Koala Habitat Rehabilitation Monitoring Report

ORU 7th Monitoring Period Yarrabilba

EPBC Number:	2013/6791
Project Name:	Yarrabilba
Proponent's ACN:	103 578 436
Prepared for:	Lendlease
Prepared by:	Dr M.N. Runkovski, K. Leopold & K. Richardt
Date:	07 March 2021

Proposed Action: To construct the Yarrabilba residential development and associated infrastructure approximately 40 kilometres south east of Brisbane, Queensland (see EPBC Act referral 3013/6791 and request to vary proposal dated 5 August 2013)

Natura Pacific – Document Control Sheet

Project	
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DCR#:	**NCO_PRJ_210310_Q00004**

Revision History					
Version:	**Purpose:**	**Issued by:**	**Date**	**Reviewer:**	**Date:**
Draft	Peer Review	K. Leopold	07/03/2021	M.N. Runkovski	08/03/2021
1.0	Quality Assurance	M.N. Runkovski	08/03/2021	D. Coburn	10/03/2021

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1 Executive summary

Natura Pacific has developed this *Habitat Rehabilitation Monitoring Report* as the 7th monitoring report after: initial baseline, 6 month, 2nd, 3rd, 4th, 5th and 6th monitoring period reports for rehabilitation within the Yarrabilba offset requirement areas as prescribed in the *Habitat Rehabilitation and Management Plan* (Natura Consulting, March 2015) and the Approval Conditions set out under the *Environmental Protection and Biodiversity Conservation Act 1999* dated 13 November 2014.

The intent of this report is to provide monitoring information to direct the rehabilitation works associated with Koala habitat within the Fauna Corridor, Greenspace Corridor and Environmental Protection Zones of the Yarrabilba Priority Development Area (PDA). Pine tree removal and assisted natural regeneration commenced six months prior to the 2nd monitoring period and has been ongoing in response to successive monitoring reports. The areas to be rehabilitated are offset requirement areas, ensuring that Koala habitat is specifically maintained within the 195 ha offset area. This report provides the 7th monitoring period data for the rehabilitation of the offset areas, with 59 sites, consistent with the 6th monitoring period, all monitored within an area of 198.2 ha in the Yarrabilba footprint. Each monitoring site is located within an offset area rehabilitation unit (ORU1 to ORU23) including road crossing rehabilitation units (CRU8, CRU11 and CU15), with the pre-clearing Regional Ecosystem (RE), management type and corridor type tabulated.

Each rehabilitation unit is to be rehabilitated to a vegetation structure and species composition that is in line with that of the pre-existing (pre-clearing) Regional Ecosystems (REs). This is derived from the vegetation structure and species composition of the appropriate pre-clearing RE. The final benchmark for rehabilitation is derived from the definition of remnant vegetation under the *Vegetation Management Act 1999* (canopy is 70% of the height, 50% of the cover and similar species composition of the appropriate pre-clearing RE). Interim benchmarks are also provided whereby an assessment at regular intervals will be made on the progress of the rehabilitation / revegetation efforts towards achieving this plan's outcomes. For interim benchmark years 1 to 10, vegetation structure has been quantified from a cumulative growth curve (CGC). The reference benchmark, interim benchmarks and final benchmarks have been tabulated for each RE, with the relevant rehabilitation unit also identified.

Contingency measures and corrective actions have also been provided to account for instances of when interim benchmarks are not being met. 'As constructed' data and surveyed boundaries will also be provided for each rehabilitation unit to test and demonstrate compliance within the offset area (195 ha) requirement.

The monitoring methodology that is applied has been detailed, where a minimum of two monitoring sites per rehabilitation unit has been surveyed in order to document and assess rehabilitation through time. The final locations of the 59 monitoring sites have been mapped. Monitoring includes photo point monitoring, transect and quadrat monitoring to monitor changes in species richness, percentage foliage cover for the ground layer, shrub and canopy, woody strata average height and weed cover.

An assessment of site species richness and structure was undertaken to determine the 7th monitoring period condition against previous monitoring and benchmark values. With seven monitoring periods now undertaken, it will be possible to observe trends in the data, however, the analyses made within this report are relatively basic, to identify high priority areas and guide management recommendations for different ORU and CRU based on a number of variables and RE benchmark indicators. Regardless of results in this report, ongoing passive and active management, weed control and maintenance of fencing is required to ensure restoration practices are effective within the offset areas.

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Overall, compared to the 6th monitoring period, improvements in general ecological health remained varied across offset sites, with a trend for improvement indicating some recovery following on from extremely dry seasonal conditions experienced in the 6th monitoring period. There was a significant increase in the number of sites that improved for species richness, supporting the findings of overall improvement. This was also reflected by a 22% increase in the number of sites meeting the final benchmark for species richness. Variables with most notable declines were shrub height (28 sites declined) and small tree height (12 sites declined). There was an overall trend for improvement in canopy height (7 sites improved), shrub cover (24 sites improved) and native ground cover (19 sites improved). The remaining variables had remained relatively stable since the 6th monitoring period. Overall the changes observed in this monitoring period may be attributed to recovery of the ground layer following return of more favourable climate conditions, recruitment of lower order structural layers into higher order structural layers (i.e. movement of shrubs into T2-T3 layers) and rehabilitation actions including continued control of exotic weeds and decreased grazing due to adequate maintenance of exclusion fencing. The slight adjustment to the methods (in 6th monitoring period) to give better RE representation in benchmark evaluations may have also impacted results slightly in the ground and shrub layers.

Of the 59 sites, a total of 27 sites meet a benchmark for T1 canopy tree cover, 34 sites meet a benchmark for T1 canopy tree height, 57 sites meet a benchmark for T2-T3 small tree cover and height, 48 sites meet a benchmark for shrub cover, 57 sites meet a benchmark for shrub height, 53 sites meet a benchmark for ground cover and 37 sites meet a benchmark for weed cover of the ground layer.

In summary, this assessment reveals that rehabilitation needs to continue, with a focus on 6 priority areas, determined from sites that are in poorest condition, have made the least improvements or fail to meet the weed cover benchmark in accordance with IMO-3 benchmark targets for this 3 year (7th) monitoring period (see Table 11). **Recommendations include targeted weed control for the exotic graminoids *Andropogon virginicus* and *Setaria sphacelata,* exotic shrubs / vines including *Lantana camara, L. montevidensis* and *Passiflora suberosa,* as well as the exotic tree species *Pinus elliotti,*** to assist natural regeneration and prevent weed spread and incursion, particularly in sensitive precinct areas adjacent to the Plunkett Conservation Reserve. **In addition, infill planting is to be considered during favourable seasonal conditions** to support long term benchmark goals and continue improving benchmark results within appropriate strata, with suitable species as recommended in previous rehabilitation monitoring reports (incl. shrubs) that will support the primary focus of assisted natural regeneration. **Furthermore, thinning out of dominant native ground cover species such as *Imperata cylindrica* in sites that fail to meet the benchmark for species richness** may also be considered.

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2 Introduction

2.1 Background

The Yarrabilba development site is located on the eastern side of Waterford - Tamborine Road and to the south of Logan Village (refer to Figure 1). It is bounded by rural residential areas to the north, Plunkett Road to the south and the Plunkett Conservation Park to the east. The site consists of approximately 2,200 ha, of which 1,931 ha is controlled by Lendlease Communities (Yarrabilba) Pty Ltd. The land has been historically used for pine forestry, a military training camp in WWII and for livestock grazing, when first cleared. Yarrabilba is predominately vegetated with areas of regrowth native vegetation, regenerating pines and exotic grasslands. Some limited areas of native remnant and regrowth vegetation exist but they are mostly confined to creeks, drainage channels and wetlands.

The site is currently in the early stages of development with the growth of Yarrabilba projected to span approximately 30 years. The long-term master-planned development incorporates an extensive network of dedicated open space (in excess of 25% of the site). A significant component of the open space is dedicated to the conservation of habitat for Koalas (*Phascolarctos cinereus*).

Habitat rehabilitation is intended to improve Koala habitat quality within the site in order to significantly increase the site's carrying capacity in the medium to long term. In addition, the configuration of key elements of the open space system (Fauna Corridor, Greenspace Corridor and Environmental Protection Zone) will enhance the site's contribution to Koala movement opportunities within the context of larger areas of Koala habitat to the east and west of the site (Austecology 2012). Under the development of Yarrabilba, all existing fragments of remnant vegetation which have value for koalas will be retained (approximately 5.4% of the total site area) (Austecology 2012). The rehabilitation of the Fauna Corridor, Greenspace Corridor and Environmental Protection Zone will significantly expand on these values by providing additional Koala habitat (Natura Consulting 2011).

This report provides the 7th monitoring data for the rehabilitation of offset areas in the development site, based on the 59 sites monitored.

2.2 Objectives

The intent of this report is to provide data with which to assess the rehabilitation of Koala habitat within the Offset Requirement area, which includes Fauna Corridor, Greenspace Corridor and Environmental Protection Zone.

This report is consistent with the *Habitat Rehabilitation and Management Plan* (Natura Consulting 2015), *Offset Management Plan* (Austecology 2015), *Koala Management Plan* (Austecology 2012) and *Fauna Corridor Infrastructure Master Plan* (Natura Consulting 2011). In particular the objectives of this report are to:

- describe the rehabilitation areas and provide clear and concise rehabilitation outcomes and performance indicators against which achievement of the rehabilitation will be measured
- identify contingency measures and appropriate corrective actions that will be undertaken if the performance indicators or outcomes are not being met
- outline the monitoring methodology including monitoring site locations
- assess whether rehabilitation is on-track to meet the next interim performance indicator

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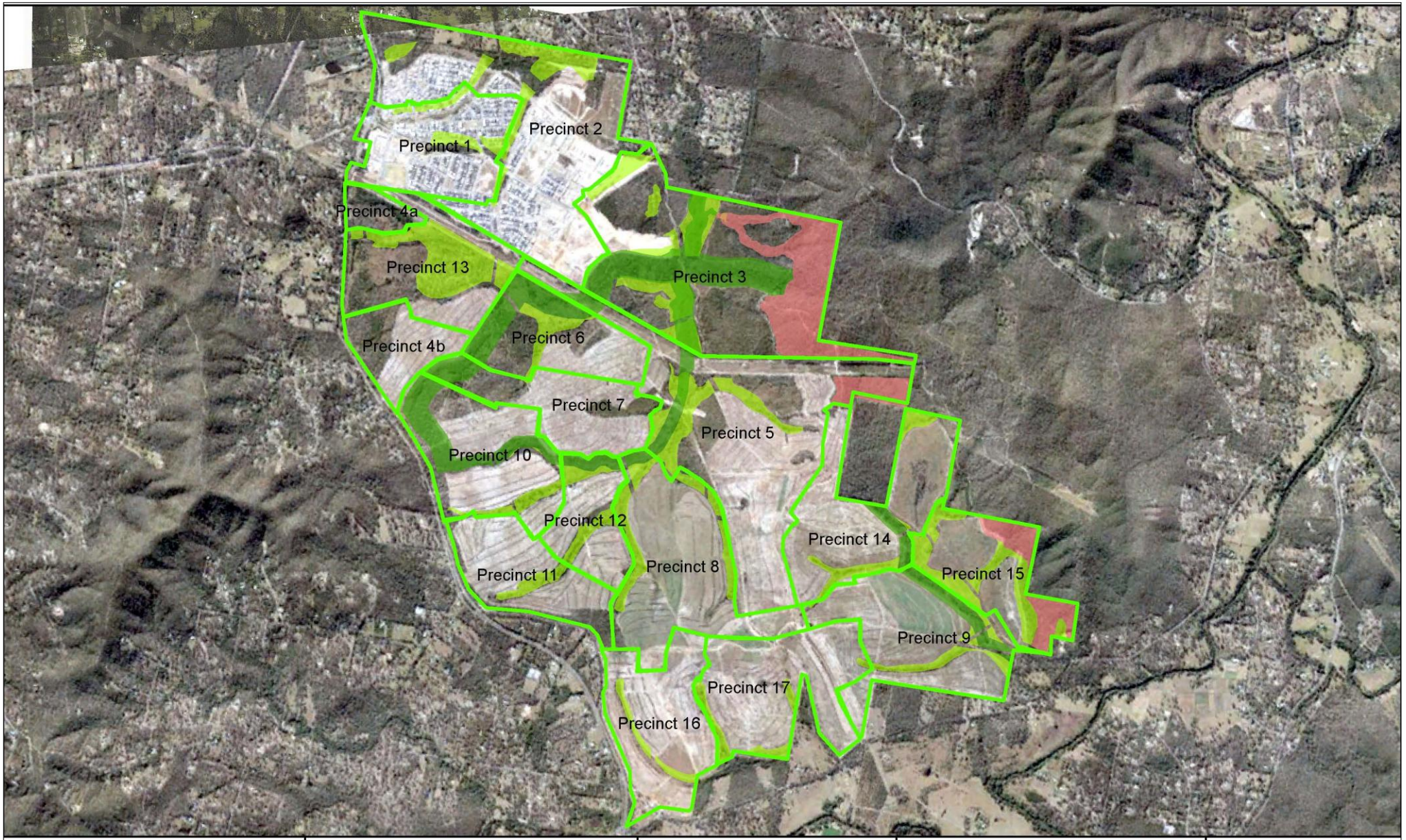

Figure 1 Yarrabilba site location

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3 Rehabilitation areas

3.1 Purpose of habitat rehabilitation

Koala habitat rehabilitation is to be undertaken within "Existing Assessable Koala Habitat to be protected and managed" and "Offset Areas" within Fauna Corridors, Greenspace Corridors and Environmental Protection Zones. This totals an area of 1,981,771 m^2 (198.2 ha) in the offset areas and an additional 754,657 m^2 (75.5 ha) within existing assessable Koala habitat areas outside of offset areas, comprising a combined area of 2,736,428 m^2 (273.6 ha) to be rehabilitated.

The Koala habitat rehabilitation area has been divided into offset rehabilitation and habitat rehabilitation units and crossing rehabilitation units. This report is relevant to the offset and crossing rehabilitation units only.

3.2 Offset rehabilitation units (ORU)

Koala habitat rehabilitation is to occur within offset rehabilitation units as shown in Figure 2. Each rehabilitation unit (ORU1 to ORU23) is a mapped polygon, where the polygon boundaries are the mapped Pre-Clearing Regional Ecosystems. The Regional Ecosystem (RE) code applicable to each unit was determined by overlapping Pre-Clearing Regional Ecosystem mapping (Queensland Government 2015b) with Offset Requirement area mapping within the Fauna Corridors, Greenspace Corridors and Environmental Protection Zones.

The Table 1 presents a summary of rehabilitation unit attributes, including:

- the area of the rehabilitation unit in square metres
- the corridor within which the rehabilitation unit is located
- the RE code for pre-clearing vegetation within the rehabilitation unit and the landzone / geology of the rehabilitation unit

It is noted that the minimum rehabilitation unit size is ~2,500 m^2 to reflect the mapping limitation of the Pre-Clearing Regional Ecosystems mapping dataset (Queensland Government 2015a).

3.3 Crossing rehabilitation units (CRU)

Rehabilitation and monitoring will also be undertaken where road and infrastructure is proposed to traverse an Offset Requirement area. Crossing rehabilitation units have been identified by overlaying the proposed internal road network (currently under review) with the Pre-Clearing Regional Ecosystem mapping (Queensland Government 2015a) and Offset Requirement area mapping. Each crossing rehabilitation unit (CRU1 to CRU15) is a mapped polygon overlayed over offset rehabilitation units. It is noted that these locations are indicative and may change with the final alignment of roads. Table 2 presents a summary of the crossing rehabilitation units, which are subject to rehabilitation actions outlined in this report.

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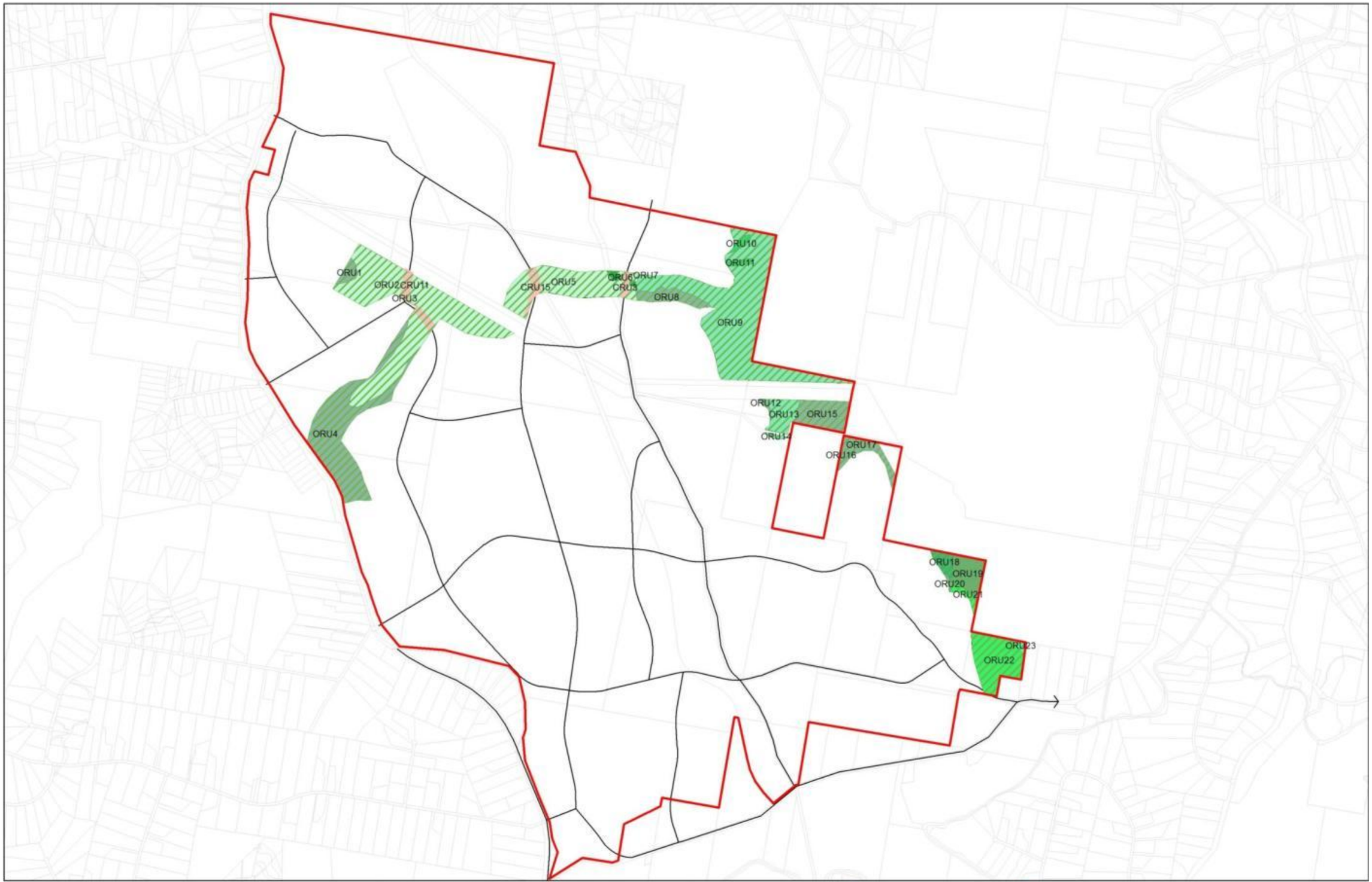

Figure 2 Rehabilitation Units within Offset Requirement areas (OR1-OR23) and road crossings (CRU3, CRU11 and CRU15)

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Table 1 Offset rehabilitation units (ORU) within the corridor network

Rehab. Unit	Area (m^2)	Corridor Type	RE Code(s)	Landzone / Geology
ORU1	16,933	Greenspace Corridor	12.9-10.17 / 12.9-10.2	Fine grained sedimentary rocks – undulating country on fine grained sedimentary rocks
ORU2	439,297	Fauna Corridor / GreenSpace Corridor	12.3.11 / 12.3.6 / 12.3.7	Recent quaternary alluvial systems – alluvial river and creek flats
ORU3	1,451	Fauna Corridor	12.9-10.17 / 12.9-10.2	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
ORU4	269,317	Fauna Corridor	12.3.11 / 12.3.6 / 12.3.7 12.9-10.17 / 12.9-10.2	Recent quaternary alluvial systems – alluvial river and creek flats and Fine grained sedimentary rocks – undulating country on fine grained sedimentary rocks
ORU5	201,530	Fauna Corridor	12.3.11 / 12.3.6 / 12.3.7	Recent quaternary alluvial systems – alluvial river and creek flats
ORU6	10,205	Fauna Corridor	12.3.11 / 12.3.7	Recent quaternary alluvial systems – alluvial river and creek flats
ORU7	7,264	Fauna Corridor	12.3.11 / 12.3.6 / 12.3.7	Recent quaternary alluvial systems – alluvial river and creek flats
ORU8	46,711	Fauna Corridor	12.9-10.17 / 12.9-10.2	Fine grained sedimentary rocks – undulating country on fine grained sedimentary rocks
ORU9	513,080	Environmental Protection / Fauna Corridor	12.9-10.17 / 12.9-10.19	Fine grained sedimentary rocks – undulating country on fine grained sedimentary rocks
ORU10	8, 777	Environmental Protection	12.9-10.17	Fine grained sedimentary rocks – undulating country on fine grained sedimentary rocks
ORU11	8,324	Environmental Protection	12.9-10.17	Fine grained sedimentary rocks – undulating country on fine grained sedimentary rocks
ORU12	46,711	Environmental Protection	12.9-10.17 / 12.9-10.2	Fine grained sedimentary rocks – undulating country on fine grained sedimentary rocks
ORU13	49,644	Environmental Protection	12.9-10.17 / 12.9-10.19 / 12.9-10.2	Fine grained sedimentary rocks – undulating country on fine grained sedimentary rocks
ORU14	4,286	Environmental Protection	12.9-10.17 / 12.9-10.19 / 12.9-10.2	Fine grained sedimentary rocks – undulating country on fine grained sedimentary rocks
ORU15	80,800	Environmental Protection	12.9-10.17 / 12.9-10.2	Fine grained sedimentary rocks – undulating country on fine grained sedimentary rocks

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Rehab. Unit	Area (m^2)	Corridor Type	RE Code(s)	Landzone / Geology
ORU16	4,708	Environmental Protection	12.9-10.17 / 12.9-10.19	Fine grained sedimentary rocks – undulating country on fine grained sedimentary rocks
ORU17	47,475	Environmental Protection	12.9-10.17 / 12.9-10.2	Fine grained sedimentary rocks – undulating country on fine grained sedimentary rocks
ORU18	24,352	Environmental Protection	12.9-10.17	Fine grained sedimentary rocks – undulating country on fine grained sedimentary rocks
ORU19	59,917	Environmental Protection	12.11.5 / 12.11.3	Recent quaternary alluvial systems – alluvial river and creek flats
ORU20	3,154	Environmental Protection	12.9-10.17 / 12.9-10.2	Fine grained sedimentary rocks - undulating country on fine grained sedimentary rocks
ORU21	13,374	Environmental Protection	12.11.5 / 12.11.3	Recent quaternary alluvial systems – alluvial river and creek flats
ORU22	118,260	Environmental Protection	12.11.5 / 12.11.3	Recent quaternary alluvial systems – alluvial river and creek flats
ORU23	6,201	Environmental Protection	12.11.5	Recent quaternary alluvial systems – alluvial river and creek flats
Area	**1,981,771**			

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Table 2 Road and infrastructure crossing rehabilitation units (CRU) traversing offset rehabilitation units (ORU)

Crossing Rehab. Unit	Area (m^2)	Traversing ORU	Corridor Type	RE Code(s)	Landzone / Geology
CRU3	12,578	ORU5, ORU6, ORU7, ORU9	Fauna Corridor	12.3.11 / 12.3.6 / 12.3.7	Fine grained sedimentary rocks – undulating country on fine grained sedimentary rocks
CRU11	31,324	ORU2	Fauna Corridor	12.3.11 / 12.3.7	Fine grained sedimentary rocks – undulating country on fine grained sedimentary rocks
CRU15	22,138	ORU5	Greenspace Corridor / Fauna Corridor	12.3.11 / 12.3.6 / 12.3.7	Fine grained sedimentary rocks – undulating country on fine grained sedimentary rocks
Area	**66,040**				

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3.4 Pre-clearing Regional Ecosystems rehabilitation units

A short description of the pre-clearing Regional Ecosystems (RE) identified in the offset rehabilitation units and crossing rehabilitation units is provided in Table 3.

Table 3 Summary of pre-clearing Regional Ecosystems (RE) within offset rehabilitation units and crossing rehabilitation units

RE Code	RE short description (extract from Qld Herbarium RE Description Database)	*Vegetation Management Act* Class	Biodiversity Status
12.3.6	*Eucalyptus tereticornis, Casuarina cunninghamiana* subsp. *cunninghamiana* +/- *Melaleuca* spp. fringing woodland	Least concern	No concern at present
12.3.7	*Melaleuca quinquenervia* +/- *Eucalyptus tereticornis, Lophostemon suaveolens* open forest on coastal alluvial plains	Least concern	No concern at present
12.3.11	*Eucalyptus tereticornis* +/- *Eucalyptus siderophloia, Corymbia intermedia* open forest on alluvial plains	Of concern	Of concern
12.9-10.2	*Corymbia citriodora* subsp. *variegata* +/- *Eucalyptus crebra* open forest on sedimentary rocks	Least concern	No concern at present
12.9-10.4	*Eucalyptus racemosa* subsp. *racemosa* woodland on sedimentary rocks	Least concern	No concern at present
12.9-10.12	*Eucalyptus seeana, Corymbia intermedia, Angophora leiocarpa* woodland on sedimentary rocks	Endangered	Endangered
12.9-10.17	*Eucalyptus acmenoides, E. major, E. siderophloia* +/- *Corymbia citriodora* subsp. *variegata* woodland on sedimentary rocks	Least concern	No concern at present
12.9-10.19	*Eucalyptus fibrosa* subsp. *fibrosa* woodland on sedimentary rocks	Least concern	No concern at present
12.11.3	*Eucalyptus siderophloia, E. propinqua* +/- *E. microcorys, Lophostemon confertus, Corymbia intermedia, E. acmenoides* open forest on metamorphics +/- interbedded volcanics	Least concern	No concern at present
12.11.5	*Corymbia citriodora* subsp. *variegata*, *Eucalyptus siderophloia, E. major* open forest on metamorphics +/- interbedded volcanics	Least concern	No concern at present

(Source: QLD Government 2015a)

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4 Rehabilitation performance indicators

In accordance with the *EPBC Act 1999* decision notice, the Koala Habitat Rehabilitation Management Plan (Natura Consulting 2015) has been formulated reflecting the onsite rehabilitation requirements of Fauna and Green Space Corridors, Regional Ecosystems, drainage lines and post development fauna movement pathways within Offset Areas on the site. This plan identifies Koala habitat rehabilitation benchmarks and determines restoration actions to meet these benchmarks.

Each rehabilitation unit is to be rehabilitated to a vegetation structure and species composition that is in line with that of the appropriate pre-clearing RE (Table 4). The reference benchmark for rehabilitation of each rehabilitation unit is derived from the vegetation structure and species composition of the appropriate pre-clearing Regional Ecosystem (RE) (Table 4). These benchmarks quantify average canopy cover, shrub cover, ground cover, species richness and average height of the canopy and have been sourced from the Queensland Herbarium (Queensland Government 2015a). These technical descriptions are a compilation of data from multiple sites for canopy cover, shrub cover, and average stem density for each strata, groundcover and average species richness (Queensland Government 2015a). Through establishing these benchmarks, a reasonable comparison can be made between the floristic composition and vegetation structure of a given rehabilitation unit and the appropriate pre-clearing RE.

4.1 Performance indicators

The final benchmark for rehabilitation is derived from the definition of remnant vegetation under the *Vegetation Management Act 1999.* Vegetation can be mapped as remnant vegetation and associated essential habitat for Koalas if the canopy is 70% of the height, 50% of the cover and similar species composition of the appropriate pre-clearing RE (Queensland Government 2015a). Therefore, the final benchmark for rehabilitation is 50% of the reference benchmark cover (for canopy, shrub and ground-layer) and 70% of the reference benchmark height (for canopy and shrub layer) of the appropriate RE.

Six rehabilitation performance indicators were selected:

1) average canopy cover
2) average height of canopy
3) dominant canopy species
4) average shrub cover
5) average groundcover
6) species richness
7) weed cover

Weed cover needs to be considered for rehabilitation benchmarks for this site, particularly in the canopy where numerous exotic pine trees exist. Throughout the life of the development a weed cover of ≤5% is to be reached, and then maintained.

The reference and final benchmark vegetation structure and species composition for each of the pre-clearing RE's identified within the mapped rehabilitation units is identified in Table 4. Note that exotic species identified in Table 4 are to assist with identification purposes only and are to be controlled and managed, not planted or assisted.

Rehabilitation units are to be managed and restored until they reach the final benchmark condition as identified in Table 4 and objectives of the Habitat Rehabilitation and Management Plan. The objectives of this plan are long term and are likely to require more than 15 years to be achieved, within each rehabilitation unit, after commencement of implementation.

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Interim benchmarks are also provided whereby an assessment at regular intervals can be made on the progress of the rehabilitation / revegetation efforts towards achieving this plan's outcomes. Given this, adaptive management approaches can also be employed to redirect restoration approaches, in the event that interim benchmarks are not being met. Table 4 provides a summary of the timeframe to achieve the interim and final benchmarks.

For Interim Benchmark years 1 to 10, vegetation structure has been quantified from a cumulative growth curve (CGC), which for biological organisms including trees and shrubs, is sigmoidal. As the reference benchmarks applied for this report are at the Regional Ecosystem level and site data and long term tree and shrub growth curves are not available for Yarrabilba, we have derived general growth curves for each Regional Ecosystem. This is based on a sigmoidal growth curve, the average reference benchmark height of the stratum, the minimum height at which regrowth vegetation is considered to be of equivalent height as the RE (50% of reference benchmark height), and the average height of tubestock (20 cm) that is predominately used for revegetation in southeast Queensland.

The final benchmark at year 15 is 70% of the reference benchmark cover (for canopy, shrub and ground-layer) and 50% of the reference benchmark height (for canopy and shrub layer) of the appropriate pre-clearing RE.

4.2 Contingency measures and corrective actions

4.2.1 Meeting benchmarks

During the course of monitoring, if interim benchmarks are not being met, the timeframes to achieve the final benchmarks will be reviewed and extended, whereby Lendlease will continue to undertake rehabilitation works with continued monitoring until the final benchmarks are met. The review of the success of meeting interim benchmarks will be undertaken at each monitoring event and reported on. Where the extension of rehabilitation works is required for particular rehabilitation units, discussions will be undertaken with the Department of Environment, to ensure that any additional requirements are also highlighted and addressed.

4.2.2 As constructed data

Constructed data and surveyed boundaries will be provided for each rehabilitation unit, within three months of completion of earthworks. This will be undertaken to test and demonstrate compliance within the offset area (195 ha) requirement.

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Table 4 Reference, interim and final benchmark vegetation structure for each pre-clearing RE detailed for rehabilitation units (ORU and HRU) and crossing rehabilitation units (CRU)

Benchmark Condition (where rehabilitation units are treated individually, at least 70% of height and 50% of cover values to be attained within first 15 years of commencement of rehabilitation works)											
RE Code	**Name**	**Status (VMA)**	**Biodiversity Status**	**Offset Rehabilitation Unit**				**Crossing Rehabilitation Unit**			
12.3.6	***Melaleuca quinquenervia* +/- *Eucalyptus tereticornis, Lophostemon suaveolens* open forest on coastal alluvial plains**	Least concern	No concern at present	ORU2, ORU4, ORU5, ORU7				CRU3, CRU15			
				Average Canopy Cover (%)	**Average Canopy Height (m)**	**Average T2-T3 Canopy Cover (%)**	**Average T2-T3 Canopy Height (m)**	**Average Shrub Cover (%)**	**Average Shrub Height (m)**	**Average Ground cover (%)**	**Species Richness (av. +/- SD)**
Interim Benchmark by 1 year				10.0	1.5			1.5	0.5	6.0	
Interim Benchmark by 2 years				14.0	3.0			2.0	0.8	10.0	
Interim Benchmark by 3 years				16.0	4.0			2.5	1.2	15.0	
Interim Benchmark by 5 years				22.0	6.0			3.0	1.4	20.0	
Interim Benchmark by 10 years				28.0	9.2			4.0	1.5	25.0	
Final Benchmark by 15 years				**30.5**	**10.7**			**4.5**	**1.6**	**29.2**	**-**
Reference Benchmark (Pre-Clearing RE)				**60.9**	**15.3**			**8.9**	**2.3**	**58.4**	**33.3 +/- 10.5**
12.3.7	***Eucalyptus tereticornis*, *Casuarina cunninghamiana* subsp. *cunninghamiana* +/- *Melaleuca* spp. fringing woodland**	Least concern	No concern at present	ORU2, ORU4, ORU5, ORU6, ORU7				CRU3, CRU11, CRU15			
				Average Canopy Cover (%)	**Average Canopy Height (m)**	**Average T2-T3 Canopy Cover (%)**	**Average T2-T3 Canopy Height (m)**	**Average Shrub Cover (%)**	**Average Shrub Height (m)**	**Average Ground cover (%)**	**Species Richness (av. +/- SD)**
Interim Benchmark by 1 year				5.5	1.6	2.0	0.8	2.5	0.5	6.0	
Interim Benchmark by 2 years				6.0	2.9	3.0	2.7	3.0	0.8	7.0	
Interim Benchmark by 3 years				7.0	4.1	4.0	3.7	3.5	1.2	8.0	
Interim Benchmark by 5 years				9.0	6.2	5.9	5.2	4.0	1.4	10.0	
Interim Benchmark by 10 years				12.0	10.1	9.3	7.3	6.0	1.5	12.0	
Final Benchmark by 15 years				**13.3**	**13.6**	**11.5**	**8.2**	**6.6**	**1.6**	**14.4**	**-**
Reference Benchmark (Pre-Clearing RE)				**26.6**	**19.4**	**15.3**	**9.0**	**13.2**	**2.3**	**28.7**	**52.8 +/- 7.5**

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Benchmark Condition
(where rehabilitation units are treated individually, at least 70% of height and 50% of cover values to be attained within first 15 years of commencement of rehabilitation works)

RE Code	Name	Status (VMA)	Biodiversity Status	Offset Rehabilitation Unit				Crossing Rehabilitation Unit			
12.3.11	***Eucalyptus tereticornis* +/- *Eucalyptus siderophloia*, *Corymbia intermedia* open-forest on alluvial plains**	Of concern	Of concern	ORU2, ORU4, ORU5, ORU6, ORU7				CRU3, CRU11, CRU15			
				Average Canopy Cover (%)	**Average Canopy Height (m)**	**Average T2-T3 Canopy Cover (%)**	**Average T2-T3 Canopy Height (m)**	**Average Shrub Cover (%)**	**Average Shrub Height (m)**	**Average Ground cover (%)**	**Species Richness (av. +/- SD)**
Interim Benchmark by 1 year				7.0	1.6	2.0	0.8	2.0	0.4	1.5	
Interim Benchmark by 2 years				10.0	3.0	3.0	2.8	4.0	0.7	2.0	
Interim Benchmark by 3 years				12.0	4.2	4.2	3.8	5.0	1.1	3.0	
Interim Benchmark by 5 years				18.0	6.4	6.4	5.5	7.0	1.3	4.5	
Interim Benchmark by 10 years				22.0	10.7	10.7	8.2	9.0	1.5	7.0	
Final Benchmark by 15 years				**25.6**	**16.7**	**13.9**	**9.6**	**10.9**	**1.9**	**8.5**	**-**
Reference Benchmark (Pre-Clearing RE)				**51.1**	**23.8**	**23.9**	**11.3**	**21.7**	**2.7**	**17**	**40.6 +/- 8.5**

12.9-10.2	***Corymbia citriodora* subsp. *variegata* +/- *Eucalyptus crebra* open forest on sedimentary rocks**	Least concern	No concern at present	ORU1, ORU3, ORU4, ORU8, ORU12, ORU13, ORU14, ORU15, ORU17, ORU20							
				Average Canopy Cover (%)	**Average Canopy Height (m)**	**Average T2-T3 Canopy Cover (%)**	**Average T2-T3 Canopy Height (m)**	**Average Shrub Cover (%)**	**Average Shrub Height (m)**	**Average Ground cover (%)**	**Species Richness (av. +/- SD)**
Interim Benchmark by 1 year				6.0	1.6	2.0	0.8	6.0	0.4	6.0	3.0
Interim Benchmark by 2 years				10.0	2.9	2.9	2.8	6.5	0.7	7.0	4.0
Interim Benchmark by 3 years				12.0	4.2	4.0	3.8	7.0	1.1	12.0	5.0
Interim Benchmark by 5 years				18.0	6.3	6.0	5.3	8.5	1.3	18.0	7.0
Interim Benchmark by 10 years				22.0	10.5	9.6	7.7	11.4	1.5	22.0	9.0
Final Benchmark by 15 years				**26.8**	**15.5**	**11.9**	**8.9**	**15.1**	**1.8**	**23.6**	**10.8**
Reference Benchmark (Pre-Clearing RE)				**53.5**	**22.2**	**16.5**	**10.1**	**21.6**	**2.5**	**47.2**	**21.6**

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Benchmark Condition
(where rehabilitation units are treated individually, at least 70% of height and 50% of cover values to be attained within first 15 years of commencement of rehabilitation works)

RE Code	Name	Status (VMA)	Biodiversity Status	Offset Rehabilitation Unit				Crossing Rehabilitation Unit			
12.9-10.17	***Eucalyptus acmenoides, Eucalyptus major, Eucalyptus siderophloia +/- Corymbia citriodora subsp. variegata* woodland on sedimentary rocks**	Least concern	No concern at present	ORU1, ORU3, ORU4, ORU8, ORU9, ORU10, ORU11, ORU12, ORU13, ORU14, ORU15, ORU16, ORU17, ORU18, ORU20							
				Average Canopy Cover (%)	**Average Canopy Height (m)**	**Average T2-T3 Canopy Cover (%)**	**Average T2-T3 Canopy Height (m)**	**Average Shrub Cover (%)**	**Average Shrub Height (m)**	**Average Ground cover (%)**	**Species Richness (av. +/- SD)**
Interim Benchmark by 1 year				6.0	1.6	2.0	0.8	6.0	0.6	10.0	
Interim Benchmark by 2 years				10.0	3.0	3.0	2.8	7.0	1.0	20.0	
Interim Benchmark by 3 years				12.0	4.2	4.3	3.9	10.0	1.5	25.0	
Interim Benchmark by 5 years				18.0	6.4	6.5	5.7	14.0	1.8	30.0	
Interim Benchmark by 10 years				22.0	10.9	11.3	8.9	16.0	2.2	35.0	
Final Benchmark by 15 years				**27.2**	**18.2**	**15.0**	**10.4**	**20.0**	**2.8**	**43.9**	-
Reference Benchmark (Pre-Clearing RE)				**54.3**	**26.0**	**30.5**	**12.9**	**40.0**	**4.0**	**87.8**	**36.5 +/- 15.1**

12.9-10.19	***Eucalyptus fibrosa subsp. fibrosa* woodland on sedimentary rocks**	Least concern	No concern at present	ORU9, ORU14, ORU16							
				Average Canopy Cover (%)	**Average Canopy Height (m)**	**Average T2-T3 Canopy Cover (%)**	**Average T2-T3 Canopy Height (m)**	**Average Shrub Cover (%)**	**Average Shrub Height (m)**	**Average Ground cover (%)**	**Species Richness (av. +/- SD)**
Interim Benchmark by 1 year				6.0	1.6	2.0	0.8	2.5	0.4	2.5	
Interim Benchmark by 2 years				7.0	3.0	2.9	2.7	4.0	0.7	3.0	
Interim Benchmark by 3 years				9.0	4.2	4.0	3.7	5.0	1.1	4.0	
Interim Benchmark by 5 years				12.0	6.3	6.0	5.2	7.0	1.3	6.0	
Interim Benchmark by 10 years				15.0	10.5	9.6	7.3	9.0	1.5	8.0	
Final Benchmark by 15 years				**20.9**	**15.8**	**11.9**	**8.2**	**9.6**	**1.7**	**8.2**	-
Reference Benchmark (Pre-Clearing RE)				**41.8**	**22.5**	**16.4**	**9.0**	**19.1**	**2.4**	**16.4**	**30.1 +/- 4.6**

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Benchmark Condition (where rehabilitation units are treated individually, at least 70% of height and 50% of cover values to be attained within first 15 years of commencement of rehabilitation works)											
RE Code	**Name**	**Status (VMA)**	**Biodiversity Status**	**Offset Rehabilitation Unit**				**Crossing Rehabilitation Unit**			
12.11.3	***Eucalyptus siderophloia, E. propinqua* +/- *E. microcorys, Lophostemon confertus, Corymbia intermedia, E. acmenoides* open forest on metamorphics +/- interbedded volcanics**	Least concern	No concern at present	ORU19, ORU21, ORU22							
				Average T1 Canopy Cover (%)	**Average T1 Canopy Height (m)**	**Average T2-T3 Canopy Cover (%)**	**Average T2-T3 Canopy Height (m)**	**Average Shrub Cover (%)**	**Average Shrub Height (m)**	**Average Ground cover (%)**	**Species Richness (av. +/- SD)**
Interim Benchmark by 1 year				6.0	1.6	1.6	1.0	1.5	0.4	3.0	
Interim Benchmark by 2 years				10.0	3.0	3.0	2.7	2.0	0.7	5.0	
Interim Benchmark by 3 years				14.0	4.2	4.2	3.6	2.5	1.1	7.0	
Interim Benchmark by 5 years				20.0	6.4	6.5	4.9	4.0	1.3	10.0	
Interim Benchmark by 10 years				25.0	10.8	11.2	6.8	4.5	1.5	12.0	
Final Benchmark by 15 years				**31.1**	**17.6**	**14.9**	**7.5**	**5.3**	**1.7**	**15.4**	-
Reference Benchmark (Pre-Clearing RE)				**62.1**	**25.2**	**30.0**	**8.0**	**10.5**	**2.4**	**30.8**	**55.1 +/ 15.4**
12.11.5	***Corymbia citriodora* subsp. *variegata*, *Eucalyptus siderophloia*, *E. major* open forest on metamorphics +/- interbedded volcanics**	Least concern	No concern at present	ORU19, ORU21, ORU22, ORU23							
				Average T1 Canopy Cover (%)	**Average T1 Canopy Height (m)**	**Average T2-T3 Canopy Cover (%)**	**Average T2-T3 Canopy Height (m)**	**Average Shrub Cover (%)**	**Average Shrub Height (m)**	**Average Ground cover (%)**	**Species Richness (av. +/- SD)**
Interim Benchmark by 1 year				6.0	1.6	1.6	1.0	0.5	0.4	8.0	
Interim Benchmark by 2 years				9.0	3.0	2.8	2.7	1	0.7	10.0	
Interim Benchmark by 3 years				12.0	4.2	3.8	3.7	1.5	1.1	14.0	
Interim Benchmark by 5 years				15.0	6.4	5.4	5.3	2	1.3	18.0	
Interim Benchmark by 10 years				18.0	10.8	7.9	7.7	2.5	1.5	20.0	
Final Benchmark by 15 years				**21.8**	**15.8**	**9.2**	**8.7**	**2.9**	**1.6**	**23.0**	-
Reference Benchmark (Pre-Clearing RE)				**43.5**	**22.5**	**10.6**	**9.9**	**5.8**	**2.3**	**46.0**	**48.0 +/ 12.3**

Adapted from Queensland Government (2015a) * No pre-defined benchmarks for this RE are provided within the RE technical descriptions (Queensland Government 2015) and therefore, these numbers have been based on data collected in the field from previous assessments and reference sites within this RE type.

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5 Monitoring methodology

The following monitoring program was implemented to capture baseline data prior to rehabilitation treatments being applied. Adaptive management strategies will be used where a rehabilitation treatment does not produce the desired result. When this occurs, the treatment will be identified and/or modified.

For this monitoring program, a minimum of two monitoring sites per rehabilitation unit is sufficient to identify any major changes and to provide a 'snap-shot' of ecological conditions. Monitoring in this way will allow the ongoing collection of information to demonstrate the effectiveness of habitat rehabilitation efforts, and the frequency of monitoring activities will enable management prescriptions to be adjusted to bring about any necessary changes and corrective actions (adaptive management).

5.1 Sites

Vegetation monitoring for the 7th monitoring period occurred in a network of 59 monitoring sites (refer to Tables 1 and 2). The final location of each monitoring site within its representative rehabilitation unit was identified by GPS coordinates and direction (compass bearing). Monitoring site locations are identified in Figure 3.

Site locations have been permanently marked by two steel pickets with yellow safety caps placed 50 m apart, measured using a 50 m stringline and marked at 10 m intervals with wooden stakes to ensure consistent replication. Each picket is clearly labelled identifying the site number.

The following methodology will be applied to monitor at each site.

5.2 Photo point monitoring

For each site, a permanently marked photo point has been established at the first marker picket. In previous monitoring rounds, a second marker picket at 10 m along the relevant compass bearing was used to assist with photo direction. This methodology has changed slightly with no difference in outcome observed - marker pickets were removed and all photos were taken such that the 0 m picket was located in the bottom left hand corner of the photo with the site number visible.

The photos were saved with the following information recorded for each file:

- site number
- survey (i.e. 7th mon.)
- date

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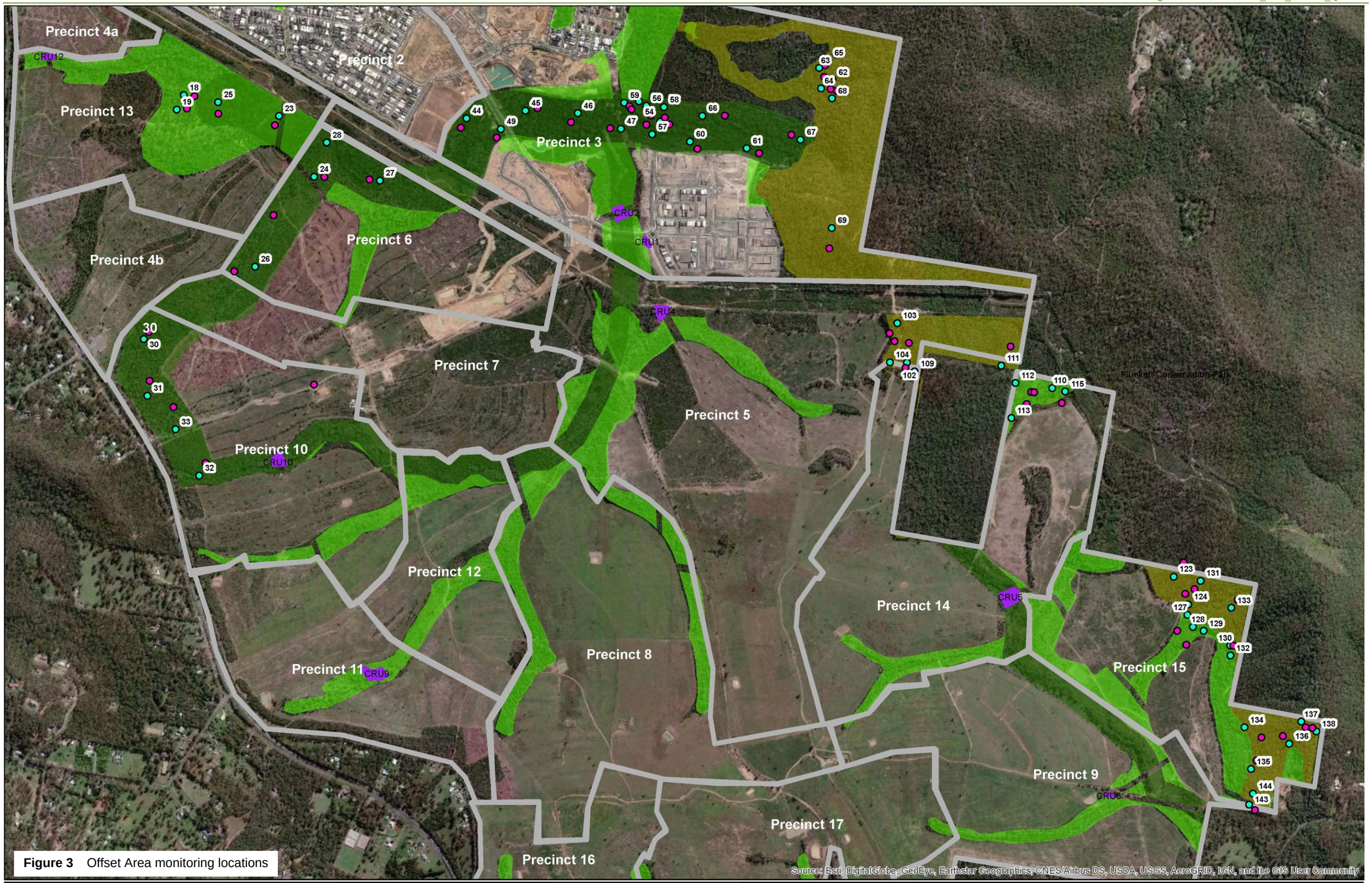

Figure 3 Offset Area monitoring locations

Source:	Yarrabilba Boundary: Lendlease 2017 Offset Areas: Lendlease 2015 Rehabilitation Units: Natura Consulting 2015 Aerial Imagery: ESRI ArcMap 2020
Desclaimer:	No warranty is given in relation the data (including accuracy, reliability, completeness, currency of suitability) and no liability is accepted (including without limitation liability in negligence) for any loss, damage or costs (including subsequent damage) relating to any use of the data. Data must not be used for direct marketing purposes or be used in breach of privacy laws.
File/Date:	Koala Offset Sites Date: 22/07/2020

N

0 90 180 360 540 720 Meters

Coordinate System: WGS 1984 Zone 56S Projection: Transverse Mercator

- Koala Offset Sites - End Posts
- Koala Offset Sites - Start Posts
- Road Crossing Rehab Unit
- Conservation Areas
- Fauna Corridor
- Greenspace Corridor
- Precinct Boundaries

Koala Offset Area Monitoring Locations

5.3 Transect and quadrat monitoring

Quantitative site data, including the attributes of species richness, percentage foliage cover for the ground layer, shrub and canopy layers, canopy height, and weed cover are to be collected from field transects and quadrats established at each of the monitoring sites:

- A 50 m transect was placed between the 0 m and 50 m metal pickets. Ten metre intervals were marked permanently with wooden stakes that had flagging tape attached for high visibility.

- Quadrats were placed along the transect:
    - 50 x 10 m plot positioned at the transect starting at 0 m on the right hand side of the transect
    - 1 x 1 m subplots positioned at staked intervals 0 m, 10 m, 20 m, 30 m and 40 m. Adjustments were made for each subplot if its positioning was placed over a trunk, fallen tree or roots. Installation of permanent stakes ensures consistent sampling and adequate replicaton for data collection in future monitoring periods.

- When recording data, reference height ranges were used for allocating vegetation to different strata layers according to dominant pre-clearing RE allocated for the different rehabilitation units (ORU and HRU) and crossing rehabilitation units (CRU) (Table 5).

Table 5 Example reference height ranges used for classifying RE vegetation to respective strata layers

RE Type	Pre clearing height ranges (m)			
	Canopy (T1)	Small trees (T2-T3)	Shrub layer (S1)	Ground Layer (G1)
12.3.11	>19.1	5.1-19	1.26-5	<1.25
12.9-10.17	>13.1	6.1-13	0.76-6	<0.75
12.11.5	>17.5	4.6-17.5	1.2-4.5	<1.1

Given the above, each monitoring site had the information collected, as detailed in (Table 6). This benchmark monitoring process has also been undertaken at 1 year, 18 months, 2 years, 2.5 years, 3 years (current monitoring period) and will continue at 6 monthly intervals until significant progress has been achieved towards RE benchmark values at which point monitoring can be reduced to annual events. Reporting from each of the monitoring events shall be provided to the Department of Environment within 4 weeks of completion of monitoring.

Table 6 Data collected at monitoring sites

Method of collection	Data collected
50 m x 10 m quadrat (plot)	Species richness, tubestock survival, height of each canopy species
50 m transect	Canopy species cover (% Foliage Projected Cover (FPC)) and height, shrub cover (% FPC) and height
Five 1 x 1 m quadrats (subplot)	Percentage cover in ground layer (including regenerating native canopy cohorts)

Percent Foliage Projected Cover calculation:

$$\% \, FPC = \frac{total \; cover \; (m)}{transect \; length \; (m)} \times 100$$

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6 Results

6.1 Photo-point monitoring

Photo monitoring results for all surveyed sites, are reported in Table 7, indicating the variety of vegetation types and condition. This photo sample was considered representative of the entire transect in most cases, with the vegetation type and structure remaining fairly consistent throughout individual sites. Many of the sites are typically at an advanced state of natural regeneration with common canopy tree sized eucalypts and mixed Acacia species. In congruence with previous monitoring periods, the ground cover vegetation varies from mixed native grasses such as Bladey Grass (*Imperata cylindrica)* and Bracken Fern (*Pteridium esculentum),* mixed with exotic grass pasture in the understorey with sparse regenerating shrubs and trees to established woodland eucalypt forest with intact structure and diverse species composition.

A number of sites continue to show evidence of *Lantana camara* infestations, with increased growth noticeable at sites 18, 55, 59, 111, 132, 135, 137 and 138, with the most heavily infested site being 129. Ground cover of native species did not appear to have declined, and this is attributed primarily to the wet conditions that ensued following the 6th monitoring round, which is also evidenced by regrowth of *I. cylindrica* and *P. esculentum* at a number of sites, including sites 45, 59 and 143. Felled and fallen trees can be seen within many of the photo monitoring points. A number of these are exotic pine (*Pinus elliottii*) which have been hand felled as part of the ongoing weed management process. There are several sites also containing immature *Pinus elliottii* in the understorey and shrub layers, with some growth observed since the 6th monitoring period (e.g. sites 23, 24, 26, 60 and 115). Management of *P. elliotti* is evident at site 57, where juveniles have been removed from the ground layer. A number of sites continue to be moderately vegetated with regrowth of mixed Acacia species, predominantly *Acacia leiocalyx* and *A. disparrima* (e.g. sites 19, 27, 44, 47 and 58), however the density and cover of *Acacia* spp. appears to have continued decreasing at these sites. Site 66 had been burned since the 6th monitoring period, with damage to the shrub layer and absence of ground cover visually observed.

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Table 7 Photo monitoring images

Site 18 – 08/07/2020

Site 19 – 08/07/2020

Site 23 – 08/07/2020

Site 24 – 08/07/2020

Site 25 – 08/07/2020

Site 26 – 08/07/2020

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Site 27 – 08/07/2020

Site 28 – 08/07/2020

Site 29 – 08/07/2020

Site 30 – 22/07/2020

Site 31 – 22/07/2020

Site 32 – 16/07/2020

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Site 33 – 22/07/2020

Site 44 – 02/07/2020

Site 45 – 02/07/2020

Site 46 – 02/07/2020

Site 47 – 02/07/2020

Site 49 – 02/07/2020

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Site 54 – 25/06/2020

Site 55 – 25/06/2020

Site 56 – 25/06/2020

Site 57 – 25/06/2020

Site 58 – 25/06/2020

Site 59 – 25/06/2020

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Site 60 – 29/10/2019 (image from 6th mon)

Site 61 – 30/10/2019 (image from 6th mon)

Site 62 – 01/07/2020

Site 63 – 01/07/2020

Site 64 – 01/07/2020

Site 65 – 01/07/2020

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Site 66 – 25/06/2020

Site 67 – 25/06/2020

Site 68 – 01/07/2020

Site 69 – 02/07/2020

Site 102 – 24/06/2020

Site 103 – 24/06/2020

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Site 104 – 24/06/2020

Site 109 – 24/06/2020

Site 110 – 24/06/2020

Site 111 – 24/06/2020

Site 112 – 24/06/2020

Site 113 – 24/06/2020

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Site 115 – 24/06/2020

Site 123 – 09/07/2020

Site 124 – 09/07/2020

Site 127 – 09/07/2020

Site 128 – 09/07/2020

Site 129 – 09/07/2020

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Site 130 – 09/07/2020

Site 131 – 09/07/2020

Site 132 – 09/07/2020

Site 133 – 16/07/2020

Site 134 – 16/07/2020

Site 135 – 16/07/2020

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Site 136 – 15/07/2020

Site 137 – 15/07/2020

Site 138 – 15/07/2020

Site 142 – 31/10/2019 (photo from 6th mon)

Site 143 – 15/07/2020

Site 144 – 15/07/2020

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6.2 Transect and quadrat monitoring

6.2.1 Species richness

During the 7th monitoring period in Jun-Jul 2020, a total of **276 species** were recorded within different strata at the 59 monitoring sites in the Offset Area. This is a decrease of 14 species from the 6th monitoring period. Species richness within sites ranged from 4 to 47 native species (minus weeds), with 22 species per site observed on average. There was **a 1.1% increase in average native species richness** since the 6th monitoring period. The site with the highest overall species richness this monitoring round was site 127.

Canopy tree species (T1 stratum) totalled 16 species (3 species less than 6th monitoring period). Those most common across the offset area remained mostly consistent with 6th monitoring period and included *Eucalyptus siderophloia* (11 sites), *Eucalyptus acmenoides* (9 sites), *C. intermedia* (7 sites) and *E. resinifera* (6 sites). This was slightly different to the previous monitoring period, where the most common T1 species recorded also included *C. trachyphloia, E. fibrosa* and *E. planchoniana.*

Small tree species (T2-T3) totalled 32 species (3 species less than 6th monitoring period). The majority of the species most common across the offset area were mostly consistent with the 6th monitoring period, with the addition of *Acacia leiocalyx,* which was represented at one more site than *Alphitonia excelsa* in this monitoring round, a slight increase since the 6th monitoring round. Species included *Eucalyptus siderophloia, Acacia disparrima, Lophostemon confertus, L. suaveolens, E. acmenoides*, *A. leiocalyx* and *A. excelsa* (from highest to lower abundance). The slight change in distribution of T2 species may indicate favourable growth conditions for species in the shrub layer including immature Acacia and Eucalypt species.

Shrub species (S1 stratum) totalled 48 species (12 species less than 6th monitoring period). Those that were most commonly represented across the offset area were mostly consistent with the 6th monitoring period. There was a slight change with the addition of Lophostemon species and removal of *Acacia maidenii* and *Davesia umbellulata* only due to a small variation in distribution. Species included *Alphitonia excelsa, Acacia leiocalyx, A. disparrima, Lantana camara, Lophostemon confertus, Lophostemon suaveolens* and *Leptospermum polygalifolium* (from highest to lower abundance).

In the ground layer, a total of 179 species were recorded (8 more than 6th monitoring period). The increase indicates that offset sites are slowly recovering from the extreme dry conditions in the lead up to and during field visits for the 6th monitoring period. Species most commonly represented in the ground layer were typically consistent with the 6th monitoring period, with the addition of two ground cover species. These included *Lomandra longifolia, Lantana camara, Entolasia stricta, Lobelia purpurascens, L. multiflora, Cymbopogon refractus, Aristida calycina* and *Imperata cylindrica* (from highest to lower abundance).

Of all the species recorded, 41 were exotic weeds (23% of total and 4 less species than 6th monitoring period). No exotic species were recorded in the T1 or T2 layers. ***Pinus elliotti*** **remained in the shrub and ground layers at a number of sites.** Weed species in the shrub layer included *Lantana camara, Pinus elliotti, Cinnamomum camphora* (recruiting), and *Passiflora suberosa* (from highest to lowest number of sites), with *Baccharis halmifolia* no longer present. The ground layer contained 42 additional weed species (93% of all of the weed species recorded across the whole assessment area) and 2 more than the 6th monitoring period), with 26 herbaceous species (3 less than 6th monitoring period), 11 graminoids (3 more than 6th monitoring period) and 3 woody shrubs (i.e. *Ochna serrulata*). This change in ratio of herbaceous to graminoid species may indicate seasonal conditions were more favourable to grasses. Eight of these had high representation across the assessment area, being

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present at more than 10 monitoring sites (three more than 6th monitoring period). This includes (from highest to lower abundance) *Lantana camara* (41 sites, 27 more than 6th monitoring period), *Passiflora suberosa* (24 sites, 9 more than 6th monitoring period), *Andropogon virginicus* (22 sites, 2 less than 6th monitoring period), *Ageratum houstonianum* (17 sites, 3 more than 6th monitoring period), *Emilia sonchifolia* (17 sites, not among highest in 6th monitoring period), *Richardia brasiliensis* (17 sites, not among highest in 6th monitoring period), *Sida cordifolia* (12 sites, not among highest in 6th monitoring period) and *Lantana montevidensis* (16 sites, 3 more than 6th monitoring period). *Lantana montevidensis* was no longer among those with highest representation. **Overall the results demonstrate notable variation in the representation of a number of prevalent weed species, which are predominantly herbs, the most notable being *Lantana camara*, which increased by 66% indicating that the species has regenerated following a decline perhaps attributable to the previous extremely dry conditions combined with successful weed management leading up to the 6th monitoring round**.

6.2.2 Tree canopy cover and height (T1)

Twenty five of the sites did not have any canopy trees present (42%, 12% less than 6th monitoring period), including sites 23, 24, 26-28, 32, 33, 44, 47, 49, 54, 56-61, 110-113, 129, 134, 135 and 144. This is a notable increase since the previous monitoring period. This may be attributed to the slight adjustment in height specifications for determining the RE benchmark values. There is a trend of gradual decline in the number of sites with trees absent in the T1 layer which is a positive result (Table 8).

Of the sites with canopy trees present in the T1 stratum, **tree canopy FPC** varied from 1% to 47.5% overlapping cover, with **average total canopy cover of 18.8% (0.5% less than 6th monitoring period)** (Table 8). Canopy species with high canopy cover were *Eucalyptus fibrosa, Corymbia trachyphloia, E. siderophloia, C. intermedia, Eucalyptus moluccana* and *Corymbia citriodora* (in order of highest to lower FPC). *Eucalyptus planchonia* had a slight decrease in cover and was no longer represented among the highest.

Of the sites with canopy trees present in the T1 stratum, **tree height** varied from 14.4 m to 23 m, with the **average tree height being 17.9 m (0.3 m higher than 6th monitoring period (not significantly higher))** (Table 8). Canopy species with high average canopy height were *Corymbia trachyphloia. Eucalyptus siderophloia, E. fibrosa, C. citriodora* and *C. intermedia* (in order of highest to lower). *E. planchoniana* had a higher cover than in the 6th monitoring round yet was not amongst the highest in this monitoring period.

Total weed crown cover remained absent from the T1 layer, attributed to management activities that were undertaken for treatment of *Pinus elliottii* and *Cinnamomum camphora* in response to recommendations made in the 1st koala offset monitoring report. In review of the T2/T3 layer, weed crown cover was recorded at 5 sites for the presence of *Pinus elliottii* (sites 19, 110, 128, 129 and 132). **Targeted removal of *P. elliotti* from the T2/T3 layer is therefore recommended.**

Table 8 7th Monitoring round sites with canopy absent for current and two previous monitoring rounds

Site and Rehabilitation Unit	T1 Canopy trees absent 5th mon	T1 Canopy trees absent 6th mon	T1 Canopy trees absent 7th mon
19 (ORU1)	x	x	
23 (CRU11)	x	x	x
24 (CRU11)	x	x	x
25 (ORU2)	x	x	
26 (ORU2)	x	x	x

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Site and Rehabilitation Unit	T1 Canopy trees absent 5th mon	T1 Canopy trees absent 6th mon	T1 Canopy trees absent 7th mon
27 (ORU2)	x	x	x
28 (ORU2)	x	x	x
32 (ORU4)	x	x	x
33 (ORU4)	x	x	x
44 (ORU5)	x	x	x
47 (ORU5)	x	x	x
49 (CRU15)	x	x	x
54 (ORU6)	x	x	x
56 (CRU3)	x	x	x
57 (CRU3)	x	x	x
58 (ORU7)	x	x	x
59 (ORU7)	x	x	x
60 (ORU8)	x	x	x
61 (ORU8)	x	x	x
110 (ORU15)	x	x	x
111 (ORU15)		x	x
112 (ORU16)	x	x	x
113 (ORU16)	x	x	x
124 (ORU18)	x		
129 (ORU21)		x	x
130 (ORU21)	x		
132 (ORU19)	x		
134 (ORU22)	x	x	x
135 (ORU22)	x	x	x
143 (CRU8)	x		
144 (CRU8)		x	x
TOTAL	**28**	**27**	**25**

6.2.3 Small tree cover and height (T2-T3)

Of the sites surveyed, only one site (site 69, consistent with 6th monitoring period) did not have any small trees (T2-T3 strata) present. Sites which had previously no small trees recorded continued to improve, for example a significant increase in cover was recorded at site 115, which had no small tree cover in the 6th monitoring period. The weed species *Pinus elliotti* continued to persist in the small tree layer at a number of sites (Table 9). **It is recommended that weed management incorporates the eradication of *P. elliotti* at these sites to further improve ecosystem health.**

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Table 9 Sites containing *Pinus elliotti* in the small tree layer this monitoring round and previous two monitoring rounds

Site and Rehabilitation Unit	× = *Pinus elliotti* present in small tree layer		
	5th mon	6th mon	7th mon
23 (CRU11)	×		×
57 (CRU3)		×	
110 (ORU15)	×	×	×
128 (ORU20)	×	×	×
129 (ORU21)	×	×	×
132 (ORU19)	×	×	×
TOTAL	**5**	**5**	**5**

Of the sites with small trees present in the T2-T3 stratum, the variation in foliage projected cover (FPC) continued to increase on average, despite a smaller range, from 0.5% to 58.5%, with **average total FPC of 24.5% (1.1% higher than in the 6th monitoring period)**. Small tree species with high average cover were mostly consistent with the 6th monitoring period yet varied in order. These included *Lophostemon confertus, Acacia disparrima, A. leiocalyx, L. suaveolens, E. acmenoides* and *E. siderophloia* (from highest to lower FPC).

Of the sites with small trees present in the T2-T3 stratum, the **minimum tree height continued to improve,** varying from 5.4 m to 13.2 m, with the average tree height 9.2 m (0.4 m less than 6th monitoring period (not a significant difference)) (Table 10). Small tree species with high average canopy height were *Eucalyptus acmenoides, E. siderophloia, L. suaveolens, Acacia disparrima, L. confertus* and *E. tereticornis* (in order of highest to lower). *Corymbia trachyphloia* was no longer amongst the highest small trees in this monitoring period.

6.2.4 Shrub cover and height (S1)

Shrub cover continued to be present at most sites in this monitoring period, with the exception of site 66, which previously had a small amount of cover recorded from several shrub species. Sites containing shrub cover ranged from 0.2% to 32.5% FPC, an increase since 6th monitoring round. **Average total cover also increased slightly to 13% (2.8% more than 6th monitoring period).** Shrub species with highest average FPC were consistent with the 6th monitoring period and included *Acacia leiocalyx, Lantana camara, Lophostemon confertus, A. disparrima* and *Alphitonia excelsa* (from highest to lower FPC).

Average shrub height also increased slightly, ranging from 1.3 m to 5.6 m with **average height continuing to decrease slightly at 2.4 m (0.4 m less than 6th monitoring period)**. Shrub species with high average height were similar to those recorded in the 5th monitoring period, including *Acacia leiocalyx, A. disparrima, Alphitonia excelsa, L. confertus* and *Lantana camara* (in order of highest to lower FPC). *L. suaveolens* was no longer amongst the highest shrubs in this monitoring period.

6.2.5 Ground cover (G1)

Consistent with previous monitoring periods, **a living ground cover layer was recorded at all sites**. Ground cover continued to increase and ranged from 1.6% to 76.4%, with an average of 25.6% (0.7% increase since 6th monitoring period). This indicates the ground cover is recovering from previous declines that were attributed to extremely dry conditions.

Consistent with the 5th and 6th monitoring periods**, the native grass species *Imperata cylindrica* continued to have the highest ground cover overall**, recorded at 28 sites (47% of sites, 7 sites

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less than 6th monitoring period), with the weed grass *Andropogon virginus* (previously dominant) continuing to decline. Other ground cover species with high ground cover within sites included *Entolasia stricta, A. virginicus, Lomandra longifolia,* the weed shrub *Lantana camara, Pteridium esculentum, Cymbopogon refractus* and *L. multiflora* (in order of highest to lower cover).

6.2.6 Weed incursion

Weeds in the ground layer were present at 47 sites (79%, 6 sites more than the 6th monitoring period), ranging from 0.4% to 42.8% with an average weed cover of 8.8% (1.1% decrease in weed cover since the 6th monitoring period). This indicates an overall decline despite an increase in the highest cover, which was recorded at site 59. **Overall, weed cover in the ground layer increased at 36 sites (61% of sites, 31 sites more than 6th monitoring period)**. Weed cover in the ground layer had decreased at 12 sites (20% of sites, 31 sites less than 6th monitoring period).

There was some variation in sites with highest weed cover, which included **sites 59** (42.8%, 10.8% increase since 6th monitoring period), **site 110** (34%, 16.8% increase since 6th monitoring period), **site 26** (32%, 8% increase since 6th monitoring period), **site 129** (27%, 12.2% increase since 6th monitoring period), **site 137** (26%, 4.8% increase since 6th monitoring period) and **site 115** (25%, 5.8% increase since 6th monitoring period) (from highest to lower % ground cover). These sites are located within the Precinct 3 Fauna Corridor area to the north (site 59), Precinct 6 Fauna Corridor area to the north-west, below the power easement (site 26) or within Greenspace Corridors (sites 110, 155 and 129) and the Conservation Area to the east (site 137) in Precincts 14/15 (Figure 3).

Weed species in the ground layer with highest overall cover were consistent with the 6th monitoring period, with slight variation in the order of highest to lower abundance, including *Andropogon virginicus*, *Lantana camara*, immature *Pinus elliotti, Setaria sphacelata, Passiflora suberosa, Lantana montevidensis.*

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Table 10 7th Koala Offset monitoring period species richness, average canopy height within the canopy (T1), sub-canopy (T2-T3) and shrub layer (S1) and average total cover within the canopy (T1), sub-canopy (T2-T3), shrub layer (S1) and ground layer (G1)

Site	Species Richness (incl. weeds)					Height (m)			Overlapping Crown Cover (%)					Av. Ground Cover (%)	
	Canopy (T1)	Sub - Canopy (T2 and T3)	Shrubs (S1)	Ground Layer (G1)	Total (excl. weeds)	Canopy (T1)	Sub - Canopy (T2 and T3)	Shrubs (S1)	Canopy (T1)	Sub - Canopy (T2 and T3)	Shrubs (S1)	Total Weed Crown Cover	Total Crown Cover	Total Ground Layer	Total Weed Ground Layer
18	2	3	3	32	31	17.5	7.1	2.6	25.0	9.0	19.5	0.0	53.5	19.6	6.4
19	1	3	5	29	29	20.0	8.8	3.1	20.5	14.0	13.0	0.0	47.5	19.2	2.8
23	0	7	6	28	32	0	7.1	4.3	0.0	17.5	8.5	5.0	21.0	38.0	0.8
24	0	4	2	29	27	0	7.6	3.0	0.0	17.5	8.5	0.0	26.0	28.8	14.0
25	0	2	6	22	23	20.0	13.0	2.2	1.0	33.0	11.5	0.0	45.5	23.6	2.0
26	0	3	7	30	27	0	9.6	2.6	0.0	13.5	18.5	0.0	32.0	55.2	32.4
27	0	5	7	25	28	0	6.7	1.9	0.0	19.0	32.0	0.0	51.0	11.2	1.6
28	0	4	2	19	19	0	5.4	2.5	0.0	5.5	12.0	0.0	17.5	30.8	4.0
29	2	1	3	27	23	14.4	7.8	1.7	6.5	23.5	4.0	0.0	34.0	42.0	14.4
30	3	3	2	42	35	17.5	10.7	2.5	47.5	10.0	1.0	0.0	58.5	32.0	3.6
31	1	4	4	15	19	15.0	10.3	2.0	6.0	20.0	5.0	0.0	31.0	2.8	0.4
32	0	5	5	23	23	0	8.0	2.6	0.0	27.0	10.0	0.0	37.0	11.2	4.4
33	0	6	3	9	15	0	8.0	3.0	0.0	33.0	11.5	0.0	44.5	7.6	1.2
44	0	5	5	30	28	0	6.8	2.6	0.0	8.5	32.0	0.0	40.5	12.4	3.2
45	1	7	10	26	33	21.0	11.4	1.8	13.0	37.0	23.0	0.0	73.0	48.0	7.2
46	2	2	6	34	33	20.0	12.9	2.9	13.0	30.5	16.0	0.0	59.5	32.0	7.2
47	0	4	3	18	22	0	7.6	2.5	0.0	5.0	27.5	0.0	32.5	21.6	0.4
49	0	6	7	33	37	0	8.8	1.9	0.0	11.0	25.5	0.0	36.5	20.4	2.0
54	0	5	7	27	28	0	8.3	2.4	0.0	10.5	23.0	0.0	33.5	74.8	9.6
55	1	10	6	20	33	23.0	11.3	2.3	14.0	53.5	20.0	0.0	87.5	33.6	4.8
56	0	4	4	32	35	0	6.7	2.5	0.0	23.0	24.5	0.0	47.5	24.8	1.2
57	0	5	3	9	14	0	5.8	3.0	0.0	17.5	19.0	0.0	36.5	4.4	2.4
58	0	10	4	17	28	0	8.3	2.8	0.0	24.5	21.5	0.0	46.0	17.2	6.0
59	0	3	7	19	24	0	6.3	2.4	0.0	18.0	13.0	0.0	31.0	76.4	42.8
60	0	7	4	11	20	0	6.2	2.5	0.0	7.5	5.5	0.0	13.0	11.2	9.2
61	0	1	3	28	23	0	6.4	3.3	0.0	15.5	8.0	0.0	23.5	16.8	4.4
62	2	3	7	11	23	17.7	9.2	2.3	18.0	13.5	11.0	0.0	42.5	18.4	0.0
63	2	5	7	13	27	21.1	10.4	5.6	25.0	15.0	19.5	0.0	59.5	21.2	0.0
64	3	2	8	15	28	17.3	11.0	2.5	15.0	12.5	9.0	0.0	36.5	12.8	0.0
65	1	4	10	21	36	16.8	10.1	1.8	29.5	13.5	6.5	0.0	49.5	34.8	0.0
66	1	6	0	25	29	17.0	9.0	0	2.0	23.0	0.0	0.0	25.0	1.6	0.0
67	2	3	5	24	34	16.4	8.8	2.3	32.0	15.0	17.5	0.0	64.5	23.2	0.0
68	2	3	8	13	26	16.2	10.0	2.4	14.0	21.0	11.0	0.0	46.0	25.2	0.0
69	1	1	5	13	20	15.4	0.0	1.3	19.0	0.0	11.5	0.0	30.5	13.6	0.0
102	2	4	2	15	22	17.5	8.7	1.9	37.5	17.0	3.5	0.0	58.0	4.8	0.0
103	3	1	6	24	32	17.1	11.7	1.7	29.0	0.5	5.5	0.0	35.0	15.2	1.2
104	2	4	8	17	30	17.7	10.3	2.4	22.0	15.5	7.5	0.0	45.0	26.4	0.0
109	1	3	7	14	24	16.4	8.5	1.9	17.0	19.5	5.0	0.0	41.5	9.2	0.8
110	0	2	5	21	18	0	13.0	2.8	0.0	3.0	5.5	3.0	5.5	57.6	34.0

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Site	Species Richness (incl. weeds)					Height (m)			Overlapping Crown Cover (%)					Av. Ground Cover (%)	
	Canopy (T1)	Sub - Canopy (T2 and T3)	Shrubs (S1)	Ground Layer (G1)	Total (excl. weeds)	Canopy (T1)	Sub - Canopy (T2 and T3)	Shrubs (S1)	Canopy (T1)	Sub - Canopy (T2 and T3)	Shrubs (S1)	Total Weed Crown Cover	Total Crown Cover	Total Ground Layer	Total Weed Ground Layer
111	1	6	4	8	17	0	9.0	2.6	0.0	36.0	38.0	0.0	74.0	24.0	15.6
112	0	3	5	35	30	0	7.0	4.1	0.0	35.0	6.0	0.0	41.0	40.0	15.6
113	0	2	6	0	8	0	6.7	3.0	0.0	13.5	10.0	0.0	23.5	39.2	11.6
115	1	1	8	24	23	14.5	5.4	2.3	3.0	8.5	8.0	0.0	19.5	52.2	25.2
123	0	1	3	17	21	15.2	9.3	2.4	33.0	23.5	5.5	0.0	62.0	9.6	0.0
124	2	3	5	17	26	16.3	8.7	2.5	41.5	18.5	6.5	0.0	66.5	13.6	0.0
127	3	4	10	30	47	15.3	7.9	1.4	28.0	17.5	2.5	0.0	48.0	16.0	0.4
128	5	6	6	30	40	17.2	9.8	1.9	43.0	24.0	8.0	5.0	70.0	30.0	8.0
129	1	5	7	32	38	0	9.8	2.2	0.0	35.5	24.0	9.5	50.0	35.6	26.8
130	3	6	6	27	39	19.0	12.5	2.4	0.0	47.5	9.0	0.0	56.5	18.4	6.8
131	1	6	4	23	32	22.3	11.8	1.5	11.5	42.0	2.5	0.0	56.0	19.2	1.6
132	0	6	7	24	33	18.0	11.7	1.9	5.0	46.5	8.0	12.0	47.5	20.4	4.0
133	3	6	5	24	32	18.3	9.9	2.5	14.0	47.5	15.0	0.0	76.5	16.0	3.2
134	1	4	5	14	21	0	8.3	1.9	0.0	58.5	11.0	0.0	69.5	19.2	0.8
135	1	8	4	11	18	0	11.0	2.4	0.0	58.2	10.0	0.0	68.2	26.8	8.0
136	2	6	4	21	27	19.8	10.6	3.0	20.0	56.5	15.0	0.0	91.5	8.4	1.2
137	3	6	3	22	23	20.0	10.7	1.7	11.0	35.0	15.5	0.0	61.5	34.0	26.4
138	2	6	3	16	18	20.0	13.2	2.5	1.0	40.0	22.0	0.0	63.0	35.6	18.0
143	2	4	2	18	22	19.0	10.2	1.7	2.0	53.0	5.5	0.0	60.5	30.0	14.0
144	0	6	6	11	20	0	11.5	1.4	0.0	51.5	7.5	0.0	59.0	40.0	1.6
Average s*	**1.8 (-0.6)**	**4.2 (-0.2)****	**5.2 (+0.7)**	**21.8 (+7.0)**	**26.7 (+5.9)**	**17.9 (+0.3)****	**9.2 (-0.4)****	**2.4 (-0.4)****	**18.8 (-0.5)**	**24.5 (+1.1)**	**13.0 (+2.8)**	**7.4 (+7.4)**	**45.3 (+1.2)**	**25.6 (+0.7)**	**8.8 (-1.1)**

*Note: values in parentheses indicate the percent or actual change in averages since 6th monitoring period
** Within the margin of error (+/- 0.4%) for this type of assessment and is otherwise identified as 'no change' between two subsequent monitoring periods. Analysis of results from additional monitoring periods will provide a basis for more accurate conclusions.

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6.3 Normalised Difference Vegetation Index (NDVI) monitoring

Although the last three Koala Offset reports presented results for normalised difference vegetation index (NDVI) monitoring across the site, this form of monitoring has been temporarily suspended due to delays and then as a result of restrictions relating to the COVID-19 pandemic. This monitoring is planned to recommence once these restrictions have eased.

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7 Discussion

An assessment of site species richness and structure was undertaken to compare the 7th monitoring period condition against the 6th monitoring period and to measure against target benchmark parameters, in order to identify priority management areas and also review sites that are doing well in terms of attaining benchmark goals. The 7th offset monitoring period was undertaken in year 3 of monitoring. Therefore, sites will ideally have attained a minimum of IMO-3 for the benchmark variables as per the 6th monitoring period. An increasing number of sites **(56 sites, 95%, 2 more than 6th monitoring period) already meet the FINAL benchmark for at least one of the benchmark parameters**. This indicates that overall, sites are already in benchmark condition in some areas, which allows the management focus to be concentrated where it is needed most. Upon closer review, it can also be seen that a high number of sites are approaching or have already attained the goal of reaching their original RE conditions and are recovering naturally, or with some assisted natural regeneration (Table 11).

7.1 Benchmark overview – trends within parameters

Whilst recovery is not consistent across all variables, there is a general trend of improvement for small tree cover, shrub cover, native ground cover and species richness. The greatest declines were observed in small tree height and shrub height whilst remaining variables were regarded as 'same'.

There was a slight increase in average species richness despite an overall decrease in the total number of species. This was reflected in the overall trend of increase in benchmark results. A total of **23 sites met the FINAL benchmark for species richness, (38.9%, 16.9% increase since 6th monitoring period).** This significant improvement may indicate that sites are in species recovery following the impacts of dry seasonal conditions inferred by results of the 5th and 6th monitoring periods.

The slight **decrease in average T1 canopy cover was not significantly reflected in the benchmark results, which had an overall trend of 'no change'**. A total of 27 sites met a benchmark for T1 canopy cover (45.7%, a 1.8% decrease since 6th monitoring period). The slight **increase in average T1 canopy height was coupled with a trend of increase for T1 canopy height**, with 34 sites having met a benchmark for T1 canopy height (57.6%, 11.9% increase since 6th monitoring period).

The slight **increase in T2-T3 small tree cover was not reflected in the benchmark results, which had an overall trend of 'no change'**. A total of 57 sites met a benchmark for T2-T3 small tree cover (96.6%, 1.7% decrease since 6th monitoring period). The slight **decrease in T2-T3 small tree height was not reflected in the benchmark results, which also had an overall trend of 'no change'**. A total of 57 sites also met the benchmark for T2-T3 small tree height (96.6%, 1.7% increase since 6th monitoring period). Site 69 failed to meet benchmarks for both small tree cover and height.

The slight **increase in overall average shrub cover was reflected in the benchmark results, which had an overall trend of 'improving'**. A total of 48 sites met a benchmark for shrub cover (81.3%, 11.9% increase since 6th monitoring period), with 24 sites improving (7 more than 6th monitoring period). The **slight decrease in average shrub height supported with an overall trend of 'declining'** due to the large number of sites that declined in benchmark value, despite a similar total number of sites meeting a benchmark. A total of 57 sites met the benchmark for shrub height (96.6%, a 1.7% decrease in the number of sites), whilst 28 sites declined (47.5%, 35.5%increase since 6th monitoring period).

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The slight **increase in average ground cover was reflected in the benchmark results, which had an overall trend of 'improving'**. A total of 53 sites met a benchmark for ground cover (89.8%, same as 6th monitoring period), with 19 sites improving (14 more than 6th monitoring period).

The slight **decrease in average weed cover was coupled with an overall trend of 'declining' in benchmark values.** This is due to the lower number of sites (37 sites) meeting the <5% cover benchmark (62.7%, 6.7% decrease since 6th monitoring period), coupled with a low number of sites improving (3 sites, 10 less than 6th monitoring period) and an increase in the number of sites declining (7 sites, 6 more than 6th monitoring period). The increase in weed cover is most likely attributable to the return of favourable seasonal conditions following the extreme dry period.

7.2 Benchmark overview – site comparison

Within individual sites, there were 11 sites (18.6%, a 5.1% increase since 6th monitoring period) that did not experience any variables that were 'declining', therefore exhibiting a trend of improvement (condition 'improving' or 'same'). One of these (site 110, ORU15) was consistent with the 6th monitoring period. Other sites with no declining variables included sites 24 (CRU11), 25 and 26 (ORU2), 49 (CRU15), 103 (ORU13), 132 and 133 (ORU19), 136 (ORU22), 137 (ORU23) and 144 (CRU8).

In general, there was one variable that was declining (weed cover), five that were improving (native species richness, canopy height, shrub cover, shrub height and native ground cover) and three that were remaining the same (canopy cover, small tree cover and small tree height). A decline in at least one of the benchmark variables was recorded at 48 sites (81%, an increase of 4% since 6th monitoring period). The variables that had declined at the least number of sites was canopy height and small tree cover, which both had one site declining in benchmark condition. **The variable that had declined at the greatest number of sites was shrub cover (24 sites declining),** indicating this is the variable that needs most improvement. A decline in two or more benchmark variables was recorded at 21 sites (8 less than 6th monitoring period). Twelve of these sites were consistent with findings for the 6th monitoring round (in bold), including sites **18, 19,** 29, 33, 45, **46,** 55, 56, 58, **60, 61, 64,** 65, 66, **67,** 68, 102, **111, 124,** 128 and **143.**

Regarding weed cover, the overall trend was in decline, with 49 sites remaining the same (5 less than 6th monitoring period), 7 declining (6 more than 6th monitoring period) and only one improving (10 less than 6th monitoring period). A total of 37 sites met the benchmark for weed cover (4 less than 6th monitoring period). **It is recommended to concentrate future management towards reducing weed cover at top priority sites and other that have not yet met the <5% benchmark as well as preventing the return of weeds to sites that have met the benchmark, through continued monitoring and feedback.** The top priority sites are regarded as those that had the highest weed cover recorded (Table 10) and did not meet the benchmark (Table 11), therefore need the most attention in order to bring them into alignment with benchmark targets. These include the following **top 5 rehabilitation units and their associated sites as identified in section 6.2.6 (ORU/CRU in italics indicate priority units in 6th monitoring period), *ORU7 (site 59), ORU15 (site 110), and ORU2 (site 26),* ORU21 (site 129), ORU23 (site 137)** (from highest to lower % weed ground cover). It is further recommended to continue investigating additional sites that have not met the benchmark or made improvements and also prioritise weed management tasks within these ORU's (see table 10).

Management units that have improved since the 6th monitoring period, with all associated sites now meeting the benchmark are no longer considered amongst the highest priority include **CRU11 (site 24) and ORU8 (site 60).**

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Despite some declines in species richness and foliage cover, **the number of variables meeting benchmarks within sites continued to improve** since the 6th monitoring period, with all sites now meeting at least 4 benchmarks across variables and all sites still meeting a minimum of three IMO-3 benchmarks (same as 6th monitoring period). Furthermore, 53 sites (90% of sites, 5.5% more than 6th monitoring period) reached the benchmark of IMO-3 or greater for at least 5 benchmark variables supporting an overall trend of improvement.

Where benchmarks had been achieved, there was a slight decrease in number of sites that were still at IMO-1 or IMO-2 benchmark level for one or more variables (24 sites, 40%, 2.4% less than 6th monitoring period) and this differed within 5 benchmark variables (sites that were in IMO-1 or IMO-2 condition in the 6th monitoring period are indicated in bold) including ground cover (15 sites, 25%, 2% less than 6th monitoring period, with 6 'declined', 3 'improved' and 6 'same' as 6th monitoring - site 18 and 19 (ORU1), 32 (ORU4), 60 and 61 (ORU8), 62, **67 and 69 (ORU9)**, 63 (ORU10), **64 (ORU11), 103 (ORU13), 111 (ORU15), 124 (ORU18), 127 (ORU20)** and 136 (ORU22)); shrub height (2 sites, 3%, both in 'same' condition as 6th monitoring period – site 69 (ORU9) and 127 (ORU20)); shrub cover (8 sites, 13%, 2% more than 6th monitoring period, with 3 'declined', 4 'improved' and 1 'same' as 6th monitoring - site 61 (ORU8), 64 (ORU11), **65 (ORU10),** 104 (ORU13), 112 (ORU16), 115 (ORU17), **124 (ORU18) and 128 (ORU20)**); small tree cover (1 site, 1%, 'improved since 6th monitoring period – site 110 (ORU15)); and canopy cover (3 sites, 5%, 5% less than 6th monitoring – **site 29 (ORU4), 131 (ORU19) and 137 (ORU23)).** Nine of these sites also failed to meet the benchmark for weed cover (<5% weed cover), including site 18, 29, 60, 110, 111, 112, 115, 128 and 137 (37.5%, 13.5% more than last monitoring period), indicating these sites as priority areas for rehabilitation, with a **focus on weed control and planting of appropriate strata specific species (when ideal seasonal conditions prevail) to bring the sites into alignment with the IMO-3 targets.** Further investigation is recommended in these sites to determine the best approach to planting.

Sites that had the poorest condition overall in the previous (6th) monitoring period (failed to meet the IMO-3 benchmark or higher for at least four variables) included site 28 (ORU2), site 110 (ORU15) and site 115 (ORU17). Site 28 continued to improve and is now at IMO-3 or greater for 6 variables, therefore no longer among the top priority sites; site 115 had also improved significantly, with four variables achieving IMO-3 or greater and is no longer among those of poorest condition; site 110 improved slightly overall yet still failed to meet IMO-3 for four or more variables and is still among the poorest condition overall.

There were two sites (1 less than 6th monitoring period) that were considered to have the **poorest condition overall in this (7th) monitoring period**. **In addition to site 110, site 60 (ORU8) had failed to meet at least four benchmarks.** Site 110 was less than IMO-3 or failed to meet a benchmark for 6 variables, including native species richness, canopy cover and height, small tree cover, shrub cover and weed cover. Site 60 was less than IMO-3 or failed to meet a benchmark for 6 variables, including native species richness, canopy cover and height, shrub cover, native ground cover and weed cover. From Table 7 it can be observed that site 60 is predominantly characterised by a dense ground cover comprised of *Imperata cylindrica* in association with juvenile *Pinus elliotti* in the shrub layer. The dense ground cover may be out-competing other species for space in the ground layer, particularly those vulnerable to hot and dry conditions where there is little canopy cover. The conditions of these sites should continue to improve with the return of more favourable climatic conditions, however they should also **be included amongst those prioritised for rehabilitation within the next 6 months, with focus on weed control to bring weed cover to <5%, potentially combined with thinning of *Imperata cylindrica* in the ground layer to give opportunity for the native seed bank to propagate - for increased species richness through assisted natural regeneration.** Overall, the low number of **poorest condition** sites (with less than four benchmark variables at IMO-3 or greater) is a positive result.

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The same sites were amongst those considered to have **the least improvement overall in the 7th monitoring period** (sites that had 4 or less IMO-3 or greater benchmarks achieved across variables, or the lowest number of variables improving overall). There were 10 other 'least improvement" sites (2 more than 6th monitoring period) that, while they attained 4 or more IMO-3 variables, they did not have any reported improvements to benchmark results. Among these least improved sites, some had already met high benchmarks; however they failed to meet a benchmark in 3 or more variables, and were therefore regarded as 'high priority least improved'. **There were 8 high priority least improved sites including site 23 (CRU11), 27 (ORU2), 31 (ORU4), 44 and 47 (ORU5), 66 (ORU9), 109 (ORU15) and 129 (ORU21). These sites failed to meet the benchmark in 3 or more variables**, primarily native species richness, canopy cover and canopy height and in some cases, shrub cover, shrub height and native ground cover. Variables that are considered to need most improvement include species richness (site 23, 27, 31, 44, 47 and 109), canopy cover (site 23, 27, 31, 44, 47, 66 and 129), canopy height (site 23, 27, 44, 47 and 129) and native ground cover (site 31, 66 and 109), as well as weed cover <5% for site 129. **It is recommended that rehabilitation efforts within these sites are focussed on assisted natural regeneration of the ground and shrub layers and potential planting of canopy species within appropriate strata where possible at sites 23, 27, 31, 44, 47, 66 and 129, with weed management in the ground layer at sites 60 and 129.**

7.3 Priority weed management in Precincts

Overall, this assessment reveals that rehabilitation efforts have continued to improve vegetation condition in a number of the priority offset rehabilitation areas, including areas CRU11, ORU8, ORU2 and ORU17**,** which are no longer considered as top priority areas for management. In contrast, the number of sites that fail to meet the ≤5% benchmark for total weed ground layer has increased to 22 (37%, 7% more than 6th monitoring period) with a subsequent trend of decline. Therefore, looking forward, it is recommended that **rehabilitation continues to prioritise weed control in areas that fail to meet the <5% weed cover benchmark, particularly those in ongoing sensitive areas, precincts 3 (ORU7, ORU8), 6 (ORU2), 14 (ORU15, ORU17) and 15 (ORU21, ORU23).** There are a total of 16 sites in these ORU's, with 11 of these failing to meet the ≤5% benchmark for weed cover (site 26 (ORU2), 58 and 59 (ORU7), 60 (ORU8), 110 and 111 (ORU15), 115 (ORU17), 129 and 130 (ORU21) and 137 and 138 (ORU23). Priority species for weed control are mostly consistent with the 6th monitoring period and include **the graminoids *Andropogon virginicus* and *Setaria sphacelata,* shrubs / vines including *Lantana camara* and *Passiflora suberosa,* as well as the exotic tree species *Pinus elliotti,* with the addition of *Lantana montevidensis.***

Where appropriate, rehabilitation efforts are to also prioritise ongoing maintenance of stock exclusion fencing, and planting of shrub and ground cover species specific to the pre-clearing RE type, as an integrated measure for reducing weed cover to below the 5% benchmark for all sites, in the shortest time frame possible and thereby restoring native species richness. **Continued strategic rehabilitation of the shrub layer may be required in priority areas** to continue boosting the layer to meet or improve benchmarks, and also to help ensure that weeds are outcompeted and shaded out, thereby reducing the need for reactive management over time. **Seasonal variation should be taken into account when considering any infill planting, which is not recommended during extreme dry conditions. Thinning of the ground layer in sites that are dominated by *Imperata cylindrical* or exotic ground cover species may also be considered**, in order to provide opportunity for the natural seed bank to propagate and help improve species richness.

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7.4 Conclusions and recommendations

In conclusion, the results for benchmark indicators and weed cover were used to determine highest priority sites for rehabilitation based on poorest overall condition, least improved, weed benchmark condition and precinct proximity to sensitive areas. **It was determined that there are 6 priority Rehabilitation Units within four precincts to be considered highest priority action, including ORU15 (Precinct 14), ORU8 (Precinct 3), ORU2 (Precinct 6), ORU21 (Precinct 15), ORU23 (Precinct 15) and ORU 7 (Precinct 3) from highest to lower priority.**

An additional 5 'least improved' Rehabilitation Units need to be prioritised to continue benchmark improvements in one or more areas including ORU4 and ORU15 (native species richness, shrub cover and ground cover) ORU9 (Shrub cover and height, ground cover) CRU11 and ORU5 (native species richness, canopy cover, canopy height) from highest to lowest priority. This has been determined by assessment of highest % total ground weed cover, and sites which require the most improvement.

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Table 11 7th Koala Offset monitoring period species richness, canopy height within the canopy (T1), sub-canopy (T2-T3) and shrub layer (S1) and cover within the canopy (T1), sub-canopy (T2-T3), shrub layer (S1) and ground layer (G1) measured against benchmarks for each respective RE

Site	Rehab Unit	Pre-Clearing Regional Ecosystem	Species Richness (native)	Canopy Cover (T1)	Canopy Height (T1)	Small Tree Cover (T2-T3)	Small Tree Height (T2-T3)	Shrub Cover (S1)	Shrub Height (S1)	Ground Cover (G1)	Weed Cover (<5%?)
18	ORU1	12.9-10.17/12.9-10.2	FINAL (I)	IMO-10 (S)	IMO-10 (S)	IMO-5 (S)	IMO-5 (S)	IMO-10 (D)	IMO-10 (D)	IMO-1 (D)	X (S)
19	ORU1	12.9-10.17/12.9-10.2	FINAL (I)	IMO-5 (D)	FMO-15 (I)	IMO-10 (I)	IMO-5 (D)	IMO-3 (D)	FMO-15 (S)	IMO-1 (D)	FINAL (S)
23	CRU11	12.3.11/12.3.6/12.3.7	X (S)	X (S)	X (S)	FMO-15 (S)	IMO-5 (S)	IMO-5 (D)	FINAL (S)	FINAL (S)	FINAL (S)
24	CRU11	12.3.11/12.3.6/12.3.7	X (S)	X (S)	X (S)	FMO-15 (S)	IMO-10 (S)	IMO-5 (I)	FINAL (I)	FINAL (S)	X (S)
25	ORU2	12.3.11/12.3.6/12.3.7	X (S)	X (S)	FMO-15 (I)	FINAL (S)	FINAL (S)	FMO-15 (I)	FMO-15 (I)	FINAL (S)	FINAL (S)
26	ORU2	12.3.11/12.3.6/12.3.7	X (S)	X (S)	X (S)	IMO-10 (I)	FINAL (S)	FMO-15 (S)	FMO-15 (S)	FINAL (S)	X (S)
27	ORU2	12.3.11/12.3.6/12.3.7	X (S)	X (S)	X (S)	FMO-15 (S)	IMO-5 (S)	FINAL (S)	FMO-15 (D)	FMO-15 (S)	FINAL (S)
28	ORU2	12.3.11/12.3.6/12.3.7	X (S)	X (S)	X (S)	IMO-3 (I)	IMO-5 (I)	FMO-15 (I)	FMO-15 (D)	FINAL (S)	FINAL (I)
29	ORU4	12.9-10.17/12.9-10.2	FINAL (I)	IMO-1 (S)	IMO-10 (S)	FMO-15 (S)	IMO-5 (D)	X (S)	IMO-5 (D)	IMO-10 (S)	X (S)
30	ORU4	12.9-10.17/12.9-10.2	FINAL (S)	FMO-15 (S)	IMO-10 (D)	IMO-5 (S)	FMO-15 (S)	X (S)	IMO-10 (I)	IMO-5 (I)	FINAL (S)
31	ORU4	12.9-10.17/12.9-10.2	X (S)	IMO-1 (S)	IMO-10 (S)	FMO-15 (S)	IMO-10 (S)	X (S)	IMO-5 (D)	X (S)	FINAL (S)
32	ORU4	12.9-10.17/12.9-10.2	FINAL (I)	X (S)	X (S)	FMO-15 (S)	IMO-5 (S)	IMO-3 (S)	IMO-10 (D)	IMO-1 (I)	FINAL (S)
33	ORU4	12.9-10.17/12.9-10.2	X (S)	X (S)	X (S)	FINAL (I)	IMO-5 (D)	IMO-3 (D)	FMO-15 (D)	X (D)	FINAL (S)
44	ORU5	12.3.11/12.3.6/12.3.7	X (S)	X (S)	X (S)	IMO-5 (S)	IMO-5 (S)	FINAL (S)	FMO-15 (D)	FMO-15 (S)	FINAL (S)
45	ORU5	12.3.11/12.3.6/12.3.7	FINAL (I)	IMO-3 (S)	FMO-15 (S)	FINAL (S)	FMO-15 (S)	FMO-15 (I)	IMO-10 (D)	FMO-15 (I)	X (D)
46	ORU5	12.3.11/12.3.6/12.3.7	FINAL (I)	IMO-3 (S)	FMO-15 (S)	FINAL (S)	FINAL (S)	IMO-10 (I)	FINAL (I)	IMO-5 (D)	X (D)
47	ORU5	12.3.11/12.3.6/12.3.7	X (S)	X (S)	X (S)	IMO-3 (S)	IMO-5 (S)	FINAL (S)	FMO-15 (D)	FINAL (S)	FINAL (S)
49	CRU15	12.3.11/12.3.6/12.3.7	FINAL (I)	X (S)	X (S)	IMO-10 (S)	IMO-10 (S)	FINAL (I)	FMO-15 (S)	FINAL (S)	FINAL (S)
54	ORU6	12.3.11/12.3.7	X (S)	X (S)	X (S)	IMO-5 (I)	IMO-10 (I)	FINAL (I)	FMO-15 (S)	FINAL (S)	X (D)
55	ORU6	12.3.11/12.3.7	FINAL (S)	IMO-3 (S)	FMO-15 (S)	FINAL (S)	FINAL (S)	FMO-15 (S)	FMO-15 (D)	FINAL (S)	FINAL (S)
56	CRU3	12.3.11/12.3.7	FINAL (I)	X (S)	X (S)	FMO-15 (S)	IMO-5 (D)	FINAL (I)	FMO-15 (D)	FINAL (S)	FINAL (S)
57	CRU3	12.3.11/12.3.6/12.3.7	X (S)	X (S)	X (S)	FMO-15 (I)	IMO-5 (S)	FMO-15 (S)	FINAL (S)	IMO-3 (D)	FINAL (I)
58	ORU7	12.3.11/12.3.6/12.3.7	X (S)	X (S)	X (S)	FINAL (I)	IMO-10 (D)	FMO-15 (D)	FINAL (S)	FINAL (I)	X (S)
59	ORU7	12.3.11/12.3.6/12.3.7	X (S)	X (S)	X (S)	FMO-15 (I)	IMO-5 (S)	FMO-15 (I)	FMO-15 (D)	FINAL (S)	X (S)
60	ORU8	12.9-10.17/12.9-10.2	X (S)	X (S)	X (S)	IMO-5 (S)	IMO-5 (S)	X (S)	IMO-10 (D)	IMO-1 (D)	X (S)

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Site	Rehab Unit	Pre-Clearing Regional Ecosystem	Species Richness (native)	Canopy Cover (T1)	Canopy Height (T1)	Small Tree Cover (T2-T3)	Small Tree Height (T2-T3)	Shrub Cover (S1)	Shrub Height (S1)	Ground Cover (G1)	Weed Cover (<5%?)
61	ORU8	12.9-10.17/12.9-10.2	FINAL (I)	X (S)	X (S)	FMO-15 (S)	IMO-5 (S)	IMO-2 (I)	FMO-15 (D)	IMO-1 (D)	FINAL (I)
62	ORU9	12.9-10.17/12.9-10.19	FINAL (I)	IMO-5 (D)	IMO-10 (S)	IMO-10 (S)	IMO-10 (S)	IMO-3 (I)	IMO-10 (S)	IMO-1 (S)	FINAL (S)
63	ORU10	12.9-10.17	FINAL (S)	IMO-10 (S)	FMO-15 (S)	FMO-15 (I)	FMO-15 (I)	IMO-10 (I)	FINAL (I)	IMO-2 (D)	FINAL (S)
64	ORU11	12.9-10.17	FINAL (S)	IMO-3 (D)	IMO-10 (S)	IMO-10 (S)	FMO-15 (S)	IMO-2 (I)	IMO-10 (D)	IMO-1 (S)	FINAL (S)
65	ORU10	12.9-10.17	FINAL (I)	FMO-15 (S)	IMO-10 (S)	IMO-10 (D)	IMO-10 (S)	IMO-1 (D)	IMO-5 (D)	IMO-5 (I)	FINAL (S)
66	ORU9	12.9-10.17/12.9-10.19	FINAL (S)	X (S)	IMO-10 (S)	FMO-15 (S)	IMO-10 (S)	X (D)	X (D)	X (D)	FINAL (S)
67	ORU9	12.9-10.17/12.9-10.19	FINAL (S)	FMO-15 (S)	IMO-10 (S)	FMO-15 (I)	IMO-5 (D)	IMO-10 (I)	IMO-10 (D)	IMO-2 (S)	FINAL (S)
68	ORU9	12.9-10.17/12.9-10.19	FINAL (S)	IMO-3 (S)	IMO-10 (S)	FMO-15 (S)	IMO-10 (D)	IMO-3 (I)	IMO-10 (S)	IMO-3 (I)	FINAL (S)
69	ORU9	12.9-10.17/12.9-10.19	X (S)	IMO-5 (I)	IMO-10 (S)	X (S)	X (D)	IMO-3 (I)	IMO-2 (S)	IMO-1 (S)	FINAL (S)
102	ORU13	12.9-10.17/12.9-10.19	X (S)	FMO-15 (S)	IMO-10 (S)	FMO-15 (I)	IMO-5 (D)	X (S)	IMO-5 (D)	X (S)	FINAL (S)
103	ORU13	12.9-10.17/12.9-10.19	X (S)	FMO-15 (S)	IMO-10 (S)	X (S)	FMO-15 (S)	X (S)	IMO-5 (I)	IMO-1 (I)	FINAL (S)
104	ORU13	12.9-10.17/12.9-10.19	X (S)	IMO-10 (I)	IMO-10 (S)	FMO-15 (S)	IMO-10 (I)	IMO-2 (I)	IMO-10 (D)	IMO-3 (I)	FINAL (S)
109	ORU15	12.9-10.17/12.9-10.2	X (S)	IMO-3 (S)	IMO-10 (S)	FMO-15 (S)	IMO-5 (S)	X (S)	IMO-5 (D)	X (S)	FINAL (S)
110	ORU15	12.9-10.17/12.9-10.2	X (S)	X (S)	X (S)	IMO-2 (I)	FINAL (S)	X (S)	FMO-15 (I)	FMO-15 (S)	X (S)
111	ORU15	12.9-10.17/12.9-10.2	X (S)	X (S)	X (S)	FINAL (S)	IMO-10 (S)	FMO-15 (I)	IMO-10 (D)	IMO-2 (D)	X (S)
112	ORU16	12.9-10.17/12.9-10.19	X (S)	X (S)	X (S)	FINAL (I)	IMO-5 (S)	IMO-1 (D)	FINAL (S)	IMO-10 (I)	X (S)
113	ORU16	12.9-10.17/12.9-10.19	X (S)	X (S)	X (S)	IMO-10 (I)	IMO-5 (S)	IMO-3 (D)	FMO-15 (S)	IMO-10 (S)	X (S)
115	ORU17	12.9-10.17/12.9-10.2	X (S)	X (S)	IMO-10 (S)	IMO-5 (I)	X (S)	IMO-2 (I)	IMO-10 (D)	FMO-15 (S)	X (S)
123	ORU18	12.9-10.17	X (S)	FMO-15 (S)	IMO-10 (S)	FMO-15 (S)	IMO-10 (S)	X (S)	IMO-10 (S)	X (D)	FINAL (S)
124	ORU18	12.9-10.17	FINAL (I)	FMO-15 (S)	IMO-10 (S)	FMO-15 (S)	IMO-5 (D)	IMO-1 (D)	IMO-10 (D)	IMO-1 (S)	FINAL (S)
127	ORU20	12.9-10.17/12.9-10.2	FINAL (S)	FMO-15 (S)	IMO-10 (S)	FMO-15 (S)	IMO-5 (D)	X (S)	IMO-2 (S)	IMO-1 (S)	FINAL (S)
128	ORU20	12.9-10.17/12.9-10.2	FINAL (S)	FMO-15 (S)	IMO-10 (S)	FMO-15 (S)	IMO-10 (S)	IMO-2 (S)	IMO-5 (D)	IMO-5 (I)	X (D)
129	ORU21	12.11.5/12.11.3	FINAL (I)	X (S)	X (S)	FINAL (S)	FINAL (S)	FINAL (S)	FMO-15 (D)	FMO-15 (S)	X (S)
130	ORU21	12.11.5/12.11.3	FINAL (I)	X (S)	FMO-15 (I)	FINAL (S)	FINAL (S)	FINAL (I)	FINAL (S)	IMO-5 (I)	X (D)
131	ORU19	12.11.5/12.11.3	X (S)	IMO-2 (I)	FMO-15 (S)	FINAL (S)	FINAL (S)	IMO-10 (I)	IMO-10 (D)	IMO-5 (I)	FINAL (S)
132	ORU19	12.11.5/12.11.3	X (S)	X (S)	IMO-10 (I)	FINAL (S)	FINAL (S)	FINAL (S)	X (S)	IMO-10 (I)	FINAL (S)
133	ORU19	12.11.5/12.11.3	X (S)	IMO-3 (I)	FMO-15 (S)	FINAL (S)	FINAL (S)	FINAL (S)	FINAL (S)	IMO-3 (I)	FINAL (S)

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Site	Rehab Unit	Pre-Clearing Regional Ecosystem	Species Richness (native)	Canopy Cover (T1)	Canopy Height (T1)	Small Tree Cover (T2-T3)	Small Tree Height (T2-T3)	Shrub Cover (S1)	Shrub Height (S1)	Ground Cover (G1)	Weed Cover (<5%?)
134	ORU22	12.11.5/12.11.3	X (S)	X (S)	X (S)	FINAL (S)	IMO-10 (D)	FINAL (I)	FMO-15 (S)	IMO-5 (I)	FINAL (S)
135	ORU22	12.11.5/12.11.3	X (S)	X (S)	X (S)	FINAL (S)	FINAL (S)	FINAL (I)	FINAL (S)	FMO-15 (I)	X (D)
136	ORU22	12.11.5/12.11.3	X (S)	IMO-10 (S)	FMO-15 (I)	FINAL (S)	FINAL (S)	FINAL (S)	FINAL (S)	IMO-1 (I)	FINAL (S)
137	ORU23	12.11.5	X (S)	IMO-2 (S)	FMO-15 (I)	FINAL (S)	FINAL (S)	FINAL (S)	FMO-15 (I)	FMO-15 (S)	X (S)
138	ORU23	12.11.5	X (S)	X (D)	FMO-15 (I)	FINAL (S)	FINAL (S)	FINAL (S)	FINAL (S)	FMO-15 (I)	X (S)
143	CRU8	12.11.5/12.11.3	X (S)	X (S)	FMO-15 (S)	FINAL (S)	FINAL (S)	FMO-15 (D)	FMO-15 (S)	FMO-15 (I)	X (D)
144	CRU8	12.11.5/12.11.3	X (S)	X (S)	X (S)	FINAL (S)	FINAL (S)	FINAL (I)	IMO-5 (I)	FMO-15 (S)	FINAL (S)
Total meeting a benchmark (current mon.)			**23**	**27**	**34**	**57**	**57**	**48**	**57**	**53**	**37**
Total meeting a benchmark (6th mon.)			**10**	**28**	**27**	**58**	**56**	**41**	**58**	**53**	**41**
Total improving (since 6th mon.)			**14**	**4**	**7**	**15**	**4**	**24**	**9**	**19**	**3**
Total declining (since 6th mon.)			**0**	**4**	**1**	**1**	**12**	**11**	**28**	**11**	**7**
Total same (since 6th mon.)			**45**	**51**	**51**	**43**	**43**	**24**	**22**	**29**	**49**
Overall trend			**≥**	**=**	**≥**	**=**	**=**	**≥**	**≤**	**≥**	**≤**

Total sites (excl. removed) = 59

Note: the site meets the following benchmarks: IMO- 1 year; IMO- 2 year, IMO-3 year, IMO-5 year, IMO-10 year, FMO-15 year, FINAL Benchmark condition, and X – does not meet any benchmark.
* D = Decrease, S = Same, I = Increase in all values

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