EPBC 2010/5649
Millar Road Clearing Vegetation to Allow Quarrying

Annual Compliance Report
2021/2022

Introduction

On the 14 February 2022 transfer of EPBC Approval 2010/5649 from WA Limestone Group of Companies (WAL) to City of Rockingham was approved by the Department of Agriculture, Water and Environment. Following approval of the transfer, the City gained responsibility for the ongoing implementation of the conditions of the EPBC approval, including the implementation of the Tamworth Hill Swamp Reserve Revegetation Plan (THSRRP) as per Condition 2.

During the preparation of the City's Tamworth Hill Swamp Management Plan in 2019, City's Officers identified that the revegetation works undertaken in accordance with the THSRRP had not met the EPBC approval requirements. The non-compliance was reported to the Department of Environment and Energy (DEE) in 2018. To assist in addressing the non-compliance of the EPBC approval requirements, a revised THSRRP was prepared by the City and subsequently approved by DEE in 2019. The THSRRP Addendum outlines additional planting requirements under an implementation schedule from 2020 to 2024.

Following the transfer of EPBC Approval 2010/5649 from WAL to the City, The City will now be wholly responsible for implementing all conditions on the approval. It is noted a number of the conditions have been previously completed and are no longer applicable. Table 1 summarises the 12 conditions detailed in the EPBC approval report.

Table 1: Compliance Audit of EPBC Approval 2010/5649 Conditions 2021/2022

Condition	Details	Status	Comment
1	The person taking the action must ensure that the vegetation clearing does not exceed 22 hectares and is contained within the area specified in the map at Figure 1 of Appendix A: project area.	Completed	Clearing was completed within the approved area prior to this reporting period as detailed by WA Limestone's EPBC 2010/5649 Millar Road Annual Compliance Report 2021 EPBC-2010-5649-Millar-Road-Annual-Compliance-Report-2021.pdf (walimestone.com)
2	To mitigate potential impacts to Black Cockatoos, within six (6) months of the commencement of construction, the person taking the action must prepare and submit a Tamworth Hill Swamp Reserve Revegetation Plan (THSRRP) for the Minister's approval that identifies the measures to minimise the impacts of the action on Black Cockatoos. The THSRRP must detail the following: i. .measures to establish the equivalent of at least 12ha of habitat known to be primary feeding plants for Black Cockatoos within the Tamworth HillSwamp Reserve (THSR), through landscape planting; ii. the revegetation methods to be undertaken within revegetation zones defined in Appendix A Figure2; iii. measures to ensure that seedlings being planted are free of Dieback, (Phytophthora cinnamomi); iv. timeframes and survival targets proposed for plantings; v. feral animal and weed controls measures to be implemented; vi. fencing to be undertaken; vii. contingency measures if targets are not met; viii. the monitoring and survey measures to be utilised, including timing schedules and reporting requirements; ix. roles and responsibilities of contractors, staff and the person taking the action, prior to, during and following any rehabilitation and revegetation works undertaken within the THSR area, and; x. how the WA DEC, CoR, or other conservation organisation(s), have been consulted in the preparation of the THSRRP. If the Minister approves the THSRRP then the THSRRP must be implemented.	Completed	Tamworth Hill Swamp Reserve Revegetation Plan – Addendum 1 was submitted to the Minister for approval in September 2019. Compliance with the approved Plan can be seen in Attachment 1 – Tamworth Hill Swamp Revegetation Report 2021/2022

3	Prior to commencement of construction the person taking the action must provide the department with written agreement from the CoR that the Tamworth Hill Swamp Reserve (THSR) revegetation areas shown at Appendix A Figure 2 will be retained in perpetuity under its existing conservation reserve status	Completed	No further update since WA Limestone's EPBC 2010/5649 Millar Road Annual Compliance Report 2021 EPBC-2010-5649-Millar-Road-Annual-Compliance-Report-2021.pdf (walimestone.com)
4	To offset the loss of 22ha of Black Cockatoo foraging habitat and the loss of 93 potential breeding trees, the person taking the action must within 12 months of the commencement of construction, provide funding of $65,000 to WA DEC for the acquisition, and to assist in the ongoing maintenance of, a 65ha area of freehold land in the Gingin area (offset area). The land being ceded to WA DEC, under irrevocable long term protection must contain Banksia woodland that is in equivalent or better condition than the Banksia woodland that is in 'average' condition within the project area. Within 4 weeks of the funding being provided to WA DEC, the person taking the action must provide written evidence to the department of the payment.	Completed by WA Limestone	No further update since WA Limestone's EPBC 2010/5649 Millar Road Annual Compliance Report 2021 EPBC-2010-5649-Millar-Road-Annual-Compliance-Report-2021.pdf (walimestone.com)
5	Within 12 months of the commencement of construction, the person taking the action must provide to the department a description and map clearly defining the location and boundaries of the offset area, as specified in Condition 4, which must be accompanied with the offset attributes.	Completed by WA Limestone	No further update since WA Limestone's EPBC 2010/5649 Millar Road Annual Compliance Report 2021 EPBC-2010-5649-Millar-Road-Annual-Compliance-Report-2021.pdf (walimestone.com)
6	To mitigate potential impacts to Black Cockatoo habitat adjacent to the Project Area, the person taking the action must ensure that the following measures is carried out to limit the occurrence of Dieback *(Phytophthora cinnamomi)* on site. i. All vehicles being used during construction of the quarry that have come from a Dieback affected area must be washed down prior to entering the project area in accordance with WA DEC management of Dieback in extractive industries guidelines.	Completed by WA Limestone	No further update since WA Limestone's EPBC 2010/5649 Millar Road Annual Compliance Report 2021 EPBC-2010-5649-Millar-Road-Annual-Compliance-Report-2021.pdf (walimestone.com)
7	Within 30 days after the commencement of construction, the person taking the action must advise the department in writing of the actual date of commencement.	Completed by WA Limestone	No further update since WA Limestone's EPBC 2010/5649 Millar Road Annual Compliance Report 2021 EPBC-2010-5649-Millar-Road-Annual-Compliance-Report-2021.pdf (walimestone.com)

8	Within three months of every 12 month anniversary of the commencement of construction, the person taking the action must publish a report on their website addressing compliance with each of the conditions of this approval, including implementation of any management plans as specified in the conditions. The reports must remain on the website for at least five (5) years. Documentary evidence providing proof of the date of publication and non-compliance with any of the conditions of this approval must be provided to the department at the same time as the compliance report is published.	Completed	This Annual Compliance Report can be found of the City of Rockingham website
9	If the person taking the action wishes to carry out any activity otherwise than in accordance with the Tamworth Hill Swamp Reserve Revegetation Plan (THSRRP) as specified in the conditions, the person taking the action must submit to the department for the Minister's written approval a revised version of that THSRRP. The varied activity shall not commence until the Minister has approved the varied THSRRP in writing. The Minister will not approve a varied THSRRP unless the revised THSRRP would result in an equivalent or improved environmental outcome over time. If the Minister approves the revised THSRRP that THSRRP must be implemented in place of the THSRRP originally approved.	Not Applicable	Not Applicable
10	If the Minister believes that it is necessary or convenient for the better protection of Listed Threatened Species and Communities to do so, the Minister may request that the person taking the action make specified revisions to the Tamworth Hill Swamp Reserve Revegetation Plan (THSRRP) specified in the conditions and submit the revised THSRRP for the Ministers written approval. The person taking the action must comply with any such request. The revised approved THSRRP must be implemented. Unless the Minister has approved the revised THSRRP then the person taking the action must continue to implement the THSRRP originally approved, as specified in the conditions.	Not Applicable	Not Applicable
11	If, at any time after five years from the date of this approval, the person taking the action has not substantially commenced the action, then the person taking the action must not substantially commence the action without the written agreement of the Minister.	Completed by WA Limestone	No further update since WA Limestone's EPBC 2010/5649 Millar Road Annual Compliance Report 2021 EPBC-2010-5649-Millar-Road-Annual-Compliance-Report-2021.pdf (walimestone.com)

12	Unless otherwise agreed to in writing by the Minister, the person taking the action must publish the Tamworth Hill Swamp Reserve Revegetation Plan (THSRRP) referred to in these conditions of approval on their website. The THSRRP must be published on the website within 1 month of being approved.	Completed	The Tamworth Hill Swamp Reserve Revegetation Plan has been uploaded to the City of Rockingham's website

Appendix 1

Tamworth Hill Swamp Revegetation Project Report 2021/2022

Background

Revegetation strategies for this project are directed by the approved Tamworth Hill Swamp Reserve Revegetation Plan (THSRRP), developed by Coterra Environment in 2013, and Addendum 1 (2019). THSRRP identified the following performance targets for the revegetation program to establish 12 ha of habitat known to be primary feeding plants for Black Cockatoos within Tamworth Hill Swamp.

Characteristic	Minimum Target / KPI
Plant density	1 plant / m^2
Species composition	75% of revegetation species list
Weed cover	<20%

The following sections detail the measures that have been taken to address the management requirements as outlined in the THSRRP.

Revegetation Works

The focus of the revegetation strategy is to protect and enhance areas of existing native vegetation and to rehabilitate 12 ha of degraded areas around Tamworth Hill Swamp (areas marked “Part of EPBC Act offset” in Figure 1). Revegetation works have been carried out at the reserve since 2015 in quantities shown below in Table 1. Species used in revegetation are plants known to be primary feeding plants for Black Cockatoos or recommended in the THSRRP and Emerge Associates’ Tamworth Hill Swamp Environmental Assessment (2018).

The THSRRP Addendum includes a revised implementation schedule for infill planting from 2020 to 2024. Most recently, infill planting of 38,570 tubestock seedlings was undertaken in winter 2021 to address the shortfall in plant density across the site.

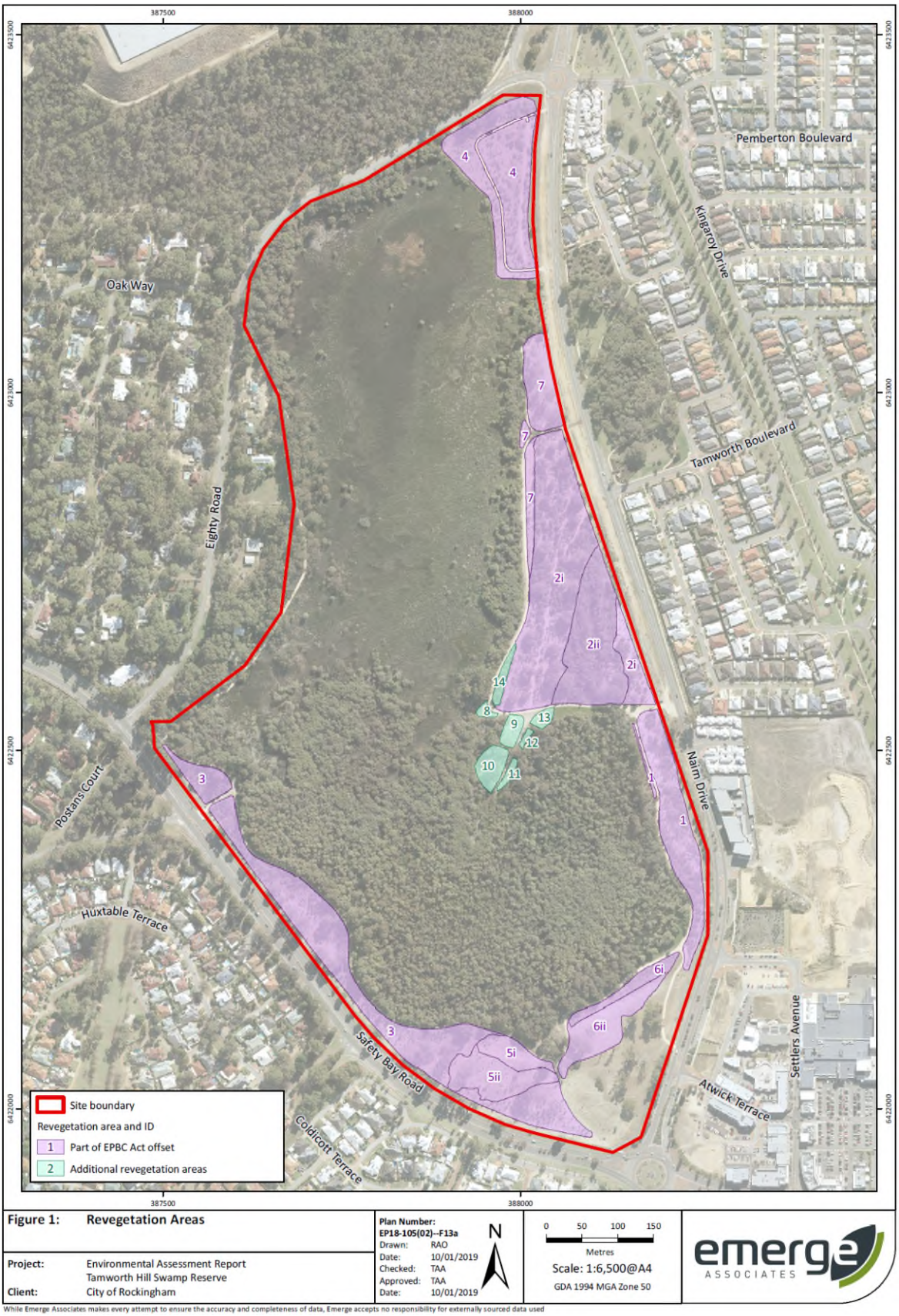


Figure 1: Revegetation areas at Tamworth Hill Swamp, numbered in relation to the order in which they were planted.

Table 1 – Yearly quantity of seedlings planted per revegetation area at the reserve

Area	2015	2016	2017	2018	2019	2020	2021	**Total**
RA1	8103				434		7130	**15667**
RA2	20000				788	9636	5090	**35514**
RA3		22000					12590	**34590**
RA4		4720					5050	**9770**
RA5			5000		560		3950	**9510**
RA6			5000				1910	**6910**
RA7			4960				2850	**7810**
RA8			100		60			**160**
RA9			100		60			**160**
RA10			100		60			**160**
RA11					118			**118**
RA12					100			**100**
RA13					100			**100**
Total	**28103**	**26720**	**15260**	**0**	**2280**	**9636**	**38570**	**120569**

Dieback Hygiene

Dieback hygiene protocols are in place for cleaning machinery and footwear with a methylated spirits or bleach solution. Seedlings used in the revegetation program are sourced from Nursery Industry Accreditation Scheme Australia (NIASA) accredited nurseries to ensure they are certified dieback free. No additional soil has been imported into the reserve.

Feral animal control

The City's feral animal control program continued this reporting period. The program is focused on the integrated control of feral rabbits, cats and foxes, in accordance with control measures recommended for use in urban environments by the Department of Agriculture and Food and the Department of Biodiversity, Conservation and Attractions. The program is coordinated by the City of Rockingham and is undertaken by a licenced feral animal control contractor.

An assessment was carried out throughout the reserve in early 2022 to check for signs of feral animal activity. No signs of foxes, cats or rabbits were recorded at the reserve.

Weed control

Weekly maintenance is undertaken at the reserve which predominantly comprises weed control (chemical, manual and mechanical). Three glyphosate treatment campaigns have been carried out this reporting period across the entirety of the revegetation area; spring 2021, autumn 2022 and early winter 2022. Additionally, hand weeding of broadleaf weeds and woody weed treatment is regularly implemented to maintain weed density below the 20% required in the maintenance contract at the reserve. Results from the assessment

of weed coverage at the reserve in spring 2021 can be seen in Table 2, and detailed further in the full consultant's report at the end of this document.

Fencing

Fences with pedestrian gates are maintained to rationalise access and recreation within the reserve. Clear pathways are designated to assist in avoiding trampling of vegetation. The perimeter fences also assists in preventing unauthorised vehicle access.

The perimeter fence is inspected during routine weekly maintenance of the reserve by environmental maintenance contractors. Any damage to the fence is repaired upon discovery or arranged through specialist fencing contractors.

Significant damage was sustained by a reserve gate and fencing on Nairn Drive in October 2021 when it was rammed by a vehicle that was then abandoned in the reserve. Police retrieved the vehicle the following day and urgent fencing repairs were carried out. No further damage has occurred.

The original THSRRP recommended temporary fencing to be constructed around revegetation areas. Kangaroo exclusion fencing was constructed around RA2 in 2015, and removed in 2017 after plant establishment. Since that time no further fencing has been installed around other revegetation zones. The Addendum to the THSRRP recommends use of compostable tree guards as the minimum treatment with fencing as the alternative measure to be considered. Compostable tree guards have been used to exclude predation by both rabbits and kangaroos with good success.

Monitoring

Results of the monitoring are included Section 4 – Monitoring below and in the attached Vegetation Survey Report 2021

Monitoring quadrats have been established across the revegetation areas and marked by GPS. Locations of 21 quadrats were nominated at random by Emerge Associates in their 2018 assessment on a 10m x 10m overlay grid across the reserve (Figure 2). Each revegetation zone contains three quadrats marked at their northwest corner by a steel fence picket.

Figure 2: Location of monitoring quadrats installed by Emerge Associates in 2018

Quadrats were resurveyed by Anders Environmental consultants in spring 2021 for native species stem density, native coverage and weed coverage. A summary of the survey results against the THSRRP performance targets is shown in Table 2 below. The full report is attached to the end of this document.

Ongoing works are scheduled to reduce weed coverage across the reserve, with particular focus on the area containing quadrat R6a, and to increase plant density and diversity through infill planting.

Table 2 – Summary of revegetation performance targets

Quadrat	Minimum 1 native plant / m2		Minimum 75% of revegetation species list represented		Maximum 20% weed coverage	
		Target met		Target met		Target met
Revegetation area (all quadrats)	1.3	✓	64.6 %	✗		
R1a	0.26	✗			<1%	✓
R1b	1.45	✓			<1%	✓
R1c	0.81	✗			1.3%	✓
R2a	0.24	✗			3.8%	✓
R2b	1.48	✓			3.2%	✓
R2c	1.02	✓			<1%	✓
R3a	0.51	✗			3.9%	✓
R3b	0.35	✗			2.5%	✓
R3c	3.47	✓			<1%	✓
R4a	3.32	✓			1.6%	✓
R4b	0.25	✗			1%	✓
R4c	0.39	✗			3.1%	✓
R5a	1.14	✓			<1%	✓
R5b	3.27	✓			<1%	✓
R5c	3.34	✓			<1%	✓
R6a	0.36	✗			24%	✗
R6b	0.6	✗			<1%	✓
R6c	0.72	✗			<1%	✓
R7a	3.36	✓			2.9%	✓
R7b	0.3	✗			1.2%	✓
R7c	1.43	✓			<1%	✓

20 December 2021

Kathy Choo
Coterra Environment
Level 1, 98 Colin Street
West Perth WA 6005

Dear Kathy,

Re: Basic flora and vegetation survey of Tamworth Hill Swamp Baldivis

A basic flora and vegetation survey was undertaken of the revegetation within the Tamworth Hill Swamp Baldivis in spring 2021 by Anders Environmental Consulting on behalf of Coterra Environment for the City of Rockingham.

The purpose of the survey was to provide information for the Tamworth Hill Swamp revegetation report, on the success of the revegetation project adopted from the Tamworth Hill Swamp Reserve Revegetation Plan (THSRRP). The revegetation project was undertaken as a native vegetation offset, to meet the approval requirements for the WA Limestone EPBC Approval for sand and limestone extraction near Millar Road in Baldivis.

1.0 Methodology

The survey was undertaken in spring on 9th, 16th and 26th November 2021 and involved assessing the 21 established monitoring quadrats within 7 revegetation areas surrounding Tamworth Hill Swamp.

Quadrats were re-established using existing fence droppers and survey tape. A photo was taken from the northwest corner and all flora species were recorded and individual plants counted. Within each quadrat the following parameters were assessed:

- Native species composition (alive and dead)
- Number of native plants per m^2
- Percentage weed cover.

The condition of the tree guards and survival rate of tubestock was also recorded.

The results of the revegetation assessment were used to provide a measure against the performance targets for the Tamworth Hill Swamp revegetation project. The performance targets were:

- Minimum 1 native plant/m2
- Minimum 75% of revegetation species list represented
- Maximum 20% weed coverage.

2.0 Results

2.1 Condition of quadrats and photo monitoring

Vegetation within quadrats consisted of a mixture of mature remnant vegetation and juvenile to semi-mature tubestock within tree guards (Table 1). The vegetation was in relatively good condition with low weed cover apart from one quadrat, R6a, which had high weed cover (24%). Some of the quadrats appeared to be weed sprayed and mulched.

Several tree guards had missing stakes, and some were missing guards which should be replaced or re-staked. Some of the tubestock were mature and the guards may need removing. Three quadrats (R4a, R5b, R5c) had wasp nests and active wasps within the tree guards which may need removing.

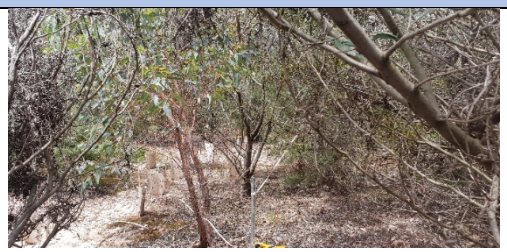
Table 1 Condition of vegetation and tubestock within quadrats

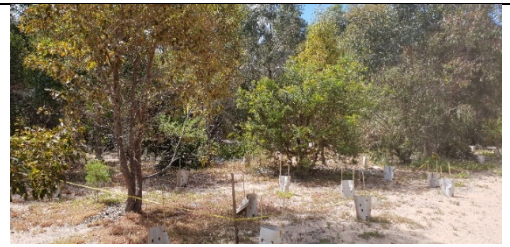
Quadrat	Vegetation structure	Vegetation condition	Tubestock within guards		Tubestock condition
			Alive	Dead	
R1a	Mature trees and shrubs with juvenile tubestock	Good – low weed cover	12	6	Some require replacement stakes
R1b	Dense mature trees and shrubs with juvenile tubestock	Good – low weed cover	11	12	Some require replacement stakes
R1c	Mature trees and shrubs with juveniles tubestock	Good – low weed cover. Large amount of leaf litter	10	10	Some require replacement stakes
R2a	Mature trees and shrubs with juvenile tubestock	Good – low weed cover	2	2	Few tree guards, most need re-staking
R2b	Dense mature tall shrubs and understorey	Good – low weed cover	No guards		
R2c	Mature trees and shrubs	Good – low weed cover	No guards		
R3a	Mature trees and shrubs with juvenile tubestock	Good – low weed cover	15	44	Low survival rate, some require replacement stakes
R3b	Mature trees and shrubs with juvenile tubestock	Good – low weed cover. Appears sprayed and mulched	10	12	Some guards and stakes require replacement
R3c	Dense mature trees and shrubs	Good – low weed cover. Large amount of leaf litter	No guards		
R4a	Mature trees and shrubs with juvenile tubestock	Good – low weed cover	21	9	Some require replacement stakes. Wasp nests in some tree guards
R4b	Mature shrubs with juvenile tubestock	Good – low weed cover	14	5	Some require replacement bags and stakes
R4c	Dense mature trees and shrubs with juvenile tubestock	Good – low weed cover	18	10	Some require replacement bags and stakes
R5a	Mature trees and shrubs with juvenile tubestock	Good – low weed cover	9	4	Some require replacement stakes

Quadrat	Vegetation structure	Vegetation condition	Tubestock within guards		Tubestock condition
			Alive	Dead	
R5b	Tubestock with weeds	Good – low weed cover	24	3	Some require replacement stakes. Wasp nests in tree guards
R5c	Mature trees and shrubs with juvenile tubestock	Good – low weed cover	18	12	Mature trees and shrubs with juvenile tubestock. Wasp nests in tree guards
R6a	Mature trees and shrubs with few juvenile tubestock	Degraded – high weed cover	1	4	
R6b	Dense mature trees and shrubs with no tubestock	Good – low weed cover	No guards		
R6c	Dense mature trees and shrubs	Good – low weed cover	5	2	Lots of old stakes and guards
R7a	Mature trees and shrubs with few juvenile tubestock	Good – low weed cover	16	1	Some require replacement stakes
R7b	Mature trees and shrubs with tubestock	Good – low weed cover. Appears sprayed	28	13	Some require replacement stakes
R7c	Mature trees and shrubs with tubestock	Good – low weed cover. High	28	23	Some require replacement stakes

Photo monitoring points for each quadrat was taken from the northwest corner looking into the quadrat. The photo monitoring points are presented in Table 2.

Table 2 Photo monitoring points for each quadrat Spring 2021

Quadrat	Photograph	Quadrat	Photograph		
R1a		R1b		R1c	
R2a		R2b		R2c	
R3a		R3b		R3c	
R4a		R4b		R4c	

Quadrat	Photograph	Quadrat	Photograph		
R5a		R5b		R5c	
R6a		R6b		R6c	
R7a		R7b		R7c	

2.2 Revegetation parameters

Native species composition

Native species within the revegetation zone comprised a combination of mature plants and semi-mature to juvenile tubestock. Mature native species were mainly Acacia, Eucalyptus, Corymbia, Grevillea, Hakea, and Jacksonia.

The number of native species within each quadrat ranged from 5 to 20 with the most native species present within quadrat R4c (20 species). Additional native species (*Crassula colorata*, *Microtis media*) not on the revegetation list were also present in some quadrats.

Weed cover

Weed cover across the revegetation zone was low. Most quadrats had less than 4% weed cover and 10 quadrats had less than 1% weed cover. One quadrat, R6a, had over 20% weed cover and was degraded with low native species cover and only 5 native species present. The number of weed species within quadrats ranged from 3 (R2b) to 15 (R2a).

Number of native plants

The total number of native plants within quadrats ranged from 26 (R4b) to 349 (R3c). The number of alive plants ranged from 24 (R2a) to 347 (R3c). The number of native plant deaths within quadrats were low, ranging from 0 to 7 deaths. The majority of native plant deaths were tubestock, however some deaths of mature shrubs and trees had occurred in six quadrats (R2a, R2c, R3a, R3b, R3c, R6c).

Native plant densities (alive) within 10 quadrats were over 1 plant per m^2 and five quadrats were above 3 plants per m^2. Native plant densities were very low in three quadrats: R1a – 0.26 plants/m^2, R2a – 0.25 plants/m^2, R4b – 0.25 plants/m^2.

A summary of the recorded revegetation parameters is provided in Table 3.

Table 3 Revegetation parameters

Quadrat	Native species composition			Weed cover		Number of native plants			
	Number of species (weed and native)	Number of native species	Number of species in revegetation list	Number of weed species	Percentage weed cover (%)	Number of native plants	Number of native plants alive	Number of native plants dead	Native (alive) plants per m^2
R1a	15	11	11	4	<1	28	26	2	0.26
R1b	25	16	15	9	<1	146	145	1	1.45
R1c	26	17	15	9	1.3	87	81	6	0.81
R2a	25	10	10	15	3.8	30	24	6	0.24
R2b	11	8	8	3	3.2	148	148	0	1.48
R2c	19	10	9	*9*	*<1*	103	102	1	1.02
R3a	26	16	16	*10*	*3.9*	58	51	7	0.51
R3b	20	14	14	6	2.5	41	35	6	0.35
R3c	23	16	14	7	<1	349	347	2	3.47
R4a	30	18	16	12	1.6	335	332	3	3.32
R4b	24	14	14	10	1	26	25	1	0.25
R4c	32	20	20	12	3.1	40	39	1	0.39
R5a	18	12	11	6	<1	117	114	3	1.14
R5b	10	5	4	5	<1	328	327	1	3.27
R5c	21	15	14	6	<1	336	334	2	3.34
R6a	13	5	4	8	24	36	36	0	0.36
R6b	15	7	7	8	<1	60	60	0	0.6
R6c	18	9	9	9	<1	78	72	6	0.72
R7a	23	13	12	10	2.9	336	336	0	3.36
R7b	23	15	15	8	1.2	31	30	1	0.3
R7c	25	16	15	9	<1	150	143	7	1.43

2.3 Performance targets

Performance target: Minimum 1 native plant per m^2

Across the whole revegetation zone this performance target was met with a plant density of 1.3 native plants per m^2. Plant densities within individual quadrats varied across the revegetation zone. Ten quadrats met this performance target. Two quadrats (R1c and R6c) were slightly below this performance target. However, plant density was very low in nine of the quadrats (R1a, R2a, R3a, R3b, R4b, R4c, R6a, R6b and R7b), having 0.6 native plants per m^2 or lower.

Performance target: Minimum 75% of revegetation species list represented

The revegetation list contains 82 native species, of these, 53 species or 64.6% of the revegetation list are present within the revegetation zone. The performance target of a minimum 75% of revegetation species list represented was not met. A further 9 species from the revegetation list is required to meet this performance target.

Quadrats with the highest number of revegetation list species were R4c (20 species) and R3a (16 species). Quadrats with the lowest number of revegetation list species were R5b and R6a (4 species).

Performance target: Maximum 20% weed coverage

This performance target was met in every quadrat except R6a which had over 20% weed cover. Majority of quadrats contained very low weed cover between <1% and 3.9%. Weed spraying appeared to have occurred in some quadrats. The majority of weeds were annual herbs (i.e., Erigeron bonariensis – Fleabane) or grasses (i.e., Ehrharta calycina – Perennial Veldt Grass).

A summary of the performance targets is presented in Table 4.

Table 4 Summary of performance targets

Quadrat	Minimum 1 native plant / m2		Minimum 75% of revegetation species list represented		Maximum 20% weed coverage	
		Target met		Target met		Target met
Revegetation area (all quadrats)	1.3	Yes	64.6 %	No		
R1a	0.26	No			<1%	Yes
R1b	1.45	Yes			<1%	Yes
R1c	0.81	No			1.3%	Yes
R2a	0.24	No			3.8%	Yes
R2b	1.48	Yes			3.2%	Yes
R2c	1.02	Yes			*<1%*	Yes
R3a	0.51	No			*3.9%*	Yes
R3b	0.35	No			2.5%	Yes
R3c	3.47	Yes			<1%	Yes
R4a	3.32	Yes			1.6%	Yes
R4b	0.25	No			1%	Yes
R4c	0.39	No			3.1%	Yes
R5a	1.14	Yes			<1%	Yes
R5b	3.27	Yes			<1%	Yes
R5c	3.34	Yes			<1%	Yes
R6a	0.36	No			24%	No
R6b	0.6	No			<1%	Yes
R6c	0.72	No			<1%	Yes
R7a	3.36	Yes			2.9%	Yes
R7b	0.3	No			1.2%	Yes
R7c	1.43	Yes			<1%	Yes

3.0 Conclusion

The 21 monitoring quadrats were surveyed, and the revegetation parameters assessed. All native and weed species were recorded and the number of alive and dead individual plants were recorded. The results of the revegetation parameter assessment were used to analysis the status of the performance targets. A summary of the performance target status and recommendations is provided in Table 5.

Table 5 Performance target summary

Performance target	Status	Details	Recommendations to achieve performance target
Minimum 1 native plant / m^2	Not achieved	• Performance target met for plant densities across the revegetation area (1.3 native plants / m^2) • Eleven quadrats were under 1 native plant / m2 (R1a, R1c, R2a, R3a, R3b, R4b, R4c, R6a, R6b, R7b)	• Additional tubestock planting within the eleven quadrats below the performance target • Tree guard maintenance – replace missing stakes and guards
Minimum 75% of revegetation species list represented	Nearing target	• This performance targeted is nearing completion with an additional nine species required.	• Tubestock planting of nine additional species from the revegetation list
Maximum 20% weed coverage	Nearing target	• Majority of quadrats were below the 20% threshold and met this performance target. One quadrat, R6a, did not meet this target (24% weed cover).	• Prioritise weed spraying within quadrat R6a • Weed spraying within quadrats with weed cover above 1% (R1c, R2a, R2b, R3a, R3b, R4a, R4c, R7a, R7b)

Yours sincerely

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References

WA Limestone, 2019. EPBC 2010/5649: Millar Road Clearing Vegetation to Allow Quarrying Annual Compliance Report 2019. Bibra Lake.

WA Limestone, (no date). Tamworth Hill Swamp Reserve Revegetation Plan (Revegetation plan to meet the requirements of the WA Limestone EPBC Approval for sand and limestone extraction at Millar Road Baldivis). Bibra Lake.

Appendix A Species list

Species recorded in quadrats	On revegetation list	Composition
Acacia huegelii	Yes	Native
Acacia lasiocarpa	Yes	Native
Acacia pulchella	Yes	Native
Acacia saligna	Yes	Native
Acacia sessilis	Yes	Native
Acacia stenoptera	Yes	Native
Allocasuarina fraseriana	Yes	Native
Anigozanthos humilis	Yes	Native
Anigozanthos manglesii	Yes	Native
Avena barbata	No	Weed
Banksia attenuata	Yes	Native
Banksia grandis	Yes	Native
Banksia ilicifolia	Yes	Native
Banksia littoralis	Yes	Native
Banksia menziesii	Yes	Native
Banksia sessilis	Yes	Native
Baumea articulata	Yes	Native
Bossiaea eriocarpa	Yes	Native
Brassica tournefortii	No	Weed
Bromus diandrus	No	Weed
Calothamnus quadrifidus	Yes	Native
Centella asiatica	Yes	Native
Conostylis aculeata	Yes	Native
Conostylis juncea	Yes	Native
Corymbia calophylla	Yes	Native
Crassula colorata	No	Native
Daviesia physodes	Yes	Native
Desmocladus flexuosus	Yes	Native
Ehrharta calycina	No	Weed
Erigeron bonariensis	No	Weed
Erodium botrys	No	Weed
Eucalyptus marginata	Yes	Native
Eucalyptus rudis	Yes	Native
Euphorbia terracina	No	Weed
Ficinia nodosa	Yes	Native
Ficus carica	No	Weed
Fumaria capreolata	No	Weed
Gahnia trifida	Yes	Native
Gastrolobium capitatum	Yes	Native
Gomphocarpus fruticosus	No	Weed
Gompholobium tomentosum	Yes	Native

Species recorded in quadrats	On revegetation list	Composition
Hakea lissocarpha	Yes	Native
Hakea prostrata	Yes	Native
Hakea ruscifolia	Yes	Native
Hakea trifurcata	Yes	Native
Hakea varia	Yes	Native
Hardenbergia comptoniana	Yes	Native
Hypochaeris glabra	No	Weed
Hypochaeris radicata	No	Weed
Jacksonia furcellata	Yes	Native
Jacksonia sternbergiana	Yes	Native
Juncus subsecundus	Yes	Native
Kennedia prostrata	Yes	Native
Kunzea glabrescens	Yes	Native
Lagurus ovatus	No	Weed
Leptospermum erubescens	Yes	Native
Lobelia alata	Yes	Native
Lolium perenne	No	Weed
Lupinus angustifolius	No	Weed
Lysimachia arvensis	No	Weed
Melaleuca lateritia	Yes	Native
Melaleuca rhaphiophylla	Yes	Native
Melaleuca teretifolia	Yes	Native
Melaleuca trichophylla	Yes	Native
Melaleuca viminea	Yes	Native
Melilotus indicus	No	Weed
Microtis media	No	Native
Oenothera drummondii	No	Weed
Orobanche minor	No	Weed
Parentucellia latifolia	No	Weed
Patersonia occidentalis	Yes	Native
Phyllanthus calycinus	No	Native
Polycarpon tetraphyllum	No	Weed
Romulea rosea	No	Weed
Solanum nigrum	No	Weed
Sonchus asper	No	Weed
Sowerbaea laxiflora	Yes	Native
Spyridium globulosum	Yes	Native
Stirlingia latifolia	Yes	Native
Trifolium arvense	No	Weed
Trifolium campestre	No	Weed
Vellereophyton dealbatum	No	Weed
Vulpia bromoides	No	Weed
Wahlenbergia capensis	No	Weed

Appendix B Data recorded with in quadrats

R1a							
Field No	**Species**	**Stratum**	**Cover (%)**	**Height (cm)**	**Width (cm)**	**No. alive**	**No. dead**
R1a-01	*Eucalyptus rudis*	Tree	30	750	350	5	
R1a-02	*Conostylis aculeata*	Shrub	0.5	20	5	7	
R1a-03	*Acacia lasiocarpa*	Shrub	0.1	10	5		1
R1a-04	*Banksia ilicifolia*	Shrub	0.1	5	3		1
R1a-05	*Jacksonia sternbergiana*	Shrub	0.1	25	5	2	
R1a-07	*Patersonia occidentalis*	Herb	0.1	15	3	3	
R1a-08	*Bossiaea eriocarpa*	Shrub	0.1	20	5	1	
R1a-09	*Hakea ruscifolia*	Shrub	0.1	30	10	1	
R1a-10	*Bromus diandrus*	Grass	0.1	10	3	2	
R1a-11	*Ehrharta calycina*	Grass	0.1	15	3	11	
R1a-12	*Hypochaeris glabra*	Herb	0.1	5	3	8	
R1a-14	*Erigeron bonariensis*	Herb	0.1	5	3	11	
R1a-15	*Acacia huegelii*	Shrub	0.1	15	5	3	
R1a-16	*Acacia pulchella*	Shrub	0.1	12	5	2	
R1a-17	*Lobelia alata*	Shrub	0.1	5	3	2	

R1b							
Field No	**Species**	**Stratum**	**Cover (%)**	**Height (cm)**	**Width (cm)**	**No. alive**	**No. dead**
R1b-01	*Corymbia calophylla*	Tree	7	300	150	3	
R1b-02	*Acacia saligna*	Shrub	20	350	200	11	
R1b-04	*Vellereophyton dealbatum*	Herb	0.1	5	3	2	
R1b-05	*Ehrharta calycina*	Grass	0.1	10	5	78	
R1b-06	*Bossiaea eriocarpa*	Shrub	0.1	20	5	5	1
R1b-07	*Kunzea glabrescens*	Shrub	10	350	150	42	
R1b-08	*Hakea varia*	Shrub	2	100	80	3	
R1b-09	*Conostylis aculeata*	Shrub	0.1	7	5	6	
R1b-10	*Hakea prostrata*	Shrub	7	80	300	3	
R1b-11	Sowerbaea laxiflora	Herb	0.1	20	5	1	
R1b-12	*Acacia lasiocarpa*	Shrub	0.1	30	15	3	
R1b-13	*Banksia ilicifolia*	Shrub	0.1	7	3	1	
R1b-14	*Erigeron bonariensis*	Herb	0.1	15	3		5
R1b-15	*Crassula colorata*	Herb	0.1	3	1	57	
R1b-16	*Trifolium arvense*	Herb	0.1	5	3	1	
R1b-17	*Melilotus indicus*	Herb	0.1	5	3	5	
R1b-18	*Erodium botrys*	Herb	0.1	5	3	3	
R1b-19	*Vulpia bromoides*	Grass	0.1	5	3	4	
R1b-20	*Hypochaeris glabra*	Herb	0.1	5	3	2	
R1b-21	*Lolium perenne*	Grass	0.1	7	3	4	
R1b-22	*Acacia huegelii*	Shrub	0.1	10	5	4	
R1b-23	Acacia pulchella	Shrub	0.1	7	3	2	
R1b-24	Acacia sessilis	Shrub	0.1	7	3	1	
R1b-25	*Hakea trifurcata*	Shrub	0.1	20	5	2	
R1b-26	*Melaleuca trichophylla*	Shrub	0.1	7	5	1	

R1c							
Field No	**Species**	**Stratum**	**Cover (%)**	**Height (cm)**	**Width (cm)**	**No. alive**	**No. dead**
R1c-01	*Acacia saligna*	Shrub	40	450	350	3	
R1c-02	Sowerbaea laxiflora	Shrub	0.1	30	7	3	1
R1c-03	*Acacia lasiocarpa*	Shrub	0.1	25	15	2	
R1c-04	*Hakea prostrata*	Shrub	1	50	100	6	
R1c-06	*Ehrharta calycina*	Grass	0.1	50	15	23	
R1c-07	*Corymbia calophylla*	Tree	20	600	250	5	
R1c-08	*Conostylis aculeata*	Shrub	0.1	5	5	2	3
R1c-10	*Microtis media*	Herb	0.1	15	5	1	
R1c-11	*Kennedia prostrata*	*Shrub*	0.1	3	5	1	
R1c-12	*Banksia ilicifolia*	Shrub	0.1	10	5		1
R1c-13	*Spyridium globulosum*	Shrub	0.1	15	7	2	
R1c-14	*Lolium perenne*	Grass	0.1	20	5	34	
R1c-15	*Solanum nigrum*	Herb	0.1	20	7	1	
R1c-16	*Hakea varia*	Shrub	5	280	200	3	
R1c-17	*Bromus diandrus*	Grass	0.1	20	7	1	
R1c-18	*Trifolium arvense*	Herb	0.1	5	5	2	
R1c-19	*Hypochaeris glabra*	Herb	0.1	5	5	9	
R1c-20	*Erigeron bonariensis*	Herb	0.5	10	5	53	
R1c-22	*Crassula colorata*	Herb	0.1	3	1	47	
R1c-23	*Melilotus indicus*	Herb	0.1	5	5	14	
R1c-24	*Erodium botrys*	Herb	0.1	7	5	2	
R1c-25	*Jacksonia furcellata*	Shrub	0.1	50	40		1
R1c-26	Acacia pulchella	Shrub	0.1	10	5	4	
R1c-27	*Baumea articulata*	Sedge	0.1	10	3	1	
R1c-28	*Hakea trifurcata*	Shrub	0.1	15	7	1	
R1c-29	*Lobelia alata*	Shrub	0.1	10	3	1	

R2a							
Field No	**Species**	**Stratum**	**Cover (%)**	**Height (cm)**	**Width (cm)**	**No. alive**	**No. dead**
R2a-01	*Corymbia calophylla*	Tree	10	700	300	3	
R2a-02	*Banksia menziesii*	Shrub	2	180	150	3	
R2a-03	*Hakea prostrata*	Shrub	7	120	300	8	1
R2a-04	*Hakea varia*	Shrub	0.5	70	80	2	
R2a-05	*Erigeron bonariensis*	Herb	0.5	70	10	68	7
R2a-06	*Lotus subbiflorus*	Herb	2	3	3	300	
R2a-08	*Lolium perenne*	Grass	0.1	20	3	14	
R2a-09	*Hypochaeris glabra*	Herb	0.1	3	3	12	
R2a-10	*Melilotus indicus*	Herb	0.1	5	7	7	
R2a-11	*Ehrharta calycina*	Grass	0.1	15	3	3	
R2a-12	*Lupinus angustifolius*	Herb	0.1	20	7	2	
R2a-14	*Calothamnus quadrifidus*	Shrub	1	170	100	2	
R2a-15	*Eucalyptus marginata*	Tree	3	250	150	1	5
R2a-16	*Acacia saligna*	Shrub	0.1	40	15	1	
R2a-17	*Euphorbia terracina*	Herb	0.1	30	15	1	
R2a-18	*Banksia attenuata*	Shrub	0.1	60	50	1	
R2a-19	*Solanum nigrum*	Herb	0.1	30	30	3	
R2a-20	*Sonchus asper*	Herb	0.1	15	7	5	
R2a-21	*Trifolium campestre*	Herb	0.1	5	5	32	
R2a-22	*Parentucellia latifolia*	Herb	0.1	20	7	24	
R2a-24	*Lysimachia arvensis*	Herb	0.1	20	7	4	
R2a-25	*Oenothera drummondii*	Herb	0.1	15	7	47	
R2a-26	*Brassica tournefortii*	Herb	0.1	30	10	18	
R2a-27	*Leptospermum erubescens*	Shrub	0.1	25	10	1	
R2a-28	Banksia sessilis	Tree	0.5	120	50	2	

R2b							
Field No	**Species**	**Stratum**	**Cover (%)**	**Height (cm)**	**Width (cm)**	**No. alive**	**No. dead**
R2b-01	*Eucalyptus rudis*	Tree	50	1200	600	12	
R2b-02	*Melaleuca rhaphiophylla*	Shrub	7	280	80	21	
R2b-03	*Gahnia trifida*	Sedge	0.5	100	15	5	
R2b-04	*Ficus carica*	Tree	3	500	180	7	
R2b-05	*Centella asiatica*	Herb	5	10	5	100+	
R2b-06	*Melaleuca viminea*	Shrub	0.1	80	50	7	
R2b-07	*Gomphocarpus fruticosus*	Shrub	0.1	40	15	1	
R2b-08	*Erigeron bonariensis*	Herb	0.1	5	3	17	
R2b-09	Banksia sessilis	Tree	0.1	40	5	1	
R2b-10	*Acacia saligna*	Shrub	0.5	180	50	1	
R2b-11	*Hakea trifurcata*	Shrub	0.1	50	40	1	

R2c							
Field No	**Species**	**Stratum**	**Cover (%)**	**Height (cm)**	**Width (cm)**	**No. alive**	**No. dead**
R2c-01	*Hakea varia*	Shrub	30	350	300	6	
R2c-02	*Hakea prostrata*	Shrub	5	20	200	4	
R2c-04	*Hypochaeris radicata*	Herb	0.1	5	5	7	1
R2c-05	*Ehrharta calycina*	Grass	0.1	10	3	46	
R2c-06	*Hardenbergia comptoniana*	Shrub	0.1	5	5	6	
R2c-07	*Crassula colorata*	Herb	0.1	3	1	71	
R2c-08	*Erigeron bonariensis*	Herb	0.1	50	5	127	4
R2c-09	*Polycarpon tetraphyllum*	Herb	0.1	3	3	106	
R2c-10	*Vellereophyton dealbatum*	Herb	0.1	10	3	5	
R2c-11	*Hypochaeris glabra*	Herb	0.1	5	3	12	
R2c-12	*Melilotus indicus*	Herb	0.1	40	5	58	
R2c-14	*Banksia ilicifolia*	Shrub	1	350	300	5	
R2c-15	*Corymbia calophylla*	Tree	7	600	300	3	1
R2c-16	*Hakea ruscifolia*	Shrub	1	280	250	2	
R2c-17	*Wahlenbergia capensis*	Herb	0.1	10	3	3	
R2c-18	*Allocasuarina fraseriana*	Tree	0.5	300	180	3	
R2c-19	*Leptospermum erubescens*	Shrub	0.1	180	100	1	
R2c-20	*Lupinus angustifolius*	Herb	0.1	15	7	1	
R2c-21	*Banksia attenuata*	Tree	0.5	200	180	1	

R3a							
Field No	**Species**	**Stratum**	**Cover (%)**	**Height (cm)**	**Width (cm)**	**No. alive**	**No. dead**
R3a-01	*Acacia saligna*	Shrub	40	550	350	9	5
R3a-02	*Banksia grandis*	Tree	0.5	180	40	6	
R3a-03	*Corymbia calophylla*	Tree	2	600	150	7	1
R3a-04	*Hakea varia*	Shrub	0.5	100	80	2	
R3a-05	*Jacksonia furcellata*	Shrub	0.5	250	70	6	1
R3a-06	*Spyridium globulosum*	Shrub	1	250	100	2	
R3a-07	*Melaleuca rhaphiophylla*	Shrub	0.5	180	80	2	
R3a-08	*Banksia menziesii*	Shrub	0.1	40	20	1	
R3a-09	*Melaleuca teretifolia*	Shrub	0.5	170	70	1	
R3a-10	*Acacia lasiocarpa*	Shrub	0.1	10	5	2	
R3a-11	*Stirlingia latifolia*	Shrub	0.1	7	3	2	
R3a-13	*Banksia ilicifolia*	Shrub	0.1	5	3	4	
R3a-14	*Ehrharta calycina*	Grass	3	10	3	352	
R3a-15	*Daviesia physodes*	Herb	0.1	5	3	2	
R3a-16	*Vulpia bromoides*	Grass	0.1	40	7	1	
R3a-17	*Sonchus asper*	Herb	0.1	10	5	36	
R3a-19	*Lysimachia arvensis*	Herb	0.1	5	3	6	
R3a-20	*Erigeron bonariensis*	Herb	0.1	10	3	32	
R3a-21	*Trifolium arvense*	Herb	0.1	3	3	4	
R3a-22	*Brassica tournefortii*	Herb	0.1	15	7		6
R3a-23	*Euphorbia terracina*	Herb	0.1	5	3	5	
R3a-24	*Trifolium campestre*	Herb	0.1	3	3	7	
R3a-25	*Hakea prostrata*	Shrub	0.1	40	40	1	
R3a-26	Acacia pulchella	Shrub	0.1	12	5	3	
R3a-26	*Hypochaeris glabra*	Herb	0.1	5	3	4	
R3a-27	*Hakea trifurcata*	Shrub	0.1	30	7	1	

R3b							
Field No	**Species**	**Stratum**	**Cover (%)**	**Height (cm)**	**Width (cm)**	**No. alive**	**No. dead**
R3b-01	*Corymbia calophylla*	Tree	10	700	350	5	1
R3b-02	*Banksia grandis*	Tree	0.1	180	50	3	
R3b-03	*Spyridium globulosum*	Shrub	1	160	80	3	
R3b-04	*Jacksonia furcellata*	Shrub	2	250	80	4	
R3b-05	*Hakea varia*	Shrub	5	200	100	7	4
R3b-06	*Melaleuca viminea*	Shrub	0.1	70	40	3	
R3b-07	*Hakea prostrata*	Shrub	0.1	40	40	1	
R3b-08	*Ehrharta calycina*	Grass	2	10	5	2	300
R3b-09	*Lolium perenne*	Grass	0.1	12	3	2	
R3b-10	*Conostylis aculeata*	Shrub	0.1	7	3	3	
R3b-11	*Ficinia nodosa*	Sedge	0.1	12	3	1	
R3b-12	*Stirlingia latifolia*	Shrub	0.1	7	3	2	
R3b-13	*Gahnia trifida*	Sedge	0.1	15	3	1	
R3b-14	*Daviesia physodes*	Herb	0.1	7	3		1
R3b-15	*Vulpia bromoides*	Grass	0.1	25	3	1	
R3b-16	*Sonchus asper*	Herb	0.1	7	5	6	14
R3b-17	*Erigeron bonariensis*	Herb	0.1	5	3	8	
R3b-18	*Lupinus angustifolius*	Herb	0.1	10	3	5	
R3b-19	*Eucalyptus marginata*	Tree	1	350	80	1	
R3b-20	*Hakea lissocarpha*	Shrub	0.1	30	10	1	

R3c							
Field No	**Species**	**Stratum**	**Cover (%)**	**Height (cm)**	**Width (cm)**	**No. alive**	**No. dead**
R3c-01	*Corymbia calophylla*	Tree	15	700	250	7	
R3c-02	*Jacksonia furcellata*	Shrub	7	350	150	6	
R3c-03	*Hakea prostrata*	Shrub	7	250	200	12	
R3c-04	*Hakea varia*	Shrub	0.1	100	50		2
R3c-05	*Gahnia trifida*	Sedge	0.1	70	40	6	
R3c-06	*Banksia menziesii*	Shrub	0.5	100	80	2	
R3c-07	*Banksia grandis*	Shrub	0.1	120	40	2	
R3c-08	*Banksia ilicifolia*	Shrub	0.1	100	70	1	
R3c-09	*Banksia attenuata*	Shrub	0.1	30	10	1	
R3c-10	*Spyridium globulosum*	Shrub	0.5	80	80	1	
R3c-11	*Melaleuca viminea*	Shrub	0.1	100	80	2	
R3c-12	*Acacia lasiocarpa*	Shrub	0.1	80	50	1	
R3c-13	*Acacia saligna*	Shrub	1	200	80	1	
R3c-15	*Sonchus asper*	Herb	0.1	15	5	9	
R3c-16	*Erigeron bonariensis*	Herb	0.1	15	5	84	23
R3c-17	*Ehrharta calycina*	Grass	0.1	10	5	47	
R3c-18	*Solanum nigrum*	Herb	0.1	7	3	15	
R3c-19	*Crassula colorata*	Herb	1	3	1	300	
R3c-20	*Vellereophyton dealbatum*	Herb	0.1	7	3	4	
R3c-21	*Hypochaeris glabra*	Herb	0.1	5	3	8	
R3c-22	*Lysimachia arvensis*	Herb	0.1	10	3	15	
R3c-23	Acacia pulchella	Shrub	0.1	10	3	4	
R3c-24	Anigozanthos humilis	Shrub	0.1	5	3	1	

R4a							
Field No	**Species**	**Stratum**	**Cover (%)**	**Height (cm)**	**Width (cm)**	**No. alive**	**No. dead**
R4a-01	*Corymbia calophylla*	Tree	25	800	500	3	
R4a-02	*Melaleuca rhaphiophylla*	Shrub	1	180	100	1	
R4a-03	*Jacksonia furcellata*	Shrub	0.1	150	50	1	2
R4a-04	*Melaleuca teretifolia*	Shrub	0.5	40	80	1	
R4a-05	*Stirlingia latifolia*	Shrub	0.1	10	5	3	
R4a-06	*Erodium botrys*	Herb	0.1	12	3	12	1
R4a-07	*Phyllanthus calycinus*	Herb	0.1	15	5	2	
R4a-08	*Conostylis aculeata*	Shrub	0.1	7	5	4	
R4a-09	*Anigozanthos manglesii*	Shrub	0.1	30	7	2	
R4a-10	*Erigeron bonariensis*	Herb	0.1	10	3	21	
R4a-12	*Daviesia physodes*	Herb	0.1	10	3	1	
R4a-13	*Gompholobium tomentosum*	Shrub	0.1	10	5	1	
R4a-14	*Acacia stenoptera*	Shrub	0.1	7	3	4	1
R4a-15	*Kennedia prostrata*	Shrub	0.1	20	7	1	
R4a-16	*Acacia lasiocarpa*	Shrub	0.1	10	5	1	
R4a-17	*Vulpia bromoides*	Grass	0.1	20	7	1	
R4a-18	*Acacia saligna*	Shrub	0.1	40	15	1	
R4a-19	*Lupinus angustifolius*	Herb	0.1	40	7	8	
R4a-20	*Patersonia occidentalis*	Herb	0.1	25	5	1	
R4a-21	*Trifolium arvense*	Herb	0.5	5	3	300	
R4a-22	*Conostylis juncea*	Shrub	0.1	7	3	1	
R4a-23	*Crassula colorata*	Herb	0.1	3	1	300	
R4a-24	*Lolium perenne*	Grass	0.1	7	3	4	
R4a-26	*Wahlenbergia capensis*	Herb	0.1	10	5	1	
R4a-27	*Bromus diandrus*	Grass	0.1	10	5	6	
R4a-28	*Ehrharta calycina*	Grass	0.1	20	7	8	

R4a							
Field No	**Species**	**Stratum**	**Cover (%)**	**Height (cm)**	**Width (cm)**	**No. alive**	**No. dead**
R4a-29	*Solanum nigrum*	Herb	0.1	7	7	3	
R4a-30	*Oenothera drummondii*	Herb	0.1	10	10	36	12
R4a-31	*Hypochaeris radicata*	Herb	0.1	3	5	2	
R4a-32	Acacia pulchella	Shrub	0.1	10	3	4	

R4b							
Field No	**Species**	**Stratum**	**Cover (%)**	**Height (cm)**	**Width (cm)**	**No. alive**	**No. dead**
R4b-01	*Acacia saligna*	Shrub	30	450	400	1	
R4b-03	*Melaleuca lateritia*	Shrub	0.5	120	70	3	
R4b-05	*Melaleuca rhaphiophylla*	Shrub	7	220	180	4	
R4b-06	*Juncus subsecundus*	Sedge	0.1	80	20	2	1
R4b-07	*Kunzea glabrescens*	Shrub	1	250	120	1	
R4b-08	*Stirlingia latifolia*	Shrub	0.1	10	5	1	
R4b-09	*Kennedia prostrata*	Shrub	0.1	20	7	1	
R4b-10	*Acacia lasiocarpa*	Shrub	0.1	12	5	2	
R4b-11	*Anigozanthos manglesii*	Shrub	0.1	15	5	2	
R4b-12	*Jacksonia furcellata*	Shrub	0.1	20	7	2	
R4b-13	*Banksia ilicifolia*	Shrub	0.1	5	5	1	
R4b-14	*Trifolium arvense*	Herb	0.1	3	5	79	
R4b-15	*Acacia stenoptera*	Shrub	0.1	10	5	1	
R4b-16	*Patersonia occidentalis*	Shrub	0.1	10	3	3	
R4b-17	*Ehrharta calycina*	Grass	0.1	12	5	4	
R4b-18	*Daviesia physodes*	Herb	0.1	15	5	1	
R4b-19	*Erodium botrys*	Herb	0.1	7	3	3	4
R4b-20	*Brassica tournefortii*	Herb	0.1	20	10		3
R4b-21	*Lupinus angustifolius*	Herb	0.1	30	5	5	2
R4b-22	*Oenothera drummondii*	Herb	0.1	7	10	16	
R4b-23	*Lolium perenne*	Grass	0.1	10	3	27	53
R4b-24	*Bromus diandrus*	Grass	0.1	7	3	4	
R4b-25	*Romulea rosea*	Herb	0.1	5	3	5	
R4b-26	*Melilotus indicus*	Herb	0.1	5	5	24	

R4c							
Field No	**Species**	**Stratum**	**Cover (%)**	**Height (cm)**	**Width (cm)**	**No. alive**	**No. dead**
R4c-01	*Corymbia calophylla*	Tree	10	800	400	2	
R4c-02	*Banksia grandis*	Tree	1	280	180	1	
R4c-03	*Banksia attenuata*	Tree	0.1	180	40	1	
R4c-04	*Jacksonia sternbergiana*	Shrub	3	120	100	7	
R4c-05	*Melaleuca viminea*	Shrub	0.5	100	80	1	
R4c-06	*Melaleuca rhaphiophylla*	Shrub	0.1	80	40	2	
R4c-07	*Kunzea glabrescens*	Shrub	2	350	250	3	
R4c-08	*Acacia saligna*	Shrub	5	400	300	1	
R4c-09	*Hakea ruscifolia*	Shrub	0.5	150	200	1	
R4c-10	*Melaleuca lateritia*	Shrub	0.5	170	60	1	
R4c-11	*Conostylis juncea*	Shrub	0.1	7	3	2	
R4c-12	*Banksia ilicifolia*	Shrub	0.1	80	60	2	
R4c-13	*Patersonia occidentalis*	Shrub	0.1	20	7	2	
R4c-14	*Melilotus indicus*	Herb	2	10	5	300	
R4c-15	*Vulpia bromoides*	Grass	0.1	30	5	2	
R4c-16	*Acacia stenoptera*	Shrub	0.1	7	3	1	
R4c-17	*Erigeron bonariensis*	Herb	0.1	10	3	17	
R4c-18	*Acacia lasiocarpa*	Shrub	0.1	7	5	2	
R4c-19	*Desmocladus flexuosus*	Sedge	0.1	7	3	2	
R4c-20	*Jacksonia furcellata*	Shrub	0.1	12	5	3	1
R4c-22	*Gastrolobium capitatum*	Shrub	0.1	10	3	1	
R4c-23	*Ficinia nodosa*	Sedge	0.1	10	3	3	
R4c-24	*Conostylis aculeata*	Shrub	0.1	10	3	1	
R4c-25	*Hypochaeris glabra*	Herb	0.1	7	3	38	
R4c-26	*Fumaria capreolata*	Herb	0.1	V	30	4	

R4c							
Field No	**Species**	**Stratum**	**Cover (%)**	**Height (cm)**	**Width (cm)**	**No. alive**	**No. dead**
R4c-27	*Lysimachia arvensis*	Herb	0.1	3	3	8	
R4c-28	*Lolium perenne*	Grass	0.1	10	3	6	
R4c-29	*Orobanche minor*	Herb	0.1	7	3	4	
R4c-30	*Ehrharta calycina*	Grass	0.1	15	3	10	
R4c-31	*Oenothera drummondii*	Herb	0.1	7	10	39	
R4c-32	*Lupinus angustifolius*	Herb	0.1	15	5	4	
R4c-33	*Trifolium arvense*	Herb	0.1	3	3	12	

R5a							
Field No	**Species**	**Stratum**	**Cover (%)**	**Height (cm)**	**Width (cm)**	**No. alive**	**No. dead**
R5a-01	*Acacia saligna*	Shrub	5	350	350	4	
R5a-02	*Jacksonia furcellata*	Shrub	5	180	120	7	1
R5a-03	*Corymbia calophylla*	Tree	3	700	250	9	
R5a-04	*Hakea trifurcata*	Shrub	0.1	120	80	4	
R5a-05	*Hakea varia*	Shrub	0.5	40	10	9	
R5a-06	*Hakea prostrata*	Shrub	1	150	80	3	
R5a-07	*Banksia menziesii*	Tree	0.1	180	70	2	
R5a-08	*Patersonia occidentalis*	Shrub	0.1	10	3	9	
R5a-09	*Vellereophyton dealbatum*	Herb	0.1	5	2	2	
R5a-10	*Stirlingia latifolia*	Shrub	0.1	10	3	1	1
R5a-12	*Ficinia nodosa*	Sedge	0.1	15	3	1	
R5a-13	*Conostylis aculeata*	Shrub	0.1	10	3	3	1
R5a-15	*Trifolium arvense*	Herb	0.1	3	3	3	
R5a-17	*Sonchus asper*	Herb	0.1	10	3	6	
R5a-18	*Lolium perenne*	Grass	0.1	10	3	13	
R5a-19	*Erigeron bonariensis*	Herb	0.1	15	5	84	150
R5a-20	*Crassula colorata*	Herb	0.1	3	1	62	
R5a-21	*Ehrharta calycina*	Grass	0.1	7	3	24	10

R5b							
Field No	**Species**	**Stratum**	**Cover (%)**	**Height (cm)**	**Width (cm)**	**No. alive**	**No. dead**
R5b-01	*Conostylis aculeata*	Shrub	0.1	15	3	4	
R5b-03	*Conostylis juncea*	Shrub	0.1	15	3	21	1
R5b-04	*Stirlingia latifolia*	Shrub	0.1	10	5	1	
R5b-05	*Crassula colorata*	Herb	5	3	1	300	
R5b-06	*Ehrharta calycina*	Grass	0.1	10	5	23	
R5b-07	*Oenothera drummondii*	Herb	0.1	7	10	7	
R5b-08	*Erigeron bonariensis*	Herb	0.1	7	3	31	
R5b-09	*Lagurus ovatus*	Grass	0.1	7	5	1	
R5b-10	*Vellereophyton dealbatum*	Herb	0.1	7	3	3	
R5b-11	*Hakea lissocarpha*	Shrub	0.1	50	10	1	

R5c							
Field No	**Species**	**Stratum**	**Cover (%)**	**Height (cm)**	**Width (cm)**	**No. alive**	**No. dead**
R5c-01	*Corymbia calophylla*	Tree	2	280	80	3	
R5c-02	*Jacksonia furcellata*	Shrub	2	300	150	5	
R5c-03	*Hakea prostrata*	Shrub	2	180	150	4	
R5c-04	*Banksia ilicifolia*	Tree	1	180	70	2	
R5c-05	*Conostylis aculeata*	Shrub	0.1	10	3	3	
R5c-06	*Acacia lasiocarpa*	Shrub	0.1	12	5	1	1
R5c-07	*Anigozanthos manglesii*	Shrub	0.1	15	5	2	1
R5c-08	*Acacia stenoptera*	Shrub	0.1	7	3	2	
R5c-09	*Gahnia trifida*	Sedge	0.1	15	3	2	
R5c-10	*Spyridium globulosum*	Shrub	0.1	20	7	6	
R5c-11	*Hakea ruscifolia*	Shrub	0.1	25	10	1	
R5c-12	*Ehrharta calycina*	Grass	0.1	10	3	29	7
R5c-13	*Conostylis juncea*	Shrub	0.1	7	3	1	
R5c-14	*Bossiaea eriocarpa*	Shrub	0.1	10	5	1	
R5c-15	*Stirlingia latifolia*	Shrub	0.1	10	3	1	
R5c-16	*Crassula colorata*	Herb	0.1	3	1	300	
R5c-18	*Oenothera drummondii*	Herb	0.1	7	10	15	3
R5c-19	*Erigeron bonariensis*	Herb	0.1	15	5	87	49
R5c-20	*Brassica tournefortii*	Herb	0.1	30	7		12
R5c-21	*Hypochaeris glabra*	Herb	0.1	5	3	3	
R5c-22	*Lupinus angustifolius*	Herb	0.1	7	3		1

R6a							
Field No	**Species**	**Stratum**	**Cover (%)**	**Height (cm)**	**Width (cm)**	**No. alive**	**No. dead**
R6a-01	*Corymbia calophylla*	Tree	3	250	120	1	
R6a-02	*Hakea prostrata*	Shrub	10	150	250	10	
R6a-03	*Hakea ruscifolia*	Shrub	2	50	50	9	
R6a-04	*Hakea varia*	Shrub	1	50	50	1	
R6a-05	*Brassica tournefortii*	Herb	0.1	20	10	37	
R6a-06	*Crassula colorata*	Herb	0.1	3	1	15	
R6a-08	*Oenothera drummondii*	Herb	3	5	7	200	
R6a-10	*Lolium perenne*	Grass	0.1	5	3	18	
R6a-11	*Parentucellia latifolia*	Herb	0.5	10	7	42	
R6a-12	*Lupinus angustifolius*	Herb	0.1	30	30	14	
R6a-13	*Ehrharta calycina*	Grass	20	40	5	400	
R6a-15	*Erodium botrys*	Herb	0.1	5	3	3	
R6a-16	*Erigeron bonariensis*	Herb	0.1	15	7	45	

R6b							
Field No	**Species**	**Stratum**	**Cover (%)**	**Height (cm)**	**Width (cm)**	**No. alive**	**No. dead**
R6b-01	*Corymbia calophylla*	Tree	10	600	180	21	
R6b-02	*Banksia grandis*	Tree	0.5	250	80	2	
R6b-03	*Banksia ilicifolia*	Shrub	0.5	120	60	3	
R6b-05	*Hakea ruscifolia*	Shrub	7	400	200	24	
R6b-06	*Jacksonia furcellata*	Shrub	0.5	200	80	7	
R6b-07	*Hakea prostrata*	Shrub	2	50	180	1	
R6b-08	*Ehrharta calycina*	Grass	0.1	10	5	58	7
R6b-09	*Melilotus indicus*	Herb	0.1	10	3	23	
R6b-10	*Wahlenbergia capensis*	Herb	0.1	15	3	60	
R6b-11	*Lolium perenne*	Grass	0.1	10	3	19	
R6b-12	*Hypochaeris glabra*	Herb	0.1	5	3	15	3
R6b-13	*Lupinus angustifolius*	Herb	0.1	12	7	2	
R6b-14	*Oenothera drummondii*	Herb	0.1	7	10	7	
R6b-15	*Allocasuarina fraseriana*	Shrub	0.1	15	7	2	
R6b-16	*Erigeron bonariensis*	Herb	0.1	15	3		21

R6c							
Field No	**Species**	**Stratum**	**Cover (%)**	**Height (cm)**	**Width (cm)**	**No. alive**	**No. dead**
R6c-01	*Corymbia calophylla*	Tree	50	700	150	24	2
R6c-03	*Melaleuca rhaphiophylla*	Shrub	0.1	100	40	1	
R6c-04	*Banksia littoralis*	Tree	0.5	350	80	7	
R6c-05	*Jacksonia furcellata*	Shrub	1	400	80	7	2
R6c-07	*Hakea prostrata*	Shrub	3	250	150	11	
R6c-08	*Acacia saligna*	Shrub	3	350	200	2	
R6c-09	*Hakea varia*	Shrub	0.5	150	70	5	
R6c-10	*Hakea ruscifolia*	Shrub	1	170	70	12	2
R6c-11	*Sonchus asper*	Herb	0.1	60	5	13	
R6c-12	*Solanum nigrum*	Herb	0.1	30	5	2	
R6c-13	*Fumaria capreolata*	Herb	0.1	v	v	28	
R6c-14	*Erigeron bonariensis*	Herb	0.1	10	3	26	
R6c-15	*Ehrharta calycina*	Grass	0.1	10	3	9	
R6c-16	*Allocasuarina fraseriana*	Shrub	0.1	20	7	3	
R6c-17	*Oenothera drummondii*	Herb	0.1	7	10	6	
R6c-18	*Hypochaeris glabra*	Herb	0.1	5	3	2	
R6c-19	*Trifolium campestre*	Herb	0.1	7	3	2	
R6c-20	*Lolium perenne*	Grass	0.1	12	5	1	

R7a							
Field No	**Species**	**Stratum**	**Cover (%)**	**Height (cm)**	**Width (cm)**	**No. alive**	**No. dead**
R7a-01	*Corymbia calophylla*	Tree	7	450	280	9	
R7a-02	*Hakea prostrata*	Shrub	3	280	200	2	
R7a-03	*Banksia attenuata*	Shrub	0.1	15	7	1	
R7a-04	*Banksia menziesii*	Shrub	0.1	120	80	1	
R7a-05	*Melaleuca rhaphiophylla*	Shrub	0.1	80	40	8	
R7a-06	*Jacksonia furcellata*	Shrub	3	250	150	2	
R7a-08	*Banksia ilicifolia*	Shrub	1	100	100	3	
R7a-09	*Patersonia occidentalis*	Herb	0.1	15	5	4	
R7a-10	*Hakea ruscifolia*	Shrub	0.1	15	5	1	
R7a-11	*Acacia lasiocarpa*	Shrub	0.1	7	5	1	
R7a-12	*Conostylis aculeata*	Shrub	0.1	7	3	3	
R7a-13	*Ehrharta calycina*	Grass	0.1	7	3	17	
R7a-14	*Crassula colorata*	Herb	1	3	1	300	
R7a-15	*Polycarpon tetraphyllum*	Herb	2	3	3	300	
R7a-16	*Vellereophyton dealbatum*	Herb	0.1	7	3	152	
R7a-17	*Erigeron bonariensis*	Herb	0.1	10	3	94	
R7a-18	*Hypochaeris glabra*	Herb	0.1	5	3	18	
R7a-19	*Oenothera drummondii*	Herb	0.1	7	10	48	
R7a-20	*Erodium botrys*	Herb	0.1	5	3	3	
R7a-22	*Allocasuarina fraseriana*	Shrub	0.1	100	50	1	
R7a-23	*Wahlenbergia capensis*	Herb	0.1	15	3	1	
R7a-24	*Lysimachia arvensis*	Herb	0.1	5	3	2	
R7a-25	*Melilotus indicus*	Herb	0.1	10	3	6	

R7b							
Field No	**Species**	**Stratum**	**Cover (%)**	**Height (cm)**	**Width (cm)**	**No. alive**	**No. dead**
R7b-01	*Eucalyptus rudis*	Tree	40	1000	800	1	
R7b-02	*Hakea prostrata*	Shrub	2	150	150	1	
R7b-03	*Conostylis juncea*	Shrub	0.1	10	5	5	1
R7b-04	*Parentucellia latifolia*	Herb	0.1	5	3	1	
R7b-05	*Ehrharta calycina*	Grass	0.1	10	5	1	
R7b-06	*Banksia ilicifolia*	Shrub	0.1	7	5	3	
R7b-07	*Conostylis aculeata*	Shrub	0.1	10	5	4	
R7b-08	*Bossiaea eriocarpa*	Shrub	0.1	10	7	2	
R7b-09	*Jacksonia furcellata*	Shrub	0.1	12	5	2	
R7b-10	*Acacia lasiocarpa*	Shrub	0.1	5	3	1	
R7b-11	*Stirlingia latifolia*	Shrub	0.1	7	5	2	
R7b-12	*Ficinia nodosa*	Sedge	0.1	15	5	2	
R7b-13	*Patersonia occidentalis*	Shrub	0.1	10	3	3	
R7b-14	*Hakea ruscifolia*	Shrub	0.1	5	3	1	
R7b-15	*Kennedia prostrata*	Shrub	0.1	10	5	1	
R7b-17	*Gompholobium tomentosum*	Herb	0.1	10	5	1	
R7b-19	*Lysimachia arvensis*	Herb	0.1	5	3	1	
R7b-20	*Brassica tournefortii*	Herb	0.1	10	10		17
R7b-21	*Acacia stenoptera*	Shrub	0.1	5	3	1	
R7b-22	*Erigeron bonariensis*	Herb	0.5	20	5	32	200
R7b-23	*Polycarpon tetraphyllum*	Herb	0.1	3	3	1	
R7b-24	*Solanum nigrum*	Herb	0.1	20	15		8
R7b-25	*Lupinus angustifolius*	Grass	0.1	15	3		2

R7c							
Field No	**Species**	**Stratum**	**Cover (%)**	**Height (cm)**	**Width (cm)**	**No. alive**	**No. dead**
R7c-01	*Corymbia calophylla*	Tree	5	650	200	4	
R7c-02	*Acacia saligna*	Shrub	10	450	300	1	
R7c-03	*Jacksonia furcellata*	Shrub	2	450	100	4	
R7c-04	*Hakea varia*	Shrub	2	220	200	1	
R7c-05	*Banksia menziesii*	Shrub	0.1	100	70	3	
R7c-06	*Ehrharta calycina*	Grass	0.1	10	5	13	2
R7c-07	*Conostylis aculeata*	Herb	0.1	10	3	14	7
R7c-08	*Gompholobium tomentosum*	Herb	0.1	7	5	3	
R7c-09	*Acacia lasiocarpa*	Shrub	0.1	7	5	2	
R7c-10	*Patersonia occidentalis*	Herb	0.1	10	5	1	
R7c-11	*Stirlingia latifolia*	Shrub	0.1	12	5	3	
R7c-12	*Banksia ilicifolia*	Shrub	0.1	15	7	2	
R7c-13	*Spyridium globulosum*	Shrub	0.1	7	3	1	
R7c-14	*Jacksonia sternbergiana*	Shrub	0.1	15	7	2	
R7c-15	*Brassica tournefortii*	Herb	0.1	10	7		21
R7c-16	*Polycarpon tetraphyllum*	Herb	0.1	3	3	300	
R7c-18	*Oenothera drummondii*	Herb	0.1	7	10	76	32
R7c-19	*Lagurus ovatus*	Grass	0.1	10	3	7	
R7c-20	*Crassula colorata*	Herb	0.1	3	1	100	
R7c-21	*Hypochaeris radicata*	Herb	0.1	5	3	4	
R7c-22	*Avena barbata*	Grass	0.1	20	5	1	
R7c-23	*Erigeron bonariensis*	Herb	0.1	10	5	41	
R7c-24	*Solanum nigrum*	Herb	0.1	20	7	7	
R7c-25	*Conostylis juncea*	Shrub	0.1	10	5	1	
R7c-26	*Hakea lissocarpha*	Shrub	0.1	50	10	1	