Koala Habitat Rehabilitation Monitoring Report ORU 10th Monitoring Period

Yarrabilba

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Prepared for:	Lendlease
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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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Executive summary

Natura Pacific has developed this *Habitat Rehabilitation Monitoring Report* as the 10th monitoring report after initial baseline, 6 month, 2nd, 3rd, 4th, 5th, 6th 7th, 8th and 9th 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 recommendations in successive monitoring reports. The areas to be rehabilitated are offset requirement areas, ensuring that koala habitat is specifically maintained and enhanced within the 195-hectare offset area. This report provides the 10th monitoring period data for the rehabilitation of the offset areas, with 59 sites assessed, consistent with the 8th and 9th 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* (Neldner *et al*. 2022). 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 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 10th monitoring period condition against previous monitoring and benchmark values. With eight monitoring periods now undertaken since the project's commencement, 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 several 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 10th monitoring period, improvements in general ecological health remained varied across offset sites, with trends of improvement indicating continued progression of vegetation into higher strata and a pause in the trend of increased weed cover overall since the 9th monitoring period. Moreover, there was a significant increase in the number of sites that improved for T1 canopy cover, supporting the findings of overall improvement. This was also reflected by an 8.6% increase in average T1 canopy cover. This said, it is also recognised that a significant number of sites do not yet contain an intact canopy, and this is addressed through management recommendations for infill planting of resident T1 species if long term benchmark goals are desired to be achieved. There was also an overall trend for improvement in native shrub cover, with a slight increase in the number of sites meeting a benchmark (23 sites improved), with small tree height improving at 25 sites, which was not reflected in the total meeting a benchmark (57 sites), which remained consistent with the 9th monitoring period. There were two variables with most notable declines including species richness (8 sites declined) and small tree cover (11 sites declined), while for other variables the number of sites in decline was like the 9th monitoring period. The remaining variables had remained relatively stable since the 9th monitoring period. Overall, the changes observed in this monitoring period may be attributed to continued recovery of the ground layer following the return of more favourable climate conditions including increased rainfall, recruitment of lower order structural layers into higher order structural layers (i.e., movement of shrubs into T2-T3 layers) and flourishing of weed species due to favourable conditions.

Of the 59 sites, a total of 39 sites meet a benchmark for T1 canopy tree cover, 34 sites meet a benchmark for T1 canopy tree height, 58 sites meet a benchmark for T2-T3 small tree cover, 57 sites meet a benchmark for T2-T3 small tree height, 48 sites meet a benchmark for shrub cover, 55 sites meet a benchmark for shrub height, 58 sites meet a benchmark for native ground cover and 25 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 **18 top priority Rehabilitation Units within 6 precincts**. These have been tabulated in order of priority, determined by sites that have highest weed cover, are in poorest condition, are declining in condition, are least improved or are in priority precinct areas in accordance with IMO-5 benchmark targets for this 10th monitoring period in the 6th year of monitoring (see Table 11 and Table 12). Recommendations aim to assist natural regeneration and prevent weed spread and incursion, particularly in sensitive precinct areas adjacent to the Plunkett Conservation Reserve through targeted weed control including the most abundant weed species - *Andropogon virginicus* (graminoid), *Lantana camara* (woody shrub), *Passiflora suberosa* (vine), *Ageratum houstonianum* (herb) and *Setaria sphacelata* (graminoid) as well as targeted removal of *Pinus elliotti* from upper strata layers where present. In addition, infill planting is to be considered during favourable seasonal conditions to support long term benchmark goals for the T1 canopy layer, with suitable species recommended based on results for each site.

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1 Introduction

1.1 Background

The Yarrabilba development site is located on the eastern side of Waterford - Tamborine Road and to the south of Logan Village (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-mid 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 (more than 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's retained natural vegetation to attempt to increase the carrying capacity of these areas in the medium to long term. In addition, the configuration of key elements of the open space system provides a network covering approximately 510 ha (271 ha of greenspace, 140 ha of fauna corridor and 99 ha of conservation estate) and provides a connection between patches of remnant vegetation in the western and central parts of the site. Together they 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, most existing fragments of remnant vegetation which have value for koalas will be earmarked to be retained (approximately 5.4% of the total site area) (Austecology 2012). The rehabilitation of the Fauna Corridor, Greenspace Corridor and Environmental Protection Zone (conservation estate) will significantly expand on these values by providing additional koala habitat (Natura Consulting 2011).

This report provides the 10th monitoring data for the rehabilitation of offset areas in the development site, based on the 59 sites monitored.

1.2 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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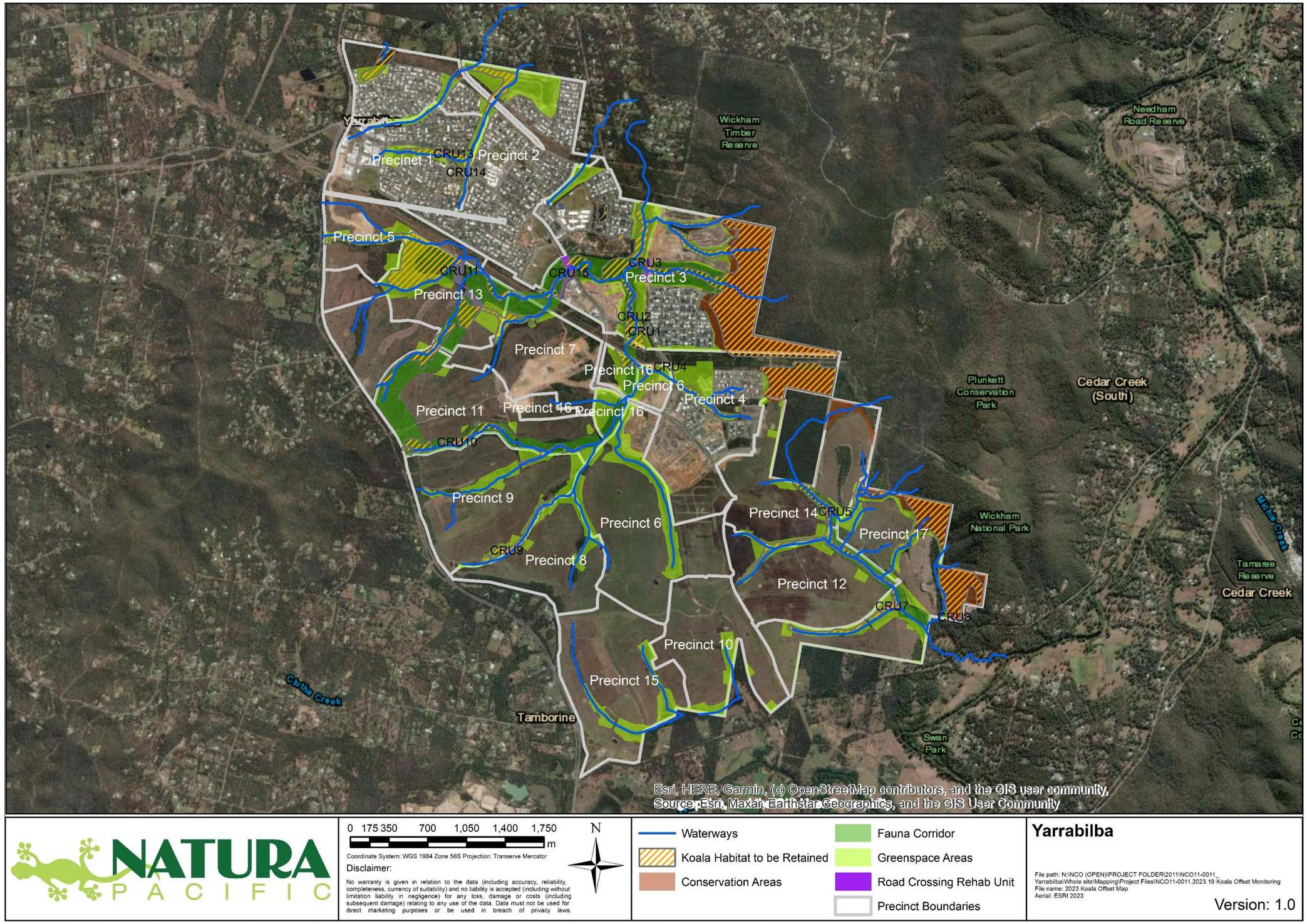

Figure 1 Overall Yarrabilba layout showing Open Space networks including Fauna Corridor, Greenspace and Conservation Estate

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2 Rehabilitation areas

2.1 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.

2.2 Offset rehabilitation units (ORU)

Koala habitat rehabilitation is to occur within offset rehabilitation units as indicated 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.

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).

2.3 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. 0 presents a summary of the crossing rehabilitation units, which are subject to rehabilitation actions outlined in this report.

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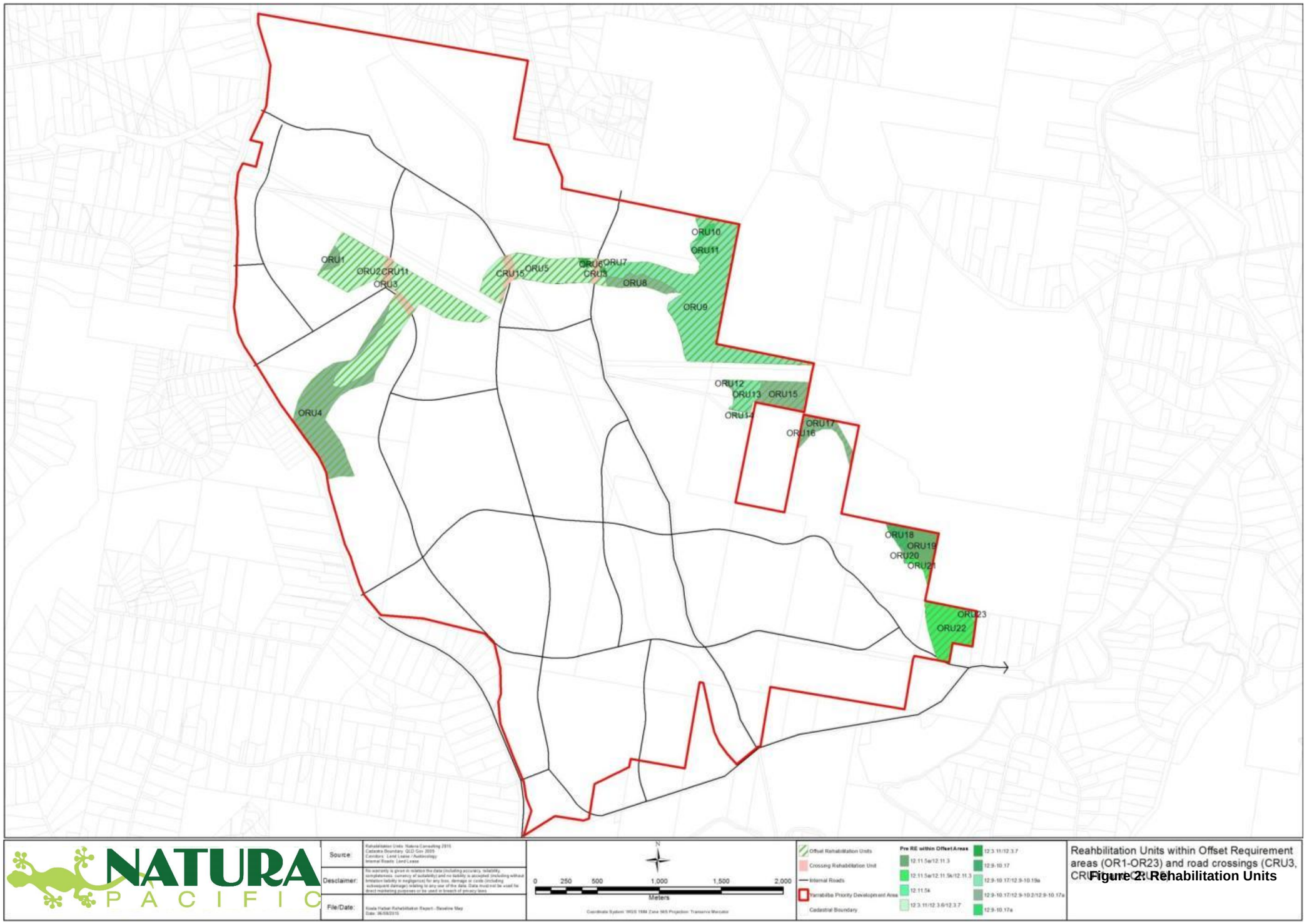

Figure 2: Rehabilitation Units

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**			

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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2.4 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 on coastal alluvial plains	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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3 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 Greenspace 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. In this instance, it is the dominant pre-clearing RE that has been used for comparison where there is more than one RE type attributed to a particular rehabilitation unit.

3.1 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, Neldner *et al.* 2022). 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 also needs to be considered for rehabilitation benchmarks for this site, particularly in the canopy where mature exotic pine trees remain. 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

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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.

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, if 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 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.

3.2 Contingency measures and corrective actions

3.2.1 Meeting benchmarks

During 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 rehabilitation units, discussions will be undertaken with the Department of Environment, to ensure that any additional requirements are also highlighted and addressed.

3.2.2 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)

RE Code	Benchmark Condition	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)
		Offset Rehabilitation Unit				**Crossing Rehabilitation Unit**			
12.3.6		ORU2, ORU4, ORU5, ORU7				CRU3, CRU15			
	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		ORU2, ORU4, ORU5, ORU6, ORU7				CRU3, CRU11, CRU15			
	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**
12.3.11		ORU2, ORU4, ORU5, ORU6, ORU7				CRU3, CRU11, CRU15			
	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**

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RE Code	Benchmark Condition	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)
		Offset Rehabilitation Unit				**Crossing Rehabilitation Unit**			
12.9-10.2		ORU1, ORU3, ORU4, ORU8, ORU12, ORU13, ORU14, ORU15, ORU17, ORU20							
	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**
12.9-10.17		ORU1, ORU3, ORU4, ORU8, ORU9, ORU10, ORU11, ORU12, ORU13, ORU14, ORU15, ORU16, ORU17, ORU18, ORU20							
	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		ORU9, ORU14, ORU16							
	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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RE Code	Benchmark Condition	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)
		Offset Rehabilitation Unit				**Crossing Rehabilitation Unit**			
12.11.3		ORU19, ORU21, ORU22							
	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		ORU19, ORU21, ORU22, ORU23							
	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**

* Note (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)
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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4 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).

4.1 Sites

Vegetation monitoring for the 10th monitoring period occurred in a network of 59 monitoring sites (refer to Table 1 and Table 2). The final location of each monitoring site within its representative rehabilitation unit was identified by GPS coordinates recorded for the permanent start and end point markers. 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.

Due to the vegetation clearing for road construction being undertaken in the Precinct 3 road corridor, two sites (site 56 and 57 (CRU3)) were lost in the 8th monitoring period due to clearing of the road corridor and subsequently relocated. Another two sites (sites 55 (ORU6) and 58 (ORU7)) were able to be retained, with start points moved outside of the clearing footprint and new end points established respectively. This may not have an impact over the long term goals of restoring sites to original RE, however the new sites selected to replace sites 56 and 57 appear to be highly degraded, potentially resulting in lower benchmark values.

In the current (10th) monitoring period, further encroachment into the fauna corridor in this area had resulted in removal of a portion of site 55, which will need to be amended in the 11th monitoring period. This meant that ground cover data was not collected for two quadrats at the site in the 10th monitoring period, however although not ideal in future monitoring periods, this was not considered to have significantly impacted the results as the site still scored high benchmarks.

The following methodology is applied for monitoring of each site.

4.2 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 – 10 m 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. 10th mon.) and date

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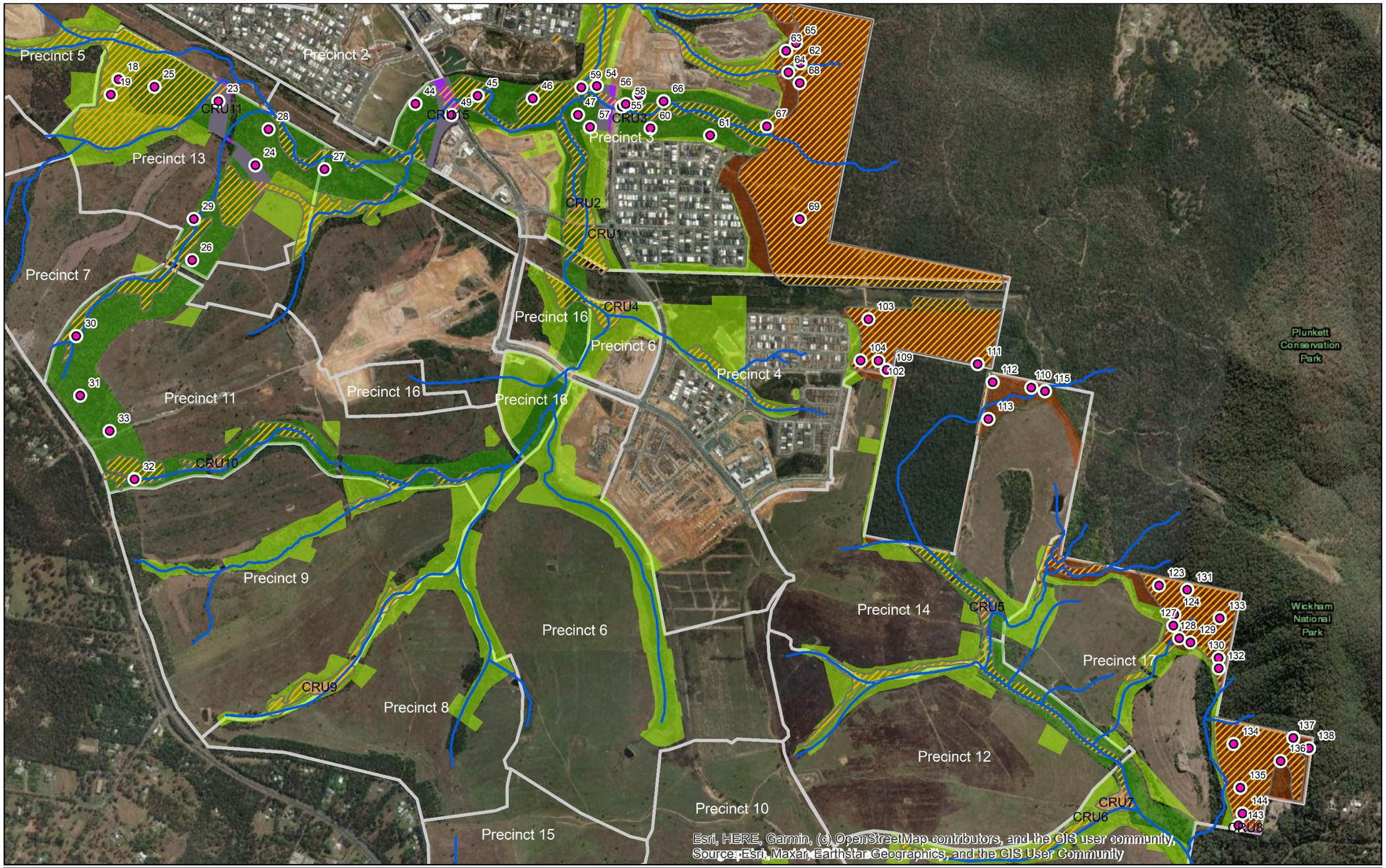

Figure 3 Koala Offset Monitoring locations

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4.3 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 replication 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) (see Table 5).

Table 5 Example reference height ranges used for classifying RE vegetation to respective strata layers, based on dominant pre-clearing RE type.

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 the table below. This benchmark monitoring process was been undertaken at 6 month intervals from Baseline to 4th year of monitoring (Baseline to 8th monitoring period) then annually for the 5th and 6th year of monitoring (9th and 10th Monitoring periods). Reporting from each of the monitoring events shall be provided to the Department of Environment as required - 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, 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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5 Results

5.1 Photo-point monitoring

Photo monitoring results for all surveyed sites are reported in the following table, indicating the variety of vegetation types and condition. In most cases, the site photo was indicative of the condition of the entire transect, which was supported in the results section that follows, with the vegetation type and structure remaining consistent throughout individual sites. Many of the sites are typically at an advanced state of natural regeneration with a canopy layer representative of the RE and varying extents of mixed native and exotic species in the understorey and ground layers, from sparse regenerating shrubs and trees to established sclerophyll woodland to open forest with intact structure and diverse species composition. In congruence with previous monitoring periods, the ground cover vegetation varies from mixed native species such as blady grass (*Imperata cylindrica)* and bracken fern (*Pteridium esculentum),* with dieback observed at several sites. There was also an observed decrease in exotic pasture grasses. In the sub canopy, there was a general decrease in foliar cover observed such as dieback of Acacia thickets, while at some sites, there appears to be no change, or an increase observed. This variability was potentially attributable to natural seasonal variability and also in some cases due to changes in hydrology associated with development.

Several sites indicated photographic evidence of continued prevalence of *Lantana camara* infestations. 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.

At site 55, the 0 m and 10 m quadrats were missing due to further clearing, therefore the site photo was taken at the 20 m quadrat picket and 1 x 1 m quadrat data was only collected at 3 points (20 m, 30 m and 40 m).

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Table 7 Photo monitoring site images

Site 18 – taken 02/05/2023	Site 19 – taken 02/05/2023	Site 23 – 19/07/2023	Site 24 – 08/08/2023
			
Site 25 – 02/05/2023	**Site 26 – 08/08/2023**	**Site 27 – 02/05/2023**	**Site 28 – 19/07/2023**
			
Site 29 – 19/07/2023	**Site 30 – 27/07/2023**	**Site 31 – 27/04/2023**	**Site 32 – 27/07/2023**
			

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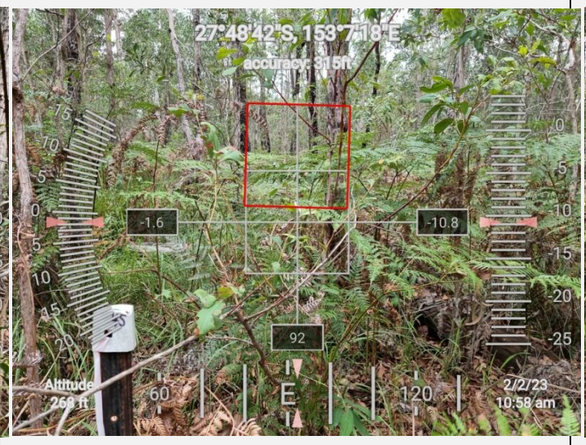
Site 33 – 27/04/2023	Site 44 – 31/01/2023	Site 45 – 02/02/2023	Site 46 – 18/08/2023
			
Site 47 – 13/04/2023	Site 49 – 24/04/2023	Site 54 – 17/04/2023	Site 55 – 26/07/2023
			
Site 56 – 10/05/2023	Site 57 – 02/02/2023	Site 58 – 10/05/2023	Site 59 – 17/04/2023
			

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Site 60 – 14/02/2023	Site 61 – 31/01/2023	Site 62 – 04/04/2023	Site 63 – 01/02/2023
			

Site 64 – 04/04/2023	Site 65 – 01/02/2023	Site 66 – 24/04/2023	Site 67 – 31/01/2023
			

Site 68 – 04/04/2023	Site 69 – 11/04/2023	Site 102 – 11/04/2023	Site 103 – 11/04/2023
			

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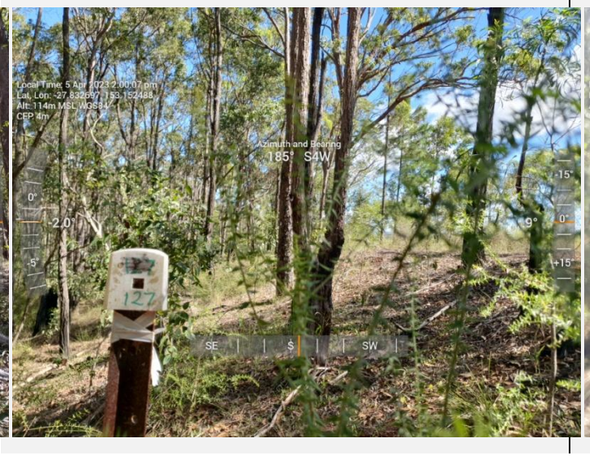
Site 104 – 11/04/2023	Site 109 – 11/04/2023	Site 110 – 18/04/2023	Site 111 – 11/04/2023
			
Site 112 – 18/04/2023	**Site 113 – 19/04/2023**	**Site 115 – 18/04/2023**	**Site 123 – 05/04/2023**
			
Site 124 – 05/04/2023	**Site 127 – 05/04/2023**	**Site 128 – 12/04/2023**	**Site 129 – 12/04/2023**
			

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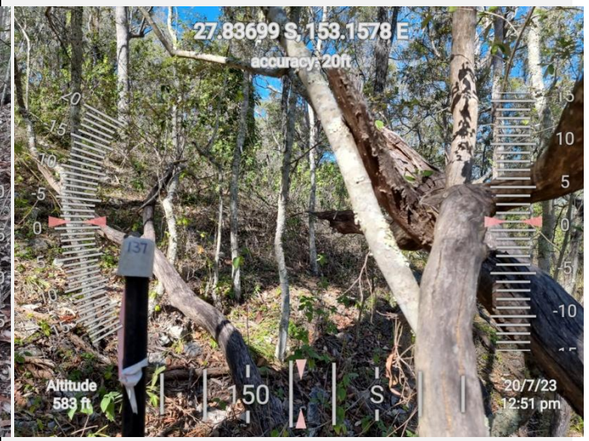
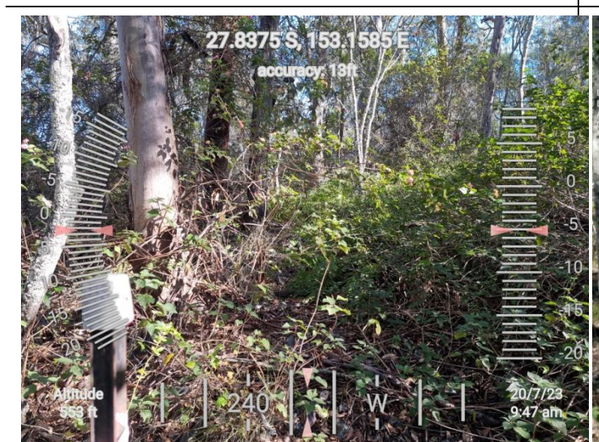
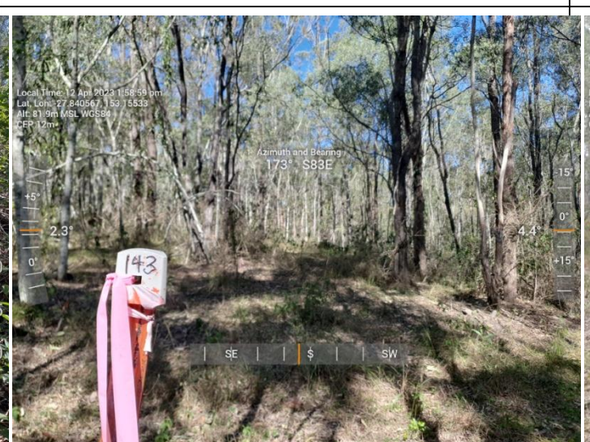
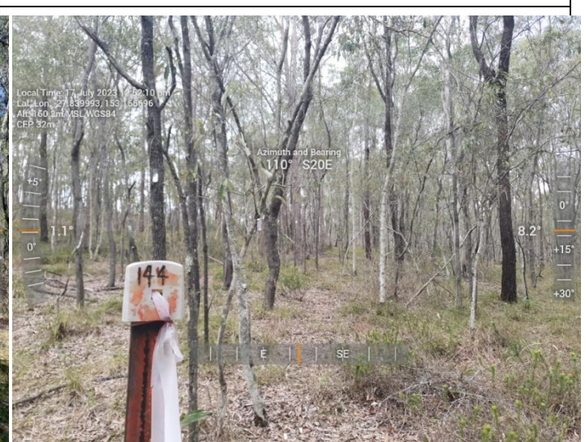
Site 130 – 12/04/2023	Site 131 – 05/04/2023	Site 132 – 12/04/2023	Site 133 – 05/04/3023
			

Site 134 – 08/05/2023	Site 135 – 08/05/2023	Site 136 – 20/07/2023	Site 137 – 20/07/2023
			

Site 138 – 20/07/2023	Site 143 – 12/04/2023	Site 144 – 17/07/2023
		

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5.2 Transect and quadrat monitoring

5.2.1 Native species richness

During the 10th monitoring period undertaken between January to August 2023, a total of **366 species were recorded within different strata** at the 59 monitoring sites in the Offset Area. This is a decrease of 18 species from the 9th monitoring period, where 384 total species within strata were recorded (this is a correction from the value of 377 species provided in the 9th monitoring report). **It has been recognised that previously, the total species richness value has not accommodated for duplicates across strata for example where a species occurs in two or more strata layers. This has now been corrected, resulting in a new total of 274 species across all 59 sites in the 10th monitoring period**. This has also been corrected for species richness for individual sites provided in the tables below and checked against the benchmark value.

Total native species richness within sites ranged from 17 to 54 native species (minus weeds), with 31.4 native species per site observed on average, resulting in **a slight decrease of 5.7% for native species richness,** since the 9th monitoring period. Site 132 replaced site 66 as the site with highest overall native species richness this monitoring period.

Canopy tree species (T1 stratum) totalled 26 species (2 species more than 9th monitoring period). One of these was the exotic *Pinus elliotti* recorded again at site 24 as well as an additional 3 sites (sites 110, 128 and 132). Species most common across the offset area were mostly consistent with the 9th monitoring period, with the addition of *Corymbia intermedia* and included *Corymbia trachyphloia* (14 sites*), *E. acmenoides* (10 sites*), *Eucalyptus siderophloia* (12 sites), Corymbia intermedia (9 sites*), *E. fibrosa* (8 sites) and *E. resinifera* (8 sites). *Species recorded at an increased number of sites since previous monitoring period.

Small tree species (T2-T3) totalled 37 species (1 species more than 9th monitoring period). There were two weed species, including *Cinnamomum camphora* (sites 27 and 129) and *Pinus elliotti,* recorded again at site 26 and additionally sites 23, 44, 110, 115, 128, 129 and 132. The most common species were mostly consistent with the 9th monitoring period, with the addition of *Acacia leiocalyx* having potentially migrated from the shrub layer. Others included *A. disparrima* (28 sites*), *Alphitonia excelsa* (25 sites), *A. leiocalyx* (24 sites*), *Lophostemon suaveolens* (24 sites), *Eucalyptus siderophloia* (22 sites) and *L. confertus* (22 sites).

Shrub species (S1 stratum) totalled 64 species (6 species more than the 9th monitoring period). This included 4 exotic species, with *Lantana camara* by far the most widespread of these, recorded at 27 sites. The most common native species included *Acacia disparrima, Alphitonia excelsa, A. leiocalyx, Lophostemon confertus* and *L. suaveolens* (from highest to lower abundance). These were also among species most represented in the 9th monitoring period.

In the ground layer, a total of 239 species were recorded (21 less than 9th monitoring period). Of these, 52 species were exotic, the most widespread of these being *Lantana camara* recorded at 48 sites. Species most represented in the ground layer were typically consistent with the 9th monitoring period, predominantly comprising graminoids, as well as two species of twining herbs. These included *Entolasia stricta, Lomandra longifolia, L. multiflora, Imperata cylindrica, Glycine clandestina, Eustrephus latifolius, Paspalidium distans* and *Cymbopogon refractus* (from highest to lower abundance).

5.2.2 Weed species richness

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Of all the species recorded, 54 were exotic weeds (11 less than the 9th monitoring period). Most of these were herbs and grasses recorded in the ground layer, which contained 53 weed species (98% of all weed species recorded), including a combination of graminoids, herbs, twining scramblers and woody weeds. The most common weed species in the ground layer remained consistent with the 3 previous monitoring periods, with some variability in the number of sites. These included *Lantana camara* (48 sites, 2 more than 9th monitoring period), *Passiflora suberosa* (35 sites, 2 less than 9th monitoring period), *Andropogon virginicus* (30 sites, 2 more than the 9th monitoring period), *Digitaria didactyla* (25 sites, 2 more than 9th monitoring period) and *Ageratum houstonianum* (24 sites, 1 less than the 9th monitoring period) (from highest to lower abundance).

In addition to this, five species again recorded in the shrub layer including *Lantana camara* (27 sites), *Pinus elliottii* (6 sites), *Cinnamomum camphora* (2 sites), *Gomphocarpus physocarpus* (1 site) and *Passiflora subpeltata* (1 site) (from highest to lowest number of sites). Two species were recorded in the T2 layer (*P. elliottii* (8 sites) and *Cinnamomum camphora* (2 sites)) and one species, *P. elliotti* (4 sites) in the T1 canopy layer.

5.2.3 Tree height and canopy cover (T1)

Eighteen sites did not have any canopy trees present along the transect midline for the measurement of tree height and FPC % (three less than the 9th monitoring period). This may indicate an increase in succession, with T1 Canopy FPC recorded at a greater number of sites than the previous two monitoring periods. This was also supported by a slight increase in T1 average height and a significant increase in total FPC cover.

Of the sites with canopy trees present along the transect in the T1 stratum, **tree height** ranged from 14.5 m to 23.3 m, with the **average tree height being 18.8 m (a 0.6 m increase since the 9th monitoring period)** (Table 10). Canopy species with high average canopy height were consistent with the 9th monitoring period, including *Corymbia trachyphloia. Eucalyptus siderophloia, E. acmenoides, C. intermedia, E. fibrosa* and *E. resinifera* (in order of highest to lower).

Of the sites with canopy trees present along the transect in the T1 stratum, **tree canopy FPC** ranged from 4% to 154% FPC, with **average total canopy cover of 63.7% (8.6% more than 9th monitoring period)** (Table 10). Canopy species with high canopy cover varied alightly from the previous monitoring period and included *Corymbia trachyphloia, Eucalyptus fibrosa, E. siderophloia, C. intermedia* and *E. planchoniana* (in order of highest to lower FPC).

There continued to be a small presence of weed crown cover in the T1 layer in the 10th monitoring period, with *Pinus elliotti* recorded at 3 sites (110 and 132, with the addition of site 128), yet not site 24 as per previous monitoring period. I**t is recommended that removal of these trees is prioritised to eliminate further contribution of seed to the local seed bank, or dispersal to other areas.**

Table 8 10th Monitoring round sites with T1 canopy absent along the transect for current and four previous monitoring rounds

Site and Rehabilitation Unit	5th mon	6th mon	7th mon	8th mon	9th mon	10th mon
19 (ORU1)	x	x				
23 (CRU11)	x	x	x	x	x	x
24 (CRU11)	x	x	x	x	x	
25 (ORU2)	x	x				
26 (ORU2)	x	x	x	x	x	
27 (ORU2)	x	x	x	x	x	
28 (ORU2)	x	x	x	x	x	x

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Site and Rehabilitation Unit	5th mon	6th mon	7th mon	8th mon	9th mon	10th mon
32 (ORU4)	x	x	x	x	x	
33 (ORU4)	x	x	x	x	x	x
44 (ORU5)	x	x	x	x	x	x
47 (ORU5)	x	x	x	x	x	x
49 (CRU15)	x	x	x	x	x	x
54 (ORU6)	x	x	x	x	x	x
56 (CRU3)	x	x	x	x	x	x
57 (CRU3)	x	x	x	x	x	x
58 (ORU7)	x	x	x	x	x	x
59 (ORU7)	x	x	x	x	x	x
60 (ORU8)	x	x	x	x	x	x
61 (ORU8)	x	x	x	x	x	x
110 (ORU15)	x	x	x			
111 (ORU15)		x	x			
112 (ORU16)	x	x	x	x	x	
113 (ORU16)	x	x	x	x	x	x
124 (ORU18)	x					
129 (ORU21)		x	x			
130 (ORU21)	x					
132 (ORU19)	x					
134 (ORU22)	x	x	x	x	x	
135 (ORU22)	x	x	x			
143 (CRU8)	x					
144 (CRU8)		x	x	x	x	x
TOTAL	**28**	**27**	**25**	**21**	**21**	**15**

5.2.4 Small tree height and canopy cover (T2-T3)

In this monitoring period, consistent with the previous monitoring period, only one site (site 69) did not have any small trees (T2-T3 strata) present along the transect midline for the measurement of height and FPC %. In review of the T2/T3 layer, weed crown cover was recorded at 5 sites (1 less than 9th monitoring period) for the presence of ***C. camphora*** **(site 129)** and ***P. elliottii*** **(sites 23, 110, 128, 129 and 132)**. **Most of these sites contained *P. elliottii* in the T2 layer in the 9th monitoring period (Table 9), therefore prioritisation of pine removal in the T2 layer is also recommended.**

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	8th mon	9th mon	10th mon
23 (CRU11)	×		×	×	x	x
26 (ORU2)					x	
57 (CRU3)		×				
110 (ORU15)	×	×	×	×		x
115 (ORU17)					x	
128 (ORU20)	×	×	×	×	x	x
129 (ORU21)	×	×	×	×	x	x
132 (ORU19)	×	×	×	×	x	x

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Site and Rehabilitation Unit	× = *Pinus elliotti* present in small tree layer					
	5th mon	6th mon	7th mon	8th mon	9th mon	10th mon
TOTAL	5	5	5	5	6	5

Of the sites with small trees present in the T2-T3 stratum along the transect, the **average tree height was slightly higher than the 9th monitoring period,** varying from 7.6 m to 14 m, with the average tree height 10.3 m (0.5 m more than the 9th monitoring period) (Table 10). Small tree species with highest average canopy height included *Lophostemon suaveolens, Acacia disparrima, Eucalyptus siderophloia, E. acmenoides, A. leiocalyx* and *Alphitonia excelsa* (in order of highest to lower). *L. confertus* was no longer amongst the highest small trees in this monitoring period.

Of the sites with trees present along the transect **in the small tree layer, FPC ranged from 4% to 156%, and there was a slight increase in average total FPC (60%, 1.5% higher than in the 9th monitoring period)**. Small tree species with high average remained mostly consistent with the 9th monitoring period yet varied in order. These included *A. disparrima, L. confertus, A. leiocalyx, L. suaveolens, A. excelsa* and *E. siderophloia* (from highest to lower FPC). *E. acmenoides* had decreased in cover despite maintaining a high average height.

5.2.5 Shrub height and cover (S1)

In this monitoring period, all sites had shrubs present along the transect. Average shrub height ranged from 1.3 m to 4.3 m. **Average height had a non significant decrease at 2.6 m (0.2 m less than the 9th monitoring period)**. Shrub species with high average height were similar to those recorded in the 8th monitoring period, including *Acacia leiocalyx, Alphitonia excelsa, A. disparrima, Lantana camara* (exotic), *L. confertus* and *L. suaveolens* (in order of highest to lower FPC).

Shrub FPC ranged from 1.8% to 78.6%. **Average FPC continued to increase (27%, 0.9% more than 9th monitoring period).** Shrub species with highest average FPC were similar to the 9th monitoring period, with highest FPC recorded for the woody weed *Lantana camara*, followed by the native species *Acacia leiocalyx, A. disparrima, L. confertus, Alphitonia excelsa, Daviesia umbellulata* and *Leptospermum polygalifolium* (from highest to lower FPC). *Pteridium esculentum* was no longer among the species with highest cover, with significant dieback observed during site assessments.

5.2.6 Native ground cover (G1)

Consistent with previous monitoring periods, **a living native ground cover layer was recorded within quadrats at all sites**, ranging from 2.8% to 89.2%. Average ground cover increased to 47.1% (1.5% increase since the 9th monitoring period).

In this monitoring period, the native grass *Entolasia stricta* had the highest ground cover of any species. The other highest native ground cover species varied slightly from the 9th monitoring period and were *Imperata cylindrica*, *Lomandra longifolia Cymbopogon refractus*, *Eragrostis brownii, Paspalidium distans, Ottochloa gracillima, Acrotriche aggregata* and *Lobelia purpurascens.* The changes are likely a reflection of seasonal variation and response to wetter climatic conditions, for example dieback of *Pteridium esculentum* was regularly observed in transects, resulting in lower representation in the ground layer.

5.2.7 Weed incursion

Weeds in the ground cover quadrats were present at 46 sites (4 less than 9th monitoring period), ranging from 0.4% to 59.6% with an average weed cover of 15.5% (1% more than 9th monitoring

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period). **Overall, weed cover in the ground layer increased at 21 sites (14 less than 9th monitoring period)**. Weed cover in the ground layer had decreased at 27 sites (10 more than 8th monitoring period), indicating a significant trend of decline for weed cover this monitoring period.

There was slight variation in sites with highest weed cover. With site 60 having experienced a significant decrease in weed cover, it was no longer among the top 6. Conversely, site 112 experienced a slight increase in weed cover, which added it to the list. The other sites were consistent with the previous monitoring period, with a slight shift in order from highest to lower cover. This included **site 24** (59.6%, 21.2% increase since 9th monitoring period), **site 137** (44%, 3.2% increase), **site 110** (41.2%, 4.4% decrease), **site 59** (40.8%, 1.6% increase), **site 112** (38.8%, 4.8% increase) and **site 129** (37.2%, same as previous 2 monitoring periods). These sites are located within the Precinct 13 Fauna corridor adjacent to the road crossing (site 24), Precinct 3 Fauna Corridor area to the north (site 59) and Fauna Corridor to the north east of Wal's block in Precinct 14 (sites 110 and 112) or within Precinct 17 Greenspace Corridors (site 129) and Conservation Areas (site 137) adjoining the Plunkett Conservation Area (Figure 3). **Considering these sites are all within highly sensitive areas, it is recommended that these sites are included among those to prioritise for assisted rehabilitation,** to continue progressing the offset area towards improved ecological condition and higher benchmark achievement in this area.

Five weed species are important to mention as they were also amongst overall species with highest ground cover, including *Andropogon virginicus (*grass)*, Lantana camara* (woody herb)*, Passiflora suberosa* (vine), *Ageratum houstonianum* (herb) and *Setaria sphacelata* (grass) (in order of highest to lower cover).

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Table 10 10th Koala Offset monitoring period species richness, average canopy height within the canopy (T1), sub-canopy (T2-T3) and shrub layer (S1) and Foliage Projected Cover (FPC %) within the canopy (T1), sub-canopy (T2-T3), shrub layer (S1) and ground layer (G1)

Site	Species Richness (incl. weeds)					Height (m)			Foliage Projected 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 FPC	Total Native Crown FPC	Total Ground Layer	Total Weed Ground Layer
18	2	4	4	30	25	17.8	7.6	3.1	56.0	57.8	68.4	0.0	182.2	53.2	18.8
19	2	3	4	29	26	17.2	8.1	2.7	54.0	52.8	36.0	0.0	142.8	50.8	15.6
23	0	10	7	37	40	0.0	9.7	3.1	0.0	77.0	28.4	20.0	85.4	50.8	8.8
24	1	4	1	24	20	0.0	9.0	3.3	0.0	53.0	4.0	0.0	57.0	89.2	59.6
25	1	3	7	31	29	20.6	11.1	2.4	59.0	63.0	19.0	0.0	141.0	70.8	10.4
26	1	7	5	33	29	20.0	8.5	2.4	20.0	48.0	19.8	0.0	87.8	46.0	13.6
27	1	8	2	21	23	0.0	8.8	3.4	0.0	74.0	36.0	0.0	110.0	25.2	8.4
28	0	6	6	39	35	0.0	8.5	2.2	0.0	28.4	11.8	0.0	40.2	69.6	18.4
29	3	5	5	43	37	16.8	10.2	3.1	40.0	65.0	8.6	0.0	113.6	74.4	29.6
30	3	2	4	37	32	18.9	11.8	1.3	104.0	22.0	1.8	0.0	127.8	50.4	2.0
31	1	6	3	24	22	15.0	9.5	3.2	25.0	55.0	14.4	0.0	94.4	10.8	1.2
32	1	7	5	23	24	0.0	8.7	2.4	0.0	61.4	19.6	0.0	81.0	2.8	0.4
33	0	6	3	29	24	0.0	7.9	3.6	0.0	99.0	21.2	0.0	120.2	18.0	6.8
44	0	5	6	28	31	0.0	7.9	3.4	0.0	64.8	40.2	0.0	105.0	44.0	7.2
45	2	5	7	42	38	22.3	13.6	3.5	72.0	106.0	17.4	0.0	195.4	62.0	18.0
46	2	4	6	39	36	21.4	12.5	2.4	43.0	48.2	46.0	0.0	137.2	69.6	13.2
47	0	4	5	22	18	0.0	9.3	2.8	0.0	73.0	67.8	0.0	140.8	18.8	2.0
49	0	7	7	21	24	0.0	9.8	2.7	0.0	29.4	78.6	0.0	108.0	46.8	13.6
54	0	9	8	35	36	0.0	9.8	1.9	0.0	50.0	67.0	0.0	117.0	44.4	2.0
55	3	9	6	18	30	21.4	12.9	2.5	62.0	86.8	14.2	0.0	163.0	23.6	0.8
56	0	4	3	24	27	0.0	12.7	3.1	0.0	90.0	5.4	0.0	95.4	48.4	8.4
57	0	3	4	36	25	0.0	10.8	2.8	0.0	19.0	21.0	0.0	40.0	41.2	15.2
58	0	7	5	25	30	0.0	10.4	2.4	0.0	73.0	19.8	0.0	92.8	16.4	0.4
59	0	3	6	23	21	0.0	8.6	2.2	0.0	49.0	18.4	0.0	67.4	82.4	40.8
60	0	4	5	32	31	0.0	8.6	1.6	0.0	13.4	13.2	0.0	26.6	56.8	24.0
61	0	3	3	29	29	0.0	9.4	2.1	0.0	36.8	27.2	0.0	64.0	58.4	10.4
62	3	3	5	33	41	18.5	10.8	2.1	78.0	44.0	14.0	0.0	136.0	37.2	0.0
63	3	3	6	22	31	22.9	10.2	2.7	56.0	36.0	61.0	0.0	153.0	23.2	0.0
64	6	3	6	35	43	17.6	10.8	1.5	75.0	33.0	12.6	0.0	120.6	45.6	0.0
65	5	4	14	27	44	18.1	9.3	1.9	89.0	18.4	27.0	0.0	134.4	38.8	0.0
66	4	5	9	36	37	15.4	9.3	2.1	28.0	57.8	49.4	0.0	135.2	65.6	14.0
67	2	4	8	38	40	17.6	8.4	2.4	97.0	21.0	46.4	0.0	164.4	37.6	0.0
68	3	2	8	26	36	15.5	10.0	2.6	114.0	17.0	16.2	0.0	147.2	51.2	0.0
69	2	1	7	18	26	17.0	0.0	1.6	46.0	0.0	50.0	0.0	96.0	18.8	0.0
102	3	2	2	22	27	18.3	8.2	2.8	137.0	14.0	11.0	0.0	162.0	16.4	0.0
103	4	2	8	34	38	20.1	10.3	2.2	99.0	4.0	23.6	0.0	126.6	22.8	1.2
104	2	3	8	26	33	16.6	12.6	2.4	52.0	28.0	18.4	0.0	98.4	42.4	0.0
109	2	5	6	28	34	20.3	9.5	3.5	46.0	33.4	12.4	0.0	91.8	22.0	0.4
110	2	7	5	35	29	18.0	10.0	3.0	12.0	23.0	41.4	13.0	63.4	66.0	41.2
111	3	6	4	32	31	15.7	9.8	3.2	90.0	48.4	44.2	0.0	182.6	54.4	18.4
112	1	6	5	42	36	14.5	9.1	3.2	4.0	87.8	3.0	0.0	94.8	75.6	38.8
113	0	7	8	32	37	0.0	10.4	2.9	0.0	56.0	14.8	0.0	70.8	62.4	23.2
115	2	3	9	53	45	18.0	8.4	2.8	8.0	27.0	28.8	0.0	63.8	51.2	25.2
123	3	1	8	28	30	17.1	12.0	2.5	119.0	10.0	21.8	0.0	150.8	34.0	0.0
124	4	5	3	20	25	17.9	10.9	4.3	135.0	13.4	22.0	0.0	170.4	25.2	0.0
127	5	5	13	42	46	17.3	12.3	2.0	154.0	30.0	24.8	0.0	208.8	55.2	0.0
128	8	3	15	41	45	17.9	9.4	2.8	116.0	29.0	28.9	19.0	154.9	66.4	20.8
129	1	6	7	46	40	20.0	8.5	2.6	24.0	114.0	77.8	44.0	171.8	46.4	37.2
130	3	7	7	38	43	19.5	11.9	3.1	32.0	142.0	11.4	0.0	185.4	52.0	18.4
131	5	7	4	28	36	23.3	13.7	1.9	32.0	122.6	4.8	0.0	159.4	34.8	0.0

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Site	Species Richness (incl. weeds)					Height (m)			Foliage Projected 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 FPC	Total Native Crown FPC	Total Ground Layer	Total Weed Ground Layer
132	4	7	12	57	55	19.3	13.6	2.5	64.0	77.0	15.0	32.0	124.0	54.4	6.8
133	3	11	5	35	39	23.0	14.0	2.6	72.0	156.0	18.8	0.0	246.8	51.6	15.6
134	2	5	5	33	33	21.7	10.2	2.5	40.0	110.0	10.8	0.0	160.8	28.4	1.2
135	7	9	5	39	43	18.5	11.2	3.3	29.0	148.0	23.4	0.0	200.4	62.8	8.0
136	3	7	5	25	28	20.8	9.5	3.4	92.0	132.0	23.4	0.0	247.4	33.6	1.2
137	3	4	4	28	27	21.5	12.6	3.2	60.0	61.4	33.0	0.0	154.4	63.6	44.0
138	4	5	3	30	32	20.3	12.9	2.9	40.0	80.0	57.0	0.0	177.0	63.2	28.8
143	2	6	6	30	32	19.5	9.8	2.0	36.0	69.8	16.4	0.0	122.2	73.6	18.0
144	0	6	3	27	28	0.0	12.7	1.6	0.0	138.0	3.4	0.0	141.4	76.4	1.6
Averages*	**2.9 (+0.2)****	**5.1 (0)****	**5.9 (+0.3)****	**31.5 (-0.9)**	**31.3 (-5.7)**	**18.8 (+0.6)**	**10.3 (+0.5)**	**2.6 (-0.2)****	**63.7*** (+8.6)**	**60*** (+1.5)**	**27*** (+0.9)**	**25.6*** (+8.3)**	**128.0*** (+15.1)**	**47.1 (+1.5)**	**15.5 (+1.0)**

*Note: values in parentheses indicate the percent or actual change in averages since the previous 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.
*** Field values have been adjusted to reflect the Foliage Projected cover. This was also calculated for the previous monitoring period, to determine the average difference in FPC (%).
**** Total values have been adjusted for strata, with duplicate species removed.

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5.3 Normalised Difference Vegetation Index (NDVI) monitoring

Although previous Koala Offset reports have presented results for normalised difference vegetation index (NDVI) monitoring across the site, this form of monitoring has been suspended due to delays relating to the aftermath of the COVID-19 pandemic. This monitoring is planned to recommence in the future.

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6 Discussion

An assessment of site species richness and structure was undertaken to compare the 10th monitoring period condition against the 9th monitoring period and to measure against target benchmark parameters, in order to identify priority management areas and guide recommendations for management. The 10th offset monitoring period was undertaken in year 6 of monitoring, therefore, sites are still measured against the minimum of IMO-5 for benchmark variables. This will remain in place through to year 10 of monitoring, at which time sites will be compared to the IMO-10 benchmarks.

Interestingly, all sites had achieved the IMO-5 benchmark for at least 4 or more variables, confirming continued progression towards the benchmark targets (in the last monitoring period, some sites had still only achieved a minimum of 3 IMO-5 targets). There were 57 sites that met a FINAL benchmark in at least one benchmark variable (1 less than 9th monitoring period) (Table 11).

6.1 Benchmark overview – trends within variables

In overview, whilst recovery is not consistent across all variables, there is a general trend of improvement for canopy cover, shrub cover and native ground cover. The greatest declines in number meeting a benchmark were observed in native species richness (whilst remaining variables were regarded as 'same' overall). As mentioned, in this monitoring period, some of this variation in total native species richness was attributed to the correction for duplicates across strata, however it is noted that while the total number meeting a benchmark had declined, there was a higher number improving, a lower number declining and an equal number that remained 'same', therefore an overall trend of 'same' was applied.

In support of the above, there was a decrease in average species richness and total number of species, perhaps also influenced by drier seasonal conditions and changes to ephemeral flows. A total of **35 sites (59.3%) met the FINAL benchmark for species richness (15.2% decrease since 9th monitoring period), therefore 24 sites did not meet the FINAL benchmark.**

A sustained significant increase in average T1 canopy cover (+8.6% FPC) was congruent with the benchmark results, which had an overall trend of 'improving' compared to the 9th monitoring period. A total of 39 sites (66.1%) met a benchmark for T1 canopy cover (3.4% increase since 9th monitoring period), with 31 of these achieving IMO-5 or greater. The **significant increase (>0.4%) in average T1 canopy height was congruent with the benchmark results, which had a continued overall trend of 'same' compared to the 9th monitoring period,** with 34 sites meeting a benchmark (of IMO-10 or greater) for T1 canopy height (57.6%) remaining consistent since the 8th monitoring period.

Again, the slight increase in T2-T3 small tree cover was not reflected in the benchmark results, which had a continued overall trend of 'same'. **A total of 58 sites again met a benchmark for T2-T3 small tree cover (98.3%, same since 8th monitoring period), with 56 of these achieving IMO-5 or greater.** The increase in T2-T3 small tree height was not reflected in the benchmark results, which also had an overall trend of 'same'. **A total of 57 sites continued to meet a benchmark for T2-T3 small tree height (96.6%, same since 8th monitoring period), with 56 of these sites achieving IMO-5 or greater.**

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 (81.4%) met a benchmark for shrub cover (3.5% increase since 9th monitoring period), however only 20 of these achieved IMO-5 or greater.** There was again a **non-significant decrease in shrub height, attributed to succession of**

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individuals migrating into the T2-T3 layer, or redistribution of cover across the centre line due to patterns of shrub growth. The slight decrease in average shrub height, was congruent with the overall trend of 'same' due to similarities in the number of sites improving and declining, with **55 sites (93.2%) meeting the benchmark for shrub height (same since 8th monitoring period). Of these, 52 sites had achieved IMO-5 or greater.**

The slight **increase in average ground cover was not reflected in the benchmark results, which had an overall trend of 'same'**. A total of 58 sites (98.3%) met a benchmark for ground cover (3.4% increase since 9th monitoring period), with 50 of these sites achieving IMO-5 or greater.

The slight **increase in average weed cover was contrasted by an overall trend of 'improving' in benchmark values.** This is due to a slightly higher number of sites (25 sites, 42.4%) meeting the <5% cover benchmark (1.8% increase, 1 more site than 9th monitoring period), coupled with an increase in sites improving, and a decrease in the number of sites declining or remaining in the same condition as last monitoring period. There were 35 sites that did not meet the benchmark for weed cover, and of these, 19 sites had increased and 14 sites had decreased in cover since the previous monitoring period. When looking at the sites with highest % weed cover, the increase in cover is most likely attributable to the lack of targeted management in hot spot areas and continuation of favourable seasonal conditions, combined with edge effects adjacent to development areas (e.g. sites 59, 60) or continued growth of existing infestations in remote protected areas (e.g. sites 24, 110, 112, 129, 137).

6.2 Benchmark overview – site comparison

Within individual sites, there were 8 sites that did not experience any variables that were 'declining' (13.6%, 6.7% decrease since 9th monitoring period), thereby exhibiting a continued trend of improvement (condition 'improving' or 'same'). Most of these sites were considered amongst those in best condition and therefore not prioritised for active management at this time, with the exception of site 110 which was among the top sites for highest weed cover. This was extended to their respective ORU if other sites within the ORU did not exhibit signs of significant decline. Sites with no declining variables included sites 18 (ORU1), 32 (ORU4), 45 (ORU5) 62 (ORU9), 64 (ORU11), 69 (ORU9), 102 (ORU13), and 115 (ORU17), of which sites 18, 32, 69, 102 and 115 were also among those with no declining variables in the previous monitoring period (and 8th monitoring period indicated in bold). Additionally, several sites included here in the previous monitoring period had experienced non-significant decline and were still amongst those in best condition as they were generally achieving high benchmarks, for example both sites 112 and 113 (ORU16) 'declined' from FINAL to FMO-15 in one benchmark variable, which was still well within benchmark targets for year 6 monitoring. Site 128 (ORU20) also fits this description.

In addition, t**here was a satisfactory result for the number of IMO-5 benchmarks met within sites, with all 59 sites (100%) meeting a minimum of four IMO-5 benchmarks**. Furthermore, 51 sites (86.4%, 1 site less than previous monitoring period) reached the benchmark of IMO-5 or greater for at least 5 benchmark variables supporting an above satisfactory overall result for the second IMO-5 year monitoring period.

6.3 Management priorities - overview

Management priorities aim to target the sites that are in poorest condition, and or in greatest decline and may include assisted natural rehabilitation for improvement of ecological condition and progression towards benchmark goals. Recommendations generally include targeted weed management, with or without infill planting to improve results for species richness or height and cover of targeted strata layers over time, for example, where the T1 canopy layer is

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lacking. The following provides a detailed discussion of results for the 10th monitoring period to highlight priority areas for management and recommended management actions.

Despite some declines, the number of variables meeting **any** benchmarks has remained consistent since the 6th monitoring period, with all sites having attained a minimum of 4 or more benchmark variables. **Three sites (sites 24, 49 and 56) met only four benchmark variables, and were therefore regarded among those in poorest condition** (despite this, where a benchmark was met, they were consistently at IMO-5 or greater condition), while site 112 had increased to five benchmark variables met (all >IMO-5). The small tree and ground cover variables at these sites are generally progressing well and achieving high benchmarks. **The variables that failed to meet any benchmarks for these sites included species richness, T1 canopy height and cover, shrub cover, shrub height (site 49 only) and weed cover, again highlighting these sites as top priority for infill planting of canopy species to facilitate regeneration of this strata layer, combined with weed management for progression towards benchmarks within the longer term.** Whilst shrub cover was not an area of concern for site 49, continued failure to meet a benchmark for shrub cover for sites 24 and 59 should be considered in future monitoring periods to determine if infill planting in this strata will be needed to achieve benchmark targets, however it is considered possible that this layer will improve naturally in cover and species richness through succession over time. The remaining 95% of sites now meet at least 5 benchmarks across variables indicating a trend of improvement overall.

As of the 9th monitoring period, additional sites in 'poorest condition' include those that failed to attain the minimum IMO-5 benchmark for 5 or more benchmark variables. **In this monitoring period, there were 8 sites (1 more than 9th monitoring period) that met this criteria, having only met the IMO-5 benchmark in 4 areas, including them among the top priority sites for management. These included site 24 (CRU11), site 59 (ORU7), site 60 (ORU8), site 57 (CRU3), site 26 (ORU2), site 49 (CRU15), site 56 (CRU3) and site 33 (ORU4) (ordered from higher to lower weed cover),** of which sites 24, 49, 56 and 59 were also those in poorest condition in the previous monitoring period. It is noted that three of these (sites 24, 49 and 56) are also listed above for lowest number of variables reaching **any** benchmark, further confirming their inclusion among poorest condition sites.

Consistent with the previous monitoring round, **there were 6 sites that were considered in greatest decline** as they had all declined in 3 or more benchmark variables, whereas other sites had declined in 2 or less variables. These varied from those that were in greatest decline in the 9th monitoring period and **included sites 49 (CRU15), 61 (ORU8), 143 (CRU8), 25 (ORU2), 58 (ORU7) and 19 (ORU1) (from higher to lower priority)**, of which sites 49 and 143 had the greatest decline in the previous monitoring period. **Overall, these sites were declining in one or more variables, predominantly species richness, shrub cover and shrub height.** Sites 62, 68 (ORU9), 136 (ORU22) and 137 (ORU23) had improved considerably and were no longer amongst those in greatest decline. Moreover, the other sites are regarded to be faring well, with high benchmark achievement for most variables despite the recorded declines; therefore they are not targeted as priority for management at this time, but will be observed for any continued decline in the next monitoring period.

Another consideration included sites that had the least improvement overall in the 10th monitoring period. Considering that sites had improved overall in terms of achieving 4 or more minimum benchmarks, the sites with the least improvement (0-1 variables improving overall AND failure to meet any benchmark in 4 or more areas) were regarded as 'high priority least improved'. There were 4 sites that fit this criteria in the current monitoring period (3 less than the previous monitoring period), including **site 24 (CRU11), 49 (CRU15), 56 (CRU3) and 144 (CRU8). These sites were among those with least improvement in the previous monitoring period (8th monitoring period) as well as in the present one**. Most of these sites had already been identified among the poorest condition sites, however site 144 had attained high benchmarks for most variables including % weed cover yet

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lacked species richness a T1 canopy layer and shrub cover, making the site a candidate for infill planting with T1 species to ensure the site progresses towards the desired benchmarks over the longer term. **The remaining sites needed most improvement in native species richness, T1 canopy cover and height, shrub cover and % weed cover. This perspective highlighted a need to focus recommended rehabilitation efforts on assisted natural regeneration through infill planting of T1 canopy tree species combined with weed management at these sites if benchmark targets are to be achieved within the next 5-10 years.** Sites 33 (ORU4), 59 (ORU7) and 112 (ORU16) had all improved with a greater number of variables achieving benchmarks since 9th monitoring period.

Converse to the previous 3 monitoring periods, there was a pause in the trend of decline regarding the number of sites meeting the benchmark of ≤5% cover for weed cover in the ground layer, with an overall trend of 'same' this monitoring period. This was reflected in the results, with 50 sites remaining the same (1 less than 9th monitoring period), 7 declining (1 less than 9th monitoring period) and 2 improving (2 more than 9th monitoring period). A total of 34 sites failed to meet the benchmark for weed cover (1 less than 9th monitoring period), which is still much higher than what was reported in the 8th monitoring period.

It is recommended to concentrate future management towards reducing weed cover at top priority sites (those listed above as in 'poorest condition') to pause the trend of decline, with a goal for establishing a trend of improvement. This will benefit offset areas through continued restoration of ecological condition towards desired RE's and in some instances (e.g. where large thickets of *Lantana camara* act as barriers) also free up ground space to enhance potential as movement corridors for koalas and other fauna. It is important to take a passive, mosaic approach to removal of weeds where established patches are providing shelter and breeding space for native fauna such as birds, small mammals and amphibians. Therefore, overspray should be avoided, with hand removal recommended for large patches of *L. camara* following close inspection to ensure active nesting sites are not disturbed.

Sites that had the highest weed cover recorded (Table 10) and therefore did not meet the benchmark (Table 11) are high priority for management in order to bring them into alignment with benchmark targets. In this monitoring period, the sites with highest weed cover were not all considered among the top 5 sites in poorest condition listed above as they scored well in other benchmark areas, with the exception of site 24. Where possible, additional management priorities may be determined through reviewing Table 10 and focusing on areas that contain the highest weed densities and/or are lacking a T1 canopy layer, as these are the top priority actions if meeting all benchmark targets are desired within the intended time frame over the next 5-10 years. Therefore, **weed management combined with infill planting for T1 canopy species is recommended for additional sites where possible, determined through combined review of results Table 10 and Table 12.**

Priority species for weed control overall include *Lantana camara* (woody shrub), *Cinnamomum camphora* (tree) and *Pinus elliottii* (tree) in the shrub layer. In the ground layer priority weed species were based on species with the greatest cover recorded and most widespread, including *Andropogon virginicus* (grass), *Lantana camara* (woody shrub), *Passiflora suberosa* (vine), *Ageratum houstonianum* (herb) and *Setaria sphacelata.* *Lantana montevidensis* (creeping herb) and *Digitaria didactyla* (grass) were no longer amongst the most invasive weeds. These may be encountered alongside other mixed exotic grasses and herbs.

6.4 Priority Precincts for weed management

In this monitoring period, the results indicate a pause in the decline in the number of sites meeting the benchmark for % weed cover, with only a small increase in overall average weed cover. Ideally,

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however, this will switch to a trend of decline in weed cover, yet it is expected there will be some continued variability due to seasonal conditions, including increased rainfall providing favourable conditions for the growth of herbaceous weeds and graminoids in the ground layer as well as continued establishment of *L. camara* in areas that have not yet been managed. Provided that management continues over time and that no severe outbreaks or incursions occur, the weed cover in most precincts does not pose a huge threat to the quality of koala habitat. It is recommended that **rehabilitation continues to prioritise weed control in ORU / CRU containing sites that fail to meet the <5% weed cover benchmark as prescribed above, particularly those in ongoing sensitive areas where koalas are thought to be most active such as those within or adjacent to conservation areas and greenspace areas adjoining Plunkett Conservation Reserve as well as within central fauna corridors. These have been recently reviewed as it is noted that there have been some changes to precinct names since the previous monitoring period. This includes the areas in the eastern most reaches of Precinct 3 (ORU9, ORU10 and ORU11), Precinct 4 (ORU13 and ORU15), Precinct 14 (ORU15 and ORU16) and Precinct 17 (CRU8, ORU17, ORU18, ORU19, ORU20, ORU21, ORU22 and ORU23).**

There are a total of 33 sites in these ORU / CRU, with 15 of these failing to meet the ≤5% benchmark for weed cover (one less than previous monitoring period). Four of these sites were already included among the top priority sites for rehabilitation supporting the above recommendations. This included site 137 (ORU23), 110 (ORU15), 112 (ORU16) and 129 (ORU21) from higher to lower priority based on overall results (see table below). Other sites have been ordered from higher to lower priority based on % weed cover, including site 138 (ORU23), 115 (ORU17), 113 (ORU16), 128 (ORU20), 130 (ORU21), 111 (ORU15), 133 (ORU19), 66 (ORU9), 135 (ORU22) and 132 (ORU19). The majority of these sites (10 sites) fall within **Precinct 17, highlighting it as the top priority Precinct for rehabilitation management, in order to contain and minimise the potential for weeds to encroach further into conservation areas. The remaining sites fell within Precincts 4 and 14, which are also located in priority precinct areas. Priority target species for weed control within these precincts are mostly consistent with the 9th monitoring period and include the most abundant species recorded** *Andropogon virginicus (*grass)*, Lantana camara* (woody herb)*, Passiflora suberosa* (vine), *Ageratum houstonianum* (herb) and *Setaria sphacelata* (grass)**.** Low occurrences of other mixed exotic herbs and grasses may be encountered in these areas.

6.5 Conclusions and recommendations

In conclusion, the results for benchmark indicators and weed cover were used to determine highest priority sites for rehabilitation based on those with highest weed cover, in poorest overall condition, in greatest decline or least improved, with consideration to precinct proximity to ecologically sensitive areas. **All 11 sites that were listed among top priority in the 9th monitoring period remained among top priority in the current monitoring period, with slight variation in order from highest to lower priority. Another 7 sites from 6 ORU were added due to their status among the sites with highest weed cover, poorest condition or in greatest decline. In this monitoring period, additional sites containing high weed cover in priority precincts were also included. Based on this, it was determined that there are 18 priority Rehabilitation Units within 6 precincts to be considered highest priority for management action. Therefore, top priority rehabilitation units for management in this monitoring period are CRU11 (Precinct 12), CRU15 and CRU3 (Precinct 3), ORU23 (Precinct 17), ORU15 (Precinct 17), ORU7 (Precinct 3), ORU16 (Precinct 17), ORU21 (Precinct 17) ORU8 (Precinct 3) CRU8 (Precinct 17), ORU1 (Precinct 13), ORU2 (Precinct 13), ORU4 (Precinct 9), ORU17 and ORU16 (Precinct 14), ORU20 (Precinct 17), ORU15 (Precinct 4), ORU19 (Precinct 17), ORU9 (Precinct 3), ORU22 and ORU19 (Precinct 17) from highest to lower priority**. Of this list, all areas except ORU1, ORU2, ORU9, ORU15, ORU16, ORU17, ORU19, ORU20, ORU22, and ORU23 were also among top priority in the 9th monitoring period and areas ORU15, ORU16, and ORU21 were those that were top priority during the 8th monitoring period.

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Additional priority sites within the priority precinct discussed above have been added at the bottom of the table for ease of reference. These sites are generally meeting high benchmarks, yet fail to meet the <5% weed cover target and are within the ecologically sensitive interface area which makes them ideal candidates for weed management where possible. They are in order of highest to lower weed cover.

The recommended actions for these sites include **weed management in the ground and shrub layer including removal of *Pinus elliottii* from the upper strata layers where present. Additionally, infill planting of T1 canopy species in these ORUs is included for a number of sites to progress towards benchmark targets for canopy in the long term.** The recommended management actions including recommended species for infill planting for top priority ORU are provided in order of highest to lowest priority in Table 11 below. Recommended species for infill planting are based on species recorded within transect surveys for each site.

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Table 11 10th Koala Offset monitoring period top priority ORU (highest to lowest) and recommended management actions

Precinct	ORU / CRU	Site	Weed cover %	Management action	Priority weeds	Species for infill planting	Notes
12	CRU11	24	59.6	Intensive weed management + infill planting (T1 species)	*Andropogon virginicus,* mixed other grasses	*Eucalyptus tereticornis, E. siderophloia*	• Poorest condition • Highest weed cover • Least improved
3	CRU15	49	10.8	Minimal weed management + infill planting (T1 species)	*Ageratum houstonianum,*	*Eucalyptus tereticornis, E. siderophloia, E. resinifera, E. seeana*	• Poorest condition • Greatest decline • Least improved
3	CRU3	56	7.2	Minimal weed management + infill planting (T1 species)	*A. virginicus*	*Eucalyptus siderophloia, E. resinifera*	• Poorest condition • Least improved
17	ORU23	137	44	Intensive weed management	*L. camara, P. suberosa, Rivina humilis, Solanum seaforthianum*	-	• Highest weed cover • Priority precinct
17	ORU15	110	41.2	Intensive weed management + infill planting (T1 species)	*A. virginicus, A. houstonianum, L. camara, Pinus elliottii,* mixed woody weeds / herbs	*Eucalyptus siderophloia, E. resinifera*	• Highest weed cover • Priority precinct
3	ORU7	59	40.8	Intensive weed management + infill planting (T1 species)	*Setaria sphacelata, A. houstonianum*	*Eucalyptus tereticornis, Melaleuca linariifolia*	• poorest condition • Highest weed cover
17	ORU16	112	38.8	Intensive weed management + infill planting (T1 species)	*A. virginicus, A. houstonianum*	*Eucalyptus tereticornis, Melaleuca linariifolia*	• Highest weed cover • Priority precinct
17	ORU21	129	37.2	Intensive weed management + infill planting (T1 species)	*L. camara*	*Eucalyptus siderophloia, E. resinifera*	• Highest weed cover • Priority precinct
3	ORU8	60	24	Intensive weed management + infill planting (T1 species)	*A. virginicus,* mixed herbs	*Corymbia intermedia, Eucalyptus seeana, E. siderophloia*	Poorest condition
17	CRU8	143	18	Moderate weed management	*L. camara, Lantana montevidensis, P. suberosa*	*Eucalyptus tereticornis*	Greatest decline
13	ORU1	19	15.6	Moderate weed management	*L. camara*		Greatest decline
3	CRU3	57	15.2	Moderate weed management + infill planting (T1 species)	A. houstonianum	*Corymbia intermedia, E. seeana, E. siderophloia*	Poorest condition
13	ORU2	26	13.6	Moderate weed management + infill planting (T1 species)	*A. virgninicus, L. camara*		Poorest condition
3	ORU8	61	10.4	Moderate weed management + infill planting (T1 species)	A. virginicus	*Corymbia intermedia, E. seeana, E. siderophloia*	Greatest decline
13	ORU2	25	10.4	Moderate weed management	*L. camara*		Greatest decline
9	ORU4	33	6.8	Minimal weed management + infill planting (T1 species)	*L. camara*, mixed herbs	*Corymbia intermedia, C. tesselaris*	Poorest condition
17	CRU8	144	1.6	infill planting (T1 species)	-	*Corymbia intermedia, E. seeana*	Least improved
3	ORU7	58	0.4	Infill planting (T1 species)	-	*E. tereticornis, E. resinifera, E. siderophloia*	Greatest decline
Additional Priority sites / ORU in Priority Precincts for weed management							
17	ORU23	138	28.8	Intensive weed management	*L. camara, P.suberosa, S. seaforthianum*	-	Priority Precinct
14	ORU17	115	25.2	Intensive weed management	*A. virginicus*	-	Priority Precinct
14	ORU16	113	23.2	Intensive weed management	*A. virginicus*	-	Priority Precinct
17	ORU20	128	20.8	Moderate weed management	*L. camara, P. suberosa*	-	Priority Precinct
17	ORU21	130	18.4	Moderate weed management	*L. montevidensis*	-	Priority Precinct
4	ORU15	111	18.4	Moderate weed management	*A. houstonianum, L. camara, P. suberosa*	-	Priority Precinct
17	ORU19	133	15.6	Moderate weed management	*L. camara*	-	Priority Precinct
3	ORU9	66	14	Moderate weed management	*Digitaria didactyla*	-	Priority Precinct
17	ORU22	135	8	Minimal weed management	*L. camara, L. montevidensis, P. suberosa*	-	Priority Precinct
17	ORU19	132	6.8	Minimal weed management	*L. montevidensis*	-	Priority Precinct

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Additional measures:

- Targeted felling of *Pinus elliottii* from the T1 canopy and T2-T3 small tree layers is recommended at sites 23 (CRU11), 110 (ORU15), 115 (ORU17), 128 (ORU20), 129 (ORU21) and 132 (ORU19).

- 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.

- Where appropriate, rehabilitation efforts are to also incorporate ongoing maintenance of stock exclusion fencing and installation of new fencing where the need has been identified based on monitoring results, if stock incursion is adversely impacting benchmark achievement due to overgrazing or trampling. Precinct 11 Fauna corridors are a priority for exclusion fencing at this 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 cylindrica* 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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Table 12 10th 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 (S)	FMO-15 (I)	IMO-10 (S)	FMO-15 (S)	IMO-5 (S)	FMO-15 (I)	FMO-15 (S)	FMO-15 (I)	X (S)
19	ORU1	12.9-10.17/12.9-10.2	FINAL (S)	IMO-10 (S)	IMO-10 (D)	FMO-15 (S)	IMO-5 (D)	IMO-10 (I)	IMO-10 (D)	FMO-15 (I)	X (S)
23	CRU11	12.3.11/12.3.6/12.3.7	FINAL (I)	X (S)	X (S)	FINAL (I)	FINAL (I)	IMO-5 (S)	FINAL (S)	FINAL (S)	X (D)
24	CRU11	12.3.11/12.3.6/12.3.7	X (S)	X (S)	X (S)	FMO-15 (S)	FINAL (I)	X (D)	FINAL (S)	FINAL (S)	X (S)
25	ORU2	12.3.11/12.3.6/12.3.7	X (D)	FMO-15 (I)	FMO-15 (S)	FINAL (S)	FINAL (S)	IMO-2 (D)	FMO-15 (D)	FINAL (S)	X (S)
26	ORU2	12.3.11/12.3.6/12.3.7	X (S)	IMO-2 (I)	X (S)	FMO-15 (S)	FMO-15 (S)	IMO-2 (D)	FMO-15 (S)	FINAL (S)	X (S)
27	ORU2	12.3.11/12.3.6/12.3.7	X (S)	X (S)	X (S)	FINAL (I)	FINAL (I)	IMO-10 (D)	FINAL (S)	FINAL (I)	X (S)
28	ORU2	12.3.11/12.3.6/12.3.7	FINAL (I)	X (S)	X (S)	IMO-10 (I)	FMO-15 (I)	X (D)	FMO-15 (D)	FINAL (S)	X (S)
29	ORU4	12.9-10.17/12.9-10.2	FINAL (S)	IMO-5 (I)	IMO-10 (S)	FINAL (S)	IMO-10 (S)	X (D)	FMO-15 (S)	FMO-15 (S)	X (S)
30	ORU4	12.9-10.17/12.9-10.2	FINAL (S)	FMO-15 (S)	FMO-15 (I)	IMO-5 (S)	FMO-15 (S)	X (S)	X (D)	FMO-15 (I)	FINAL (S)
31	ORU4	12.9-10.17/12.9-10.2	X (D)	IMO-3 (I)	IMO-10 (S)	FMO-15 (S)	IMO-10 (S)	IMO-2 (I)	FMO-15 (I)	IMO-1 (I)	FINAL (S)
32	ORU4	12.9-10.17/12.9-10.2	FINAL (S)	X (S)	X (S)	FINAL (I)	IMO-5 (S)	IMO-2 (I)	IMO-10 (I)	X (S)	FINAL (S)
33	ORU4	12.9-10.17/12.9-10.2	FINAL (S)	X (S)	X (S)	FINAL (I)	IMO-5 (S)	IMO-3 (D)	FMO-15 (D)	IMO-1 (S)	X (S)
44	ORU5	12.3.11/12.3.6/12.3.7	X (S)	X (S)	X (S)	FINAL (I)	IMO-5 (S)	FMO-15 (D)	FINAL (S)	FINAL (I)	X (D)
45	ORU5	12.3.11/12.3.6/12.3.7	FINAL (I)	FMO-15 (I)	FMO-15 (S)	FINAL (S)	FINAL (I)	IMO-2 (I)	FINAL (S)	FMO-15 (S)	X (S)
46	ORU5	12.3.11/12.3.6/12.3.7	FINAL (I)	IMO-5 (I)	FMO-15 (S)	FMO-15 (S)	FMO-15 (D)	FMO-15 (I)	FMO-15 (D)	FMO-15 (I)	X (S)
47	ORU5	12.3.11/12.3.6/12.3.7	X (S)	X (S)	X (S)	FINAL (I)	IMO-10 (I)	FMO-15 (D)	FINAL (S)	FINAL (I)	FINAL (S)
49	CRU15	12.3.11/12.3.6/12.3.7	X (D)	X (S)	X (S)	IMO-10 (D)	FMO-15 (I)	FMO-15 (D)	X (D)	FINAL (S)	X (S)
54	ORU6	12.3.11/12.3.7	FINAL (S)	X (S)	X (S)	FMO-15 (I)	FMO-15 (I)	FMO-15 (D)	IMO-10 (D)	FINAL (S)	FINAL (I)
55	ORU6	12.3.11/12.3.7	X (D)	FMO-15 (I)	FMO-15 (S)	FINAL (S)	FINAL (I)	IMO-2 (D)	FMO-15 (S)	FINAL (S)	FINAL (S)
56	CRU3	12.3.11/12.3.7	X (S)	X (S)	X (S)	FINAL (S)	FINAL (I)	X (S)	FINAL (S)	FINAL (S)	X (D)
57	CRU3	12.3.11/12.3.6/12.3.7	X (S)	X (S)	X (S)	IMO-5 (I)	FMO-15 (I)	IMO-3 (I)	FINAL (I)	FINAL (I)	X (D)
58	ORU7	12.3.11/12.3.6/12.3.7	X (D)	X (S)	X (S)	FINAL (S)	FMO-15 (I)	IMO-2 (D)	FMO-15 (D)	FMO-15 (S)	FINAL (S)
59	ORU7	12.3.11/12.3.6/12.3.7	X (S)	X (S)	X (S)	FMO-15 (S)	IMO-10 (I)	IMO-2 (D)	FMO-15 (I)	FINAL (S)	X (S)
60	ORU8	12.9-10.17/12.9-10.2	FINAL (S)	X (S)	X (S)	IMO-5 (S)	IMO-5 (S)	IMO-1 (I)	IMO-3 (D)	FMO-15 (I)	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 (S)	X (S)	X (S)	FMO-15 (S)	IMO-10 (I)	IMO-3 (D)	IMO-5 (D)	FMO-15 (I)	X (D)
62	ORU9	12.9-10.17/12.9-10.19	FINAL (S)	FMO-15 (I)	FMO-15 (S)	FMO-15 (S)	FMO-15 (S)	IMO-2 (I)	IMO-5 (S)	IMO-10 (I)	FINAL (S)
63	ORU10	12.9-10.17	FINAL (S)	FMO-15 (I)	FMO-15 (S)	FMO-15 (S)	IMO-10 (I)	FMO-15 (I)	IMO-10 (S)	IMO-2 (D)	FINAL (S)
64	ORU11	12.9-10.17	FINAL (S)	FMO-15 (I)	IMO-10 (S)	FMO-15 (I)	FMO-15 (I)	IMO-1 (I)	IMO-3 (D)	FMO-15 (I)	FINAL (S)
65	ORU10	12.9-10.17	FINAL (S)	FMO-15 (S)	IMO-10 (S)	IMO-5 (D)	IMO-10 (S)	IMO-3 (I)	IMO-5 (D)	IMO-10 (I)	FINAL (S)
66	ORU9	12.9-10.17/12.9-10.19	FINAL (S)	IMO-3 (I)	IMO-10 (S)	FMO-15 (S)	IMO-10 (S)	FMO-15 (I)	X (S)	FMO-15 (S)	X (D)
67	ORU9	12.9-10.17/12.9-10.19	FINAL (S)	FMO-15 (S)	IMO-10 (S)	IMO-5 (D)	IMO-5 (S)	FMO-15 (I)	IMO-10 (S)	IMO-10 (I)	FINAL (S)
68	ORU9	12.9-10.17/12.9-10.19	FINAL (S)	FINAL (I)	IMO-10 (S)	IMO-5 (D)	IMO-10 (S)	IMO-2 (S)	IMO-10 (I)	FMO-15 (I)	FINAL (S)
69	ORU9	12.9-10.17/12.9-10.19	FINAL (S)	IMO-10 (S)	IMO-10 (S)	X (S)	X (S)	FMO-15 (I)	IMO-3 (S)	IMO-1 (S)	FINAL (S)
102	ORU13	12.9-10.17/12.9-10.19	X (S)	FINAL (I)	FMO-15 (I)	IMO-5 (D)	IMO-5 (D)	X (S)	FMO-15 (I)	IMO-1 (I)	FINAL (S)
103	ORU13	12.9-10.17/12.9-10.19	FINAL (S)	FMO-15 (S)	FMO-15 (I)	IMO-1 (S)	IMO-10 (S)	IMO-3 (I)	IMO-10 (I)	IMO-2 (I)	FINAL (S)
104	ORU13	12.9-10.17/12.9-10.19	X (I)	IMO-10 (S)	IMO-10 (D)	IMO-10 (D)	FMO-15 (S)	IMO-2 (I)	IMO-10 (S)	IMO-10 (I)	FINAL (S)
109	ORU15	12.9-10.17/12.9-10.2	X (D)	IMO-10 (S)	FMO-15 (S)	FMO-15 (I)	IMO-10 (I)	IMO-1 (S)	FMO-15 (I)	IMO-2 (I)	FINAL (S)
110	ORU15	12.9-10.17/12.9-10.2	X (S)	IMO-1 (I)	X (S)	IMO-10 (I)	IMO-10 (I)	FMO-15 (I)	FMO-15 (I)	FMO-15 (S)	X (S)
111	ORU15	12.9-10.17/12.9-10.2	X (S)	FMO-15 (I)	X (S)	FMO-15 (D)	IMO-10 (S)	FMO-15 (I)	FMO-15 (I)	FMO-15 (I)	X (S)
112	ORU16	12.9-10.17/12.9-10.19	FINAL (I)	X (S)	X (S)	FINAL (S)	IMO-10 (I)	X (S)	FMO-15 (D)	FMO-15 (S)	X (S)
113	ORU16	12.9-10.17/12.9-10.19	FINAL (I)	X (S)	X (S)	FMO-15 (S)	FMO-15 (I)	IMO-2 (D)	FMO-15 (S)	FMO-15 (I)	X (S)
115	ORU17	12.9-10.17/12.9-10.2	FINAL (I)	X (S)	IMO-10 (S)	IMO-10 (I)	X (S)	IMO-5 (S)	FMO-15 (S)	FMO-15 (S)	X (S)
123	ORU18	12.9-10.17	FINAL (S)	FINAL (I)	IMO-10 (S)	IMO-3 (D)	FMO-15 (I)	IMO-3 (I)	IMO-10 (S)	IMO-5 (I)	FINAL (S)
124	ORU18	12.9-10.17	FINAL (S)	FINAL (I)	IMO-10 (S)	IMO-5 (D)	FMO-15 (I)	IMO-3 (I)	FINAL (S)	IMO-3 (I)	FINAL (S)
127	ORU20	12.9-10.17/12.9-10.2	FINAL (S)	FINAL (I)	IMO-10 (S)	FMO-15 (S)	FMO-15 (I)	IMO-3 (I)	IMO-5 (D)	FMO-15 (I)	FINAL (S)
128	ORU20	12.9-10.17/12.9-10.2	FINAL (S)	FINAL (I)	IMO-10 (S)	IMO-10 (D)	IMO-10 (S)	IMO-5 (I)	FMO-15 (S)	FMO-15 (I)	X (S)
129	ORU21	12.11.5/12.11.3	FINAL (I)	IMO-3 (I)	X (S)	FINAL (D)	IMO-10 (S)	FMO-15 (D)	FINAL (S)	FINAL (S)	X (S)
130	ORU21	12.11.5/12.11.3	FINAL (S)	IMO-3 (D)	FMO-15 (I)	FINAL (S)	FINAL (S)	X (D)	FINAL (S)	FINAL (I)	X (S)
131	ORU19	12.11.5/12.11.3	FINAL (I)	IMO-3 (S)	FMO-15 (S)	FINAL (S)	FINAL (S)	X (D)	FMO-15 (D)	FMO-15 (I)	FINAL (S)
132	ORU19	12.11.5/12.11.3	FINAL (S)	FMO-15 (I)	FMO-15 (I)	FINAL (S)	FINAL (S)	IMO-2 (D)	X (S)	FINAL (I)	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%?)
133	ORU19	12.11.5/12.11.3	FINAL (S)	FMO-15 (I)	FMO-15 (I)	FINAL (I)	FINAL (I)	IMO-2 (D)	FINAL (I)	FINAL (I)	X (D)
134	ORU22	12.11.5/12.11.3	X (S)	IMO-5 (I)	X (S)	FINAL (S)	FINAL (I)	X (D)	FINAL (S)	FMO-15 (S)	FINAL (S)
135	ORU22	12.11.5/12.11.3	FINAL (I)	IMO-3 (I)	X (S)	FINAL (S)	FINAL (S)	IMO-3 (D)	FINAL (I)	FINAL (I)	X (S)
136	ORU22	12.11.5/12.11.3	X (S)	FMO-15 (S)	FMO-15 (S)	FINAL (S)	FMO-15 (D)	IMO-3 (D)	FINAL (S)	FMO-15 (I)	FINAL (I)
137	ORU23	12.11.5	X (D)	FMO-15 (S)	FMO-15 (S)	FINAL (S)	FINAL (S)	IMO-10 (D)	FINAL (S)	FINAL (S)	X (S)
138	ORU23	12.11.5	X (S)	IMO-5 (D)	FMO-15 (S)	FINAL (S)	FINAL (S)	FMO-15 (D)	FINAL (S)	FINAL (S)	X (S)
143	CRU8	12.11.5/12.11.3	X (D)	IMO-5 (D)	FMO-15 (S)	FINAL (S)	FINAL (S)	IMO-2 (D)	FMO-15 (I)	FINAL (S)	X (S)
144	CRU8	12.11.5/12.11.3	X (S)	X (S)	X (S)	FINAL (S)	FINAL (S)	X (D)	FMO-15 (I)	FINAL (S)	FINAL (S)
Total meeting a benchmark (current mon.)			**35**	**39**	**34**	**58**	**57**	**48**	**55**	**58**	**25**
Total meeting a benchmark (9th mon.)			**44**	**37**	**34**	**58**	**57**	**46**	**55**	**56**	**24**
Total improving (since 9th mon.)			**11**	**25**	**6**	**14**	**25**	**23**	**14**	**32**	**2**
Total declining (since 9th mon.)			**8**	**3**	**2**	**11**	**4**	**28**	**16**	**1**	**7**
Total same (since 9th mon.)			**40**	**31**	**51**	**34**	**30**	**8**	**29**	**26**	**50**
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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