



Central Queensland Coal Project
Appendix 11d – Draft [REDACTED]
Offset Area Management Plan

Central Queensland Coal

CQC SEIS, Version 3

October 2020

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Offset Area Management Plan

Central Queensland Coal Project

August 2020



APPROVALS

Rev	Date	Description
0	30 July 2020	Draft issued for review
1	25 August 2020	Draft revised for submission

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1. To the best of my knowledge, all the information contained in, or accompanying this [REDACTED] Offset Area Management Plan is complete, current and correct.
2. I am duly authorised to sign this declaration on behalf of the approval holder.
3. I am aware that:
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Signed: _____

Full name: _____

Organisation: _____

Date: ___/___/_____

EXECUTIVE SUMMARY

This offset area management plan (OAMP) has been prepared to address offset requirements for matters of national environmental significance (MNES) and matters of state environmental significance (MSES) associated with the Central Queensland Coal Pty Ltd (CQC) and Fairway Coal Pty Ltd (the joint proponents). As CQC is the senior proponent, CQC is referred to as the proponent for this Project.

The Project was deemed a controlled action (EPBC 2016/7851) and is being assessed under the bilateral agreement between the Commonwealth and the State of Queensland in accordance with section 45 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth; EPBC Act). The Project will result in significant residual impacts on MNES and MSES for which CQC will be required to provide biodiversity offsets in accordance with the EPBC Act Environmental Offsets Policy (DSEWPC 2012) and Queensland Environmental Offsets Policy (DES 2020).

Table ES-1 presents a summary of the Project's significant residual impacts and anticipated offsets for MNES and MSES.

Table ES-1: Summary of the Project's significant residual impacts and anticipated offsets.

Protected Matter	Status	Significant residual impact (ha)		Total impact to offset (ha)
		Direct	Indirect	
MNES – Listed threatened species and ecological communities	EPBC Act			
Habitat for greater glider (<i>Petauroides volans</i>)	Vulnerable	115.7	165.2	281.0
Habitat for koala (<i>Phascolarctos cinereus</i>)	Vulnerable	159.4	165.2	324.6
Habitat for squatter pigeon (southern) (<i>Geophaps scripta scripta</i>)	Vulnerable	141.4	165.2	306.6
Habitat for ornamental snake (<i>Denisonia maculata</i>)	Vulnerable	18.8	0	18.8
MSES – Regulated vegetation	VM Act			
RE 11.3.4 (BVG 16c)	Of concern	1.4	39.3	40.7
RE 11.4.2 (BVG 17a)	Of concern	110.8	0	110.8
Watercourse RE 11.3.4 (BVG 16c)	Of concern	0.5	3.8	4.3
Watercourse RE 11.3.25 (BVG 16a)	Least concern	10.7	68.1	78.8
Essential habitat for greater glider	-	0	15.0	15.0*
Essential habitat for koala	-	96.1	14.3	110.4*
Essential habitat for squatter pigeon	-	14.6	14.3	28.9*
MSES – Protected wildlife habitat	NC Act			
Habitat for greater glider	Vulnerable	115.7	165.2	281.0*
Habitat for koala	Vulnerable	159.4	165.2	324.6*
Habitat for squatter pigeon	Vulnerable	141.4	165.2	306.6*
Habitat for ornamental snake	Vulnerable	18.8	0	18.8*

Protected Matter	Status	Significant residual impact (ha)		Total impact to offset (ha)
		Direct	Indirect	
MSES – Waterway fish passage				
Waterway providing for fish passage	-	8.35 +	-	8.35+

* To be offset as an MNES protected matter, noting that the State cannot impose an offset condition for a prescribed activity that has the ‘same, or substantially the same’ impact on the ‘same, or substantially the same’ matter as the MNES, if it has already been assessed as a ‘controlled action’ under the EPBC Act.

+ Based on an impact to 8.35 km of waterway providing for fish passage with an average width of 10 m.

Table ES-2 presents a summary of the Project’s offsets for MNES and MSES that will be secured on the [REDACTED] property. [REDACTED] is a [REDACTED] ha leasehold cattle grazing property located [REDACTED] in Queensland’s Brigalow Belt bioregion.

Table ES-2: Summary of anticipated MNES and MSES offsets to be secured on [REDACTED]

Protected matter	Total significant residual impact to be offset (ha)	Offset area to be secured on [REDACTED] (ha)	Acquittal (%) [^] /minimum offset area required (ha) [#]	Is MNES/MSES fully acquit on [REDACTED]
Ornamental snake	18.8	121.1	102.37%	Yes
RE 11.3.4 (BVG 16c)	40.7	148.2	162.8	No*
Watercourse RE 11.3.4 (BVG 16c)	4.3	2.4	17.2	No*
Watercourse RE 11.3.25 (BVG 16a)	78.8	78.6	315.2	No*

[^] Acquittal (%) calculated in accordance with the EPBC Act Environmental Offsets Policy and associated offsets assessment guide.

[#] Minimum offset area (ha) calculated in accordance with the Queensland Environmental Offsets Policy and associated land-based offset multiplier calculator.

* Balance of offset to be secured on Mamelon (or other land-based offset and/or financial settlement offset for MSES in accordance with Queensland Environmental Offsets Policy).

The primary purpose of this OAMP is to address both Commonwealth and State offset requirements for the Project and guide the ongoing management and monitoring of the [REDACTED] offset area. The [REDACTED] OAMP aims to improve the quality of habitat and vegetation for MNES and MSES within the offset area. The [REDACTED] offset area will be managed and monitored based on an adaptive management framework, using interim performance targets and completion criteria, as set out in Table ES-3.

Table ES-3: Interim performance targets and completion criteria for offsets on [REDACTED]

Offset value	Interim performance targets – year 10 of management	Completion criteria – year 20 of management
Ornamental snake	<ul style="list-style-type: none"> ▶ Improve the quality of ornamental snake habitat to achieve a habitat quality score greater than 7. ▶ Non-native plant cover – increase the score across all monitoring sites to a 5 representing between 5% to 25% of non-native plant cover at each site. 	<p>Improve the quality of ornamental snake habitat to achieve a habitat quality score of 8.</p> <ul style="list-style-type: none"> ▶ Site condition – the following scores for each ecological attribute will be achieved through the implementation of specific management actions under the OAMP: <ul style="list-style-type: none"> – Native shrub species richness – increase the score across all monitoring sites to a 5 representing > 90% of the benchmark for RE 11.3.3 and RE 11.3.25 – Native grass species richness – increase the score across all monitoring sites to a 5 representing > 90% of the benchmark for RE 11.3.3 and RE 11.3.25 – Native forb species richness – increase the score across all monitoring sites to a 5 representing > 90% of the benchmark for RE 11.3.3 and RE 11.3.25 – Tree canopy height – increase the score across all monitoring sites to a 5 representing 70% of the benchmark for RE 11.3.3 and RE 11.3.25 – Shrub canopy cover – increase the score across all monitoring sites to a 5 representing between 50% and 200% of the benchmark for RE 11.3.3 and RE 11.3.25 – Native perennial grass cover – increase the score across all monitoring sites to a 5 representing > 90% of the benchmark for RE 11.3.3 and RE 11.3.25 – Large trees – increase the score across all monitoring sites to a 10, representing between 50% to 100% of the benchmark for RE 11.3.3 and RE 11.3.25 – Non-native plant cover – increase the score across all monitoring sites to a 10 representing <5% non-native plant cover at each site. ▶ Site context <ul style="list-style-type: none"> – Average site context score for each RE is maintained or increased compared to the start quality score: <ul style="list-style-type: none"> – RE 11.3.3 – ≥ 9.23 – RE 11.3.25 – ≥ 9.81 ▶ Species habitat index <ul style="list-style-type: none"> – Increase the threats to species score to a 15 through the implementation of the OAMP specifically implementation of successful pest animal control targeting feral cats and foxes as well as degradation of habitat by feral pigs, active fire management, security through a legally binding mechanism and active management of the area for conservation purposes.

Offset value	Interim performance targets – year 10 of management	Completion criteria – year 20 of management
Of concern RE 11.3.4 (BVG 16c)	By year 10, achieve habitat quality score of 9	By year 20, achieve habitat quality score of 10
Watercourse RE 11.3.4 (BVG 16c)	By year 10, achieve habitat quality score of 9	By year 20, achieve habitat quality score of 10
Watercourse RE 11.3.25 (BVG 16a)	By year 10, achieve habitat quality score of 9	By year 20, achieve habitat quality score of 10

DRAFT

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ABBREVIATIONS AND ACRONYMS

BVG	Broad Vegetation Group
CQC	Central Queensland Coal Pty Ltd
DAF	Department of Agriculture and Fisheries
DAWE	Commonwealth Department of Agriculture, Water and the Environment
DES	Queensland Department of Environment and Science
EIS	Environmental Impact Statement
EN	Endangered
EP Act	<i>Environmental Protection Act 1994</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
EPC	Exploration Permit for Coal
GTDTHQ	Guide to Determining Terrestrial Habitat Quality
ha	hectare
hd	head
LC	Least concern
ML	Mining Lease
MLA	Meat and Livestock Australia
MNES	matters of national environmental significance
MSES	matters of state environmental significance
Mtpa	million tonnes per annum
OAMP	offset area management plan
OC	Of concern
RE	Regional ecosystem
REDD	Regional Ecosystem Description Database
SEIS	Supplementary Environmental Impact Statement
SOIC	Strategic Footprint of the Galilee Basin Strategic Offset Investment Corridor
The BOS	Biodiversity Offset Strategy for the Central Queensland Coal Project
the joint proponents	Central Queensland Coal Pty Ltd and Fairway Coal Pty Ltd
the Project	Central Queensland Coal Project
VM Act	<i>Vegetation Management Act 1999</i>

1 INTRODUCTION

This offset area management plan (OAMP) has been prepared for the Central Queensland Coal Project (the Project), located in the southern part of the Styx Basin, approximately 130 km north-west of Rockhampton (and 25 km north-west of Marlborough) in Central Queensland (Figure 1). The Project is being undertaken by Central Queensland Coal Pty Ltd (CQC) and Fairway Coal Pty Ltd (the joint proponents). As CQC is the senior proponent, CQC is referred to as the proponent for this Project, which involves the extraction of up to ten million tonnes per annum (Mtpa) of product coal for the export market over a life of approximately 20 years.

Under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth: EPBC Act) the Project was determined to be a controlled action (EPBC 2016/7851). It is being assessed under the bilateral agreement between the Commonwealth and the State of Queensland (section 45 of the EPBC Act) through an Environmental Impact Statement (EIS) process being completed under the Environmental Protection Act 1994 (Qld: EP Act).

Subject to approval, it is likely the Project will be conditioned in relation to biodiversity offsets and CQC required to provide offsets for significant residual impacts on matters of national environmental significance (MNES) and matters of state environmental significance (MSES). As such, the *Biodiversity Offset Strategy for the Central Queensland Coal Project* (the BOS; CO2 Australia 2020) has been prepared and submitted to the Commonwealth Department of Agriculture, Water and the Environment (DAWE) and Queensland Department of Environment and Science (DES). In line with the BOS, Table 1 summarises the Project's significant residual impacts on MNES and MSES anticipated to require offsets.

Table 1: Summary of the Project's MNES and MSES impacts anticipated to require offsets.

Protected Matter	Status	Significant residual impact (ha)		Total impact to offset (ha)
		Direct	Indirect	
MNES – Listed threatened species and ecological communities	EPBC Act			
Habitat for greater glider (<i>Petauroides volans</i>)	Vulnerable	115.7	165.2	281.0
Habitat for koala (<i>Phascolarctos cinereus</i>)	Vulnerable	159.4	165.2	324.6
Habitat for squatter pigeon (southern) (<i>Geophaps scripta scripta</i>)	Vulnerable	141.4	165.2	306.6
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Watercourse RE 11.3.25 (BVG 16a)	Least concern	10.7	68.1	78.8
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Protected Matter	Status	Significant residual impact (ha)		Total impact to offset (ha)
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MSES – Waterway fish passage				
Waterway providing for fish passage	-	8.35 +	-	8.35+

* To be offset as an MNES protected matter, noting that the State cannot impose an offset condition for a prescribed activity that has the 'same, or substantially the same' impact on the 'same, or substantially the same' matter as the MNES, if it has already been assessed as a 'controlled action' under the EPBC Act.

+ Based on an impact to 8.35 km of waterway providing for fish passage with an average width of 10 m.

CQC are proposing to deliver the majority of anticipated offsets for MNES and MSES as direct land-based offsets, with two MSES to be delivered as a financial settlement offset:

- ▶ Watercourse RE 11.3.25 (BVG 16a) (part of impact of 33.95 ha)
- ▶ Waterway providing for fish passage (full impact of 8.35 ha).

Land-based offsets will be acquit across two offset properties, Mamelon and [REDACTED] OAMPs have been developed for Mamelon and [REDACTED] with this OAMP detailing the offset acquittal on the [REDACTED] property.

1.1 PURPOSE

This OAMP has been prepared to address the following MNES and MSES offset requirements that will be acquit on the [REDACTED] property and guide the ongoing management and monitoring of the offset area, satisfying obligations under the EPBC Act Environmental Offsets Policy (DSEWPC 2012) and the Queensland Environmental Offsets Policy (DES 2020):

- ▶ Ornamental snake (*Denisonia maculata*) – MNES (fully acquit on [REDACTED])
- ▶ Of concern RE 11.3.4 (BVG 16c) – MSES (partly acquit [REDACTED])
- ▶ Watercourse RE 11.3.4 (BVG 16c) – MSES (partly acquit [REDACTED])
- ▶ Watercourse RE 11.3.25 (BVG 16a) – MSES (partly acquit [REDACTED])



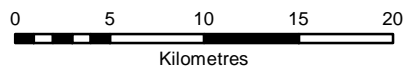
Central Queensland Coal Location diagram

Figure 1:
CQC Project context map

- Mamelon
- Mining leases (ML700022 and ML80187)
- Road

DATA SOURCE:
The following datasets are © State of Qld:
- Cadastral data
- Mining leases
- Roads

Date: 8/3/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:400,000@A3



2 OFFSET PROPERTY

2.1 PROPERTY OVERVIEW

Mellaluka [REDACTED] is a [REDACTED] ha property [REDACTED]. The [REDACTED] property is situated in the Brigalow Belt bioregion [REDACTED]. The offset area on [REDACTED] property is mapped within an area identified as a *Priority 3 – Strategic Footprint of the Galilee Basin Strategic Offset Investment Corridor* (SOIC; DEHP 2013).

This leasehold property is used for cattle grazing and zoned rural [REDACTED]. Table 2 provides an overview of the landholder details and property description of the proposed [REDACTED] offset property. [REDACTED]

Table 2: [REDACTED] offset landholder and property details.

Landholder details	
Registered owner/s on title:	[REDACTED]
ABN/ACN:	[REDACTED]
Phone:	[REDACTED]
Primary contact person:	[REDACTED]
Email:	[REDACTED]
Postal address:	[REDACTED]
Property description	
Lot on plan:	[REDACTED]
Address:	[REDACTED]
Tenure:	[REDACTED]
Area:	[REDACTED]
Local government area:	[REDACTED]
Zoning:	[REDACTED]
Permits	
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]

2.2 CLIMATE

The [REDACTED] property is considered to have a hot semi-arid climate (BSh) in accordance with the Köppen-Geiger climate classification system. This climate is characterised as having hot, sometimes extremely hot, summers and warm to cool winters, with some to minimal precipitation (Figure 4). Mean monthly rainfall data from Albro Station [REDACTED] ranges from 14 mm in August up to 113 mm in February. Temperature records from the Clermont Airport [REDACTED] show mean monthly maximum temperatures range between 23°C (June) and 35°C (December/January) and mean monthly minimum temperature range between 6°C (July) and 22°C (January).

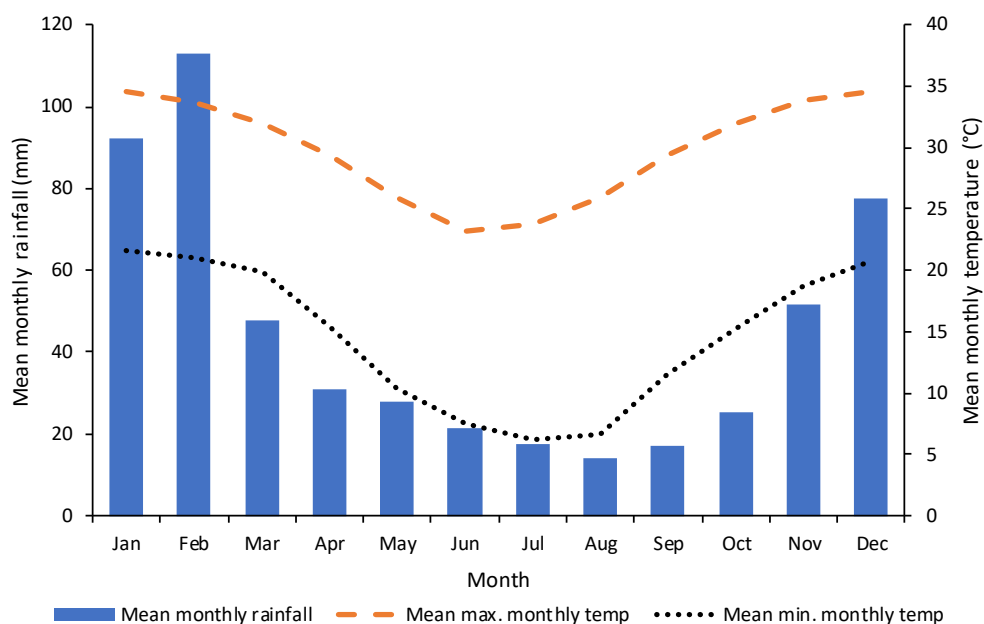


Figure 4: Mean monthly temperature records (Clermont Airport – station 35124) and rainfall records (Albro Station – station 36083) (www.bom.gov.au).

2.3 FIELD SURVEYS

Following discussions with the landholders, ecological field surveys were undertaken by CO2 Australia in May 2020 within an area on [REDACTED] available for offsets. The field surveys included:

- ▶ Ground-truthing of regional ecosystem (RE) mapping, including stratification of ground-truthed observed REs in the same general condition state (remnant or regrowth)
- ▶ Site condition assessments at each monitoring site, generally in accordance with the Guide to Determining Terrestrial Habitat Quality (version 1.2; DEHP 2017)
- ▶ Spotlighting surveys over three (3) nights (for up to 3 hours per night), focusing on areas likely to support ornamental snake, targeting the presence of ornamental snake and their known prey frog species
- ▶ Assessment of habitat attributes for ornamental snake
- ▶ Targeted survey for frog prey species
- ▶ Observation of other threatened species listed under the EPBC Act and/or NC Act.

2.4 VEGETATION COMMUNITIES

Surveying of vegetation communities involved quaternary and tertiary assessments to ground-truth RE mapping, including stratification of ground-truthed REs in the same general condition state. The areas of newly mapped REs were used to randomly stratify monitoring sites throughout mapped ground-truthed REs.

Site condition assessments were undertaken at each monitoring site, generally in accordance with the *Guide to Determining Terrestrial Habitat Quality* (version 1.2; DEHP 2017). The site condition assessments included assessment of up to 13 ecological attributes, including:

- ▶ Native plant species richness of trees, shrubs, grasses and forbs
- ▶ Recruitment of woody perennial species
- ▶ Tree canopy heights and cover (canopy and subcanopy layers)
- ▶ Shrub canopy cover
- ▶ Native perennial grass cover
- ▶ Organic litter cover
- ▶ Coarse woody debris volume
- ▶ Number of large native trees over a certain size threshold (RE-specific)
- ▶ Non-native plant cover

In addition to the assessment of specific, quantitative ecological attributes assessed as part of the site condition assessments, additional information was collected from the field assessment including habitat attributes reflecting the appropriateness and integrity of potential offset areas (e.g. presence of coarse woody debris and gilgai in areas of potential ornamental snake offset areas), as well as the location of existing fences to guide potential offset areas.

Vegetation within the surveyed area on [REDACTED] is characterised by alluvial vegetation communities (landzone 3) corresponding to red gum communities [REDACTED] grading to alluvial floodplain communities dominated by coolabah woodland on cracking clays with gilgai, grading to slightly elevated areas dominated by gidgee. In the east of the surveyed areas, Quaternary alluvial deposits with deeper uniform sands supports bloodwood and box eucalypt woodland.

2.4.1 Coolabah woodland

The dominant vegetative feature in the surveyed area of the site was represented by 1,357 ha of *Eucalyptus coolabah* woodland, predominantly on often deep, cracking clays, consistent with RE 11.3.3 (Figure 5). While coolabah woodland areas were dominated by *Eucalyptus coolabah* to approximately 14 m, there was also occasionally other species such as *Alectryon diversifolius*, *Terminalia oblongata*, *Acacia stenophylla*, *A harpophylla* and *Atalaya hemiglauca*. The shrub layer was often very open or absent, although where present, was characterised by species from the tree layer, *Eremophila spp.* as well as areas with locally dominant patches of *Duma florulenta* or *Sesbania cannabina*. The ground layer was dominated by grasses (e.g. *Panicum decompositum*, *Eriochloa pseudoacrotricha*, *Eulalia aurea*, *Enteropogon acicularis*, *Aristida leptopoda*) with a small cover of forbs in places (e.g. *Alternanthera nodiflora*, *Abuliton spp.*, *Atriplex muelleri*), particularly in lower-lying areas.

Gilgai were located throughout the areas of RE 11.3.3, with some areas supporting relatively deep (~1 m vertical depth) and wide (>6 m) relief, many with deep cracks (up to 40 cm) and supporting accumulations of timber. Many of the gilgai were interlaced with other gilgai, often stretching many tens of metres through the coolabah woodland community. Much of the coolabah woodland area away from watercourse areas was low in weed cover, with evidence throughout of varying impacts from cattle grazing.

2.4.2 Alluvial watercourse communities

Traversing the site are a series of alluvial channels draining from the south to the north, [REDACTED], consistent with RE 11.3.25 (Figure 5). Vegetation along these channels are characterised by alluvial vegetation communities dominated by a diverse canopy of *Eucalyptus camaldulensis* +/- *Corymbia tessellaris*, *Melaleuca leucadendra*, *M. bracteata*, *Alstonia constricta*, *Acacia salicifolia*, *Lysiphillum hookeri*, *Terminalia oblongata* and *Atalaya hemiglauca* to 15 m. Many of the alluvial watercourses, including their terraces were subject to dense weed cover dominated in parts by *Megathyrsus maximus*, *Parthenium hysterophorus*, *Sida cordifolia*, *Cenchrus ciliaris*, *Xanthium occidentale*, *Vachellia farnesiana*, *Passiflora suberosa* or *Achyranthes aspera*.

Many of the watercourse areas were supporting pools of water; often expansive stretches of open water. Soils within these watercourses were of high clay content, aside from sandy areas within exposed beds of the watercourses.

2.4.3 Gidgee woodlands

Interspersed amongst the coolabah woodlands on slightly elevated terraces were large tracts of gidgee woodland (consistent with RE 11.3.5) supporting *Acacia cambagei* low woodland. These areas, with a canopy to 9 m, were characterised by a dense web of interspersed gilgai, some to 15 m wide. Understorey vegetation in these areas was relatively sparse, with occasional dense patches of *Carissa ovata*. Given the alluvial-derived nature of the underlying soils, gilgai in these areas did not support cracking clays, and were instead characterised by a sandy surface horizon, with any observed cracks invariably filled with loamy sand and silt.

2.4.4 Sandy woodlands on elevated alluvial plain

To the east of the surveyed area, [REDACTED], vegetation communities graded to those characterised by either a grassy woodlands of *Eucalyptus brownii* (RE 11.3.10) or woodlands comprising a mix of *Corymbia clarksoniana*, *C. tessellaris* and *C. dallachiana* (RE 11.3.7). These vegetation communities were located on levees and plains formed from Quaternary alluvial deposits, with soils deep uniform sands.

2.4.5 Ground-truthed regional ecosystems

The results of the vegetation assessments on the surveyed area of [REDACTED] confirmed the presence of five regional ecosystems. A summary of these ground-truthed REs is provided in Table 3 and illustrated in Figure 5.

Table 3: Ground-truthed regional ecosystems observed on the surveyed area of [REDACTED]

RE	Description	VM status*	Total area (ha) in surveyed area
11.3.3	Eucalyptus coolabah woodland to open woodland with a grassy understorey. Occurs on Cainozoic alluvial plains or levees with clay or sometimes texture contrast soils.	OC	1,357.0

RE	Description	VM status*	Total area (ha) in surveyed area
11.3.5	<i>Acacia cambagei</i> +/- <i>A. harpophylla</i> low woodland or open forest sometimes clumped. Occurs on levees on alluvial plains which are rarely flooded. Associated soils are often texture contrast with sandy surfaces.	LC	951.2
11.3.25	<i>Eucalyptus camaldulensis</i> or <i>E. tereticornis</i> woodland to open forest. Occurs on fringing levees and banks of major rivers and drainage lines of alluvial plains throughout the region. Soils are very deep, alluvial, grey and brown cracking clays with or without some texture contrast.	LC	264.1
11.3.10	<i>Eucalyptus brownii</i> woodland on alluvial plains. Occurs on Cainozoic alluvial plains.	LC	237.9
11.3.7	<i>Corymbia clarksoniana</i> , <i>C. tessellaris</i> and <i>C. dallachiana</i> tall woodland to open woodland, usually with a low open woodland tree layer dominated by a variety of species such as <i>Acacia salicina</i> , <i>Lysiphyllum hookeri</i> or <i>Grevillea striata</i> . Occurs on levees and plains formed from Quaternary alluvial deposits supporting soils that are usually deep uniform sands with minor areas of sandy red earths.	LC	100.0
	Non-remnant	-	235.2
	Total area ground-truthed (ha)	-	3,145.4

* *Vegetation Management Act 1999* (Qld); EN = Endangered, OC = Of Concern, LC = Least Concern

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3 [REDACTED] OFFSET AREA

The proposed [REDACTED] offset area of approximately 227 ha has been identified specifically to acquit the Project’s anticipated MNES and MSES offset requirements for those matters not already fully acquit by the other proposed land-based offset for the Project (Mamelon; see also the Mamelon OAMP prepared for the Project), namely:

- ▶ Ornamental snake (*Denisonia maculata*) – MNES (fully acquit on [REDACTED])
- ▶ Of concern RE 11.3.4 (BVG 16c) – MSES (partly acquit [REDACTED])
- ▶ Watercourse RE 11.3.4 (BVG 16c) – MSES (partly acquit [REDACTED])
- ▶ Watercourse RE 11.3.25 (BVG 16a) – MSES (partly acquit [REDACTED]).

The Project’s BOS has been submitted to DAWE and DES for endorsement. It included an assessment of the impact habitat quality scores for all relevant MNES and MSES, and, for the [REDACTED] offset area, assessments for relevant MNES and MSES with regard to:

- ▶ Offset start and future habitat quality scoring
- ▶ Commonwealth Government’s offsets assessment guide
- ▶ Queensland Government’s land-based offset multiplier calculator.

These assessments are summarised in the following Sections 3.1 - 3.3,

3.1 HABITAT QUALITY SCORING

The results of detailed field surveys at the [REDACTED] offset site in 2020 (and at the impact site on Mamelon between 2018 and 2020) were used to calculate the habitat quality scores in Table 4 generally in accordance with the Guide to Determining Terrestrial Habitat Quality (version 1.2; DEHP 2017). This included an assessment, for each of the monitoring sites, of the following:

- ▶ Site condition
- ▶ Site context
- ▶ Species habitat index.

Habitat quality scores were area-weighted (where relevant) to account for the various component REs/condition states (including their corresponding habitat quality scores) contributing to the habitat area for each of the impacted and offset matters.

Table 4: MNES and MSES habitat quality scores relevant to [REDACTED] offset.

Protected Matter	Impact habitat quality score	Start habitat quality score on [REDACTED]	Future habitat quality score on [REDACTED]
Ornamental snake	5	7	8
Of concern RE 11.3.4 (BVG 16c)	7	8	10
Watercourse RE 11.3.4 (BVG 16c)	7	8	10
Watercourse RE 11.3.25 (BVG 16a)	8	8	10

3.2 OFFSETS ASSESSMENT GUIDE

Using the habitat quality scores calculated above (Table 4), the [REDACTED] offset area has been assessed in accordance with the Commonwealth Government’s offsets assessment guide to determine its suitability to

acquit the Project’s outstanding MNES offset requirements (ornamental snake) and accommodate the minimum offset area required to be secured for this MNES on [REDACTED]

Table 5 presents a summary of the [REDACTED] offset area for the ornamental snake, including the total area to be secured and the percent acquittal in accordance with the offsets assessment guide.

Table 5: [REDACTED] offset area to be secured for ornamental snake in accordance with the offsets assessment guide.

MNES	Total significant residual impact (ha)	Total offset area to be secured (ha) on [REDACTED]	Acquittal (%) under offsets assessment guide
Ornamental snake	18.8	121.1	102.37%

3.3 LAND-BASED OFFSET MULTIPLIER CALCULATOR

In addition to the assessment in Section 3.2, the [REDACTED] offset area has also been assessed in accordance with the Queensland Government’s land-based offset multiplier calculator to determine its suitability to acquit the Project’s outstanding MSES offset requirements (of concern RE 11.3.4 (BVG 16c), watercourse RE 11.3.4 (BVG 17a) and watercourse RE 11.3.25 (BVG 16a)).

Table 6 presents a summary of the [REDACTED] offset area including the total area to be secured for MSES calculated in accordance with the land-based offset multiplier calculator. The total area to be secured on [REDACTED] represents the balance of the offset required for that MSES currently proposed to be secured on Mamelon.

Table 6: [REDACTED] offset area to be secured for MSES in accordance with the land-based offset multiplier calculator.

MSES	Total significant residual impact (ha)	Offset multiplier	Minimum offset area required (ha)	Total offset area to be secured (ha) on [REDACTED]
Of concern RE 11.3.4 (BVG 16c)	40.7	4.00	162.8	148.2*
Watercourse RE 11.3.4 (BVG 16c)	4.3	4.00	17.2	2.4*
Watercourse RE 11.3.25 (BVG 16a)	78.8	4.00	315.2	78.6*

* Balance of offset required proposed to be secured on Mamelon (or other land-based offset and/or financial settlement offset).

3.4 OFFSET PROTECTION

The [REDACTED] offset area is proposed to be protected by a Voluntary Declaration under section 19E and 19F of the VM Act and will be declared as an area of high nature conservation value. The Voluntary Declaration will be registered on the property’s title and will be binding on current and future landowners.

A Voluntary Declaration under the VM Act is an authorised legally binding mechanism and is considered appropriate to legally secure MNES and MSES values and protect the area from vegetation clearing.

This OAMP is required to support the Voluntary Declaration process which will be commenced post approval of the [REDACTED] OAMP.

The Voluntary Declaration will remain in place for the life of the Project. The Voluntary Declaration may only be removed in accordance with the provisions of the VM Act or if the chief executive the Queensland Department of Natural Resources, Mines and Energy considers it is necessary.

3.5 OFFSET POLICY REQUIREMENTS

The offset package proposed for the Project meets the key overarching requirements of the EPBC Act Environmental Offsets Policy and the Queensland Environmental Offsets Policy, respectively, as set out in Table 13 and Table 14 of the BOS. Table 7 and Table 8 below provide an overview of how the [REDACTED] offset specifically meets these requirements.

Table 7: EPBC Act Environmental Offsets Policy requirements and [REDACTED] offset compliance.

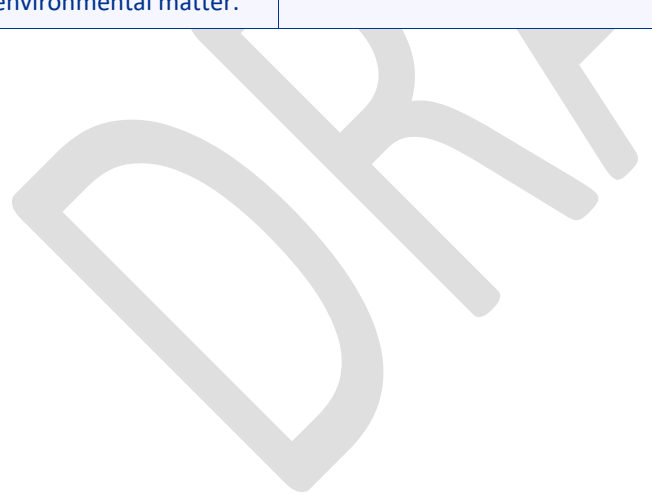
Policy requirement	[REDACTED] offset
<p>Suitable offsets must deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environment law and affected by the proposed action</p>	<p>The [REDACTED] offset area (227 ha) will acquit a minimum of 100% of the offset requirements for ornamental snake in accordance with the EPBC Act Environmental Offsets Policy and offsets assessment guide. An additional offset property will be used to acquit a minimum of 100% of the offset requirement for other MNES (greater glider, koala and squatter pigeon). The [REDACTED] offset area will be managed to improve the condition and viability of the threatened species habitat in accordance with EPBC Act offset obligations and offsets assessment guide. This OAMP sets out specific management objectives with interim performance targets and completion criteria. Management actions are outlined with accompanying adaptive management triggers and corrective actions in the event that monitoring identifies that interim performance targets are not attained or completion criteria are not attained and/or maintained. The [REDACTED] offset area will be managed and monitored from approval of this OAMP for a minimum of 20 years. It is anticipated that the completion criteria will be achieved within a 20 year period.</p>
<p>Suitable offsets must be built around direct offsets but may include other compensatory measures</p>	<p>100% of the Project's MNES offset requirements will be acquit through the delivery of direct land-based offsets. The direct land-based offset areas proposed on [REDACTED] have been determined to be suitable in accordance with the EPBC Act Environmental Offsets Policy and offsets assessment guide.</p>
<p>Suitable offsets must be in proportion to the level of statutory protection that applies to the protected matter</p>	<p>The EPBC Act status of the MNES proposed to be offset on [REDACTED] has been taken into account in the offsets assessment guide in calculating the area of the offset to be provided.</p>
<p>Suitable offsets must be of a size and scale proportionate to the impacts on the protected matter</p>	<p>The size of the [REDACTED] offset area to be secured for MNES has been calculated in accordance with the offsets assessment guide. The inputs and justifications are based on the results of detailed field assessments. The Project's BOS submitted to regulators for endorsement includes full offsets assessment guide inputs, justifications and results for all MNES.</p>
<p>Suitable offsets must effectively account for and manage the risks of the offset not succeeding</p>	<p>The size of the [REDACTED] offset area to be secured for MNES has been calculated in accordance with the offsets assessment guide.</p>
<p>Suitable offsets must be additional to what is already required, determined by law or planning regulations or agreed to under other schemes or programs (this does not preclude state or territory offsets)</p>	<p>The proposed [REDACTED] offset area is zoned rural [REDACTED]. The current primary land use on the offset area is cattle grazing. The proposed offset is subject to potential threats, including spread of weeds such as Parthenium (<i>Parthenium hysterophorus</i>), mimosa bush (<i>Vachellia farnesiana</i>), Guinea grass (<i>Megathyrsus maximus</i>) and exotic pasture grasses, pest animals, inappropriate fire regimes and potential future development.</p>
<p>Suitable offsets must be efficient, effective, timely, transparent, scientifically robust and reasonable</p>	<p>The process used to identify, secure and establish offsets for the Project are consistent with the requirements of the EPBC Act Environmental Offsets Policy. The [REDACTED] offset area has been identified and deemed suitable using an evidence-based and scientifically robust approach. The [REDACTED] OAMP supports the efficient, effective, timely, transparent and scientifically robust approach to providing offsets.</p>

Policy requirement	[REDACTED] offset
Suitable offsets must have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced.	The [REDACTED] OAMP outlines a governance framework and delivery pathway to legally secure the offset area on the property title, which will be monitored, and audited/enforced.

Table 8: Queensland Environmental Offsets Policy requirements and [REDACTED] offset compliance.

Queensland Environmental Offsets Policy requirement	[REDACTED] offset
Offsets will not replace or undermine existing environmental standards or regulatory requirements, or be used to allow development in areas otherwise prohibited through legislation or policy	A detailed assessment of the significant residual impacts on MSES associated with the Project was undertaken as part of the updated SEIS (Version 3; August 2020). Since the publication of the previous SEIS (Version 2; December 2018), substantial additional ecological field surveys and technical studies have been undertaken in order to evaluate the habitat characteristics within the impact area that are specific to the respective threatened environmental values. The likely significant residual impacts on MNES and MSES have been refined and amended accordingly in the SEIS v3 and detailed in the Project’s BOS and summarised in Table 1 of this OAMP.
Environmental impacts must first be avoided, then minimised, before considering the use of offsets for any remaining impact.	<p>The Project has been designed to avoid and minimise environmental impacts to the greatest extent possible; however, the mine layout is dependent on the underlying geology as well as the location of the existing North Coast Rail Line which will be used to transport the Project’s coal to the existing Dalrymple Bay Coal Terminal.</p> <p>Avoidance and mitigation measures were considered as part of the impact assessment and identification of significant residual impacts on MNES and MSES for the Project. To avoid and minimise any further impacts on environmental values as part of construction and operation, a range of mitigation, management and monitoring measures will be implemented, a summary of which is provided in the Project’s BOS.</p>
Offsets must achieve a conservation outcome that achieves an equivalent environmental outcome	<p>This draft [REDACTED] OAMP includes specific management objectives and completion criteria for each of the MNES and MSES offset values in the offset area, as well as ongoing management and monitoring activities to ensure that a conservation outcome for the offset values can be achieved.</p> <p>In accordance with the Queensland Environmental Offset Framework and the Guide to Determining Terrestrial Habitat Quality the MSES offsets will be required to achieve:</p> <ul style="list-style-type: none"> ▶ habitat quality score at least 1 point greater than the impact site’s score, and ▶ minimum overall habitat quality gain of at least 2 points, relative to the offset sites starting habitat quality.
Offsets must provide environmental values as similar as possible to those being lost.	<p>The Mellaluika offset property meets the specific criteria for the relevant MSES outlined in the Queensland Environmental Offsets Policy section 2.3.1.6 Characteristics of a land-based offset site.</p> <p>Detailed field surveys on [REDACTED] have been completed in accordance with the Guide to Determining Terrestrial Habitat Quality in order to confirm the extent and condition of MSES offset values.</p>

Queensland Environmental Offsets Policy requirement	[REDACTED] offset
<p>Offset provision must minimise the time-lag between the impact and delivery of the offset.</p>	<p>The Project’s BOS, in conjunction with the Project’s ODP, have been prepared to outline CQC’s proposed plan for the delivery of the Project’s MNES and MSES offset package. The tasks and anticipated timeframes to deliver the Project’s offsets, as detailed in the BOS, are proposed to minimise the time-lag between Project construction (impact) and delivery of the required offsets.</p> <p>Following Commonwealth and Queensland Government approval of the Project, CQC will execute an agreement with the [REDACTED] landholder to secure a legal interest in the offset area and finalise this OAMP. Following approval of the OAMP CQC will implement the OAMP and proceed to legally secure the offset area through a suitable legally binding mechanism. These tasks and timeframes are subject to change due to a number of variables, including regulatory (Commonwealth and Queensland Government) approval, regulatory requirements, climatic conditions, stakeholder inactivity and other unexpected delays.</p>
<p>Offsets must provide additional protection to environmental values at risk, or additional management actions to improve environmental values.</p>	<p>The [REDACTED] offset area will be secured through a legally binding mechanism negotiated between CQC, the Queensland and Australian governments, the landholder and other relevant parties with a registered interest in the land.</p> <p>Legal security of the [REDACTED] offset area will provide greater protection for the environmental values than what is currently afforded to remnant vegetation under the VM Act, and the <i>Planning Act 2016</i> and associated policies and codes.</p>
<p>Where legal security is required, offsets must be legally secured for the duration of the impact on the prescribed environmental matter.</p>	<p>The [REDACTED] offset area (227 ha) will be protected by legally binding mechanisms which will remain in effect as required by the applicable State and Commonwealth legislative requirements (see section 3.4).</p>



4 [REDACTED] OFFSET VALUES

4.1 ORNAMENTAL SNAKE

4.1.1 Species ecology

The ornamental snake (*Denisonia maculata*) is commonly associated with habitat containing cracking clays in the Brigalow Belt bioregion, preferring habitat also favoured by frogs; its main food source. It is typically found inhabiting moist areas in woodland and open forest of brigalow, gidgee and eucalypt dominant vegetation communities, particularly associations with gilgai (melon-hole) mounds and depressions and wetlands (DEE 2017b). Suitable habitats are commonly mapped in Queensland as RE 11.3.3, 11.4.3, 11.4.6, 11.4.8, 11.4.9 and 11.5.16, whether they are current remnant vegetation, or cleared but where the abovementioned RE formerly occurred. Microhabitat features are critical to the species, and include appropriate shelter habitat including fallen timber, rocks, bark and deep, clay soil cracks (DAWE 2020).

4.1.2 Offset area

Ornamental snake habitat within the offset area comprises ~121.1 ha of ground-truthed remnant RE 11.3.3 (117.7 ha) and a small area of RE 11.3.25 (3.4 ha). A single ornamental snake was confirmed during spotlighting in May 2020 (Figure 6) in an area of RE 11.3.3 adjacent RE 11.3.25 approximately 1 km from the offset area, and in an area of comparable habitat to the offset area. The area of RE 11.3.3 is located in the north of [REDACTED] along the eastern floodplain [REDACTED] (Figure 7). The areas of RE 11.3.3 are characterised throughout by gilgai with a canopy of *Eucalyptus coolabah* with occasional *Acacia harophylla* on cracking clay. A small part of the ornamental snake offset area corresponds to RE 11.3.25, which was confirmed as supporting a number of preferred frog prey species of the ornamental snake including floodplain frog (*Litoria inermis*), spotted marsh frog (*Limnodynastes tasmaniensis*), desert tree frog (*Litoria rubella*), striped burrowing frog (*Cyclorana alboguttata*), New Holland frog (*Cyclorana novaehollandiae*) and green tree frog (*Litoria caerulea*).

4.1.3 Threats

The following key threats to ornamental snake will be addressed through the implementation of this OAMP (Richardson 2006; DoE 2014; DAWE 2020):

- ▶ Habitat loss through land clearing
- ▶ Degradation of habitat by overgrazing livestock, including grazing of gilgai during the wet season which leads to soil compaction and compromising soil structure
- ▶ Predation by foxes (*Vulpes vulpes*) and feral cats (*Felis catus*)
- ▶ Poisoning through the ingestion of cane toads (*Rhinella marina*)
- ▶ Habitat degradation by feral pigs (*Sus scrofa*)
- ▶ Destruction of wetland habitat by feral pigs, and associated destruction of frog habitat and direct competition for their food source (frogs)
- ▶ Direct competition with food sources by pigs
- ▶ Invasive weeds.



Figure 6: The ornamental snake (*Denisonia maculata*) confirmed in the vicinity of the offset area in the north of [REDACTED]

4.2 REGULATED VEGETATION

4.2.1 Of Concern Regional Ecosystems

Of concern RE 11.3.4 (BVG 16c)

Offset areas for *of concern RE 11.3.4 (BVG 16c)* comprise ~148.2 ha of ground-truthed RE 11.3.3. Areas of this RE are proposed to be used to offset impacts on *of concern RE 11.3.4* as it is of the same class (of concern) and BVG. The offset area for *of concern RE 11.3.4 (BVG 16c)* on [REDACTED] is wholly collocated with the ornamental snake offset area in the north of [REDACTED] (Figure 8). This offset area is also collocated with the small (2.4 ha) *Watercourse RE 11.3.4 (BVG 16c)* offset area. The balance of the offset requirement for this MSES is located on an alternative property (Mamelon).

4.2.2 Watercourse Regional Ecosystems

Watercourse RE 11.3.4 (BVG 16c)

Offset areas for *Watercourse RE 11.3.4 (BVG 16c)* comprise ~2.4 ha of ground-truthed RE 11.3.3, able to be used to offset impacts on *Watercourse RE 11.3.4* as it is of the same BVG and associated with a watercourse. The offset area for *Watercourse RE 11.3.4 (BVG 16c)* on [REDACTED] is located in a small area along the western boundary of the [REDACTED] offset area (Figure 8). This offset area is collocated with the *of concern RE 11.3.4 (BVG 16c)* offset area and the ornamental snake (MNES) offset area. The balance of the offset requirement for this MSES is located on an alternative property (Mamelon).

Watercourse RE 11.3.25 (BVG 16a)

Offset areas for *Watercourse RE 11.3.25 (BVG 17a)* comprise ~78.6 ha of ground-truthed RE 11.3.25. The offset area for *Watercourse RE 11.3.25 (BVG 17a)* on [REDACTED] corresponds to ~5.5 km stretch of the [REDACTED] is located along in a small area along the western boundary of the [REDACTED] offset area (Figure 8). This offset area is collocated with a small area (3.4 ha) of the ornamental snake offset area. Part of the balance of the offset requirement for this MSES is located on another offset property for the Project (Mamelon), with the remaining balance to be acquit through a financial settlement offset.

5 ENVIRONMENTAL OUTCOMES TO BE ACHIEVED

The overall environmental outcome sought by the [REDACTED] OAMP is to acquit the MNES and MSES offset requirements for the Project's significant residual impacts, in accordance with the EPBC Act Environmental Offsets Policy and the Queensland Environmental Offsets Policy.

The interim performance targets and completion criteria defined in Table 9 indicate progress towards, and achievement of, the more specific environmental outcomes as per the Commonwealth Government's offsets assessments guides for relevant MNES, and the Queensland Government's Queensland Environmental Offsets Policy for relevant MSES.

Following the approval and implementation of this OAMP, the interim performance targets and completion criteria for the offset area are expected to be achieved within 10 and 20 years, respectively. The management actions outlined in Section 7 have been designed to minimise the risk of identified threats to the MNES and MSES occurring and improve habitat for offset matters across the offset area.

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Table 9: Interim performance targets and completion criteria for the [redacted] offset area.

Offset value	Interim performance targets – year 10 of management	Completion criteria – year 20 of management
Ornamental snake	<ul style="list-style-type: none"> ▶ Improve the quality of ornamental snake habitat to achieve a habitat quality score greater than 7. ▶ Non-native plant cover – increase the score across all monitoring sites to a 5 representing between 5% to 25% of non-native plant cover at each site. 	<p>Improve the quality of ornamental snake habitat to achieve a habitat quality score of 8.</p> <ul style="list-style-type: none"> ▶ Site condition – the following scores for each ecological attribute will be achieved through the implementation of specific management actions under the OAMP: <ul style="list-style-type: none"> – Native shrub species richness – increase the score across all monitoring sites to a 5 representing > 90% of the benchmark for RE 11.3.3 and RE 11.3.25 – Native grass species richness – increase the score across all monitoring sites to a 5 representing > 90% of the benchmark for RE 11.3.3 and RE 11.3.25 – Native forb species richness – increase the score across all monitoring sites to a 5 representing > 90% of the benchmark for RE 11.3.3 and RE 11.3.25 – Tree canopy height – increase the score across all monitoring sites to a 5 representing 70% of the benchmark for RE 11.3.3 and RE 11.3.25 – Shrub canopy cover – increase the score across all monitoring sites to a 5 representing between 50% and 200% of the benchmark for RE 11.3.3 and RE 11.3.25 – Native perennial grass cover – increase the score across all monitoring sites to a 5 representing > 90% of the benchmark for RE 11.3.3 and RE 11.3.25 – Large trees – increase the score across all monitoring sites to a 10, representing between 50% to 100% of the benchmark for RE 11.3.3 and RE 11.3.25 – Non-native plant cover – increase the score across all monitoring sites to a 10 representing <5% non-native plant cover at each site. ▶ Site context <ul style="list-style-type: none"> – Average site context score for each RE is maintained or increased compared to the start quality score: <ul style="list-style-type: none"> – RE 11.3.3 – ≥ 9.23 – RE 11.3.25 – ≥ 9.81 ▶ Species habitat index <ul style="list-style-type: none"> – Increase the threats to species score to a 15 through the implementation of the OAMP specifically implementation of successful pest animal control targeting feral cats and foxes as well as degradation of habitat by feral pigs, active fire management, security through a legally binding mechanism and active management of the area for conservation purposes.

Offset value	Interim performance targets – year 10 of management	Completion criteria – year 20 of management
Of concern RE 11.3.4 (BVG 16c)	By year 10, achieve habitat quality score of 9	By year 20, achieve habitat quality score of 10
Watercourse RE 11.3.4 (BVG 16c)	By year 10, achieve habitat quality score of 9	By year 20, achieve habitat quality score of 10
Watercourse RE 11.3.25 (BVG 16a)	By year 10, achieve habitat quality score of 9	By year 20, achieve habitat quality score of 10

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6 ADAPTIVE MANAGEMENT

6.1 WHAT IS ADAPTIVE MANAGEMENT?

This OAMP is based on an adaptive management approach which involves ‘flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood’ (National Research Council 2004).

Adaptive management includes two key phases:

- ▶ Establishment of the key components of a management framework including engaging stakeholders, developing clear and measurable objectives and performance targets, identification and selection of potential management actions and the development of monitoring protocols which enable the evaluation of progress towards achieving objectives, and which will effectively contribute to the adaptive decision-making process
- ▶ An iterative learning phase which involves utilisation of the management framework to learn about the natural resource system and iteratively adapt management strategies and approaches based on what is learned (Williams 2011).

The management of natural systems involves uncertainty which can affect the success of the management measures in achieving the objectives and performance criteria. Williams (2011) and Williams and Brown (2016) identify four kinds of uncertainty, outlined as follows, with how they have been addressed through the development of this OAMP:

- ▶ Environmental variation
 - caused by external factors that act upon natural systems, but which are not influenced by the resource conditions and dynamics, for example variation in rainfall or temperature
 - largely outside of the control of the manager (Williams 2011)
 - influence is considered in the analysis of the effectiveness of the adaptive management approach, the analysis of the ability to achieve and maintain performance criteria and when considering the need for corrective actions.
- ▶ Partial observability
 - includes potential uncertainty that arises from variation in the collection of data during monitoring events, and from being unable to completely observe the natural system in its entirety (Williams and Brown 2016)
 - addressed in this OAMP through the development of a monitoring program based on scientifically tested and repeatable methods.
- ▶ Partial controllability
 - relates to the difference between the intended effect of the management measures to be implemented as part of this OAMP and the actual effect of their implementation on the ground (Williams and Brown 2016)
 - addressed through adherence to an adaptive management approach including regular monitoring of compliance with performance criteria, assessment of adaptive management triggers, the implementation of corrective actions, review and amendments to the OAMP, and ongoing reporting to ensure that management measures are being effectively implemented on the ground.

- ▶ Structural and process uncertainty
 - concerns a lack of knowledge or understanding regarding biological and ecological processes and relationships, and differing views regarding how natural systems respond to management (Williams and Brown 2016)
 - addressed through the adaptive management approach. Following the results of ongoing management, monitoring and reporting, the OAMP will be reviewed and updated as required to incorporate learnings, updated conservation advice and best practice management techniques.

6.2 OAMP ADAPTIVE MANAGEMENT FRAMEWORK

6.2.1 Risk assessment

The adaptive management process for this OAMP is supported by a risk assessment which evaluated the known and potential risks for each offset value (see Appendix B). The relevant risks were identified based on a review of current literature (i.e. conservation advices, recovery plans etc.) and identification of potential site-specific risks. As presented in Appendix B, the risk assessment included an assessment of the likelihood and consequence for each identified risk, both with and without the implementation of control strategies. The results of the risk assessment were used to develop the adaptive management process including the identification of threats to offset values, management objectives, performance criteria, management actions, monitoring programs, adaptive management triggers and corrective actions.

Implementation of the adaptive management process aims to reduce the risk of the identified threats occurring to ensure that the environmental outcomes sought by this OAMP are achieved.

6.2.2 Adaptive management process

In summary, the adaptive management process for this OAMP includes the following key components:

- ▶ **Identified threats to offset values** – known and potential threats to the offset values have been identified as part of the risk assessment process.
- ▶ **Relevant offset values** – MNES for which the identified threat is relevant have been indicated.
- ▶ **Management objectives** – management objectives have been developed to address each identified threat to the offset values, and to ensure that the interim performance targets and completion criteria are attained.
- ▶ **Performance criteria** – assessable criteria have been defined to measure adherence to the management objectives.
- ▶ **Management action** – specific management actions have been identified to ensure that the performance criteria and management objectives are satisfied, and which will ultimately result in attainment of the interim performance targets and completion criteria.
- ▶ **Monitoring** - a combination of qualitative and quantitative methodologies has been included in the OAMP to assess whether management actions are meeting the performance criteria and management objectives, and ultimately, whether the OAMP is able to attain the interim performance targets and completion criteria.
- ▶ **Adaptive management trigger** - measurable events or parameters have been identified which, when triggered, indicate that a performance criterion has not been satisfied, instigating the implementation of contingency plans and corrective actions.

- ▶ **Contingency response and corrective action** – a two-step process has been established to identify the likely cause of the non-compliance with the performance criteria and allow for identification of suitable corrective actions:
 - Contingency response – a process to be instigated by an Environmental Supervisor (or a nominated representative) to investigate the cause of the non-compliance with the performance criteria and identify suitable corrective actions to be implemented.
 - Corrective actions – implementation of a feasible, appropriate and effective action to address the identified issue and ensure the performance criteria is satisfied.

Figure 9 illustrates how the key components of the adaptive management process are implemented through an ongoing cycle of implementation, learning and review, with the aim of achieving the interim performance targets and completion criteria. Through the implementation of this adaptive management process, it is anticipated that the interim performance targets and completion criteria will be attained and maintained for the life of the Project.

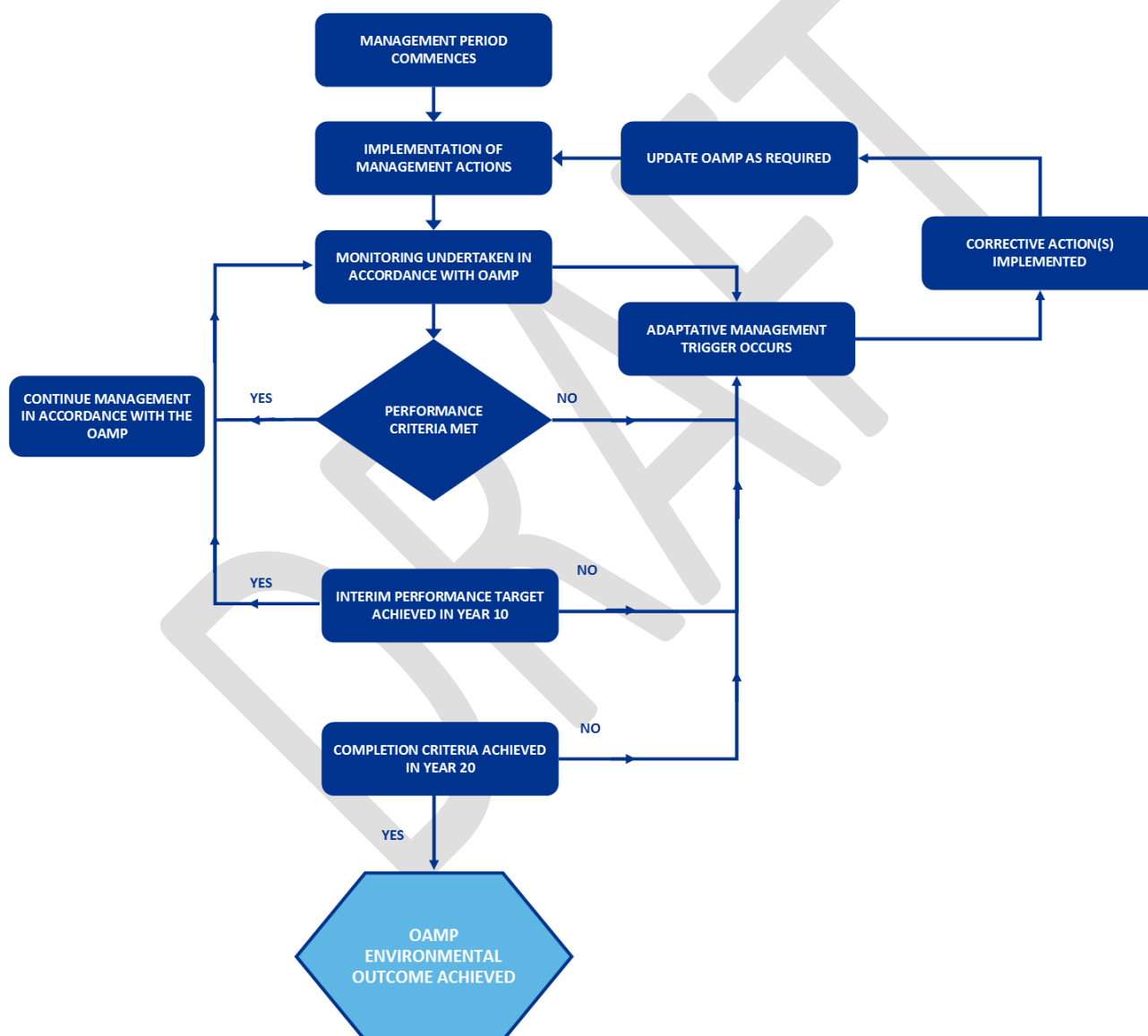


Figure 9: Adaptive management process for implementation of the OAMP.

6.2.3 Timing for implementation of the OAMP

The [redacted] offset area will be managed and monitored until the interim performance targets and completion criteria are achieved. It is anticipated that through the adaptive management approach, interim performance targets and completion criteria will be achieved for all offset values within the proposed 20-year management period. However, if the interim performance targets and/or completion criteria for all values have not been achieved within the anticipated timeframes, management and monitoring will continue beyond the 20-year period in accordance with this OAMP until the completion criteria have been achieved.

6.2.4 Risk of offset failure

In the very unlikely event that the interim performance targets are not achieved for one or more offset values by year 10, for those offset values, CQC will establish scientific advisory groups and/or research programs with the aim of identifying appropriate additional management interventions.

In the very unlikely event that it is considered the completion criteria will not be achieved, the following process will be implemented:

- ▶ discuss the provision of additional offset options with DAWE and DES
- ▶ deliver offset requirements in accordance with the EPBC Act Environmental Offsets Policy and the Queensland Environmental Offsets Policy
- ▶ incorporate offset requirements in a revised BOS and submit to DAWE and DES for approval.

6.2.5 Management objectives

A summary of the management objectives and performance criteria for the [redacted] offset area is presented in Table 10. The complete adaptive management process for this OAMP is encapsulated in Table 11. Management actions, monitoring events, adaptive management triggers and corrective actions have been assigned to each management objective and performance criteria (Table 11).

Table 10: Summary of the management objectives and performance criteria

Management objectives	Performance criteria
Achieve the completion criteria and habitat quality improvements for offset values, which include the habitat quality scores in this OAMP.	<ul style="list-style-type: none"> ▶ Increase the habitat quality scores for ornamental snake at each habitat quality assessment site based on the results of baseline and subsequent monitoring events so as to achieve the scores presented in the completion criteria.
Maintain the extent of offset value habitat within the offset area.	<ul style="list-style-type: none"> ▶ No unapproved/intentional clearing of habitat within the offset area, with the exception of clearing that is required for fencing, access, firebreaks and public safety as outlined in Table 12. ▶ Minimise any clearing required within the offset area for the above purposes (i.e. for fencing, access, firebreaks and public safety).
Ensure that any livestock grazing for fire management and weed control maintains and enhances the ground cover attributes for offset values and does not result in the degradation of habitat and vegetation.	<ul style="list-style-type: none"> ▶ Increase the richness and average % cover of native perennial grasses at each habitat quality assessment site based on the results of baseline and subsequent monitoring events. ▶ Biomass levels of at least 2,000 kg/ha are retained at each of the monitoring sites at the end of the dry season. ▶ Livestock are only observed in the offset management areas during strategic grazing events.
Minimise predation risk by feral cats to ornamental snake.	<ul style="list-style-type: none"> ▶ Reduction in Catling* Index for feral cats from year 1 and subsequent monitoring events.

Management objectives	Performance criteria
Minimise predation risk by foxes to ornamental snake.	▶ Reduction in Catling* Index for foxes from year 1 and subsequent monitoring events.
Minimise risk of poisoning by cane toads to the ornamental snake.	▶ Manage to reduce relative abundance of cane toads to the greatest extent possible.
Minimise degradation of offset habitat and vegetation by feral pigs.	▶ Reduction in mean feral pig abundance score from year 1 and subsequent monitoring events.
Minimise degradation of offset habitat and vegetation by rabbits.	▶ Maintain rabbit impact category as ‘acceptable’.
Manage invasive weed species to reduce degradation of habitat and vegetation.	<ul style="list-style-type: none"> ▶ A decrease in species richness and relative abundance of weed species at 80% of monitoring sites from year 1 and subsequent monitoring events. ▶ No new weed species are identified at any monitoring site (based on year 1 and subsequent monitoring events).
Reduce the risk of adverse impacts on offset habitat and vegetation associated with inappropriate fire regimes and unplanned fire.	<ul style="list-style-type: none"> ▶ No unplanned fire within the offset area ▶ Increase in habitat quality scores as a result of implementation of any fire management measures.
Achieve the interim performance targets and completion criteria for each offset value within 10 and 20 years, respectively.	<ul style="list-style-type: none"> ▶ The interim performance targets are achieved for all offset values by year 10. ▶ The completion criteria are achieved for all offset values by year 20.

* Catling index provides a measure of relative abundance of foxes and feral cats within the offset area. The Catling index will be measured as the percentage of camera nights in which the pest species was observed as part of fauna camera monitoring for the species, as outlined in Section 8.2.

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Table 11: Management objectives, performance criteria, adaptive management triggers, corrective actions.

Identified threats to offset values	Relevant offset values	Management objective	Performance criteria	Management action	Monitoring	Trigger for adaptive management and corrective actions	Corrective actions
<ul style="list-style-type: none"> ▶ Degradation of habitat 	<ul style="list-style-type: none"> ▶ Ornamental snake ▶ Of concern RE 11.3.4 ▶ Watercourse RE 11.3.4 ▶ Watercourse RE 11.3.25 	<ul style="list-style-type: none"> ▶ Achieve the completion criteria and habitat quality improvements for offset values, which include the habitat quality scores in this OAMP. 	<ul style="list-style-type: none"> ▶ Increase the habitat quality scores for each offset value at each habitat quality assessment site based on the results of baseline and subsequent monitoring events so as to achieve the scores in the completion criteria. 	<ul style="list-style-type: none"> ▶ Implementation of the management actions and adaptive management framework as outlined in this OAMP 	<ul style="list-style-type: none"> ▶ Monitoring of offset value habitat quality scores will be undertaken in accordance with Section 8 including: <ul style="list-style-type: none"> – Offset area inspections (Section 8.1) – Habitat quality assessments to determine habitat quality scores (Section 8.5.2). ▶ The results of monitoring events will be compared against the habitat quality scores in the interim performance targets and completion criteria to determine the progress of the offset area and recorded as part of reporting (Section 9). 	<ul style="list-style-type: none"> ▶ Habitat quality scores for interim performance targets are not achieved for one or more offset values by year 10. ▶ Habitat quality scores for completion criteria are not achieved for one or more offset values by year 20. 	<ul style="list-style-type: none"> ▶ Step 1: Investigate cause of trigger ▶ Investigate reasons why the interim performance targets or the completion criteria were not achieved within the specified timeframes. ▶ Re-evaluate the suitability of the relevant management measures in the OAMP. ▶ Identify appropriate corrective actions. ▶ Step 2: Implementation of corrective action/s ▶ The appropriate corrective actions will be implemented and may include: <ul style="list-style-type: none"> – Third party review of the OAMP to provide input on the effectiveness of the management actions. – Increasing the frequency and intensity of pest animal and weed control measures, or revising the type of measures to be implemented. – Modifying the strategic grazing regime to better support enhancement of offset values. – For offset values that have not achieved interim performance targets by year 15, for those offset values, CQC will obtain advice from scientific advisory groups with the aim of identifying appropriate additional management interventions. ▶ In the very unlikely event that it is considered that the completion criteria will not be achieved, CQC will discuss the provision of additional offset options with the Commonwealth Government.
<ul style="list-style-type: none"> ▶ Habitat loss through vegetation clearing 	<ul style="list-style-type: none"> ▶ Ornamental snake ▶ Of concern RE 11.3.4 ▶ Watercourse RE 11.3.4 ▶ Watercourse RE 11.3.25 	<ul style="list-style-type: none"> ▶ Maintain the extent of offset value habitat within the offset area. 	<ul style="list-style-type: none"> ▶ No unapproved/intentional clearing of habitat within the offset area, with the exception of clearing that is required for fencing, access, firebreaks and public safety as outlined in Table 12. ▶ Minimise any clearing required within the offset area for the above purposes (i.e. for fencing, access, firebreaks and public safety). 	<ul style="list-style-type: none"> ▶ Protection of the offset area via a Voluntary Declaration under section 19E and 19F of the VMA, as described in Section 3.4. 	<ul style="list-style-type: none"> ▶ Reporting to the Commonwealth Government consistent with any EPBC approval. 	<ul style="list-style-type: none"> ▶ At 12 months after approval of OAMP, no progress in legally securing the offset area. 	<ul style="list-style-type: none"> Step 1: Investigate cause of trigger ▶ Discuss alternative options for legal security with the Queensland and Commonwealth Governments. ▶ Identify appropriate corrective actions. Step 2: Implementation of corrective action/s ▶ The appropriate corrective actions will be implemented and may include submission of application for alternative legal security mechanism to relevant authority.

Identified threats to offset values	Relevant offset values	Management objective	Performance criteria	Management action	Monitoring	Trigger for adaptive management and corrective actions	Corrective actions
				<ul style="list-style-type: none"> ▶ Comply with the restrictions outlined in Section 7.1 ▶ Construction and maintenance of access tracks, fencing and firebreaks will be undertaken in accordance with Sections 7.2, 7.3 and 7.6. ▶ In the event that vegetation clearing is required for fencing, access, firebreaks or public safety, all activities will be planned, recorded and monitored. 	<ul style="list-style-type: none"> ▶ Compliance with restrictions for vegetation clearing associated with maintenance and establishment of access tracks, fencing and firebreaks will also be assessed as part of offset area inspections (Section 7.1). 	<ul style="list-style-type: none"> ▶ Clearing for access, fencing, firebreaks or public safety is not undertaken in accordance with the restrictions outlined in Table 12 and Sections 7.1, 7.2, 7.3 and 7.4. 	<p>Step 1: Investigate cause of trigger</p> <ul style="list-style-type: none"> ▶ If restrictions for clearing associated with fencing, access, firebreaks or public safety are not adhered to, Origin will ensure that all clearing activities cease immediately. ▶ Investigate the reason for unapproved or unintentional clearing. ▶ Following clearing, the area is to be assessed by a suitably qualified ecologist/expert to determine the total clearing extent of offset value habitat. ▶ Identify appropriate corrective actions. <p>Step 2: Implementation of corrective action/s</p> <ul style="list-style-type: none"> ▶ The appropriate corrective actions will be implemented and may include: <ul style="list-style-type: none"> – Reviewing and modifying protocols for the establishment of fences, access tracks, and firebreaks. – Prior to the establishment of fences, access tracks, and firebreaks, the area to be cleared will be clearly marked out with flagging tape and checked prior to clearing. – Rehabilitation of the impacted area.
<ul style="list-style-type: none"> ▶ Degradation of habitat by livestock overgrazing. 	<ul style="list-style-type: none"> ▶ Ornamental snake ▶ Of concern RE 11.3.4 ▶ Watercourse RE 11.3.4 ▶ Watercourse RE 11.3.25 	<ul style="list-style-type: none"> ▶ Ensure that any livestock grazing for fire management and weed control maintains and enhances the ground cover attributes for offset values and does not result in the degradation of habitat and vegetation. 	<ul style="list-style-type: none"> ▶ Increase the richness and average % cover of native perennial grasses at each habitat quality assessment site based on the results of baseline and subsequent monitoring events. 	<ul style="list-style-type: none"> ▶ Implementation of strategic grazing to reduce fuel loads and control exotic pasture grasses and promote the establishment of native perennial grass species in accordance with Section 7.6 and 7.7. 	<ul style="list-style-type: none"> ▶ Habitat quality assessments will be undertaken in accordance with Section 8.5.2. These will include assessment of % cover of native perennial grasses. 	<ul style="list-style-type: none"> ▶ Decrease in the richness and average % cover of native perennial grasses at one or more habitat quality assessment sites based on the results of baseline and subsequent monitoring events. 	<p>Step 1: Investigate cause of trigger</p> <ul style="list-style-type: none"> ▶ Investigate the reason for the decrease in richness and average % cover of native perennial grasses ▶ Identify appropriate corrective actions. <p>Step 2: Implementation of corrective action/s</p> <ul style="list-style-type: none"> ▶ The appropriate corrective actions will be implemented and may include: <ul style="list-style-type: none"> – Modifying the strategic grazing regime to maintain a suitable ground layer cover for the squatter pigeon including modifying the frequency, intensity and/or duration of grazing events. – Constructing additional fencing should the current fencing be considered insufficient to manage livestock in accordance with the grazing regime. – Installing additional watering points for livestock to manage livestock in accordance with the grazing regime.

Identified threats to offset values	Relevant offset values	Management objective	Performance criteria	Management action	Monitoring	Trigger for adaptive management and corrective actions	Corrective actions
			<ul style="list-style-type: none"> Biomass levels of at least 2,000 kg/ha are retained at each of the monitoring sites at the end of the dry season. 	<ul style="list-style-type: none"> Implementation of a strategic grazing regime to protect and maintain environmental values in accordance with Section 7.6 and 7.7. 	<ul style="list-style-type: none"> Biomass monitoring and fuel load assessments will be undertaken in accordance with Section 8.4. 	<ul style="list-style-type: none"> Biomass monitoring results indicate less than 2,000 kg/ha of biomass is present at any of the monitoring sites at the end of the dry season. 	<ul style="list-style-type: none"> Removal of stock or spelling grazing <p>Step 1: Investigate cause of trigger</p> <ul style="list-style-type: none"> Investigate the reason for biomass being less than 2,000 kg/ha. Re-evaluate the strategic grazing regime to assess the suitability of grazing to ensure no less than an average of 2,000 kg/ha of biomass is retained at the end of the dry season. Identify appropriate corrective actions. <p>Step 2: Implementation of corrective action/s</p> <ul style="list-style-type: none"> The appropriate corrective actions will be implemented and may include: <ul style="list-style-type: none"> Removal of stock or spelling grazing from the area of the offset in which less than 2,000kg/ha of biomass was identified. Review adherence to livestock grazing restrictions in Section 7.6 and 7.7. Where relevant, amending livestock management practices in the OAMP, including amending stocking rates, and/or duration and/or frequency of strategic grazing events.
			<ul style="list-style-type: none"> Livestock are only observed in the offset management areas during strategic grazing events. 	<ul style="list-style-type: none"> Existing fencing is maintained at all times as outlined in Section 7.3. 	<ul style="list-style-type: none"> Offset area inspections to be undertaken at least annually (Section 8.1) and will include monitoring to assess the: <ul style="list-style-type: none"> condition of fencing to identify any necessary maintenance requirements. presence of livestock within the offset area. 	<ul style="list-style-type: none"> Livestock are observed within the offset area when not permitted within that area. Damaged fencing is observed. 	<p>Step 1: Investigate cause of trigger</p> <ul style="list-style-type: none"> If livestock are identified in the offset area, remove stock immediately. Inspect and evaluate fencing and identify the cause of livestock within the offset area. Identify appropriate corrective actions. <p>Step 2: Implementation of corrective action/s</p> <ul style="list-style-type: none"> The appropriate corrective actions will be implemented and may include: <ul style="list-style-type: none"> Repairing fencing where required to ensure its condition is satisfactory to exclude livestock. Constructing additional fencing should the current fencing be considered insufficient to exclude livestock.
<ul style="list-style-type: none"> Predation by feral cats. 	<ul style="list-style-type: none"> Ornamental snake 	<ul style="list-style-type: none"> Minimise predation risk by feral cats to ornamental snake. 	<ul style="list-style-type: none"> Reduction in Catling* Index for feral cats from year 1 and subsequent monitoring events. 	<ul style="list-style-type: none"> Implement control actions for feral cats in accordance with Section 7.4. 	<ul style="list-style-type: none"> Undertake monitoring for feral cats in accordance with Section 8.2. 	<ul style="list-style-type: none"> An increase in Catling* Index for feral cats from year 1 and subsequent monitoring events. 	<ul style="list-style-type: none"> Step 1: Investigate cause of trigger Investigate potential sources or reasons that may have attributed to an increase in the: <ul style="list-style-type: none"> Catling* index for feral cats and/or foxes

Identified threats to offset values	Relevant offset values	Management objective	Performance criteria	Management action	Monitoring	Trigger for adaptive management and corrective actions	Corrective actions
▶ Predation by foxes.	▶ Ornamental snake	▶ Minimise predation risk by foxes to ornamental snake.	▶ Reduction in Catling* Index for foxes from year 1 and subsequent monitoring events.	▶ Implement control actions for foxes in accordance with Section 7.4.	▶ Undertake monitoring for foxes in accordance with Section 8.2.	▶ An increase in Catling* Index for foxes from year 1 and subsequent monitoring events.	<ul style="list-style-type: none"> ▶ rabbit impact category ▶ relative abundance of feral pigs. ▶ Review adherence to pest management control measures as outlined in Section 7.4. ▶ Identify appropriate corrective actions. ▶ Step 2: Implementation of corrective action/s ▶ The appropriate corrective actions will be implemented and may include: <ul style="list-style-type: none"> – Increasing the frequency and intensity of pest animal control. – Revising methods of pest animal control in accordance with Queensland Department of Agriculture and Fisheries (DAF) guidelines, and coordinate with neighbouring land owners to ensure a consistent approach. – Updating pest animal control methods in the OAMP and targeted pest animal control programs.
▶ Poisoning through ingestion of cane toads	▶ Ornamental snake	▶ Minimise risk of poisoning by cane toads to the ornamental snake.	▶ Manage to reduce relative abundance of cane toads to the greatest extent possible.	▶ Implement control actions for cane toads in accordance with Section 7.4	▶ Undertake monitoring for cane toads in accordance with Section 8.2.	▶ A significant increase in the relative abundance of cane toads in the offset area from year 1 abundance is observed in the first five years of monitoring.	
▶ Degradation of habitat by rabbits.	▶ Ornamental snake ▶ Of concern RE 11.3.4	▶ Minimise degradation of offset value habitat by rabbits.	▶ Maintain rabbit impact category as 'acceptable'.	▶ Implement control actions for rabbits in accordance with Section 7.4.	▶ Undertake monitoring for rabbits in accordance with Section 8.2.	▶ Rabbit impact category measured as 'monitor closely', or 'unacceptable'.	
▶ Degradation of habitat by feral pigs.	▶ Watercourse RE 11.3.4 ▶ Watercourse RE 11.3.25	▶ Minimise degradation of offset value habitat by feral pigs.	▶ Reduction in mean feral pig abundance score from year 1 and subsequent monitoring events.	▶ Implement control actions for feral pigs in accordance with Section 7.4.	▶ Undertake monitoring for feral pigs in accordance with Section 8.2.	▶ An increase in mean feral pig abundance score from year 1 and subsequent monitoring events.	
▶ Invasion of habitat by weed species, including exotic grasses.	▶ Ornamental snake ▶ Of concern RE 11.3.4 ▶ Watercourse RE 11.3.4 ▶ Watercourse RE 11.3.25	▶ Manage invasive weed species to reduce degradation of offset value habitat.	<ul style="list-style-type: none"> ▶ A decrease in species richness and relative abundance of weed species at 80% of monitoring sites from year 1 and subsequent monitoring events. ▶ No new weed species are identified at any monitoring site (based on year 1 and subsequent monitoring data). 	<ul style="list-style-type: none"> ▶ Implement weed control actions in accordance with Section 7.5. ▶ Adhere to weed hygiene restrictions in accordance with Section 7.1. 	▶ Undertake weed monitoring in accordance with Section 8.3.	<ul style="list-style-type: none"> ▶ An increase in species richness and relative abundance of weed species at more than 20% of monitoring sites from year 1 and subsequent monitoring events. ▶ A new weed species is identified at one or more monitoring sites. 	<p>Step 1: Investigate cause of trigger</p> <ul style="list-style-type: none"> ▶ Investigate potential sources or reasons that may have attributed to an increase in species richness and/or relative abundance of weeds. ▶ Investigate potential sources or reasons for the occurrence of the new weed species. ▶ Review adherence to weed management control measures as outlined in Section 7.5. ▶ Review adherence to weed hygiene restrictions as outlined in Section 7.1. ▶ Identify appropriate corrective actions. <p>Step 2: Implementation of corrective action/s</p> <ul style="list-style-type: none"> ▶ The appropriate corrective actions will be implemented and may include: <ul style="list-style-type: none"> – Amending weed hygiene restrictions. – Providing additional educational awareness training for all staff and contractors to ensure weed hygiene restrictions are adhered to. – Revising weed control methods in accordance with the <i>Biosecurity Act 2014</i> (Qld).

Identified threats to offset values	Relevant offset values	Management objective	Performance criteria	Management action	Monitoring	Trigger for adaptive management and corrective actions	Corrective actions
							<ul style="list-style-type: none"> - Increasing the frequency and intensity of weed control. - Updating weed control methods in the OAMP and targeted weed control programs.
<ul style="list-style-type: none"> ▶ Decrease in the habitat quality score for any offset value from baseline and subsequent monitoring events as a result of fire management measures, or an unplanned fire. 	<ul style="list-style-type: none"> ▶ Ornamental snake ▶ Of concern RE 11.3.4 ▶ Watercourse RE 11.3.4 ▶ Watercourse RE 11.3.25 	<ul style="list-style-type: none"> ▶ Reduce the risk of adverse impacts to offset value habitat by inappropriate fire regimes or unplanned fire. 	<ul style="list-style-type: none"> ▶ No unplanned fire within the offset area ▶ Increase in habitat quality scores as a result of implementation of any fire management measures. 	<ul style="list-style-type: none"> ▶ All fire management measures to be implemented in accordance with the program outlined in Section 7.6. 	<p>Habitat quality assessments to determine habitat quality scores will be undertaken in accordance with Section 8.5.2.</p>	<ul style="list-style-type: none"> ▶ As a result of fire management measures, or an unplanned fire, there is a decrease in the habitat quality score for any offset value from baseline and subsequent monitoring events. 	<p>Step 1: Investigate cause of trigger</p> <ul style="list-style-type: none"> ▶ Investigate reasons why the fire management measures have resulted in a decrease in habitat quality scores. ▶ Review adherence to the fire management measures as outlined in Section 7.6. ▶ Identify appropriate corrective actions. <p>Step 2: Implementation of corrective action/s</p> <ul style="list-style-type: none"> ▶ The appropriate corrective actions will be implemented and may include: <ul style="list-style-type: none"> - Increasing the frequency of biomass and fuel load monitoring. - Increasing the frequency of weed control measures. - Amending the strategic grazing regime. - Reviewing effectiveness of firebreaks, and establishment of additional fire breaks. - Review timing and intensity of fuel hazard reduction burns in accordance with the Regional Ecosystem Description Database (REDD) fire management guidelines and conservation advice for the particular offset value.
<ul style="list-style-type: none"> ▶ Offset fails to achieve the interim performance targets and completion criteria within the anticipated 10 and 20 year timeframes, respectively. 	<ul style="list-style-type: none"> ▶ Ornamental snake ▶ Of concern RE 11.3.4 ▶ Watercourse RE 11.3.4 ▶ Watercourse RE 11.3.25 	<ul style="list-style-type: none"> ▶ Achieve the interim performance targets and completion criteria for each offset value within 10 and 20 years, respectively. 	<ul style="list-style-type: none"> ▶ The interim performance targets are achieved for all offset values by year 10. ▶ The completion criteria are achieved for all offset values by year 20. 	<ul style="list-style-type: none"> ▶ All management actions outlined in Section 7 will be implemented to ensure that the interim performance targets and completion criteria are achieved. 	<ul style="list-style-type: none"> ▶ Monitoring of the offset area will be undertaken in accordance with Section 8 including: <ul style="list-style-type: none"> ▶ Offset area inspections (Section 8.1). ▶ Habitat quality assessments to determine habitat quality scores (Section 8.5.2). ▶ The results of monitoring events will be compared against the interim performance targets and completion criteria 	<ul style="list-style-type: none"> ▶ Interim performance targets are not achieved for one or more offset values by year 10. ▶ Completion criteria are not achieved for one or more offset values by year 20. 	<p>Step 1: Investigate cause of trigger</p> <ul style="list-style-type: none"> ▶ Investigate reasons why the interim performance targets or the completion criteria were not achieved within the specified timeframes. ▶ Re-evaluate the suitability of the relevant management measures in the OAMP. ▶ Identify appropriate corrective actions. <p>Step 2: Implementation of corrective action/s</p> <ul style="list-style-type: none"> ▶ The appropriate corrective actions will be implemented and may include: <ul style="list-style-type: none"> - Third party review of the OAMP to provide input on the effectiveness of the management actions.

Identified threats to offset values	Relevant offset values	Management objective	Performance criteria	Management action	Monitoring	Trigger for adaptive management and corrective actions	Corrective actions
					to determine the progress of offset area and recorded as part of reporting (Section 9).		<ul style="list-style-type: none"> – Increasing the frequency and intensity of pest animal and weed control measures, or revising the type of measures to be implemented. – Modifying the strategic grazing regime, or fire management measures, to better support enhancement of offset values.

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7 MANAGEMENT ACTIONS

7.1 GENERAL RESTRICTIONS

To ensure the management objectives and completion criteria are achieved, the [REDACTED] offset area will be managed with overarching restrictions in place relating to access, weed hygiene, vehicles and vegetation clearing, as set out in Table 12.

Table 12: [REDACTED] offset area restrictions.

Restriction	Details
Access	Access into the offset area will be restricted to authorised personnel only. Existing and new fences will be used to restrict access into the offset area. Signs will be installed in prominent locations (i.e. at access points into the offset area) which recognise that the area is protected for conservation purposes. The signs will also advise that access into the offset area is restricted to authorised personnel only.
Weed hygiene	Weed hygiene measures will be implemented to prevent the movement of weed material into the offset area. All persons entering the offset area will be required to ensure vehicles and equipment are weed free. Contractors entering the offset area must hold a current weed hygiene certificate or equivalent for all vehicles and equipment. Evidence is to be provided on request to the landowner that vehicles, slashers or any machinery implementing management actions are clean prior to entry to minimise potential weed spread.
Vehicles	Vehicle movement will be limited to designated access tracks in the offset area and access will be restricted to authorised personnel only. Vehicles will travel to track conditions to minimise the risk of vehicle strike to fauna.
Vegetation clearing	<p>Clearing of native vegetation will not be permitted within the offset area as part of any management and monitoring activities associated with the OAMP, with the exception of clearing that is required for:</p> <ul style="list-style-type: none"> ▶ maintenance of access tracks and/or fire breaks, with any vegetation clearing required to establish new access tracks to be no more than 6 m wide (Section 7.2 and 7.6), ▶ fence construction and maintenance, with any vegetation clearing required for establishing or maintaining fencing to be no more than 5 m wide on each side of the fence (Section 7.3), and ▶ ensure public safety or as directed by emergency management response personnel in the event of unplanned fire or other emergency or other associated procedure. <p>In the event that vegetation clearing is required for fencing, access, firebreaks or public safety, all activities will be appropriately planned, recorded and monitored.</p> <p>Machinery will not be allowed on site after heavy or prolonged rainfall events until after the site has dried to allow for safe movement of traffic.</p>
Alternate land use	[REDACTED] offset areas will be managed for conservation purposes only, therefore no activities in contravention of this OAMP (or the eventual legally securing mechanism – see Section 3.4) can occur.

7.2 ACCESS TRACKS

Existing access tracks will be utilised to facilitate management, maintenance and monitoring activities (refer to existing tracks in Figure 10). In the event that existing access tracks become impassable (through erosion or vegetation regrowth), track maintenance (e.g. grading) will be prioritised over alternative track alignments. Gully crossings are likely to be subject to periodic, ongoing maintenance as a consequence of erosion following rain events.

Existing and new access tracks will be managed to both reduce vegetation disturbance and safety risks (in accordance with Section 7.1 and Section 8.1).

7.3 FENCING

Fencing will be used to manage access to offset management areas as well as strategic grazing activities. Existing internal and boundary fencing will be used where they are in good condition (refer to the location of existing fences and gates in Figure 10).

Where additional fencing is required to be installed, it will be constructed to be fit for purpose and fauna friendly (exact specifications will be in accordance with any executed offset agreement or any addendum to that agreement). Any access tracks into the offset area will be gated and locked to prevent unauthorised access.

7.3.1 Livestock fencing for ornamental snake

In year 1 of the implementation of this OAMP, all fencing in the immediate vicinity of the [REDACTED] offset area will be mapped. Figure 10 illustrates the location of known existing fencing and indicative new fencing to be constructed within the first year of management of the [REDACTED] offset area. The purpose of the fencing is to assist with the management of livestock as part of any strategic grazing events, which may be required for weed and fuel load management.

If monitoring indicates degradation of habitat for ornamental snake is occurring due to strategic grazing for weed and fuel load management, then options for additional fencing will be investigated and installed as required.

Any vegetation disturbance associated with new fence construction will be minimised (in accordance with Section 7.1).

7.3.2 Fencing inspections

Regular inspections of all fencing will be undertaken in accordance with Section 8.1, and repairs to the fences will be made as required.

7.4 PEST ANIMAL MANAGEMENT

Pest animals are present or have the potential to be present within or in the immediate vicinity of the offset area, and pose the following threats:

- ▶ predation of fauna (including ornamental snake) by feral cats and foxes, and
- ▶ erosion and degradation of habitat and competition by feral pigs and rabbits
- ▶ poisoning of ornamental snake by ingestion of cane toads.

An initial assessment of pest animals in the offset area will be undertaken in year 1 of the implementation of this OAMP, consisting of a survey during the dry season and a survey post wet season, to assess the spatial extent of pest animal presence within the offset area (see Section 8.2).

Pest animal control activities will be conducted generally in accordance with the *Biosecurity Act 2014* (Qld). Table 13 provides examples of approved species-specific pest animal control measures recommended by the Queensland and Commonwealth governments. Results of pest animal assessments will be reviewed following each reporting event to inform the need for, location and timing of species-specific control measures in subsequent years.

Table 13: Species specific pest animal control methods

Species	Status*	Control method options
Feral cat (<i>Felis catus</i>)	Restricted matter – category 3,4,6	Control methods for feral cats include (DAF 2020a): <ul style="list-style-type: none"> ▶ Night shooting ▶ Poisoning ▶ Trapping
Fox (<i>Vulpes vulpes</i>)	Restricted matter – category 3,4,5,6	Control methods for foxes include (DAF 2020b): <ul style="list-style-type: none"> ▶ Ground baiting ▶ Trapping ▶ Shooting
Rabbit (<i>Oryctolagus cuniculus</i>)	Restricted matter – category 3,4,5,6	Rabbit control methods include (DAF 2020c): <ul style="list-style-type: none"> ▶ Baiting ▶ Fumigation ▶ Trapping ▶ Shooting
Pig (<i>Sus scrofa</i>)	Restricted matter – category 3,4,6	Pig control methods include (DAF 2020d): <ul style="list-style-type: none"> ▶ Trapping ▶ Shooting ▶ Poisoning
Cane toads (<i>Bufo marinus</i>)	Prohibited matter	There is currently no broad scale control method for cane toads (e.g. trapping or baiting). Should cane toads be identified to be present within the ornamental snake offset management area and the relative abundance has been observed to be increasing from the monitoring event undertaken in year 1 of management, potential sources or reasons that may have attributed to the increase will be investigated. Appropriate control strategies relevant to the offset management area and the reason for the increase in the relative abundance of cane toads will be identified and implemented.

* Status under the *Biosecurity Act 2014* (Qld).

7.5 WEED MANAGEMENT

Offset area weed management will minimise the introduction, establishment and spread of restricted and prohibited pest plants under the Biosecurity Act and other invasive species that present a threat to vegetation communities and species habitat in the offset area. Weed management within the offset area will focus on reducing the extent of existing weeds (see list below) as well as minimising the risk of introduction of additional weed species to the offset areas.

A targeted weed survey will be conducted in year 1 of the implementation of this OAMP to calculate the species richness and abundance of restricted, prohibited and other weed species, including exotic pasture grasses, at each monitoring site in accordance with Section 8.3. The results of the year 1 surveys will inform the species-specific weed control measures, timing and location for ongoing weed management. Table 14 presents example weed control methods that may be used for species known to occur within the [REDACTED] offset area. Species-specific control measures and timing for control activities will be reviewed based on the results of ongoing weed monitoring in the offset area.

Table 14: Example weed control methods for species in the [REDACTED] offset area.

Species	Status	Control method	Link to website
Parthenium weed (<i>Parthenium hysterophorus</i>)	Restricted matter – category 3*	<ul style="list-style-type: none"> ▶ Herbicide control ▶ Biological control ▶ Pasture management 	▶ https://www.daf.qld.gov.au/_data/assets/pdf_file/0004/68602/IPA-Parthenium-PP2.pdf
Guinea grass (<i>Megathyrsus maximus</i>)	Not prohibited or restricted invasive plant	▶ Herbicide control	▶ https://www.daf.qld.gov.au/_data/assets/pdf_file/0006/67398/Guinea-Grass-PP82.pdf
Mimosa bush (<i>Acacia farnesiana</i>)	Not prohibited or restricted invasive plant	▶ Herbicide control	▶ https://www.daf.qld.gov.au/plants/weeds-pest-animals-ants/weeds/a-z-listing-of-weeds/photo-guide-to-weeds/mimosa-bush?a=74167

* Status under the *Biosecurity Act 2014* (Qld)

7.6 FIRE MANAGEMENT

The aim of fire management is to minimise the risk and impacts of unplanned high-intensity bushfire within the offset area by controlling fuel loads. High-intensity, uncontrolled bushfires are often widespread, and can result in direct, detrimental impacts on vegetation communities, as well as indirect impacts on species through the destruction of microhabitat features (e.g. woody debris) known to support species such as ornamental snake.

Given the fire-sensitive nature of the offset area (Table 15), fire will be completely excluded from the whole offset area, including the ornamental snake offset area, and instead, fire risk will be managed by:

- ▶ well-maintained network of firebreaks – regular maintenance (grading and spraying) of firebreaks will be used to manage risks associated with unplanned fire. The existing network of tracks and fence lines will be used to manage fire rather than establishing additional firebreaks (Figure 10)
- ▶ biomass monitoring – undertaken annually (Section 8.4) as part of fire management activities to assess fuel loads, determine the risk of unplanned fire to the offset area and inform strategic grazing activities for fuel load management.

Table 15: Fire management guidelines for regional ecosystems within offset areas based on REDD guidelines (Queensland Herbarium 2019).

Regional ecosystem (RE)	Strategy	Season	Intensity	Timing	Considerations
11.3.3	Manage surrounding country.	n/a	n/a	n/a	This community does not need fire. Flood events drive recruitment of coolabah. Hollow trees are critical habitat. High intensity and extensive fires will degrade vegetation structure and destroy animal habitats. Restrict extent and intensity of fires.
11.3.25	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.	Primarily early dry season.	Low	3 – 5 years.	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. 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. Late wet to early dry season when there is good soil moisture. Early storm season or after good spring rains.

7.7 LIVESTOCK MANAGEMENT

The offset area is located on land that has historically been developed for pastoral grazing. There is evidence of grazing throughout the offset area, with varying degrees of impact including browsing on shrubby vegetation, track formation, grazing on native grasses as well as trampling within gilgai and erosion within waterways.

Livestock grazing will be excluded from the offset areas except during strategic grazing events that will play an important role in reducing fuel loads. As increasing grazing intensity is correlated with an increase in weedy cover (Franks 2002), and a decrease in native grass species richness, grazing will be permitted in the offset areas on a managed and limited basis. Best management practices will be employed as follows:

- ▶ minimum of 2,000 kg/ha of dry matter will be retained at the end of the dry season
- ▶ stock will only be permitted in the offset areas to reduce fuel loads, avoid weed seed set and reduce weed cover.

To minimise erosion and subsequent impacts on water quality, strategic grazing will be excluded where rainfall causes inundated or waterlogged soils. The location and extent of grazing exclusion areas will be reviewed annually based on the results of management and monitoring events.

The suitability of conditions for undertaking a grazing event will be informed by biomass monitoring events as described in Section 8.4. Regular inspections of all fencing will be undertaken in accordance with Section 8.1 and repairs to the fences will be made as required.

7.7.1 Year 1 review

At the beginning of year 1 of management, CQC will review the following factors in order to support the best practice strategic grazing management approach outlined below:

- ▶ Location of existing and new fence lines to enable strategic grazing for conservation outcomes, fuel load management and management of exotic grass infestations
- ▶ Location of existing watering points and the potential to install new additional watering points for livestock that can be turned on and off
- ▶ Weed management activities, specifically management of *Parthenium*, Mimosa bush, Guinea grass and other exotic pasture grasses
- ▶ Agistment arrangements.

7.7.2 Best practice strategic grazing management principles

Best practice management for strategic grazing within the offset area will involve the following:

- ▶ livestock will only be permitted in the offset areas to:
 - reduce fuel loads based on the results of biomass monitoring (Section 8.4)
 - to avoid weed seed set and reduce weed cover based on the results of weed monitoring (Section 8.3)
- ▶ livestock will be excluded from the offset area during the wet season (approximately December to March) to maximise native grass seed production and facilitate recovery of native perennial grasses and the herbaceous layer, unless grazing is required under exceptional circumstances (e.g. the grazing event may be required to be extended as a result of additional rainfall and resultant grass growth/extended flowering and seeding period). In the event strategic grazing is required to be

undertaken during the wet season the minimum amount of grazing to reduce the identified risk will be implemented

- ▶ livestock will be excluded from recently burnt areas (< 2 years) to allow native grasses to recover, including seed set, except in instances where biomass monitoring (see Section 8.4) indicates there is a high fire risk
- ▶ for strategic grazing implemented during the dry season, a minimum of 2,000 kg/ha of dry matter will be retained at the end of the dry season
- ▶ strategic grazing, when required, will involve light stocking rates (maximum 1 beast per 25 hectares), unless a higher rate is required to reduce biomass based on the results of biomass monitoring (Section 8.4).

7.8 EROSION MANAGEMENT

Erosion of waterlogged areas is possible especially in the vicinity of gilgai and historic high stock traffic areas following wet season flood events.

Erosion will be managed by:

- ▶ promoting vegetation colonisation of eroded areas by excluding stock from the offset areas
- ▶ maintaining offset boundary fencing
- ▶ restriction of strategic grazing events within these offset areas following wet season rainfall (Section 7.7).

Livestock will be excluded from offset areas for the 3-month wet season spell (typically December to March), which is when most of the grass growth and seedling recruitment occurs. Offset boundary fencing will be maintained to ensure it is in good working order, with inspections carried out at least annually (see Section 8.1) and prior to cattle entering a paddock that bounds an offset area.

If areas subject to waterlogging (e.g. gilgai and high stock traffic areas) are not stabilising through this management regime, and are continuing to degrade in offset areas, corrective actions (including extended livestock exclusion and/or additional fencing or remediation) will be implemented.

8 MONITORING

The results of the monitoring program will be used to inform operational management decisions, ensure the performance criteria and management objectives, and ultimately interim performance targets and completion criteria are met.

8.1 OFFSET AREA INSPECTIONS

Inspections of the [REDACTED] offset area will provide a general assessment of the offset area to identify any potential issues that may require remedial action to be undertaken. Visual inspections will be undertaken at least annually for the duration of the 20-year management period to determine:

- ▶ condition of access tracks
- ▶ condition of fencing, gates and signs
- ▶ condition of firebreaks
- ▶ compliance with restrictions for vegetation clearing associated with maintenance and establishment of access tracks, fencing and firebreaks
- ▶ signs of damage/degradation resulting from pest animal activity
- ▶ signs of damage/degradation resulting from over-grazing
- ▶ signs of degradation from weed infestations
- ▶ exclusion of livestock
- ▶ erosion
- ▶ incidental fauna observations and any additional risks to offset values (i.e. evidence of vehicle strike).

8.2 PEST ANIMAL MONITORING

The offset area will be monitored for evidence of pest animals including:

- ▶ an initial survey undertaken in year 1 to assess the distribution and abundance of pest animals
- ▶ ongoing pest animal monitoring surveys undertaken post wet season (approximately April) (frequency to be confirmed following year 1 assessment).

Pest animal monitoring sites will be established in year 1 based on the outcome of year 1 survey. The location of pest animal monitoring sites will be assessed by a suitably qualified ecologist prior to each monitoring event to ensure the offset area is effectively monitored.

Monitoring of feral cats, foxes, feral pigs and rabbits will target areas of known impacts/movements (e.g. along topographic features, including creeks, pads, paths, ridge-tops and roads) to not only maximise the success of encountering pest animals, but target monitoring in environments that are more regularly impacted (e.g. drainage lines, moist gullies and around swamps favoured by feral pigs; Hone 1995). Monitoring of cane toads will be undertaken within the ornamental snake offset area with the aim of determining the presence and relative abundance of the pest species.

In addition to surveys at the permanent monitoring sites to be established in year 1, evidence of pest animals will be opportunistically observed throughout the year as part of other monitoring events (i.e. offset area inspections – Section 8.1).

The results of pest animal monitoring will inform adaptive pest animal control, including targeting specific areas of pest animal outbreaks or impact. Methods for determining the presence and relative abundance of pest animals are presented in Table 16.

8.3 WEED MONITORING

The [REDACTED] offset area will be monitored for evidence of restricted, prohibited and other weed outbreaks, including:

- ▶ an initial survey at each monitoring site to be undertaken in year 1 to calculate the species richness and abundance of weeds, including exotic grasses
- ▶ ongoing weed surveys undertaken at the end of the wet season (approximately March) (frequency to be confirmed after year 1 assessment) to implement timely and effective management of emerging weed infestations (and opportunistically during management and offset area inspections).

Weed monitoring sites will be located according to the following considerations:

- ▶ randomly stratified, permanent monitoring sites representative of offset values and incorporating natural variability such as aspect (e.g. a mix of north, east, south and west facing monitoring sites), and community type – (e.g. grassland, woodland, riparian, wetland)
- ▶ permanent weed monitoring sites at heavily trafficked/disturbed areas (e.g. entry gates, creek crossings, stock watering points) to monitor potential introduction and/or outbreaks of prohibited and restricted weed species.
- ▶ within 1.5 km of each existing watering point and any new watering points in the offset area (if required) to ensure timely detection of new source infestations of weeds.

Permanent monitoring sites provide greater confidence in monitoring changes that have occurred over time, compared with random monitoring sites which are likely to just reflect natural variation at the site level (Auld 2009). Accordingly, permanent weed monitoring sites will be established in year 1 based on the results of the year 1 surveys. The location of weed monitoring sites will be assessed prior to each monitoring event to ensure the offset area is effectively monitored.

Monitoring events will be undertaken post wet season and will include a combination of the following methods:

- ▶ plot-based weed transects – an assessment of weed species richness and relative abundance based on plot-based cover estimates along transects within 1 ha of weed monitoring sites
- ▶ photo monitoring of selected sites to assess visual changes in weed species and infestations over time
- ▶ the use of precision unmanned aerial vehicles (drone) technology, aerial imagery and/or remote sensing
- ▶ incidental observations will be collated as part of offset area inspections, noting weed infestations away from permanent weed monitoring sites.

Details of the weed monitoring methodologies are presented in Table 17.

Table 16: Pest animal monitoring methodology

Pest animal	Methodology to be implemented
Feral cat (<i>Felis catus</i>) & Fox (<i>Vulpes vulpes</i>)	<p>To assess the relative abundance of feral cats and foxes within the [redacted] offset area, camera monitoring will be undertaken as follows to provide a measure of the Catling index for each species. The Catling index will be measured as the percentage of camera nights in which the pest species was observed. An increase or decrease in the Catling index value between subsequent monitoring events will represent an increase or a decrease in the relative abundance of pest species and a measure of the success of pest animal control.</p> <ul style="list-style-type: none"> ▶ fauna monitoring cameras will be placed in the offset area ▶ cameras will be placed along tracks, more than 500 m apart ▶ cameras will be left in place for a minimum of three consecutive nights ▶ an analysis of the camera footage will be undertaken to determine the percentage of camera nights with animal captures for each species observed. This percentage represents the Catling index (Mitchell and Balogh 2007b). It is important to account for and remove cameras that have failed when determining the Catling index.
Feral pig (<i>Sus scrofa</i>)	<p>An assessment of the presence or absence of feral pig signs as a measure of the relative abundance of feral pigs within the [redacted] offset area in accordance with Mitchell and Balogh (2007a) and Hone (1988), will be undertaken as follows:</p> <ul style="list-style-type: none"> ▶ nominate randomly stratified, permanent 500 m x 300 m sites across the offset area in environments that are more regularly impacted (e.g. drainage lines, moist gullies, around swamps etc) ▶ at each site, randomly select the start location of 500 m transects, and record locations via GPS ▶ traverse in an east-west direction, surveying for the presence of any feral pig signs 1 m either side of the transect in every 50 m section ▶ calculate an abundance score for each transect as the percentage of 'present' feral pig signs from the 10 sections along the 500 m transect ▶ calculate the mean abundance score (and variance) across all transects in the offset area. If the variance exceeds 20% of the mean, more sites/transects are required. <p>The average frequency of occurrence across the offset area will be used as an index of abundance and compared between subsequent monitoring events to assess the effectiveness of feral pig control. Furthermore, changes to scores for individual sites/transects can point to areas to target control activities.</p> <p>^a Feral pig signs can include rooting, wallows, dung, footprints, travel pads, plant damage and tree rubs, as well as the physical presence of feral pigs</p>
Rabbit (<i>Oryctolagus cuniculus</i>)	<p>An assessment of rabbit impact in accordance with Cooke <i>et al.</i> (2008)(Appendix C) will be undertaken as follows. Randomly stratified, permanent monitoring points, a 2-ha patch of habitat is traversed over 15-20 minutes assessing:</p> <ul style="list-style-type: none"> ▶ Rabbit abundance – a measure of the presence and number of rabbit warrens and the abundance of any faecal pellets (including 'buck-heaps' or latrines) – measured on a scale of 0 – 5 ▶ Seedling abundance – a measure of the presence and abundance of native vegetation seedlings encountered during the 15-20-minute traverse – measured on a scale of 0 – 5 ▶ Rabbit damage – a measure of seedlings (< 0.5 m height) with evidence of rabbit damage, identified as 45° 'secateurs-like' cuts through smaller stems, defoliation and gnawing of bark – measured on a scale of 0 – 5 <p>From this assessment, a 'corrected regeneration score' is calculated from the seedling abundance and rabbit damage score. This measure corrects for seedling regeneration as a function of observed rabbit damage and is subsequently used to calculate overall rabbit impact with the rabbit abundance score (refer to Cooke <i>et al.</i> (2008)).</p> <p>Overall rabbit impact is assigned as one of three categories – 'acceptable', 'monitor closely' or 'unacceptable', as determined from a combination of the score for rabbit abundance and the corrected regeneration score (refer to Appendix C).</p>
Cane toad (<i>Rhinella marina</i>)	<p>An assessment of the relative abundance of cane toads within the ornamental snake offset area will be undertaken as follows based on survey methods outlined in OEHDP (2013):</p> <ul style="list-style-type: none"> ▶ nominate randomly stratified, permanent 200 m x 200 m sites across the offset area, near areas of standing perennial freshwater water bodies ▶ at each site, randomly select the start location of two 200 m transects (100 m apart) to run in an east-west direction and record the start locations via GPS. ▶ traversing in an east-west direction, survey for the presence or absence of any cane toads or signs of 1 m either side of the transects in every 20 m section. ▶ calculate an abundance score for transects at each site, as the percentage of 'present' cane toads from the 20 sections along the two 200 m transects. ▶ calculate the mean abundance score (and variance) across all transects in the offset site. If the variance exceeds 20% of the mean, more sites/transects are required. <p>Targeted searches for cane toads will be during warmer months (September to March) after dark when the species is most active, on a suitably warm and wet night. However, targeted searches of water bodies will also be undertaken during day light when tadpoles are most active, and eggs can be easily identified.</p>

Table 17: Weed monitoring methodology

Weed monitoring method	Methodology
Plot-based weed transects	<p>An assessment of weed species richness and relative abundance and the presence of any new weed species, will be undertaken in accordance with the following method:</p> <ul style="list-style-type: none"> ▶ at randomly stratified, permanent 1 ha sites (100 m x 100 m) across the offset area in environments that are more regularly impacted by weeds (e.g. drainage lines, around swamps etc.) and high traffic areas ▶ at each site, mark out three 100 m transects (traversing in an east-west direction), keeping them parallel to one another, 50 m apart ▶ at every 10 m interval along each of the transects, centre a 2 m x 2 m plot frame and record the presence, species and cover of weeds. Weed cover at each 2 m x 2 m survey site will be recorded as a percentage and converted into one of five cover classes: 1 = 0%, 2 = 0-5%, 3 = 6-25%, 4 = 26-50% and 5 = 51-100% (Auld 2009) ▶ an average cover score for each weed species for each 1 ha site will be calculated. The average cover score is calculated as the average percentage from the 30 plots surveyed from the three 100 m transects.
Photo monitoring	<p>A time-series photographic analysis to visually assess changes in vegetation composition (namely, weeds), will be undertaken as follows:</p> <ul style="list-style-type: none"> ▶ at each end of the plot-based weed transects, establish photo-monitoring points ▶ at each of the photo monitoring points, take five photos from 1.5 m height above ground level, namely photos facing north, east, south, west and one facing the ground. The ground shot should be chosen to give a representative indication of cover and species composition for the general area.
Incidental observations	<p>As part of ██████████ offset area inspections, outside of plot-based weed transects, record details (including location, species and extent) of weeds, species not previously encountered in the offset area, new weed outbreaks and areas of significant weed cover.</p>

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8.4 BIOMASS MONITORING

Biomass monitoring for fire management will be undertaken twice a year, at the end of the wet season and end of the dry season, to:

- ▶ determine the risk of fire to the offset site
- ▶ inform fire management strategies.

Biomass is at its greatest at the end of the wet season (around April) with fire risk greatest towards the end of the dry season (September/October). Biomass will be monitored within the offset areas using appropriate photo standards¹ which will be used to determine dry matter yields and subsequently fuel loads. Biomass monitoring will be undertaken at the same permanent weed monitoring sites established as part of the baseline surveying in year 1.

Fuel loads will be managed through strategic grazing events (see Section 7.7) if the biomass assessment at the end of the wet season shows that biomass is greater than 2,000 kg/ha.

The stocking rate of these strategic grazing events will be determined through a feed budgeting assessment (see Section 8.4.1) undertaken prior to a grazing event in the offset area. A feed budgeting assessment is a recognised method of determining the stocking rate based on the amount of feed available and the amount of feed desired at the end of the grazing event (i.e. > 2,000 kg/ha).

8.4.1 Feed budgeting assessment

The process for undertaking a feed budget assessment will include the following sequence of activities:

- ▶ determine the current amount of feed present (kg/ha) using appropriate photo standards available on the Future Beef website¹.
- ▶ determine the amount of feed desired (kg/ha) at the end of the grazing event.
- ▶ calculate the total useable feed (kg/ha) by subtracting the feed desired from the feed present.
- ▶ determine utilisation (i.e. the proportion of useable feed that livestock can use).
- ▶ determine the feed available for the grazing animal (kg/ha) by multiplying the total useable feed by the utilisation rate.
- ▶ calculate the safe stocking rate by:
 - determining the feed consumption per day (kg/day)
 - determining the number of days feed is required (days)
 - calculating the feed requirement per head (kg/hd) by multiplying the feed consumption per day by the number of days
 - calculating the stocking rate (ha/hd) by dividing the feed requirement per head by feed available
 - calculate the number of stock (head) by dividing the area of the paddock by the stocking rate.

The amount of feed available prior to the grazing event will be estimated using the appropriate photo standards available on the Future Beef website. The Meat and Livestock Australia (MLA) “Stocking Rate Calculator” will then be used to calculate the required stocking rate for the grazing event².

¹ See <https://futurebeef.com.au/knowledge-centre/pastures-forage-crops/pasture-photo-standards/>

² See <https://www.mla.com.au/extension-training-and-tools/tools-calculators/stocking-rate-calculator/>

At the completion of the grazing event, photo standards will be used to assess ground cover and ecosystem biomass. Should the grazing event be required to be extended (e.g. as a result of additional rainfall and resultant grass growth and potential weed flowering), the feed budget assessment will be recalculated using the MLA “Stocking Rate Calculator”.

8.5 OFFSET AREA MONITORING

Monitoring activities for MNES and MSES within the [REDACTED] offset area will consist of:

- ▶ habitat quality assessments in accordance with the Guide to Determining Terrestrial Habitat Quality (version 1.2; DEHP 2017), including targeted fauna surveys for ornamental snake
- ▶ photo monitoring.

Specific timing for each of these monitoring activities is outlined in the sections below and is shown in the implementation schedule in Section 10.

8.5.1 Monitoring locations

Permanent monitoring points within the offset area will be established as part of the habitat quality assessments in year 1. The number of monitoring points is based on the minimum number of monitoring points required to be established in accordance with the Guide to Determining Terrestrial Habitat Quality (DEHP 2017). As such, Table 18 shows the number of points required and Figure 11 the location of these permanent monitoring points (all of which will be established in year 1).

As part of habitat quality assessments in year 1, the 0 m and 50 m points of all monitoring sites will be demarcated with a capped stake and a GPS location will be recorded using a GPS in GDA94 (or GDA2020), Zone 55 projection.

Table 18: Habitat quality monitoring sites (GDA94).

New site number	Existing site number	RE	Transect centre point	
			Easting	Northing
B01	B06	11.3.25	454758	7535768
B02	B07	11.3.3	455048	7537240
B03	B10	11.3.25	457019	7533884
B04	B11	11.3.3	455541	7537201
B05	B12	11.3.3	455010	7536573
B06	B13	11.3.3	455359	7536391
B07	B14	11.3.25	455493	7534567
-	B01	11.3.25	453958	7531036
-	B02	11.3.25	454146	7532563
-	B03	11.3.3	454950	7533853
-	B04	11.3.3	455115	7534490
-	B05	11.3.3	454389	7535689
-	B08	11.3.3	452623	7537521
-	B09	11.3.3	457127	7534058

* Additional monitoring sites to be established in the first year of management as part of the habitat quality assessments.

8.5.2 Habitat quality assessments

Habitat quality for each MNES and MSES will be assessed in accordance with the Guide to Determining Terrestrial Habitat Quality (DEHP 2017) as outlined in the method presented in Section 3.1 (and detailed in the Project’s BOS). The guide was developed by the Queensland Government to measure the habitat quality of a land-based offset. The guide is based on the methodology set out in the BioCondition Assessment Manual (Eyre *et al.* 2015) and compared to control sites (BioCondition benchmarks), as developed by the Queensland Herbarium.

Habitat quality assessments will be undertaken in year 1, year 3, year 5 and then every five years for the remainder of the management period. Habitat quality assessments will be undertaken at the permanent monitoring points (Table 18 and Figure 11).

Data from habitat quality assessments will be recorded in survey sheets and these will be attached to the monitoring reports. Reports prepared for subsequent years will include summary data from all previous reporting years, and these will be presented so as to allow trend analysis of each of the measured attributes and assess progress towards achieving the interim performance targets and completion criteria.

Targeted fauna surveys

The species habitat index assessment will include targeted fauna surveys in the [redacted] offset area for ornamental snake to assess presence and the effectiveness of management actions for this species. These targeted surveys will be undertaken in year 1, year 3, year 5, 10, 15 and 20 to align with interim performance targets and completion criteria milestone dates.

Targeted fauna surveys for ornamental snake will be undertaken in the wet season when this species is most detectable, and will be conducted in accordance with the relevant survey guidelines in Table 19.

Table 19: Summary of survey techniques for ornamental snake

Offset matter	Survey summary	Relevant guidance
Ornamental snake	Nocturnal spotlight searches will be conducted over a minimum of 3 survey days and nights during periods of known peak activity (wet season) on foot around suitable habitat including: gilgai mounds and depressions; woodlands dominated by Brigalow, Gidgee, Blackwood or Coolabah; and vegetation on natural levees. Where possible, search effort will focus on flooded gulgais where frogs are active (DAWE 2020). If access to gilgai habitat is not possible due to inclement weather, searches by vehicle along roads will be conducted. Diurnal targeted searches under sheltering sites (fallen timber, coarse woody debris and rocks) will also be undertaken (DSEWPC 2011).	DSITIA Terrestrial Vertebrate Fauna Survey Guidelines for Queensland (Eyre <i>et al.</i> 2018) Survey guidelines for Australia’s threatened reptiles (DSEWPC 2011)

Guidance on the specific methodologies to use as part of this OAMP is deferred to the abovementioned guidelines, but may include area searches, transects-based searches or other contemporary methods outlined in current or updated guidelines where endorsed by Queensland and/or Commonwealth Governments.

All methodology documents noted throughout this OAMP are referenced in Section 12 and include internet hyperlinks to PDFs of those documents (where available).

8.5.3 Photo monitoring

Photo monitoring is a qualitative analysis technique that provides the opportunity for visual time series analysis of changes in vegetation composition, structure and integrity. In areas where active management is being undertaken, photo monitoring offers a simple and effective visual means by which to capture the response of the vegetation to management actions.

Photo monitoring will be undertaken at the same time as habitat quality assessments at each of the permanent habitat monitoring points. Permanent photo monitoring points will be established at the 0 m and 50 m point at all permanent habitat quality assessment transects, providing an opportunity to visually assess the changes in habitat over time.

Five photos will be taken at each photo monitoring point (from 1.5 m height above ground level) in the direction of magnetic north, south, east and west and ground. The ground shot should be taken at such an angle (~45°) that the horizon is just visible at the top of the frame; in a direction chosen to give a representative indication of cover and species composition for the general area. A record of the photographs will be maintained, including GPS co-ordinates, date and time of each photograph, the direction in which the photo was taken, and the height above the ground at which the photo was taken.

Photo monitoring will also be used to monitor biomass within the offset areas (Section 8.4) by comparing to relevant photo standards³ in order to manage grazing biomass and minimise risk of unplanned fire.

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³ See <https://futurebeef.com.au/knowledge-centre/pastures-forage-crops/pasture-photo-standards/>

9 REPORTING

9.1 REPORTING AGAINST OAMP

Following approval of the [REDACTED] OAMP, reporting against the OAMP (including the management and monitoring undertaken and progress/results) will be prepared after the management years 1, 3, 5, and then every five years of the 20-year management period (i.e. years 10, 15 and 20) to align with interim performance targets and completion criteria milestone dates. The OAMP report will contain, but may not be limited to:

- ▶ results of monitoring events
- ▶ a comparison of the monitoring results with previous monitoring results
- ▶ a description of any performance criteria which were not satisfied and, where required, describe instances where corrective actions have been implemented
- ▶ an indication of any risks or potential threats that have become apparent through monitoring and activities to be undertaken to manage these threats and risks including any corrective actions that need to be implemented
- ▶ progress towards achieving the interim performance targets and completion criteria
- ▶ proposed changes to management and monitoring activities to improve management and/or monitoring performance and attain interim performance targets and/or completion criteria.

9.2 UPDATE OF OAMP

In accordance with the principles of adaptive management, the [REDACTED] OAMP will be amended (if required) to incorporate changes identified through management actions and monitoring activities. This may include the revision of/addition to current management actions and monitoring activities, responses to adaptive management triggers and review of environmental threats.

Changes to the [REDACTED] OAMP will be made in consultation with the landholder, in accordance with the executed offset agreement.

10 IMPLEMENTATION SCHEDULE

Persons implementing management and monitoring activities described in this management plan will have appropriate skills and qualifications as required by the relevant government guidelines.

In the event that injured fauna are encountered, they will be taken to the nearest qualified veterinary practitioner or wildlife carer. Animals with a poor prognosis for survival and that are suffering must be euthanised on site in accordance with the *Code of Practice: Care of Sick, Injured or Orphaned Protected Animals in Queensland*.

A proposed implementation schedule for management actions and monitoring events is presented in Table 20 and Table 21 respectively.

Table 22 presents months of the year when monitoring events can occur and nominates months when multiple monitoring events can occur in the same month.

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Table 20: Implementation of management actions.

Management action and description (relevant sections)		Timing	Related detection/monitoring activity/ies
General restrictions (Section 7.1)	Install/upgrade fencing and gates	Within 12 months of OAMP approval	Offset area inspections (Section 8.1)
	Install signs on access points		
	Control access/vehicle movement	At all times	
	Limit vegetation clearing	At all times	
	Implement weed hygiene protocols	At all times	
Access tracks (Section 7.2)	Maintain access tracks	At all times, subject to constraints in Section 7.2	Offset area inspections (Section 8.1)
Fencing (Section 7.3)	Install new fencing and gates, upgrade current fencing where required	Within 12 months of OAMP approval	Offset area inspections (Section 8.1)
	Maintain fencing	At all times	
Pest animal management (Section 7.4)	Conduct pest animal assessment in year 1 of OAMP implementation	Following the first wet season after OAMP approval	Offset area inspections (Section 8.1) Pest animal monitoring (Section 8.2)
	Implement pest animal control as per Section 7.4	Timing determined following results of year 1 assessment, subject to constraints in Section 7.4	
Weed management (Section 7.5)	Conduct weed assessment in year 1 of OAMP implementation	Following the first wet season after OAMP approval	Offset area inspections (Section 8.1) Weed monitoring (Section 8.3)
	Implement weed control as per Section 7.5	Timing determined following results of year 1 assessment, subject to constraints in Section 7.5	
Fire management (Section 7.6)	Implement strategic grazing regimes to maintain fuel loads	As required, subject to constraints in Section 7.6	Offset area inspections (Section 8.1) Weed monitoring (Section 8.3) Biomass monitoring (Section 8.4)
	Maintain firebreaks	Annually	
	Implement fuel hazard reduction burns to maintain fuel loads	As required, subject to constraints in Section 7.6	
Livestock management (Section 7.7)	Strategic grazing	As required, based on results of related monitoring and subject to constraints in Section 7.7	Offset area inspections (Section 8.1) Weed monitoring (Section 8.3) Biomass monitoring (Section 8.4) Offset area monitoring (Section 8.5)
Erosion management (Section 7.8)	Implement erosion control as per Section 7.8	At all times	Offset area inspections (Section 8.1)
Reporting (Section 9)	Report against OAMP	Following approval OAMP, years 1, 3, 5, 10, 15 and 20	Offset area inspections (Section 8.1) Pest animal monitoring (Section 8.2) Weed monitoring (Section 8.3) Biomass monitoring (Section 8.4) Offset area monitoring (Section 8.5)

Table 21: OAMP monitoring events.

Survey or monitoring objective (relevant sections)	Monitoring activity	Timing	Survey/monitoring guidelines	Reliability
Baseline assessments (Section 8.2, Section 8.3, Section 8.4, and Section 8.5)	Baseline monitoring sites established for: <ul style="list-style-type: none"> ▶ Pest animal monitoring ▶ Weed monitoring ▶ Biomass monitoring ▶ Offset area monitoring 	Year 1	See relevant sections	Establishes fixed/repeatable location and/or baseline condition/scores from which subsequent monitoring will be compared.
Offset area inspections (Section 8.1)	Offset area monitoring for: <ul style="list-style-type: none"> ▶ condition of access tracks ▶ condition of fencing, gates and signs ▶ condition of firebreaks ▶ compliance with restrictions for vegetation clearing associated with maintenance and establishment of access tracks, fencing and firebreaks ▶ signs of damage/degradation from pest animal activity ▶ signs of damage/degradation from over-grazing ▶ signs of degradation from weed infestations ▶ exclusion of livestock ▶ erosion ▶ incidental fauna observations and any additional risks to offset values (i.e. evidence of vehicle strike). 	At least annually for duration of 20-year management period	-	Visual inspections, providing a general assessment of the offset area to identify any potential issues that may require remedial action to be undertaken
Habitat quality assessments (Section 8.5.2)	Habitat quality assessments will be undertaken at fixed/repeatable monitoring sites to determine the site condition of the vegetation communities and overall habitat quality of the offset values to assess progress towards attaining and maintaining the completion criteria.	Year 1, year 3, year 5, and then every 5 years thereafter	Guide to Determining Terrestrial Habitat Quality (DEHP 2017)	Assessment undertaken generally in accordance with method developed by the Queensland Government and also aligns with the EPBC Act Environmental Offsets Policy measure of ‘habitat quality’ and is intended to provide a consistent framework for environmental offsets in Queensland. The methods presented are based on the Guide to Determining Terrestrial Habitat Quality Version 1.2 (DEHP 2017).
Targeted fauna surveys (Section 8.5.2)	Targeted fauna surveys will be undertaken to assess the presence of ornamental snake and changes in capture rates between sites and monitoring events.	Year 1, year 3, year 5, and then every 5 years thereafter	Survey Guidelines for Australia’s Threatened Reptiles (DSEWPC 2011)	Assessment undertaken generally in accordance with methods and guidelines developed by the Queensland and Commonwealth governments, or other methodologies endorsed by relevant bodies, including other State or Territory Governments.
Photo monitoring (Section 8.5.3)	Visual assessment of habitat changes over time including at habitat quality assessment sites	Year 1, year 3, year 5, and then every 5 years thereafter	Monitoring method outlined in Section 8.5.3	Based on best practice photo monitoring techniques, see Appendix 4 of BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland. Assessment Manual. Version 2.2. (Eyre <i>et al.</i> 2015).
Weed monitoring (Section 8.3)	Year 1 weed survey to assess the distribution and abundance of weed infestations.	Year 1, post-wet season (~March – April)	Monitoring method outlined in Section 8.3	Assessment methodology based on NSW Guidelines for Monitoring Weed Control and recovery of native vegetation (Auld 2009)
	Ongoing weed surveys to assess the effectiveness of weed control	Every two years, post-wet season (~March - April)		
Pest animal monitoring (Section 8.2)	Year 1 pest animal survey to assess the presence of pest animals	Year 1, post-wet season (~March-April)	Monitoring method outlined in Section 8.2	Assessment undertaken generally in accordance with published monitoring techniques developed by the NSW Government – Monitoring Techniques for Vertebrate Pests (Mitchell and Balogh 2007a, b, c) and Bureau of Rural Sciences methodology for assessing impacts from rabbits (Cooke <i>et al.</i> 2008).
	Ongoing pest animal surveys to assess the effectiveness of pest animal control	Every two years, post-wet season (~March - April)		

Survey or monitoring objective (relevant sections)	Monitoring activity	Timing	Survey/monitoring guidelines	Reliability
Biomass monitoring (Section 8.4)	Biomass monitoring for sustainable grazing	Post-wet season (~March-April), or at least annually during offset area inspections	<p>Feed budget assessment methodology outlined in Section 8.4.1</p> <p>Appropriate Future Beef photo standards</p> <p>Meat and Livestock Australia stocking rate calculator</p>	<p>Future Beef website: https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/grazing-pasture/sustainable-grazing/monitoring</p> <p>Meat and Livestock Australia stocking rate calculator: https://www.mla.com.au/extension-training-and-tools/tools-calculators/stocking-rate-calculator/</p>

Table 22: Nominal timing of months when monitoring is recommended to occur; green columns are when monitoring could most efficiently occur.

Monitoring	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
General offset area inspections (Section 8.1)	X	X	X	X	X	X	X	X	X	X	X	X
Pest animal monitoring (Section 8.2) – post-wet season			X	X	X							
Weed monitoring (Section 8.3) – post-wet season			X	X	X							
Biomass monitoring (Section 8.4) – twice year at end of wet season and end of dry season			X	X					X	X		
Offset area monitoring (Section 8.5) – habitat quality assessments, targeted fauna surveys, photo monitoring	X	X	X	X							X	X

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11 CONSENT

Administering authority of *Vegetation Management Act 1999*

SIGNED by the

to indicate approval of the OAMP

Name:

Signature:

Witness name:

Signature:

Date:

Landowner

The landowner agrees:

- ▶ Any non-compliance by the Landowner with the Landowner's requirements of this OAMP shall constitute a breach of the terms and conditions of the legally binding mechanism entered into.

SIGNED by

being the current owner/s of the

abovementioned property to indicate that the terms of this OAMP including Landowner's responsibilities under the OAMP, have been read, understood and accepted.

Name:

Signature:

Witness name:

Signature:

Date:

Name:

Signature:

Witness name:

Signature:

Date:

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APPENDIX A OFFSET AREA COORDINATES

Table A-1: Offset area coordinates (GDA94).

Site	Easting	Northing	Site	Easting	Northing	Site	Easting	Northing
1	454786	7537512	38	456247	7533847	75	456356	7533599
2	455757	7537415	39	456224	7533751	76	456284	7533595
3	455757	7537388	40	456317	7533715	77	456204	7533629
4	455885	7537050	41	456389	7533718	78	456133	7533823
5	455892	7536931	42	456555	7533824	79	456131	7533887
6	455805	7536642	43	456680	7533893	80	455963	7533936
7	455773	7536516	44	456770	7533966	81	455692	7534211
8	455741	7536433	45	457067	7533966	82	455711	7534359
9	455762	7536393	46	457253	7533986	83	455609	7534379
10	455858	7536295	47	457322	7534006	84	455467	7534479
11	455918	7536179	48	457385	7534049	85	455424	7534535
12	455918	7536063	49	457501	7534052	86	455410	7534641
13	454758	7536063	50	457630	7534006	87	455457	7534799
14	454736	7536012	51	457782	7533986	88	455357	7534905
15	454732	7535957	52	457827	7533961	89	455305	7534978
16	454805	7535818	53	457910	7533971	90	455222	7535203
17	454865	7535752	54	458078	7534041	91	455162	7535239
18	454974	7535553	55	458235	7534135	92	454914	7535285
19	454990	7535491	56	458287	7534160	93	454871	7535358
20	455007	7535378	57	458415	7534195	94	454845	7535497
21	455143	7535345	58	458475	7534151	95	454851	7535570
22	455228	7535335	59	458426	7534034	96	454737	7535696
23	455271	7535282	60	458389	7533947	97	454704	7535682
24	455291	7535295	61	458327	7533969	98	454748	7535599
25	455364	7535289	62	458212	7533923	99	454778	7535432
26	455377	7535226	63	458086	7533840	100	454779	7535349
27	455364	7535173	64	458000	7533820	101	454694	7535371
28	455434	7534998	65	457798	7533840	102	454669	7535576
29	455539	7534836	66	457722	7533863	103	454569	7535950
30	455553	7534571	67	457567	7533860	104	454583	7536232
31	455751	7534472	68	457504	7533827	105	454606	7536261
32	455820	7534389	69	457418	7533820	106	454619	7536362
33	455850	7534254	70	457223	7533867	107	454819	7536550
34	455883	7534174	71	457048	7533837	108	454835	7536712
35	456082	7534049	72	456912	7533857	109	454942	7536864
36	456191	7533969	73	456836	7533834	110	454942	7536919
37	456237	7533906	74	456555	7533685	111	454746	7537236

APPENDIX B RISK ASSESSMENT

The following risk assessment assesses the risk of failure to achieve the OAMP’s objectives for the offset values. For each risk identified, the potential consequence of the risk (rated from minor to critical; Table B-1) was assessed against the likelihood of that risk occurring (rated from very unlikely to almost certain; Table B-2) to determine a risk rating. The risk rating was evaluated by using the matrix in Table B-3.

The consequence and likelihood of each risk was first considered without the management measures in place to provide an initial risk rating. The consequence and likelihood of each risk occurring was then reassessed following the implementation of the management measures to provide a residual risk rating.

Table B-4 provides the risk register which was used to document the findings of the risk assessment process.

Table B-1: Consequence classification

Classification	Description
Minor	Minor risk of failure to achieve the plan’s objectives. Results in short term delays to achieving plan objectives, implementing low cost, well characterised corrective actions.
Moderate	Moderate risk of failure to achieve the plan’s objectives. Results in short term delays to achieving plan objectives, implementing well characterised, high cost/effort corrective actions.
High	High risk of failure to achieve the plan’s objectives. Results in medium-long term delays to achieving plan objectives, implementing uncertain, high cost/effort corrective actions.
Major	The plan’s objectives are unlikely to be achieved, with significant legislative, technical, ecological and/or administrative barriers to attainment that have no evidenced mitigation strategies.
Critical	The plan’s objectives are unable to be achieved, with no evidenced mitigation strategies.

Table B-2: Likelihood classification

Classification	Description
Highly likely	Is expected to occur in most circumstances
Likely	Will probably occur during the life of the Project
Possible	Might occur during the life of the Project
Unlikely	Could occur but considered unlikely or doubtful
Very unlikely	May occur in exceptional circumstances

Table B-3: Risk framework

Likelihood	Consequence				
	Minor	Moderate	High	Major	Critical
Highly likely	Medium	High	High	Severe	Severe
Likely	Low	Medium	High	High	Severe
Possible	Low	Medium	Medium	High	Severe
Unlikely	Low	Low	Medium	High	High
Very unlikely	Low	Low	Low	Medium	High

A brief description of each overall possible risk rating is provided below.

- ▶ Severe:
 - A ranking of extreme represents an unacceptable risk, which is usually critical in nature in terms of consequences and is considered possible to almost certain to occur. Such risks significantly exceed the risk acceptance threshold and require comprehensive control measures, and additional urgent and immediate attention towards the identification and implementation of measures necessary to reduce the level of risk.
- ▶ High:
 - High risks typically relate to moderate to critical consequences that are rated as possible to almost certain to occur. These are also likely to exceed the risk acceptance threshold, and although proactive control measures are usually planned or implemented, a very close monitoring regime and additional actions towards achieving further risk reduction is required.
- ▶ Medium:
 - As suggested by the classification, medium level risks span a group of risk combinations varying from relatively minor consequence/likely likelihood to mid-level consequence/likelihood to relatively major consequence/very unlikely likelihood scenarios. These risks are likely to require active monitoring as they are effectively positioned on the risk acceptance threshold.
- ▶ Low:
 - Low risks are below the risk acceptance threshold and although they may require additional monitoring in certain cases, are not considered to require active management. In general, such risks represent relatively low likelihood, and low to mid-level consequence scenarios.

Table B-4: Risk assessment

Management objective	Risk	Initial risk rating			Control strategies	Residual risk rating		
		Likelihood	Consequence	Overall Risk Rating		Likelihood	Consequence	Overall Risk Rating
Achieve the completion criteria and habitat quality improvements for offset values, which include the habitat quality scores in this OAMP.	Completion criteria and habitat quality improvements are not achieved	3	4	H	<ul style="list-style-type: none"> Implement the OAMP, including the monitoring programs and management actions outlined in Section 8 and Section 7, respectively. Implementation of the adaptive management process outlined in Section 6 Obtain advice from scientific advisory groups with the aim of identifying appropriate additional management interventions if interim performance targets are not achieved for one or more offset values by year 15. Discuss with the Commonwealth Government regarding the provision of additional offset options if it is considered that the completion criteria will not be achieved. 	2	3	M
Maintain the extent of offset value habitat within the offset area.	Habitat or vegetation loss through land clearing.	3	4	H	<ul style="list-style-type: none"> Declaration of [redacted] offset area as a Voluntary Declaration under the <i>Vegetation Management Act 1999</i> or other security mechanism. No clearing of native vegetation is permitted within the [redacted] offset area as part of any management and monitoring activities associated with the OAMP, except for clearing that is required: <ul style="list-style-type: none"> to realign, construct or maintain access tracks up to 6 m width for fence construction and maintenance (up to 5 m width on each side of the fence) ensure public safety or as directed by emergency management response personnel in the event of uncontrolled bushfire or other emergency procedure. Any clearing required for fencing, access, firebreaks or public safety is undertaken in accordance with the restrictions outlined in Sections 7.1, 7.2 and 7.3. 	1	4	M
Minimise predation risk by feral cats to ornamental snake.	Predation of threatened fauna by cats.	3	2	M	<ul style="list-style-type: none"> Regular monitoring for pest animals will be undertaken in accordance with the methods detailed in Section 8.2 and pest animal control will be implemented following the results of monitoring in accordance with Section 7.4. 	2	2	L
Minimise predation risk by foxes to ornamental snake.	Predation of threatened fauna by foxes.	3	2	M		2	2	L
Minimise risk of poisoning by cane toads to the ornamental snake.	Poisoning of ornamental snake through ingestion of cane toads	3	2	M		2	2	L
Minimise degradation of offset value habitat by feral pigs.	Degradation of habitat by feral pigs.	3	2	M		2	2	L
Minimise degradation of offset value habitat by rabbits.	Degradation of habitat by rabbits.	3	2	M		2	2	L
Manage invasive weed species to reduce degradation of offset value habitat.	Invasion of habitat by weed species, including exotic grasses.	3	3	M	<ul style="list-style-type: none"> Regular inspections in accordance with the methods in Section 8.3 will be undertaken to monitor the presence of weeds. Based on the results of monitoring events, weed control will be implemented in accordance with Section 7.5 and the recommended control measures available from the Queensland Department of Agriculture and Fisheries. 	2	3	M

Management objective	Risk	Initial risk rating			Control strategies	Residual risk rating		
		Likelihood	Consequence	Overall Risk Rating		Likelihood	Consequence	Overall Risk Rating
Reduce the risk of adverse impacts to offset value habitat by inappropriate fire regimes or unplanned fire.	Decrease in the habitat quality score for any offset value from baseline and subsequent monitoring events as a result of fire management measures, or an unplanned fire.	4	4	H	<ul style="list-style-type: none"> Fuel loads within the offset area will be managed through strategic grazing (see Section 7.6 and 7.7). Firebreaks will be maintained to be no wider than 6 m along all boundaries of the offset area, except along the road reserve (which will act as a firebreak) and where they correspond with waterways; all existing/proposed fence lines. 	2	3	M
Achieve the interim performance targets and completion criteria for each offset value within 10 and 20 years, respectively.	Offset fails to achieve the interim performance targets and completion criteria within the anticipated 10 and 20 year timeframes, respectively	3	4	H	<ul style="list-style-type: none"> Monitoring of the offset area will be undertaken in accordance with Section 8, including: <ul style="list-style-type: none"> Offset area inspections (Section 8.1). Habitat quality assessments to determine habitat quality scores (Section 8.5.2). The results of monitoring events will be compared against the interim performance targets and completion criteria to determine the progress of offset area and recorded as part of reporting (Section 9). Third party review of the OAMP to provide input on the effectiveness of the management actions. Increasing the frequency and intensity of pest animal and weed control measures or revising the type of measures to be implemented. Modifying fire management measures to better support enhancement of offset values. 	2	3	M

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APPENDIX C RABBIT IMPACT ASSESSMENT (COOKE ET AL. 2008)

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Rabbits:

A threat to conservation & natural resource management

**How to rapidly assess a rabbit
problem and take action**



The problem

It takes less than one rabbit per hectare to prevent the successful regeneration of many of our common native trees and shrubs. This means that many rabbit-infested patches of remnant native vegetation can't sustain themselves naturally and are in slow decline - but unfortunately this often goes unnoticed. Whether you are a land-owner who conserves some uncleared woodland on the farm or belong to a Landcare group managing vegetation along a roadside, this quick assessment method will help you decide if rabbits are a problem and what action you need to take. National Park managers will also find this a useful tool for alerting them to problems.

How to monitor

Take 15 – 20 minutes to walk through the patch of native vegetation of interest. You should cover about 2 – 3 hectares in this time. Observe carefully but don't stop too long at any given point.

Use this guide to help you fill in the data sheet on pages 14-15.

STEP 1:

Rabbit abundance score

Record evidence of rabbits as you walk; it will help form an 'average' picture of the whole area in your mind. Rabbit warrens may be present as well as scratches and 'buck-heaps' or latrines but the abundance of rabbit pellets (faeces) is the best measure to use (see **Figure 1**). Score these as follows:

- 0 - none found in the 15 minute search
- 1 - isolated pellets and small clumps of 5 - 10 pellets 10 metres or more apart
- 2 - scattered pellets and clumps less than 10 metres apart
- 3 - common, pellets in larger clumps and occasional buck-heaps on about half the areas you scan closely during the search
- 4 - abundant, pellets often in large clumps and buck-heaps obvious but not present across whole area
- 5 - very abundant, pellets and buck-heaps always apparent



FIGURE 1: Typical small clump of rabbit pellets (faeces) in grassland.

Rabbit 'score' and population density

The score for rabbits (0 – 5 scale) is not a direct measure of rabbit abundance or population density. However, an approximate conversion is as follows:

Rabbit abundance score	Approximate density (adult rabbits/hectare)
0	0
1	0.5
2	1
3	2
4	5
5	10 or more

STEP 2:

Seedling abundance score

Once you are beginning to get the picture on rabbit abundance, look around to see if there are seedlings of the common native trees and shrubs present in the area. They can be ‘scored’ in a similar way to the rabbits:

- 0 - none found during 15 minute search
- 1 - very few, only 1 - 5 individual seedlings encountered
- 2 - uncommon, 6 - 20 seedlings encountered
- 3 - common, 20 - 100 seedlings encountered
- 4 - abundant, 100 - 200 seedlings encountered
- 5 - very abundant, many hundreds of seedlings encountered

The presence of seedlings is a measure of the health of the vegetation community and a mix of seedlings of different tree or shrub species indicates broad community health.



Common trees and shrubs damaged by rabbits

These can be useful ‘indicators’ of rabbit browsing but you will find many other examples.

- Acacia (Wattles):
Acacia ligulata, *A. oswaldii*
- Bursaria (Sweet Bursaria):
Bursaria spinosa
- Casuarina (Sheokes and Bulokes):
Allocasuarina verticilliata
- Callitris (Native Pines):
Callitris glaucophylla and *C. gracilis*
- Dodonea (Turpentine):
Dodonea viscosa
- Hakea (Needlebush):
Hakea leucoptera
- Myoporum (Boobialas):
Myoporum insulare

STEP 3: Rabbit damage score

Closely inspect smaller seedlings, less than 0.5 metres high, for evidence of rabbit damage. Oblique 45° ‘secateurs-like’ cuts through smaller stems, defoliation and gnawing of bark are tell-tale signs (see **Figure 2**). Another sign can be twigs cut from seedlings and then discarded without being eaten – and again look for the ‘secateurs-like’ cut to confirm that rabbits were responsible. The severity of rabbit damage should be ranked as follows:

- 0 - no evidence of rabbit damage
- 1 - slight damage to some seedlings
- 2 - obvious damage but confined to some seedlings
- 3 - many seedlings moderately damaged
- 4 - heavy general damage, some seedlings retain foliage
- 5 - foliage, twigs and bark stripped from all seedlings



FIGURE 2: Rabbit damage showing stripping of bark and 45° ‘secateurs-like’ cuts through twigs.

In some instances rabbits may have eaten all of the seedlings but the severity of grazing can still be ranked at '5' from the presence of a distinct 'browse-line' 500 millimetres above the ground on older saplings or mature shrubs with lower foliage within reach of the rabbits (see **Figure 3**).



FIGURE 3: Absence of small seedlings and a distinct 'browse-line' 500 millimetres above the ground on older saplings indicates severe rabbit impact (Damage score = 5).



FIGURE 4: Native pines with: (a) little damage (score 1); or (b) complete defoliation (score 5).

STEP 4:

Corrected regeneration score

Use the **Table** below to work out a 'corrected regeneration score' from the seedling abundance and rabbit damage scores you have obtained.

Two examples are provided:

- Example 1: Seedlings were abundant (score 4) and very little rabbit damage was noted (score 1); the corrected regeneration score is 2.
- Example 2: Seedlings were again abundant (score 4) but rabbit damage was very heavy (score 5); the corrected regeneration score is 0.7 (which can be rounded up to 1).

	Seedling abundance					
Rabbit damage	0	1	2	3	4	5
0	0.20	1.00	2.00	3.00	4.00	5.00
1	0.20	0.50	1.00	1.50	2.00	2.50
2	0.20	0.34	0.70	1.00	1.30	1.70
3	0.20	0.28	0.50	0.80	1.00	1.30
4	0.20	0.20	0.40	0.60	0.80	1.00
5	0.20	0.20	0.30	0.50	0.70	0.80

Use the corrected regeneration score obtained from the **Table** for the next Step.

STEP 5:

Assessing overall rabbit impact

Where does the site you have assessed fit on **Figure 5** below? Use your corrected regeneration score and the score you obtained for rabbit abundance to do this.

Again, two examples are given:

- Example 1: Corrected regeneration score about 3 and rabbit abundance score 1.
- Example 2: Corrected regeneration score about 1 and rabbit abundance score 4.

Most assessments should fall roughly around the *dotted black line* which is based on observations from over 200 sites assessed in south-eastern Australia.

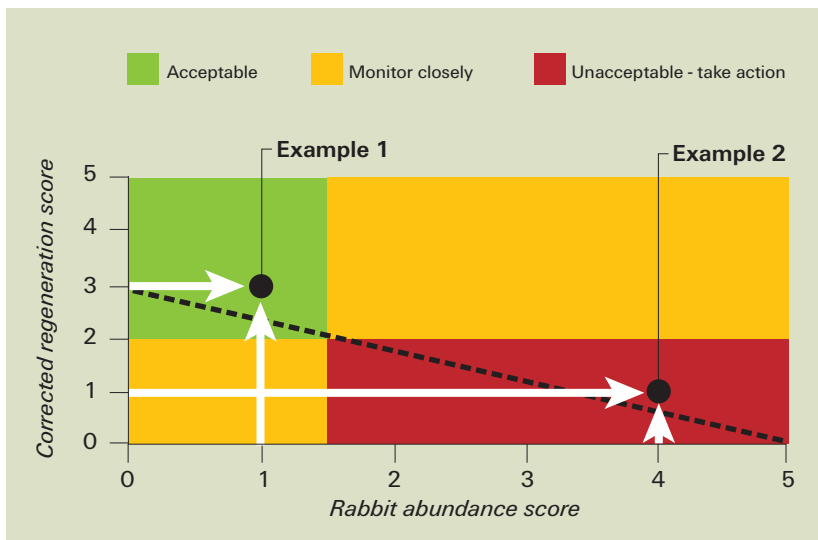


FIGURE 5: Assessing overall rabbit impact.

If your assessment falls within the green zone, rabbits are not having a significant impact on native vegetation regeneration. The yellow zones indicate where rabbits should be watched more closely and the red zone indicates that rabbits must be controlled to avoid serious biodiversity losses.

Removing rabbits

Where rabbits are damaging vegetation, and action to reduce their impact is needed, it is important to remember that the '*cure should not be worse than the disease*'. Where rabbits are living amongst thick remnant native vegetation, the control methods chosen should not irreparably damage trees, shrubs and native herbage.

Several different methods of control often need to be combined to achieve the best results among roadside vegetation:

- poison in summer or autumn to eliminate most rabbits;
- destroy readily accessible warrens by ripping with a suitable small tractor or back-hoe, preferably while soil remains dry;
- fumigate inaccessible rabbit holes and any that re-open after ripping.

This combination of techniques means more work and initial expense, but the low costs of keeping rabbits down in subsequent years quickly brings accumulated costs below those of repeated annual treatments. Treating re-opened rabbit holes by fumigation 'on the spot' during annual inspections will keep costs down and ensure that rabbits do not regain damaging numbers. Ask your local Natural Resource Management Board, Catchment

Management Authority or Rural Lands Protection Board for advice on availability and use of poisons and fumigation equipment.

More information on rabbit management is available at: www.feral.org.au

Measuring achievement

This simple method of assessing rabbits can be useful for measuring progress in rabbit control. Note the results in your diary so that you can measure progress by repeating the assessment again a year from now. Success should not be measured in terms of reduced rabbit numbers alone. The health of the native vegetation — measured in terms of its ability to regenerate — is the main aim.



Rabbit and vegetation data sheet

Site name or reference: <i>(e.g. local name, owner's name details)</i>	
Name of assessor:	
Date:	Inspection time: am/pm
Location: <i>(e.g. nearest town)</i>	
Latitude: <i>(from GPS)</i> ° S	Longitude: ° E
Altitude: <i>(from GPS)</i>	metres
Approximate area inspected:	ha.
Total area of land if known:	ha.
Land use(s): <i>(e.g. grazing, cropping, rail reserve)</i>	

General description of site: <i>(e.g. remnant native vegetation adjacent to cropland)</i>	
Rabbit Abundance	Score
0 = none found in 15 minute search; 1 = small, isolated clumps >10m apart; 2 = clumps <10 m apart; 3 = common; 4 = abundant, still patchy; 5 = very abundant, faeces always apparent.	
Seedling Abundance	Score
0 = none; 1 = very few; 2 = uncommon; 3 = common; 4 = abundant; 5 = very abundant.	
Rabbit Damage	Score
0 = no damage; 1 = slight damage; 2 = obvious damage confined to some seedlings; 3 = many seedlings moderately damaged; 4 = heavy general damage; 5 = foliage and small twigs and bark stripped from almost all seedlings. If there are no seedlings and there is a browse-line on low foliage, score as 5.	
Corrected Damage Score	Score
Final decision on rabbit control:	

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