. Impact of fire on rare and threatened plants associated with mound springs that include <i>Arthraxon hispidus</i> and <i>Dimeria</i> sp. (<i>Salvator Rosa</i> R.J.Fensham RJF3643) should be considered. Boggomosses/springs can bounce back following fire but care should be taken where a dry peat layer has developed (particularly in degraded situations). Fire is an option for control of weeds (possibly in ungrazed situations). If riparian areas need to be burnt to reduce fuel loads then burning should occur when there is good soil moisture and active growth.

Table B1 (Continued)
Queensland Herbarium (2024) Regional Ecosystem Fire Guidelines

Regional Ecosystem	Description Label	Fire Guidelines
11.3.27	Freshwater wetlands	<i>STRATEGY:</i> Depending on position in the landscape, protection depends on broad-scale management of surrounding country, with numerous small fires throughout the year so that wildfires will be very limited in extent. <i>ISSUES:</i> If burning is to occur then implement when water level is deep enough to protect the bases of aquatic plants. Sedges are disadvantaged by repeated fires. Impact of fire on rare and threatened plants associated with mound springs that include <i>Arthraxon hispidus</i> and <i>Dimeria</i> sp. (Salvator Rosa R.J.Fensham RJF3643) should be considered. Boggomosses/springs can bounce back following fire but care should be taken where a dry peat layer has developed (particularly in degraded situations). Fire is an option for control of weeds (possibly in ungrazed situations). If riparian areas need to be burnt to reduce fuel loads then burning should occur when there is good soil moisture and active growth.
11.4.2	<i>Eucalyptus</i> spp. and/or <i>Corymbia</i> spp. grassy or shrubby woodland on Cainozoic clay plains	<i>SEASON:</i> Late wet to early dry season when there is good soil moisture. Early storm season or after good spring rains. <i>INTENSITY:</i> Low to moderate. <i>INTERVAL:</i> 6-10 years (shorter intervals in north of bioregion: 2 - 7 years). <i>STRATEGY:</i> Restrict to less than 30% in any year. Burn under conditions of good soil moisture and when plants are actively growing. Sometimes a small amount of wind may move the fire front quickly so that burn intensity is not too severe to destroy habitat trees. <i>ISSUES:</i> Burn interval for conservation purposes will differ from that for grazing purposes; the latter being much shorter. Management of this vegetation type should be based on maintaining vegetation composition, structural diversity, fauna habitats (in particular hollow-bearing trees and logs) and preventing extensive wildfire. Maintaining a fire mosaic will help ensure protection of habitat and mitigate against wildfires. Fire can control shrub invasives (e.g., <i>Eremophila</i> spp. and <i>A. stenophylla</i> in the red soil country in particular). Fire will also control cypress. Low to moderate intensity burns with good soil moisture are necessary to minimise loss of hollow trees. Avoid burning riparian communities as these can be critical habitat for some species. Culturally significant (scar) trees may need protection, such as rake removal of ground fuels. Planned burns have traditionally been carried out in the winter dry season; further research required.
11.4.8	<i>Eucalyptus cambageana</i> woodland to open forest with <i>Acacia harpophylla</i> or <i>A. argyrodendron</i> on Cainozoic clay plains	<i>STRATEGY:</i> Maintain fire management of surrounding country so that wildfires will be very limited in extent. Frequent fire at the edge of this RE keeps fuel loads low. Protection from fire is necessary. <i>ISSUES:</i> <i>Casuarina cristata</i> is fire sensitive, although germination can be good in bare areas. <i>Brigalow</i> is soft-seeded, so germination is not promoted by fire. Buffel grass invasion will increase risk from fire. High intensity fires will cause damage to overstorey. Grazing may be an option for reducing fuel loads where exotic grass such as buffel have invaded.
11.4.9	<i>Acacia harpophylla</i> shrubby woodland with <i>Terminalia oblongata</i> on Cainozoic clay plains	<i>STRATEGY:</i> Maintain fire management of surrounding country so that wildfires will be very limited in extent. Frequent fire at the edge of this RE keeps fuel loads low. Protection from fire is necessary. <i>ISSUES:</i> <i>Casuarina cristata</i> is fire sensitive, although germination can be good in bare areas. <i>Brigalow</i> is soft-seeded, so germination is not promoted by fire. Buffel grass invasion will increase risk from fire. High intensity fires will cause damage to overstorey. Grazing may be an option for reducing fuel loads where exotic grass such as buffel have invaded.

Table B1 (Continued)
Queensland Herbarium (2024) Regional Ecosystem Fire Guidelines

Regional Ecosystem	Description Label	Fire Guidelines
11.5.2	<i>Eucalyptus crebra</i> , <i>Corymbia</i> spp., with <i>E. moluccana</i> woodland on lower slopes of Cainozoic sand plains and/or remnant surfaces	SEASON: Late wet to early dry season when there is good soil moisture. Early storm season or after good spring rains. INTENSITY: Low to moderate. INTERVAL: 6-10 years. STRATEGY: Restrict to less than 30% in any year. Burn under conditions of good soil moisture and when plants are actively growing. Sometimes a small amount of wind may move the fire front quickly so that burn intensity is not too severe to destroy habitat trees. a: Restrict to less than 30-60% in any year. Rotate burns in mosaic patches. Maintain fire management of surrounding country so that wildfires will be very limited in extent. Burn under conditions of good soil moisture and when plants are actively growing. ISSUES: Burn interval for conservation purposes will differ from that for grazing purposes; the latter being much shorter. Management of this vegetation type should be based on maintaining vegetation composition, structural diversity, fauna habitats (in particular hollow-bearing trees and logs) and preventing extensive wildfire. Maintaining a fire mosaic will help ensure protection of habitat and mitigate against wildfires. Fire can control shrub invasives (e.g., <i>Eremophila</i> spp. and <i>A. stenophylla</i> in the red soil country in particular). Fire will also control cypress. Low to moderate intensity burns with good soil moisture are necessary to minimise loss of hollow trees. Avoid burning riparian communities as these can be critical habitat for some species. Culturally significant (scar) trees may need protection, such as rake removal of ground fuels. Planned burns have traditionally been carried out in the winter dry season; further research required. a: Maintaining a fire mosaic will ensure protection of fauna habitats (such as dense stands of <i>A. luehmannii</i>) and mitigate against wildfires. <i>Allocasuarina luehmannii</i> (bull oak) can be both killed by fire and regenerate from seed following fire. Bull oak thickening/creation of whipstick communities may be controlled with planned low intensity burns. Drought index will help deliver required guideline. Jewel butterfly is significant in this community, but the jewel butterfly needs thick leaf litter/mature bull oak; so high intensity fire (or fire that removes the litter layer) could be detrimental to survival. <i>Allocasuarina</i> is also an important food source for glossy-black cockatoo.
11.5.3	<i>Eucalyptus populnea</i> +/- <i>E. melanophloia</i> +/- <i>Corymbia clarksoniana</i> woodland on Cainozoic sand plains and/or remnant surfaces	SEASON: Late wet to early dry season when there is good soil moisture. Early storm season or after good spring rains. INTENSITY: Various. INTERVAL: 6-15 years (shorter intervals in north of bioregion: 5 - 10 years). No shrubby woodlands should receive two consecutive burns at intervals of < 6 years. STRATEGY: Once boundaries of the planned burning area are secure, ignite across the landscape in a patchwork, rather than continuous ignition strips. Use topographical features to help create a patchily burnt landscape. Where shrubby woodlands occur within a broader grassy landscape, attempt to burn the shrubby woodland during every second fire rotation in the grassy woodland, by burning early breaks around the shrubby areas. In sites with a history of wildfires recurring within 5 years, patchy burning in a few small strategic locations at 3 or 4 year intervals may reduce the incidence of extensive wildfires, while ensuring most shrubby woodland areas remain unburnt for > 5 years. b: Burn under mild conditions and primarily away from the edge into surrounding vegetation. Low intensity burning may be of benefit within the forests with native grasses and where Para grass density requires management. ISSUES: Shrubby woodlands require longer fire intervals than grassy woodlands, because of the presence of fire-killed shrubs and the time required for post-fire regrowth to return to a mature structure. The seedlings of many fire-killed shrubs (such as some wattles) require 5 years or more before they mature. The creation of a fine-scale patchy mosaic can be more difficult to achieve in shrubby compared to grassy woodlands. Ensure seedlings of fire-killed shrubs mature and persist in the woodland; ensure several years of mature shrubby woodland structure before the subsequent fire. b: Care is needed to ensure a low intensity fire, as high intensity fires can damage trees, e.g. <i>Melaleuca</i> spp. and <i>Brigalow</i>. Native grasses (e.g. <i>Imperata cylindrica</i>, <i>Sporobolus virginicus</i>) and sedges (e.g. <i>Fimbristylis</i> spp) will benefit from occasional burning. Fire, coupled with herbicide spraying, is important for managing exotic wetland plants, such as Olive <i>Hymenachne</i> and Para grass. Burning temporarily opens gaps within exotic grass patches, allowing native flora to establish. Ensure native grass diversity is maintained and native trees are not damaged by fires.

Table B1 (Continued)
Queensland Herbarium (2024) Regional Ecosystem Fire Guidelines

Regional Ecosystem	Description Label	Fire Guidelines
11.5.8	<i>Melaleuca</i> spp., <i>Eucalyptus crebra</i> , <i>Corymbia intermedia</i> woodland on Cainozoic sand plains and/or remnant surfaces	<i>SEASON:</i> Late wet to early dry season when there is good soil moisture. Early storm season or after good spring rains. <i>INTENSITY:</i> Low to moderate. <i>INTERVAL:</i> 6-10 years. <i>STRATEGY:</i> Restrict to less than 30% in any year. Burn under conditions of good soil moisture and when plants are actively growing. Sometimes a small amount of wind may move the fire front quickly so that burn intensity is not too severe to destroy habitat trees. <i>ISSUES:</i> Maintaining a fire mosaic will help ensure protection of habitat and mitigate against wildfires. Avoid burning riparian communities as these can be critical habitat for some species.
11.5.9	<i>Eucalyptus crebra</i> and other <i>Eucalyptus</i> spp. and <i>Corymbia</i> spp. woodland on Cainozoic sand plains and/or remnant surfaces	<i>SEASON:</i> Late wet to early dry season when there is good soil moisture. Early storm season or after good spring rains. <i>INTENSITY:</i> Various. <i>INTERVAL:</i> 6-15 years (shorter intervals in north of bioregion: 5 - 10 years). No shrubby woodlands should receive two consecutive burns at intervals of < 6 years. <i>STRATEGY:</i> Once boundaries of the planned burning area are secure, ignite across the landscape in a patchwork, rather than continuous ignition strips. Use topographical features to help create a patchily burnt landscape. Where shrubby woodlands occur within a broader grassy landscape, attempt to burn the shrubby woodland during every second fire rotation in the grassy woodland, by burning early breaks around the shrubby areas. In sites with a history of wildfires recurring within 5 years, patchy burning in a few small strategic locations at 3 or 4 year intervals may reduce the incidence of extensive wildfires, while ensuring most shrubby woodland areas remain unburnt for > 5 years. <i>ISSUES:</i> Shrubby woodlands require longer fire intervals than grassy woodlands, because of the presence of fire-killed shrubs and the time required for post-fire regrowth to return to a mature structure. The seedlings of many fire-killed shrubs (such as some wattles) require 5 years or more before they mature. The creation of a fine-scale patchy mosaic can be more difficult to achieve in shrubby compared to grassy woodlands. Ensure seedlings of fire-killed shrubs mature and persist in the woodland. Ensure several years of mature shrubby woodland structure before the subsequent fire.
11.7.2	<i>Acacia</i> spp. woodland on Cainozoic lateritic duricrust. Scarp retreat zone	<i>STRATEGY:</i> Maintain fire management of surrounding country so that wildfires will be very limited in extent and do not penetrate Lancewood forests. <i>ISSUES:</i> Although fire promotes the germination of Lancewood seedlings, trees are killed by all but the lowest intensity fires. Lancewood trees require approximately 20 years before seedlings mature. Often the lack of grass layer inhibits fire spread into these forests, and they will regenerate after occasional wildfires. Damaged by repeated fires < 20 years. Manage surrounding woodlands so that wildfires do not burn large areas of Lancewood forest in a single event. Ensure no damage to Lancewood trees from fires; extra protection required to ensure no two fires penetrate Lancewood forests within 20 years.
11.7.4	<i>Eucalyptus decorticans</i> and/or <i>Eucalyptus</i> spp., <i>Corymbia</i> spp., <i>Acacia</i> spp., <i>Lysicarpus</i> <i>angustifolius</i> woodland on Cainozoic lateritic duricrust	<i>STRATEGY:</i> Manage surrounding country. Burn surrounding country only under conditions of good soil moisture and when plants are actively growing. Will be difficult to burn owing to a lack of ground fuel that normally occurs in this RE.

Source: Queensland Herbarium (2024) Regional Ecosystem Fire Guidelines (May 2024) (Queensland Department Of Environment, Science and Innovation: Brisbane). <https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/fire-management>. Last updated: 15 May 2024.

APPENDIX C
RISK ANALYSIS

Table C1
Likelihood of Risk Occurring

Category	Likelihood	Qualitative description	Quantitative description
A	Almost Certain	The event is expected to occur in most circumstances	May occur once a month or more frequently
B	Likely	The event will probably occur in many circumstances	May occur once every year
C	Possible	Identified factors indicate the event could occur at some time	May occur once every 2 or 3 years
D	Unlikely	The event could occur at some time but is not expected	May occur once every 5 years
E	Rare	The event may occur only in exceptional circumstances	May occur once every 10 years

Source: Qld Government Offset Delivery Plan Template.

Table C2
Qualitative Risk Analysis Matrix

RATING	CONSEQUENCES	LIKELIHOOD				
		Rare – E	Unlikely – D	Possible – C	Likely – B	Almost certain – A
5	Severe - Permanent and/or very long term damage to areas of significant value, e.g. permanent loss of vegetation through pest invasion.	H	H	E	E	E
4	Major - Significant and/or long term damage to areas of high value, e.g. significant loss of vegetation through pest invasion.	M	M	H	H	E
3	Moderate - Moderate or medium term damage to areas of value, e.g. moderate loss of vegetation through pest invasion.	M	M	M	H	H
2	Minor - Minor and/or short term damage to areas of low value, e.g. minor loss of vegetation through pest invasion.	L	M	M	M	H
1	Insignificant - Insignificant or very short term damage to areas of very low or negligible value, e.g. insignificant loss of vegetation through pest invasion.	L	L	L	M	M

Low Risk (L)	Moderate Risk (M)	High Risk (H)	Extreme Risk (H)
Requires routine action	Requires moderate action < 1 Month	Requires priority action < 2 Weeks	Requires immediate action < 1 Week

Source: Qld Government Offset Delivery Plan Template.

Table C3
Risk Assessment

Risk Factor (Hazard)	Impact (Risk)	Before Management			Action/Control/Risk Mitigation Measure	After Management		
		Likelihood	Consequence	Risk		Likelihood	Consequence	Risk Level
Clearing	Illegal access and potential vandalism	D	3	M	- On-ground set up including fencing, installing locked gates, signage and access tracks. - Inspect and remedy issues.	E	2	L
Livestock	Grazing by cattle – ground disturbance, remove or destroy seeds, seedlings or plantings	D	2	M	- Modify fencing. - Incorporate electric fencing. - Inspect and remedy issues. - Modify rotational grazing regime. - Management of watering locations	E	2	L
Introduced flora species (environmental weeds/restricted invasive plants)	Weed invasion	C	2	M	- Ongoing monitoring. - Weed management strategy. - Restricting vehicles to designated access tracks. - Implementation of measures that favour the restoration of healthy native vegetation. - Physical removal and chemical application are the main weed control methods available.	E	2	L
Impacts from Animals (exotics and grazing native animals)	Grazing by pest animals (e.g. pigs, goats, rabbits and hares)	C	2	M	- Pest Animal Management Strategy. - Ongoing monitoring. - Removing available feed. - Implement trapping and/or baiting.	E	2	L
	Grazing native fauna species (e.g. kangaroos)	D	2	M	- Strategic grazing in the offset areas to control biomass and reduce fuel load. - Inspect and remedy issues with fences, gates or access.	E	2	L

Table C3 (Continued)
Risk Assessment

Risk Factor (Hazard)	Impact (Risk)	Before Management			Action/Control/Risk Mitigation Measure	After Management		
		Likelihood	Consequence	Risk		Likelihood	Consequence	Risk Level
Fire	Uncontrolled bushfire	C	4	H	- The Qld Rural Fire Service will be called for assistance if a significant bushfire was to occur within or move towards the offset areas. - Inspect and remedy issues with fences, gates or access. - MCPL also has firefighting capabilities (e.g. trained personnel and mobile equipment) that can assist the Qld Rural Fire Service.	E	2	L
Floristics	Poor diversity in the seed mix or tube stock	D	2	M	- Favour natural regeneration within the offset area in the first instance. - Further active revegetation (planting or seeding).	E	2	L
	Poor understorey diversity	D	2	M	Further active revegetation (planting or seeding).	E	2	L
	Over-collection of seed for revegetation purposes	D	2	M	All seed collection is to be conducted under the framework of the 'Florabank Guidelines'. This includes best practice in collection activities, cleaning, data collection, germination testing and storage.	E	2	L
Native plant growth	Poor native plant growth/germination	C	3	M	- Site preparation including stabilising and preparing the surface of the rehabilitation area so that it can absorb water and nutrients. - Further active revegetation.	D	1	L
	Dense overstorey and midstorey revegetation	C	2	M	Ongoing monitoring and implementation of remedial actions.	D	1	L
	Dense grass cover	C	2	M	Strategic grazing in the offset areas to control biomass.	D	1	L
Fauna habitat	Lack of structural diversity (including lack of tree hollows)	C	2	M	- Re-use of habitat features salvaged during vegetation clearance (or nest boxes). - Further active revegetation.	D	1	L
	Lack of suitable vegetation for foraging and/or roosting	C	2	M	- Re-use of habitat features salvaged during vegetation clearance (or nest boxes). - Further active revegetation.	D	1	L

Table C3 (Continued)
Risk Assessment

Risk Factor (Hazard)	Impact (Risk)	Before Management			Action/Control/Risk Mitigation Measure	After Management		
		Likelihood	Consequence	Risk		Likelihood	Consequence	Risk Level
Natural Disaster	Drought	D	4	M	- The Qld Rural Fire Service will be called for assistance if a significant bushfire was to occur within or move towards the offset areas. - Inspect and remedy issues with fences, gates or access. - MCPL also has firefighting capabilities (e.g. trained personnel and mobile equipment) that can assist the Qld Rural Fire Service.	E	2	L

APPENDIX D
PEER REVIEW LETTER

Wednesday, 6 August 2025

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Mr Dan Radovic
Environment, Community & Approvals Manager
Middlemount Coal Mine
PO Box 24
Middlemount QLD 4746
Delivery via: Email [dradovic@middlemountcoal.com.au]

Dear Dan,

Re: Peer Review of Middlemount Coal Mine Offset Management Plan/Vegetation Management Plan Addendum, (August 2025)

As requested, we carried out a peer review of the Middlemount Coal Mine Offset Management Plan/Vegetation Management Plan Addendum (August 2025).

1.0 Background Information

The Addendum has been developed to cover the additional Middlemount Coal Offset Areas that have been established as part of recent project approvals and applications associated with Middlemount Coal Mine Southern Extension.

Biodiversity Australia have worked at Middlemount Coal Mine since 2013. Work carried has included annual monitoring of offset areas, flora and fauna surveys and impact assessments for mine expansion projects, ground-truthing vegetation and conducting baseline ecological surveys of new offset areas now included in the plan.

2.0 Reviewer's Qualifications

The peer review of the revised plan addendum was undertaken by Principal Ecologist Daniel Joyce.

Daniel has tertiary qualifications in Environmental Science and 20 years' experience in environmental management and ecological surveys in Queensland. Daniel meets the requirements of a "suitably trained ecologist" as per the following definition on the North-eastern Extension EPBC Act approval:

"Suitably trained ecologists: means a natural person/s with the requisite training and/or experience in the ecological field relevant to the ecological work to be undertaken. The requisite training and experience must include, at minimum:

(a) one year of experience conducting ecological surveys in Queensland, Australia; and

(b) tertiary qualification in a suitable area of study (such as natural resources, environmental sciences, zoology or botany) and 5 years of ecological field work experience (alternatively a minimum of 3 years of ecological field work experience with supervision by a senior suitably qualified ecologist); or

(c) 5 years of ecological field work experience unless the person is engaged in a specialist field in which case half the number of years of field experience in that specialisation would be sufficient experience for work in regard to that specialisation."

3.0 Review Outcomes

Biodiversity Australia carried out a detailed review of the plan and provided minor technical corrections to background information of the offset areas as well as input and advice for management of the offset areas (e.g. fire management, weed management) and the annual monitoring requirements.

We are satisfied with the content of the revised plan and have found it to adequately address the setup, environmental management and monitoring requirements of the offset areas.

Yours faithfully,



Daniel Joyce BSc. ENV

Principal Ecologist

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APPENDIX E
WEED AND ANIMAL PEST MANAGEMENT

Table E1
Weed and Pest Animal Management - comparison between the Biosecurity Act 2014 and the proposed management of the offset areas

Aspect	Biosecurity Act, 2014	Proposed Management of the Offset Areas
Weeds		
Measures to <u>reduce spread</u> of prohibited or restricted invasive plants and <u>prevent</u> weeds from leaving property.	✓	✓
Measures to prevent new weeds entering property.	✓	✓
Overall reduction in abundance of weeds across the property.	x	✓
Targeted control of naturalised pasture grasses such as Buffel Grass (<i>Cenchrus ciliaris</i>), Rhodes Grass (<i>Chloris spp.</i>) and Red Natal Grass (<i>Melinis repens</i>)*	x	✓
Targeted control of environmental weeds such as Flannel Weed (<i>Sida hackettiana</i>), Cobblers Pegs (<i>Bidens pilosa</i>), Gomphrena Weed (<i>Gomphrena celosioides</i>) and Stylo (<i>Stylosanthes scabra</i>) *	x	✓
Structured management plan*	x	✓
Weed reduction targets and completion criteria.	x	✓
Regular targeted control of listed weed species.	x	✓
Regular weed monitoring*	x	✓
Regular weed reporting (annually for the first 5 years, then every 2 years until the completion criteria have been met).	x	✓
Internal and independent compliance auditing.	x	✓
Implementation of control measures and monitoring by a suitably qualified expert*	x	✓
Pests		
Feeding or keeping vertebrate pest species.	✓	✓
Transporting or releasing pest species to/from property.	✓	✓
Measures to reduce abundance and spread of invasive animals which pose a biosecurity risk (e.g. dog, cat, fox, rabbit) *	✓	✓
Reduction and removal of livestock.	x	✓
Structured management plan*	x	✓
Pest reduction targets and completion criteria.	x	✓
Regular targeted control of invasive pest species including trapping, shooting and baiting*	x	✓
Regular pest animal monitoring*	x	✓
Regular pest animal reporting (annually for the first 5 years, then every 2 years until the completion criteria have been met) *	x	✓
Internal and independent compliance auditing.	x	✓
Implementation of control measures and monitoring by a suitably qualified expert.	x	✓

* Consistent with the control of threats within relevant Threat Abatement Plans.