

Annual Review

Canyon Coal Mine

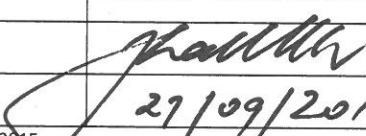
Name of operation	Canyon Coal Mine
Name of operator	Whitehaven Coal Mining Ltd
Development consent/project approval number	DA 8-1-2005
Name of holder of development consent/project approval	Whitehaven Coal Mining Ltd
Mining lease number	ML 1464, ML 1471
Name of holder of mining lease	Whitehaven Coal Mining Ltd
Water licence number	WAL 29458
Name of holder of water licence	Whitehaven Coal Mining Ltd
MOP start date	7 September 2015
MOP end date	6 September 2022
Annual review start date ¹	1 July 2015
Annual review end date	30 June 2016
<p>I, Jamie Frankcombe, certify that this audit report is a true and accurate record of the compliance status of Canyon Coal Mine for the period July 1st 2015 until June 30th 2016, and that I am authorised to make this statement on behalf of Whitehaven Coal Mining Pty Ltd.</p> <p><i>Note. a) The Annual Review is an 'environmental audit' for the purposes of section 122B (2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, \$1 million and for an individual, \$250,000.</i></p> <p><i>b) The Crimes Act 1900 contains other offences relating to false and misleading information: section 192G (Intention to defraud by false or misleading statement—maximum penalty 5 years imprisonment); sections 307A, 307B and 307C (False or misleading applications/information/documents—maximum penalty 2 years imprisonment or \$22,000, or both).</i></p>	
Name of authorised reporting officer	Jamie Frankcombe
Title of authorised reporting officer	Director- Whitehaven Coal Mining Ltd
Signature of authorised reporting officer	
Date	27/09/2016
¹ NSW Annual Review Guideline was released in October 2015.	

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STATEMENT OF COMPLIANCE

The compliance status of the Canyon Coal Mine as at 30th June 2016 is summarised in Table 1.

Table 2 notes non-compliances that occurred during the reporting period.

Table 1 - Statement of Compliance

Were all conditions of the relevant approval(s) complied with? ¹	
ML 1471	No
ML 1464	Yes
DA 88-1-2005 MOD 3	No
WAL 29458	No

Table 2 - Non-compliances

Relevant Approval	Condition Schedule and Number	Condition Description (summary)	Compliance status	Comment	Where Addressed in Annual Review
DA- 8-1-2005 MOD 3	2(2)	The Proponent shall carry out the development: Generally in accordance with the EIS; and In accordance with the conditions of this consent.	NC	Several non-compliances with the Development Consent were identified during the 2015 Independent Environmental Audit process.	Section 9.2
DA- 8-1-2005 MOD 3	3(3)	The Applicant shall carry out the development in a way that prevents and/or minimises the air pollution generated by the development.	NC	Stabilisation of void batters and gravel pit area required during next reporting.	Section 9.2
DA- 8-1-2005 MOD 3	3(20)	The Applicant shall: (a) prepare a detailed site water balance for all the development site; (b) measure water use on site; (c) review the site water balance for the development annually; and (d) report the results of this review in the AEMR, to the satisfaction of the Secretary.	NC	Although no water has been taken on site during the reporting period, this has not been recorded in a water log book. Whitehaven are currently in the process of decommissioning the bore on site, therefore eliminating the requirement for a log book.	Section 9.2
DA- 8-1-2005	3(21)	The Applicant shall implement a	NC	Soil erosion occurring	Section 9.2

MOD 3		range of erosion and sediment controls at the site, in general accordance with the requirements of the Department of Housing's Managing Urban Stormwater: Soils and Construction manual, to minimise erosion and the discharge of sediment from the site.		in gravel pit area and on void batters. To be seeded next reporting period.	
DA- 8-1-2005 MOD 3	3(30)	At least 6 months prior to the cessation of mining, unless the Secretary directs otherwise, the Applicant shall commission, and pay the full cost of, an Independent Audit of the offset strategy.	NC	Audit of offset strategy to be completed during next reporting period.	Section 9.2
DA- 8-1-2005 MOD 3	5(6)	By the end of September 2006, and every 3 years thereafter, unless the Secretary directs otherwise, the Applicant shall commission and pay the full cost of an Independent Environmental Audit of the development.	NC	Independent Environmental Audits were not undertaken in 2009 or 2012.	Section 9.2
ML 1471	30	The lease holder shall conduct operations in a manner as not to cause or aggravate soil erosion.	NC	Soil erosion occurring in gravel pit area and on void batters. To be seeded next reporting period.	Section 9.2
WAL 29458	MW0635-00001	The licence holder must record water taken in a logbook.	NC	Logbook not maintained. Whitehaven are currently in the process of decommissioning the bore on site, therefore eliminating the requirement for a log book.	Section 9.2
WAL 29458	MW0633-00001	The licence holder must record the following in the logbook: (i) each date and period of time during which water is taken under this licence; (ii) the volume of water taken on that date; (iii) the water supply work approval number of the water supply work used to take the water on that date; (iv) the purpose or purposes for which the water taken on that date.	NC	Logbook not maintained. Whitehaven are currently in the process of decommissioning the bore on site, therefore eliminating the requirement for a log book.	Section 9.2
WAL 29458	MW0632-	The licence holder must keep a log book, except where the access	NC	Logbook not maintained.	Section 9.2

	00001	licence nominates only a metered work with a data logger. A "logbook" means a written record, kept in hard copy or electronic form, which accurately records all information required to be kept for this licence.		Whitehaven are currently in the process of decommissioning the bore on site, therefore eliminating the requirement for a log book.	
WAL 29458	MW0637-00001	The licence holder must retain the information required to be recorded in the logbook for 5 years from the date to which that information relates.	NC	Logbook not maintained. Whitehaven are currently in the process of decommissioning the bore on site, therefore eliminating the requirement for a log book.	Section 9.2
WAL 29458	MW0831-00001	The licence holder must notify the Minister, in writing, immediately upon becoming aware of a breach of any condition of this licence. Note: a notification does not authorise a breach, or continuing breach, of a condition of this licence.	NC	Notification made within this Annual Review.	Section 9.2

Compliance status key for Table 2

Risk level	Colour code	Description
High	Non-compliant	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence
Medium	Non-compliant	Non-compliance with: <ul style="list-style-type: none"> potential for serious environmental consequences, but is unlikely to occur; or potential for moderate environmental consequences, but is likely to occur
Low	Non-compliant	Non-compliance with: <ul style="list-style-type: none"> potential for moderate environmental consequences, but is unlikely to occur; or potential for low environmental consequences, but is likely to occur
Administrative non-compliance	Non-compliant	Only to be applied where the non-compliance does not result in any risk of environmental harm (e.g. submitting a report to government later than required under approval conditions)

1 INTRODUCTION

This is the 15th Annual Review (AR), formally Annual Environmental Management Report, produced for the Canyon Coal Mine, and it has been prepared in accordance with Condition 3 of Mining Leases (MLs) 1464 and 1471 (Mining Act 1992) and Condition 5 (Schedule 5) of DA 8-1-2005 MOD 3. The AR follows the format required by the NSW Government Annual Review Guideline (October, 2015).

Canyon Coal Mine (Canyon) is located within the Narrabri Shire, approximately 30 km north-west of Gunnedah, 16 km east-south-east of Boggabri and immediately north of the former Vickery Coal Mine (Figure 1).

Mining at Canyon ceased in July 2009, and the mine is now in Closure, with a small area leased to Hitachi as a maintenance compound.

1.1 Mine Contacts

The management personnel responsible for the Canyon Coal Mine and their relevant contact details are as follows:

- Mrs Jill Johnson, Group Manager - Environment – oversees day to day environmental and rehabilitation performance across the site. Contact: (02) 6741 9321.
- Mr Nigel Wood, General Manager, Open Cut Operations - oversees Open Cut Operations for the Whitehaven Group. Contact: (02) 6741 9309.

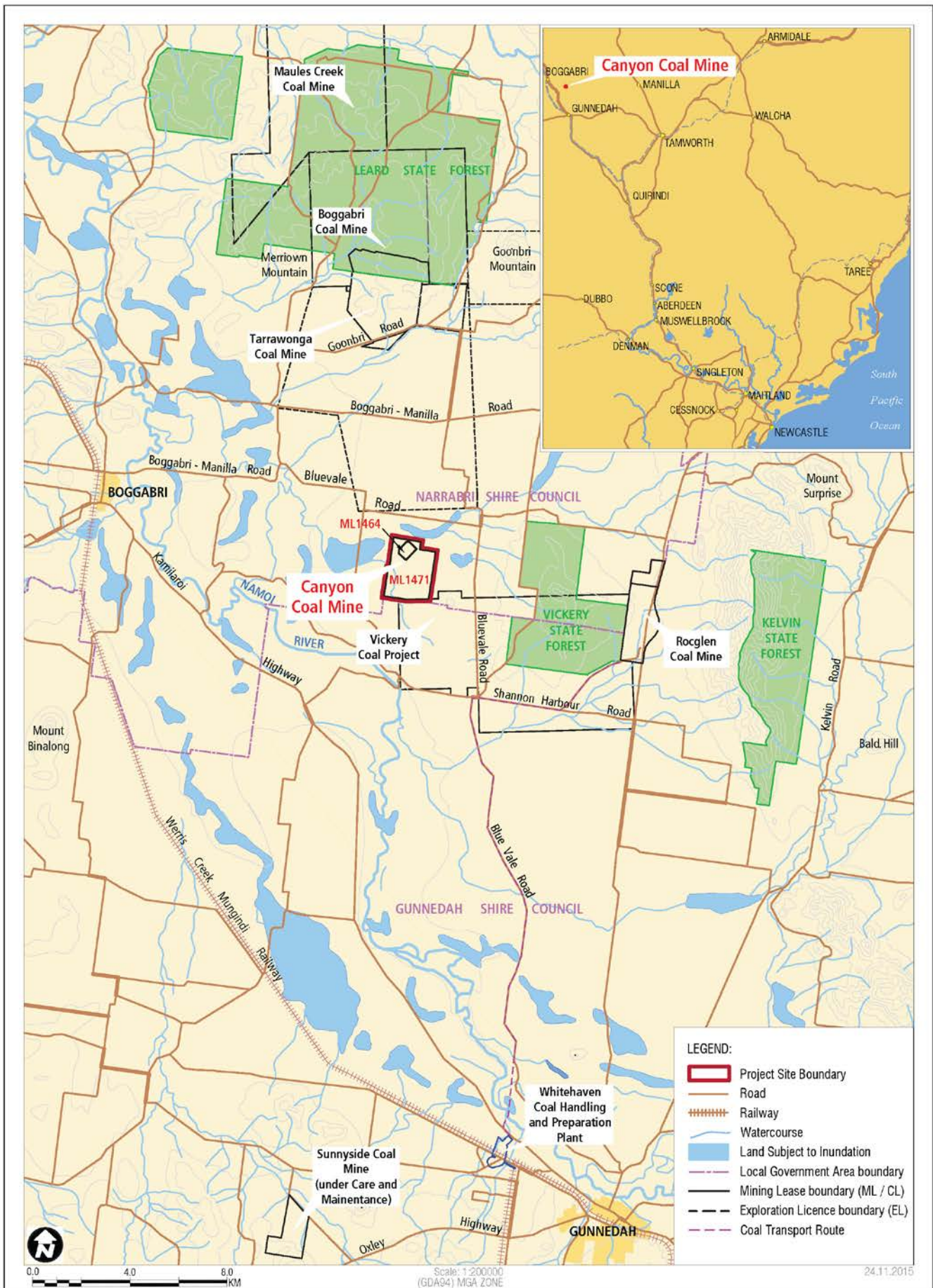


Figure 1 - Locality Plan

2 APPROVALS

2.1 Tenements, Licences, and Approvals

Table 3 identifies the approvals in place for the Canyon Coal Mine at the end of the reporting period, the issuing / responsible Authority, dates of issue, expiry date and relevant comments.

Table 3 - Tenements, Licences and Approvals

Issuing / Responsible Authority	Type of Lease, Licence, Approval	Date of Issue	Expiry	Comments
Department of Planning and Environment	Development Consent DA 88-1-2005, Modification 3	3 September 2015	3 September 2020	-
Department of Primary Industry-Division of Resources and Energy	ML 1471	7 th September 2000	7 th September 2021	-
Department of Primary Industry-Division of Resources and Energy	ML 1464	21 August 2006	21 st August 2027	-
Department of Primary Industry - Water	WAL 29458 (90WA822498)	12 September 2012	In perpetuity	-

3 OPERATIONS SUMMARY

3.1 Mining Operations

No mining operations have occurred at the Canyon Coal Mine during the reporting period.

Table 4 – Production Summary

Material	Approved Limit	Previous Reporting Period (actual)	This Reporting Period (actual)	Next Reporting Period (forecast)
Waste Rock/Overburden	n/a	0	0	0
ROM Coal/Ore	n/a	0	0	0
Coarse Reject	n/a	0	0	0
Fine Reject (Tailings)	n/a	0	0	0
Saleable Product	n/a	0	0	0

Fuel usage onsite was limited to that used within the leased Hitachi compound, and consisted of 44,480L of diesel, primarily consumed by the onsite generator.

3.2 Next Reporting Period

Operations forecast for the next reporting period are expected to be limited to environmental monitoring and maintenance earthworks, if and as required.

4 ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

There were no actions required from the 2015 Annual Environmental Management Report.

5 ENVIRONMENTAL PERFORMANCE

The following sub-sections document the implementation and effectiveness of the various control strategies adopted at the Canyon Coal Mine.

5.1 Air Quality

5.1.1 Criteria

The air quality criteria applicable to the Canyon Coal Mine are specified in DA 8-1-2005 MOD 3, and are summarised below.

- Maximum increase in deposited dust – 2 g/m²/month.
- Maximum mean total deposited dust level (insoluble solids) – 4 g/m²/month.
- Mean annual Total Suspended Particulate (TSP) matter (all sources) concentration – 90 µg/m³.
- Mean annual PM₁₀ particulate level – 30 µg/m³.
- 24 hour average PM₁₀ particulate level – 50 µg/m³.

5.1.2 Dust Monitoring

Monitoring of deposited dust is undertaken on a monthly basis, with results presented below in Table 5.

Table 5 Deposited Dust Monitoring Data

Site	Property Name	Annual Mean Total Insoluble Solids (g/m ² /month)	Annual Mean Ash (g/m ² /month)
D1	Whitehaven	1.9	0.8
D2	Merton	1.4	0.6
D5*	Wilga	0.8	0.3
D7*	Wilga	2.0	0.8
D8*	Gundawarra	2.6	1.6
D10*	Merton	2.2	0.6
D11 *	Merton	1.6	0.8
D12	Whitehaven	6.0	5.7
D13b	Womboola	1.1	0.9
D15*	Merton	3.1	1.0
D16*	Merton	2.2	1.1

*Sites no longer monitored; monitoring ceased in April 2016. Averages for the period calculated for these sites over the 9 months of monitoring.

NOTE: Remaining 4 sites averages calculated over the full 12 months of the reporting period.

A review of Table 5 shows that the annual average limit for deposited dust was exceeded at one location, D12, during the reporting period. D12 is located on Whitehaven owned land, outside of the Mining Lease. D12 received very low results for each month in the reporting period, except for December 2015 and January 2016, which resulted in the exceedance for this site. The dominant wind directions during these months were from the east, northeast and north indicating the potential for impact from site, however no rehabilitation work, earth works, or maintenance works were undertaken on the former mine site during either month. This location has been retained in the latest Air Quality Management Plan for continued monitoring.

5.1.3 Key Environmental Performance/Management Issues

No key environmental performance/management issues were identified during the reporting period.

5.1.4 Proposed Improvements to Environmental Management

No improvements are proposed within the next reporting period.

5.2 Biodiversity

5.2.1 Flora

Rehabilitation monitoring was undertaken during the reporting period in spring 2015, by EcoLogical Australia (ELA), with results provided in Appendix 1. Normalised Differential Vegetation Index (NDVI) of multi-spectral imagery was assessed during this monitoring, comparing changes between the 2014 and 2015 monitoring campaigns, and found that there was no substantial change in photosynthetically active biomass (PAB) in most of the rehabilitation zones. No management actions were recommended by ELA, as changes are consistent with control zone trends. Woodland monitoring showed a continued increase in structural complexity and suitable fauna habitat in Woodland Zones.

Soil pit samples are required every 3 years by the Rehabilitation Monitoring Program, and were last undertaken in 2014 by ELA, with results included in Appendix 2. Changes in soil core monitoring results were found not to be significant.

Investigations undertaken by Geoff Cunningham Natural Resource Consultants Pty Ltd as part of the Stage 2 Mine EIS identified no Threatened flora species, ROTAP species or Endangered Ecological communities within the DA Area.

Biodiversity management of the Biobank Offset Site for Canyon Coal Mine was also undertaken during the reporting period, with the annual results reported in Appendix 3.

5.2.2 Fauna

A series of investigations into the occurrence of Threatened fauna within the DA Area were undertaken by Countrywide Ecological Service as part of the Stage 2 EIS preparation phase, with two vulnerable micro bat species and a koala recorded within open woodland areas within the “Womboola” property.

Targeted monitoring for *Neophema pulchella* (Turquoise Parrot) and *Pomatostomus temporalis* (Grey-crowned Babbler), both listed as threatened under the Threatened Species Conservation (TSC) Act, is undertaken during the rehabilitation monitoring. Grey-crowned Babblers were not recorded in any rehabilitation sites from 2011 to 2014, however in the 2015 monitoring undertaken by ELA they were recorded at one site, W04. Turquoise Parrot remains unrecorded on site. In addition to these threatened species, the following were also present during this reporting period:

- *Chthonicola sagittata* (Speckled Warbler) Control Wood 2 in 2011, 2012, 2013 and 2014 (Vulnerable – TSC Act)
- *Falco subniger* (Black Falcon) over Control Wood 1 in 2012 and Wood_07c in 2014 (Vulnerable – TSC Act)
- *Hieraetus morphnoides* (Little Eagle) over Control Wood 1 in 2011 (Vulnerable – TSC Act)
- *Melanodryas cucullata* (Hooded Robin) Control Wood 2 in 2012 2013 and 2014. (Vulnerable – TSC Act).

5.2.3 Weeds

Weed control is undertaken by Whitehaven’s own qualified personnel on an as-needs basis, following the detection of weeds within the monthly environmental inspections. During the period spraying was undertaken a number of times, as listed below.

- 2015: August, September, November

- 2016: January, February, May, June, July

These occurrences primarily involved the spot spraying of African Boxthorn (*Lycium ferocissimum*) and Prickly Pear (*Opuntia*), although spraying of broad leaf weeds around the leased compound is also undertaken as needed.

5.2.4 Feral Animal Control

Feral animals are not a significant land management issue on Canyon Coal Mine's landholding and are limited to isolated occurrences of pigs, foxes, hares and rabbits. In view of the low frequency of occurrence, and in the absence of an extensive programme by all surrounding landowners, no broad scale feral animal control programme was considered warranted during the reporting period. One pig trap has been in place on site since April 2016, however no animals have been captured.

5.2.5 Key Environmental Performance/Management Issues

No key environmental performance/management issues were identified during the reporting period.

5.2.6 Proposed Improvements to Environmental Management

Ongoing campaign weed spraying will be undertaken as required on site, along with opportunistic feral animal control.

5.3 Blasting

5.3.1 Criteria

Blasting criteria for the Canyon Coal Mine are noted in DA 8-1-2005 MOD 3, however they are not relevant for this reporting period, as no blasting has been undertaken onsite.

5.3.2 Key Environmental Performance/Management Issues

No blasts were undertaken during the reporting period.

5.3.3 Proposed Improvements to Environmental Management

No blasting is proposed within the next reporting period.

5.4 Operational Noise

5.4.1 Criteria

DA 8-1-2005 MOD 3 details the noise criteria for site operations and coal haulage, however there was no requirement for noise monitoring during the reporting period.

5.4.2 Key Environmental Performance/Management Issues

No key environmental performance/management issues were identified during the reporting period.

5.4.3 Proposed Improvements to Environmental Management

No improvements are proposed within the next reporting period.

5.5 Aboriginal Heritage Management

5.5.1 Environmental Management Measures

Four Aboriginal heritage sites have been discovered since 1999, during investigations for the Canyon Coal mine. Two of these sites, Whitehaven 3 and Whitehaven 4, were located within the Mining Lease area. Whitehaven 3, a scar tree located adjacent to the southern mine lease boundary, has been protected by fencing to minimise the potential for adverse impacts. Whitehaven 4 was located within the extraction area, and artefacts at this site were salvaged by representatives of the Red Chief LALC in accordance with a Section 90 Permit (No 2051) prior to disturbance. The remaining two heritage sites, Whitehaven 1 and Whitehaven 2, although not located within the Mine Lease boundary, have also been fenced and demarcated to avoid disturbance.

5.5.2 Consultation

No soil stripping has been undertaken for the Canyon Coal Mine. No additional Aboriginal cultural heritage items have been discovered during the reporting period, and no consultation with Aboriginal stakeholders was conducted.

5.5.3 Environmental Management Measures

Given the status of the site the environmental management measures for Aboriginal Heritage are limited to ensuring that any identified heritage sites remain undisturbed.

5.5.4 Key Environmental Performance/Management Issues

No key environmental performance/management issues were identified during the reporting period.

5.5.5 Proposed Improvements to Environmental Management

No improvements are proposed within the next reporting period.

5.6 Natural Heritage

There are no features of natural heritage within the Project Approval area and hence no specific management procedures are required.

5.7 Bushfire Management

5.7.1 Environmental Management Measures

Canyon Coal Mine is located within an area of cleared agricultural land, and Whitehaven Coal personnel liaise with the local Rural Fire Service, as required. All fire breaks were graded on the 10th October 2015 in preparation for summer. There have been no bushfire incidents on, or adjacent to, the mine site during this reporting period.

5.7.2 Key Environmental Performance/Management Issues

No key environmental performance/management issues were identified during the reporting period.

5.7.3 Proposed Improvements to Environmental Management

No improvements are proposed within the next reporting period.

5.8 Public Safety

5.8.1 Environmental Management Measures

Access to the site is restricted to authorised personnel only.

5.8.2 Key Environmental Performance/Management Issues

No key environmental performance/management issues were identified during the reporting period.

5.8.3 Proposed Improvements to Environmental Management

No improvements are proposed within the next reporting period.

5.9 Waste

No waste was produced by Whitehaven Coal Mining (WHC) at the Canyon mine site during the reporting period, although the removal of a waste oil drum at the historic workshop site was undertaken. The small compound currently leased to Hitachi is managed by the tenants, who maintain responsibility of their own waste treatment and removal.

5.10 Environmental Performance Summary

An environmental performance summary for Canyon Coal Mine is presented in Table 6 below.

Table 6 - Environmental Performance

Aspect	Approval Criteria / EIS Prediction	Performance during the reporting period	Trend / Key Management Implications	Implemented / proposed management actions
Erosion	N/A	Areas of surface erosion occurring on void batters and gravel pit area.	Nil	Stabilisation of void batters and gravel pit to be achieved through the sowing of a cover crop during next reporting period.

6 WATER MANAGEMENT

6.1 Surface Water Management

Surface water monitoring on site is limited to the void, and wet weather monitoring as required, with the complete surface water monitoring results presented in Appendix 4.

Previously surface water monitoring was undertaken in both the upper and lower voids quarterly, however in accordance with the DP&E approval of the updated Water Management plan in February 2016, this monitoring was altered during the period to include only the lower void on a 6 monthly basis.

This period has seen a return to normal oil and grease levels, following two high readings in late 2015, while the long term water results are continuing to show a slight upward trend in pH and EC readings.

6.1.1 Discharges

There were no wet weather discharges during the reporting period.

6.1.2 Water Take

During the reporting period no water was taken from any bores on site.

6.2 Groundwater Management

6.2.1 Environmental Performance/Management

Groundwater monitoring was also altered during the reporting period in line with the current approved Water Management Plan. Current requirements include 6 monthly monitoring of:

- Standing water level, pH, conductivity, Cl, Na, and oil and grease at GW-11 and P3; and
- Standing water level at GW-7, GW-8, AND GW-9.

Water quality results and standing water levels have remained relatively consistent throughout the monitoring period, with the exception of GW11 and GW8. GW11 results indicate an increasing conductivity trend, along with a slight calcium concentration increase, while all other monitored parameters remain consistent. GW8 continues to show large fluctuations in standing water level, as it has for the previous 3 years. GW8 is located on mine owned land, and is currently leased. It is expected that the drawn down is being caused by farm use, with a solar pump installed on the bore, and therefore unrelated to Whitehaven Coal.

Full monitoring data results for GW11 and GW8, along with all other groundwater monitoring sites, are included in Appendix 5.

6.3 Rehabilitation Performance during the Reporting Period

6.3.1 Status of Mining and Rehabilitation

Table 7 - Rehabilitation Status

Mine Area Type ¹	Previous Reporting Period (Actual)	This Reporting Period (Actual)	Next Reporting Period (Forecast)
	2014-15 (ha)	2015-16(ha)	2016-17 (ha)
A. Total Mine Footprint	416.98	416.98	416.98
B. Total Active Disturbance	2.9	2.9	2.9
C. Land Being Prepared for Rehabilitation	0	0	0
D. Land Under Active Rehabilitation	249.8	249.8	249.8
E. Completed Rehabilitation	0	0	0

¹ Refer Annual Review Guideline (p.11) for description of mine area types.

6.3.2 Post Rehabilitation Land Uses

The overall closure goal for Canyon is for the restored landform to be capable of sustaining pre-mining land-uses. WHC considers that rehabilitating Canyon to produce a mix of grazing and native vegetation land uses is most appropriate and compatible with the surrounding land uses and landscapes.

6.3.3 Renovation or Removal of Buildings

No renovation or removal of buildings occurred during the reporting period.

6.3.4 Other Rehabilitation Undertaken

No additional rehabilitation of explorations areas, infrastructure, shafts, adits, dams, fence lines or bunds occurred during the reporting period.

6.3.5 Departmental Sign-off of Rehabilitated Areas

No departmental sign-off of rehabilitated areas was received during the reporting period.

6.3.6 Variations in Activities against MOP/RMP

Not applicable.

6.3.7 Trials, Research Projects and Initiatives

No rehabilitation trials, research projects or other initiatives were undertaken during the reporting period.

6.3.8 Key Issues to Achieving Successful Rehabilitation

The key issues to achieving successful rehabilitation are:-

- Landform stability (Final Void);
- Soil quality;
- Water quality;
- Pasture development; and
- Land management, including weed control.

Management measures to address these key issues, including both trigger levels and response, are described in the Closure MOP prepared by SLR Consulting Australia, and approved in September 2015 by the Division of Resources and Energy.

6.4 Actions for Next Reporting Period

Seeding of the gravel pit area and void batters to address surface erosion will be undertaken within the next reporting period.

7 COMMUNITY

Whitehaven Coal maintains an open door policy for interested local groups, including local residents, landholders, schools and community groups, to visit the mine where practically possible. Furthermore, Canyon has a designated complaints line advertised on the Whitehaven Coal website and, in the event of a complaint, details pertaining to the complainant, complaint and action taken are recorded. A complaints register is maintained on Whitehaven's website. No complaints have been received for the site since 2008.

A Community Consultative Committee (CCC) for Canyon is covered under the terms of reference of the Vickery Coal Mine CCC, and last met in April 2016.

Community contributions are managed in accordance the Whitehaven Coal Donations and Sponsorship Policy.

8 INDEPENDENT AUDIT

The most recent independent audit of Canyon Coal Mine was undertaken by Environmental Resource Management Australia Pty Ltd (ERM) in early 2016, with the site component completed on the 23rd of March. Outstanding items from the 2016 Audit Action Plan, and how they are being addressed, are summarised in Table 8 below.

Table 8 2016 Independent Audit- Outstanding Actions

Condition/Plan	Proposed Action	Status
Minister's Conditions of Approval DA 8-1-2005 MOD 3	Consider completing maintenance on the groundwater pumps or decommission if no longer required.	Following investigation WHC have decided to decommission the pump on site which is no longer in use. Decommission has not yet been completed.
	Consider stabilising the gravel pit area until the Vickery Project commences and permanent soil stabilisation works are completed.	Seeding of gravel pit area to be undertaken by December 2016.
	Ensure the transport management plan for the Vickery Project outlines the requirements of this consent condition for any material transported to the Canyon Mine prior to works commencing.	TMP to be updated prior to commencement of Vickery construction.
	Although the lease holder is the current user of water on site, the condition is still relevant and water use should be recorded and reported.	No water take occurred on site during the reporting period. Pump to be decommissioned.
	Consider including the requirement to report volume discharged from site and the method for estimating /calculating the volume of any discharges from site into the Water Management Plan	WMP to be updated.
	Consider submitting the revised plan to DPI (Water), EPA and DP&E requesting comment. Consider including evidence of any consultation and liaison into the annex of the plan.	Consultation to be undertaken. Consultation and liaison records not to be included in WMP.
	As the updated Air Quality	AQMP was approved by DP&E

	Monitoring Program has not been submitted to the DP&E consider informing the DP&E and potentially impacted residents until the updated plan is accepted by DP&E.	4/02/2016. D12 is located on Company owned land. Action complete.
	Consider including line items in the revision history table to record any reviews completed of the Environment Management Strategy.	Future revisions to be noted in table.
Mining Leases 1464 & 1471	Consider obtaining evidence from the Director General if no records within Whitehaven Coal. Note: this refers to evidence of payment of security.	Complete by December 2016
Water Access Licence 29458	Consider including record keeping requirement for the water access licence into the Water Management Plan.	WMP to be updated.
Closure Mining Operations Plan	Consider adding into the Air Quality Monitoring Program mitigation measures for managing dust and actions to be taken in the case of exceedances of the air quality parameters.	AQMP to be updated.
	Consider including in the references section of the Rehabilitation Monitoring Reports the list of operational records as discussed in this commitment to indicate these records have been considered.	To be included in the next Annual Rehabilitation Monitoring Report.
	MOP to be updated to reflect EPL surrender.	Next MOP amendment.
Water Management Plan	Although the water in the void will remain on site, further investigation is required to determine the reason for higher pH than the groundwater and surface water pH.	Investigation has begun, with Whitehaven currently in the process of selecting an appropriate Environmental Consultant to advise on the matter.
Rehabilitation Monitoring Program	Consider completing LiDAR assessment as detailed in the Rehabilitation Monitoring Plan	To be included in the next Annual Rehabilitation Monitoring Report.
	Consider including methodology of fauna assessments in monitoring reports.	To be included in the next Annual Rehabilitation Monitoring Report.
	Consider the inclusion of ANOVA test in the annual rehabilitation monitoring reports	To be included in the next Annual Rehabilitation Monitoring Report.

	Consider the inclusion of management response triggers linked to pasture or soil condition in the annual reports.	To be included in the next Annual Rehabilitation Monitoring Report.
	Evidence of review of the program after the first round of sampling to be provided.	To be included in the next Annual Rehabilitation Monitoring Report.
	Consider updating the Rehabilitation Monitoring Program to reflect the review recommendations once stakeholder feedback has been requested and received (see below).	RMP to be updated.
	Consider issuing the letter outlining the review to key stakeholders to ensure acceptance of the proposed changes.	Letter to be issued.

9 INCIDENTS AND NON-COMPLIANCES DURING THE REPORTING PERIOD

9.1 Reportable Incidents

No environmental incidents occurred at Canyon Coal Mine during the reporting period.

9.2 Non-compliances

All of the non-compliances with relevant approvals have been ranked as either administrative or low, with very limited potential for significant environmental harm, and are addressed below.

- Conditions 3(3), and 3(21) of DA- 8-1-2005 MOD 3, and Condition 30 of ML 1471 all concern soil erosion, and the effects thereof. These conditions will be addressed in the seeding of soil erosion areas identified in the site gravel pit and on void batters. This work is to be undertaken within the next reporting period, and is scheduled for December 2016.
- Non compliances with DA-8-1-2005 MOD 3 Condition 3(20), and WAL 29458 are being addressed through the decommissioning of the remaining pump on site, which will prevent any water take on site and eliminate the requirement for a water log book.

- Condition 3(30) of DA- 8-1-2005 MOD 3 requires an audit of the offset strategy, and is scheduled to be undertaken by the Whitehaven Coal Environmental Specialist (Biodiversity) during the next reporting period.
- Condition 5(6) of DA- 8-1-2005 MOD 3 concerns the requirement to undertake Independent Environmental Audits (IEA). Whitehaven have undertaken an IEA in 2016, and received a Warning Letter regarding this non-compliance, see Section 9.3.

9.3 Regulatory Actions

A Warning Letter was received from the DP&E, following the non-compliance with Schedule 5, Condition 6 of the Development Approval by failing to undertake IEAs in 2009 and 2012. Whitehaven undertook an IEA in early 2016, with the next scheduled audit date in 2018.

10 ACTIVITIES TO BE COMPLETED IN THE NEXT REPORTING PERIOD

The following measures will be continued, or implemented, in the next reporting period to improve the environmental or community performance of the operation:-

- The maintenance of woodland and rehabilitated areas;
- Compliance with all relevant conditions of the lease, licences and consents;
- Completion of outstanding Independent Environmental Audit actions; and
- The continuation of environmental monitoring and management.

APPENDIX 1 REHABILITATION MONITORING REPORT 2015



Canyon Coal Mine – Rehabilitation Monitoring Report

Volume 1

Spring 2015

Prepared for
Whitehaven Coal Mining Limited

25 May 2016



DOCUMENT TRACKING

Item	Detail
Project Name	Canyon Rehabilitation Monitoring Report 0 Spring 2015 (Volume 1)
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Prepared by	Nathalie van der Veer; Linden Burch
Reviewed by	Dr Paul Frazier; Dr Lachlan Copeland
Approved by	Dr Paul Frazier
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Cover photo	Left: Plot 20 in Burnt_2013; Right: Plot 41 in Wood Control 1. Photos taken by Emily Southwell and Dr Lachlan Copeland

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Abbreviations

Abbreviation	Description
CWD	Coarse Woody Debris
DBH	Diameter at Breast Height
DPI	Department of Primary Industries
ELA	Eco Logical Australia
EMS	Environmental Management System
MCP	Mine Closure Plan
MDS	Multidimensional Scaling
MOP	Mining Operations Plan
NDVI	Normalised Differential Vegetation Index
PAB	Photosynthetically Active Biomass
PFC	Projected Foliage Cover
RMP	Rehabilitation Monitoring Program
TPFC	True Projected Foliage Cover
WCM	Whitehaven Coal Mining Limited

Key Outcomes

- Few of the trees and shrubs affected by the 2013 fire event appear to be re-sprouting; we recommend additional planting with local species in this zone
- Temporal changes in vegetation cover and composition occurred across Control and Rehabilitation zones and is indicative of seasonal conditions rather than impacts from land management.

Recommendations

- Planting of additional local trees and shrubs at Wood_10c and Wood_07c to improve habitat complexity. This should be done with reference to control data collected on native species composition and density from remnant vegetation communities adjacent to the site.
- Rhodes Grass can reduce native biodiversity. For future plantings it is important to find an alternative, preferably a mix of groundcover species that are native to the local area.
- African Boxthorn and Prickly Pear are present on site, although in low numbers. These weeds should be removed and managed.
- Removal of remaining plastic tree guards on planted trees as they are impeding growth.
- Pigs were present throughout the woodland sites. Management advice can be obtained from the DPI.

1 Introduction

This Rehabilitation Monitoring Report has been prepared by Eco Logical Australia (ELA) for Whitehaven Coal Mining Ltd (WCM) in accordance with the *Rehabilitation Monitoring Program for Canyon Coal Mine (RMP)* (ELA 2011). The Canyon Open Cut Coal Mine ceased production in mid-2009 and is currently in mine closure phase.

1.1 Background

Canyon Open Cut Coal Mine (Canyon) is owned and managed by WCM. The mine was established in 2000 as a trial coal mining operation and progressed to long-term operations later that same year. Further expansion towards the south was approved in 2005 to incorporate additional coal reserves, before mining ceased in July 2009.

The mine is located within the Narrabri Shire, approximately 30 km north-west of Gunnedah and 15 km east of Boggabri in the Gunnedah coalfields of NSW. The mine lies within the Mining Leases 1464 and 1471. The mine exists on the former “Whitehaven” and “Womboola” properties, as well as a small section of the “Merton” property. Prior to mining activities, these properties were used for agricultural cultivation and grazing.

Progressive rehabilitation at Canyon aims to restore ecosystem function. Recognising the heterogeneity of the landscape around Canyon, the rehabilitation program has created eight unique rehabilitation zones of either woodland or pasture. Monitoring methods and objectives to assess the effectiveness of rehabilitation are outlined in the RMP (ELA 2011).

1.2 Scope and objectives

The aim of this monitoring report is to document the spring 2015 monitoring results and provide a quantitative assessment of rehabilitation performance against nearby control landscapes.

Specific monitoring objectives for 2015 include:

- Quantitative tracking of rehabilitation performance
- Assess key aspects of flora and vegetation structure (upper, mid and lower strata) in woodland areas
- Compare data with previous monitoring events
- Evaluate monitoring results against monitoring triggers and rehabilitation objectives as outlined in the RMP
- Provide recommendations to improve the rehabilitation or monitoring methods and mine closure procedures for WCM.

Rehabilitation monitoring surveys were undertaken in accordance with the RMP (ELA 2011) and included:

- Remote-sensing based landscape assessment (multi-spectral imagery)
- Soil monitoring in both the pasture and woodland zones
- Native vegetation and fauna surveys
- Analysis of results including statistical analysis (where appropriate).

1.3 Report structure

This report is presented in two volumes. Volume 1 contains a summary of the rehabilitation objectives and provides a summary of the spring 2015 monitoring program, including results, conclusion and recommendations. Volume 2 contains the collated field survey data from 2011, 2012, 2013, 2014 and 2015 monitoring periods and 2015 weather data.

1.4 Rehabilitation monitoring - management triggers

A multi-scale, multi-data source rehabilitation monitoring approach has been developed and implemented at Canyon. Remote sensing has been used to monitor the entire target area, including control areas, while targeted field work was used in agricultural and native vegetation environments, both within control and impact areas.

A two-tiered system of triggers for management was developed to respond to any changes identified via remote sensing. The first tier of response is triggered by changes detected in the remote sensing time series analysis. This instigates further investigations such as targeted, rapid, on-ground assessments. The second tier of response is triggered if changes are confirmed or discovered on-ground. These triggers instigate the development of site-specific management responses and remedial actions (ELA 2011).

2 Rehabilitation objectives

A summary of the objectives for rehabilitation at Canyon, as stated in the relevant management plans, is provided in Table 1 (ELA 2011).

Table 1: Summary of rehabilitation objectives for Canyon Mine

Stated rehabilitation objectives (EMS, MOP, MCP)
Maintain and/or restore biodiversity and ecological integrity of areas affected by mining or agriculture within the mining lease
Maintain and/or re-establish agricultural land (pasture establishment) of comparable land capability to that of the pre-disturbance environment
Provide a revegetated post-mining landform which is consistent with surrounding landforms and, with the exception of the final void, provides no obvious evidence of a prior mining land use
Create low maintenance, geotechnically stable final landform
Minimise visual exposure by ensuring rehabilitation blends with the adjoining landscape
Minimise erosion and sedimentation
Establish rehabilitated areas that will provide habitat for fauna and corridors for fauna movement between rehabilitated areas, regrowth areas and remnant vegetation
Control vermin, feral animals and noxious weeds
Ensure successful implementation of the approved biodiversity offset strategy
Monitor rehabilitation success using selected physical and biological parameters
Re-establish native vegetation communities using locally collected seed
Develop and implement a flora and fauna monitoring program which provides statistically valid conclusions on rehabilitation success and recommendations for improved outcomes (if required)
Exclude bushfires and control noxious weeds and feral animals
Develop native vegetation communities in the stock exclusion zone (i.e. rehabilitated areas and remnants) which emulate the structure and floristics of undisturbed areas (as demonstrated by monitoring)
Establish native vegetation communities more extensive than currently exist in the area of the mine
Create rehabilitated areas that are used by native fauna (as demonstrated by monitoring)
Refine the rehabilitation / offset strategy based on monitoring outcomes, site experience and improved technologies

Stated rehabilitation objectives (EMS, MOP, MCP)

Re-establish approximately 16 ha of Class II capability land (including an area classified as Class III prior to mining) using soils reclaimed from existing Class II areas

Elsewhere, establish landform, soil profiles and vegetation communities consistent with pre-disturbance land capabilities

3 Methods

Detailed methods for rehabilitation monitoring are provided in the RMP (ELA 2011). The spring 2015 monitoring was undertaken in accordance with the methods prescribed (Table 2). Any minor alterations from the original methods are detailed in the following sub-sections.

Table 2: Multi-scale monitoring program summary

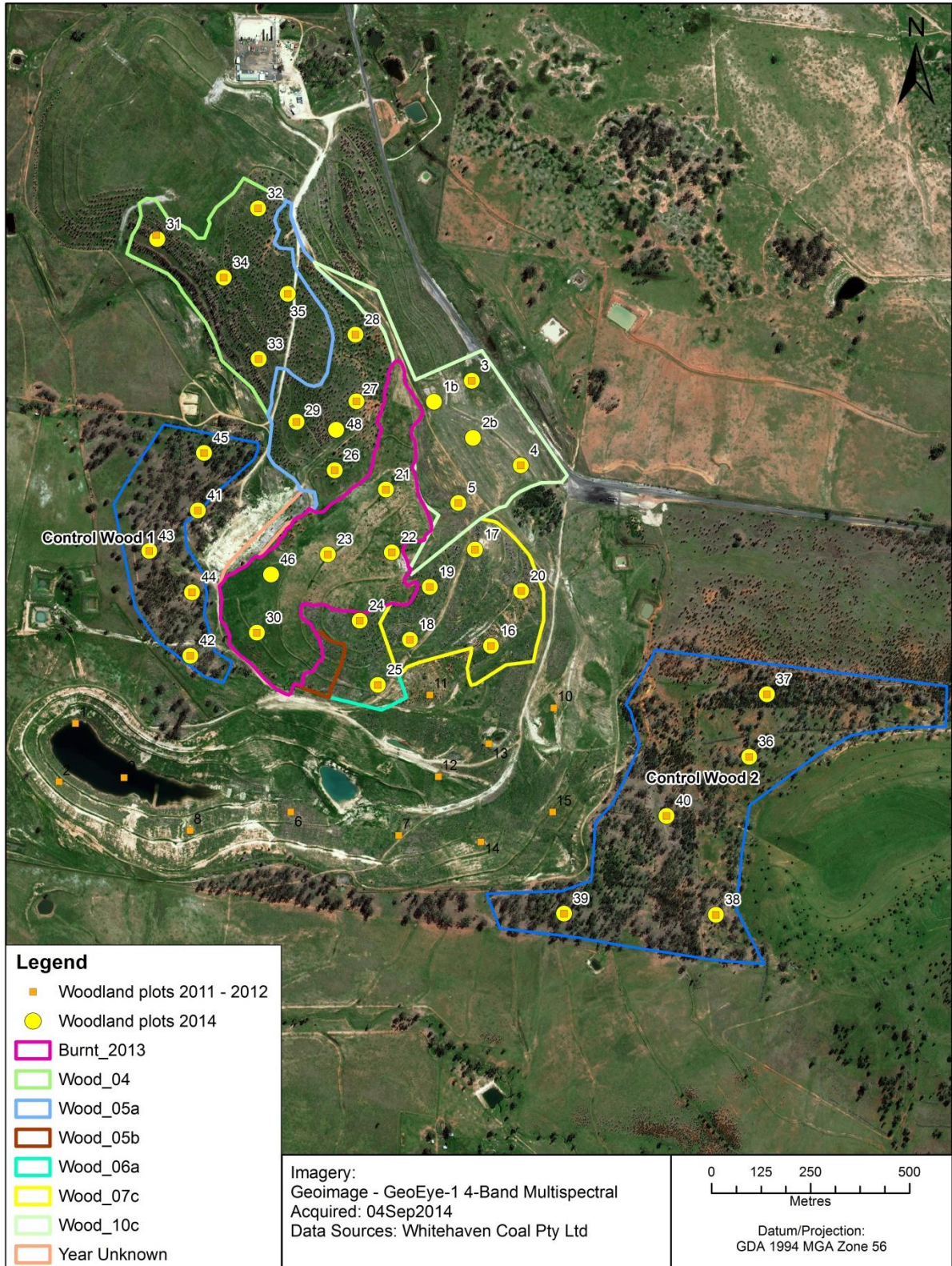
Data source	Type	Scale	Purpose
Remote sensing	Multi-spectral imaging	Entire site	Agricultural pasture cover/biomass Woodland cover/biomass Erosion monitoring Direct field survey
Woodland survey	Vegetation survey: <ul style="list-style-type: none"> • Canopy species and cover • Midstorey species and cover • Groundcover species and cover • Groundcover composition • Coarse Woody Debris 	Woodland zones	Woodland health and function
	Fauna survey (Birds – winter and spring)	Woodland zones	Woodland health and function
	Soil survey (every 3 years)	Woodland zones	Soil condition
	Soil Survey (every 3 years)	Pasture zones	Soil nutrient status

3.1 Survey dates

Four-band multi-spectral imagery was captured across the entire target area (including control areas) on 11 September 2015.

Ecologist Dr Stephen Debus undertook terrestrial fauna and habitat monitoring of woodland areas between 7 – 8 April 2015 (autumn), 13 – 14 July 2015 (winter), and 12 - 13 October 2015 (spring).

Botanist Dr Lachlan Copeland and Environmental Scientist Emily Southwell undertook monitoring of woodland areas (vegetation transects only) between 27 – 30 October 2015.



This map is not guaranteed to be free from error or omission. Eco Logical Australia Pty Ltd and its employees disclaim liability for any act done on the information in the map and any consequences of such acts or omissions.

Figure 1: Woodland vegetation monitoring plots for spring 2015 survey (also shown are monitoring plots from 2011 – 2012) (note: Year Unknown refers to rehabilitation zone where it is unknown in which year rehabilitation took place)

3.2 Weather

Temperatures in the three months preceding the spring monitoring period were cool to warm, with average minimum temperatures lower than the historical mean, and average maximum temperatures higher than the historical mean (Table 3; Volume 2, Section 1). Rainfall in the six months preceding the spring surveys was well above average, with the exception of July and August. Rainfall was more than twice the historical monthly average in April (Table 3; Volume 2, Section 1).

Conditions during the autumn bird survey were moderate and dry. Minimum temperatures were 8.8 and 9°C, both below the historical average of 12.8°C. Maximum temperatures reached 18.6 and 22.1°C and were also below the historical maximum temperature of 25.2. Conditions were dry during the winter bird survey. Minimum temperatures were 4.8 and 5.4°C, at and above the historical average. Maximum temperatures were 12.4 and 13.1°C, both below the historical average of 16.1°C (Table 3; Volume 2, Section 1). Minimum temperatures during the spring survey were 11.2 and 18.1°C, falling below and above the historical minimum temperature respectively. Maximum temperatures were 5.9 and 7.5°C above the historical average (Table 3; Volume 2, Section 1).

Table 3: Temperatures and rainfall during 2015 fauna surveys

Date	Min temp (°C)	Average temp (°C)	Max temp (°C)	Rainfall (mm)
7/04/2015	9	16.3	22.1	0
8/04/2015	8.8	13.4	18.6	0
13/07/2015	5.4	8.1	12.4	0.4
14/07/2015	4.8	9	3.1	0
12/10/2015	11.2	22.2	31.2	0
13/10/2015	18.1	24.7	32.8	0

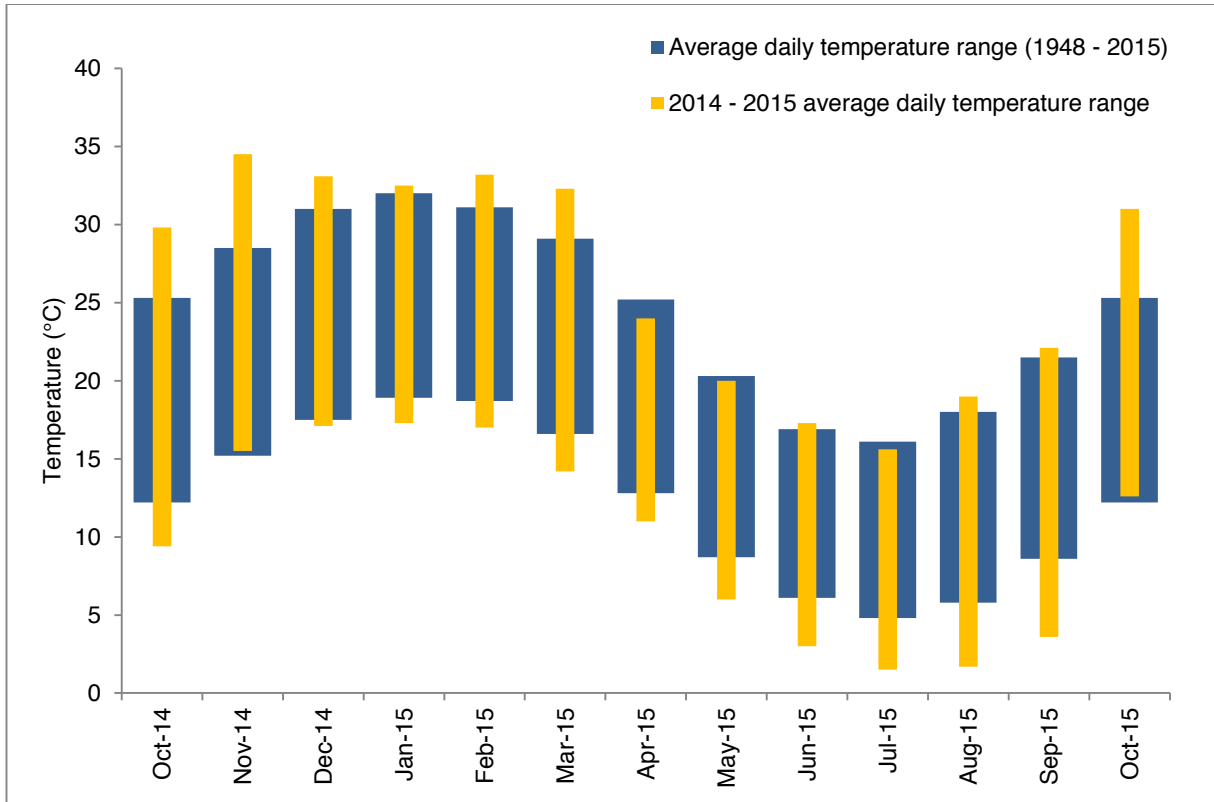


Figure 2: Historical average (Gunnedah Resource Centre 55024; BoM 2015) and recorded average daily temperature range (WCM weather station).

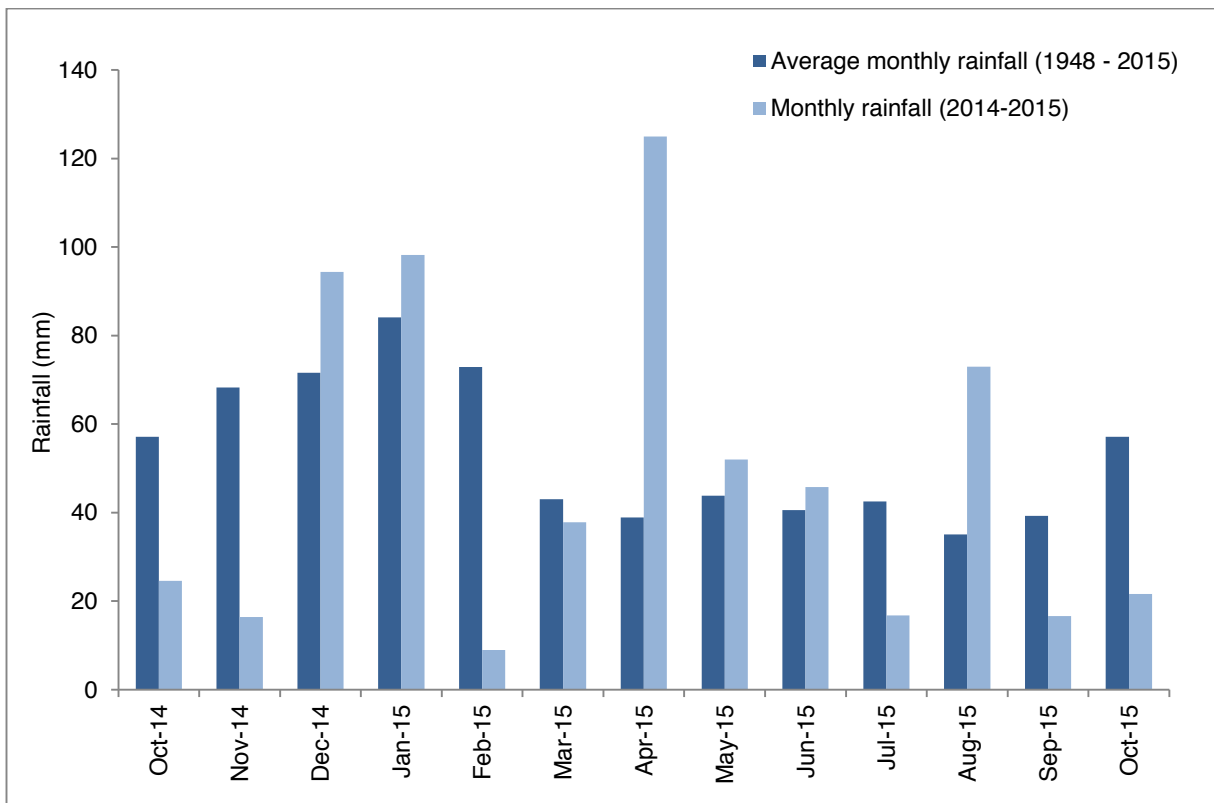


Figure 3: Historical average (Gunnedah Resource Centre 55024; BoM 2015) and recorded monthly rainfall (WCM).

4 Results & discussion

4.1 Remote sensing monitoring

Changes in the 2014 and 2015 Normalised Differential Vegetation Index (NDVI) of multi-spectral imagery were assessed.

4.1.1 Relative plant biomass & bare soil assessment

There was no substantial change in photosynthetically active biomass (PAB) in most of the rehabilitation zones. One substantial area of increase on the western perimeter of Wood 10c requires ground-truthing to determine the cause of the change (Table 4; Figure 4). Large areas of increase in groundcover are evident with comparison of the 2014 and 2015 true colour image in Wood 6a and Wood 7c (Table 4).

Scattered areas of increase and decrease in PAB across the image can be attributed to shadow position and slight image shift; this is particularly pronounced around dam perimeters (Table 4; Figure 4).

Table 4: Remote sensing analysis outcomes

Rehabilitation Zone	Comment
Control Wood 1	No substantial change
Control Wood 2	No substantial change
Wood 4	No substantial areas of significant change detected. Scattered areas of increase and decrease attributed to shift in shadow from canopy species
Wood 5a	No substantial change
Wood 5b	No substantial change
Wood 6a	No substantial areas of significant change. Large areas of groundcover increase evident in true colour image
Wood 7c	No substantial areas of significant change. Large areas of groundcover increase evident in true colour image
Wood 10c	One substantial area of increase on the western perimeter of this zone; ground-truthing required to assess the cause of the change
Burnt_2013	No substantial change
Control Pasture 1	Substantial decrease attributed to agricultural land management
Control Pasture 2	No substantial change
Pasture 2004	No substantial change

4.1.2 Monitoring triggers and management actions required

NDVI analysis identified an area of substantial concentrated groundcover increase in Wood 10c. This area requires ground-truthing to determine the nature of the increase (i.e. weed outbreak or other).

Table 5: Remote sensing monitoring triggers for management

Trigger	Investigation	Management
Remote sensing change detection identifies areas of substantial change ($> \pm 2$ std dev from average) in area greater than 0.1 ha	Investigate sources of change via desktop assessment: 1. Obvious external influence e.g. fire, major storm, or unrelated development) 2. Potentially due to weed infestation, erosion / sedimentation, poor cover establishment	Respond to change based on likely source of impact: Identify region of change and tag it as non-project specific impact Undertake directed field investigation via rapid field checking protocol (Table 5-11 in ELA 2011)

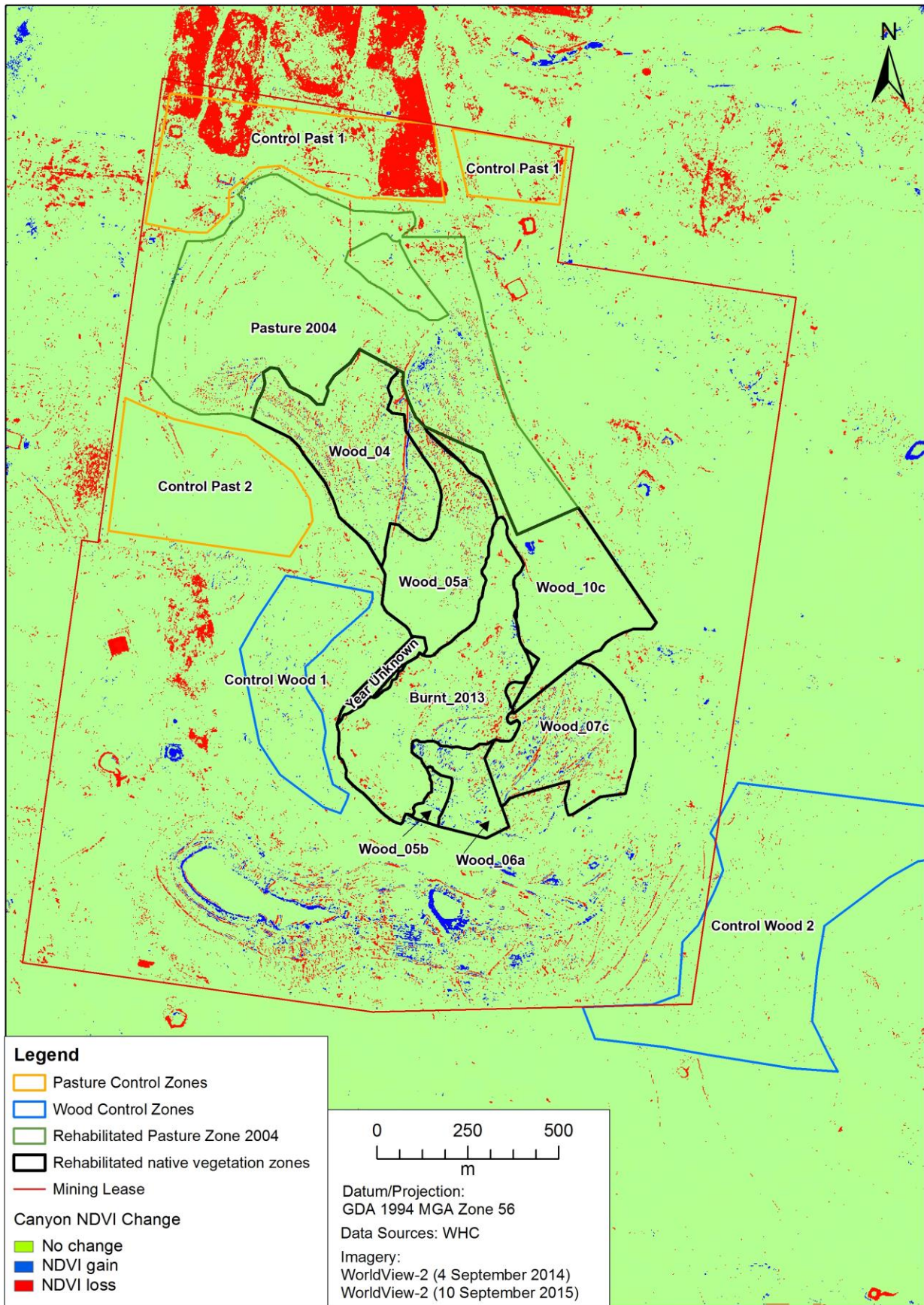


Figure 4: NDVI change detection analysis

4.2 Woodland monitoring

Woodland zones rehabilitated in 2004 and 2005 (Wood_04 and Wood_05a) continue to increase in structural complexity and show an increase in suitable fauna habitat and a corresponding increase in the number of animals using the sites. More recently rehabilitated sites are yet to show similar trends.

4.4.1 Vegetation

Woodland rehabilitation is yet to reach a point where there is a canopy layer present; as a result there is no True Projected Foliage Cover (TPFC) in any of the rehabilitation zones. Planted trees in all rehabilitation sites excepting Wood_10c continue to form a midstorey layer, with both increases and minor decreases in TPFC. Larger decreases in TPFC for the midstorey occur at Burnt_2013.

The established canopy layer within the control plots have an average TFPC of 5.7%, while the rehabilitation plots are yet to establish a canopy layer. Average TFPC for the midstorey layer remains low for both control and rehabilitation plots (>2%). The rehabilitated sites comprise a midstorey dominated by juvenile tree species that will eventually grow to form the canopy layer. Compared to the control plots however, which have a combination of both tree and shrub species contributing to the midstorey layer, the rehabilitation plots lack diversity and structural complexity. These differences in species composition are confirmed in Cluster and nMDS analysis, where rehabilitation zones have some similarity to the control zones (40%), but the control zones are 60% similar to each other (Volume 2, Section 3.3). As a result it is likely that the rehabilitated sites, when mature, will lack these features of the control plots.

Native species richness remains below that recorded in 2011 at most control and rehabilitation zones and decreased species richness since 2014 was recorded in all zones except Wood_04 and Wood_05a (

Figure 5). Despite declining native species richness at Burnt_2013 since the 2014 monitoring period, it remains higher than records prior 2013. Mean exotic species richness is variable across zones. Exotic species richness has remained stable or increased in the control zones (Control Woodland 1 and Control Woodland 2 respectively) and remains higher than 2011 records. Despite increased exotic species richness, native species richness in these two zones remains greater. Declining exotic species richness was recorded in all rehabilitation zones, and remains greater than native species richness in all rehabilitation zones except Wood_05a and Wood_04. A particularly wet late autumn and early winter appears to have led to a proliferation of winter annual weed species and these exotic forbs were still present during the spring survey.

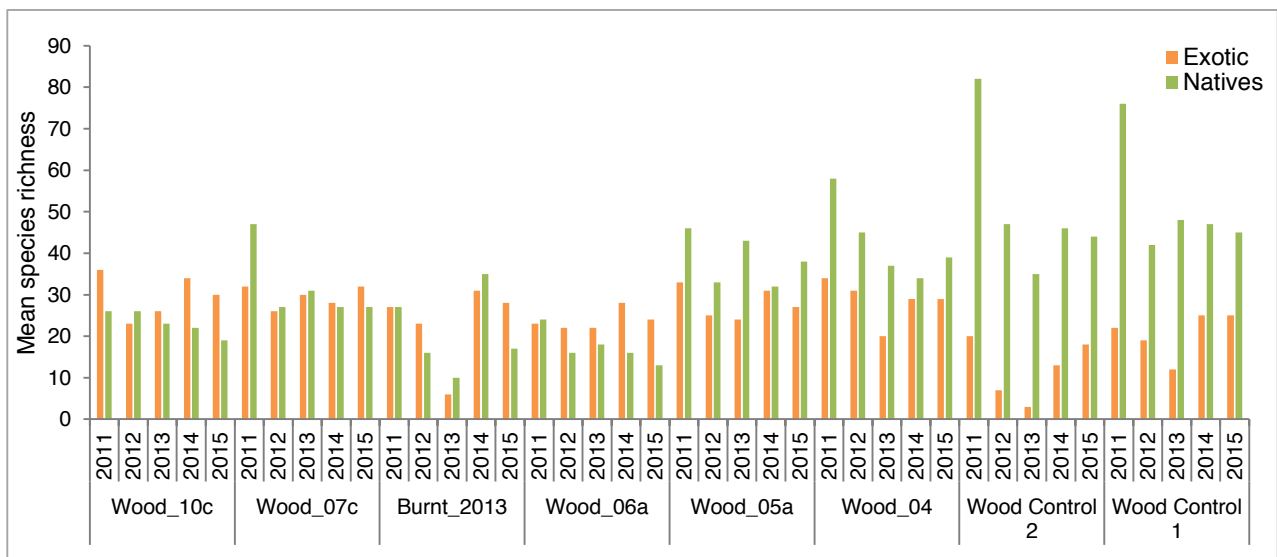
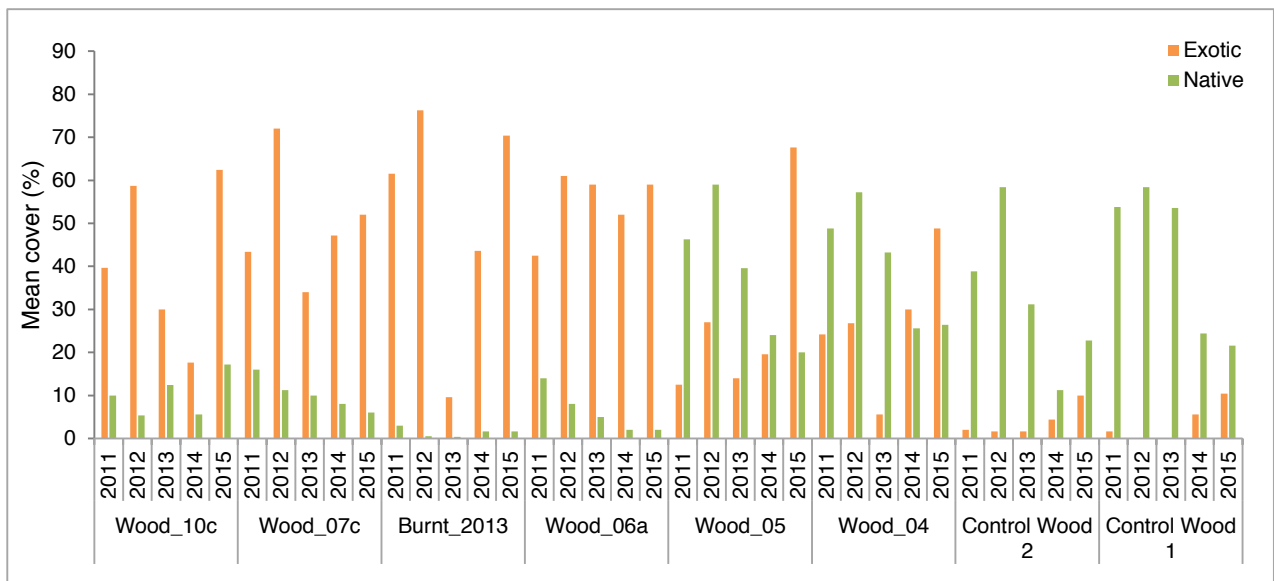


Figure 5: Mean native and exotic groundcover species richness across zones (2011 - 2015)

Changes in mean native species cover since 2014 have been variable in both control and rehabilitation zones (Figure 6). However, since 2011 there has been an overall decline of native cover in all zones, and this decrease is statistically significant in all zones, except Wood_07c, Burnt_2013 and Wood_10c (Volume 2, Section 4.7). Mean exotic species cover has also increased significantly at all rehabilitation sites, except Wood_06a and the control sites where increased cover was also recorded but was not significant (Volume 2, Section 4.7). Mean leaf litter cover has decreased significantly across all rehabilitation and control zones, except Wood_06a and Burnt_2013 since 2011. Decreased leaf litter cover was also recorded at Wood_06a and Burnt_2013, but was not statistically significant ($p > 0.05$). Since 2014, mean bare ground cover has generally decreased or remained stable. This trend has been observed since 2011 and is a result of increased exotic species cover.

**Figure 6: Mean native and exotic groundcover at each monitoring zone (2011 - 2015)**

Cluster and nMDS show that native groundcover species composition has temporal and spatial variability within zones, but does not differ substantially between all zones. Generally, the control zones, Wood_04 and Burnt_2013 have less variability than the rehabilitation zones (Volume 2; Section 3.6).

In the 2014 monitoring period remedial works within Wood_10c (plot 1B) was identified to be at risk of erosion due to decreased groundcover, particularly during intense rainfall events. Since 2014, groundcover has increased at plot 1B (Wood_10c). However, dense thickets of *Sisymbrium irio* (London Rocket) make up a large proportion of the groundcover recorded at plot 1B. London Rocket is an annual or biennial weed, which may not provide long term cover.

Two noxious weeds persist on site, *Opuntia stricta* (Common Prickly Pear) at Wood_05a and Wood_10c and *Lycium ferocissimum* (African Boxthorn) at Wood_10c. In 2014 Common Prickly Pear was recorded at Control Wood 1, Control Wood 2 and Wood_05a, and African Boxthorn at Wood_07c. Despite the absence of these species in previously affected plots, their presence in new plots still requires ongoing management. The control of noxious weeds on private land is the responsibility of the land owner or occupier and is one of the management objectives for Canyon Mine. Both species are classified as Class 4, so should be managed to reduce spread and inhibit reproduction. WCM should refer to the site MCP for weed management procedures. NSW Department of Primary Industries (DPI) also recommends suitable management methods (DPI 2012).

Amount of Coarse Woody Debris (CWD) did not vary much between 2014 and 2015, where there are decreases this may be a result of pieces being obscured by increased groundcover and hence undetected during the field survey.

4.1.1 Fauna

An analysis of bird species composition shows that bird species composition fluctuates between years at all monitoring zones, but is slightly more stable at the control zones. This is mainly due to the young habitat within the rehabilitated zones being less complex than the more mature woodland control sites.

Bird species richness is consistently highest at Control Woodland 2 across all seasons, with up to twice as many species recorded in this zone during each monitoring period compared with the other control and rehabilitation zones. Control Woodland 2 is a larger area than Control Woodland 1 and has better vegetation structure (more dense with a shrub layer), so higher bird diversity is expected.

Bird species richness at the rehabilitated zones is generally lower than the control sites (Figure 7). This is confirmed in the nMDS analysis where there is a distinct difference between species recorded at the control sites compared to the rehabilitation sites. Data for all seasons at control sites are closely clustered together compared to rehabilitation sites, indicating that species are stable (Volume 2, Section 4). Bird species richness at W04 remained high in the spring monitoring period despite a decline in winter. Increased species richness was recorded at W06 in winter and spring. The remaining rehabilitation sites still have lower species richness than the control zones, with lower numbers generally recorded at the most recently rehabilitated sites (W06 and W07). Temporal trends at the rehabilitated sites remain consistent with the control zones, where a decline in species richness is recorded during the winter survey period. W06 showed similar trends to Control Woodland 2 where an increase in species richness was recorded in the spring monitoring period after a decline during the autumn and winter survey periods. The remaining rehabilitation zones have exhibited trends similar to Control Woodland 1 where a decline in species richness since was recorded in the spring monitoring period. Additionally, the composition of species guilds at the rehabilitation sites are yet to be representative of either control sites (Volume 2, Section 4).

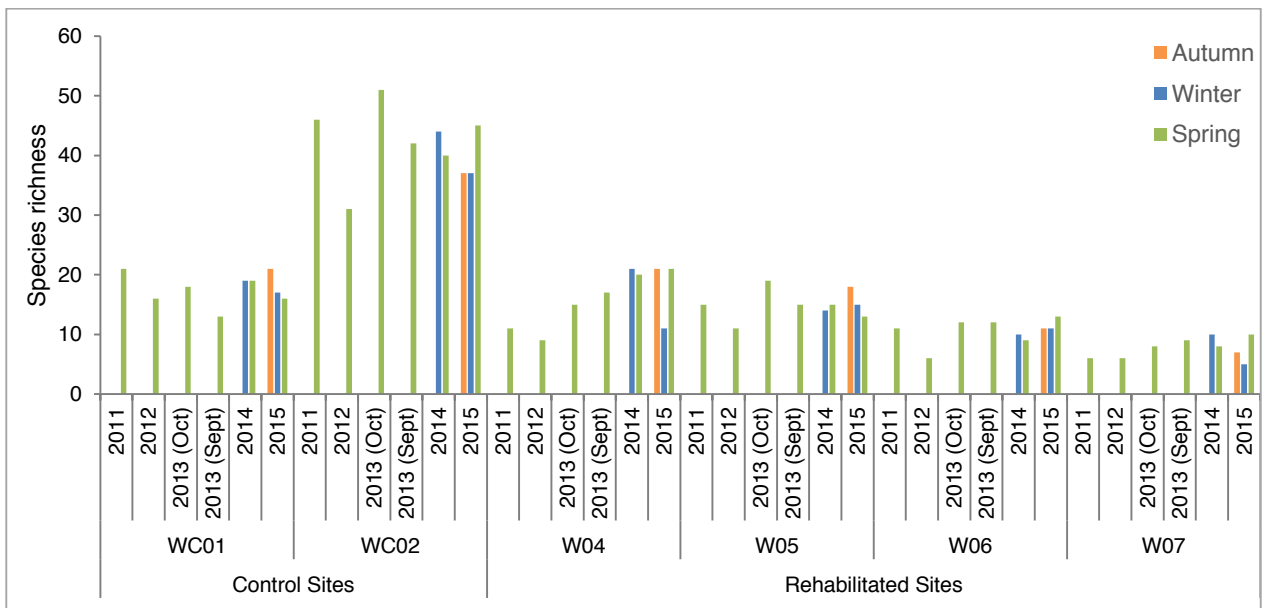


Figure 7: Bird species richness at each monitoring plot for all seasons (2011 - 2015). Autumn surveys commenced in 2014 and winter surveys commenced in 2015.

The Rehabilitation Monitoring Program for Canyon Coal Mine (ELA 2011) recommends targeted monitoring for *Neophema pulchella* (Turquoise Parrot) and *Pomatostomus temporalis* (Grey-crowned Babbler), both listed as threatened under the TSC Act. Grey-crowned Babbler were not recorded in any rehabilitation sites from 2011 to 2014, however in the 2015 monitoring period they have been recorded in rehabilitation site W04. Turquoise Parrot remains unrecorded on site. In addition to these threatened species, the following were also present in the current monitoring period:

- *Chthonicola sagittata* (Speckled Warbler) Control Wood 2 in 2011, 2012, 2013 and 2014 (Vulnerable – TSC Act)
- *Falco subniger* (Black Falcon) over Control Wood 1 in 2012 and Wood_07c in 2014 (Vulnerable – TSC Act)
- *Hieraaetus morphnoides* (Little Eagle) over Control Wood 1 in 2011 (Vulnerable – TSC Act)
- *Melanodryas cucullata* (Hooded Robin) Control Wood 2 in 2012 2013 and 2014. (Vulnerable – TSC Act).

Of the non-bird fauna, seven mammal species were observed during the 2015 monitoring period. *Macropus giganteus* (Eastern Grey Kangaroo), *Macropus robustus* (Common Wallaroo), and *Wallabia bicolor* (Swamp Wallaby) have been seen across the control sites in all survey years and appear widespread. As recorded in the previous monitoring report, Eastern Grey Kangaroo and Common Wallaroo populations were also found in the rehabilitated zones. Four exotic species, *Lepus capensis* (Hare), *Oryctolagus cuniculus* (Rabbit), *Vulpes vulpes* (Fox) and *Sus scrofa* (Feral Pig) were also recorded as in the rehabilitated zones, as well as being present in the reference zones. Hare was recorded in three rehabilitation zones (Wood_05a, Wood_06a and Wood_07), and the fox within Wood_05. Feral Pigs were less widespread than in the 2014 monitoring period. Unlike the previous monitoring report, reptiles and amphibians were recorded in the 2015 period. Of the amphibians *Limnodynastes tasmaniensis* (Spotted Grass-Frog) was present in rehabilitated zone Wood_05, and of the reptiles, *Egernia stiroolata* (Tree Skink), *Morethia boulengeri* (Boulenger's Skink) and *Pogona barbata* (Eastern Bearded Dragon) were recorded. Tree skinks were recorded in rehabilitations zones, Wood_05, Wood_06 and Wood_07 as well as reference zone WC_01. Boulenger's Skink was recorded in the same zones as the Tree Skinks, with the addition of reference site WC_02. Eastern Bearded Dragon was recorded in only one control site, Wood_05, and reference site WC_01.

4.1.2 Monitoring triggers

Monitoring triggers that require action are the presence of feral pigs and the presence of weed species (including two that are classed as noxious) (Table 6).

Plastic tree guards remain around some of the planted trees and are impeding growth; these should be removed.

Table 6: Management recommendations for woodland zones.

Trigger	2015 Monitoring outcomes	Management
Statistically significant change detected in either: Native overstorey (cover, health, richness, recruitment) Mid storey (cover, richness) Ground cover (cover, richness) Weeds (cover, richness)	Exotic groundlayer species composition increased significantly in Wood_10c, Wood_07c, Burnt_2013, Wood_04, Wood_05a and Control Wood 1. Native groundlayer species richness decreased	No management actions required at this stage as changes are consistent with control zone trends.

Trigger	2015 Monitoring outcomes	Management
% ground cover	significantly in Control Wood 1 & 2, Wood_04, Wood_05a and Wood_06a.	
Exotic fauna	Feral Pigs, Hares and Foxes observed on site	Refer to MCP and/or DPI for management procedures.
Weed infestation	Rhodes grass is a threat to native groundcover species diversity. Prickly Pear and African Boxthorn persist on site.	Refer to MCP and/or DPI for management procedures.
Soil erosion	None identified.	No management actions required at this stage.

5 Recommendations and conclusion

5.1 Remote sensing monitoring

Image capture and NDVI analysis identified an area of substantial increase in vegetation growth. Field verification showed that the increase was due to regeneration following the 2013 fire event. Exotic groundcover was lower than pre-fire records and species recorded during the survey were not environmental or noxious weeds, so no specific management action is required.

5.2 Woodland monitoring

Monitoring of woodland areas indicate that groundcover has increased since the previous monitoring period, however, much of this cover can be attributed to exotic species. This increase has likely been a response by competitive exotic species to rainfall in the lead up to the 2015 spring survey period. Additionally, native groundcover has decreased significantly since the 2014 monitoring period. No management actions are recommended since these changes were consistent with control zone trends.

Rhodes Grass can reduce native biodiversity. For future plantings it is important to find an alternative, preferably a mix of groundcover species that are native to the local area. African Boxthorn and Prickly Pear are present on site in low abundance. As per the previous monitoring report (ELA 2014) these should be managed to prevent spread.

Additional local tree and shrub species should be planted at Wood_10c and Wood_07c to improve habitat complexity. Most trees and shrubs within Burnt_2013 have not recovered, ELA recommend that this zone be replanted. This should be done with reference to control data collected on native species composition and density from remnant vegetation communities adjacent to the site.

Many planted trees have had their plastic tree guards removed since 2013 and appear to be responding well. Any plastic guards that remain on planted trees should be removed to encourage growth.

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Eco Logical Australia (ELA). 2014. *Canyon Coal Mine – Rehabilitation Monitoring Report – Spring 2014*. Prepared for Whitehaven Coal Mining Limited.



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Canyon Coal Mine – Rehabilitation Monitoring Report

Volume 2

Spring 2015

Prepared for
Whitehaven Coal Mining Limited

23 March 2016



DOCUMENT TRACKING

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Prepared by	Linden Burch
Reviewed by	Dr Paul Frazier
Status	FINAL
Version Number	1
Last saved on	23 March 2016
Cover photo	Left: Plot 20 in Burnt_2013; Right: Plot 41 in Wood Control 1. Photos taken by Emily Southwell and Lachlan Copeland

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1 Weather Data

Table 1: Canyon Mine and Gunnedah historical monthly weather data

Month	Canyon Mine Monthly Mean [#]						Historical Averages [*]			
	Min Temp (°C)	Max Temp (°C)	Rainfall (mm)	Cumulative rainfall (mm)	No. of rain days	Maximum daily rainfall (mm)	Min Temp (°C)	Max Temp (°C)	Rainfall (mm)	No. of rain days
Oct-14	9.4	29.8	24.6	24.6	5.0	6.0	12.2	25.3	57.1	5.9
Nov-14	15.5	34.5	16.4	41.0	5.0	18.4	15.2	28.5	68.3	6.2
Dec-14	17.1	33.1	94.4	135.4	12.0	67.8	17.5	31	71.6	6.6
Jan-15	17.3	32.5	98.2	233.6	10.0	20.0	18.9	32	84.1	6.0
Feb-15	17.0	33.2	9.0	242.6	7.0	54.4	18.7	31.1	72.9	5.3
Mar-15	14.2	32.3	37.8	280.4	11.0	1.0	16.6	29.1	43	4.1
Apr-15	11.0	24.0	125.0	405.4	7.0	11.8	12.8	25.2	38.9	3.5
May-15	6.0	20.0	52.0	457.4	10.0	24.0	8.7	20.3	43.8	4.3
Jun-15	3.0	17.3	45.8	503.2	14.0	24.2	6.1	16.9	40.6	4.6
Jul-15	1.5	15.6	16.8	520.0	12.0	4.2	4.8	16.1	42.5	4.9
Aug-15	1.7	19.0	73.0	593.0	4.0	15.8	5.8	18	35.1	4.5
Sep-15	3.6	22.1	16.6	609.6	4.0	10.2	8.6	21.5	39.3	4.5
Oct-15	12.6	31.0	21.6	631.2	3.0	21.2	12.2	25.3	57.1	5.9

Whitehaven Coal Mine data

* Gunnedah Resource Centre Station 55024 (BoM 2015)

2 Woodland vegetation monitoring results

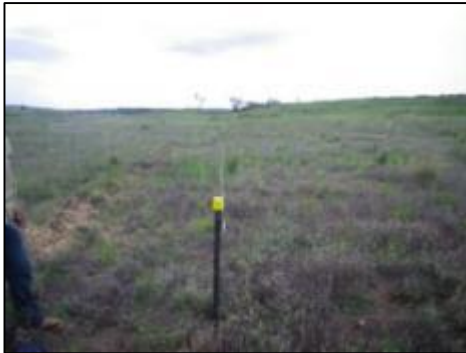
Table 2: Survey dates for each monitoring plot in 2015

Treatment	Zone	Plot	Start Easting	Start Northing	Date of survey
Rehabilitated woodland	Wood_10c	1B	229675	6596115	28/10/2015
		2B	229774	6596024	28/10/2015
		3	229771	6596171	28/10/2015
		4	229896	6595954	28/10/2015
		5	229740	6595863	30/10/2015
	Wood_07c	16	229821	6595502	30/10/2015
		17	229780	6595743	30/10/2015
		18	229616	6595515	30/10/2015
		19	229667	6595648	30/10/2015
		20	229897	6595639	30/10/2015
	Burnt_2013	21	229560	6595883	28/10/2015
		22	229569	6595737	28/10/2015
		23	229398	6595736	28/10/2015
		46	229265	6595679	29/10/2015
		30	229230	6595533	29/10/2015
	Wood_06a	24	229491	6595561	30/10/2015
		25	229534	6595400	30/10/2015
	Wood_05b	26	229426	6595954	28/10/2015
		27	229482	6596119	28/10/2015
		28	229483	6596294	27/10/2015
29		229324	6596068	28/10/2015	
48		229429	6595045	28/10/2015	
Wood_04	31	228975	6596539	29/10/2015	
	32	229234	6596607	27/10/2015	
	33	229232	6596224	28/10/2015	
	34	229147	6596433	29/10/2015	
	35	229302	6596389	27/10/2015	
Control woodland	Control Wood 2	36	230471	6595217	28/10/2015
		37	230521	6595381	28/10/2015
		38	230387	6594823	28/10/2015
		39	230004	6594823	28,10,2015
		40	230264	6595071	28/10/2015

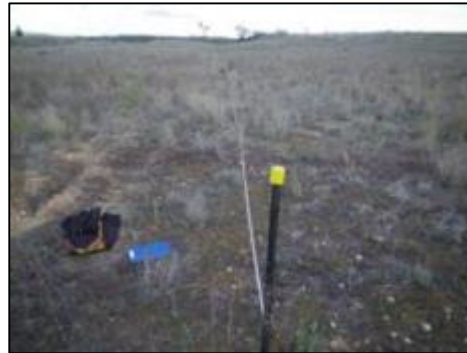
Treatment	Zone	Plot	Start Easting	Start Northing	Date of survey
	Control Wood 1	41	229092	6595856	29/10/2015`
		42	229060	6595481	29/10/2015
		43	228970	6595744	29/10/2015
		44	229062	6595639	29/10/2015
		45	229093	6595989	29/10/2015

3.1 Plot photographs

Plot 3



2011



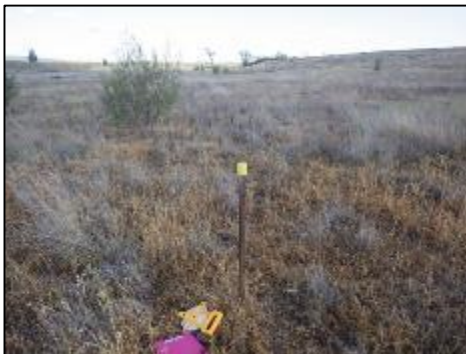
2012



January 2014



November 2014



2015

Plot 4



2011



2012



January 2014



November 2014



2015

Plot 5



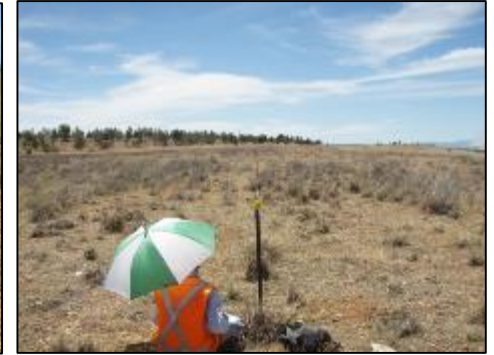
2011



2012



January 2014

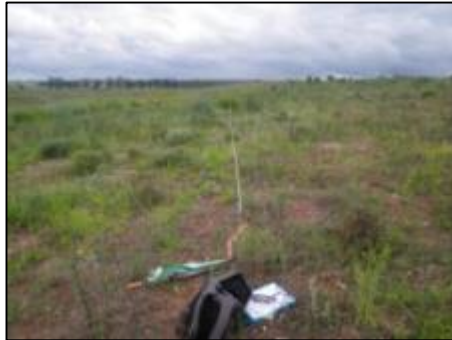


November 2014



2015

Plot 16



2011



2012



January 2014



November
2014



2015

Plot 17



2011



2012



2013



November
2014



2015

Plot 18



2011



2012



2013



November 2014



2011

Plot 19



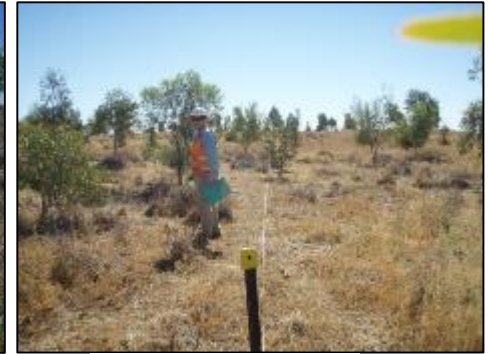
2011



2012



2013

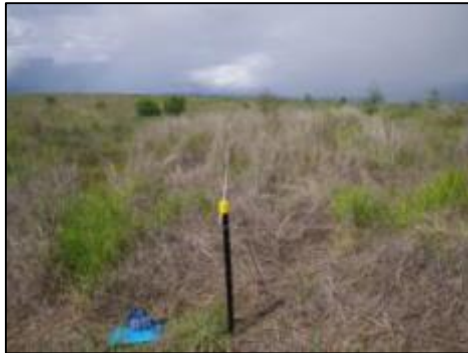


November 2014



2015

Plot 21



2011



2012



2013



November 2014



2015

Plot 22



2011



2012



2013



November 2014



2015

Plot 23



2011



2012



2013



November 2014



2015

Plot 24



2011



2012



2013



November 2014

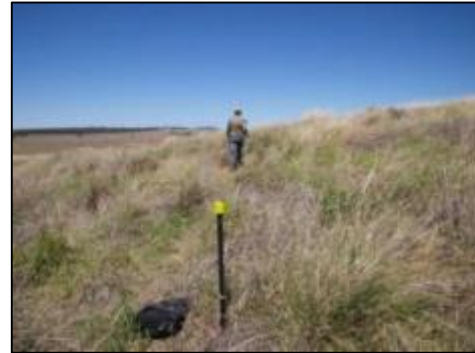


2015

Plot 25



2011



2012



2013



November 2014



2015

Plot 26



2011



2012



2013



November 2014



2015

Plot 27



2011



2012



January 2014

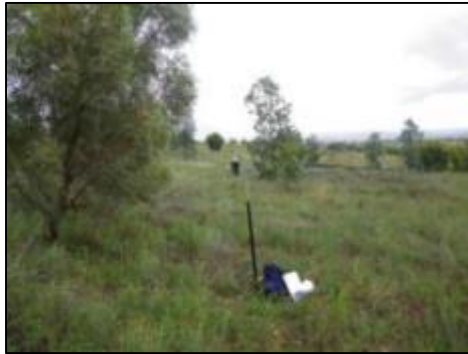


November 2014



2015

Plot 28



2011



2012



January 2014



November 2014



2015

Plot 29



2011



2012



January 2014

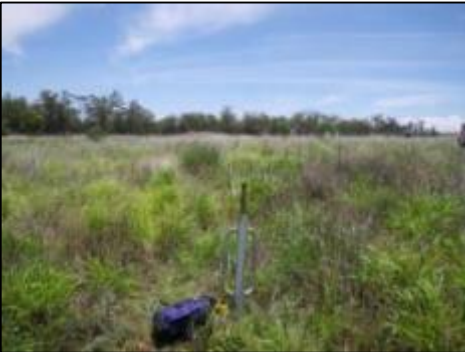


November 2014



2015

Plot 30



2011



2012



2013



November 2014



2015

Plot 24



2011



2012



2013



November 2014



2015

Plot 31



2011



2012



January 2014



November 2014



2015

Plot 32



2011



2012



January 2014



November 2014

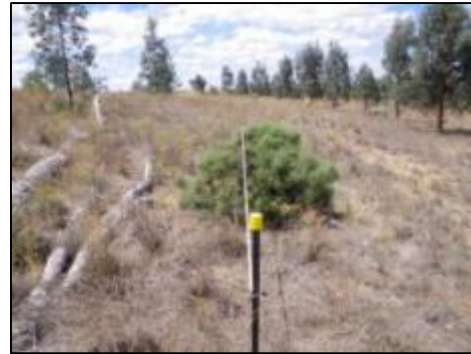


2015

Plot 33



2011



2012



January 2014



November 2014



2015

Plot 34



2011



2012



January 2014

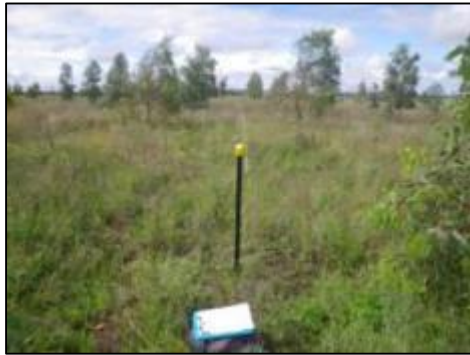


November 2014

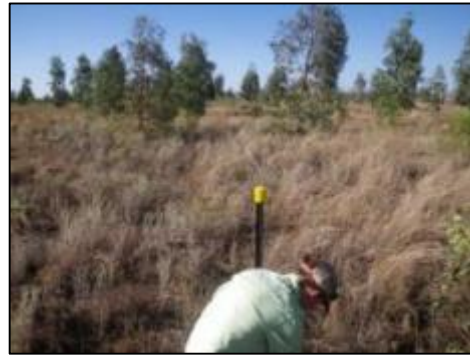


2015

Plot 35



2011



2012



2013



November 2014



2015

Plot 36



2011



2012



January 2014



November 2014



2015

Plot 37



2011



2012



January 2014



November 2014



2015

Plot 38



2011



2012



January 2014



November 2014



2015

Plot 39



2011

No image

2012



January 2014



November 2014



2015

Plot 40



2011



2012



January 2014



November 2014



2015

Plot 41



2011



2012



2013



November 2014



2015

Plot 42



2011



2012



2013



November 2014



2015

Plot 43



2011



2012



2013



November 2014



2015

Plot 44



2011



2012



2013



November 2014



2015

Plot 45



2011



2012



January 2014



November 2014



2015

Plot 46 (Established 2013)



2013



November 2014



2015

Plot 48 (Established 2013)



2013



November 2014



2015

3.2 Canopy & midstorey information

Table 3: Control Wood 1 habitat characteristics (2011, 2012, 2014 and 2015)

Monitoring Zone		Control Wood 1																									
Plot Number_Monitoring Year		41_2011	41_2012	41_2013	41_2014	41_2015	42_2011	42_2012	42_2013	42_2014	42_2015	43_2011	43_2012	43_2013	43_2014	43_2015	44_2011	44_2012	44_2013	44_2014	44_2015	45_2011	45_2012	45_2013	45_2014	45_2015	
Canopy DBH Thresholds	Large Tree ≥ 60 cm DBH	50	-	-	-	-	60	-	-	-	-	50	-	-	-	-	50	-	-	-	-	50	-	-	-	-	
	Mature Tree ≥ 30 cm DBH	-	-	-	-	-	30	-	-	-	-	-	-	-	-	-	30	-	-	-	-	-	-	-	-	-	
	Advanced Regrowth (x cm to x cm)	-	-	-	-	-	10 x 30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Sapling ≤ x cm to x cm	-	-	-	-	-	1 to 10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Seedlings < x cm dbh	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Canopy ≥ x m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Midstorey x m to x m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Ground layer ≤ x m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Canopy Species and Age Classes	No. of native canopy species	1	1	1	1	1	1	1	1	1	1	2	2	-	2	2	2	2	2	3	3	1	1	1	1	1	
	No. of large trees	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	2	2	2	2	2	2	2		2	2	
	Juveniles present (Y/N)	n	n	n	y	y	y	y	n	y	y	y	y	y	y	y	n	y	y	y	y	y	y	y	y	y	
	Mature trees present (Y/N)	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y
	Seedlings present (Y/N)	n	n	y	n	n	-	y	n	n	n	y	n	y	n	n	n	n	n	n	n	n	-	y	y	n	n
	Advanced regrowth present (Y/N) (note in rehab sites this pertains to planted trees as sites were devoid of trees prior to rehab):	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y
Coarse Woody	Total length of CWD (m)	24	27.5	35	51	51	86	147.5	209	232	225	3	1	3	6	8	105	79	97	233	241	15	8	47	41	43	

Monitoring Zone		Control Wood 1																								
Plot Number_Monitoring Year		41_2011	41_2012	41_2013	41_2014	41_2015	42_2011	42_2012	42_2013	42_2014	42_2015	43_2011	43_2012	43_2013	43_2014	43_2015	44_2011	44_2012	44_2013	44_2014	44_2015	45_2011	45_2012	45_2013	45_2014	45_2015
Debris (CWD)	No. of sections of CWD	13	12	19	33	33	35	60	90	93	92	3	1	3	6	6	24	29	33	68	70	7	6	14	19	19
Midstorey, Understorey Species	No. of native midstorey species	0	0	0	0	0	1	1	0	1	1		1	1	1	3	3	1	1	3	4	2	3	4	3	5
	No. of native species in ground layer	34	19	19	22	21	35	17	20	12	13		19	20	17	17	37	15	21	24	44	35	19	20	13	19
Transect	% Projected Crown Cover-Canopy Species	72	60	50	74	72	20	12	12	28	8	12	6	8	8	0	58	66	72	68	68	38	36	42	38	38
	% Projected Crown Cover - Midstorey Species	0	0	0	0	0	4	4	0	4	0	12	12	8	8	0	6	6	0	0	0	10	10	8	10	10
	% True Projected Foliage Cover - Canopy	14.8	8.4	6	11	12	2	1.6	1	3	1	2.8	0.6	1	1	0	12.7	8.9	10	12	12	9.2	5.4	6	6	7
	% True Projected Foliage Cover - Midstorey	0	0	0	0	0	0.4	0.4	0	0.4	0	2.4	2.4	1	1	0	0.9	0.6	1	0	0	1.5	1.75	7	1	1

Table 4: Control Wood 2 habitat characteristics (2011, 2012, 201, 2014 and 2015)

Monitoring Zone		Control Wood 2																									
Plot Number_Monitoring Year		36_2011	36_2012	36_2013	36_2014	36_2015	37_2011	37_2012	37_2013	37_2014	37_2015	38_2011	38_2012	38_2013	38_2014	38_2015	39_2011	39_2012	39_2013	39_2014	39_2015	40_2011	40_2012	40_2013	40_2014	40_2015	
Canopy DBH Thresholds	Large Tree ≥ 60 cm DBH	50	-	-	-	-	50	-	-	-	-	50	-	-	-	-	50	-	-	-	-	50	-	-	-	-	
	Mature Tree ≥ 30 cm DBH	-	-	-	-	-	-	-	-	-	-	30	-	-	-	-	30	-	-	-	-	30	-	-	-	-	
	Advanced Regrowth (x cm to x cm)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Sapling ≤ x cm to x cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Seedlings < x cm dbh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Canopy ≥ x m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Midstorey x m to x m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Ground layer ≤ x m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Canopy Species and Age Classes	No. of native canopy species	1	1	1	1	1	2	2	2	2	2	3	3	2	3	3	2	2	2	2	2	1	1	1	1	1	
	No. of large trees	2	2	0	2	2	0	0	0	0	0	1	1	0	1	1	1	1	0	0	0	1	1	1	1	1	
	Juveniles present (Y/N)	y	y	y	y	y	y	y	y	y	y	y	y	y	n	n	n	y	y	y	y	y	y	y	n	n	
	Mature trees present (Y/N)	y	y	y	y	y	y	-	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	
	Seedlings present (Y/N)	y	y	y	n	n	n	y	y	n	n	y	y	y	n	n	n	y	y	y	y	y	n	y	y	n	n
	Advanced regrowth present (Y/N) (note in rehab sites this pertains to planted trees as sites were devoid of trees prior to rehab):	y	y	y	y	y	y	-	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	
Coarse Woody Debris (CWD)	Total length of CWD (m)	none	2	4	5	0	27	80	74	97	54	4	9	6	10	4	62	28	38	43	30	99	102	103	138	125	
	No. of sections of CWD	none	2	3	4	0	8	44	32	50	27	3	7	4	9	4	15	15	16	22	15	42	68	42	76	67	

Monitoring Zone		Control Wood 2																								
Plot Number_Monitoring Year		36_2011	36_2012	36_2013	36_2014	36_2015	37_2011	37_2012	37_2013	37_2014	37_2015	38_2011	38_2012	38_2013	38_2014	38_2015	39_2011	39_2012	39_2013	39_2014	39_2015	40_2011	40_2012	40_2013	40_2014	40_2015
Midstorey, Understorey Species	No. of native midstorey species	1	2	2	2	3	3	5	5	4	3	1	2	2	2	3	4	2	5	3	3	2	2	3	2	2
	No. of native species in ground layer	36	12	15	16	16	39	11	14	19	19	35	22	18	12	20	35	9	17	19	22	39	25	16	21	21
Transect	% Projected Crown Cover-Canopy Species	42	40	38	44	34	16	22	20	16	14	22	20	14	14	32	52	40	36	36	40	28	30	28	26	28
	% Projected Crown Cover - Midstorey Species	0	0	0	0	0	52	52	56	56	48	0	0	0	0	0	0	0	0	0	0	20	16.6	24	20	24
	% True Projected Foliage Cover - Canopy	8	7	5	6	6	2	4	2	2	2	3	4	2	3	5	9	8	5	5	6	7	8	4	5	6
	% True Projected Foliage Cover - Midstorey	0	0	2	0	0	10	13	12	10	13	0	1	1	0	0	0	0	2	0	0	4	3	1	6	5

Table 5: Rehabilitated zone Wood_04 habitat characteristics (2011, 2012, 2013, 2014 and 2015)

Monitoring Zone		Wood_04																									
Plot Number_Monitoring Year		31_2011	31_2012	31_2013	31_2014	31_2015	32_2011	32_2012	32_2013	32_2014	32_2015	33_2011	33_2012	33_2013	33_2014	33_2015	34_2011	34_2012	34_2013	34_2014	34_2015	35_2011	35_2012	35_2013	35_2014	35_2015	
Canopy DBH Thresholds	Large Tree ≥ 60 cm DBH	Note: No trees along transect but 2 rows of young trees within plot	-	-	-	-	-	-	-	-	-	Note: Estimated cover for 20 x 50 m plot 3%	-	-	-	-	Note: Estimated planted tree cover for 20 x 50 m plot 2%	-	-	-	-	Note: Estimated planted tree cover for 20 x 50 m plot 5%	-	-	-	-	
	Mature Tree ≥ 30 cm DBH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Advanced Regrowth (x cm to x cm)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Sapling ≤ x cm to x cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Seedlings < x cm dbh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Canopy ≥ x m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Midstorey x m to x m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Ground layer ≤ x m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Canopy Species and Age Classes	No. of native canopy species	No canopy yet	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	No. of large trees	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Juveniles present (Y/N)	y	n	y	y	y	y	-	y	y	y	y	n	y	y	y	y	y	y	y	y	y	y	y	y	y	
	Mature trees present (Y/N)	n	n	n	n	n	n	-	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	
	Seedlings present (Y/N)	n	n	n	n	n	n	-	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	y	n	n
	Advanced regrowth present (Y/N) (note in rehab sites this pertains to planted trees as sites were devoid of trees prior to rehab):	n	y	y	n	n	n	-	y	n	n	n	n	y	y	y	y	n	y	y	n	n	n	y	y	n	y
Coarse Woody Debris (CWD)	Total length of CWD (m)	14, deliberately imported	54.5	58	54	55	113	-	89	192	164	53	55	37	48	52	51	51	55	67	70	none	0	0	5	3	

Monitoring Zone		Wood_04																								
Plot Number_Monitoring Year		31_2011	31_2012	31_2013	31_2014	31_2015	32_2011	32_2012	32_2013	32_2014	32_2015	33_2011	33_2012	33_2013	33_2014	33_2015	34_2011	34_2012	34_2013	34_2014	34_2015	35_2011	35_2012	35_2013	35_2014	35_2015
	No. of sections of CWD	8	22	17	26	28	30	-	34	95	85	6	11	6	10	14	14	16	16	28	30	none	0	0	4	3
Midstorey, Understorey Species	No. of native midstorey species	None - but young trees forming a midstorey	4	6	5	5	-	-	4	4	5	0	3	5	5	5	3 (inc. sml trees)	3	4	4	3	5-planted	4	8	7	6
	No. of native species in ground layer	0	19	13	14	17	14	-	12	12	10	25	21	14	13	19	31	19	15	12	10	22	22	17	7	13
Transect	% Projected Crown Cover-Canopy Species	-	0	0	0	0	6	-	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0	0	0
	% Projected Crown Cover - Midstorey Species	-	0	0	0	0	-	-	8	0	8	-	0	0	0	0	-	0	0	0	0	-	0	4	4	4
	% True Projected Foliage Cover - Canopy	0	0	0	0	0	1.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	% True Projected Foliage Cover - Midstorey	0	0	6	0	0	0	1.4	4	0	1	0	5	4	0	0	0	8	4	0	0	0	8	10	0.4	0.4

Table 6: Rehabilitated zone Wood_05a habitat characteristics (2011, 2012, 2013, 2014 and 2015)

Monitoring Zone		Wood_05a																							
Plot Number_Monitoring Year		26_2011	26_2012	26_2013	26_2014	26_2015	27_2011	27_2012	27_2013	27_2014	27_2015	28_2011	28_2012	28_2013	28_2014	28_2015	29_2011	29_2012	29_2013	29_2014	29_2015	48_2013	48_2014	48_2015	
Canopy DBH Thresholds	Large Tree ≥ 60 cm DBH	Note: Cover of trees in plot is ~ 1%	-	-	-	-	Note: Cover of trees in plot is ~ 3%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Mature Tree ≥ 30 cm DBH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Advanced Regrowth (x cm to x cm)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sapling ≤ x cm to x cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Seedlings < x cm dbh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Canopy ≥ x m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Midstorey x m to x m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Ground layer ≤ x m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Canopy Species and Age Classes	No. of native canopy species	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	No. of large trees	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Juveniles present (Y/N)	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	n	y	y	y	y	y	y	y	y
	Mature trees present (Y/N)	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
	Seedlings present (Y/N)	n	n	y	n	n	n	n	n	n	n	n	n	y	n	n	n	n	n	n	n	n	y	n	n
	Advanced regrowth present (Y/N) (note in rehab sites this pertains to planted trees as sites were devoid of trees prior to rehab):	n	y	y	n	n	n	n	n	n	n	y	n	y	y	y	y	n	y	y	n	n	n	n	n
Coarse Woody Debris (CWD)	Total length of CWD (m)	37	126	106	139		64	17	13	45		72	77	58	80		10	10	9	27		17	17		
	No. of sections of CWD	13	41	38	52		17	6	3	16		21	29	16	38		8	9	8	23		9	7		

Monitoring Zone		Wood_05a																						
Plot Number_Monitoring Year		26_2011	26_2012	26_2013	26_2014	26_2015	27_2011	27_2012	27_2013	27_2014	27_2015	28_2011	28_2012	28_2013	28_2014	28_2015	29_2011	29_2012	29_2013	29_2014	29_2015	48_2013	48_2014	48_2015
Midstorey, Understorey Species	No. of native midstorey species	1, plus planted Eucs	4	3	4	3	-	4	6	6	7	0	3	3	5	2	3	5	5	5	6	5	6	4
	No. of native species in ground layer	24	22	15	11	11	19	17	9	13	15	22	18	17	15	15	35	23	23	16	15	16	6	12
Transect	% Projected Crown Cover-Canopy Species	-	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0	0	0	0	0	0
	% Projected Crown Cover - Midstorey Species	-	4	4	4	4	-	0	0	0	0	-	0	4	4	0	-	0	0	0	0	0	0	0
	% True Projected Foliage Cover - Canopy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	% True Projected Foliage Cover - Midstorey	0	0.2	8	0.4	0.4	0	3	2	0	0	0	5	2	1	0	0	2	2	0	0	6	0	0

Table 7: Rehabilitated zone Wood_06a habitat characteristics (2011, 2012, 201, 2014 and 2015)

Monitoring Zone		Wood_06a									
Plot Number_Monitoring Year		24_2011	24_2012	24_2013	24_2014	24_2015	25_2011	25_2012	25_2013	25_2014	25_2015
Canopy DBH Thresholds	Large Tree ≥ 60 cm DBH	Planted trees on site 1.5 - 2 m tall, covers ~2% of plot	-	-	-	-	No planted trees	-	-	-	-
	Mature Tree ≥ 30 cm DBH	-	-	-	-	-	-	-	-	-	-
	Advanced Regrowth (x cm to x cm)	-	-	-	-	-	-	-	-	-	-
	Sapling ≤ x cm to x cm	-	-	-	-	-	-	-	-	-	-
	Seedlings < x cm dbh	-	-	-	-	-	-	-	-	-	-
	Canopy ≥ x m	-	-	-	-	-	-	-	-	-	-
	Midstorey x m to x m	-	-	-	-	-	-	-	-	-	-
	Ground layer ≤ x m	-	-	-	-	-	-	-	-	-	-
Canopy Species and Age Classes	No. of native canopy species	0	0	0	0	0	0	0	0	0	0
	No. of large trees	0	0	0	0	0	0	0	0	0	0
	Juveniles present (Y/N)	y	y	y	y	y	n	n	n	n	n
	Mature trees present (Y/N)	n	n	n	n	n	n	n	n	n	n
	Seedlings present (Y/N)	n	n	n	n	n	n	n	n	n	n
	Advanced regrowth present (Y/N) (note in rehab sites this pertains to planted trees as sites were devoid of trees prior to rehab):	n	y	y	n	n	n	n	n	n	n
Coarse Woody Debris (CWD)	Total length of CWD (m)	19	11	8	14	15	4	3	1	2	2
	No. of sections of CWD	5	3	3	7	7	3	2	1	2	2
Midstorey, Understorey Species	No. of native midstorey species	15	2	2	5	3	0	0	0	0	1
	No. of native species in ground layer	2	14	16	12	11	14	5	8	9	5
Transect	% Projected Crown Cover- Canopy Species	0	0	10	0	0	0	0	0	0	0
	% Projected Crown Cover - Midstorey Species	0	4	10	8	8	0	0	0	0	0
	% True Projected Foliage Cover - Canopy	0	0	0	0	0	0	0	0	0	0
	% True Projected Foliage Cover - Midstorey	0	0.8	3	1	2	0	0	0	0	0

Table 8: Fire impact area Burnt_2013 habitat characteristics (2011, 2012, 2013, 2014 and 2015)

Monitoring Zone		Burnt_2013																						
Plot Number_Monitoring Year		21_2011	21_2012	21_2013	21_2014	21_2015	22_2011	22_2012	22_2013	22_2014	22_2015	23_2011	23_2012	23_2013	23_2014	23_2015	30_2011	30_2012	30_2013	30_2014	30_2015	46_2013	46_2014	46_2015
Canopy DBH Thresholds	Large Tree ≥ 60 cm DBH	-	-	-	-	-	-	-	-	-	-	Note: Very weedy site and no trees planted in plot		-	-	-	-	-	-	-	-	-	-	-
	Mature Tree ≥ 30 cm DBH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Advanced Regrowth (x cm to x cm)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sapling ≤ x cm to x cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Seedlings < x cm dbh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Canopy ≥ x m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Midstorey x m to x m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Ground layer ≤ x m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Canopy Species and Age Classes	No. of native canopy species	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	No. of large trees	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Juveniles present (Y/N)	y	y	n	y	y	y	y	n	y	y	y	n	n	n	n	n	y	n	y	y	n	n	n
	Mature trees present (Y/N)	n	n	n	n	n	n	n	n	n	n	n	n	n	y	n	n	n	n	n	n	n	n	n
	Seedlings present (Y/N)	n	n	n	y	y	n	n	n	y	y	n	n	n	y	y	n	n	n	n	n	n	n	n
	Advanced regrowth present (Y/N) (note in rehab sites this pertains to planted trees as sites were devoid of trees prior to rehab):	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
Coarse Woody Debris (CWD)	Total length of CWD (m)	0	0	0	0	0	22	67	55	75	58	22	55	20	19	28	15	32	30	32	30	49	47.5	50
	No. of sections of CWD	0	0	0	0	0	5	19	20	29	18	5	26	7	7	13	4	12	16	18	16	17	12	13
Midstorey, Understorey Species	No. of native midstorey species	0	5	3	6	5	1	2	0	2	0	0	0	0	1	1	1	1	0	2	2	0	0	0
	No. of native species in ground layer	4	3	1	5	4	5	4	2	13	7	8	4	0	7	4	0	12	4	17	8	4	17	7
Transect	% Projected Crown Cover- Canopy Species	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	% Projected Crown Cover - Midstorey Species	0	2	0	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	% True Projected Foliage Cover - Canopy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	% True Projected Foliage Cover - Midstorey	0	2	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 9: Rehabilitated zone Wood_07c habitat characteristics (2011, 2012, 2013, 2014 and 2015)

Monitoring Zone		Wood_07c																								
Plot Number_Monitoring Year		16_2011	16_2012	16_2013	16_2014	16_2015	17_2011	17_2012	17_2013	17_2014	17_2015	18_2011	18_2012	18_2013	18_2014	18_2015	19_2011	19_2012	19_2013	19_2014	19_2015	20_2011	20_2012	20_2013	20_2014	20_2015
Canopy DBH Thresholds	Large Tree ≥ 60 cm DBH	Overall tree cover is ~2%	-	-	-	-	Overall tree cover is ~2%	-	-	-	-	One planted tree 2 m tall	-	-	-	-	-	-	-	-	-	Overall tree cover ~5 %	-	-	-	-
	Mature Tree ≥ 60 cm DBH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Advanced Regrowth (x cm to x cm)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sapling ≤ x cm to x cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Seedlings < x cm dbh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Canopy ≥ x m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Midstorey x m to x m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Canopy Species and Age Classes	Ground layer ≤ x m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	No. of native canopy species	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	No. of large trees	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Juveniles present (Y/N)	y	y	y	y	y	y	y	y	y	y	n	n	n	n	n	y	y	y	y	y	y	y	y	y	y
	Mature trees present (Y/N)	n	n	n	n	n	n	n	n	n	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n
	Seedlings present (Y/N)	n	y	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	y		y
Coarse Woody Debris (CWD)	Advanced regrowth present (Y/N) (note in rehab sites this pertains to planted trees as sites were devoid of trees prior to rehab):	n	n	n	n	n	n	y	y	n	y	n	n	y	n	n	n	y	y	n	n	n	n	n	n	n
	Total length of CWD (m)		0.5	0	2	2	7	5	6	6	7	91	297	263	138	135	none	0	2	0	0	1	0	0	0	0
Midstorey, Understorey Species	No. of sections of CWD		1	0	2	2	1	1	1	1	19	91	84	37	36		0	2	0	0	1	0	0	0	0	
	No. of native midstorey species	1 (planted)	5	5	4	6	0	2	4	6	5	1 (planted)	1	1	1	2	1 (planted)	3	5	6	7	1 (planted?)	4	7	7	8
Transect	No. of native species in ground layer	29	12	17	12	11	4	2	1	3	3	23	15	16	16	14	16	4	12	9	4	11	8	6	6	5
	% Projected Crown Cover- Canopy Species	-	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0	0	0		0	0	0	0
	% Projected Crown Cover - Midstorey Species	4	4	8	6	4	-	0	4	4	0	-	0	0	0	0	-	0	0	4	0	2	4	16	16	14
	% True Projected Foliage Cover - Canopy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% True Projected Foliage Cover - Midstorey	2	1.2	4	2	1	0	0.4	1.2	1	0	0	0	1	0	0	0	2	3	0.4	0	0.2	0.8	3	2	2	

Table 10: Rehabilitated zone Wood_10c habitat characteristics (2011, 2012, 2013, 2014 and 2015)

Monitoring Zone		Wood_10c																				
Plot Number_Monitoring Year		1B_2013	1B_2014	1B_2015	2B_2013	2B_2014	2B_2015	3_2011	3_2012	3_2013	3_2014	3_2015	4_2011	4_2012	4_2013	4_2014	4_2015	5_2011	5_2012	5_2013	5_2014	5_2015
Canopy DBH Thresholds	Large Tree ≥ 60 cm DBH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Mature Tree ≥ 30 cm DBH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Advanced Regrowth (x cm to x cm)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sapling ≤ x cm to x cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Seedlings < x cm dbh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Canopy ≥ x m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Midstorey x m to x m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ground layer ≤ x m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Canopy Species and Age Classes	No. of native canopy species	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	No. of large trees	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Juveniles present (Y/N)	n	n	n	n	n	n	n	n	n	y	y	n	n	n	n	n	n	n	n	n	n
	Mature trees present (Y/N)	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
	Seedlings present (Y/N)	n	n	n	n	n	n	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n
	Advanced regrowth present (Y/N) (note in rehab sites this pertains to planted trees as sites were devoid of trees prior to rehab):	n	n		n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
Coarse Woody Debris (CWD)	Total length of CWD (m)	0	9	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0	0	0
	No. of sections of CWD	0	9	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0	0	
Midstorey, Understorey Species	No. of native midstorey species	0	0	0	0	0	0	-	1	1	5	5	-	0	0	0	0	-	0	0	0	0
	No. of native species in ground layer	11	3	7	7	8	5	-	15	13	7	5	9	17	5	8	10	8	1	4	6	3
Transect	% Projected Crown Cover- Canopy Species	0	0	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0	0	0
	% Projected Crown Cover - Midstorey Species	0	0	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0	0	0
	% True Projected Foliage Cover - Canopy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	% True Projected Foliage Cover - Midstorey	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0

Table 11: Average True Projected Foliage Cover (%) of plots within each monitoring zone (2011 – 2015)

Monitoring zone	Average True Projected Foliage Cover (%)				
	2011	2012	2013	2014	2015
Burnt_2013	0	0.6	0.2	0.2	0.2
Wood_10c	0	0	0.2	0	0.4
Wood_07c	0.44	0.88	3	1.08	0.5
Wood_05a	0	4.04	4	0.28	0.08
Wood_04	0	4.48	5.6	0.08	0.28
Control Wood 2	2.72	3.40	3.6	3.2	3.6
Control Wood 1	1.04	1.03	1.8	0.28	0.68

Midstorey / Overstorey	Species	Wood_10_c															Wood_7c																																					
		1B_201c	1B_201a	1B_201e	2B_201c	2B_201a	2B_201e	3_2011	3_2012	3_2013	3_2014	3_2015	4_2011	4_2012	4_2013	4_2014	4_2015	5_2011	5_2012	5_2013	5_2014	5_2015	16_201a	16_201c	16_201e	16_201a	16_201e	17_201a	17_201c	17_201e	17_201a	17_201e	18_201a	18_201c	18_201e	18_201a	18_201e	19_201a	19_201c	19_201e	19_201a	19_201e	20_201a	20_201c	20_201e	20_201a	20_201e							
M	<i>Dodonaea viscosa</i> subsp. <i>cuneata</i> Wedge-leaf Hop- bush																																													1								
M	<i>Dodonaea</i> sp.																																													1								
M	<i>Eucalyptus albens</i> White Box																										2																			2								
M	<i>Eucalyptus blakelyi</i> Blakely's Red Gum																									2	2	2			1	2	2									1	1	1	1			1	1					
M	<i>Eucalyptus crebra</i> Narrow-leaved Ironbark																																										1	1										
N	<i>Eucalyptus fibrosa?</i> Red Ironbark											1																																										
M	<i>Eucalyptus melanophloia</i> Silver-leaved Ironbark									1	1																																											
M	<i>Eucalyptus microcarpa</i> Grey Box																											2																		2		2		1				
M	<i>Eucalyptus melliodora</i> Yellow Box																																																	1				
M	<i>Eucalyptus populnea</i> subsp. <i>bimbi</i> Bimble Box									1																																					1	1	1					
M	<i>Eucalyptus sideroxylon</i> Mugga Ironbark																																																					
M	<i>Eucalyptus viridis</i> Green Mallee																												1																		1							
M	<i>Eucalyptus</i> sp. (unknown) (Gum)																																																	1				
M	<i>Eucalyptus</i> sp. (unknown) (flakey bark)																																																					
M	<i>Eucalyptus</i> sp. (unknown) (stringy bark)																																																					
M	<i>Eucalyptus</i> sp. (unknown) (ironbark)																																																					
M	<i>Geijera parviflora</i> Wilga																																																					
M	<i>Jasminum lineare</i> Desert Jasmine											1																																							1			
M	* <i>Lycium ferocissimum</i> African Boxtorn																																																			1		1
M	<i>Myoporum montanum</i> Western Boobiella																																																					

Table 13: Overstorey and midstorey cover scores in 20 x 50 m Woodland Plots (Burnt_2013 and Wood_06a) for 2011 - 2015 (note plot 46 established in 2013)

Midstorey / Overstorey	Species	Burnt_2013															Wood_06a																						
		21_2011	21_2012	21_2013	21_2014	21_2015	22_2011	22_2012	22_2013	22_2014	22_2015	23_2011	23_2012	23_2013	23_2014	23_2015	30_2011	30_2012	30_2013	30_2014	30_2015	46_2013	46_2014	46_2015	24_2011	24_2012	24_2013	24_2014	24_2015	25_2011	25_2012	25_2013	25_2014	25_2015					
M	<i>Acacia deanei</i> Green Wattle																								1			1	1										
M	<i>Acacia decora</i> Western Silver Wattle																																						
M	<i>Acacia filicifolia</i> Fern-leaved Wattle																																						
M	<i>Acacia fimbriata</i> Fringed Wattle																																						
M	<i>Acacia floribunda</i> White Sally Wattle																																						
M	<i>Acacia homalophylla</i> Yarran																																						
M	<i>Acacia longifolia</i>																																						
M	<i>Acacia mearnsi</i> Black Wattle																																						
M	<i>Acacia pendula</i> Weeping Myall																																						
M	<i>Acacia salicina</i> Cooba	1	2		2	2				1						1											2	2	1	2								1	
M	<i>Acacia saligna?</i> Golden Wreath Wattle																								1														
M	<i>Acacia</i> sp.																																						
M	<i>Alectryon oleifolius</i> Western Rosewood																																						
M	<i>Alphitonia excelsa</i> Red Ash																																						
M	<i>Alstonia constricta</i> Bitter Bark																																						
M	<i>Pittosporum angustifolium</i>																																						
M	<i>Brachychiton populneus</i> Kurrajong																																						
M	<i>Callitris glaucophylla</i> White Cypress Pine	1				1																																	
M	<i>Casuarina cristata</i> Belah		1		1																																		
M	<i>Clematis microphylla</i> Small-leaved Clematis																																						
M	<i>Dodonaea viscosa</i> Sticky Hop-bush								1									1																					
M	<i>Dodonaea viscosa</i> subsp. <i>angustifolia</i>							1																				1											
M	<i>Dodonaea viscosa</i> subsp. <i>cuneata</i> Wedge-leaf Hop-bush															1				1																			
M	<i>Dodonaea</i> sp.																																						
M	<i>Eucalyptus albens</i> White Box																																				2		
M	<i>Eucalyptus blakelyi</i> Blakely's Red Gum		1		1																		1					2	1	1									
M	<i>Eucalyptus crebra</i> Narrow-leaved Ironbark																																						

Midstorey / Overstorey	Species	Burnt_2013															Wood_06a																						
		21_2011	21_2012	21_2013	21_2014	21_2015	22_2011	22_2012	22_2013	22_2014	22_2015	23_2011	23_2012	23_2013	23_2014	23_2015	30_2011	30_2012	30_2013	30_2014	30_2015	46_2013	46_2014	46_2015	24_2011	24_2012	24_2013	24_2014	24_2015	25_2011	25_2012	25_2013	25_2014	25_2015					
N	<i>Eucalyptus fibrosa?</i> Red Ironbark					2																																	
M	<i>Eucalyptus melanophloia</i> Silver-leaved Ironbark		2	1	1			1		1																											1		
M	<i>Eucalyptus microcarpa</i> Grey Box																																						
M	<i>Eucalyptus melliodora</i> Yellow Box				1	2																																	
M	<i>Eucalyptus populnea</i> subsp. <i>bimbil</i> Bimble Box		2	1	1	2																																	
M	<i>Eucalyptus sideroxylon</i> Mugga Ironbark																																						
M	<i>Eucalyptus viridis</i> Green Mallee																																						
M	<i>Eucalyptus</i> sp. (unknown) (Gum)			1																		1																	
M	<i>Eucalyptus</i> sp. (unknown) (flakey bark)																																						
M	<i>Eucalyptus</i> sp. (unknown) (stringy bark)																																						
M	<i>Eucalyptus</i> sp. (unknown) (ironbark)																																						
M	<i>Geijera parviflora</i> Wilga																																						
M	<i>Jasminum lineare</i> Desert Jasmine																																						
M	* <i>Lycium ferocissimum</i> African Boxthorn																																						
M	<i>Myoporum montanum</i> Western Boobialla																																						
M	<i>Notelaea microcarpa</i> Native Olive																																						
M	<i>Pimelea neo-anglica</i> Poison Pimelea																																						
M	<i>Parsonsia eucalyptophylla</i> Gargaloo																																						
O	<i>Brachychiton populneus</i> Kurrajong																																						
O	<i>Callitris glaucophylla</i> White Cypress Pine																																						
O	<i>Casuarina cristata</i> Belah	1																																					
O	<i>Eucalyptus albens</i> White Box																																						
O	<i>Eucalyptus blakelyi</i> Blakely's Red Gum	1																																					
O	<i>Eucalyptus crebra</i> Narrow-leaved Ironbark																																						
O	<i>Eucalyptus fibrosa?</i> Red Ironbark																																						

Midstorey / Overstorey	Species	Burnt_2013															Wood_06a																								
		21_2011	21_2012	21_2013	21_2014	21_2015	22_2011	22_2012	22_2013	22_2014	22_2015	23_2011	23_2012	23_2013	23_2014	23_2015	30_2011	30_2012	30_2013	30_2014	30_2015	46_2013	46_2014	46_2015	24_2011	24_2012	24_2013	24_2014	24_2015	25_2011	25_2012	25_2013	25_2014	25_2015							
O	<i>Eucalyptus melanophloia</i> Silver-leaved Ironbark						1																																		
O	<i>Eucalyptus melliodora</i> Yellow Box																								1																
O	<i>Eucalyptus microcarpa</i> Grey Box																																								
O	<i>Euc. molucanna/albens</i>																																								
O	<i>Eucalyptus populnea</i> subsp. <i>bimbil</i> Bimble Box	1																																							
O	<i>Eucalyptus</i> sp. (unknown)																																								
O	Var. planted Euc sp.																																								
Total number of species		5	5	3	6		2	2	0	2		0	0	0	0	1	1	1	0	2	2	0	0	0	5	4	3	5	5	0	0	0	0	0	0	0	0	1			

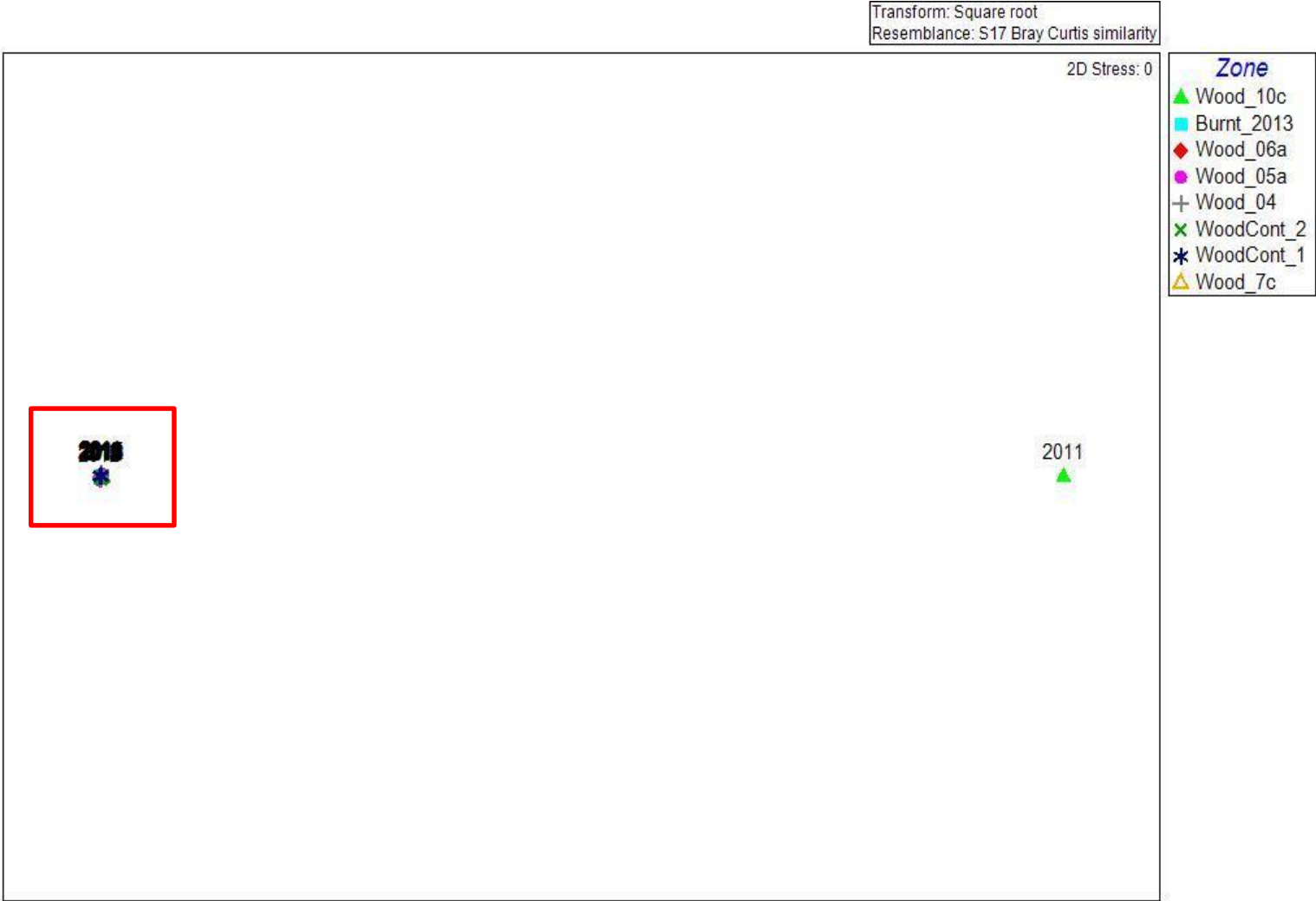


Figure 1: nMDS of midstorey and canopy species composition in Control and Rehabilitation zones (red square indicates data captured in nMDS subset in Figure 2)

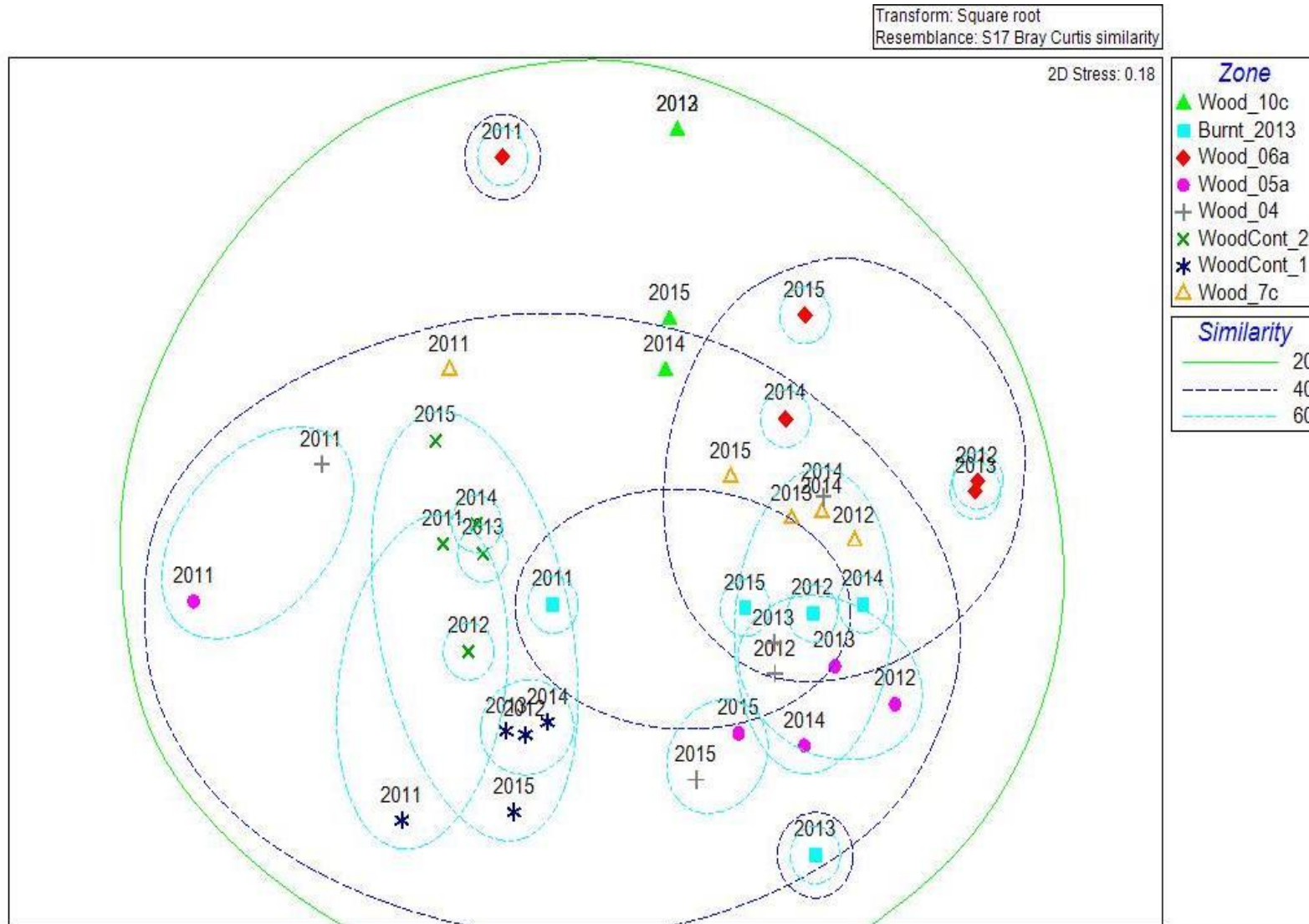


Figure 2: nMDS subset of midstorey and canopy species composition in Control and Rehabilitation zones.

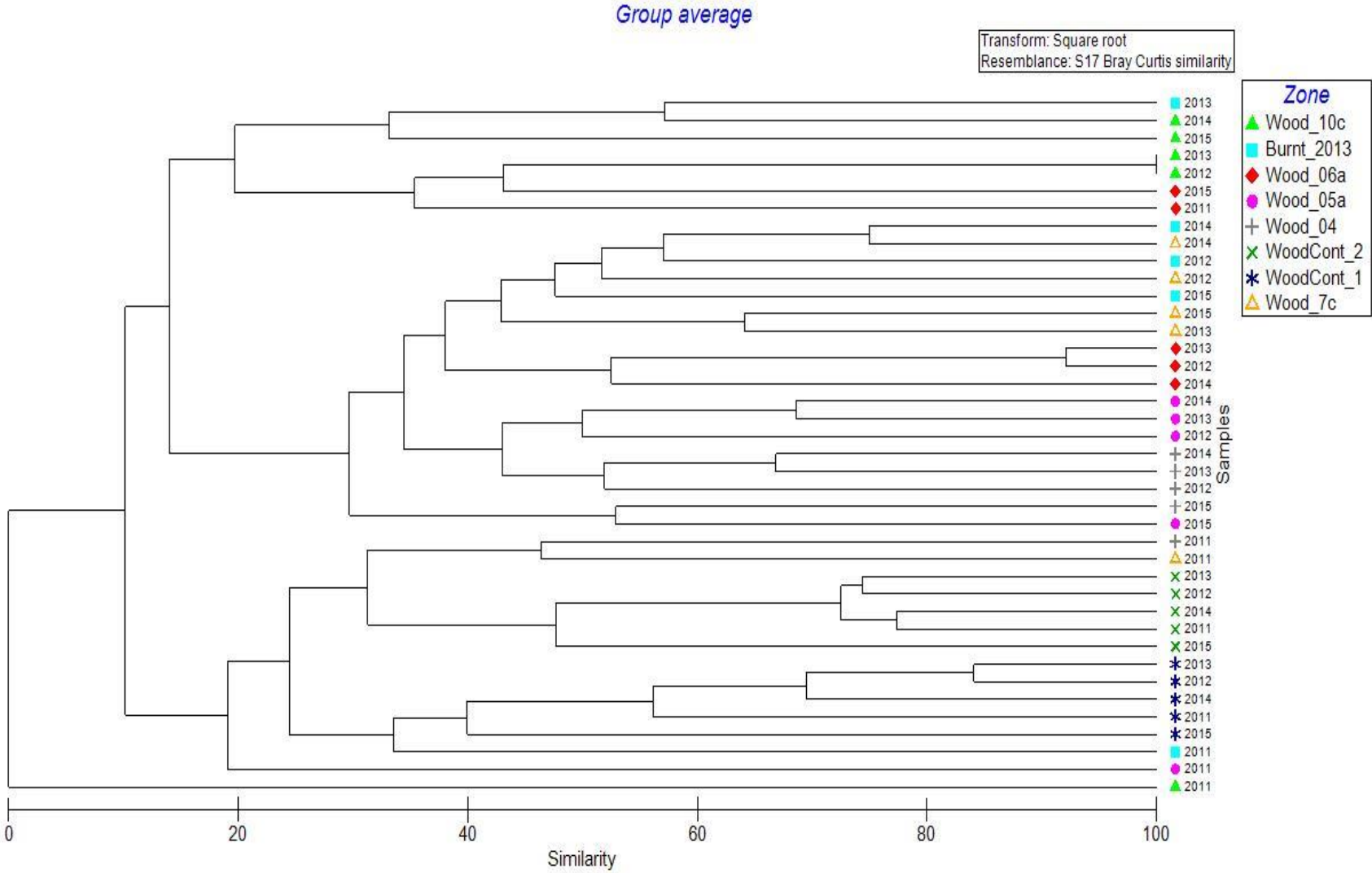


Figure 3: Cluster analysis of midstorey and canopy species composition in Control and Rehabilitation zones.

3.4 Tree & shrub species >1 m tall in 20 x 20 m plots

Table 14: Overstorey and midstorey cover scores in 20 x 20 m Woodland Plots located in Wood_10c for 2011 - 2015 monitoring periods (note plots 1b and 2b established in 2013)

Species	Common Name	Notes	Wood_10_c																				
			1B_2013	1B_2014	1B_2015	2B_2013	2B_2014	2B_2015	3_2011	3_2012	3_2013	3_2014	3_2015	4_2011	4_2012	4_2013	4_2014	4_2015	5_2011	5_2012	5_2013	5_2014	5_2015
<i>Acacia deanei</i>	Green Wattle										1	1	1	2									
<i>Acacia decora</i>	Western Silver Wattle																						
<i>Acacia floribunda</i>	White Sally Wattle																						
<i>Acacia homalophylla</i>	Yarran																						
<i>Acacia longifolia</i>																							
<i>Acacia pendula</i>	Weeping Myall																						
<i>Acacia salicina</i>	Native Willow																						
<i>Acacia filicifolia</i>	Fern-leaved Wattle	Species uncertain at present growth stage																					
<i>Acacia mearnsii</i>	Black Wattle																						
<i>Alectryon oleifolius</i>	Western Rosewood																						
<i>Alstonia constricta</i>	Quinine Tree																						
<i>Brachychiton populneus</i>	Kurrajong												1	1									
<i>Callitris glaucophylla</i>	White Cypress Pine																						
<i>Clematis microphylla</i>	Small-leaved clematis																						
<i>Dodnaea viscosa</i> subsp. <i>angustifolia</i>	Sticky Hop-bush																						
<i>Dodonaea viscosa</i>	Sticky Hop-bush																						
<i>Dodonaea viscosa</i> subsp. <i>cunneata</i>	Wedge-leaf Hop-bush																						
<i>Eucalyptus albens</i>	White Box																						
<i>Eucalyptus blakelyi</i>	Blakely's Red Gum																						
<i>Eucalyptus albens</i>	White Box	Species uncertain at present growth stage																					
<i>Eucalyptus blakelyi</i>	Blakely's Red Gum	Species uncertain at present growth stage																					
<i>Eucalyptus crebra</i>	Narrow-leaved Ironbark	Species uncertain at present growth stage																					
<i>Eucalyptus fibrosa</i>	Red Ironbark	Species uncertain at present growth stage																					
<i>Eucalyptus melanophloia</i>	Silver-leaved Ironbark													1									
<i>Eucalyptus melliodora</i>	Yellow Box																						
<i>Euclyptus microcarpa</i>	Grey Box													1									
<i>Euclyptus moluccana/albens</i>																							
<i>Eucalyptus populnea</i> subsp. <i>bimbil</i>	Poplar Box																						
<i>Eucalyptus sideroxylon</i>	Mugga Ironbark																						
<i>Eucalyptus viridis</i>	Green Mallee																						
<i>Eucalyptus</i> sp. (unknown)													1										
<i>Geijera parviflora</i>	Wilga																						
<i>Lycium ferocissimum</i>	African Boxthorn	Exotic									1	1	1	1	1								
<i>Parsonsia eucalyptophylla</i>	Gargaloo																						
Total Number of Species			0	0	0	0	0	0	1	2	2	4	6	0	0	0	0	0	0	0	0	0	0

Braun-Blanquet cover scores: 1=projected foliage cover <5% of the plot, plants uncommon; 2=projected foliage cover <5% of the plot, plants common; 3=projected foliage cover 6-25% of the plot; 4=projected foliage cover of 26-50% of the plot; 5=projected foliage cover of 51-75% of the plot; 6=projected foliage cover of 76-100% of the plot.

Table 15: Overstorey and midstorey cover scores in 20 x 20 m Woodland Plots located in Wood_07c for 2011 - 2015 monitoring periods

Species	Common Name	Notes	Wood_07c																								
			16_2011	16_2012	16_2013	16_2014	16_2015	17_2011	17_2012	17_2013	17_2014	17_2015	18_2011	18_2012	18_2013	18_2014	18_2015	19_2011	19_2012	19_2013	19_2014	19_2015	20_2011	20_2012	20_2013	20_2014	20_2015
<i>Acacia deanei</i>	Green Wattle															1											
<i>Acacia decora</i>	Western Silver Wattle																										
<i>Acacia floribunda</i>	White Sally Wattle																										
<i>Acacia homalophylla</i>	Yarran																										
<i>Acacia longifolia</i>																											
<i>Acacia pendula</i>	Weeping Myall		1	1	1	1	1				1													1	2	1	1
<i>Acacia salicina</i>	Native Willow			1	2	1	1				1	2						2	1	2	2			2	3	2	1
<i>Acacia filicifolia</i>	Fern-leaved Wattle	Species uncertain at present growth stage																									
<i>Acacia mearnsii</i>	Black Wattl																										
<i>Alectryon oleifolius</i>	Western Rosewood																1							2			
<i>Alstonia constricta</i>	Quinine Tree																										
<i>Brachychiton populneus</i>	Kurrajong		1	1			1																1				
<i>Callitris glaucophylla</i>	White Cypress Pine																										
<i>Clematis microphylla</i>	Small-leaved clematis																										
<i>Dodnaea viscosa</i> subsp. <i>angustifolia</i>	Sticky Hop-bush																										
<i>Dodonaea viscosa</i>	Sticky Hop-bush																						1			1	
<i>Dodonaea viscosa</i> subsp. <i>cunneata</i>	Wedge-leaf Hop-bush																										1
<i>Eucalyptus albens</i>	White Box		1				2	1																1			
<i>Eucalyptus blakelyi</i>	Blakely's Red Gum		1				2	1			3						1	1									2
<i>Eucalyptus albens</i>	White Box	Species uncertain at present growth stage																									
<i>Eucalyptus blakelyi</i>	Blakely's Red Gum	Species uncertain at present growth stage		2	1	2			1	2	1								1	2	2					2	
<i>Eucalyptus crebra</i>	Narrow-leaved Ironbark	Species uncertain at present growth stage						1									1						1	2		1	1
<i>Eucalyptus fibrosa</i>	Red Ironbark	Species uncertain at present growth stage																									
<i>Eucalyptus melanophloia</i>	Silver-leaved Ironbark																										
<i>Eucalyptus melliodora</i>	Yellow Box				1				1	1	1	2					1	1	2	2	2						
<i>Eucalyptus microcarpa</i>	Grey Box																									2	
<i>Eucalyptus moluccana/albens</i>																											
<i>Eucalyptus populnea</i> subsp. <i>bimbil</i>	Poplar Box																						1	1	1	1	1
<i>Eucalyptus sideroxylon</i>	Mugga Ironbark																										
<i>Eucalyptus viridis</i>	Green Mallee										1																
<i>Eucalyptus</i> sp. (unknown)					1						1																
<i>Geijera parviflora</i>	Wilga																										
<i>Lycium ferocissimum</i>	African Boxthorn	<i>Exotic</i>										1					1		1		1						
<i>Parsonsia eucalyptophylla</i>	Gargaloo																										
Total Number of Species			4	5	5	5	7	3	2	3	6	7	1	0	0	1	0	5	4	5	6	7	7	6	8	8	7

Braun-Blanquet cover scores: 1=projected foliage cover <5% of the plot, plants uncommon; 2=projected foliage cover <5% of the plot, plants common; 3=projected foliage cover 6-25% of the plot; 4=projected foliage cover of 26-50% of the plot; 5=projected foliage cover of 51-75% of the plot; 6=projected foliage cover of 76-100% of the plot.

3.5 Groundcover species – Braun-Blanquet cover scores

Table 16: Groundcover species cover scores in 20 x 50 m Woodland Plots located in Wood_10c for 2011 - 2015 monitoring periods (note plots 1b and 2b established in 2013)

Species	Species	Notes	Wood_10_c																					
			1B_2013	1B_2014	1B_2015	2B_2013	2B_2014	2B_2015	3_2011	3_2012	3_2013	3_2014	3_2015	4_2011	4_2012	4_2013	4_2014	4_2015	5_2011	5_2012	5_2013	5_2014	5_2015	
<i>Abutilon oxycarpum</i>	Straggly Lantern-bush																							
<i>Abutilon</i> sp.																								
<i>Acacia deanei</i> (seedling)	Green Wattle																							
<i>Acacia decora</i> (seedling)	Western Silver Wattle																							
<i>Acacia salicina</i> (seedling)	Cooba																							
<i>Aira</i> sp.		Exotic																						
<i>Alternanthera denticulata</i>	Lesser Joyweed																							
<i>Alternanthera</i> sp. A																								
<i>Ammi majus</i>	Bishop's-weed	Exotic				1	1	1																
<i>Anagallis arvensis</i>	Scarlet Pimpernel	Exotic				2	2	2																
<i>Arenaria leptoclados</i>		Exotic																						
<i>Aristida leptopoda</i>	White Speargrass																							
<i>Aristida personata</i>	Purple Wire-grass		2					2		1	2	2	2							1				
<i>Aristida</i> sp.					2	2							3	3	3									
<i>Aristida vagans</i>	Threeawn Speargrass																							
<i>Arthropodium</i> sp.																								
<i>Asperula cunninghamii</i>	Twining Woodruff																							
<i>Asphodelus fistulosus</i>	Onion Weed	Exotic																						
<i>Aster subulatus</i>	Wild Aster	Exotic	1																			2	2	
<i>Atriplex muelleri</i>																								
<i>Atriplex semibaccata</i>	Creeping Saltbush																							
<i>Austrodanthonia bipartita</i>	Wallaby Grass																							
<i>Austrodanthonia racemosa</i>																								
<i>Austrodanthonia racemosa</i> var. <i>obtusata</i>																								
<i>Austrodanthonia</i> sp.																								
<i>Austrostipa aristiglumis</i>	Plains Grass																							
<i>Austrostipa ramosissima</i>	Stout Bamboo Grass																							
<i>Austrostipa scabra</i>	Speargrass		3	2						2	2	2												
<i>Austrostipa</i> sp.																								
<i>Austrostipa verticillata</i>	Slender Bamboo Grass																							
<i>Avena fatua</i>	Wild Oats	Exotic																						
<i>Avena</i> sp.		Exotic																						
<i>Bidens pilosa</i>	Cobblers Pegs	Exotic								1	1		1	1										
<i>Bidens subalternans</i>	Greater Beggar's Ticks	Exotic			1					2	3	2			1									
<i>Boerhavia dominii</i>	Tarvine																							
<i>Boerhavia</i> sp.																								
<i>Bothriochloa bladhii</i>	Forest Blue Grass																							
<i>Bothriochloa decipiens</i>	Red Grass							2																
<i>Bothriochloa macra</i>	Red Grass																							
<i>Bothriochloa</i> sp.																								
<i>Brachychiton populneus</i>	Kurrajong																							
<i>Brachyscome ciliaris</i>	Variable Daisy																							
<i>Bromus catharticus</i>	Prairie Grass	Exotic																						
<i>Bromus molliformis</i>	Soft Brome	Exotic																						
<i>Bromus</i> sp.		Exotic																						
<i>Brunoniella australis</i>	Blue Trumpet																							
<i>Bryophyllum delagoense</i>	Mother-of-millions	Exotic																						
<i>Bulbine bulbosa</i>	Native Leek																							
<i>Calandrinia</i> sp.																								
<i>Callitris glaucophylla</i>																								
<i>Calotis lappulacea</i>	Yellow Burr-daisy									1														
<i>Carex breviculmis</i>																								

Species	Species	Notes	Wood_10_c																					
			1B_2013	1B_2014	1B_2015	2B_2013	2B_2014	2B_2015	3_2011	3_2012	3_2013	3_2014	3_2015	4_2011	4_2012	4_2013	4_2014	4_2015	5_2011	5_2012	5_2013	5_2014	5_2015	
<i>Carex inversa</i>																	1							
<i>Carthamus lanatus</i>	Saffron Thistle	Exotic	2	1			1		1	2	2	2					2							
<i>Centaurea melitensis</i>	Maltese Cockspur	Exotic	2		3	1	2	3	2		2	3	3		1	1	3	2				1	2	
<i>Centaurea solstitialis</i>	St Barnaby's Thistle	Exotic												1			2					1		
<i>Centaurea sp.</i>		Exotic																						
<i>Centaureum erythraea</i>	Common Centaury	Exotic																						
<i>Centaureum sp.</i>		Exotic												1					2					
<i>Chamaesyce sp.</i>					1		1		2	2	1				1			1						
<i>Cheilanthes distans</i>	Bristly Cloak Fern																							
<i>Cheilanthes sieberi</i>																								
<i>Chenopodium desertorum</i>																								
<i>Chenopodium pumilio</i>	Small Crumbweed																							
<i>Chloris gayana</i>	Rhodes Grass	Exotic	3		3	4	2	3		3	2			3	4	4	4	3	5	5	4	4	4	
<i>Chloris pectinata</i>	Comb Chloris																							
<i>Chloris truncata</i>	Windmill Grass								2	2		1							1					
<i>Chloris ventricosa</i>	Plump Windmill Grass																							
<i>Chondrilla juncea</i>	Skeleton Weed	Exotic	1						1	2														
<i>Chrysocephalum apiculatum</i>	Yellow Buttons																							
<i>Cichorium intybus</i>	Chicory	Exotic																						
<i>Cirsium vulgare</i>	Spear Thistle	Exotic								1	2											1	1	
<i>Convolvulus graminetinus</i>			1					1		1				1	1			1						
<i>Conyza bonariensis</i>	Flaxleaf Fleabane	Exotic	1						1	2				4					2					
<i>Conyza parva</i>		Exotic		1											2									
<i>Conyza sp.</i>		Exotic																						
<i>Cotula australis</i>	Common Cotula																							
<i>Cyclosporum leptophyllum</i>	Slender Celery	Exotic												2		1	1				1			
<i>Cymbopogon refractus</i>	Barbed Wire Grass																							
<i>Cynodon dactylon</i>	Couch														2									
<i>Cyperus concinnus</i>															1		1							
<i>Cyperus fulvus</i>	Sticky Sedge																							
<i>Cyperus gracilis</i>	Slender Flat-sedge																							
<i>Cyperus rotundus</i>	Nutgrass	Exotic																						
<i>Datura ferox</i>		Exotic																						
<i>Daucus glochidiatus</i>	Native Carrot																							
<i>Desmodium brachypodium</i>	Large Tick-trefoil																							
<i>Desmodium varians</i>	Slender Tick-trefoil																							
<i>Dianella revoluta</i>	Blueberry Lily																							
<i>Dianella sp.</i>																								
<i>Dichanthium sericeum</i>	Queensland Bluegrass		2						3	3	2													
<i>Dichelachne micrantha</i>	Shorthair Plumegrass																							
<i>Dichondra repens</i>	Kidney Weed								2															
<i>Dichondra sp. A</i>																								
<i>Dichopogon fimbriatus</i>	Nodding Chocolate Lily																							
<i>Digitaria brownii</i>	Cotton Panic Grass																							
<i>Digitaria divaricatissima</i>	Umbrella Grass		2						3	2	2													
<i>Digitaria sanguinalis</i>	Crab Grass	Exotic												2										
<i>Digitaria sp.</i>															1									
<i>Echinochloa crus-galli</i>	Barnyard Grass	Exotic																						
<i>Echinochloa sp.</i>														2										
<i>Echium plantagineum</i>	Patterson's Curse	Exotic		1	2				2	1	2	2	2			2	1	2						
<i>Eclipta platyglossa</i>																								
<i>Einadia hastata</i>	Berry Saltbush				1										1									
<i>Einadia nutans</i>	Climbing Saltbush																							
<i>Einadia polygonoides</i>														1										
<i>Einadia trigonos</i>	Fishweed																							

Species	Species	Notes	Wood_10_c																				
			1B_2013	1B_2014	1B_2015	2B_2013	2B_2014	2B_2015	3_2011	3_2012	3_2013	3_2014	3_2015	4_2011	4_2012	4_2013	4_2014	4_2015	5_2011	5_2012	5_2013	5_2014	5_2015
<i>Elymus scaber</i>																							
<i>Enchylaena tomentosa</i>	Ruby Saltbush																						
<i>Enneapogon nigricans</i>																							
<i>Enneapogon sp.</i>			1						2	1	2												
<i>Enteropogon acicularis</i>												2							2				
<i>Enteropogon sp.</i>																							
<i>Eragrostis alveiformis</i>																							
<i>Eragrostis brownii</i>	Brown's Lovegrass																						
<i>Eragrostis elongata</i>	Clustered Lovegrass																						
<i>Eragrostis lacunaria</i>	Bristly Love-grass																						
<i>Eragrostis leptostachya</i>	Paddock Lovegrass																						
<i>Eragrostis parviflora</i>	Weeping Lovegrass																						
<i>Eragrostis setifolia</i>	Bristly Love-grass																						
<i>Eragrostis sp.</i>																							
<i>Eremophila debilis</i>	Winter Apple																						
<i>Eriochloa pseudoacrotricha</i>	Early Spring Grass								2						1		2			1			
<i>Eriochloa sp.</i>																							
<i>Erodium crinitum</i>	Blue Storksbill							2															
<i>Euchiton sp.</i>																							
<i>Euchiton sphaericus</i>															2	1					1		
<i>Eulalia aurea</i>	Silky Browntop																						
<i>Evolvulus alsinoides var. decumbens</i>																							
<i>Fimbristylis dichotoma</i>	Common Fringe-sedge																						
<i>Galenia pubescens</i>	Galenia	Exotic				2	2	2									1	1	2				
<i>Geijera parviflora</i>																							
<i>Geranium solanderi</i>	Native Geranium																						
<i>Glossogyne tannensis</i>												1											
<i>Glycine clandestina</i>			1																				
<i>Glycine tabacina</i>																					1		
<i>Gomphocarpus fruticosus</i>	Narrow-leaved Cotton Bush	Exotic							1		1	1											
<i>Gomphocarpus sp.</i>		Exotic																					
<i>Gomphrena celosioides</i>	Gomphrena Weed	Exotic																					
<i>Gonocarpus elatus</i>																							
<i>Goodenia cycloptera</i>																							
<i>Goodenia fascicularis</i>																							
<i>Goodenia glabra</i>																							
<i>Goodenia pinnatifida</i>																							
<i>Gypsophila tubulosa</i>	Annual Chalkwort																						
<i>Haloragis heterophylla</i>	Rough Raspwort																1						
<i>Hedynois rhagadioloides subsp. cretica</i>	Cretan Weed	Exotic																					
<i>Helianthus sp.</i>	Sunflower	Exotic																					
<i>Hibiscus trionum</i>																							
<i>Hordeum sp.</i>	Barley Grass	Exotic																					
<i>Hyparrhenia hirta</i>	Coolatai Grass	Exotic								3													
<i>Hypochaeris microcephala</i>	White Flatweed	Exotic				1		1														1	1
<i>Hypochaeris radicata</i>	Flatweed	Exotic																					
<i>Jasminum suavissimum</i>																							
<i>Juncus sp.</i>																							
<i>Juncus usitatus</i>	Pinrush																1						
<i>Lachnagrostis filiformis</i>	Blown Grass							1	2									1				1	
<i>Lactuca saligna</i>	Willow-leaved Lettuce	Exotic							1										1			1	1
<i>Lactuca serriola</i>	Prickly Lettuce	Exotic						2		1				3	1		2	1	1		1	2	2
<i>Lepidium africanum</i>		Exotic			2		1		2							1							
<i>Lepidium bonariense</i>		Exotic				1									1						1		
<i>Leptochloa sp.</i>																							

Species	Species	Notes	Wood_10_c																					
			1B_2013	1B_2014	1B_2015	2B_2013	2B_2014	2B_2015	3_2011	3_2012	3_2013	3_2014	3_2015	4_2011	4_2012	4_2013	4_2014	4_2015	5_2011	5_2012	5_2013	5_2014	5_2015	
<i>Leptorhynchus panaetioides</i>	Woolly Buttons		2																1			2	2	1
<i>Linaria pelisseriana</i>	Pelisser's Toadflax	Exotic																						
<i>Linaria</i> sp.																								
<i>Linum marginale</i>	Native Flax																							
<i>Lolium rigidum</i>	Wimmera Ryegrass	Exotic									2													
<i>Lolium</i> sp.		Exotic											2	2										
<i>Lomandra confertifolia</i>	Mat-rush																							
<i>Lomandra filiformis</i>	Wattle Mat-rush																							
<i>Lomandra longifolia</i>	Spiny-headed Mat-rush																							
<i>Lomandra multiflora</i>																								
<i>Lycium ferocissimum</i>	African Boxthorn	Exotic																						
<i>Lythrum hyssopifolia</i>	Hyssop Loosestrife																							
<i>Maireana decalvans</i>	Black Cotton Bush																							
<i>Maireana enchylaenoides</i>	Wingless Bluebush																							
<i>Maireana microphylla</i>	Small-leaf Bluebush																							
<i>Malva</i> sp.		Exotic																						
<i>Malvastrum americanum</i>	Spiked Malvastrum	Exotic																						
<i>Malvastrum coromandelianum</i>	Prickly Malvastrum																							
<i>Marrubium vulgare</i>	White Horehound	Exotic																						
<i>Medicago minima</i>	Woolly Burr Medic	Exotic			3		3	4				3	4				2	3				3	3	
<i>Medicago polymorpha</i>	Burr Medic	Exotic	2		2	2	3	2	2	2	2	3	2			2	2	2			2	3	1	
<i>Medicago sativa</i>	Lucerne	Exotic																						
<i>Medicago</i> sp.		Exotic							1															
<i>Medicago truncatula</i>	Barrel Medic	Exotic																						
<i>Melilotus indicus</i>	Hexham Scent	Exotic					1						2			2		3	3			2	3	
<i>Melilotus</i> sp.		Exotic				1																		
<i>Mentha satureioides</i>	Creeping Mint																							
<i>Microlaena stipoides</i>	Weeping Grass																							
<i>Misopates orontium</i>	Lesser Snapdragon	Exotic											1		1									
<i>Murdannia graminea</i>	Grass Lily																							
<i>Nicotiana</i> sp.																								
<i>Nyssanthes diffusa</i>	Barbwire Weed																							
<i>Opuntia stricta</i>	Common Prickly Pear	Exotic						1																
<i>Oxalis exilis</i>																								
<i>Oxalis perennans</i>																								
<i>Oxalis</i> sp.																								
<i>Panicum buncei</i>																								
<i>Panicum effusum</i>	Hairy Panic								2	1														
<i>Panicum maximum</i>		Exotic				1						1			2		2							
<i>Papaver</i> sp.																								
<i>Panicum queenslandicum</i>	Yadbila Grass																							
<i>Panicum</i> sp.												1												
<i>Parsonsia eucalyptophylla</i>	Gargaloo																							
<i>Paspalidium jubiflorum</i>	Warrego Grass																							
<i>Paspalidium</i> sp.						1																		
<i>Paspalum dilatatum</i>	Paspalum	Exotic			1																			
<i>Paspalum</i> sp.		Exotic																						
<i>Petrorhagia nanteuilii</i>		Exotic	1	2				2	2			1	2	2						2			2	1
<i>Phalaris</i> sp.	Canary Grass	Exotic																						
<i>Phyllanthus virgatus</i>	Petty Spurge																							
<i>Pimelea microcephala</i>	Shrubby Rice-flower																							
<i>Pimelea neo-anglica</i>	Shrubby Rice-flower																							
<i>Pimelea</i> sp.																								
<i>Plantago debilis</i>																								
<i>Plantago lanceolata</i>	Lamb's Tongues	Exotic																						

Species	Species	Notes	Wood_10_c																					
			1B_2013	1B_2014	1B_2015	2B_2013	2B_2014	2B_2015	3_2011	3_2012	3_2013	3_2014	3_2015	4_2011	4_2012	4_2013	4_2014	4_2015	5_2011	5_2012	5_2013	5_2014	5_2015	
<i>Poa sieberiana</i>	Snow Grass																							
<i>Polycarpon tetraphyllum</i>	Four-leaved Allseed	Exotic																						
<i>Polygonum aviculare</i>	Wireweed	Exotic												1										
<i>Portulaca oleracea</i>	Pigweed																							
<i>Rapistrum rugosum</i>	Turnip Weed	Exotic			2	1	2	1		2	2	2						2	1			2	1	
<i>Rhodanthe anthemoides</i>					1																			
<i>Rostellularia adscendens</i>			1																					
<i>Rumex brownii</i>	Swamp Dock																							
<i>Rumex crispus</i>	Curled Dock	Exotic																						
<i>Rumex sp.</i>												1					1							
<i>Salsola australis</i>					1								1	1	2									
<i>Schenkia spicata</i>	Spike Centaury																							
<i>Schkuhria pinnata</i>		Exotic							1															
<i>Sclerolaena birchii</i>	Galvanised Burr				1		1	1												1				
<i>Sclerolaena diacantha</i>	Grey Copperburr																							
<i>Sclerolaena muricata</i>	Black Rolypoly																							
<i>Sclerolaena muricata</i> var. <i>muricata</i>	Black Rolypoly																				1			
<i>Sclerolaena muricata</i> var. <i>villosa</i>	Black Rolypoly																	1						
<i>Senecio quadridentatus</i>	Cotton Fireweed					2	2	1	1							2	1	1	1	1		1	1	2
<i>Setaria incrassata</i>	Purple Pigeon Grass	Exotic													1									
<i>Setaria sp.</i>		Exotic																						
<i>Sida corrugata</i>	Corrugated Sida																							
<i>Sida cunninghamii</i>	Ridged Sida																							
<i>Sida rhombifolia</i>	Paddy's Lucerne	Exotic																						
<i>Sida sp.</i>																								
<i>Sida spinosa</i>		Exotic	2	1	2		2		1	1	2	2	2						2	1				
<i>Sida subspicata</i>																								
<i>Silybum marianum</i>		Exotic																						
<i>Sisymbrium irio</i>	London Rocket	Exotic			4																			
<i>Sisymbrium officinale</i>	Hedge Mustard	Exotic					2																	
<i>Sisymbrium orientale</i>	Indian Hedge Mustard	Exotic			3				2				2	2			2	2						
<i>Sisymbrium sp.</i>		Exotic																			1			
<i>Solanum esuriale</i>	Quena																1							
<i>Solanum nigrum</i>	Black-berry Nightshade	Exotic													1									
<i>Solanum parvifolium</i>																								
<i>Solanum sp.</i>																								
<i>Sonchus asper</i> subsp. <i>glaucescens</i>		Exotic			1																			
<i>Sonchus oleraceus</i>	Common Sowthistle	Exotic					1	1					2	2			1	1	1					
<i>Sorghum halepense</i>	Johnson Grass	Exotic							1															
<i>Spergularia sp.</i>		Exotic																1						
<i>Sporobolus caroli</i>																								
<i>Sporobolus creber</i>	Slender Rat's Tail Grass																							
<i>Stachys arvensis</i>	Stagger Weed	Exotic																						
<i>Stackhousia viminea</i>	Slender Stackhousia																							
<i>Swainsona galegifolia</i>	Smooth Darling-pea																							
<i>Themeda australis</i>	Kangaroo Grass																							
<i>Tragopogon porrifolius</i>	Oyster Plant	Exotic																						
<i>Tragus australianus</i>	Small Burgrass																							
<i>Trianthema sp.</i>																								
<i>Trifolium angustifolium</i>	Narrow-leaved Clover	Exotic																						
<i>Trifolium arvense</i>	Haresfoot Clover	Exotic				2	2	2	3	2	2	2		2		2	2	3	2		2	2	2	
<i>Trifolium campestre</i>	Hop Clover	Exotic				1	2	3	2			2		2		2	1	2	1	2	1	2	3	
<i>Trifolium dubium</i>	Yellow Suckling Clover	Exotic						1								1								
<i>Trifolium glomeratum</i>	Clustered Clover	Exotic					1	2									1	1	2			1		
<i>Trifolium repens</i>	White Clover	Exotic																						

Species	Species	Notes	Wood_10_c																				
			1B_2013	1B_2014	1B_2015	2B_2013	2B_2014	2B_2015	3_2011	3_2012	3_2013	3_2014	3_2015	4_2011	4_2012	4_2013	4_2014	4_2015	5_2011	5_2012	5_2013	5_2014	5_2015
<i>Triptilodiscus pygmaeus</i>																							
<i>Urochloa panicoides</i>	Urochloa Grass	Exotic		2																			
<i>Verbascum thapsus</i>	Great Mullein	Exotic																					
<i>Verbascum virgatum</i>	Twiggy Mullein	Exotic																					
<i>Verbena bonariensis</i>	Purpletop	Exotic															1						
<i>Verbena gaudichaudii</i>								2							1			1	1			1	1
<i>Verbesina encelioides</i>		Exotic																					
<i>Vicia</i> sp.		Exotic																					
<i>Vittadinia cuneata</i>	Fuzzweed		2			2					2	1							1		1	1	
<i>Vittadinia dissecta</i>	Dissected New Holland Daisy																						
<i>Vittadinia muelleri</i>			1								1	1										1	
<i>Vittadinia</i> sp.									2														
<i>Vulpia</i> sp.																							
<i>Wahlenbergia communis</i>	Tufted Bluebell			1				1											1	1		1	
<i>Wahlenbergia gracilis</i>	Sprawling Bluebell																						
<i>Wahlenbergia luteola</i>																							
<i>Walwhalleya proluta</i>																							
<i>Xanthium occidentale</i>	Noogoora Burr	Exotic		1																			
<i>Xanthium spinosum</i>	Bathurst Burr	Exotic																					
<i>Xerochrysum bracteatum</i>	Golden Everlasting				2		1	1						1	1		1	2					
<i>Xerochrysum viscosum</i>	Sticky Everlasting																						
<i>Zornia dyctiocarpa</i>	Zornia																						
Total number of species			20	11	19	16	26	23	32	26	25	22	17	29	27	18	26	28	20	5	12	22	17

Table 17: Groundcover species cover scores in 20 x 50 m Woodland Plots located in Wood_07c for 2011 - 2015 monitoring periods (note plot 46 established in 2013)

Species	Species	Notes	Wood_07c																								
			16_2011	16_2012	16_2013	16_2014	16_2015	17_2011	17_2012	17_2013	17_2014	17_2015	18_2011	18_2012	18_2013	18_2014	18_2015	19_2011	19_2012	19_2013	19_2014	19_2015	20_2011	20_2012	20_2013	20_2014	20_2015
<i>Abutilon oxycarpum</i>	Straggly Lantern-bush																										
<i>Abutilon</i> sp.																											
<i>Acacia deanei</i> (seedling)	Green Wattle																										
<i>Acacia decora</i> (seedling)	Western Silver Wattle																										
<i>Acacia salicina</i> (seedling)	Cooba																										
<i>Aira</i> sp.		Exotic																								1	
<i>Alternanthera denticulata</i>	Lesser Joyweed																										
<i>Alternanthera</i> sp. A																											
<i>Ammi majus</i>	Bishop's-weed	Exotic																									
<i>Anagallis arvensis</i>	Scarlet Pimpernel	Exotic	2	2		2	2	2		2	2	2		2	2	2			1		2	2			2	2	2
<i>Arenaria leptoclados</i>		Exotic					2																				
<i>Aristida leptopoda</i>	White Speargrass																										
<i>Aristida personata</i>	Purple Wire-grass		1		2	2	2							3		1											
<i>Aristida</i> sp.																											
<i>Aristida vagans</i>	Threeawn Speargrass																										
<i>Arthropodium</i> sp.																											
<i>Asperula cunninghamii</i>	Twining Woodruff																										
<i>Asphodelus fistulosus</i>	Onion Weed	Exotic																									
<i>Aster subulatus</i>	Wild Aster	Exotic	2	2				2	2	1		2	2	2											1		
<i>Atriplex muelleri</i>																							2	1	1		
<i>Atriplex semibaccata</i>	Creeping Saltbush			1		1	1																				
<i>Austrodanthonia bipartita</i>	Wallaby Grass		2																				1				
<i>Austrodanthonia racemosa</i>																	2										
<i>Austrodanthonia racemosa</i> var. <i>obtusata</i>																											
<i>Austrodanthonia</i> sp.				1	3									2		2											
<i>Austrostipa aristiglumis</i>	Plains Grass																										
<i>Austrostipa ramosissima</i>	Stout Bamboo Grass															1											
<i>Austrostipa scabra</i>	Speargrass		2	2		2					1			3	2	2	2			2	2						
<i>Austrostipa</i> sp.														2	1												
<i>Austrostipa verticillata</i>	Slender Bamboo Grass												1														
<i>Avena fatua</i>	Wild Oats	Exotic																									
<i>Avena</i> sp.		Exotic												1													
<i>Bidens pilosa</i>	Cobblers Pegs	Exotic													1												
<i>Bidens subalternans</i>	Greater Beggar's Ticks	Exotic											1		1	2						2					
<i>Boerhavia dominii</i>	Tarvine																										
<i>Boerhavia</i> sp.			1																								
<i>Bothriochloa bladhii</i>	Forest Blue Grass							2																			
<i>Bothriochloa decipiens</i>	Red Grass			3		2								2							2						
<i>Bothriochloa macra</i>	Red Grass																										
<i>Bothriochloa</i> sp.					2		2										2										
<i>Brachychiton populneus</i>	Kurrajong																										
<i>Brachyscome ciliaris</i>	Variable Daisy																										
<i>Bromus catharticus</i>	Prairie Grass	Exotic	1										1	2													
<i>Bromus molliformis</i>	Soft Brome	Exotic																									
<i>Bromus</i> sp.		Exotic																									
<i>Brunoniella australis</i>	Blue Trumpet																										
<i>Bryophyllum delagoense</i>	Mother-of-millions	Exotic																									
<i>Bulbine bulbosa</i>	Native Leek															1											
<i>Calandrinia</i> sp.																											
<i>Callitris glaucophylla</i>																											
<i>Calotis lappulacea</i>	Yellow Burr-daisy		1										2	1	1			2		1							
<i>Carex breviculmis</i>																											
<i>Carex inversa</i>													1		1	2											

Species	Species	Notes	Wood_07c																								
			16_2011	16_2012	16_2013	16_2014	16_2015	17_2011	17_2012	17_2013	17_2014	17_2015	18_2011	18_2012	18_2013	18_2014	18_2015	19_2011	19_2012	19_2013	19_2014	19_2015	20_2011	20_2012	20_2013	20_2014	20_2015
<i>Carthamus lanatus</i>	Saffron Thistle	Exotic	2	2	1	2	3	1			2								2	2	2	3	1			1	
<i>Centaurea melitensis</i>	Maltese Cockspur	Exotic	2	2	2	3	2	2		2	2	2	1	2	2	3	4		1	2	3	3	1			2	2
<i>Centaurea solstitialis</i>	St Barnaby's Thistle	Exotic									1		1		1												
<i>Centaurea</i> sp.		Exotic																									
<i>Centaureum erythraea</i>	Common Centaury	Exotic																									
<i>Centaureum</i> sp.		Exotic																1						1			
<i>Chamaesyce</i> sp.																											
<i>Cheilanthes distans</i>	Bristly Cloak Fern																										
<i>Cheilanthes sieberi</i>																											
<i>Chenopodium desertorum</i>																											
<i>Chenopodium pumilio</i>	Small Crumbweed																										
<i>Chloris gayana</i>	Rhodes Grass	Exotic		2	2		3	4	5	4	4	3	3	3	4	4	3	5	5	4	4	3	4	4	4	3	3
<i>Chloris pectinata</i>	Comb Chloris																										
<i>Chloris truncata</i>	Windmill Grass		1										3					1									
<i>Chloris ventricosa</i>	Plump Windmill Grass		1	2	2	2	1																				
<i>Chondrilla juncea</i>	Skeleton Weed	Exotic	1																								
<i>Chrysocephalum apiculatum</i>	Yellow Buttons																										
<i>Cichorium intybus</i>	Chicory	Exotic																									
<i>Cirsium vulgare</i>	Spear Thistle	Exotic	1										1	1						1	1	1	1	1	1	1	1
<i>Convolvulus graminetinus</i>			1		1							1						1		1							
<i>Conyza bonariensis</i>	Flaxleaf Fleabane	Exotic	2					2					2				1	2	1	1							
<i>Conyza parva</i>		Exotic																							1		
<i>Conyza</i> sp.		Exotic										1															
<i>Cotula australis</i>	Common Cotula																										
<i>Cyclosporum leptophyllum</i>	Slender Celery	Exotic	2	1						1	1	2	1	2	2	1	2		2			2					
<i>Cymbopogon refractus</i>	Barbed Wire Grass																				1						
<i>Cynodon dactylon</i>	Couch			2						1																	
<i>Cyperus concinnus</i>																											
<i>Cyperus fulvus</i>	Sticky Sedge																										
<i>Cyperus gracilis</i>	Slender Flat-sedge																										
<i>Cyperus rotundus</i>	Nutgrass	Exotic	1																								
<i>Datura ferox</i>		Exotic																									
<i>Daucus glochidiatus</i>	Native Carrot																										
<i>Desmodium brachypodum</i>	Large Tick-trefoil																										
<i>Desmodium varians</i>	Slender Tick-trefoil																										
<i>Dianella revoluta</i>	Blueberry Lily																										
<i>Dianella</i> sp.																											
<i>Dichanthium sericeum</i>	Queensland Bluegrass		2																								
<i>Dichelachne micrantha</i>	Shorthair Plumegrass																										
<i>Dichondra repens</i>	Kidney Weed																	1									
<i>Dichondra</i> sp. A													2		1				1								
<i>Dichopogon fimbriatus</i>	Nodding Chocolate Lily																										
<i>Digitaria brownii</i>	Cotton Panic Grass																										
<i>Digitaria divaricatissima</i>	Umbrella Grass		1										2					2									
<i>Digitaria sanguinalis</i>	Crab Grass	Exotic																									
<i>Digitaria</i> sp.																											
<i>Echinochloa crus-galli</i>	Barnyard Grass	Exotic																									
<i>Echinochloa</i> sp.									1																		
<i>Echium plantagineum</i>	Patterson's Curse	Exotic																			1						
<i>Eclipta platyglossa</i>			1																								
<i>Einadia hastata</i>	Berry Saltbush																	1									
<i>Einadia nutans</i>	Climbing Saltbush		1		1								1	1		1											
<i>Einadia polygonoides</i>															1		1										
<i>Einadia trigonos</i>	Fishweed																										
<i>Elymus scaber</i>														2	1	2	2										

Species	Species	Notes	Wood_07c																											
			16_2011	16_2012	16_2013	16_2014	16_2015	17_2011	17_2012	17_2013	17_2014	17_2015	18_2011	18_2012	18_2013	18_2014	18_2015	19_2011	19_2012	19_2013	19_2014	19_2015	20_2011	20_2012	20_2013	20_2014	20_2015			
<i>Enchylaena tomentosa</i>	Ruby Saltbush																													
<i>Enneapogon nigricans</i>																														
<i>Enneapogon</i> sp.							1																							
<i>Enteropogon acicularis</i>													1					1									1			
<i>Enteropogon</i> sp.																														
<i>Eragrostis alveiformis</i>																														
<i>Eragrostis brownii</i>	Brown's Lovegrass																													
<i>Eragrostis elongata</i>	Clustered Lovegrass																													
<i>Eragrostis lacunaria</i>	Bristly Love-grass																													
<i>Eragrostis leptostachya</i>	Paddock Lovegrass																													
<i>Eragrostis parviflora</i>	Weeping Lovegrass																													
<i>Eragrostis setifolia</i>	Bristly Love-grass																													
<i>Eragrostis</i> sp.														1																
<i>Eremophila debilis</i>	Winter Apple																													
<i>Eriochloa pseudoacrotricha</i>	Early Spring Grass		3		2	1							3										2							
<i>Eriochloa</i> sp.																														
<i>Erodium crinitum</i>	Blue Storksbill													1																
<i>Euchiton</i> sp.										1																				
<i>Euchiton sphaericus</i>													2																	
<i>Eulalia aurea</i>	Silky Browntop																													
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>																														
<i>Fimbristylis dichotoma</i>	Common Fringe-sedge																													
<i>Galenia pubescens</i>	Galenia	Exotic																												
<i>Geijera parviflora</i>																														
<i>Geranium solanderi</i>	Native Geranium																	1												
<i>Glossogyne tannensis</i>																														
<i>Glycine clandestina</i>			1															1												
<i>Glycine tabacina</i>																		1												
<i>Gomphocarpus fruticosus</i>	Narrow-leaved Cotton Bush	Exotic																												
<i>Gomphocarpus</i> sp.		Exotic																												
<i>Gomphrena celosioides</i>	Gomphrena Weed	Exotic																												
<i>Gonocarpus elatus</i>														1																
<i>Goodenia cycloptera</i>																														
<i>Goodenia fascicularis</i>			2																					1						
<i>Goodenia glabra</i>																														
<i>Goodenia pinnatifida</i>																														
<i>Gypsophila tubulosa</i>	Annual Chalkwort		1	2																										
<i>Haloragis heterophylla</i>	Rough Raspwort																													
<i>Hedypnois rhagadioloides</i> subsp. <i>cretica</i>	Cretan Weed	Exotic																												
<i>Helianthus</i> sp.	Sunflower	Exotic																												
<i>Hibiscus trionum</i>																														
<i>Hordeum</i> sp.	Barley Grass	Exotic																												
<i>Hyparrhenia hirta</i>	Coolatai Grass	Exotic																												
<i>Hypochaeris microcephala</i>	White Flatweed	Exotic									2	1					1			1										
<i>Hypochaeris radicata</i>	Flatweed	Exotic																												
<i>Jasminum suavissimum</i>																														
<i>Juncus</i> sp.																														
<i>Juncus usitatus</i>	Pinrush																													
<i>Lachnagrostis filiformis</i>	Blown Grass																													
<i>Lactuca saligna</i>	Willow-leaved Lettuce	Exotic	2	1						1	1	2	1	1						1	2			1			1			
<i>Lactuca serriola</i>	Prickly Lettuce	Exotic	1					1			1	1	2	2			2	2	1	2	1					1	1			
<i>Lepidium africanum</i>		Exotic	1			1	2			2			2	1	1		2	1												
<i>Lepidium bonariense</i>		Exotic	2							1						1														
<i>Leptochloa</i> sp.																														
<i>Leptorhynchus panaetioides</i>	Woolly Buttons		1	2	2	3	3	2	1	2		2											2	2	2	1	1	1	1	2

Species	Species	Notes	Wood_07c																								
			16_2011	16_2012	16_2013	16_2014	16_2015	17_2011	17_2012	17_2013	17_2014	17_2015	18_2011	18_2012	18_2013	18_2014	18_2015	19_2011	19_2012	19_2013	19_2014	19_2015	20_2011	20_2012	20_2013	20_2014	20_2015
<i>Linaria pelisseriana</i>	Pelisser's Toadflax	Exotic																									
<i>Linaria</i> sp.																											
<i>Linum marginale</i>	Native Flax																										
<i>Lolium rigidum</i>	Wimmera Ryegrass	Exotic		3								2		4													
<i>Lolium</i> sp.		Exotic			2	2	1								2	2											
<i>Lomandra confertifolia</i>	Mat-rush																										
<i>Lomandra filiformis</i>	Wattle Mat-rush																										
<i>Lomandra longifolia</i>	Spiny-headed Mat-rush																										
<i>Lomandra multiflora</i>																											
<i>Lycium ferocissimum</i>	African Boxthorn	Exotic																		1							
<i>Lythrum hyssopifolia</i>	Hyssop Loosestrife																										
<i>Maireana decalvans</i>	Black Cotton Bush																										
<i>Maireana enchylaenoides</i>	Wingless Bluebush																										
<i>Maireana microphylla</i>	Small-leaf Bluebush												1			1	1										
<i>Malva</i> sp.		Exotic																									
<i>Malvastrum americanum</i>	Spiked Malvastrum	Exotic																									
<i>Malvastrum coromandelianum</i>	Prickly Malvastrum																										
<i>Marrubium vulgare</i>	White Horehound	Exotic																									
<i>Medicago minima</i>	Woolly Burr Medic	Exotic					3					3			2		3		1	2		3					3
<i>Medicago polymorpha</i>	Burr Medic	Exotic					2			2		2			2		3	2		2		2	2		2		2
<i>Medicago sativa</i>	Lucerne	Exotic																					1		1		
<i>Medicago</i> sp.		Exotic											1	2												2	
<i>Medicago truncatula</i>	Barrel Medic	Exotic																									
<i>Melilotus indicus</i>	Hexham Scent	Exotic									3	2						2	2	2	3	2					
<i>Melilotus</i> sp.		Exotic																									
<i>Mentha satureioides</i>	Creeping Mint																										
<i>Microlaena stipoides</i>	Weeping Grass																										
<i>Misopates orontium</i>	Lesser Snapdragon	Exotic															2										
<i>Murdannia graminea</i>	Grass Lily																										
<i>Nicotiana</i> sp.																											
<i>Nyssanthes diffusa</i>	Barbwire Weed																										
<i>Opuntia stricta</i>	Common Prickly Pear	Exotic																									
<i>Oxalis exilis</i>																1											
<i>Oxalis perennans</i>					1																						
<i>Oxalis</i> sp.			2										1						1								
<i>Panicum buncei</i>			1																								
<i>Panicum effusum</i>	Hairy Panic																										
<i>Panicum maximum</i>		Exotic							2	1	2		2	3	2			2		2		2	2				
<i>Papaver</i> sp.																											
<i>Panicum queenslandicum</i>	Yadbila Grass																										
<i>Panicum</i> sp.																											
<i>Parsonsia eucalyptophylla</i>	Gargaloo																										
<i>Paspalidium jubiflorum</i>	Warrego Grass																										
<i>Paspalidium</i> sp.					1									1		2	2	2			2						
<i>Paspalum dilatatum</i>	Paspalum	Exotic																									
<i>Paspalum</i> sp.		Exotic																									
<i>Petrorhagia nanteuilii</i>		Exotic																									
<i>Phalaris</i> sp.	Canary Grass	Exotic																			1	1					2
<i>Phyllanthus virgatus</i>	Petty Spurge																										
<i>Pimelea microcephala</i>	Shrubby Rice-flower																										
<i>Pimelea neo-anglica</i>	Shrubby Rice-flower																										
<i>Pimelea</i> sp.																											
<i>Plantago debilis</i>																											
<i>Plantago lanceolata</i>	Lamb's Tongues	Exotic														1											
<i>Poa sieberiana</i>	Snow Grass																										

Species	Species	Notes	Wood_07c																									
			16_2011	16_2012	16_2013	16_2014	16_2015	17_2011	17_2012	17_2013	17_2014	17_2015	18_2011	18_2012	18_2013	18_2014	18_2015	19_2011	19_2012	19_2013	19_2014	19_2015	20_2011	20_2012	20_2013	20_2014	20_2015	
<i>Polycarpon tetraphyllum</i>	Four-leaved Allseed	Exotic																										
<i>Polygonum aviculare</i>	Wireweed	Exotic								1									1									
<i>Portulaca oleracea</i>	Pigweed		1				1																					
<i>Rapistrum rugosum</i>	Turnip Weed	Exotic			1	2	2				2				3	3				1	2					2		
<i>Rhodanthe anthemoides</i>																1												
<i>Rostellularia adscendens</i>																												
<i>Rumex brownii</i>	Swamp Dock						1	1					1										1					
<i>Rumex crispus</i>	Curled Dock	Exotic																	1									
<i>Rumex</i> sp.																												
<i>Salsola australis</i>			2		1	2		1													1		2	1				
<i>Schenkia spicata</i>	Spike Centaury																											
<i>Schkuhria pinnata</i>		Exotic																										
<i>Sclerolaena birchii</i>	Galvanised Burr		2	1	2	1	2						1	1		2	2			1	1	2	2	1	2	2	1	
<i>Sclerolaena diacantha</i>	Grey Copperburr																											
<i>Sclerolaena muricata</i>	Black Rolypoly		2	2									2	2				1					1					
<i>Sclerolaena muricata</i> var. <i>muricata</i>	Black Rolypoly				2																		2					
<i>Sclerolaena muricata</i> var. <i>villosa</i>	Black Rolypoly					1	1							2	1	2									2	1	1	1
<i>Senecio quadridentatus</i>	Cotton Fireweed			1	1	2	2				1			2	2	2		2	1	2	2					2	2	2
<i>Setaria incrassata</i>	Purple Pigeon Grass	Exotic							2					3					3					2				
<i>Setaria</i> sp.		Exotic												3					1									
<i>Sida corrugata</i>	Corrugated Sida														1						1							
<i>Sida cunninghamii</i>	Ridged Sida																											
<i>Sida rhombifolia</i>	Paddy's Lucerne	Exotic																										
<i>Sida</i> sp.																												
<i>Sida spinosa</i>		Exotic	2										2		2			1		2	1	2						
<i>Sida subspicata</i>																												
<i>Silybum marianum</i>		Exotic															1											
<i>Sisymbrium irio</i>	London Rocket	Exotic														2	1											
<i>Sisymbrium officinale</i>	Hedge Mustard	Exotic																										
<i>Sisymbrium orientale</i>	Indian Hedge Mustard	Exotic	1	1	1	2	2				2			2		2	2			2	3	2	1		1	2	2	
<i>Sisymbrium</i> sp.		Exotic																										
<i>Solanum esuriale</i>	Quena		2		1								2		2		1											
<i>Solanum nigrum</i>	Black-berry Nightshade	Exotic	1										1											1				
<i>Solanum parvifolium</i>																												
<i>Solanum</i> sp.																												
<i>Sonchus asper</i> subsp. <i>glaucescens</i>		Exotic																										
<i>Sonchus oleraceus</i>	Common Sowthistle	Exotic	2	2			1	2		1	1			2	1	2			1				2			1	1	
<i>Sorghum halepense</i>	Johnson Grass	Exotic																										
<i>Spergularia</i> sp.		Exotic				1							1															
<i>Sporobolus caroli</i>			1			1							2											2				
<i>Sporobolus creber</i>	Slender Rat's Tail Grass																											
<i>Stachys arvensis</i>	Stagger Weed	Exotic																										
<i>Stackhousia viminea</i>	Slender Stackhousia																											
<i>Swainsona galegifolia</i>	Smooth Darling-pea																											
<i>Themeda australis</i>	Kangaroo Grass																											
<i>Tragopogon porrifolius</i>	Oyster Plant	Exotic																										
<i>Tragus australianus</i>	Small Burgrass																											
<i>Trianthema</i> sp.																												
<i>Trifolium angustifolium</i>	Narrow-leaved Clover	Exotic																										
<i>Trifolium arvense</i>	Haresfoot Clover	Exotic			2	3		2	2	2	3	2		2	1	3	2	2	2	1	3		2	2	2	3	2	
<i>Trifolium campestre</i>	Hop Clover	Exotic				1				1	2	3		2	1	2	3	2	2	2	2	2		2	2		2	2
<i>Trifolium dubium</i>	Yellow Suckling Clover	Exotic										1		1														
<i>Trifolium glomeratum</i>	Clustered Clover	Exotic				2					2				2	2		2				1					2	
<i>Trifolium repens</i>	White Clover	Exotic																										
<i>Triptilodiscus pygmaeus</i>																												

Species	Species	Notes	Wood_07c																								
			16_2011	16_2012	16_2013	16_2014	16_2015	17_2011	17_2012	17_2013	17_2014	17_2015	18_2011	18_2012	18_2013	18_2014	18_2015	19_2011	19_2012	19_2013	19_2014	19_2015	20_2011	20_2012	20_2013	20_2014	20_2015
<i>Urochloa panicoides</i>	Urochloa Grass	Exotic																									
<i>Verbascum thapsus</i>	Great Mullein	Exotic																									
<i>Verbascum virgatum</i>	Twiggy Mullein	Exotic																									
<i>Verbena bonariensis</i>	Purpletop	Exotic																									
<i>Verbena gaudichaudii</i>			1									1						1	1	2	1						
<i>Verbesina encelioides</i>		Exotic																									
<i>Vicia sp.</i>		Exotic																									
<i>Vittadinia cuneata</i>	Fuzzweed			1	2										2	1	1			2					2	1	1
<i>Vittadinia dissecta</i>	Dissected New Holland Daisy																										
<i>Vittadinia muelleri</i>																											
<i>Vittadinia sp.</i>			2										1						2					2			1
<i>Vulpia sp.</i>																											
<i>Wahlenbergia communis</i>	Tufted Bluebell		1		1								1						1		1	1					
<i>Wahlenbergia gracilis</i>	Sprawling Bluebell																										
<i>Wahlenbergia luteola</i>																											
<i>Walwhalleya proluta</i>																											
<i>Xanthium occidentale</i>	Noogoora Burr	Exotic																									
<i>Xanthium spinosum</i>	Bathurst Burr	Exotic																									
<i>Xerochrysum bracteatum</i>	Golden Everlasting													1			1	2						1			
<i>Xerochrysum viscosum</i>	Sticky Everlasting																										
<i>Zornia dyctiocarpa</i>	Zornia																										
Total number of species			46	22	24	23	23	16	7	15	19	20	40	35	30	31	29	29	17	30	26	19	26	15	12	19	16

Table 18: Groundcover species cover scores in 20 x 50 m Woodland Plots located in Burnt_2013 for 2011 - 2015 monitoring periods (note plot 46 established in 2013)

Species	Species	Notes	Burnt_2013																								
			21_2011	21_2012	21_2013	21_2014	21_2015	22_2011	22_2012	22_2013	22_2014	22_2015	23_2011	23_2012	23_2013	23_2014	23_2015	30_2011	30_2012	30_2013	30_2014	30_2015	46	46_2014	46_2015		
<i>Abutilon oxycarpum</i>	Straggly Lantern-bush																										
<i>Abutilon</i> sp.																											
<i>Acacia deanei</i> (seedling)	Green Wattle																1									1	
<i>Acacia decora</i> (seedling)	Western Silver Wattle																										
<i>Acacia salicina</i> (seedling)	Cooba																										
<i>Aira</i> sp.		Exotic																									
<i>Alternanthera denticulata</i>	Lesser Joyweed																										
<i>Alternanthera</i> sp. A																											
<i>Ammi majus</i>	Bishop's-weed	Exotic																								1	
<i>Anagallis arvensis</i>	Scarlet Pimpernel	Exotic	1			2	2		2		2	2	2	2			2	2	2		2				2		2
<i>Arenaria leptoclados</i>		Exotic																									
<i>Aristida leptopoda</i>	White Speargrass																										
<i>Aristida personata</i>	Purple Wire-grass												2													2	
<i>Aristida</i> sp.																											
<i>Aristida vagans</i>	Threeawn Speargrass																										
<i>Arthropodium</i> sp.																											
<i>Asperula cunninghamii</i>	Twining Woodruff																										
<i>Asphodelus fistulosus</i>	Onion Weed	Exotic																									
<i>Aster subulatus</i>	Wild Aster	Exotic								2																	
<i>Atriplex muelleri</i>																											
<i>Atriplex semibaccata</i>	Creeping Saltbush																										
<i>Austrodanthonia bipartita</i>	Wallaby Grass																										
<i>Austrodanthonia racemosa</i>																											
<i>Austrodanthonia racemosa</i> var. <i>obtusata</i>																											
<i>Austrodanthonia</i> sp.			1																								
<i>Austrostipa aristiglumis</i>	Plains Grass																										
<i>Austrostipa ramosissima</i>	Stout Bamboo Grass																										
<i>Austrostipa scabra</i>	Speargrass												1	2												1	
<i>Austrostipa</i> sp.																											
<i>Austrostipa verticillata</i>	Slender Bamboo Grass																										
<i>Avena fatua</i>	Wild Oats	Exotic																									
<i>Avena</i> sp.		Exotic																									
<i>Bidens pilosa</i>	Cobblers Pegs	Exotic																									
<i>Bidens subalternans</i>	Greater Beggar's Ticks	Exotic																									
<i>Boerhavia dominii</i>	Tarvine																										
<i>Boerhavia</i> sp.																											
<i>Bothriochloa bladhii</i>	Forest Blue Grass																										
<i>Bothriochloa decipiens</i>	Red Grass																										
<i>Bothriochloa macra</i>	Red Grass																										
<i>Bothriochloa</i> sp.																											
<i>Brachychiton populneus</i>	Kurrajong																										
<i>Brachyscome ciliaris</i>	Variable Daisy																										
<i>Bromus catharticus</i>	Prairie Grass	Exotic																									
<i>Bromus molliformis</i>	Soft Brome	Exotic																									
<i>Bromus</i> sp.		Exotic																									
<i>Brunoniella australis</i>	Blue Trumpet																										
<i>Bryophyllum delagoense</i>	Mother-of-millions	Exotic																									
<i>Bulbine bulbosa</i>	Native Leek																									1	2
<i>Calandrinia</i> sp.																											
<i>Callitris glaucophylla</i>																											
<i>Calotis lappulacea</i>	Yellow Burr-daisy																										
<i>Carex breviculmis</i>																											
<i>Carex inversa</i>																											

Species	Species	Notes	Burnt_2013																							
			21_2011	21_2012	21_2013	21_2014	21_2015	22_2011	22_2012	22_2013	22_2014	22_2015	23_2011	23_2012	23_2013	23_2014	23_2015	30_2011	30_2012	30_2013	30_2014	30_2015	46	46_2014	46_2015	
<i>Carthamus lanatus</i>	Saffron Thistle	Exotic				2	2					1	1			1					2	2				
<i>Centaurea melitensis</i>	Maltese Cockspur	Exotic				2	2		1			3	2			1	2	3	2		3	3			3	4
<i>Centaurea solstitialis</i>	St Barnaby's Thistle	Exotic										2														
<i>Centaurea sp.</i>		Exotic																								
<i>Centaurium erythraea</i>	Common Centaury	Exotic																								
<i>Centaurium sp.</i>		Exotic						1										1								
<i>Chamaesyce sp.</i>																										
<i>Cheilanthes distans</i>	Bristly Cloak Fern																									
<i>Cheilanthes sieberi</i>																										
<i>Chenopodium desertorum</i>																										
<i>Chenopodium pumilio</i>	Small Crumbweed																									
<i>Chloris gayana</i>	Rhodes Grass	Exotic	5	5	2	2	3	5	6	3	3	3	5	6	3	3	3	3	6	3	4	3	2	3	3	
<i>Chloris pectinata</i>	Comb Chloris																									
<i>Chloris truncata</i>	Windmill Grass																									
<i>Chloris ventricosa</i>	Plump Windmill Grass																	2								
<i>Chondrilla juncea</i>	Skeleton Weed	Exotic																								
<i>Chrysocephalum apiculatum</i>	Yellow Buttons																									
<i>Cichorium intybus</i>		Exotic																								
<i>Cirsium vulgare</i>	Spear Thistle	Exotic		2	1	1	1	1	2	1	1					1			1							
<i>Convolvulus graminetinus</i>												1	1			1									1	
<i>Conyza bonariensis</i>	Flaxleaf Fleabane	Exotic	2											2		1										
<i>Conyza parva</i>		Exotic																								
<i>Conyza sp.</i>		Exotic																1								
<i>Cotula australis</i>	Common Cotula																									
<i>Cyclosporum leptophyllum</i>	Slender Celery	Exotic						1	1		2		2	2		2		2	2							
<i>Cymbopogon refractus</i>	Barbed Wire Grass																									
<i>Cynodon dactylon</i>	Couch																									
<i>Cyperus concinnus</i>																										
<i>Cyperus fulvus</i>	Sticky Sedge																									
<i>Cyperus gracilis</i>	Slender Flat-sedge																									
<i>Cyperus rotundus</i>	Nutgrass	Exotic																								
<i>Datura ferox</i>		Exotic																								
<i>Daucus glochidiatus</i>	Native Carrot					2													1	1		1				
<i>Desmodium brachypodum</i>	Large Tick-trefoil																									
<i>Desmodium varians</i>	Slender Tick-trefoil																									
<i>Dianella revoluta</i>	Blueberry Lily																									
<i>Dianella sp.</i>																										
<i>Dichanthium sericeum</i>	Queensland Bluegrass																									
<i>Dichelachne micrantha</i>	Shorthair Plumegrass																									
<i>Dichondra repens</i>	Kidney Weed																									
<i>Dichondra sp. A</i>													1													
<i>Dichopogon fimbriatus</i>	Nodding Chocolate Lily																									
<i>Digitaria brownii</i>	Cotton Panic Grass																									
<i>Digitaria divaricatissima</i>	Umbrella Grass																		1							
<i>Digitaria sanguinalis</i>	Crab Grass	Exotic																								
<i>Digitaria sp.</i>																										
<i>Echinochloa crus-galli</i>	Barnyard Grass	Exotic																								
<i>Echinochloa sp.</i>																										
<i>Echium plantagineum</i>	Patterson's Curse	Exotic					2					2				2	2									
<i>Eclipta platyglossa</i>																										
<i>Einadia hastata</i>	Berry Saltbush																									2
<i>Einadia nutans</i>	Climbing Saltbush								1		1															
<i>Einadia polygonoides</i>												1						1			1			1		1
<i>Einadia trigonos</i>	Fishweed												1											1		1
<i>Elymus scaber</i>																										

Species	Species	Notes	Burnt_2013																								
			21_2011	21_2012	21_2013	21_2014	21_2015	22_2011	22_2012	22_2013	22_2014	22_2015	23_2011	23_2012	23_2013	23_2014	23_2015	30_2011	30_2012	30_2013	30_2014	30_2015	46	46_2014	46_2015		
<i>Enchylaena tomentosa</i>	Ruby Saltbush																										
<i>Enneapogon nigricans</i>																											
<i>Enneapogon</i> sp.																											
<i>Enteropogon acicularis</i>																											
<i>Enteropogon</i> sp.																											
<i>Eragrostis alveiformis</i>																											
<i>Eragrostis brownii</i>	Brown's Lovegrass																										
<i>Eragrostis elongata</i>	Clustered Lovegrass																										
<i>Eragrostis lacunaria</i>	Bristly Love-grass																										
<i>Eragrostis leptostachya</i>	Paddock Lovegrass																										
<i>Eragrostis parviflora</i>	Weeping Lovegrass																										
<i>Eragrostis setifolia</i>	Bristly Love-grass																										
<i>Eragrostis</i> sp.																											
<i>Eremophila debilis</i>	Winter Apple																										
<i>Eriochloa pseudoacrotricha</i>	Early Spring Grass																										
<i>Eriochloa</i> sp.																											
<i>Erodium crinitum</i>	Blue Storksbill																										
<i>Euchiton</i> sp.																											
<i>Euchiton sphaericus</i>																											
<i>Eulalia aurea</i>	Silky Browntop																										
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>																											
<i>Fimbristylis dichotoma</i>	Common Fringe-sedge																										
<i>Galenia pubescens</i>	Galenia	Exotic																									
<i>Geijera parviflora</i>																											
<i>Geranium solanderi</i>	Native Geranium			1		1	1																				
<i>Glossogyne tannensis</i>																											
<i>Glycine clandestina</i>			1			1		1																			
<i>Glycine tabacina</i>																											
<i>Gomphocarpus fruticosus</i>	Narrow-leaved Cotton Bush	Exotic																									
<i>Gomphocarpus</i> sp.		Exotic																									
<i>Gomphrena celosioides</i>	Gomphrena Weed	Exotic																									
<i>Gonocarpus elatus</i>																											
<i>Goodenia cycloptera</i>																											
<i>Goodenia fascicularis</i>																											
<i>Goodenia glabra</i>																											
<i>Goodenia pinnatifida</i>																											
<i>Gypsophila tubulosa</i>	Annual Chalkwort																										
<i>Haloragis heterophylla</i>	Rough Raspwort																										
<i>Hedynois rhagadioloides</i> subsp. <i>cretica</i>	Cretan Weed	Exotic																									
<i>Helianthus</i> sp.	Sunflower	Exotic																									
<i>Hibiscus trionum</i>					1																						
<i>Hordeum</i> sp.	Barley Grass	Exotic																									
<i>Hyparrhenia hirta</i>	Coolatai Grass	Exotic																									
<i>Hypochaeris microcephala</i>	White Flatweed	Exotic																									
<i>Hypochaeris radicata</i>	Flatweed	Exotic																									
<i>Jasminum suavissimum</i>																											
<i>Juncus</i> sp.																											
<i>Juncus usitatus</i>	Pinrush																										
<i>Lachnagrostis filiformis</i>	Blown Grass																										
<i>Lactuca saligna</i>	Willow-leaved Lettuce	Exotic		1		1		2																			
<i>Lactuca serriola</i>	Prickly Lettuce	Exotic	2	1		2		2	1		2		2	2													
<i>Lepidium africanum</i>		Exotic										1		2	1				1		2						
<i>Lepidium bonariense</i>		Exotic																									
<i>Leptochloa</i> sp.																											
<i>Leptorhynchus panaetioides</i>	Woolly Buttons							1	1	1		2	3	2	2		2	2	1								

Species	Species	Notes	Burnt_2013																							
			21_2011	21_2012	21_2013	21_2014	21_2015	22_2011	22_2012	22_2013	22_2014	22_2015	23_2011	23_2012	23_2013	23_2014	23_2015	30_2011	30_2012	30_2013	30_2014	30_2015	46	46_2014	46_2015	
<i>Urochloa panicoides</i>	Urochloa Grass	Exotic																								
<i>Verbascum thapsus</i>	Great Mullein	Exotic																								
<i>Verbascum virgatum</i>	Twiggy Mullein	Exotic																								
<i>Verbena bonariensis</i>	Purpletop	Exotic																								
<i>Verbena gaudichaudii</i>																			1	1				1		
<i>Verbesina encelioides</i>		Exotic																								
<i>Vicia</i> sp.		Exotic																								
<i>Vittadinia cuneata</i>	Fuzzweed					1	1				1	1					2	1		1						
<i>Vittadinia dissecta</i>	Dissected New Holland Daisy																									
<i>Vittadinia muelleri</i>													1	2												
<i>Vittadinia</i> sp.								2					1													
<i>Vulpia</i> sp.																										
<i>Wahlenbergia communis</i>	Tufted Bluebell		1	1				2		1	1								2		1					
<i>Wahlenbergia gracilis</i>	Sprawling Bluebell																									
<i>Wahlenbergia luteola</i>																										
<i>Walwhalleya proluta</i>																										
<i>Xanthium occidentale</i>	Noogoora Burr	Exotic																								
<i>Xanthium spinosum</i>	Bathurst Burr	Exotic																								
<i>Xerochrysum bracteatum</i>	Golden Everlasting																					2	2		1	
<i>Xerochrysum viscosum</i>	Sticky Everlasting																		1							
<i>Zornia dyctiocarpa</i>	Zornia																									
Total number of species			15	13	3	21	20	17	18	6	31	23	24	17	2	26	18	35	24	7	32	20	5	27	13	

Table 19: Groundcover species cover scores in 20 x 50 m Woodland Plots located in Wood_06a for 2011 - 2015 monitoring periods

Species	Species	Notes	Wood_06a											
			24_2011	24_2012	24_2013	24_2014	24_2015	25_2011	25_2012	25_2013	25_2014	25_2015		
<i>Abutilon oxycarpum</i>	Straggly Lantern-bush													
<i>Abutilon</i> sp.														
<i>Acacia deanei</i> (seedling)	Green Wattle			1	1									
<i>Acacia decora</i> (seedling)	Western Silver Wattle				1									
<i>Acacia salicina</i> (seedling)	Cooba													
<i>Aira</i> sp.		Exotic												
<i>Alternanthera denticulata</i>	Lesser Joyweed													
<i>Alternanthera</i> sp. A														
<i>Ammi majus</i>	Bishop's-weed	Exotic												
<i>Anagallis arvensis</i>	Scarlet Pimpernel	Exotic				2	1	2		2	2	2		
<i>Arenaria leptoclados</i>		Exotic												
<i>Aristida leptopoda</i>	White Speargrass													
<i>Aristida personata</i>	Purple Wire-grass			2										
<i>Aristida</i> sp.														
<i>Aristida vagans</i>	Threeawn Speargrass													
<i>Arthropodium</i> sp.														
<i>Asperula cunninghamii</i>	Twining Woodruff													
<i>Asphodelus fistulosus</i>	Onion Weed	Exotic												
<i>Aster subulatus</i>	Wild Aster	Exotic							2	2				
<i>Atriplex muelleri</i>								1						
<i>Atriplex semibaccata</i>	Creeping Saltbush													
<i>Austrodanthonia bipartita</i>	Wallaby Grass							2						
<i>Austrodanthonia racemosa</i>														
<i>Austrodanthonia racemosa</i> var. <i>obtusata</i>														
<i>Austrodanthonia</i> sp.			2	2	2									
<i>Austrostipa aristiglumis</i>	Plains Grass													
<i>Austrostipa ramosissima</i>	Stout Bamboo Grass													
<i>Austrostipa scabra</i>	Speargrass			2	2	2	2							
<i>Austrostipa</i> sp.														
<i>Austrostipa verticillata</i>	Slender Bamboo Grass													
<i>Avena fatua</i>	Wild Oats	Exotic												
<i>Avena</i> sp.		Exotic												
<i>Bidens pilosa</i>	Cobblers Pegs	Exotic												
<i>Bidens subalternans</i>	Greater Beggar's Ticks	Exotic						2						2
<i>Boerhavia dominii</i>	Tarvine													
<i>Boerhavia</i> sp.														
<i>Bothriochloa bladhii</i>	Forest Blue Grass													
<i>Bothriochloa decipiens</i>	Red Grass			2		2								
<i>Bothriochloa macra</i>	Red Grass													
<i>Bothriochloa</i> sp.														
<i>Brachychiton populneus</i>	Kurrajong													
<i>Brachyscome ciliaris</i>	Variable Daisy													
<i>Bromus catharticus</i>	Prairie Grass	Exotic								1	2		2	
<i>Bromus molliformis</i>	Soft Brome	Exotic		2	2	2	3					2	2	2
<i>Bromus</i> sp.		Exotic												
<i>Brunoniella australis</i>	Blue Trumpet													
<i>Bryophyllum delagoense</i>	Mother-of-millions	Exotic												
<i>Bulbine bulbosa</i>	Native Leek													
<i>Calandrinia</i> sp.														
<i>Callitris glaucophylla</i>														
<i>Calotis lappulacea</i>	Yellow Burr-daisy													
<i>Carex breviculmis</i>														
<i>Carex inversa</i>												2		

Species	Species	Notes	Wood_06a										
			24_2011	24_2012	24_2013	24_2014	24_2015	25_2011	25_2012	25_2013	25_2014	25_2015	
<i>Carthamus lanatus</i>	Saffron Thistle	Exotic							1	1	2	2	2
<i>Centaurea melitensis</i>	Maltese Cockspur	Exotic		2	2	2		2		2	2	3	3
<i>Centaurea solstitialis</i>	St Barnaby's Thistle	Exotic											
<i>Centaurea</i> sp.		Exotic											
<i>Centaurium erythraea</i>	Common Centaury	Exotic								1			
<i>Centaurium</i> sp.		Exotic	1						2				
<i>Chamaesyce</i> sp.													
<i>Cheilanthes distans</i>	Bristly Cloak Fern												
<i>Cheilanthes sieberi</i>													
<i>Chenopodium desertorum</i>													
<i>Chenopodium pumilio</i>	Small Crumbweed												
<i>Chloris gayana</i>	Rhodes Grass	Exotic	4	5	4	4		3	5	5	4	4	3
<i>Chloris pectinata</i>	Comb Chloris												
<i>Chloris truncata</i>	Windmill Grass												
<i>Chloris ventricosa</i>	Plump Windmill Grass												
<i>Chondrilla juncea</i>	Skeleton Weed	Exotic											
<i>Chrysocephalum apiculatum</i>	Yellow Buttons												
<i>Cichorium intybus</i>		Exotic											
<i>Cirsium vulgare</i>	Spear Thistle	Exotic						2			1	1	2
<i>Convolvulus graminetinus</i>					1					1	1		
<i>Conyza bonariensis</i>	Flaxleaf Fleabane	Exotic	2						2	2		2	1
<i>Conyza parva</i>		Exotic											
<i>Conyza</i> sp.		Exotic											
<i>Cotula australis</i>	Common Cotula												
<i>Cyclosporum leptophyllum</i>	Slender Celery	Exotic	2						2		1	2	1
<i>Cymbopogon refractus</i>	Barbed Wire Grass												
<i>Cynodon dactylon</i>	Couch								2		1		
<i>Cyperus concinnus</i>													
<i>Cyperus fulvus</i>	Sticky Sedge												
<i>Cyperus gracilis</i>	Slender Flat-sedge												
<i>Cyperus rotundus</i>	Nutgrass	Exotic											
<i>Datura ferox</i>		Exotic											
<i>Daucus glochidiatus</i>	Native Carrot								1				
<i>Desmodium brachypodum</i>	Large Tick-trefoil												
<i>Desmodium varians</i>	Slender Tick-trefoil												
<i>Dianella revoluta</i>	Blueberry Lily												
<i>Dianella</i> sp.													
<i>Dichanthium sericeum</i>	Queensland Bluegrass								1				
<i>Dichelachne micrantha</i>	Shorthair Plumegrass												
<i>Dichondra repens</i>	Kidney Weed												
<i>Dichondra</i> sp. A					1	1							
<i>Dichopogon fimbriatus</i>	Nodding Chocolate Lily												
<i>Digitaria brownii</i>	Cotton Panic Grass												
<i>Digitaria divaricatissima</i>	Umbrella Grass		1										
<i>Digitaria sanguinalis</i>	Crab Grass	Exotic											
<i>Digitaria</i> sp.													
<i>Echinochloa crus-galli</i>	Barnyard Grass	Exotic											
<i>Echinochloa</i> sp.													
<i>Echium plantagineum</i>	Patterson's Curse	Exotic										1	
<i>Eclipta platyglossa</i>													
<i>Einadia hastata</i>	Berry Saltbush												
<i>Einadia nutans</i>	Climbing Saltbush		1	1		1							
<i>Einadia polygonoides</i>					1				1				
<i>Einadia trigonos</i>	Fishweed												
<i>Elymus scaber</i>				2									

Species	Species	Notes	Wood_06a											
			24_2011	24_2012	24_2013	24_2014	24_2015	25_2011	25_2012	25_2013	25_2014	25_2015		
<i>Enchylaena tomentosa</i>	Ruby Saltbush													
<i>Enneapogon nigricans</i>														
<i>Enneapogon</i> sp.							1							
<i>Enteropogon acicularis</i>														
<i>Enteropogon</i> sp.														
<i>Eragrostis alveiformis</i>														
<i>Eragrostis brownii</i>	Brown's Lovegrass													
<i>Eragrostis elongata</i>	Clustered Lovegrass													
<i>Eragrostis lacunaria</i>	Bristly Love-grass													
<i>Eragrostis leptostachya</i>	Paddock Lovegrass		2											
<i>Eragrostis parviflora</i>	Weeping Lovegrass													
<i>Eragrostis setifolia</i>	Bristly Love-grass													
<i>Eragrostis</i> sp.														
<i>Eremophila debilis</i>	Winter Apple													
<i>Eriochloa pseudoacrotricha</i>	Early Spring Grass		3						3					
<i>Eriochloa</i> sp.														
<i>Erodium crinitum</i>	Blue Storksbill													
<i>Euchiton</i> sp.														
<i>Euchiton sphaericus</i>														
<i>Eulalia aurea</i>	Silky Browntop													
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>														
<i>Fimbristylis dichotoma</i>	Common Fringe-sedge													
<i>Galenia pubescens</i>	Galenia	Exotic							1					
<i>Geijera parviflora</i>														
<i>Geranium solanderi</i>	Native Geranium													
<i>Glossogyne tannensis</i>														
<i>Glycine clandestina</i>									1					
<i>Glycine tabacina</i>														
<i>Gomphocarpus fruticosus</i>	Narrow-leaved Cotton Bush	Exotic												
<i>Gomphocarpus</i> sp.		Exotic												
<i>Gomphrena celosioides</i>	Gomphrena Weed	Exotic												
<i>Gonocarpus elatus</i>														
<i>Goodenia cycloptera</i>														
<i>Goodenia fascicularis</i>														
<i>Goodenia glabra</i>														
<i>Goodenia pinnatifida</i>														
<i>Gypsophila tubulosa</i>	Annual Chalkwort			1										
<i>Haloragis heterophylla</i>	Rough Raspwort													
<i>Hedypnois rhagadioloides</i> subsp. <i>cretica</i>	Cretan Weed	Exotic					2							
<i>Helianthus</i> sp.	Sunflower	Exotic												
<i>Hibiscus trionum</i>														
<i>Hordeum</i> sp.	Barley Grass	Exotic												
<i>Hyparrhenia hirta</i>	Coolatai Grass	Exotic												
<i>Hypochoeris microcephala</i>	White Flatweed	Exotic												
<i>Hypochoeris radicata</i>	Flatweed	Exotic									1			
<i>Jasminum suavisimum</i>														
<i>Juncus</i> sp.														
<i>Juncus usitatus</i>	Pinrush													
<i>Lachnagrostis filiformis</i>	Blown Grass									1				
<i>Lactuca saligna</i>	Willow-leaved Lettuce	Exotic	2	1					2	2	2	1		
<i>Lactuca serriola</i>	Prickly Lettuce	Exotic	2		1	2			2	2	1	2	2	
<i>Lepidium africanum</i>		Exotic	2	1	1				1		1			
<i>Lepidium bonariense</i>		Exotic						1						
<i>Leptochloa</i> sp.														
<i>Leptorhynchus panaetioides</i>	Woolly Buttons		2		2	1	2					1	2	

Species	Species	Notes	Wood_06a											
			24_2011	24_2012	24_2013	24_2014	24_2015	25_2011	25_2012	25_2013	25_2014	25_2015		
<i>Linaria pelisseriana</i>	Pelisser's Toadflax	Exotic												
<i>Linaria</i> sp.														
<i>Linum marginale</i>	Native Flax													
<i>Lolium rigidum</i>	Wimmera Ryegrass	Exotic								3				
<i>Lolium</i> sp.		Exotic							1				3	1
<i>Lomandra confertifolia</i>	Mat-rush													
<i>Lomandra filiformis</i>	Wattle Mat-rush													
<i>Lomandra longifolia</i>	Spiny-headed Mat-rush													
<i>Lomandra multiflora</i>														
<i>Lycium ferocissimum</i>	African Boxthorn	Exotic												
<i>Lythrum hyssopifolia</i>	Hyssop Loosestrife													
<i>Maireana decalvans</i>	Black Cotton Bush													
<i>Maireana enchylaenoides</i>	Wingless Bluebush													
<i>Maireana microphylla</i>	Small-leaf Bluebush													
<i>Malva</i> sp.		Exotic												
<i>Malvastrum americanum</i>	Spiked Malvastrum	Exotic												
<i>Malvastrum coromandelianum</i>	Prickly Malvastrum													
<i>Marrubium vulgare</i>	White Horehound	Exotic												
<i>Medicago minima</i>	Woolly Burr Medic	Exotic			2			3			2			3
<i>Medicago polymorpha</i>	Burr Medic	Exotic	2		2			2			2	2		
<i>Medicago sativa</i>	Lucerne	Exotic												1
<i>Medicago</i> sp.		Exotic		2									2	
<i>Medicago truncatula</i>	Barrel Medic	Exotic												
<i>Melilotus indicus</i>	Hexham Scent	Exotic							1				1	2
<i>Melilotus</i> sp.		Exotic												
<i>Mentha satureioides</i>	Creeping Mint													
<i>Microlaena stipoides</i>	Weeping Grass													
<i>Misopates orontium</i>	Lesser Snapdragon	Exotic												
<i>Murdannia graminea</i>	Grass Lily													
<i>Nicotiana</i> sp.														
<i>Nyssanthes diffusa</i>	Barbwire Weed													
<i>Opuntia stricta</i>	Common Prickly Pear	Exotic												
<i>Oxalis exilis</i>					1						1			
<i>Oxalis perennans</i>														
<i>Oxalis</i> sp.														
<i>Panicum buncei</i>									1					
<i>Panicum effusum</i>	Hairy Panic													
<i>Panicum maximum</i>		Exotic	3		2					2				
<i>Papaver</i> sp.														
<i>Panicum queenslandicum</i>	Yadbila Grass													
<i>Panicum</i> sp.														
<i>Parsonsia eucalyptophylla</i>	Gargaloo													
<i>Paspalidium jubiflorum</i>	Warrego Grass													
<i>Paspalidium</i> sp.			2		2	2								
<i>Paspalum dilatatum</i>	Paspalum	Exotic												
<i>Paspalum</i> sp.		Exotic												
<i>Petrorhagia nanteuilii</i>		Exotic	2	2		2							1	2
<i>Phalaris</i> sp.	Canary Grass	Exotic												
<i>Phyllanthus virgatus</i>	Petty Spurge													
<i>Pimelea microcephala</i>	Shrubby Rice-flower													
<i>Pimelea neo-anglica</i>	Shrubby Rice-flower													
<i>Pimelea</i> sp.														
<i>Plantago debilis</i>								1						
<i>Plantago lanceolata</i>	Lamb's Tongues	Exotic												
<i>Poa sieberiana</i>	Snow Grass													

Species	Species	Notes	Wood_06a											
			24_2011	24_2012	24_2013	24_2014	24_2015	25_2011	25_2012	25_2013	25_2014	25_2015		
<i>Polycarpon tetraphyllum</i>	Four-leaved Allseed	Exotic												
<i>Polygonum aviculare</i>	Wireweed	Exotic							1					
<i>Portulaca oleracea</i>	Pigweed		1	1	2									
<i>Rapistrum rugosum</i>	Turnip Weed	Exotic		1	1	2	3				2	2	3	
<i>Rhodanthe anthemoides</i>								1						
<i>Rostellularia adscendens</i>														
<i>Rumex brownii</i>	Swamp Dock													1
<i>Rumex crispus</i>	Curled Dock	Exotic												
<i>Rumex</i> sp.														
<i>Salsola australis</i>														
<i>Schenkia spicata</i>	Spike Centaury													
<i>Schkuhria pinnata</i>		Exotic												
<i>Sclerolaena birchii</i>	Galvanised Burr		1	2	2	1	2	1	1			2		
<i>Sclerolaena diacantha</i>	Grey Copperburr													
<i>Sclerolaena muricata</i>	Black Rolypoly			2					2	2				
<i>Sclerolaena muricata</i> var. <i>muricata</i>	Black Rolypoly													
<i>Sclerolaena muricata</i> var. <i>villosa</i>	Black Rolypoly				2	2	2				2	1	2	
<i>Senecio quadridentatus</i>	Cotton Fireweed		1	2	2	2	1	1	2	2	2	2	1	
<i>Setaria incrassata</i>	Purple Pigeon Grass	Exotic	3		1				3					
<i>Setaria</i> sp.		Exotic		3		1								
<i>Sida corrugata</i>	Corrugated Sida		1											
<i>Sida cunninghamii</i>	Ridged Sida													
<i>Sida rhombifolia</i>	Paddy's Lucerne	Exotic												
<i>Sida</i> sp.														
<i>Sida spinosa</i>		Exotic	1						1		2		2	
<i>Sida subspicata</i>														
<i>Silybum marianum</i>		Exotic												
<i>Sisymbrium irio</i>	London Rocket	Exotic												
<i>Sisymbrium officinale</i>	Hedge Mustard	Exotic				2						1		
<i>Sisymbrium orientale</i>	Indian Hedge Mustard	Exotic			2		2		1				1	
<i>Sisymbrium</i> sp.		Exotic												
<i>Solanum esuriale</i>	Quena													
<i>Solanum nigrum</i>	Black-berry Nightshade	Exotic									1			
<i>Solanum parvifolium</i>														
<i>Solanum</i> sp.														
<i>Sonchus asper</i> subsp. <i>glaucescens</i>		Exotic											1	
<i>Sonchus oleraceus</i>	Common Sowthistle	Exotic		2		1	2	2	2			1		
<i>Sorghum halepense</i>	Johnson Grass	Exotic												
<i>Spergularia</i> sp.		Exotic												
<i>Sporobolus caroli</i>			2											
<i>Sporobolus creber</i>	Slender Rat's Tail Grass								1					
<i>Stachys arvensis</i>	Stagger Weed	Exotic												
<i>Stackhousia viminea</i>	Slender Stackhousia													
<i>Swainsona galegifolia</i>	Smooth Darling-pea													
<i>Themeda australis</i>	Kangaroo Grass													
<i>Tragopogon porrifolius</i>	Oyster Plant	Exotic												
<i>Tragus australianus</i>	Small Burgrass													
<i>Trianthema</i> sp.					1									
<i>Trifolium angustifolium</i>	Narrow-leaved Clover	Exotic				1								
<i>Trifolium arvense</i>	Haresfoot Clover	Exotic	1	2		3	2	2	2	2	2	2	1	
<i>Trifolium campestre</i>	Hop Clover	Exotic			2	2	3	2	2	2	2	2	2	
<i>Trifolium dubium</i>	Yellow Suckling Clover	Exotic		2		3			2					
<i>Trifolium glomeratum</i>	Clustered Clover	Exotic	2					2		2	2			
<i>Trifolium repens</i>	White Clover	Exotic												
<i>Triptilodiscus pygmaeus</i>														

Species	Species	Notes	Wood_06a											
			24_2011	24_2012	24_2013	24_2014	24_2015	25_2011	25_2012	25_2013	25_2014	25_2015		
<i>Urochloa panicoides</i>	Urochloa Grass	Exotic												
<i>Verbascum thapsus</i>	Great Mullein	Exotic												
<i>Verbascum virgatum</i>	Twiggy Mullein	Exotic												
<i>Verbena bonariensis</i>	Purpletop	Exotic						1						
<i>Verbena gaudichaudii</i>					1						1	1		
<i>Verbesina encelioides</i>		Exotic												
<i>Vicia</i> sp.		Exotic												
<i>Vittadinia cuneata</i>	Fuzzweed			2	2	2	2	2						1
<i>Vittadinia dissecta</i>	Dissected New Holland Daisy													
<i>Vittadinia muelleri</i>												1		
<i>Vittadinia</i> sp.			2						2					
<i>Vulpia</i> sp.								1						
<i>Wahlenbergia communis</i>	Tufted Bluebell								1		1			
<i>Wahlenbergia gracilis</i>	Sprawling Bluebell											1		
<i>Wahlenbergia luteola</i>														
<i>Walwhalleya prolata</i>														
<i>Xanthium occidentale</i>	Noogoora Burr	Exotic												
<i>Xanthium spinosum</i>	Bathurst Burr	Exotic												
<i>Xerochrysum bracteatum</i>	Golden Everlasting		1	1		1	1					1		
<i>Xerochrysum viscosum</i>	Sticky Everlasting													
<i>Zornia dyctiocarpa</i>	Zornia													
Total number of species			28	26	29	27	27	34	21	25	33	25		

Table 20: Groundcover species cover scores in 20 x 50 m Woodland Plots located in Wood_05a for 2011 - 2015 monitoring periods (plot 48 established in 2013)

Species	Species	Notes	Wood_05a																								
			26_2011	26_2012	26_2013	26_2014	26_2015	27_2011	27_2012	27_2013	27_2014	27_2015	28_2011	28_2012	28_2013	28_2014	28_2015	29_2011	29_2012	29_2013	29_2014	29_2015	48_2013	48_2014	48_2015		
<i>Abutilon oxycarpum</i>	Straggly Lantern-bush																										
<i>Abutilon</i> sp.																											
<i>Acacia deanei</i> (seedling)	Green Wattle																										
<i>Acacia decora</i> (seedling)	Western Silver Wattle																										
<i>Acacia salicina</i> (seedling)	Cooba																										
<i>Aira</i> sp.		Exotic																									
<i>Alternanthera denticulata</i>	Lesser Joyweed																										
<i>Alternanthera</i> sp. A																						1					
<i>Ammi majus</i>	Bishop's-weed	Exotic		1				2												1					1		
<i>Anagallis arvensis</i>	Scarlet Pimpernel	Exotic		2		2			2	2	2		2								2		1	2	2		
<i>Arenaria leptocladus</i>		Exotic																									
<i>Aristida leptopoda</i>	White Speargrass																										
<i>Aristida personata</i>	Purple Wire-grass			3	2				3	2	1	2	2		3	2	2	3		3		3	2	3	3		
<i>Aristida</i> sp.											3	2	2	1		2			1								
<i>Aristida vagans</i>	Threeawn Speargrass																										
<i>Arthropodium</i> sp.																											
<i>Asperula cunninghamii</i>	Twining Woodruff																										
<i>Asphodelus fistulosus</i>	Onion Weed	Exotic																									
<i>Aster subulatus</i>	Wild Aster	Exotic		1					1					1	1												
<i>Atriplex muelleri</i>																											
<i>Atriplex semibaccata</i>	Creeping Saltbush																										
<i>Austrodanthonia bipartita</i>	Wallaby Grass							3													2						
<i>Austrodanthonia racemosa</i>							2										1						2				
<i>Austrodanthonia racemosa</i> var. <i>obtusata</i>																											
<i>Austrodanthonia</i> sp.			2	2	2	2			2	2				1		2	2			2	2		2				
<i>Austrostipa aristiglumis</i>	Plains Grass																										
<i>Austrostipa ramosissima</i>	Stout Bamboo Grass																						3				
<i>Austrostipa scabra</i>	Speargrass		3	3	3	3	3	3	3	3			3	3	3	2	3	2	3	3	3	3	3	3	3		
<i>Austrostipa</i> sp.																2					2	2					
<i>Austrostipa verticillata</i>	Slender Bamboo Grass																			2							
<i>Avena fatua</i>	Wild Oats	Exotic																									
<i>Avena</i> sp.		Exotic		1	1		1										1				1	1		2	1		
<i>Bidens pilosa</i>	Cobblers Pegs	Exotic																									
<i>Bidens subalternans</i>	Greater Beggar's Ticks	Exotic		2									1	2	2	2		1		2		1		1	1		
<i>Boerhavia dominii</i>	Tarvine																										
<i>Boerhavia</i> sp.																					1						
<i>Bothriochloa bladhii</i>	Forest Blue Grass																										
<i>Bothriochloa decipiens</i>	Red Grass		2	4		3			2	4			3			4		3			3		2		3		
<i>Bothriochloa macra</i>	Red Grass				3											3							3				
<i>Bothriochloa</i> sp.							2				3			2				3				3			2		
<i>Brachychiton populneus</i>	Kurrajong																										
<i>Brachyscome ciliaris</i>	Variable Daisy																										
<i>Bromus catharticus</i>	Prairie Grass	Exotic																									
<i>Bromus molliformis</i>	Soft Brome	Exotic				2											2	2						2	2		
<i>Bromus</i> sp.		Exotic			1						2							1	1								
<i>Brunoniella australis</i>	Blue Trumpet																										
<i>Bryophyllum delagoense</i>	Mother-of-millions	Exotic																									
<i>Bulbine bulbosa</i>	Native Leek																										
<i>Calandrinia</i> sp.																											
<i>Callitris glaucophylla</i>																											
<i>Calotis lappulacea</i>	Yellow Burr-daisy					1			2					2	2	2				2	2	2					
<i>Carex breviculmis</i>					2																						
<i>Carex inversa</i>			1	1											1	1			1	2	1		2	2		1	

Species	Species	Notes	Wood_05a																							
			26_2011	26_2012	26_2013	26_2014	26_2015	27_2011	27_2012	27_2013	27_2014	27_2015	28_2011	28_2012	28_2013	28_2014	28_2015	29_2011	29_2012	29_2013	29_2014	29_2015	48_2013	48_2014	48_2015	
<i>Carthamus lanatus</i>	Saffron Thistle	Exotic	2	2	2	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
<i>Centaurea melitensis</i>	Maltese Cockspur	Exotic	2	1	1	2	3				2	3			2	3	3	2	2	2	3	4	2		3	
<i>Centaurea solstitialis</i>	St Barnaby's Thistle	Exotic																								
<i>Centaurea sp.</i>		Exotic																								
<i>Centaurium erythraea</i>	Common Centaury	Exotic																								
<i>Centaurium sp.</i>		Exotic																								
<i>Chamaesyce sp.</i>									1										1							
<i>Cheilanthes distans</i>	Bristly Cloak Fern																									
<i>Cheilanthes sieberi</i>																								1		
<i>Chenopodium desertorum</i>																										
<i>Chenopodium pumilio</i>	Small Crumbweed																									
<i>Chloris gayana</i>	Rhodes Grass	Exotic														1			1					1		
<i>Chloris pectinata</i>	Comb Chloris																									
<i>Chloris truncata</i>	Windmill Grass		1	2								1							2							
<i>Chloris ventricosa</i>	Plump Windmill Grass		2	2							1								2	2	2	2			1	
<i>Chondrilla juncea</i>	Skeleton Weed	Exotic	1	2	1	1			1	2	1															
<i>Chrysocephalum apiculatum</i>	Yellow Buttons																									
<i>Cichorium intybus</i>	Chichory	Exotic											1													
<i>Cirsium vulgare</i>	Spear Thistle	Exotic																								
<i>Convolvulus graminetinus</i>			2	1	2	2	1	1	1	1				1	1				1	1		1		1		
<i>Conyza bonariensis</i>	Flaxleaf Fleabane	Exotic	2	2		1														1						
<i>Conyza parva</i>		Exotic																								
<i>Conyza sp.</i>		Exotic																								
<i>Cotula australis</i>	Common Cotula																									
<i>Cyclosporum leptophyllum</i>	Slender Celery	Exotic	2											2										1		
<i>Cymbopogon refractus</i>	Barbed Wire Grass															1										
<i>Cynodon dactylon</i>	Couch																									
<i>Cyperus concinnus</i>																										
<i>Cyperus fulvus</i>	Sticky Sedge		1							1				1	1					1						
<i>Cyperus gracilis</i>	Slender Flat-sedge																									
<i>Cyperus rotundus</i>	Nutgrass	Exotic																								
<i>Datura ferox</i>		Exotic																								
<i>Daucus glochidiatus</i>	Native Carrot															1										
<i>Desmodium brachypodum</i>	Large Tick-trefoil																									
<i>Desmodium varians</i>	Slender Tick-trefoil																									
<i>Dianella revoluta</i>	Blueberry Lily																									
<i>Dianella sp.</i>																										
<i>Dichanthium sericeum</i>	Queensland Bluegrass		3		2					3				3	2					2						
<i>Dichelachne micrantha</i>	Shorthair Plumegrass																									
<i>Dichondra repens</i>	Kidney Weed																									
<i>Dichondra sp. A</i>																		2	2	2				1		
<i>Dichopogon fimbriatus</i>	Nodding Chocolate Lily																									
<i>Digitaria brownii</i>	Cotton Panic Grass									1																
<i>Digitaria divaricatissima</i>	Umbrella Grass													2		2				2			1		1	
<i>Digitaria sanguinalis</i>	Crab Grass	Exotic																								
<i>Digitaria sp.</i>																										
<i>Echinochloa crus-galli</i>	Barnyard Grass	Exotic																								
<i>Echinochloa sp.</i>																										
<i>Echium plantagineum</i>	Patterson's Curse	Exotic	1		1	2	2	1	1	2			1		1	2	2	2	1							
<i>Eclipta platyglossa</i>																										
<i>Einadia hastata</i>	Berry Saltbush																						1			
<i>Einadia nutans</i>	Climbing Saltbush																						1		1	
<i>Einadia polygonoides</i>			2				1	2	1	1			1		1	1	1			1	1		1			
<i>Einadia trigonos</i>	Fishweed																									
<i>Elymus scaber</i>																	1									

Species	Species	Notes	Wood_05a																							
			26_2011	26_2012	26_2013	26_2014	26_2015	27_2011	27_2012	27_2013	27_2014	27_2015	28_2011	28_2012	28_2013	28_2014	28_2015	29_2011	29_2012	29_2013	29_2014	29_2015	48_2013	48_2014	48_2015	
<i>Enchylaena tomentosa</i>	Ruby Saltbush																									
<i>Enneapogon nigricans</i>												2					1									
<i>Enneapogon</i> sp.			1						2			1				1								2		
<i>Enteropogon acicularis</i>				1	2											2		1	1		2					
<i>Enteropogon</i> sp.																										
<i>Eragrostis alveiformis</i>																										
<i>Eragrostis brownii</i>	Brown's Lovegrass																									
<i>Eragrostis elongata</i>	Clustered Lovegrass																									
<i>Eragrostis lacunaria</i>	Bristly Love-grass																									
<i>Eragrostis leptostachya</i>	Paddock Lovegrass		2																							
<i>Eragrostis parviflora</i>	Weeping Lovegrass																									
<i>Eragrostis setifolia</i>	Bristly Love-grass																									
<i>Eragrostis</i> sp.																										
<i>Eremophila debilis</i>	Winter Apple		1	1					1	1	1	1	1		1				1							
<i>Eriochloa pseudoacrotricha</i>	Early Spring Grass								1						1					1						
<i>Eriochloa</i> sp.																					1					
<i>Erodium crinitum</i>	Blue Storksbill																									
<i>Euchiton</i> sp.																										
<i>Euchiton sphaericus</i>																										
<i>Eulalia aurea</i>	Silky Browntop																									
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>																										
<i>Fimbristylis dichotoma</i>	Common Fringe-sedge																									
<i>Galenia pubescens</i>	Galenia	Exotic																								
<i>Geijera parviflora</i>																										
<i>Geranium solanderi</i>	Native Geranium																									
<i>Glossogyne tannensis</i>																										
<i>Glycine clandestina</i>			2			1								2		1	1	1			1	1		1		
<i>Glycine tabacina</i>				1						1								1			1	1	2			1
<i>Gomphocarpus fruticosus</i>	Narrow-leaved Cotton Bush	Exotic																								
<i>Gomphocarpus</i> sp.		Exotic																								
<i>Gomphrena celosioides</i>	Gomphrena Weed	Exotic																								
<i>Gonocarpus elatus</i>																										
<i>Goodenia cycloptera</i>																										
<i>Goodenia fascicularis</i>																										
<i>Goodenia glabra</i>																										
<i>Goodenia pinnatifida</i>																										
<i>Gypsophila tubulosa</i>	Annual Chalkwort																									
<i>Haloragis heterophylla</i>	Rough Raspwort		1		2									2												
<i>Hedypnois rhagadioloides</i> subsp. <i>cretica</i>	Cretan Weed	Exotic			2			3				2	2					2				2			2	2
<i>Helianthus</i> sp.	Sunflower	Exotic																								
<i>Hibiscus trionum</i>																										
<i>Hordeum</i> sp.	Barley Grass	Exotic																								
<i>Hyparrhenia hirta</i>	Coolatai Grass	Exotic																								
<i>Hypochaeris microcephala</i>	White Flatweed	Exotic																								
<i>Hypochaeris radicata</i>	Flatweed	Exotic																								
<i>Jasminum suavissimum</i>																										
<i>Juncus</i> sp.																										
<i>Juncus usitatus</i>	Pinrush																									
<i>Lachnagrostis filiformis</i>	Blown Grass			1																						
<i>Lactuca saligna</i>	Willow-leaved Lettuce	Exotic	1	1						1					1						1					
<i>Lactuca serriola</i>	Prickly Lettuce	Exotic	2	1											1					1						
<i>Lepidium africanum</i>		Exotic		1					2			1		1		1	2	2	1	1						
<i>Lepidium bonariense</i>		Exotic																								
<i>Leptochloa</i> sp.																										
<i>Leptorhynchus panaetioides</i>	Woolly Buttons					2											1	1			2	2	2	2		

Species	Species	Notes	Wood_05a																								
			26_2011	26_2012	26_2013	26_2014	26_2015	27_2011	27_2012	27_2013	27_2014	27_2015	28_2011	28_2012	28_2013	28_2014	28_2015	29_2011	29_2012	29_2013	29_2014	29_2015	48_2013	48_2014	48_2015		
<i>Linaria pelisseriana</i>	Pelisser's Toadflax	Exotic																								1	
<i>Linaria</i> sp.																											
<i>Linum marginale</i>	Native Flax		1	1	1	1	2		2																	1	1
<i>Lolium rigidum</i>	Wimmera Ryegrass	Exotic		1					2												2						
<i>Lolium</i> sp.		Exotic	1				2				2	2						1							2		2
<i>Lomandra confertifolia</i>	Mat-rush																										
<i>Lomandra filiformis</i>	Wattle Mat-rush																										
<i>Lomandra longifolia</i>	Spiny-headed Mat-rush																										
<i>Lomandra multiflora</i>																											
<i>Lycium ferocissimum</i>	African Boxthorn	Exotic																									
<i>Lythrum hyssopifolia</i>	Hyssop Loosestrife																										
<i>Maireana decalvans</i>	Black Cotton Bush																										
<i>Maireana enchylaenoides</i>	Wingless Bluebush																										
<i>Maireana microphylla</i>	Small-leaf Bluebush		1	1	2	1	1														2	2	3	1	2	1	
<i>Malva</i> sp.		Exotic																									
<i>Malvastrum americanum</i>	Spiked Malvastrum	Exotic							1																		
<i>Malvastrum coromandelianum</i>	Prickly Malvastrum																										
<i>Marrubium vulgare</i>	White Horehound	Exotic																									
<i>Medicago minima</i>	Woolly Burr Medic	Exotic			2	3	4	2			3	3	2				3	2						3	1	3	3
<i>Medicago polymorpha</i>	Burr Medic	Exotic	2	2	2	3	2		2	2	2	2	1			3	2	2		2	3	2	2	3	2	2	
<i>Medicago sativa</i>	Lucerne	Exotic			1																						
<i>Medicago</i> sp.		Exotic																									
<i>Medicago truncatula</i>	Barrel Medic	Exotic																									
<i>Melilotus indicus</i>	Hexham Scent	Exotic																									
<i>Melilotus</i> sp.		Exotic																									
<i>Mentha satureioides</i>	Creeping Mint																										
<i>Microlaena stipoides</i>	Weeping Grass																										
<i>Misopates orontium</i>	Lesser Snapdragon	Exotic		1																							
<i>Murdannia graminea</i>	Grass Lily																										
<i>Nicotiana</i> sp.																											
<i>Nyssanthus diffusa</i>	Barbwire Weed																										
<i>Opuntia stricta</i>	Common Prickly Pear	Exotic								1	1	1															
<i>Oxalis exilis</i>																											
<i>Oxalis perennans</i>																											
<i>Oxalis</i> sp.			1																								
<i>Panicum buncei</i>																											
<i>Panicum effusum</i>	Hairy Panic		2						2																		
<i>Panicum maximum</i>		Exotic																									
<i>Papaver</i> sp.																											
<i>Panicum queenslandicum</i>	Yadbila Grass																										
<i>Panicum</i> sp.																											
<i>Parsonsia eucalyptophylla</i>	Gargaloo																										
<i>Paspalidium jubiflorum</i>	Warrego Grass																										
<i>Paspalidium</i> sp.																											
<i>Paspalum dilatatum</i>	Paspalum	Exotic																									
<i>Paspalum</i> sp.		Exotic																									
<i>Petrorhagia nanteuilii</i>		Exotic	2	2	2	2	3	2	2	2	2	3	2	2		3	3	2	2					3	2	2	3
<i>Phalaris</i> sp.	Canary Grass	Exotic																									
<i>Phyllanthus virgatus</i>	Petty Spurge																										
<i>Pimelea microcephala</i>	Shrubby Rice-flower		1																								
<i>Pimelea neo-anglica</i>	Shrubby Rice-flower																										
<i>Pimelea</i> sp.							1																				
<i>Plantago debilis</i>					1				1												1	2	1				
<i>Plantago lanceolata</i>	Lamb's Tongues	Exotic																									
<i>Poa sieberiana</i>	Snow Grass																										

Species	Species	Notes	Wood_05a																								
			26_2011	26_2012	26_2013	26_2014	26_2015	27_2011	27_2012	27_2013	27_2014	27_2015	28_2011	28_2012	28_2013	28_2014	28_2015	29_2011	29_2012	29_2013	29_2014	29_2015	48_2013	48_2014	48_2015		
<i>Polycarpon tetraphyllum</i>	Four-leaved Allseed	Exotic																									
<i>Polygonum aviculare</i>	Wireweed	Exotic																									
<i>Portulaca oleracea</i>	Pigweed										1																
<i>Rapistrum rugosum</i>	Turnip Weed	Exotic									1	3	2					2		1	1						
<i>Rhodanthe anthemoides</i>																											
<i>Rostellularia adscendens</i>																											
<i>Rumex brownii</i>	Swamp Dock			1						1		1	1							1						1	
<i>Rumex crispus</i>	Curled Dock	Exotic																									
<i>Rumex sp.</i>																											
<i>Salsola australis</i>						1						1					1									1	
<i>Schenkia spicata</i>	Spike Centaury																										
<i>Schkuhria pinnata</i>		Exotic						1																			
<i>Sclerolaena birchii</i>	Galvanised Burr					1	2	1	1				2	1		1	2	2	1	1	2	1	2			2	
<i>Sclerolaena diacantha</i>	Grey Copperburr																										
<i>Sclerolaena muricata</i>	Black Rolypoly																		1								
<i>Sclerolaena muricata var. muricata</i>	Black Rolypoly												2					1			1					1	
<i>Sclerolaena muricata var. villosa</i>	Black Rolypoly			1					1		1			1	1					1							
<i>Senecio quadridentatus</i>	Cotton Fireweed		3	3	2				2				3	3		2			1	2	1						
<i>Setaria incrassata</i>	Purple Pigeon Grass	Exotic																									
<i>Setaria sp.</i>		Exotic																									
<i>Sida corrugata</i>	Corrugated Sida											1									1	2					
<i>Sida cunninghamii</i>	Ridged Sida																										
<i>Sida rhombifolia</i>	Paddy's Lucerne	Exotic																									
<i>Sida sp.</i>																											
<i>Sida spinosa</i>		Exotic	2		2	2	2	2	2	2	2	2	2	2	2	2	2				1	1		2		2	
<i>Sida subspicata</i>																											
<i>Silybum marianum</i>		Exotic																									
<i>Sisymbrium irio</i>	London Rocket	Exotic																									
<i>Sisymbrium officinale</i>	Hedge Mustard	Exotic				2						2		2													
<i>Sisymbrium orientale</i>	Indian Hedge Mustard	Exotic	1	2	1	2	3						2	2		2	2	2		1	2	1	2		2	2	
<i>Sisymbrium sp.</i>		Exotic																		2							
<i>Solanum esuriale</i>	Quena				1				1				1	1						1		2			1		
<i>Solanum nigrum</i>	Black-berry Nightshade	Exotic																									
<i>Solanum parvifolium</i>																											
<i>Solanum sp.</i>																											
<i>Sonchus asper</i> subsp. <i>glaucescens</i>		Exotic																									
<i>Sonchus oleraceus</i>	Common Sowthistle	Exotic	2				1	2				1	1	2													
<i>Sorghum halepense</i>	Johnson Grass	Exotic																									
<i>Spergularia sp.</i>		Exotic																									
<i>Sporobolus caroli</i>													1														
<i>Sporobolus creber</i>	Slender Rat's Tail Grass													1													
<i>Stachys arvensis</i>	Stagger Weed	Exotic					2																				
<i>Stackhousia viminea</i>	Slender Stackhousia																										
<i>Swainsona galegifolia</i>	Smooth Darling-pea																										
<i>Themeda australis</i>	Kangaroo Grass			2																					3	1	2
<i>Tragopogon porrifolius</i>	Oyster Plant	Exotic																									
<i>Tragus australianus</i>	Small Burgrass																										
<i>Trianthema sp.</i>																											
<i>Trifolium angustifolium</i>	Narrow-leaved Clover	Exotic	2	2	1		1	2					1	2	2												
<i>Trifolium arvense</i>	Haresfoot Clover	Exotic	2	2		3		2	2	2			2	2	2							3		2	2	2	
<i>Trifolium campestre</i>	Hop Clover	Exotic	2	2		2	2	2						2									2		1	2	1
<i>Trifolium dubium</i>	Yellow Suckling Clover	Exotic																									
<i>Trifolium glomeratum</i>	Clustered Clover	Exotic				1																					
<i>Trifolium repens</i>	White Clover	Exotic																									
<i>Triptilodiscus pygmaeus</i>																											

Species	Species	Notes	Wood_05a																							
			26_2011	26_2012	26_2013	26_2014	26_2015	27_2011	27_2012	27_2013	27_2014	27_2015	28_2011	28_2012	28_2013	28_2014	28_2015	29_2011	29_2012	29_2013	29_2014	29_2015	48_2013	48_2014	48_2015	
<i>Urochloa panicoides</i>	Urochloa Grass	Exotic																								
<i>Verbascum thapsus</i>	Great Mullein	Exotic																								
<i>Verbascum virgatum</i>	Twiggy Mullein	Exotic							1																	
<i>Verbena bonariensis</i>	Purpletop	Exotic																								
<i>Verbena gaudichaudii</i>			2	1					1					1	1					2	1	1			1	1
<i>Verbesina encelioides</i>		Exotic																								
<i>Vicia</i> sp.		Exotic																								
<i>Vittadinia cuneata</i>	Fuzzweed			1	2			2				2	2								1	1	1	1		
<i>Vittadinia dissecta</i>	Dissected New Holland Daisy													1												
<i>Vittadinia muelleri</i>																										
<i>Vittadinia</i> sp.									2												1					
<i>Vulpia</i> sp.								2														2				
<i>Wahlenbergia communis</i>	Tufted Bluebell		2	1						2	1	1		2	1	1					2				1	1
<i>Wahlenbergia gracilis</i>	Sprawling Bluebell																									
<i>Wahlenbergia luteola</i>																										
<i>Walwhalleya proluta</i>																										
<i>Xanthium occidentale</i>	Noogoora Burr	Exotic																								
<i>Xanthium spinosum</i>	Bathurst Burr	Exotic																								
<i>Xerochrysum bracteatum</i>	Golden Everlasting											1	1	1							1				1	
<i>Xerochrysum viscosum</i>	Sticky Everlasting																				1					
<i>Zornia dyctiocarpa</i>	Zornia																									
Total number of species			40	41	29	27	27	33	28	18	28	32	38	27	27	29	31	46	37	31	26	25	28	21	28	

Table 21: Groundcover species cover scores in 20 x 50 m Woodland Plots located in Wood_04 for 2011 - 2015 monitoring periods

Species	Species	Notes	Wood_04																								
			31_2011	31_2012	31_2013	31_2014	31_2015	32_2011	32_2012	32_2013	32_2014	32_2015	33_2011	33_2012	33_2013	33_2014	33_2015	34_2011	34_2012	34_2013	34_2014	34_2015	35_2011	35_2012	35_2013	35_2014	35_2015
<i>Abutilon oxycarpum</i>	Straggly Lantern-bush																										
<i>Abutilon</i> sp.			1		1																						
<i>Acacia deanei</i> (seedling)	Green Wattle																										
<i>Acacia decora</i> (seedling)	Western Silver Wattle																										
<i>Acacia salicina</i> (seedling)	Cooba																										
<i>Aira</i> sp.		Exotic																									
<i>Alternanthera denticulata</i>	Lesser Joyweed																										
<i>Alternanthera</i> sp. A																											
<i>Ammi majus</i>	Bishop's-weed	Exotic						1									2	1		1							
<i>Anagallis arvensis</i>	Scarlet Pimpernel	Exotic	2	2	2	2	2		2	2			2	2		2	2		2	2	2		2			2	
<i>Arenaria leptoclados</i>		Exotic																									
<i>Aristida leptopoda</i>	White Speargrass								1		1										1						
<i>Aristida personata</i>	Purple Wire-grass		3	3	3	2	2	3	3	3	2	3	3	3	3	3	2	3	2	3		2	3	3	3	3	3
<i>Aristida</i> sp.											1																
<i>Aristida vagans</i>	Threeawn Speargrass																										
<i>Arthropodium</i> sp.			1				1										1			1							
<i>Asperula cunninghamii</i>	Twining Woodruff																										
<i>Asphodelus fistulosus</i>	Onion Weed	Exotic																									
<i>Aster subulatus</i>	Wild Aster	Exotic																									
<i>Atriplex muelleri</i>																											
<i>Atriplex semibaccata</i>	Creeping Saltbush																										
<i>Austrodanthonia bipartita</i>	Wallaby Grass																										
<i>Austrodanthonia racemosa</i>							3															1					
<i>Austrodanthonia racemosa</i> var. <i>obtusata</i>																											
<i>Austrodanthonia</i> sp.			1							2	2							1	1		2						
<i>Austrostipa aristiglumis</i>	Plains Grass																										
<i>Austrostipa ramosissima</i>	Stout Bamboo Grass																				1						
<i>Austrostipa scabra</i>	Speargrass		3	2	3	3	2	3	2	3		2		2	3	2	3	3	3	3	3		3	3			
<i>Austrostipa</i> sp.				2	2														2	2							
<i>Austrostipa verticillata</i>	Slender Bamboo Grass		2																								
<i>Avena fatua</i>	Wild Oats	Exotic																									
<i>Avena</i> sp.		Exotic	2			2	1																				
<i>Bidens pilosa</i>	Cobblers Pegs	Exotic																									
<i>Bidens subalternans</i>	Greater Beggar's Ticks	Exotic	2	2		2	2		1								1	1	2			2			2	1	
<i>Boerhavia dominii</i>	Tarvine													1													
<i>Boerhavia</i> sp.				1					2						1		1								1		1
<i>Bothriochloa bladhii</i>	Forest Blue Grass																										
<i>Bothriochloa decipiens</i>	Red Grass		4	4		3		3	4		3		3	3		3		2	3		3		3	3		3	
<i>Bothriochloa macra</i>	Red Grass																										
<i>Bothriochloa</i> sp.					3		3			3		3			3		3				3				3		2
<i>Brachychiton populneus</i>	Kurrajong																										
<i>Brachyscome ciliaris</i>	Variable Daisy																										
<i>Bromus catharticus</i>	Prairie Grass	Exotic																									
<i>Bromus molliformis</i>	Soft Brome	Exotic				1																	1			2	2
<i>Bromus</i> sp.		Exotic																									
<i>Brunoniella australis</i>	Blue Trumpet																										
<i>Bryophyllum delagoense</i>	Mother-of-millions	Exotic																									
<i>Bulbine bulbosa</i>	Native Leek																										
<i>Calandrinia</i> sp.																											
<i>Callitris glaucophylla</i>																											
<i>Calotis lappulacea</i>	Yellow Burr-daisy				2								1	2				1	1								
<i>Carex breviculmis</i>																											
<i>Carex inversa</i>			1	2			1		1				2			1			2	2	1	2	2				1

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			31_2011	31_2012	31_2013	31_2014	31_2015	32_2011	32_2012	32_2013	32_2014	32_2015	33_2011	33_2012	33_2013	33_2014	33_2015	34_2011	34_2012	34_2013	34_2014	34_2015	35_2011	35_2012	35_2013	35_2014	35_2015
<i>Carthamus lanatus</i>	Saffron Thistle	Exotic			2	2	2	2	2	2	2	2	1			2	2		2		2	1		1	2	2	3
<i>Centaurea melitensis</i>	Maltese Cockspur	Exotic	2		2	3	3	2	2	2	3	3	2	2	2	3	2		2		2	3	2	2	2	2	3
<i>Centaurea solstitialis</i>	St Barnaby's Thistle	Exotic																									
<i>Centaurea sp.</i>		Exotic																									
<i>Centaureum erythraea</i>	Common Centaury	Exotic																							1		
<i>Centaureum sp.</i>		Exotic											2														
<i>Chamaesyce sp.</i>																	1										
<i>Cheilanthes distans</i>	Bristly Cloak Fern																										
<i>Cheilanthes sieberi</i>			1																								
<i>Chenopodium desertorum</i>																											
<i>Chenopodium pumilio</i>	Small Crumbweed																										
<i>Chloris gayana</i>	Rhodes Grass	Exotic						2	3	3	2	1		2					1	2			2	2	1	2	
<i>Chloris pectinata</i>	Comb Chloris																										
<i>Chloris truncata</i>	Windmill Grass												1						2				2				
<i>Chloris ventricosa</i>	Plump Windmill Grass																		1				3	3	2	3	2
<i>Chondrilla juncea</i>	Skeleton Weed	Exotic	2	2	1															2							
<i>Chrysocephalum apiculatum</i>	Yellow Buttons													1													
<i>Cichorium intybus</i>		Exotic																									
<i>Cirsium vulgare</i>	Spear Thistle	Exotic																									
<i>Convolvulus graminetinus</i>			1	1		1	1						1	1				2	1			1	2	1	1		1
<i>Conyza bonariensis</i>	Flaxleaf Fleabane	Exotic	1	2																			1	2			
<i>Conyza parva</i>		Exotic							1																		
<i>Conyza sp.</i>		Exotic																									
<i>Cotula australis</i>	Common Cotula																										
<i>Cyclosporum leptophyllum</i>	Slender Celery	Exotic		2				1											2				2	2			
<i>Cymbopogon refractus</i>	Barbed Wire Grass				2	1					2	2						2				1			2		
<i>Cynodon dactylon</i>	Couch																										
<i>Cyperus concinnus</i>																											
<i>Cyperus fulvus</i>	Sticky Sedge																						1			1	
<i>Cyperus gracilis</i>	Slender Flat-sedge																									1	
<i>Cyperus rotundus</i>	Nutgrass	Exotic																									
<i>Datura ferox</i>		Exotic																									
<i>Daucus glochidiatus</i>	Native Carrot		1										1			2											
<i>Desmodium brachypodium</i>	Large Tick-trefoil																										
<i>Desmodium varians</i>	Slender Tick-trefoil		1																								
<i>Dianella revoluta</i>	Blueberry Lily																										
<i>Dianella sp.</i>																											
<i>Dichanthium sericeum</i>	Queensland Bluegrass							3					3					2	1					3			
<i>Dichelachne micrantha</i>	Shorthair Plumegrass		2																								
<i>Dichondra repens</i>	Kidney Weed																										
<i>Dichondra sp. A</i>			2										1														
<i>Dichopogon fimbriatus</i>	Nodding Chocolate Lily																										
<i>Digitaria brownii</i>	Cotton Panic Grass																										
<i>Digitaria divaricatissima</i>	Umbrella Grass																										
<i>Digitaria sanguinalis</i>	Crab Grass	Exotic																									
<i>Digitaria sp.</i>																											
<i>Echinochloa crus-galli</i>	Barnyard Grass	Exotic																									
<i>Echinochloa sp.</i>																											
<i>Echium plantagineum</i>	Patterson's Curse	Exotic				1	1																			1	2
<i>Eclipta platyglossa</i>																											
<i>Einadia hastata</i>	Berry Saltbush							1											1				1				
<i>Einadia nutans</i>	Climbing Saltbush																										
<i>Einadia polygonoides</i>			1					1																			
<i>Einadia trigonos</i>	Fishweed												1						1				1	1	1		1
<i>Elymus scaber</i>													1														

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			31_2011	31_2012	31_2013	31_2014	31_2015	32_2011	32_2012	32_2013	32_2014	32_2015	33_2011	33_2012	33_2013	33_2014	33_2015	34_2011	34_2012	34_2013	34_2014	34_2015	35_2011	35_2012	35_2013	35_2014	35_2015
<i>Enchylaena tomentosa</i>	Ruby Saltbush																										
<i>Enneapogon nigricans</i>						1	2							1			2										
<i>Enneapogon sp.</i>								1		1		1	2			2	1			1							
<i>Enteropogon acicularis</i>																		1		1		2		1	2		
<i>Enteropogon sp.</i>																											
<i>Eragrostis alveiformis</i>																											
<i>Eragrostis brownii</i>	Brown's Lovegrass																										
<i>Eragrostis elongata</i>	Clustered Lovegrass																										
<i>Eragrostis lacunaria</i>	Bristly Love-grass																										
<i>Eragrostis leptostachya</i>	Paddock Lovegrass								1																		
<i>Eragrostis parviflora</i>	Weeping Lovegrass																										
<i>Eragrostis setifolia</i>	Bristly Love-grass																										
<i>Eragrostis sp.</i>																											
<i>Eremophila debilis</i>	Winter Apple										1	1	1														
<i>Eriochloa pseudoacrotricha</i>	Early Spring Grass																								1		
<i>Eriochloa sp.</i>																											
<i>Erodium crinitum</i>	Blue Storksbill																										
<i>Euchiton sp.</i>													1														
<i>Euchiton sphaericus</i>																											
<i>Eulalia aurea</i>	Silky Browntop																			2						2	
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>																											
<i>Fimbristylis dichotoma</i>	Common Fringe-sedge																										
<i>Galenia pubescens</i>	Galenia	Exotic																									
<i>Geijera parviflora</i>						1																					
<i>Geranium solanderi</i>	Native Geranium																										
<i>Glossogyne tannensis</i>													1	1													
<i>Glycine clandestina</i>				1		1		2	1		1		2	1	1	1	1	1		1				2	1	1	
<i>Glycine tabacina</i>			2	1				2	1	2	1	1	2	1	1	1	1	1						1			
<i>Gomphocarpus fruticosus</i>	Narrow-leaved Cotton Bush	Exotic																									
<i>Gomphocarpus sp.</i>		Exotic																									
<i>Gomphrena celosioides</i>	Gomphrena Weed	Exotic																									
<i>Gonocarpus elatus</i>																											
<i>Goodenia cycloptera</i>																											
<i>Goodenia fascicularis</i>																											
<i>Goodenia glabra</i>																											
<i>Goodenia pinnatifida</i>																											
<i>Gypsophila tubulosa</i>	Annual Chalkwort																										
<i>Haloragis heterophylla</i>	Rough Raspwort		2					2					1					2	2					2			
<i>Hedypnois rhagadioloides</i> subsp. <i>cretica</i>	Cretan Weed	Exotic						2				2	2				2				2						
<i>Helianthus sp.</i>	Sunflower	Exotic										1													1		1
<i>Hibiscus trionum</i>																											
<i>Hordeum sp.</i>	Barley Grass	Exotic																									
<i>Hyparrhenia hirta</i>	Coolatai Grass	Exotic																									
<i>Hypochaeris microcephala</i>	White Flatweed	Exotic																								1	
<i>Hypochaeris radicata</i>	Flatweed	Exotic																									
<i>Jasminum suavisissimum</i>																											
<i>Juncus sp.</i>																											
<i>Juncus usitatus</i>	Pinrush																									1	
<i>Lachnagrostis filiformis</i>	Blown Grass																										
<i>Lactuca saligna</i>	Willow-leaved Lettuce	Exotic		1										1						1							
<i>Lactuca serriola</i>	Prickly Lettuce	Exotic	2	1									1	1				1						2	1		
<i>Lepidium africanum</i>		Exotic				1		1					2									1	2		1		1
<i>Lepidium bonariense</i>		Exotic																									
<i>Leptochloa sp.</i>																											
<i>Leptorhynchus panaetioides</i>	Woolly Buttons												1														

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			31_2011	31_2012	31_2013	31_2014	31_2015	32_2011	32_2012	32_2013	32_2014	32_2015	33_2011	33_2012	33_2013	33_2014	33_2015	34_2011	34_2012	34_2013	34_2014	34_2015	35_2011	35_2012	35_2013	35_2014	35_2015
<i>Linaria pelisseriana</i>	Pelisser's Toadflax	Exotic																									
<i>Linaria</i> sp.																											
<i>Linum marginale</i>	Native Flax		1	1		2	2																				
<i>Lolium rigidum</i>	Wimmera Ryegrass	Exotic										2															
<i>Lolium</i> sp.		Exotic														1											1
<i>Lomandra confertifolia</i>	Mat-rush																										
<i>Lomandra filiformis</i>	Wattle Mat-rush																										
<i>Lomandra longifolia</i>	Spiny-headed Mat-rush																										
<i>Lomandra multiflora</i>																											
<i>Lycium ferocissimum</i>	African Boxthorn	Exotic																									
<i>Lythrum hyssopifolia</i>	Hyssop Loosestrife																										
<i>Maireana decalvans</i>	Black Cotton Bush																										
<i>Maireana enchylaenoides</i>	Wingless Bluebush																										
<i>Maireana microphylla</i>	Small-leaf Bluebush								1	1			1	1		1	1										
<i>Malva</i> sp.		Exotic																			2						
<i>Malvastrum americanum</i>	Spiked Malvastrum	Exotic					1									1							1				
<i>Malvastrum coromandelianum</i>	Prickly Malvastrum																										
<i>Marrubium vulgare</i>	White Horehound	Exotic																	1								
<i>Medicago minima</i>	Woolly Burr Medic	Exotic						1				3	2			2	3		1	2		3				3	
<i>Medicago polymorpha</i>	Burr Medic	Exotic				2		2	2	2	3	2		1	2	2	2				2	3			2	2	3
<i>Medicago sativa</i>	Lucerne	Exotic						1	2		1		1	1	1												
<i>Medicago</i> sp.		Exotic																									
<i>Medicago truncatula</i>	Barrel Medic	Exotic						1																			
<i>Melilotus indicus</i>	Hexham Scent	Exotic						1	2		2	1						1	1								
<i>Melilotus</i> sp.		Exotic																									
<i>Mentha satureioides</i>	Creeping Mint																										
<i>Microlaena stipoides</i>	Weeping Grass																										
<i>Misopates orontium</i>	Lesser Snapdragon	Exotic	2		1		2	2			1	2	2			2	2	1			2		2			2	2
<i>Murdannia graminea</i>	Grass Lily																										
<i>Nicotiana</i> sp.																											
<i>Nyssanthes diffusa</i>	Barbwire Weed																										
<i>Opuntia stricta</i>	Common Prickly Pear	Exotic																				1					
<i>Oxalis exilis</i>																											
<i>Oxalis perennans</i>																											
<i>Oxalis</i> sp.			1										1					2					1				
<i>Panicum buncei</i>																											
<i>Panicum effusum</i>	Hairy Panic																										
<i>Panicum maximum</i>		Exotic																									
<i>Papaver</i> sp.																											
<i>Panicum queenslandicum</i>	Yadbila Grass																		2								
<i>Panicum</i> sp.																											
<i>Parsonsia eucalyptophylla</i>	Gargaloo																										
<i>Paspalidium jubiflorum</i>	Warrego Grass																										
<i>Paspalidium</i> sp.			2									2					1	2	2	3	2	3	2				
<i>Paspalum dilatatum</i>	Paspalum	Exotic																									
<i>Paspalum</i> sp.		Exotic																									
<i>Petrorhagia nanteuillii</i>		Exotic	2	2	2	2	2	2		2	2	3			2	2	3	2	2		3	2		2	2	2	3
<i>Phalaris</i> sp.	Canary Grass	Exotic		1																							
<i>Phyllanthus virgatus</i>	Petty Spurge		1																								
<i>Pimelea microcephala</i>	Shrubby Rice-flower		1																								
<i>Pimelea neo-anglica</i>	Shrubby Rice-flower																										
<i>Pimelea</i> sp.							1																				
<i>Plantago debilis</i>			1												1												
<i>Plantago lanceolata</i>	Lamb's Tongues	Exotic																									
<i>Poa sieberiana</i>	Snow Grass		3	2	2	2												1	2								

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			31_2011	31_2012	31_2013	31_2014	31_2015	32_2011	32_2012	32_2013	32_2014	32_2015	33_2011	33_2012	33_2013	33_2014	33_2015	34_2011	34_2012	34_2013	34_2014	34_2015	35_2011	35_2012	35_2013	35_2014	35_2015
<i>Polycarpon tetraphyllum</i>	Four-leaved Allseed	Exotic											1				2		1								
<i>Polygonum aviculare</i>	Wireweed	Exotic																	1						1		
<i>Portulaca oleracea</i>	Pigweed																										
<i>Rapistrum rugosum</i>	Turnip Weed	Exotic			1	2	2			1		2			1		1		2	2	2	2			1	2	2
<i>Rhodanthe anthemoides</i>								1																			
<i>Rostellularia adscendens</i>																											
<i>Rumex brownii</i>	Swamp Dock			1														1	1	1					1		
<i>Rumex crispus</i>	Curl'd Dock	Exotic																									
<i>Rumex sp.</i>																											
<i>Salsola australis</i>																					1						
<i>Schenkia spicata</i>	Spike Centaury																										
<i>Schkuhria pinnata</i>		Exotic										1															
<i>Sclerolaena birchii</i>	Galvanised Burr																						1	1	1	1	1
<i>Sclerolaena diacantha</i>	Grey Copperburr																										
<i>Sclerolaena muricata</i>	Black Rolypoly																										
<i>Sclerolaena muricata var. muricata</i>	Black Rolypoly																										2
<i>Sclerolaena muricata var. villosa</i>	Black Rolypoly																										
<i>Senecio quadridentatus</i>	Cotton Fireweed		2	3	2	1			2				2	3	1	1	1		2	2		1	3	3	2	1	1
<i>Setaria incrassata</i>	Purple Pigeon Grass	Exotic																									
<i>Setaria sp.</i>		Exotic																									
<i>Sida corrugata</i>	Corrugated Sida		1	2	2	1	1		1	1	1	1			2			1							1	1	
<i>Sida cunninghamii</i>	Ridged Sida			1																							
<i>Sida rhombifolia</i>	Paddy's Lucerne	Exotic																									
<i>Sida sp.</i>																											
<i>Sida spinosa</i>		Exotic	2	1	2	2	2	2	1			2						2		2	2	2	2		2	2	2
<i>Sida subspicata</i>																											1
<i>Silybum marianum</i>		Exotic																									
<i>Sisymbrium irio</i>	London Rocket	Exotic																									1
<i>Sisymbrium officinale</i>	Hedge Mustard	Exotic		2							2			1		2		2						2	2		2
<i>Sisymbrium orientale</i>	Indian Hedge Mustard	Exotic				2	2		2		2	2	2			1	1	3			2	2	2	1	2	2	2
<i>Sisymbrium sp.</i>		Exotic	1						1																		
<i>Solanum esuriiale</i>	Quena								1		1												1	1	2		
<i>Solanum nigrum</i>	Black-berry Nightshade	Exotic	1																								
<i>Solanum parvifolium</i>																											
<i>Solanum sp.</i>																											
<i>Sonchus asper</i> subsp. <i>glaucescens</i>		Exotic																									
<i>Sonchus oleraceus</i>	Common Sowthistle	Exotic				1			2	1		2		2			1			1	1	2	1				
<i>Sorghum halepense</i>	Johnson Grass	Exotic																									
<i>Spergularia sp.</i>		Exotic																									
<i>Sporobolus caroli</i>																											
<i>Sporobolus creber</i>	Slender Rat's Tail Grass																										
<i>Stachys arvensis</i>	Stagger Weed	Exotic	1			2	1					2														2	2
<i>Stackhousia viminea</i>	Slender Stackhousia																	1									
<i>Swainsona galegifolia</i>	Smooth Darling-pea		1	1	2	1							2	2	2	1	1										
<i>Themeda australis</i>	Kangaroo Grass													3	3	2	2	3								1	
<i>Tragopogon porrifolius</i>	Oyster Plant	Exotic																									
<i>Tragus australianus</i>	Small Burgrass																										
<i>Trianthema sp.</i>																											
<i>Trifolium angustifolium</i>	Narrow-leaved Clover	Exotic																								1	1
<i>Trifolium arvense</i>	Haresfoot Clover	Exotic			2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3
<i>Trifolium campestre</i>	Hop Clover	Exotic	2	2	2	2	1	2			2		2		2		2		2		1		1	1		2	
<i>Trifolium dubium</i>	Yellow Suckling Clover	Exotic																		2							
<i>Trifolium glomeratum</i>	Clustered Clover	Exotic				2															1					1	2
<i>Trifolium repens</i>	White Clover	Exotic																									
<i>Triptilodiscus pygmaeus</i>																											

Species	Species	Notes	Wood_04																								
			31_2011	31_2012	31_2013	31_2014	31_2015	32_2011	32_2012	32_2013	32_2014	32_2015	33_2011	33_2012	33_2013	33_2014	33_2015	34_2011	34_2012	34_2013	34_2014	34_2015	35_2011	35_2012	35_2013	35_2014	35_2015
<i>Urochloa panicoides</i>	Urochloa Grass	Exotic																									
<i>Verbascum thapsus</i>	Great Mullein	Exotic	1																								
<i>Verbascum virgatum</i>	Twiggy Mullein	Exotic		1																							
<i>Verbena bonariensis</i>	Purpletop	Exotic																									
<i>Verbena gaudichaudii</i>			2	1			1	2															2	1	2		
<i>Verbesina encelioides</i>		Exotic																						2			
<i>Vicia sp.</i>		Exotic																									
<i>Vittadinia cuneata</i>	Fuzzweed										1			1		1				1	1	1					
<i>Vittadinia dissecta</i>	Dissected New Holland Daisy																										
<i>Vittadinia muelleri</i>			2										1														
<i>Vittadinia sp.</i>								1					2					2					2				
<i>Vulpia sp.</i>																											
<i>Wahlenbergia communis</i>	Tufted Bluebell		2	2	1		1	2		1		1	2	2	1		1	2		1					1		
<i>Wahlenbergia gracilis</i>	Sprawling Bluebell																										
<i>Wahlenbergia luteola</i>																		1									
<i>Walwhalleya prolata</i>																											
<i>Xanthium occidentale</i>	Noogoora Burr	Exotic																									
<i>Xanthium spinosum</i>	Bathurst Burr	Exotic																									
<i>Xerochrysum bracteatum</i>	Golden Everlasting					1	1																1	1			
<i>Xerochrysum viscosum</i>	Sticky Everlasting		2																								
<i>Zornia dyctiocarpa</i>	Zornia																										
Total number of species			46	31	23	31	34	30	24	20	27	25	39	29	20	24	35	43	31	20	29	26	37	39	31	26	30

Table 22: Groundcover species cover scores in 20 x 50 m Woodland Plots located in Wood Control 2 for 2011 - 2015 monitoring periods

Species	Species	Notes	Wood Control 2																									
			36_2011	36_2012	36_2013	36_2014	36_2015	37_2011	37_2012	37_2013	37_2014	37_2015	38_2011	38_2012	38_2013	38_2014	38_2015	39_2011	39_2012	39_2013	39_2014	39_2015	40_2011	40_2012	40_2013	40_2014	40_2015	
<i>Abutilon oxycarpum</i>	Straggly Lantern-bush																											
<i>Abutilon</i> sp.									1						1	1	1					1						
<i>Acacia deanei</i> (seedling)	Green Wattle														1	1	1											
<i>Acacia decora</i> (seedling)	Western Silver Wattle															1												
<i>Acacia salicina</i> (seedling)	Cooba																											
<i>Aira</i> sp.		Exotic																										
<i>Alternanthera denticulata</i>	Lesser Joyweed								1																			
<i>Alternanthera</i> sp. A																												
<i>Ammi majus</i>	Bishop's-weed	Exotic												1	1													
<i>Anagallis arvensis</i>	Scarlet Pimpernel	Exotic		2		1	2						2	2	2		2	2			2						2	
<i>Arenaria leptoclados</i>		Exotic										1	2															
<i>Aristida leptopoda</i>	White Speargrass																											
<i>Aristida personata</i>	Purple Wire-grass		2	2	3	2	2	3	3	3	3	3		3	3	2	2	3	3	3	3	3	3	4	3	3	3	4
<i>Aristida</i> sp.																												
<i>Aristida vagans</i>	Threeawn Speargrass		1											1														
<i>Arthropodium</i> sp.										1			1								1					1	1	
<i>Asperula cunninghamii</i>	Twining Woodruff						1							2	1													
<i>Asphodelus fistulosus</i>	Onion Weed	Exotic																										
<i>Aster subulatus</i>	Wild Aster	Exotic																										
<i>Atriplex muelleri</i>																												
<i>Atriplex semibaccata</i>	Creeping Saltbush																											
<i>Austrodanthonia bipartita</i>	Wallaby Grass																											
<i>Austrodanthonia racemosa</i>																			1									
<i>Austrodanthonia racemosa</i> var. <i>obtusata</i>			2									1																
<i>Austrodanthonia</i> sp.					1			1						1					1			2						
<i>Austrostipa aristiglumis</i>	Plains Grass																											
<i>Austrostipa ramosissima</i>	Stout Bamboo Grass																											
<i>Austrostipa scabra</i>	Speargrass		3	3	2	2	3	3	3	2	2		3	3	2	3	3	3	3	2	2	3	3	3	3	3	3	
<i>Austrostipa</i> sp.									1																			
<i>Austrostipa verticillata</i>	Slender Bamboo Grass							4																				
<i>Avena fatua</i>	Wild Oats	Exotic																										
<i>Avena</i> sp.		Exotic																										
<i>Bidens pilosa</i>	Cobblers Pegs	Exotic																										
<i>Bidens subalternans</i>	Greater Beggar's Ticks	Exotic	1						1					2														
<i>Boerhavia dominii</i>	Tarvine																									1		
<i>Boerhavia</i> sp.			1						1					1	2				1					1	1	1		
<i>Bothriochloa bladhii</i>	Forest Blue Grass																											
<i>Bothriochloa decipiens</i>	Red Grass		1	3		3						2		2	3					4		3		1	3			
<i>Bothriochloa macra</i>	Red Grass																											
<i>Bothriochloa</i> sp.					3					1						3		2			3		2		3		2	
<i>Brachychiton populneus</i>	Kurrajong																											
<i>Brachyscome ciliaris</i>	Variable Daisy																											
<i>Bromus catharticus</i>	Prairie Grass	Exotic																										
<i>Bromus molliformis</i>	Soft Brome	Exotic																										
<i>Bromus</i> sp.		Exotic																										
<i>Brunoniella australis</i>	Blue Trumpet		2		1				2				2	2	1				2	1	1		2	2	1		1	
<i>Bryophyllum delagoense</i>	Mother-of-millions	Exotic																										
<i>Bulbine bulbosa</i>	Native Leek					1						1									1	1		1		2	1	
<i>Calandrinia</i> sp.																												
<i>Callitris glaucophylla</i>																1												
<i>Calotis lappulacea</i>	Yellow Burr-daisy		2						2	1				2		2			2							1		
<i>Carex breviculmis</i>																												
<i>Carex inversa</i>									1															2				

Species	Species	Notes	Wood Control 2																								
			36_2011	36_2012	36_2013	36_2014	36_2015	37_2011	37_2012	37_2013	37_2014	37_2015	38_2011	38_2012	38_2013	38_2014	38_2015	39_2011	39_2012	39_2013	39_2014	39_2015	40_2011	40_2012	40_2013	40_2014	40_2015
<i>Carthamus lanatus</i>	Saffron Thistle	Exotic																									
<i>Centaurea melitensis</i>	Maltese Cockspur	Exotic																									2
<i>Centaurea solstitialis</i>	St Barnaby's Thistle	Exotic																									
<i>Centaurea</i> sp.		Exotic																									
<i>Centaureum erythraea</i>	Common Centaury	Exotic																									
<i>Centaureum</i> sp.		Exotic																									
<i>Chamaesyce</i> sp.													1	1			1	1		1			1	1	1		
<i>Cheilanthes distans</i>	Bristly Cloak Fern																	1							2	2	1
<i>Cheilanthes sieberi</i>									2														2				
<i>Chenopodium desertorum</i>																											
<i>Chenopodium pumilio</i>	Small Crumbweed												2														
<i>Chloris gayana</i>	Rhodes Grass	Exotic																									
<i>Chloris pectinata</i>	Comb Chloris																								2		
<i>Chloris truncata</i>	Windmill Grass																						2				
<i>Chloris ventricosa</i>	Plump Windmill Grass														2								2	2	2		
<i>Chondrilla juncea</i>	Skeleton Weed	Exotic																									
<i>Chrysocephalum apiculatum</i>	Yellow Buttons		2	1		1	2	2																	1		1
<i>Cichorium intybus</i>		Exotic																									
<i>Cirsium vulgare</i>	Spear Thistle	Exotic																									
<i>Convolvulus graminetinus</i>																										1	1
<i>Conyza bonariensis</i>	Flaxleaf Fleabane	Exotic												1													
<i>Conyza parva</i>		Exotic																									
<i>Conyza</i> sp.		Exotic																									
<i>Cotula australis</i>	Common Cotula																										
<i>Cyclosporum leptophyllum</i>	Slender Celery	Exotic																									
<i>Cymbopogon refractus</i>	Barbed Wire Grass		2		1	2	2				2		2		2												
<i>Cynodon dactylon</i>	Couch																										
<i>Cyperus concinnus</i>																											
<i>Cyperus fulvus</i>	Sticky Sedge		2						1				2					2									
<i>Cyperus gracilis</i>	Slender Flat-sedge		2	1	2				2		1		2		1			2		1							
<i>Cyperus rotundus</i>	Nutgrass	Exotic																									
<i>Datura ferox</i>		Exotic																									
<i>Daucus glochidiatus</i>	Native Carrot																									1	
<i>Desmodium brachypodum</i>	Large Tick-trefoil					1							2			1											
<i>Desmodium varians</i>	Slender Tick-trefoil		2															1									
<i>Dianella revoluta</i>	Blueberry Lily																										
<i>Dianella</i> sp.																											
<i>Dichanthium sericeum</i>	Queensland Bluegrass																								2		
<i>Dichelachne micrantha</i>	Shorthair Plumegrass																										
<i>Dichondra repens</i>	Kidney Weed																								1		
<i>Dichondra</i> sp. A									2							2											2
<i>Dichopogon fimbriatus</i>	Nodding Chocolate Lily					1																	2				
<i>Digitaria brownii</i>	Cotton Panic Grass																								1		
<i>Digitaria divaricatissima</i>	Umbrella Grass																							2			
<i>Digitaria sanguinalis</i>	Crab Grass	Exotic																									
<i>Digitaria</i> sp.																											
<i>Echinochloa crus-galli</i>	Barnyard Grass	Exotic												1													
<i>Echinochloa</i> sp.																											
<i>Echium plantagineum</i>	Patterson's Curse	Exotic					1																				
<i>Eclipta platyglossa</i>																											
<i>Einadia hastata</i>	Berry Saltbush						1							1													
<i>Einadia nutans</i>	Climbing Saltbush		1																								
<i>Einadia polygonoides</i>								2					2		1		2				1	2				1	1
<i>Einadia trigonos</i>	Fishweed												1		1		1					2	1				
<i>Elymus scaber</i>																											

Species	Species	Notes	Wood Control 2																									
			36_2011	36_2012	36_2013	36_2014	36_2015	37_2011	37_2012	37_2013	37_2014	37_2015	38_2011	38_2012	38_2013	38_2014	38_2015	39_2011	39_2012	39_2013	39_2014	39_2015	40_2011	40_2012	40_2013	40_2014	40_2015	
<i>Enchylaena tomentosa</i>	Ruby Saltbush																											
<i>Enneapogon nigricans</i>													2									2						
<i>Enneapogon</i> sp.			2					1						2			3		1	1								
<i>Enteropogon acicularis</i>					1				2	1	1		2				1	2		2		1	2		2			
<i>Enteropogon</i> sp.																												
<i>Eragrostis alveiformis</i>																							1					
<i>Eragrostis brownii</i>	Brown's Lovegrass																											
<i>Eragrostis elongata</i>	Clustered Lovegrass																											
<i>Eragrostis lacunaria</i>	Bristly Love-grass						2					1		2	1													
<i>Eragrostis leptostachya</i>	Paddock Lovegrass								1	2		1																
<i>Eragrostis parviflora</i>	Weeping Lovegrass																											
<i>Eragrostis setifolia</i>	Bristly Love-grass		1										1										1					
<i>Eragrostis</i> sp.																												
<i>Eremophila debilis</i>	Winter Apple		2	1	2	2	2	2		1	2	2	1	2		;	1		2	2	1	1	1	1	1	2	1	
<i>Eriochloa pseudoacrotricha</i>	Early Spring Grass																											
<i>Eriochloa</i> sp.																												
<i>Erodium crinitum</i>	Blue Storksbill																									1		
<i>Euchiton</i> sp.																												
<i>Euchiton sphaericus</i>																												
<i>Eulalia aurea</i>	Silky Browntop																								2			
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>														1					1									
<i>Fimbristylis dichotoma</i>	Common Fringe-sedge		1																						2			
<i>Galenia pubescens</i>	Galenia	Exotic											1	1	2	2	2											
<i>Geijera parviflora</i>																												
<i>Geranium solanderi</i>	Native Geranium																											
<i>Glossogyne tannensis</i>			1						1				2						1						1			
<i>Glycine clandestina</i>			11	1					1	2			1					1										
<i>Glycine tabacina</i>			2					2	2				1	2	1			1	2			1			1			
<i>Gomphocarpus fruticosus</i>	Narrow-leaved Cotton Bush	Exotic																										
<i>Gomphocarpus</i> sp.		Exotic																										
<i>Gomphrena celosioides</i>	Gomphrena Weed	Exotic																							2	1		
<i>Gonocarpus elatus</i>																												
<i>Goodenia cycloptera</i>								2										1										
<i>Goodenia fascicularis</i>																												
<i>Goodenia glabra</i>			1							2				2					1									
<i>Goodenia pinnatifida</i>																												
<i>Gypsophila tubulosa</i>	Annual Chalkwort																											
<i>Haloragis heterophylla</i>	Rough Raspwort			1																								
<i>Hedypnois rhagadioloides</i> subsp. <i>cretica</i>	Cretan Weed	Exotic																										
<i>Helianthus</i> sp.	Sunflower	Exotic																										
<i>Hibiscus trionum</i>																												
<i>Hordeum</i> sp.	Barley Grass	Exotic																										
<i>Hyparrhenia hirta</i>	Coolatai Grass	Exotic																										
<i>Hypochaeris microcephala</i>	White Flatweed	Exotic						1										1										
<i>Hypochaeris radicata</i>	Flatweed	Exotic																										
<i>Jasminum suavissimum</i>			1	1	1	2					1	2	1															
<i>Juncus</i> sp.																												
<i>Juncus usitatus</i>	Pinrush																											
<i>Lachnagrostis filiformis</i>	Blown Grass																											
<i>Lactuca saligna</i>	Willow-leaved Lettuce	Exotic																										
<i>Lactuca serriola</i>	Prickly Lettuce	Exotic												1														
<i>Lepidium africanum</i>		Exotic	1	1				2						2									1	1		1	2	1
<i>Lepidium bonariense</i>		Exotic																										
<i>Leptochloa</i> sp.																												
<i>Leptorhynchus panaetioides</i>	Woolly Buttons																											

Species	Species	Notes	Wood Control 2																									
			36_2011	36_2012	36_2013	36_2014	36_2015	37_2011	37_2012	37_2013	37_2014	37_2015	38_2011	38_2012	38_2013	38_2014	38_2015	39_2011	39_2012	39_2013	39_2014	39_2015	40_2011	40_2012	40_2013	40_2014	40_2015	
<i>Linaria pelisseriana</i>	Pelisser's Toadflax	Exotic	1																									
<i>Linaria</i> sp.							1								1													
<i>Linum marginale</i>	Native Flax																	1		1	1			1				
<i>Lolium rigidum</i>	Wimmera Ryegrass	Exotic																										
<i>Lolium</i> sp.		Exotic																										
<i>Lomandra confertifolia</i>	Mat-rush								1					2										2				
<i>Lomandra filiformis</i>	Wattle Mat-rush		1		1	1				1		1							1	2		1			2			
<i>Lomandra longifolia</i>	Spiny-headed Mat-rush																					1						
<i>Lomandra multiflora</i>				1			1	2				1			1					1			1		1	1	1	
<i>Lycium ferocissimum</i>	African Boxthorn	Exotic																										
<i>Lythrum hyssopifolia</i>	Hyssop Loosestrife																											
<i>Maireana decalvans</i>	Black Cotton Bush																											
<i>Maireana enchylaenoides</i>	Wingless Bluebush					1	1	1		1	2												1	1	1	1	1	
<i>Maireana microphylla</i>	Small-leaf Bluebush							1	1	1	1	1			1				1		1	1	1	1	2	2	2	
<i>Malva</i> sp.		Exotic													1													
<i>Malvastrum americanum</i>	Spiked Malvastrum	Exotic											1						1									
<i>Malvastrum coromandelianum</i>	Prickly Malvastrum																											
<i>Marrubium vulgare</i>	White Horehound	Exotic																										
<i>Medicago minima</i>	Woolly Burr Medic	Exotic					2						2														2	
<i>Medicago polymorpha</i>	Burr Medic	Exotic											1															
<i>Medicago sativa</i>	Lucerne	Exotic																										
<i>Medicago</i> sp.		Exotic																								2		
<i>Medicago truncatula</i>	Barrel Medic	Exotic																										
<i>Melilotus indicus</i>	Hexham Scent	Exotic																										
<i>Melilotus</i> sp.		Exotic																										
<i>Mentha satureioides</i>	Creeping Mint																											
<i>Microlaena stipoides</i>	Weeping Grass							2																				
<i>Misopates orontium</i>	Lesser Snapdragon	Exotic	2			2	2					2	2	2		1	2	1				1	1		1		2	1
<i>Murdannia graminea</i>	Grass Lily																											
<i>Nicotiana</i> sp.																												
<i>Nyssanthes diffusa</i>	Barbwire Weed																											
<i>Opuntia stricta</i>	Common Prickly Pear	Exotic				1	1					1	1															
<i>Oxalis exilis</i>																												
<i>Oxalis perennans</i>																												
<i>Oxalis</i> sp.			1						2					1						1								
<i>Panicum buncei</i>																												
<i>Panicum effusum</i>	Hairy Panic		2						1					1						2					2			
<i>Panicum maximum</i>		Exotic																										
<i>Papaver</i> sp.																												
<i>Panicum queenslandicum</i>	Yadbila Grass																											
<i>Panicum</i> sp.																												
<i>Parsonsia eucalyptophylla</i>	Gargaloo								1			1																
<i>Paspalidium jubiflorum</i>	Warrego Grass																											
<i>Paspalidium</i> sp.			2		1				2			2	2	1	2		2		2		2	2	2					
<i>Paspalum dilatatum</i>	Paspalum	Exotic																										
<i>Paspalum</i> sp.		Exotic																										
<i>Petrorhagia nanteuilii</i>		Exotic		2		2	2								2	1	2	2										
<i>Phalaris</i> sp.	Canary Grass	Exotic																										
<i>Phyllanthus virgatus</i>	Petty Spurge		2						2					2						1								
<i>Pimelea microcephala</i>	Shrubby Rice-flower																											
<i>Pimelea neo-anglica</i>	Shrubby Rice-flower																											
<i>Pimelea</i> sp.																												
<i>Plantago debilis</i>												2		1					1		1						2	
<i>Plantago lanceolata</i>	Lamb's Tongues	Exotic																										
<i>Poa sieberiana</i>	Snow Grass		1						1																			

Species	Species	Notes	Wood Control 2																								
			36_2011	36_2012	36_2013	36_2014	36_2015	37_2011	37_2012	37_2013	37_2014	37_2015	38_2011	38_2012	38_2013	38_2014	38_2015	39_2011	39_2012	39_2013	39_2014	39_2015	40_2011	40_2012	40_2013	40_2014	40_2015
<i>Polycarpon tetraphyllum</i>	Four-leaved Allseed	Exotic					2																				
<i>Polygonum aviculare</i>	Wireweed	Exotic																									
<i>Portulaca oleracea</i>	Pigweed																										
<i>Rapistrum rugosum</i>	Turnip Weed	Exotic																									
<i>Rhodanthe anthemoides</i>												1						1									2
<i>Rostellularia adscendens</i>			2	2	2		2	1		2	1	2	2		2	1	2	2		2	2	2	1				2
<i>Rumex brownii</i>	Swamp Dock							1																			
<i>Rumex crispus</i>	Curled Dock	Exotic																									
<i>Rumex sp.</i>																											
<i>Salsola australis</i>																											
<i>Schenkia spicata</i>	Spike Centaury																										
<i>Schkuhria pinnata</i>		Exotic																									
<i>Sclerolaena birchii</i>	Galvanised Burr											1			1	1	1	1			1	2	2	2	1	2	2
<i>Sclerolaena diacantha</i>	Grey Copperburr																										
<i>Sclerolaena muricata</i>	Black Rolypoly																										
<i>Sclerolaena muricata var. muricata</i>	Black Rolypoly																										
<i>Sclerolaena muricata var. villosa</i>	Black Rolypoly																										
<i>Senecio quadridentatus</i>	Cotton Fireweed					1							1							1	1		1				
<i>Setaria incrassata</i>	Purple Pigeon Grass	Exotic																									
<i>Setaria sp.</i>		Exotic																									
<i>Sida corrugata</i>	Corrugated Sida		2		1	1	1			2			1	1	2		1	1		1		1	2	1	1	1	1
<i>Sida cunninghamii</i>	Ridged Sida		1						2		1	1	1		1	1	1	2									1
<i>Sida rhombifolia</i>	Paddy's Lucerne	Exotic																									
<i>Sida sp.</i>			1																								
<i>Sida spinosa</i>		Exotic																							1		
<i>Sida subspicata</i>																			1								
<i>Silybum marianum</i>		Exotic																									
<i>Sisymbrium irio</i>	London Rocket	Exotic																1									
<i>Sisymbrium officinale</i>	Hedge Mustard	Exotic											1														
<i>Sisymbrium orientale</i>	Indian Hedge Mustard	Exotic				1	1						1				2	2			2						
<i>Sisymbrium sp.</i>		Exotic																									
<i>Solanum esuriiale</i>	Quena								1					1					2					2			1
<i>Solanum nigrum</i>	Black-berry Nightshade	Exotic												2													
<i>Solanum parvifolium</i>						2						2															
<i>Solanum sp.</i>																											
<i>Sonchus asper</i> subsp. <i>glaucescens</i>		Exotic																									
<i>Sonchus oleraceus</i>	Common Sowthistle	Exotic											2	1											1		
<i>Sorghum halepense</i>	Johnson Grass	Exotic																									
<i>Spergularia sp.</i>		Exotic																									
<i>Sporobolus caroli</i>																											
<i>Sporobolus creber</i>	Slender Rat's Tail Grass				2									1						2					2		
<i>Stachys arvensis</i>	Stagger Weed	Exotic																									
<i>Stackhousia viminea</i>	Slender Stackhousia		1			1			1					2	1			1	1					2			1
<i>Swainsona galegifolia</i>	Smooth Darling-pea																										
<i>Themeda australis</i>	Kangaroo Grass																										
<i>Tragopogon porrifolius</i>	Oyster Plant	Exotic																									
<i>Tragus australianus</i>	Small Burgrass																										
<i>Trianthema sp.</i>																											
<i>Trifolium angustifolium</i>	Narrow-leaved Clover	Exotic																									
<i>Trifolium arvense</i>	Haresfoot Clover	Exotic				1	2										2				2						
<i>Trifolium campestre</i>	Hop Clover	Exotic					2																				
<i>Trifolium dubium</i>	Yellow Suckling Clover	Exotic																									
<i>Trifolium glomeratum</i>	Clustered Clover	Exotic					1																				
<i>Trifolium repens</i>	White Clover	Exotic																									
<i>Triptilodiscus pygmaeus</i>																											2

Species	Species	Notes	Wood Control 2																									
			36_2011	36_2012	36_2013	36_2014	36_2015	37_2011	37_2012	37_2013	37_2014	37_2015	38_2011	38_2012	38_2013	38_2014	38_2015	39_2011	39_2012	39_2013	39_2014	39_2015	40_2011	40_2012	40_2013	40_2014	40_2015	
<i>Urochloa panicoides</i>	Urochloa Grass	Exotic												2														
<i>Verbascum thapsus</i>	Great Mullein	Exotic																										
<i>Verbascum virgatum</i>	Twiggy Mullein	Exotic																										
<i>Verbena bonariensis</i>	Purpletop	Exotic																										
<i>Verbena gaudichaudii</i>									1														1	1	1			
<i>Verbesina encelioides</i>		Exotic																										
<i>Vicia sp.</i>		Exotic																										
<i>Vittadinia cuneata</i>	Fuzzweed																									2	1	1
<i>Vittadinia dissecta</i>	Dissected New Holland Daisy																											
<i>Vittadinia muelleri</i>																												
<i>Vittadinia sp.</i>									2															2				
<i>Vulpia sp.</i>																											2	
<i>Wahlenbergia communis</i>	Tufted Bluebell												2						2						2			
<i>Wahlenbergia gracilis</i>	Sprawling Bluebell		1										1															
<i>Wahlenbergia luteola</i>																												
<i>Walwhalleya proluta</i>									2			1																
<i>Xanthium occidentale</i>	Noogoora Burr	Exotic											1															
<i>Xanthium spinosum</i>	Bathurst Burr	Exotic											1	1														
<i>Xerochrysum bracteatum</i>	Golden Everlasting			1		2	1					2	1		1		1	1	1			1	1	2	2		2	
<i>Xerochrysum viscosum</i>	Sticky Everlasting																					1					2	
<i>Zornia dyctiocarpa</i>	Zornia		1											2														
Total number of species			40	15	15	22	30	40	11	14	22	26	51	28	20	21	29	36	9	17	23	24	40	27	17	25	28	

Table 23: Groundcover species cover scores in 20 x 50 m Woodland Plots located in Wood Control 1 for 2011 - 2015 monitoring periods

Species	Species	Notes	Wood Control 1																									
			41_2011	41_2012	41_2013	41_2014	41_2015	42_2011	42_2012	42_2013	42_2014	42_2015	43_2011	43_2012	43_2013	43_2014	43_2015	44_2011	44_2012	44_2013	44_2014	44_2015	45_2011	45_2012	45_2013	45_2014	45_2015	
<i>Abutilon oxycarpum</i>	Straggly Lantern-bush																											
<i>Abutilon</i> sp.					1																							
<i>Acacia deanei</i> (seedling)	Green Wattle																											
<i>Acacia decora</i> (seedling)	Western Silver Wattle																											
<i>Acacia salicina</i> (seedling)	Cooba																											
<i>Aira</i> sp.		Exotic																										
<i>Alternanthera denticulata</i>	Lesser Joyweed																						1					
<i>Alternanthera</i> sp. A																												
<i>Ammi majus</i>	Bishop's-weed	Exotic											2															
<i>Anagallis arvensis</i>	Scarlet Pimpernel	Exotic					2		1	2	2					2	2		1		2	2		2		2	2	
<i>Arenaria leptoclados</i>		Exotic																										
<i>Aristida leptopoda</i>	White Speargrass																											
<i>Aristida personata</i>	Purple Wire-grass			3	3	3	3	4	4	4	3	3	4	4	4	3	3	3	4	3	3	3		2	2	3	3	
<i>Aristida</i> sp.																												
<i>Aristida vagans</i>	Threeawn Speargrass																											
<i>Arthropodium</i> sp.																					1						2	
<i>Asperula cunninghamii</i>	Twining Woodruff																											
<i>Asphodelus fistulosus</i>	Onion Weed	Exotic																										
<i>Aster subulatus</i>	Wild Aster	Exotic																										
<i>Atriplex muelleri</i>																												
<i>Atriplex semibaccata</i>	Creeping Saltbush																											
<i>Austrodanthonia bipartita</i>	Wallaby Grass						2									1												
<i>Austrodanthonia racemosa</i>							2																2	2			2	
<i>Austrodanthonia racemosa</i> var. <i>obtusata</i>																					1							
<i>Austrodanthonia</i> sp.			1		1	2																						
<i>Austrostipa aristiglumis</i>	Plains Grass																											
<i>Austrostipa ramosissima</i>	Stout Bamboo Grass				2																							
<i>Austrostipa scabra</i>	Speargrass		4	3			3		1	2	2	2	2	2	2	3	2	2	2	2	2	2	2	3	3			
<i>Austrostipa</i> sp.									2										2	2	2			3	2			
<i>Austrostipa verticillata</i>	Slender Bamboo Grass		2								2							2			2		3			2		
<i>Avena fatua</i>	Wild Oats	Exotic																										
<i>Avena</i> sp.		Exotic																										
<i>Bidens pilosa</i>	Cobblers Pegs	Exotic								1																		
<i>Bidens subalternans</i>	Greater Beggar's Ticks	Exotic						1	2							1						2	2		2			
<i>Boerhavia dominii</i>	Tarvine					1				1					1													
<i>Boerhavia</i> sp.			1				1	1					1			1	1											
<i>Bothriochloa bladhii</i>	Forest Blue Grass																											
<i>Bothriochloa decipiens</i>	Red Grass			2		3		3	3	2			3	3		3		2			2			3		3		
<i>Bothriochloa macra</i>	Red Grass				3										3				3	2								
<i>Bothriochloa</i> sp.							2					3				3				3	2				3		2	
<i>Brachychiton populneus</i>	Kurrajong																											
<i>Brachyscome ciliaris</i>	Variable Daisy																											
<i>Bromus catharticus</i>	Prairie Grass	Exotic																					1				1	
<i>Bromus molliformis</i>	Soft Brome	Exotic																										
<i>Bromus</i> sp.		Exotic																										
<i>Brunoniella australis</i>	Blue Trumpet		1		2	1											2	2	1		1							
<i>Bryophyllum delagoense</i>	Mother-of-millions	Exotic																										
<i>Bulbine bulbosa</i>	Native Leek																											
<i>Calandrinia</i> sp.																												
<i>Callitris glaucophylla</i>																												
<i>Calotis lappulacea</i>	Yellow Burr-daisy		2	2	1			1	2	1			2	2	2	1	1	2	1	2					1			
<i>Carex breviculmis</i>								1																				
<i>Carex inversa</i>			2	2	1	2	1	1	1	1	1	3	2	1		2	1	2			1				2	2	3	2

Species	Species	Notes	Wood Control 1																									
			41_2011	41_2012	41_2013	41_2014	41_2015	42_2011	42_2012	42_2013	42_2014	42_2015	43_2011	43_2012	43_2013	43_2014	43_2015	44_2011	44_2012	44_2013	44_2014	44_2015	45_2011	45_2012	45_2013	45_2014	45_2015	
<i>Carthamus lanatus</i>	Saffron Thistle	Exotic								1	1	2															2	
<i>Centaurea melitensis</i>	Maltese Cockspur	Exotic		1			2		1	1	1										1	2		1	2	2	3	
<i>Centaurea solstitialis</i>	St Barnaby's Thistle	Exotic																								1		
<i>Centaurea</i> sp.		Exotic																										
<i>Centaureum erythraea</i>	Common Centaury	Exotic																										
<i>Centaureum</i> sp.		Exotic																										
<i>Chamaesyce</i> sp.													1		1		1											
<i>Cheilanthes distans</i>	Bristly Cloak Fern																											
<i>Cheilanthes sieberi</i>			1										2	1		2		1			2		1					
<i>Chenopodium desertorum</i>																												
<i>Chenopodium pumilio</i>	Small Crumbweed																											
<i>Chloris gayana</i>	Rhodes Grass	Exotic				2																						
<i>Chloris pectinata</i>	Comb Chloris																											
<i>Chloris truncata</i>	Windmill Grass								2																			
<i>Chloris ventricosa</i>	Plump Windmill Grass		3	3	1	2		2	2	2									3	1	1	1			3	2		
<i>Chondrilla juncea</i>	Skeleton Weed	Exotic																								1		
<i>Chrysocephalum apiculatum</i>	Yellow Buttons																											
<i>Cichorium intybus</i>		Exotic																										
<i>Cirsium vulgare</i>	Spear Thistle	Exotic																										
<i>Convolvulus graminetinus</i>														1														
<i>Conyza bonariensis</i>	Flaxleaf Fleabane	Exotic						1					1	1														
<i>Conyza parva</i>		Exotic																										
<i>Conyza</i> sp.		Exotic	2																									
<i>Cotula australis</i>	Common Cotula																											
<i>Cyclosporum leptophyllum</i>	Slender Celery	Exotic						2	2		2										2							
<i>Cymbopogon refractus</i>	Barbed Wire Grass								1																2			
<i>Cynodon dactylon</i>	Couch																											
<i>Cyperus concinnus</i>																												
<i>Cyperus fulvus</i>	Sticky Sedge							1					2		1	1							2		1			
<i>Cyperus gracilis</i>	Slender Flat-sedge		2					1		1					1				2		2		2		1			
<i>Cyperus rotundus</i>	Nutgrass	Exotic																										
<i>Datura ferox</i>		Exotic																										
<i>Daucus glochidiatus</i>	Native Carrot								1																			
<i>Desmodium brachypodum</i>	Large Tick-trefoil									1									1		1		1					
<i>Desmodium varians</i>	Slender Tick-trefoil														1	1			2									
<i>Dianella revoluta</i>	Blueberry Lily																											
<i>Dianella</i> sp.																												
<i>Dichanthium sericeum</i>	Queensland Bluegrass							1																				
<i>Dichelachne micrantha</i>	Shorthair Plumegrass							1																				
<i>Dichondra repens</i>	Kidney Weed																											
<i>Dichondra</i> sp. A			1		2		1	2	2	2	2	2			2				3	2	1		1	2	2			
<i>Dichopogon fimbriatus</i>	Nodding Chocolate Lily							1											1		2		1				1	
<i>Digitaria brownii</i>	Cotton Panic Grass																											
<i>Digitaria divaricatissima</i>	Umbrella Grass																											
<i>Digitaria sanguinalis</i>	Crab Grass	Exotic																										
<i>Digitaria</i> sp.																												
<i>Echinochloa crus-galli</i>	Barnyard Grass	Exotic																										
<i>Echinochloa</i> sp.																												
<i>Echium plantagineum</i>	Patterson's Curse	Exotic																									2	
<i>Eclipta platyglossa</i>																												
<i>Einadia hastata</i>	Berry Saltbush					2	1										1					2	2			2	1	
<i>Einadia nutans</i>	Climbing Saltbush																											
<i>Einadia polygonoides</i>				1			1	1															2				1	
<i>Einadia trigonos</i>	Fishweed		2	2			1			1		2	1										2		2		1	
<i>Elymus scaber</i>																				2	1	2	2	1	2	1	2	3

Species	Species	Notes	Wood Control 1																								
			41_2011	41_2012	41_2013	41_2014	41_2015	42_2011	42_2012	42_2013	42_2014	42_2015	43_2011	43_2012	43_2013	43_2014	43_2015	44_2011	44_2012	44_2013	44_2014	44_2015	45_2011	45_2012	45_2013	45_2014	45_2015
<i>Enchylaena tomentosa</i>	Ruby Saltbush																										
<i>Enneapogon nigricans</i>				1			2								2	1										1	
<i>Enneapogon</i> sp.												2					1										
<i>Enteropogon acicularis</i>			1	2	1	2	2				1			2	1	2			2		2		1		2		
<i>Enteropogon</i> sp.																											
<i>Eragrostis alveiformis</i>																											
<i>Eragrostis brownii</i>	Brown's Lovegrass		1																								
<i>Eragrostis elongata</i>	Clustered Lovegrass																						1				
<i>Eragrostis lacunaria</i>	Bristly Love-grass					1																					
<i>Eragrostis leptostachya</i>	Paddock Lovegrass												1														
<i>Eragrostis parviflora</i>	Weeping Lovegrass																										
<i>Eragrostis setifolia</i>	Bristly Love-grass																										
<i>Eragrostis</i> sp.																											
<i>Eremophila debilis</i>	Winter Apple		2	2	2	2	2	2	1	2	1	2			2		1	2	2	2	2			2	2	1	
<i>Eriochloa pseudoacrotricha</i>	Early Spring Grass																	1									
<i>Eriochloa</i> sp.																								1			
<i>Erodium crinitum</i>	Blue Storksbill																										
<i>Euchiton</i> sp.																											
<i>Euchiton sphaericus</i>																											
<i>Eulalia aurea</i>	Silky Browntop																						3	1			
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>			1											1		1											
<i>Fimbristylis dichotoma</i>	Common Fringe-sedge																						2	1			
<i>Galenia pubescens</i>	Galenia	Exotic																									
<i>Geijera parviflora</i>																											
<i>Geranium solanderi</i>	Native Geranium								1																		
<i>Glossogyne tannensis</i>													2	1													
<i>Glycine clandestina</i>			1					1				2	1				1			1							
<i>Glycine tabacina</i>			1				1	2				2				1					1			1			
<i>Gomphocarpus fruticosus</i>	Narrow-leaved Cotton Bush	Exotic													1											2	
<i>Gomphocarpus</i> sp.		Exotic												1													
<i>Gomphrena celosioides</i>	Gomphrena Weed	Exotic																									
<i>Gonocarpus elatus</i>																											
<i>Goodenia cycloptera</i>																											
<i>Goodenia fascicularis</i>																											
<i>Goodenia glabra</i>														2		2	1	2	1				1				
<i>Goodenia pinnatifida</i>																											
<i>Gypsophila tubulosa</i>	Annual Chalkwort																										
<i>Haloragis heterophylla</i>	Rough Raspwort								2	2	1		2	2	2	1	2	1				2	1				
<i>Hedypnois rhagadioloides</i> subsp. <i>cretica</i>	Cretan Weed	Exotic																								2	
<i>Helianthus</i> sp.	Sunflower	Exotic																									
<i>Hibiscus trionum</i>																											
<i>Hordeum</i> sp.	Barley Grass	Exotic																									
<i>Hyparrhenia hirta</i>	Coolatai Grass	Exotic																									
<i>Hypochoeris microcephala</i>	White Flatweed	Exotic							1						1	1	1										
<i>Hypochoeris radicata</i>	Flatweed	Exotic																									
<i>Jasminum suavissimum</i>																											
<i>Juncus</i> sp.																											
<i>Juncus usitatus</i>	Pinrush																						1	1			
<i>Lachnagrostis filiformis</i>	Blown Grass														1												
<i>Lactuca saligna</i>	Willow-leaved Lettuce	Exotic							1	1																	
<i>Lactuca serriola</i>	Prickly Lettuce	Exotic								2											1		2				
<i>Lepidium africanum</i>		Exotic	2	1	1	2	2				2	2						1			2	1	2		2	2	
<i>Lepidium bonariense</i>		Exotic																									
<i>Leptochloa</i> sp.			1			1																	1				
<i>Leptorhynchus panaetioides</i>	Woolly Buttons											1	1														

Species	Species	Notes	Wood Control 1																								
			41_2011	41_2012	41_2013	41_2014	41_2015	42_2011	42_2012	42_2013	42_2014	42_2015	43_2011	43_2012	43_2013	43_2014	43_2015	44_2011	44_2012	44_2013	44_2014	44_2015	45_2011	45_2012	45_2013	45_2014	45_2015
<i>Linaria pelisseriana</i>	Pelisser's Toadflax	Exotic																									
<i>Linaria sp.</i>																											
<i>Linum marginale</i>	Native Flax													1													
<i>Lolium rigidum</i>	Wimmera Ryegrass	Exotic																								1	
<i>Lolium sp.</i>		Exotic										2	2														2
<i>Lomandra confertifolia</i>	Mat-rush												1														
<i>Lomandra filiformis</i>	Wattle Mat-rush										1									2			2				
<i>Lomandra longifolia</i>	Spiny-headed Mat-rush																										
<i>Lomandra multiflora</i>			1	2	1					1			1														1
<i>Lycium ferocissimum</i>	African Boxthorn	Exotic																									
<i>Lythrum hyssopifolia</i>	Hyssop Loosestrife																										
<i>Maireana decalvans</i>	Black Cotton Bush																										
<i>Maireana enchylaenoides</i>	Wingless Bluebush		1		1	1	2																				1
<i>Maireana microphylla</i>	Small-leaf Bluebush		1	2	1	2	2	1	1	1	1																1
<i>Malva sp.</i>		Exotic																									
<i>Malvastrum americanum</i>	Spiked Malvastrum	Exotic																									
<i>Malvastrum coromandelianum</i>	Prickly Malvastrum		1																								2
<i>Marrubium vulgare</i>	White Horehound	Exotic																									
<i>Medicago minima</i>	Woolly Burr Medic	Exotic						2					2														3
<i>Medicago polymorpha</i>	Burr Medic	Exotic						2	2				1														
<i>Medicago sativa</i>	Lucerne	Exotic						1		1																	
<i>Medicago sp.</i>		Exotic																									
<i>Medicago truncatula</i>	Barrel Medic	Exotic																									
<i>Melilotus indicus</i>	Hexham Scent	Exotic																				1					3
<i>Melilotus sp.</i>		Exotic																									
<i>Mentha satureioides</i>	Creeping Mint																										1
<i>Microlaena stipoides</i>	Weeping Grass								2																		
<i>Misopates orontium</i>	Lesser Snapdragon	Exotic										1	2			1										2	2
<i>Murdannia graminea</i>	Grass Lily																										
<i>Nicotiana sp.</i>			1																								1
<i>Nyssanthes diffusa</i>	Barbwire Weed																										
<i>Opuntia stricta</i>	Common Prickly Pear	Exotic	1	1									1	1	1	1	1									1	1
<i>Oxalis exilis</i>																											1
<i>Oxalis perennans</i>																											
<i>Oxalis sp.</i>			1																								
<i>Panicum buncei</i>																											
<i>Panicum effusum</i>	Hairy Panic																										
<i>Panicum maximum</i>		Exotic							1																		
<i>Papaver sp.</i>																											
<i>Panicum queenslandicum</i>	Yadbila Grass																										
<i>Panicum sp.</i>																											
<i>Parsonsia eucalyptophylla</i>	Gargaloo																										
<i>Paspalidium jubiflorum</i>	Warrego Grass																										
<i>Paspalidium sp.</i>			2	2	2	2	3	1																			2
<i>Paspalum dilatatum</i>	Paspalum	Exotic																									
<i>Paspalum sp.</i>		Exotic																									
<i>Petrorhagia nanteuilii</i>		Exotic									1		2	2													2
<i>Phalaris sp.</i>	Canary Grass	Exotic																									
<i>Phyllanthus virgatus</i>	Petty Spurge																										
<i>Pimelea microcephala</i>	Shrubby Rice-flower																										
<i>Pimelea neo-anglica</i>	Shrubby Rice-flower																										
<i>Pimelea sp.</i>																											
<i>Plantago debilis</i>																											
<i>Plantago lanceolata</i>	Lamb's Tongues	Exotic							1																		
<i>Poa sieberiana</i>	Snow Grass																										2

Species	Species	Notes	Wood Control 1																								
			41_2011	41_2012	41_2013	41_2014	41_2015	42_2011	42_2012	42_2013	42_2014	42_2015	43_2011	43_2012	43_2013	43_2014	43_2015	44_2011	44_2012	44_2013	44_2014	44_2015	45_2011	45_2012	45_2013	45_2014	45_2015
<i>Polycarpon tetraphyllum</i>	Four-leaved Allseed	Exotic																									
<i>Polygonum aviculare</i>	Wireweed	Exotic								1																	
<i>Portulaca oleracea</i>	Pigweed																										
<i>Rapistrum rugosum</i>	Turnip Weed	Exotic									2																
<i>Rhodanthe anthemoides</i>																											
<i>Rostellularia adscendens</i>					1	1	2							1				1					1				
<i>Rumex brownii</i>	Swamp Dock		1				1	1		1							2		1			2		1	1		
<i>Rumex crispus</i>	Curled Dock	Exotic																									
<i>Rumex sp.</i>																											
<i>Salsola australis</i>			1			1															1						
<i>Schenkia spicata</i>	Spike Centaury																							1			
<i>Schkuhria pinnata</i>		Exotic																									
<i>Sclerolaena birchii</i>	Galvanised Burr		1	2		1	1																				
<i>Sclerolaena diacantha</i>	Grey Copperburr																										
<i>Sclerolaena muricata</i>	Black Rolypoly																										
<i>Sclerolaena muricata var. muricata</i>	Black Rolypoly																										
<i>Sclerolaena muricata var. villosa</i>	Black Rolypoly																										
<i>Senecio quadridentatus</i>	Cotton Fireweed							2	2	1	2	1		2								1					
<i>Setaria incrassata</i>	Purple Pigeon Grass	Exotic																									
<i>Setaria sp.</i>		Exotic																									
<i>Sida corrugata</i>	Corrugated Sida		2	1	2	1		1					1	1	1	1	1	2	1	2	2	1	1		2		
<i>Sida cunninghamii</i>	Ridged Sida							1		1		1					1		1	1							
<i>Sida rhombifolia</i>	Paddy's Lucerne	Exotic																									
<i>Sida sp.</i>																											
<i>Sida spinosa</i>		Exotic		1				1										1							1		2
<i>Sida subspicata</i>																											
<i>Silybum marianum</i>		Exotic																									
<i>Sisymbrium irio</i>	London Rocket	Exotic	1		1	1	2																				
<i>Sisymbrium officinale</i>	Hedge Mustard	Exotic																									
<i>Sisymbrium orientale</i>	Indian Hedge Mustard	Exotic				2	2					2	2													2	
<i>Sisymbrium sp.</i>		Exotic																									
<i>Solanum esuriiale</i>	Quena																										
<i>Solanum nigrum</i>	Black-berry Nightshade	Exotic	1		1	1	1						1														
<i>Solanum parvifolium</i>																											
<i>Solanum sp.</i>																											
<i>Sonchus asper subsp. glaucescens</i>		Exotic																									
<i>Sonchus oleraceus</i>	Common Sowthistle	Exotic	1					2	2	1	1	1									2		2				2
<i>Sorghum halepense</i>	Johnson Grass	Exotic																									
<i>Spergularia sp.</i>		Exotic																									
<i>Sporobolus caroli</i>																											
<i>Sporobolus creber</i>	Slender Rat's Tail Grass												1	1					1							2	
<i>Stachys arvensis</i>	Stagger Weed	Exotic																						1			
<i>Stackhousia viminea</i>	Slender Stackhousia							1				1			1	1		2	1					1			
<i>Swainsona galegifolia</i>	Smooth Darling-pea																										
<i>Themeda australis</i>	Kangaroo Grass										1												4	3	3	2	2
<i>Tragopogon porrifolius</i>	Oyster Plant	Exotic								1																	
<i>Tragus australianus</i>	Small Burgrass																										
<i>Trianthema sp.</i>																											
<i>Trifolium angustifolium</i>	Narrow-leaved Clover	Exotic																									
<i>Trifolium arvense</i>	Haresfoot Clover	Exotic						2				2		1		2						2			3	1	
<i>Trifolium campestre</i>	Hop Clover	Exotic					2	2				1					1	2				1			2	2	
<i>Trifolium dubium</i>	Yellow Suckling Clover	Exotic														1											
<i>Trifolium glomeratum</i>	Clustered Clover	Exotic																								2	
<i>Trifolium repens</i>	White Clover	Exotic																									
<i>Triptilodiscus pygmaeus</i>																											

Species	Species	Notes	Wood Control 1																								
			41_2011	41_2012	41_2013	41_2014	41_2015	42_2011	42_2012	42_2013	42_2014	42_2015	43_2011	43_2012	43_2013	43_2014	43_2015	44_2011	44_2012	44_2013	44_2014	44_2015	45_2011	45_2012	45_2013	45_2014	45_2015
<i>Urochloa panicoides</i>	Urochloa Grass	Exotic																									
<i>Verbascum thapsus</i>	Great Mullein	Exotic																									
<i>Verbascum virgatum</i>	Twiggy Mullein	Exotic																									
<i>Verbena bonariensis</i>	Purpletop	Exotic																									
<i>Verbena gaudichaudii</i>								1									1										
<i>Verbesina encelioides</i>		Exotic																									
<i>Vicia sp.</i>		Exotic																									
<i>Vittadinia cuneata</i>	Fuzzweed		1	2		1				2						1		1	2	1							
<i>Vittadinia dissecta</i>	Dissected New Holland Daisy							2																			
<i>Vittadinia muelleri</i>																											
<i>Vittadinia sp.</i>													1														
<i>Vulpia sp.</i>																											2
<i>Wahlenbergia communis</i>	Tufted Bluebell		2	1		1		2	1				2	1		1		2	1	1	1		2				
<i>Wahlenbergia gracilis</i>	Sprawling Bluebell																										
<i>Wahlenbergia luteola</i>																											
<i>Walwhalleya proluta</i>																											
<i>Xanthium occidentale</i>	Noogoora Burr	Exotic																									
<i>Xanthium spinosum</i>	Bathurst Burr	Exotic																									
<i>Xerochrysum bracteatum</i>	Golden Everlasting					2						1									1					1	1
<i>Xerochrysum viscosum</i>	Sticky Everlasting		2																				1				
<i>Zornia dyctiocarpa</i>	Zornia																										
Total number of species			39	22	21	27	30	45	27	28	25	25	30	22	21	21	24	40	18	21	31	27	41	25	23	29	33

3.6 Native groundcover species composition data analysis

Native groundcover species composition is variable between control plots and over time, with less than 20% similarity overall and no apparent trends as shown in the lack of any clear groupings in Figure 4. Groundcover communities at Wood_04 and Wood_05a also vary through time. Of all the rehabilitated zones, these two zones have the groundcover community most similar to the control plots. This is made evident by the proximity of the Wood_04 plot samples to those of Control wood 1 and 2 samples in Figure 4 and Figure 5. The remaining rehabilitated zones (Wood_06a, Wood_07c, Wood_10c and Burnt_13) have a high degree of variability through space and time (Figure 4).

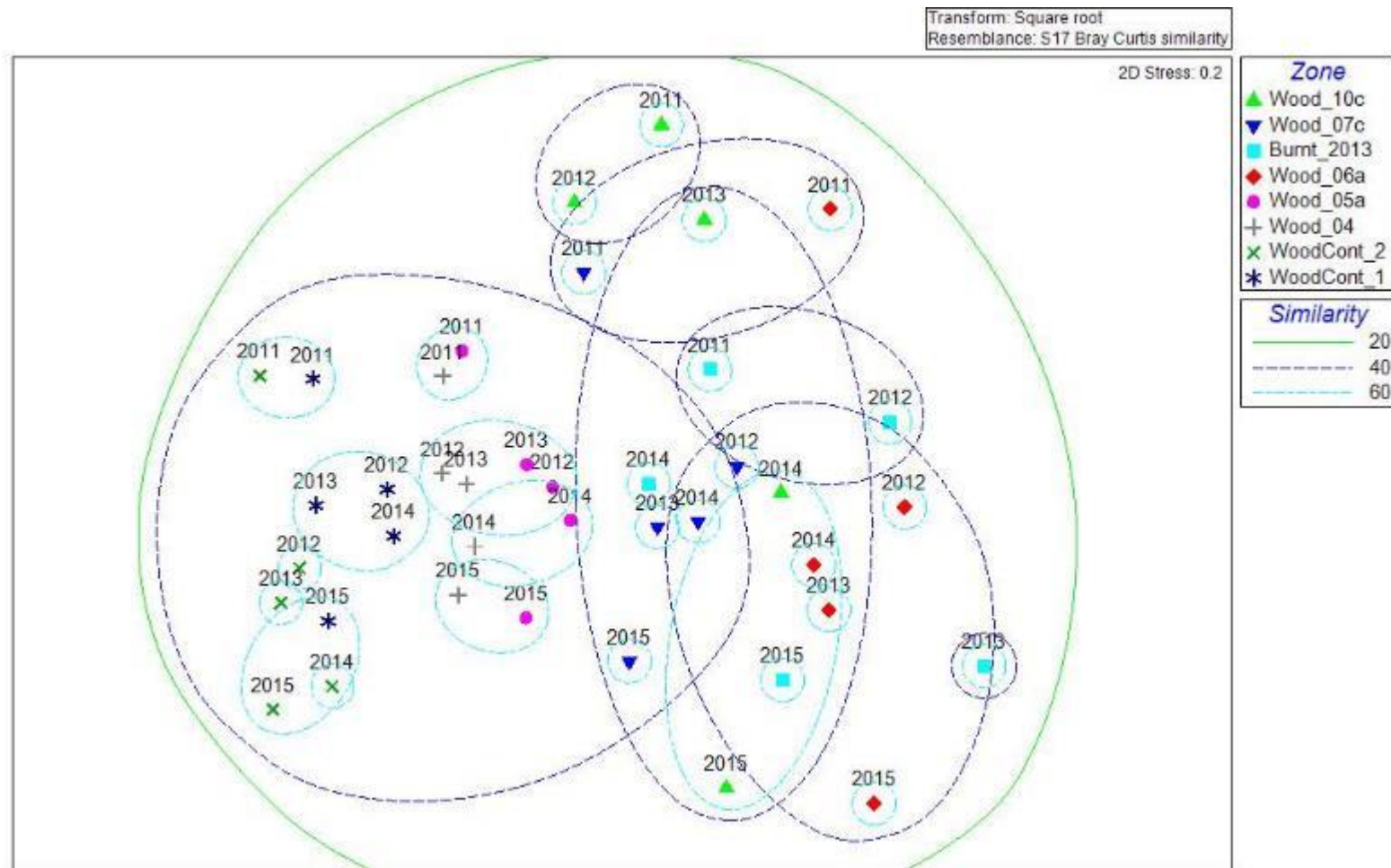


Figure 4: Cluster analysis Non-metric multi-dimensional scaling plot for native groundcover species abundance in Control and Rehabilitation zones for 2011 - 2015 monitoring periods

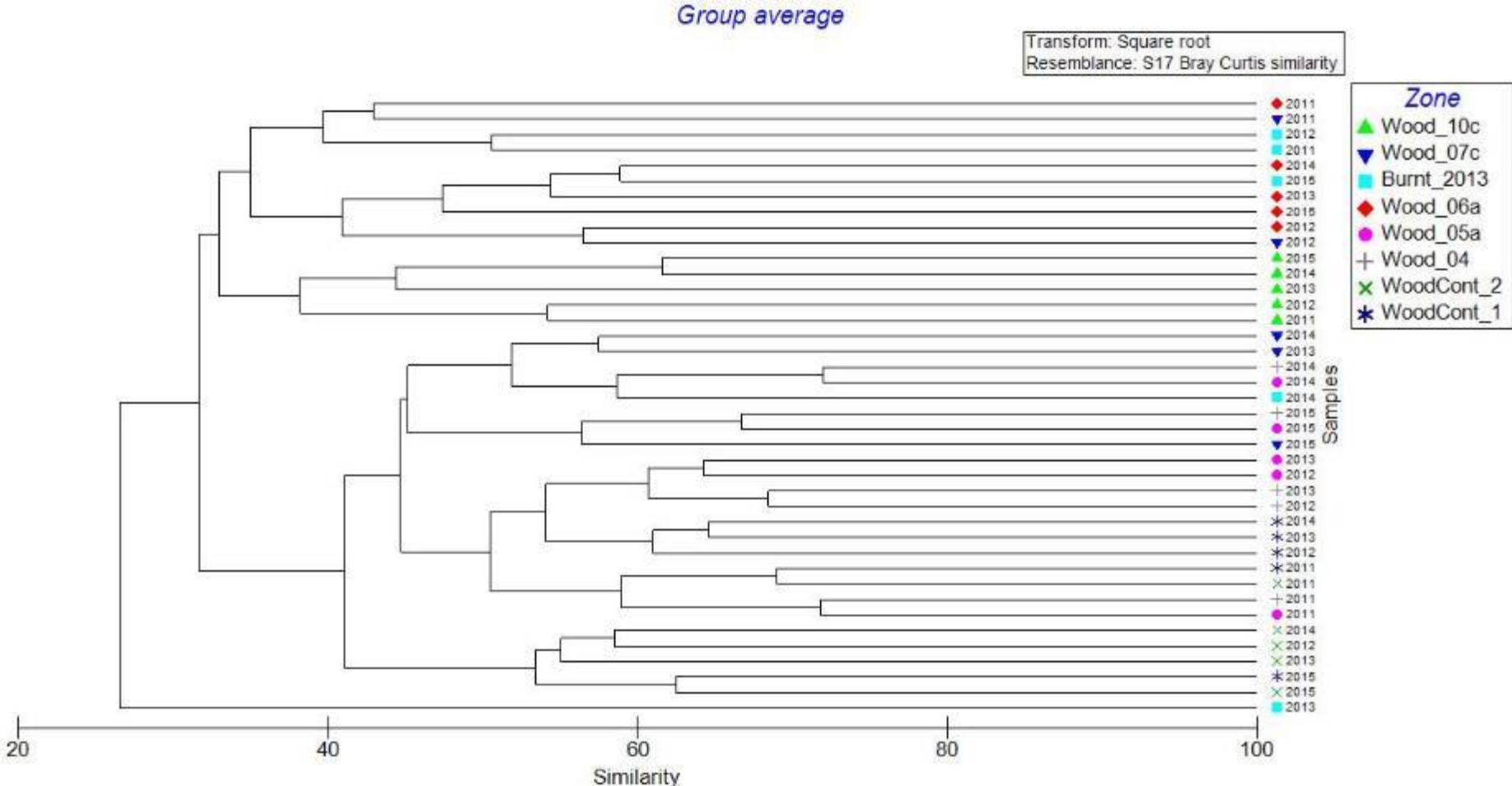


Figure 5: Cluster analysis for native groundcover species abundance in Control and Rehabilitation zones for 2011-2015 monitoring periods.

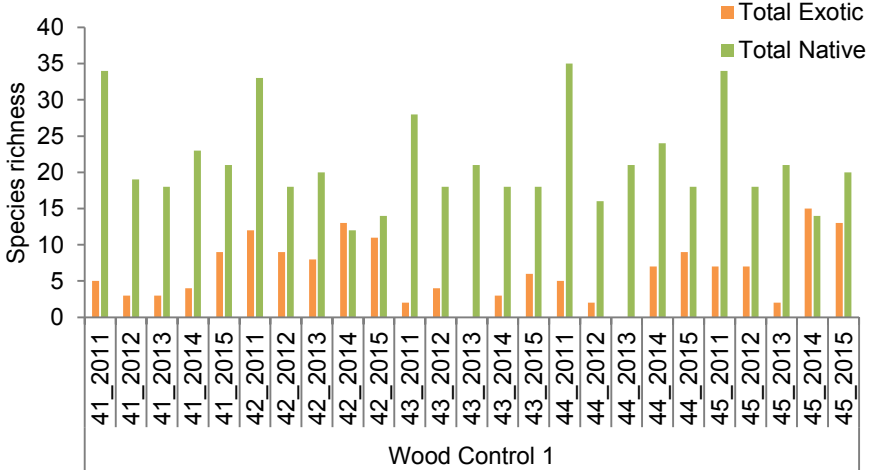


Figure 6: Groundcover species richness at Wood Control 1 (2011 - 2015)

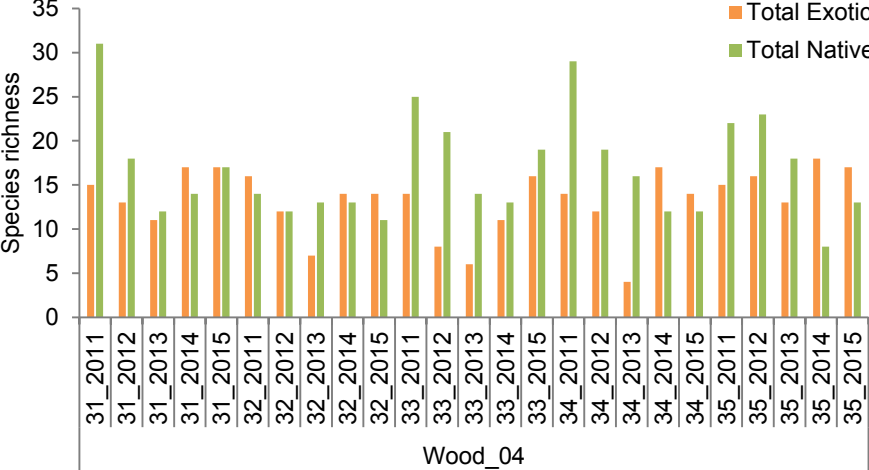


Figure 8: Groundcover species richness at Wood_04 (2011 - 2015)

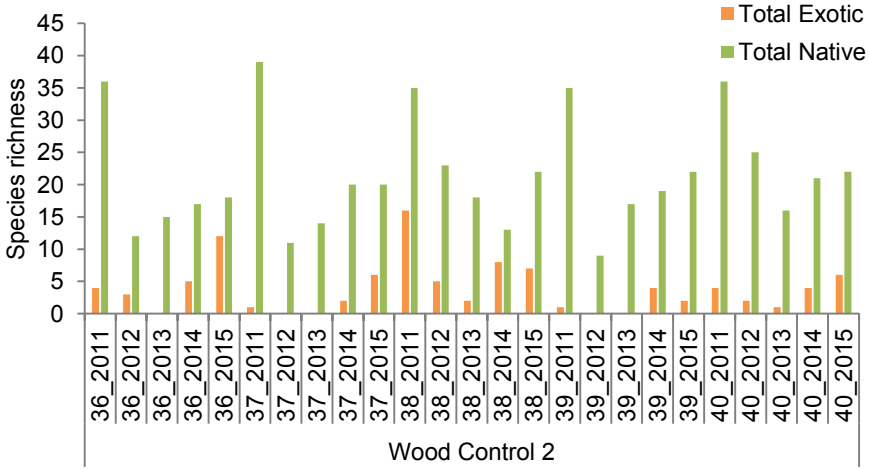


Figure 7: Groundcover species richness at Wood Control 2 (2011 - 2015)

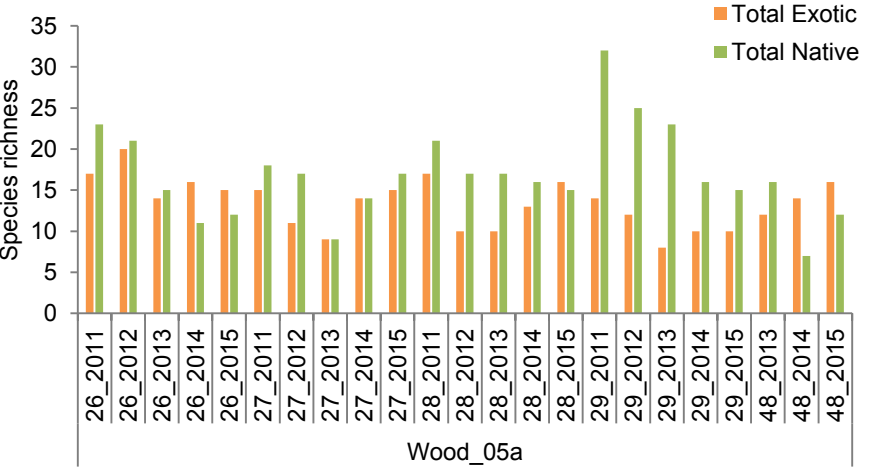


Figure 9: Groundcover species richness at Wood_05a (2011 - 2015)

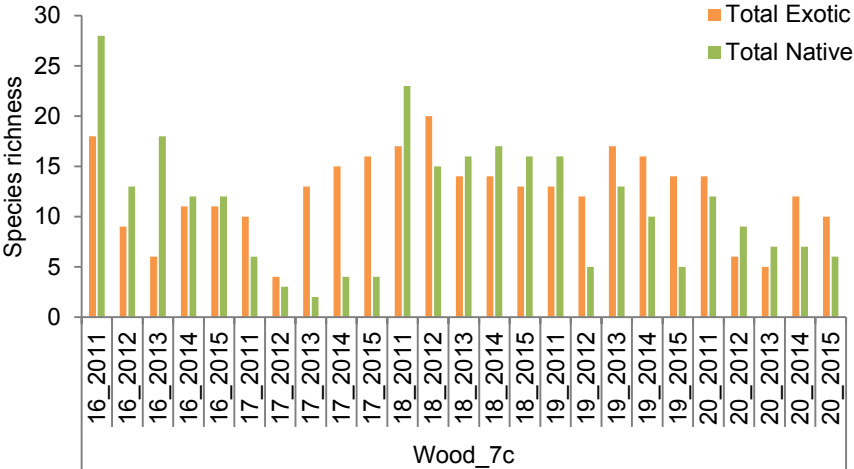


Figure 10: Groundcover species richness at Wood_07c (2011 - 2015)

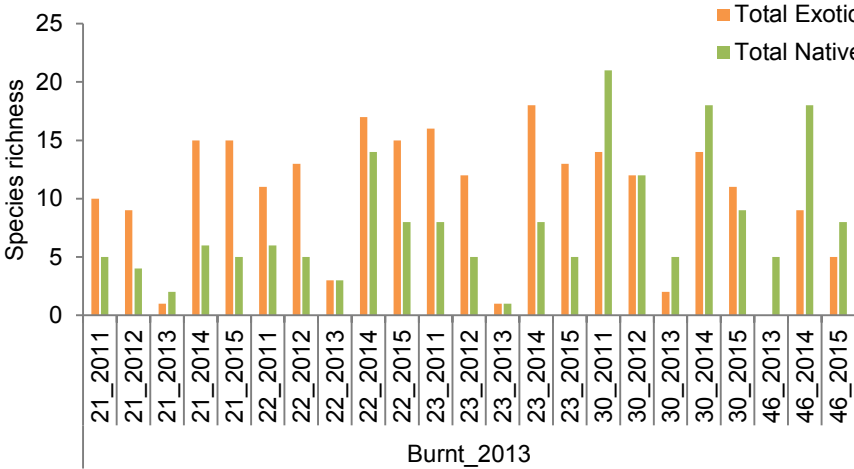


Figure 12: Groundcover species richness at Burnt_2013 (2011 - 2015)

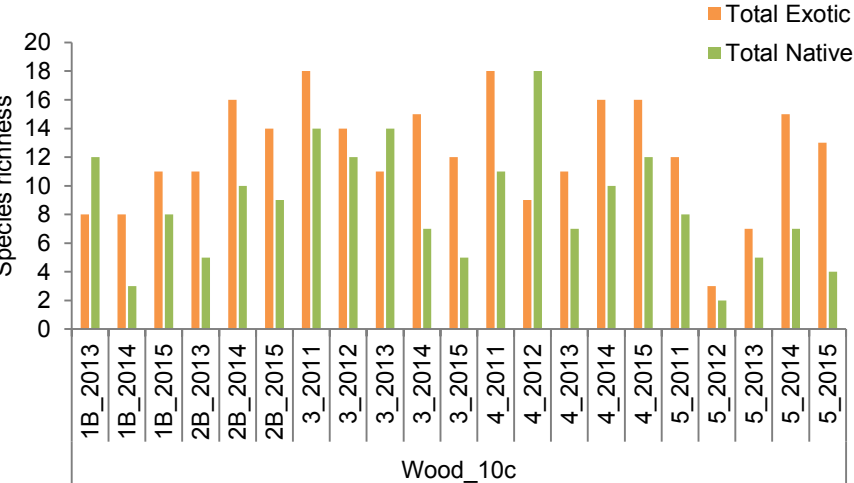


Figure 11: Groundcover species richness at Wood_10c (2011 - 2015)

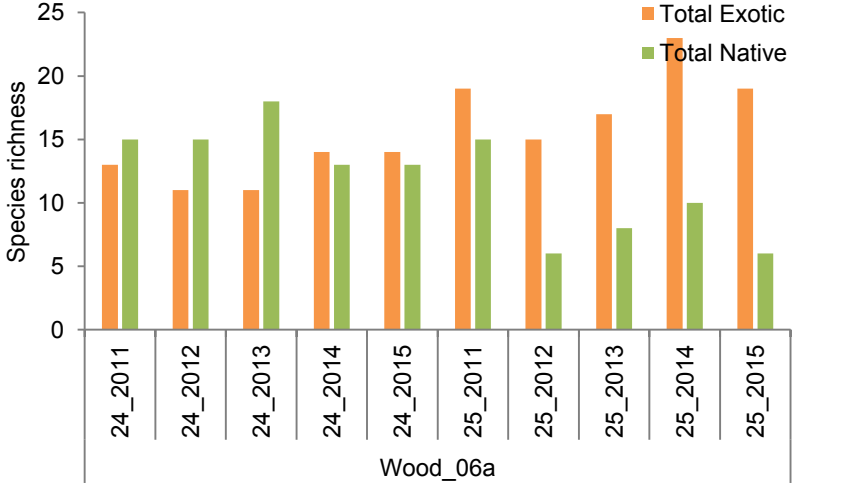


Figure 13: Groundcover species richness at Wood_06a (2011 - 2015)

3.7 Groundcover composition

Table 24: Groundcover composition for 2011 – 2015 monitoring periods

Treatment	Plot	Native species cover (%)					Exotic species cover (%)					Leaf litter cover (%)					Cryptogam cover (%)					Bare ground (%)					Rocks (%)				
		2011	2012	2013	2014	2015	2011	2012	2013	2014	2015	2011	2012	2013	2014	2015	2011	2012	2013	2014	2015	2011	2012	2013	2014	2015	2011	2012	2013	2014	2015
Wood_10c	1B	-	-	30	0	54	-	-	8	6	36	-	-	22	16	0	-	-	0	0	0	-	-	24	78	6	-	-	16	0	0
	2B	-	-	0	0	0	-	-	46	28	94	-	-	22	66	4	-	-	0	0	0	-	-	32	6	2	-	-	0	0	0
	3	20	12	22	26	32	23	46	12	10	60	23	30	34	60	4	0	0	0	0	0	34	12	26	4	4	0	0	6	0	0
	4	10	4	6	2	0	38	56	38	18	82	23	22	22	66	6	0	0	0	0	0	29	18	32	14	12	0	0	2	0	0
	5	0	0	4	0	0	58	74	46	26	40	8	2	14	56	44	0	0	0	0	0	34	24	32	18	16	0	0	4	0	0
Wood_07c	16	50	44	20	14	12	21	36	8	42	46	21	14	50	42	40	0	0	0	0	0	8	6	22	2	2	0	0	0	0	0
	17	0	0	0	0	0	54	84	46	44	48	2	6	34	36	26	0	0	0	0	0	44	10	20	20	26	0	0	0	0	0
	18	16	12	24	10	8	36	80	46	66	72	48	8	28	24	20	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
	19	10	0	4	10	6	58	80	38	52	58	16	16	38	30	30	0	0	0	0	0	16	4	20	8	6	0	0	0	0	0
	20	4	0	2	6	4	48	80	32	32	36	4	8	10	42	42	0	0	0	2	2	44	12	54	16	14	0	0	2	2	2
Burnt_2013	21	0	0	0	0	0	54	78	6	40	72	30	18	50	54	18	0	0	36	0	0	16	4	8	6	10	0	0	0	0	0
	22	0	0	0	2	2	54	39	8	30	88	30	61	38	62	8	0	0	0	0	0	16	0	54	6	2	0	0	0	0	0
	23	4	2	0	0	0	68	96	12	48	82	26	2	40	46	10	0	0	0	0	0	2	0	40	6	8	0	0	8	0	0
	30	8	0	0	2	0	70	92	14	58	66	22	8	28	34	30	0	0	56	0	0	0	0	2	6	4	0	0	0	0	0
	46	-	-	2	4	6	-	-	8	42	44	-	-	58	42	40	-	-	0	0	0	-	-	30	5	0	-	-	0	0	0
Wood_06a	24	12	10	6	2	2	41	68	58	58	66	14	14	26	32	28	0	0	0	0	0	33	8	10	8	4	0	0	0	0	0
	25	16	6	4	2	2	44	54	60	46	52	8	6	12	44	42	0	0	0	0	0	32	34	0	8	4	0	0	24	0	0
Wood_05	26	33	48	34	8	8	14	40	30	16	76	43	10	30	70	14	0	0	0	0	0	10	2	6	6	2	0	0	0	0	0
	27	52	82	32	38	36	14	12	8	12	52	30	4	50	50	12	0	0	0	0	0	4	2	10	0	0	0	0	0	0	0
	28	36	54	42	16	14	10	20	6	26	72	48	26	48	50	6	0	0	0	0	0	6	0	4	8	8	0	0	0	0	0
	29	64	52	50	20	28	12	36	4	30	64	18	12	38	48	8	0	0	0	0	0	6	0	8	2	0	0	0	0	0	0
	48	-	-	40	38	14	-	-	22	14	74	-	-	38	48	10	-	-	0	0	0	-	-	0	0	2	-	-	0	0	0
Wood_04	31	58	64	40	22	16	34	36	2	46	52	4	0	56	30	30	0	0	0	0	0	4	0	2	2	2	0	0	0	0	0
	32	53	50	40	22	28	31	16	0	28	64	10	24	46	50	6	0	0	0	0	0	6	10	14	0	2	0	0	0	0	0
	33	48	58	40	44	46	14	16	4	10	32	28	12	52	42	18	0	0	0	0	0	10	14	4	4	4	0	0	0	0	0
	34	47	50	46	24	22	24	42	10	28	32	27	8	42	46	44	0	0	0	0	0	2	0	2	2	2	0	0	0	0	0
	35	38	64	50	16	20	18	24	12	38	64	36	12	38	44	14	0	0	0	0	0	8	0	0	2	2	0	0	0	0	0
Wood Control 2	36	44	72	30	10	36	2	0	0	10	6	34	26	52	74	52	0	0	0	0	0	20	2	14	6	4	0	0	4	0	0
	37	22	40	26	8	12	0	0	2	0	0	58	60	46	74	80	2	0	0	0	0	18	0	26	18	8	0	0	0	0	0
	38	26	40	26	2	28	6	8	6	6	34	12	46	42	78	32	0	0	0	0	0	56	6	24	14	6	0	0	2	0	0
	39	48	74	28	20	24	2	0	0	4	4	40	22	44	70	60	0	4	10	4	2	10	0	14	2	10	0	0	4	0	0
	40	54	66	46	16	14	0	0	0	2	6	38	30	48	70	66	0	0	0	0	2	8	4	6	12	12	0	0	0	0	0
Wood Control 1	41	50	40	44	30	28	0	0	0	0	4	38	60	54	62	60	0	0	0	0	0	12	0	2	8	8	0	0	0	0	0
	42	43	70	64	16	16	6	0	0	6	12	41	26	36	72	66	0	0	0	0	0	10	4	0	6	6	0	0	0	0	0
	43	50	54	54	26	22	0	0	0	0	4	40	42	40	66	66	0	0	0	0	0	10	4	6	8	8	0	0	0	0	0
	44	54	44	44	22	18	0	0	0	6	10	42	52	54	70	70	0	0	0	0	0	4	4	2	2	2	0	0	0	0	0
	45	72	84	62	28	24	2	0	0	16	22	26	16	34	54	52	0	0	0	0	0	0	0	4	2	2	0	0	0	0	0
Min (all sites)		0	0	0	0	0	0	0	0	0	2	0	10	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Max (all sites)		72	84	64	44	54	70	96	60	66	94	58	61	58	78	80	2	4	56	4	2	56	34	54	78	26	0	0	24	2	2
Average (all sites)		32	36	26	14	16	26	37	16	25	47	27	21	38	52	31	1	0	3	0	0	15	6	15	8	6	0	0	0	0	0

Table 25: Groundcover ANOVA results (note cells shaded orange indicate significant temporal change (p<0.05) within Wood_10c, Wood_07c, Wood_06a and Burnt_2013; cells shaded green indicate significant (p>0.05) temporal change within zones)

Monitoring zone		Wood_10c					Wood_07c					Wood_6a					Burnt 2013				
Monitoring year		2011	2012	2013	2014	2015	2011	2012	2013	2014	2015	2011	2012	2013	2014	2015	2011	2012	2013	2014	2015
Native Cover (%)	Mean	10.00	5.33	12.40	5.60	17.20	16.00	11.20	10.00	8.00	6.00	14.00 ^A	8.00 ^{AB}	5.00 ^B	2.00 ^B	2.00 ^B	3.00	0.50	0.40	1.60	1.60
	Standard deviation	10.00	6.11	12.91	11.44	24.80	19.95	19.06	11.14	5.29	4.47	2.82	2.82	1.41	0.00	0.00	3.82	1.00	0.89	1.67	2.61
	P-value	0.77					0.82					0.00					0.45				
Exotic cover (%)	Mean	39.67 ^{AB}	58.67 ^A	30.00 ^{AB}	17.60 ^A	62.40 ^B	43.40 ^{AB}	72.00 ^A	34.00 ^B	47.20 ^{AB}	52.00 ^{AB}	42.50	61.00	59.00	52.00	59.00	61.50 ^{AB}	76.25 ^A	9.60 ^C	43.60 ^B	70.40 ^{AB}
	Standard deviation	17.56	14.19	18.60	9.63	25.43	15.03	20.20	15.68	12.70	13.64	2.12	9.90	1.41	8.49	9.89	8.7	26.00	32.80	10.33	17.05
	P-value	0.00					0.02					0.21					0.00				
Leaf litter (%)	Mean	18.00 ^B	18.00 ^B	22.80 ^{AB}	52.80 ^A	11.6 ^B	18.2 ^{AB}	10.40 ^B	32.00 ^{AB}	34.00 ^A	31.60 ^{AB}	11.00	10.00	19.00	38.00	35.00	27.00 ^A	22.25 ^A	42.6 ^B	47.60 ^B	21.20 ^A
	Standard deviation	8.66	14.42	7.15	21	18.24	18.47	4.34	14.7	7.82	9.32	4.24	5.66	9.9	8.48	9.89	3.83	26.66	11.54	10.80	13.61
	P-value	0.01					0.02					0.05					0.04				
Bare ground (%)	Mean	32.33	18.00	29.20	24.00	80	22.40	6.40	23.60	9.20	9.60	32.50	24.00	5.00	8.00	4.00	8.50 ^{AB}	1.00 ^B	43.2 ^A	7.20 ^{AB}	4.8 ^B
	Standard deviation	2.88	6.00	3.90	30.72	5.83	20.51	4.75	18.84	8.67	10.62	0.70	18.39	7.07	0.00	0.00	8.70	2.00	11.37	2.68	4.15
	P-value	0.22					0.19					0.08					0.01				

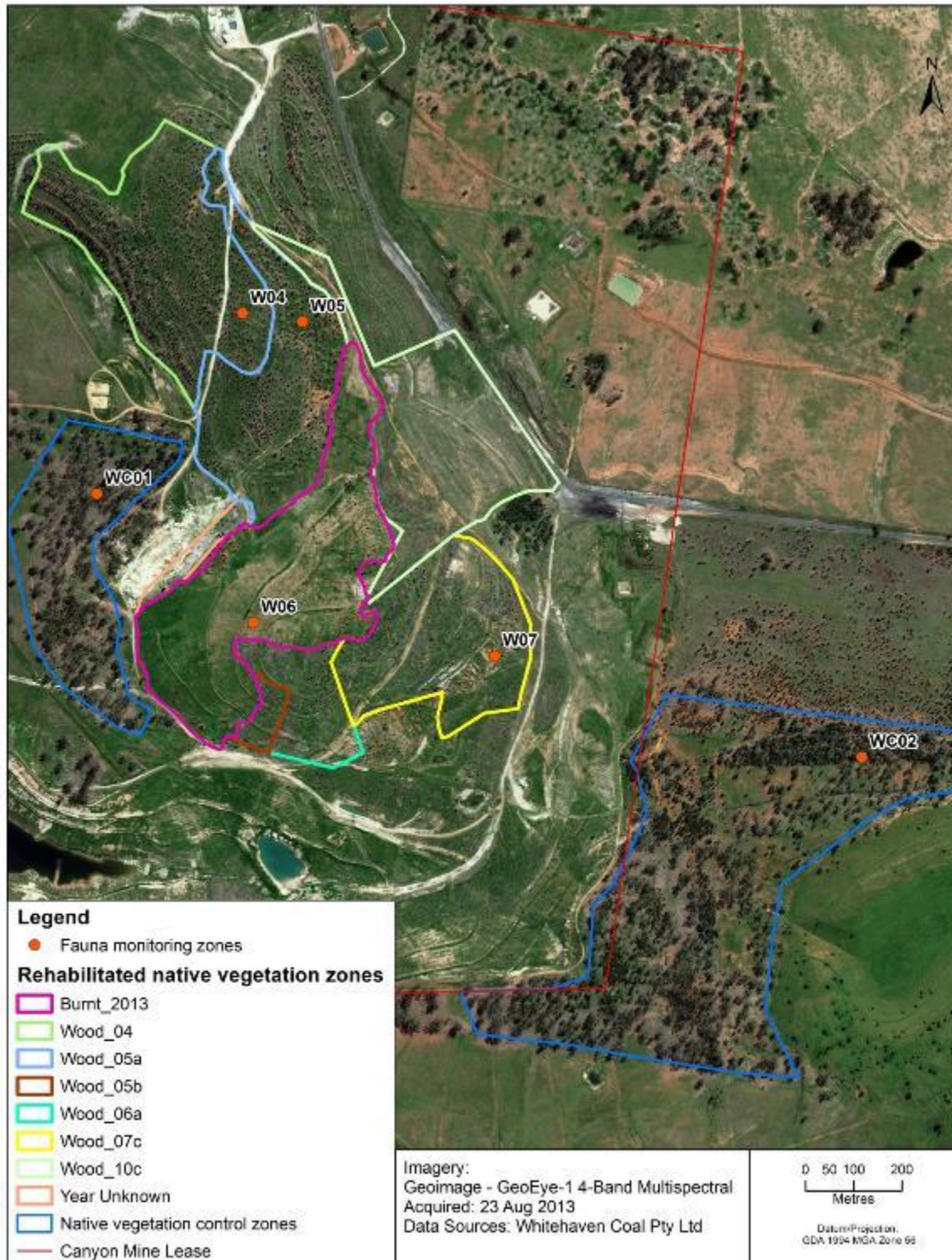
Common superscript indicates no significant difference in means (p>0.05).

Table 26: Groundcover ANOVA results (note cells shaded orange indicate significant temporal change (p<0.05) within Wood_04, Wood_05a, Control Wood 2 and Control Wood 1; cells shaded green indicate significant (p>0.05) temporal change within zones)

Monitoring zone		Wood_04					Wood_05a					Control Wood 2					Control Wood 1				
Monitoring year		2011	2012	2013	2014	2051	2011	2012	2013	2014	2015	2011	2012	2013	2014	2015	2011	2012	2013	2014	2015
Native Cover (%)	Mean	48.80 ^A	57.20 ^A	43.20 ^A	25.60 ^B	26.40 ^B	46.25 ^{AB}	59.00 ^A	39.50 ^{BC}	24.00 ^{BC}	20.00 ^C	38.80 ^{AB}	58.40 ^A	31.20 ^{BC}	11.20 ^C	22.80 ^{BC}	53.80 ^A	58.40 ^A	53.60 ^A	24.40 ^B	21.60 ^B
	Standard deviation	7.46	7.01	4.60	10.71	11.78	14.48	15.54	8.23	13.49	11.58	14.04	17.05	8.44	7.01	9.96	10.92	18.41	9.53	5.55	4.77
	P-value	0.00					0.00					0.00					0.00				
Exotic cover (%)	Mean	24.20 ^{CB}	26.80 ^{ABC}	5.60 ^C	30.00 ^{AB}	48.8A	12.50 ^B	27.00 ^B	12.00 ^B	19.60 ^B	67.60 ^A	2.00	1.60	1.60	4.40	10.00	1.60 ^B	0.00 ^B	0.00 ^B	5.60 ^{AB}	10.40 ^A
	Standard deviation	8.44	11.8	5.18	13.49	16.1	1.91	13.22	12.11	7.92	9.84	2.45	3.58	2.07	3.85	13.64	2.61	0.00	0.00	6.54	7.40
	P-value	0.00					0.00					0.26					0.00				
Leaf litter (%)	Mean	21.00 ^C	11.20 ^C	46.80 ^A	42.40 ^{AB}	22.40 ^{BC}	34.75 ^B	13.00 ^C	40.8 ^{AB}	53.2 ^A	10.00 ^C	36.40 ^A	36.80 ^A	46.40 ^A	73.20 ^B	58.00 ^{AB}	37.40 ^C	39.20 ^C	43.60 ^{BC}	64.80 ^A	62.80 ^{AB}
	Standard deviation	13.42	8.67	7.29	7.54	14.86	13.5	9.31	8.19	9.44	3.16	16.46	15.85	3.85	3.35	17.78	6.54	18.14	9.74	7.15	7.01
	P-value	0.00					0.00					0.00					0.00				
Bare ground (%)	Mean	6.00	4.80	4.40	2.00	2.40	6.50	1.00	5.60	3.20	2.40	22.40 ^A	2.40 ^B	16.80 ^{AB}	10.40 ^{AB}	8.00 ^{AB}	7.20	2.40	2.80	5.20	5.20
	Standard deviation	3.16	6.72	5.55	1.41	0.89	2.52	1.15	3.85	3.63	3.29	19.46	2.61	8.2	13.00	3.16	5.02	2.19	2.28	3.03	3.03
	P-value	0.54					0.11					0.04					0.17				

Common superscript indicates no significant difference in means (p>0.05)

3 Fauna data



This map is not guaranteed to be free from error or omission. Eco Logical Australia Pty Ltd and its employees disclaim liability for any act done on the information in the map and any consequences of such acts or omissions.

Figure 14: Location of Fauna Monitoring Sites

Table 27: Bird species and associated feeding guilds recorded at W01 in 2011 - 2015 in Spring

Species	Common Name	Guild	Notes	Reference Sites					
				WC01					
				2011	2012	2013 (Oct)	2013 (Sept)	2014 (Nov)	2015 (Oct)
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater	Canopy feeder							
<i>Acanthiza apicalis</i>	Inland Thornbill	Generalist - insects							
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill	Ground forager - insects							
<i>Acanthiza nana</i>	Yellow Thornbill	Canopy feeder							
<i>Acanthiza Uropygialis</i>	Chestnut-rumped Thornbill	Generalist - insects							
<i>Accipiter fasciatus</i>	Brown Goshawk	Bird of Prey		X					
<i>Anas gracilis</i>	Grey Teal	Water Bird							
<i>Anas superciliosa</i>	Pacific Black Duck	Water Bird							
<i>Anthus novaeseelandiae</i>	Australasian Pipit	Ground forager - insects							
<i>Aphelocephala leucopsis</i>	Southern Whiteface	Ground forager - omnivorous							
<i>Aprosmictus erythropterus</i>	Red-winged Parrot	Canopy feeder							
<i>Aquila audax</i>	Wedge-tailed Eagle	Bird of Prey							
<i>Ardea pacifica</i>	White-necked Heron	Ground forager - omnivorous							
<i>Artamus superciliosus</i>	White-browed Woodswallow	Generalist - insects							
<i>Aythya australis</i>	Hardhead	Water Bird							
<i>Barnardius zonarius</i>	Australian Ringneck	Generalist - plant based				X			
<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	Generalist - plant based	X		X				1
<i>Cacatua sanguinea</i>	Little Corella	Ground forager - plant based	X	X			X		2
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo	Generalist - insects							
<i>Chalcites basalis</i>	Horsfield's Bronze-Cuckoo	Generalist - insects							
<i>Chenonetta jubata</i>	Australian Wood Duck	Water Bird	X						
<i>Chthonicola sagittata</i>	Speckled Warbler	Ground forager - insects							
<i>Cincloramphus mathewsi</i>	Rufous Songlark	Ground forager - insects							
<i>Cisticola exilis</i>	Golden-headed Cisticola	Ground forager - insects							
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	Generalist - insects					X		
<i>Corcorax melanoramphos</i>	White-winged Chough	Ground forager - insects	X		X		X		5

Species	Common Name	Guild	Notes	Reference Sites					
				WC01					
				2011	2012	2013 (Oct)	2013 (Sept)	2014 (Nov)	2015 (Oct)
<i>Corvus coronoides</i>	Australian Raven	Generalist - carnivorous		X			X		
<i>Corvus mellori</i>	Little Raven	Generalist - insects							1
<i>Corvus orru</i>	Torresian Crow	Ground forager - omnivorous							
<i>Coturnix ypsilophora</i>	Brown Quail	Ground forager - plant based							
<i>Cracticus nigrogularis</i>	Pied Butcherbird	Generalist - carnivorous			X		X	X	1
<i>Cracticus tibicen</i>	Australian Magpie	Generalist - carnivorous		X	X	X	X	X	2
<i>Cracticus torquatus</i>	Grey Butcherbird	Generalist - carnivorous		X	X	X	X	X	2
<i>Dacelo novaeguineae</i>	Laughing Kookaburra	Generalist - carnivorous			X	X			
<i>Dicaeum hirundinaceum</i>	Mistletoebird	Canopy feeder							
<i>Egretta novaehollandiae</i>	White-faced Heron	Water Bird		X					
<i>Elanus axillaris</i>	Black-shouldered Kite	Bird of Prey			X				
<i>Entomyzon cyanotis</i>	Blue-faced Honeyeater	Generalist - insects							
<i>Eolophus roseicapillus</i>	Galah	Ground forager - plant based		X	X	X	X	X	7
<i>Eopsaltria australis</i>	Eastern Yellow Robin	Generalist - insects							
<i>Eurystomus orientalis</i>	Dollarbird	Aerial forager							
<i>Falco berigora</i>	Brown Falcon	Bird of Prey							
<i>Falco cenchroides</i>	Nankeen Kestrel	Bird of Prey		X		X		X	
<i>Falco longipennis</i>	Australian Hobby	Bird of Prey		X		X			
<i>Falco peregrinus</i>	Peregrine Falcon	Bird of Prey							
<i>Falco subniger</i>	Black Falcon	Bird of Prey	Vulnerable - TSC Act		X				
<i>Fulica atra</i>	Eurasian Coot	Water Bird							
<i>Geopelia striata</i>	Peaceful Dove	Ground forager - plant based							
<i>Gerygone fusca</i>	Western Gerygone	Canopy feeder							
<i>Glossopsitta concinna</i>	Musk Lorikeet	Canopy feeder		X					
<i>Grallina cyanoleuca</i>	Magpie-lark	Ground forager - insects		X	X	X		X	
<i>Haliastur sphenurus</i>	Whistling Kite	Bird of Prey				X			
<i>Hieraaetus morphnoides</i>	Little Eagle	Bird of Prey	Vulnerable – TSC Act	X					
<i>Hirundapus caudacutus</i>	White-throated Needletail	Aerial forager							
<i>Hirundo neoxena</i>	Welcome Swallow	Generalist - insects							
<i>Lalage sueurii</i>	White-winged Triller	Aerial forager							
<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater	Canopy feeder							

Species	Common Name	Guild	Notes	Reference Sites					
				WC01					
				2011	2012	2013 (Oct)	2013 (Sept)	2014 (Nov)	2015 (Oct)
<i>Lichenostomus virescens</i>	Singing Honeyeater	Generalist							
<i>Malurus cyaneus</i>	Superb Fairy-wren	Ground forager - insects							
<i>Malurus leucopterus</i>	White-winged Fairy-wren	Ground forager - insects							
<i>Manorina melanocephala</i>	Noisy Miner	Generalist		X	X	X	X	X	15
<i>Megalurus timoriensis</i>	Tawny Grassbird	Ground forager - insects							
<i>Melanodryas cucullata</i>	Hooded Robin	Ground forager - insects	Vulnerable - TSC Act					X	
<i>Microeca fascinans</i>	Jacky Winter	Ground forager - insects							
<i>Mirafra javanica</i>	Horsfield's Bushlark	Generalist - plant based							
<i>Myiagra inquieta</i>	Restless Flycatcher	Generalist - insects							
<i>Neochmia modesta</i>	Plum-headed Finch	Ground forager - plant based							
<i>Northiella haematogaster</i>	Blue Bonnet	Ground forager - plant based							
<i>Nymphicus hollandicus</i>	Cockatiel	Ground forager - plant based		X	X	X	X	X	1
<i>Ocyphaps lophotes</i>	Crested Pigeon	Ground forager - plant based		X	X	X	X	X	5
<i>Pachycephala pectoralis</i>	Golden Whistler	Generalist - insects							
<i>Pachycephala rufiventris</i>	Rufous Whistler	Canopy feeder							
<i>Pardalotus punctatus</i>	Spotted Pardalote	Canopy feeder							
<i>Pardalotus striatus</i>	Striated Pardalote	Canopy feeder							
<i>Pelecanus conspicillatus</i>	Australian Pelican	Generalist - carnivorous							
<i>Petrochelidon ariel</i>	Fairy Martin	Aerial forager							
<i>Petrochelidon nigricans</i>	Tree Martin	Aerial forager							
<i>Petroica goodenovii</i>	Red-capped Robin	Ground forager - insects							
<i>Phaps chalcoptera</i>	Common Bronzewing	Ground forager - plant based							
<i>Philemon corniculatus</i>	Noisy Friarbird	Canopy feeder							
<i>Platycercus eximius</i>	Eastern Rosella	Generalist - plant based		X	X	X	X	X	4
<i>Plectorhyncha lanceolata</i>	Striped Honeyeater	Generalist - plant based							
<i>Pomatostomus temporalis</i>	Grey-crowned Babbler	Ground forager - insects	Vulnerable – TSC Act	X	X	X	X	X	10
<i>Psephotus haematonotus</i>	Red-rumped Parrot	Ground forager - plant based			X	X	X	X	2
<i>Rhipidura albiscapa</i>	Grey Fantail	Generalist - insects							
<i>Rhipidura leucophrys</i>	Willie Wagtail	Aerial forager							

Species	Common Name	Guild	Notes	Reference Sites					
				WC01					
				2011	2012	2013 (Oct)	2013 (Sept)	2014 (Nov)	2015 (Oct)
<i>Scythrops navaehollandiae</i>	Channel-billed Cuckoo	Canopy feeder				X		X	
<i>Smicromnis brevirostris</i>	Weebill	Canopy feeder							
<i>Struthidea cinerea</i>	Apostlebird	Ground forager - omnivorous		X		X		X	20
<i>Sturnus tristis</i>	Common Myna	Generalist	Exotic						
<i>Sturnus vulgaris</i>	Common Starling	Ground forager - omnivorous	Exotic				X	X	2
<i>Tachybaptus novaehollandiae</i>	Australian Grebe	Water Bird							
<i>Taeniopygia bichenovii</i>	Double-barred Finch	Ground forager - plant based							
<i>Taeniopygia guttata</i>	Zebra Finch	Ground forager - plant based							
<i>Threskiornis spinicollis</i>	Straw-necked Ibis	Water Bird							
<i>Todiramphus sanctus</i>	Sacred Kingfisher	Generalist - carnivorous							
<i>Turdus merula</i>	Common Blackbird	Ground forager - omnivorous							
<i>Turnix varia</i>	Painted Button-quail	Ground forager - omnivorous		X					
<i>Vanellis tricolor</i>	Banded Lapwing	Ground forager - insects							
<i>Vanellus miles</i>	Masked Lapwing	Ground forager - insects							
Total number of species				21	16	18	13	19	16

Table 28: Bird species and associated feeding guilds recorded at W02 in 2011 - 2015 in Spring

Species	Common Name	Guild	Notes	Reference Sites				
				WC02				
				2012	2013 (Oct)	2013 (Sept)	2014 (Nov)	2015 (Oct)
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater	Canopy feeder		X	X	X		2
<i>Acanthiza apicalis</i>	Inland Thornbill	Generalist - insects		X	X	X	X	4
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill	Ground forager - insects			X	X	X	8
<i>Acanthiza nana</i>	Yellow Thornbill	Canopy feeder		X	X	X	X	4
<i>Acanthiza Uropygialis</i>	Chestnut-rumped Thornbill	Generalist - insects		X	X	X		2
<i>Accipiter fasciatus</i>	Brown Goshawk	Bird of Prey			X			
<i>Anas gracilis</i>	Grey Teal	Water Bird						
<i>Anas superciliosa</i>	Pacific Black Duck	Water Bird						
<i>Anthus novaeseelandiae</i>	Australasian Pipit	Ground forager - insects						
<i>Aphelocephala leucopsis</i>	Southern Whiteface	Ground forager - omnivorous					X	2
<i>Aprosmictus erythropterus</i>	Red-winged Parrot	Canopy feeder			X			2
<i>Aquila audax</i>	Wedge-tailed Eagle	Bird of Prey			X	X		
<i>Ardea pacifica</i>	White-necked Heron	Ground forager - omnivorous						
<i>Artamus superciliosus</i>	White-browed Woodswallow	Generalist - insects		X	X		X	
<i>Aythya australis</i>	Hardhead	Water Bird			X			
<i>Barnardius zonarius</i>	Australian Ringneck	Generalist - plant based		X	X	X	X	2
<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	Generalist - plant based			X			1
<i>Cacatua sanguinea</i>	Little Corella	Ground forager - plant based			X		X	20
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo	Generalist - insects						
<i>Chalcites basalis</i>	Horsfield's Bronze-Cuckoo	Generalist - insects				X		
<i>Chenonetta jubata</i>	Australian Wood Duck	Water Bird						
<i>Chthonicola sagittata</i>	Speckled Warbler	Ground forager - insects	Vulnerable - TSC Act	X	X	X	X	4
<i>Cincloramphus mathewsi</i>	Rufous Songlark	Ground forager - insects			X	X		2
<i>Cisticola exilis</i>	Golden-headed Cisticola	Ground forager - insects						
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	Generalist - insects			X	X	X	1
<i>Corcorax melanoramphos</i>	White-winged Chough	Ground forager - insects		X	X	X	X	14
<i>Corvus coronoides</i>	Australian Raven	Generalist - carnivorous		X		X	X	3
<i>Corvus mellori</i>	Little Raven	Generalist - insects						
<i>Corvus orru</i>	Torresian Crow	Ground forager - omnivorous						
<i>Coturnix ypsilophora</i>	Brown Quail	Ground forager - plant based						
<i>Cracticus nigrogularis</i>	Pied Butcherbird	Generalist - carnivorous		X	X	X	X	1
<i>Cracticus tibicen</i>	Australian Magpie	Generalist - carnivorous		X	X	X	X	10
<i>Cracticus torquatus</i>	Grey Butcherbird	Generalist - carnivorous			X	X		
<i>Dacelo novaeguineae</i>	Laughing Kookaburra	Generalist - carnivorous		X	X	X	X	1

Species	Common Name	Guild	Notes	Reference Sites				
				WC02				
				2012	2013 (Oct)	2013 (Sept)	2014 (Nov)	2015 (Oct)
<i>Dicaeum hirundinaceum</i>	Mistletoebird	Canopy feeder		X	X			1
<i>Egretta novaehollandiae</i>	White-faced Heron	Water Bird						
<i>Elanus axillaris</i>	Black-shouldered Kite	Bird of Prey						
<i>Entomyzon cyanotis</i>	Blue-faced Honeyeater	Generalist - insects						
<i>Eolophus roseicapillus</i>	Galah	Ground forager - plant based		X	X	X	X	10
<i>Eopsaltria australis</i>	Eastern Yellow Robin	Generalist - insects		X	X	X	X	1
<i>Eurystomus orientalis</i>	Dollarbird	Aerial forager						
<i>Falco berigora</i>	Brown Falcon	Bird of Prey						
<i>Falco cenchroides</i>	Nankeen Kestrel	Bird of Prey						
<i>Falco longipennis</i>	Australian Hobby	Bird of Prey			X		X	
<i>Falco peregrinus</i>	Peregrine Falcon	Bird of Prey						
<i>Falco subniger</i>	Black Falcon	Bird of Prey	Vulnerable - TSC Act					
<i>Fulica atra</i>	Eurasian Coot	Water Bird						
<i>Geopelia striata</i>	Peaceful Dove	Ground forager - plant based		X		X		
<i>Gerygone fusca</i>	Western Gerygone	Canopy feeder		X	X		X	2
<i>Glossopsitta concinna</i>	Musk Lorikeet	Canopy feeder						
<i>Grallina cyanoleuca</i>	Maggie-lark	Ground forager - insects			X	X	X	4
<i>Haliastur sphenurus</i>	Whistling Kite	Bird of Prey						
<i>Hieraaetus morphnoides</i>	Little Eagle	Bird of Prey	Vulnerable - TSC Act					
<i>Hirundapus caudacutus</i>	White-throated Needletail	Aerial forager						
<i>Hirundo neoxena</i>	Welcome Swallow	Generalist - insects						
<i>Lalage sueurii</i>	White-winged Triller	Aerial forager			X		X	2
<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater	Canopy feeder		X	X	X	X	4
<i>Lichenostomus virescens</i>	Singing Honeyeater	Generalist				X		
<i>Malurus cyaneus</i>	Superb Fairy-wren	Ground forager - insects		X	X	X	X	8
<i>Malurus leucopterus</i>	White-winged Fairy-wren	Ground forager - insects						
<i>Manorina melanocephala</i>	Noisy Miner	Generalist		X	X	X	X	15
<i>Megalurus timoriensis</i>	Tawny Grassbird	Ground forager - insects						
<i>Melanodryas cucullata</i>	Hooded Robin	Ground forager - insects	Vulnerable - TSC Act		X		X	3
<i>Microeca fascinans</i>	Jacky Winter	Ground forager - insects		X	X	X	X	2
<i>Mirafra javanica</i>	Horsfield's Bushlark	Generalist - plant based						
<i>Myiagra inquieta</i>	Restless Flycatcher	Generalist - insects						1
<i>Neochmia modesta</i>	Plum-headed Finch	Ground forager - plant based						
<i>Northiella haematogaster</i>	Blue Bonnet	Ground forager - plant based			X	X	X	3
<i>Nymphicus hollandicus</i>	Cockatiel	Ground forager - plant based			X	X		

Species	Common Name	Guild	Notes	Reference Sites				
				WC02				
				2012	2013 (Oct)	2013 (Sept)	2014 (Nov)	2015 (Oct)
<i>Ocyphaps lophotes</i>	Crested Pigeon	Ground forager - plant based		X	X	X	X	3
<i>Pachycephala pectoralis</i>	Golden Whistler	Generalist - insects						1
<i>Pachycephala rufiventris</i>	Rufous Whistler	Canopy feeder		X	X	X	X	6
<i>Pardalotus punctatus</i>	Spotted Pardalote	Canopy feeder		X				
<i>Pardalotus striatus</i>	Striated Pardalote	Canopy feeder				X	X	1
<i>Pelecanus conspicillatus</i>	Australian Pelican	Generalist - carnivorous						
<i>Petrochelidon ariel</i>	Fairy Martin	Aerial forager			X			
<i>Petrochelidon nigricans</i>	Tree Martin	Aerial forager						
<i>Petroica goodenovii</i>	Red-capped Robin	Ground forager - insects		X	X	X	X	4
<i>Phaps chalcoptera</i>	Common Bronzewing	Ground forager - plant based		X	X		X	
<i>Philemon corniculatus</i>	Noisy Friarbird	Canopy feeder			X	X		
<i>Platycercus eximius</i>	Eastern Rosella	Generalist - plant based		X	X	X	X	4
<i>Plectorhyncha lanceolata</i>	Striped Honeyeater	Generalist - plant based			X	X		1
<i>Pomatostomus temporalis</i>	Grey-crowned Babbler	Ground forager - insects	Vulnerable - TSC Act	X	X	X	X	8
<i>Psephotus haematonotus</i>	Red-rumped Parrot	Ground forager - plant based			X	X	X	5
<i>Rhipidura albiscapa</i>	Grey Fantail	Generalist - insects		X	X	X	X	2
<i>Rhipidura leucophrys</i>	Willie Wagtail	Aerial forager		X	X	X	X	6
<i>Scythrops navaehollandiae</i>	Channel-billed Cuckoo	Canopy feeder						
<i>Smicromnis brevirostris</i>	Weebill	Canopy feeder		X	X	X	X	4
<i>Struthidea cinerea</i>	Apostlebird	Ground forager - omnivorous		X	X		X	15
<i>Sturnus tristis</i>	Common Myna	Generalist	Exotic					
<i>Sturnus vulgaris</i>	Common Starling	Ground forager - omnivorous	Exotic			X		
<i>Tachybaptus novaehollandiae</i>	Australian Grebe	Water Bird						
<i>Taeniopygia bichenovii</i>	Double-barred Finch	Ground forager - plant based			X	X	X	4
<i>Taeniopygia guttata</i>	Zebra Finch	Ground forager - plant based						
<i>Threskiornis spinicollis</i>	Straw-necked Ibis	Water Bird						
<i>Todiramphus sanctus</i>	Sacred Kingfisher	Generalist - carnivorous						
<i>Turdus merula</i>	Common Blackbird	Ground forager - omnivorous						
<i>Turnix varia</i>	Painted Button-quail	Ground forager - omnivorous			X			
<i>Vanellus tricolor</i>	Banded Lapwing	Ground forager - insects						
<i>Vanellus miles</i>	Masked Lapwing	Ground forager - insects						
Total number of species				31	51	42	40	45

Table 29: Bird species and associated feeding guilds recorded at W04 in 2011 - 2015 in Spring

Species	Common Name	Guild	Notes	Rehabilitated Sites					
				W04					
				2011	2012	2013 (Oct)	2013 (Sept)	2014 (Nov)	2015 (Oct)
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater	Canopy feeder		X	X	X	X	X	1
<i>Acanthiza apicalis</i>	Inland Thornbill	Generalist - insects							
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill	Ground forager - insects		X		X	X		2
<i>Acanthiza nana</i>	Yellow Thornbill	Canopy feeder							
<i>Acanthiza Uropygialis</i>	Chestnut-rumped Thornbill	Generalist - insects							
<i>Accipiter fasciatus</i>	Brown Goshawk	Bird of Prey							
<i>Anas gracilis</i>	Grey Teal	Water Bird							
<i>Anas superciliosa</i>	Pacific Black Duck	Water Bird							
<i>Anthus novaeseelandiae</i>	Australasian Pipit	Ground forager - insects							
<i>Aphelocephala leucopsis</i>	Southern Whiteface	Ground forager - omnivorous							
<i>Aprosmictus erythropterus</i>	Red-winged Parrot	Canopy feeder							
<i>Aquila audax</i>	Wedge-tailed Eagle	Bird of Prey							
<i>Ardea pacifica</i>	White-necked Heron	Ground forager - omnivorous							
<i>Artamus superciliosus</i>	White-browed Woodswallow	Generalist - insects							
<i>Aythya australis</i>	Hardhead	Water Bird							
<i>Barnardius zonarius</i>	Australian Ringneck	Generalist - plant based						X	
<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	Generalist - plant based							
<i>Cacatua sanguinea</i>	Little Corella	Ground forager - plant based							
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo	Generalist - insects							
<i>Chalcites basalus</i>	Horsfield's Bronze-Cuckoo	Generalist - insects							1
<i>Chenonetta jubata</i>	Australian Wood Duck	Water Bird							
<i>Chthonicola sagittata</i>	Speckled Warbler	Ground forager - insects	Vulnerable - TSC Act						
<i>Cincloramphus mathewsi</i>	Rufous Songlark	Ground forager - insects		X		X	X		
<i>Cisticola exilis</i>	Golden-headed Cisticola	Ground forager - insects							
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	Generalist - insects			X	X	X	X	3
<i>Corcorax melanoramphos</i>	White-winged Chough	Ground forager - insects						X	9
<i>Corvus coronoides</i>	Australian Raven	Generalist - carnivorous				X	X	X	1
<i>Corvus mellori</i>	Little Raven	Generalist - insects							
<i>Corvus orru</i>	Torresian Crow	Ground forager - omnivorous							
<i>Coturnix ypsilophora</i>	Brown Quail	Ground forager - plant based		X		X	X		

Species	Common Name	Guild	Notes	Rehabilitated Sites					
				W04					
				2011	2012	2013 (Oct)	2013 (Sept)	2014 (Nov)	2015 (Oct)
<i>Cracticus nigrogularis</i>	Pied Butcherbird	Generalist - carnivorous					X		3
<i>Cracticus tibicen</i>	Australian Magpie	Generalist - carnivorous		X	X	X	X	X	8
<i>Cracticus torquatus</i>	Grey Butcherbird	Generalist - carnivorous							
<i>Dacelo novaeguineae</i>	Laughing Kookaburra	Generalist - carnivorous							
<i>Dicaeum hirundinaceum</i>	Mistletoebird	Canopy feeder							
<i>Egretta novaehollandiae</i>	White-faced Heron	Water Bird							
<i>Elanus axillaris</i>	Black-shouldered Kite	Bird of Prey							
<i>Entomyzon cyanotis</i>	Blue-faced Honeyeater	Generalist - insects							
<i>Eolophus roseicapillus</i>	Galah	Ground forager - plant based							2
<i>Eopsaltria australis</i>	Eastern Yellow Robin	Generalist - insects							
<i>Eurystomus orientalis</i>	Dollarbird	Aerial forager							
<i>Falco berigora</i>	Brown Falcon	Bird of Prey							
<i>Falco cenchroides</i>	Nankeen Kestrel	Bird of Prey						X	
<i>Falco longipennis</i>	Australian Hobby	Bird of Prey							
<i>Falco peregrinus</i>	Peregrine Falcon	Bird of Prey							
<i>Falco subniger</i>	Black Falcon	Bird of Prey	Vulnerable - TSC Act						
<i>Fulica atra</i>	Eurasian Coot	Water Bird							
<i>Geopelia striata</i>	Peaceful Dove	Ground forager - plant based							
<i>Gerygone fusca</i>	Western Gerygone	Canopy feeder				X		X	1
<i>Glossopsitta concinna</i>	Musk Lorikeet	Canopy feeder							
<i>Grallina cyanoleuca</i>	Magpie-lark	Ground forager - insects					X		
<i>Haliastur sphenurus</i>	Whistling Kite	Bird of Prey							
<i>Hieraaetus morphnoides</i>	Little Eagle	Bird of Prey	Vulnerable - TSC Act						
<i>Hirundapus caudacutus</i>	White-throated Needletail	Aerial forager							
<i>Hirundo neoxena</i>	Welcome Swallow	Generalist - insects						X	
<i>Lalage sueurii</i>	White-winged Triller	Aerial forager				X		X	6
<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater	Canopy feeder							
<i>Lichenostomus virescens</i>	Singing Honeyeater	Generalist		X	X	X	X	X	1
<i>Malurus cyaneus</i>	Superb Fairy-wren	Ground forager - insects		X	X	X	X	X	4
<i>Malurus leucopterus</i>	White-winged Fairy-wren	Ground forager - insects		X	X	X	X	X	6
<i>Manorina melanocephala</i>	Noisy Miner	Generalist						X	
<i>Megalurus timoriensis</i>	Tawny Grassbird	Ground forager - insects							
<i>Melanodryas cucullata</i>	Hooded Robin	Ground forager - insects	Vulnerable - TSC Act						
<i>Microeca fascians</i>	Jacky Winter	Ground forager - insects							

Species	Common Name	Guild	Notes	Rehabilitated Sites					
				W04					
				2011	2012	2013 (Oct)	2013 (Sept)	2014 (Nov)	2015 (Oct)
<i>Mirafra javanica</i>	Horsfield's Bushlark	Generalist - plant based							
<i>Myiagra inquieta</i>	Restless Flycatcher	Generalist - insects							1
<i>Neochmia modesta</i>	Plum-headed Finch	Ground forager - plant based		X					
<i>Northiella haematogaster</i>	Blue Bonnet	Ground forager - plant based							
<i>Nymphicus hollandicus</i>	Cockatiel	Ground forager - plant based							
<i>Ocyphaps lophotes</i>	Crested Pigeon	Ground forager - plant based		X	X	X			2
<i>Pachycephala pectoralis</i>	Golden Whistler	Generalist - insects							
<i>Pachycephala rufiventris</i>	Rufous Whistler	Canopy feeder					X	X	1
<i>Pardalotus punctatus</i>	Spotted Pardalote	Canopy feeder							
<i>Pardalotus striatus</i>	Striated Pardalote	Canopy feeder					X		
<i>Pelecanus conspicillatus</i>	Australian Pelican	Generalist - carnivorous							
<i>Petrochelidon ariel</i>	Fairy Martin	Aerial forager						X	
<i>Petrochelidon nigricans</i>	Tree Martin	Aerial forager							
<i>Petroica goodenovii</i>	Red-capped Robin	Ground forager - insects							
<i>Phaps chalcoptera</i>	Common Bronzewing	Ground forager - plant based							
<i>Philemon corniculatus</i>	Noisy Friarbird	Canopy feeder							
<i>Platycercus eximius</i>	Eastern Rosella	Generalist - plant based				X			2
<i>Plectorhyncha lanceolata</i>	Striped Honeyeater	Generalist - plant based							
<i>Pomatostomus temporalis</i>	Grey-crowned Babbler	Ground forager - insects	Vulnerable - TSC Act						7
<i>Psephotus haematonotus</i>	Red-rumped Parrot	Ground forager - plant based							
<i>Rhipidura albiscapa</i>	Grey Fantail	Generalist - insects					X		
<i>Rhipidura leucophrys</i>	Willie Wagtail	Aerial forager		X	X	X	X	X	1
<i>Scythrops navaehollandiae</i>	Channel-billed Cuckoo	Canopy feeder						X	
<i>Smicromnis brevirostris</i>	Weebill	Canopy feeder			X	X	X	X	10
<i>Struthidea cinerea</i>	Apostlebird	Ground forager - omnivorous							
<i>Sturnus tristis</i>	Common Myna	Generalist	Exotic						
<i>Sturnus vulgaris</i>	Common Starling	Ground forager - omnivorous	Exotic						
<i>Tachybaptus novaehollandiae</i>	Australian Grebe	Water Bird							
<i>Taeniopygia bichenovii</i>	Double-barred Finch	Ground forager - plant based							

Species	Common Name	Guild	Notes	Rehabilitated Sites					
				W04					
				2011	2012	2013 (Oct)	2013 (Sept)	2014 (Nov)	2015 (Oct)
<i>Taeniopygia guttata</i>	Zebra Finch	Ground forager - plant based		X				X	
<i>Threskiornis spinicollis</i>	Straw-necked Ibis	Water Bird							
<i>Todiramphus sanctus</i>	Sacred Kingfisher	Generalist - carnivorous							
<i>Turdus merula</i>	Common Blackbird	Ground forager - omnivorous							
<i>Turnix varia</i>	Painted Button-quail	Ground forager - omnivorous							
<i>Vanellus tricolor</i>	Banded Lapwing	Ground forager - insects							
<i>Vanellus miles</i>	Masked Lapwing	Ground forager - insects							
Total number of species				11	9	15	17	20	21

Table 30: Bird species and associated feeding guilds recorded at W05 in 2011 - 2015 in Spring

Species	Common Name	Guild	Conservation status	Rehabilitated Sites					
				W05					
				2011	2012	2013 (Oct)	2013 (Sept)	2014 (Nov)	2015 (Oct)
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater	Canopy feeder		X	X	X	X	X	1
<i>Acanthiza apicalis</i>	Inland Thornbill	Generalist - insects							
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill	Ground forager - insects		X		X	X	X	3
<i>Acanthiza nana</i>	Yellow Thornbill	Canopy feeder							
<i>Acanthiza Uropygialis</i>	Chestnut-rumped Thornbill	Generalist - insects							
<i>Accipiter fasciatus</i>	Brown Goshawk	Bird of Prey							
<i>Anas gracilis</i>	Grey Teal	Water Bird							
<i>Anas superciliosa</i>	Pacific Black Duck	Water Bird							
<i>Anthus novaeseelandiae</i>	Australasian Pipit	Ground forager - insects							
<i>Aphelocephala leucopsis</i>	Southern Whiteface	Ground forager - omnivorous							
<i>Aprosmictus erythropterus</i>	Red-winged Parrot	Canopy feeder		X			X		
<i>Aquila audax</i>	Wedge-tailed Eagle	Bird of Prey							
<i>Ardea pacifica</i>	White-necked Heron	Ground forager - omnivorous							
<i>Artamus superciliosus</i>	White-browed Woodswallow	Generalist - insects							
<i>Aythya australis</i>	Hardhead	Water Bird							
<i>Barnardius zonarius</i>	Australian Ringneck	Generalist - plant based							
<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	Generalist - plant based				X			
<i>Cacatua sanguinea</i>	Little Corella	Ground forager - plant based		X		X			
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo	Generalist - insects							
<i>Chalcites basalis</i>	Horsfield's Bronze-Cuckoo	Generalist - insects					X		
<i>Chenonetta jubata</i>	Australian Wood Duck	Water Bird							
<i>Chthonicola sagittata</i>	Speckled Warbler	Ground forager - insects	Vulnerable – TSC Act						
<i>Cincloramphus mathewsi</i>	Rufous Songlark	Ground forager - insects		X		X	X		
<i>Cisticola exilis</i>	Golden-headed Cisticola	Ground forager - insects							
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	Generalist - insects		X		X	X	X	
<i>Corcorax melanoramphos</i>	White-winged Chough	Ground forager - insects							
<i>Corvus coronoides</i>	Australian Raven	Generalist - carnivorous							1
<i>Corvus mellori</i>	Little Raven	Generalist - insects							
<i>Corvus orru</i>	Torresian Crow	Ground forager - omnivorous							
<i>Coturnix ypsilophora</i>	Brown Quail	Ground forager - plant based		X		X	X		

Species	Common Name	Guild	Conservation status	Rehabilitated Sites					
				W05					
				2011	2012	2013 (Oct)	2013 (Sept)	2014 (Nov)	2015 (Oct)
<i>Cracticus nigrogularis</i>	Pied Butcherbird	Generalist - carnivorous		X		X			
<i>Cracticus tibicen</i>	Australian Magpie	Generalist - carnivorous		X	X	X	X	X	6
<i>Cracticus torquatus</i>	Grey Butcherbird	Generalist - carnivorous							2
<i>Dacelo novaeguineae</i>	Laughing Kookaburra	Generalist - carnivorous							
<i>Dicaeum hirundinaceum</i>	Mistletoebird	Canopy feeder							
<i>Egretta novaehollandiae</i>	White-faced Heron	Water Bird							
<i>Elanus axillaris</i>	Black-shouldered Kite	Bird of Prey							
<i>Entomyzon cyanotis</i>	Blue-faced Honeyeater	Generalist - insects							
<i>Eolophus roseicapillus</i>	Galah	Ground forager - plant based							
<i>Eopsaltria australis</i>	Eastern Yellow Robin	Generalist - insects							
<i>Eurystomus orientalis</i>	Dollarbird	Aerial forager							
<i>Falco berigora</i>	Brown Falcon	Bird of Prey							
<i>Falco cenchroides</i>	Nankeen Kestrel	Bird of Prey		X				X	
<i>Falco longipennis</i>	Australian Hobby	Bird of Prey							
<i>Falco peregrinus</i>	Peregrine Falcon	Bird of Prey							
<i>Falco subniger</i>	Black Falcon	Bird of Prey	Vulnerable - TSC Act						
<i>Fulica atra</i>	Eurasian Coot	Water Bird							
<i>Geopelia striata</i>	Peaceful Dove	Ground forager - plant based							
<i>Gerygone fusca</i>	Western Gerygone	Canopy feeder			X				
<i>Glossopsitta concinna</i>	Musk Lorikeet	Canopy feeder							
<i>Grallina cyanoleuca</i>	Magpie-lark	Ground forager - insects							1
<i>Haliastur sphenurus</i>	Whistling Kite	Bird of Prey							
<i>Hieraaetus morphnoides</i>	Little Eagle	Bird of Prey	Vulnerable - TSC Act						
<i>Hirundapus caudacutus</i>	White-throated Needletail	Aerial forager							
<i>Hirundo neoxena</i>	Welcome Swallow	Generalist - insects							
<i>Lalage sueurii</i>	White-winged Triller	Aerial forager			X			X	
<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater	Canopy feeder							
<i>Lichenostomus virescens</i>	Singing Honeyeater	Generalist		X	X	X	X	X	2
<i>Malurus cyaneus</i>	Superb Fairy-wren	Ground forager - insects		X	X	X	X		5
<i>Malurus leucopterus</i>	White-winged Fairy-wren	Ground forager - insects		X	X	X	X	X	4
<i>Manorina melanocephala</i>	Noisy Miner	Generalist						X	
<i>Megalurus timoriensis</i>	Tawny Grassbird	Ground forager - insects		X					
<i>Melanodryas cucullata</i>	Hooded Robin	Ground forager - insects	Vulnerable - TSC Act						
<i>Microeca fascinans</i>	Jacky Winter	Ground forager - insects							

Species	Common Name	Guild	Conservation status	Rehabilitated Sites					
				W05					
				2011	2012	2013 (Oct)	2013 (Sept)	2014 (Nov)	2015 (Oct)
<i>Mirafra javanica</i>	Horsfield's Bushlark	Generalist - plant based							
<i>Myiagra inquieta</i>	Restless Flycatcher	Generalist - insects							1
<i>Neochmia modesta</i>	Plum-headed Finch	Ground forager - plant based							
<i>Northiella haematogaster</i>	Blue Bonnet	Ground forager - plant based							
<i>Nymphicus hollandicus</i>	Cockatiel	Ground forager - plant based			X				
<i>Ocyphaps lophotes</i>	Crested Pigeon	Ground forager - plant based	X	X	X		X		3
<i>Pachycephala pectoralis</i>	Golden Whistler	Generalist - insects							
<i>Pachycephala rufiventris</i>	Rufous Whistler	Canopy feeder							
<i>Pardalotus punctatus</i>	Spotted Pardalote	Canopy feeder							
<i>Pardalotus striatus</i>	Striated Pardalote	Canopy feeder			X				
<i>Pelecanus conspicillatus</i>	Australian Pelican	Generalist - carnivorous							
<i>Petrochelidon ariel</i>	Fairy Martin	Aerial forager							
<i>Petrochelidon nigricans</i>	Tree Martin	Aerial forager							
<i>Petroica goodenovii</i>	Red-capped Robin	Ground forager - insects							
<i>Phaps chalcoptera</i>	Common Bronzewing	Ground forager - plant based							
<i>Philemon corniculatus</i>	Noisy Friarbird	Canopy feeder							
<i>Platycercus eximius</i>	Eastern Rosella	Generalist - plant based		X			X		
<i>Plectorhyncha lanceolata</i>	Striped Honeyeater	Generalist - plant based							
<i>Pomatostomus temporalis</i>	Grey-crowned Babbler	Ground forager - insects	Vulnerable - TSC Act						
<i>Psephotus haematotus</i>	Red-rumped Parrot	Ground forager - plant based					X		
<i>Rhipidura albiscapa</i>	Grey Fantail	Generalist - insects							
<i>Rhipidura leucophrys</i>	Willie Wagtail	Aerial forager	X	X	X	X	X	X	2
<i>Scythrops navaehollandiae</i>	Channel-billed Cuckoo	Canopy feeder							
<i>Smicromis brevirostris</i>	Weebill	Canopy feeder	X	X	X	X	X	X	6
<i>Struthidea cinerea</i>	Apostlebird	Ground forager - omnivorous							
<i>Sturnus tristis</i>	Common Myna	Generalist	Exotic						
<i>Sturnus vulgaris</i>	Common Starling	Ground forager - omnivorous	Exotic						
<i>Tachybaptus novaehollandiae</i>	Australian Grebe	Water Bird							
<i>Taeniopygia bichenovii</i>	Double-barred Finch	Ground forager - plant based							

Species	Common Name	Guild	Conservation status	Rehabilitated Sites					
				W05					
				2011	2012	2013 (Oct)	2013 (Sept)	2014 (Nov)	2015 (Oct)
<i>Taeniopygia guttata</i>	Zebra Finch	Ground forager - plant based			X		X		
<i>Threskiornis spinicollis</i>	Straw-necked Ibis	Water Bird							
<i>Todiramphus sanctus</i>	Sacred Kingfisher	Generalist - carnivorous							
<i>Turdus merula</i>	Common Blackbird	Ground forager - omnivorous				X			
<i>Turnix varia</i>	Painted Button-quail	Ground forager - omnivorous							
<i>Vanellis tricolor</i>	Banded Lapwing	Ground forager - insects							
<i>Vanellus miles</i>	Masked Lapwing	Ground forager - insects							
Total number of species				15	11	19	15	15	13

Table 31: Bird species and associated feeding guilds recorded at W06 in 2011 - 2015 in Spring

Species	Common Name	Guild	Notes	Rehabilitated Sites					
				W06					
				2011	2012	2013 (Oct)	2013 (Sept)	2014 (Nov)	2015 (Oct)
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater	Canopy feeder						X	1
<i>Acanthiza apicalis</i>	Inland Thornbill	Generalist - insects							
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill	Ground forager - insects							2
<i>Acanthiza nana</i>	Yellow Thornbill	Canopy feeder							
<i>Acanthiza Uropygialis</i>	Chestnut-rumped Thornbill	Generalist - insects							
<i>Accipiter fasciatus</i>	Brown Goshawk	Bird of Prey				X			
<i>Anas gracilis</i>	Grey Teal	Water Bird							
<i>Anas superciliosa</i>	Pacific Black Duck	Water Bird							
<i>Anthus novaeseelandiae</i>	Australasian Pipit	Ground forager - insects							1
<i>Aphelocephala leucopsis</i>	Southern Whiteface	Ground forager - omnivorous							
<i>Aprosmictus erythropterus</i>	Red-winged Parrot	Canopy feeder							
<i>Aquila audax</i>	Wedge-tailed Eagle	Bird of Prey							
<i>Ardea pacifica</i>	White-necked Heron	Ground forager - omnivorous							
<i>Artamus superciliosus</i>	White-browed Woodswallow	Generalist - insects							
<i>Aythya australis</i>	Hardhead	Water Bird							
<i>Barnardius zonarius</i>	Australian Ringneck	Generalist - plant based							
<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	Generalist - plant based							
<i>Cacatua sanguinea</i>	Little Corella	Ground forager - plant based			X			X	
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo	Generalist - insects							
<i>Chalcites basalis</i>	Horsfield's Bronze-Cuckoo	Generalist - insects							
<i>Chenonetta jubata</i>	Australian Wood Duck	Water Bird							
<i>Chthonicola sagittata</i>	Speckled Warbler	Ground forager - insects	Vulnerable - TSC Act						
<i>Cincloramphus mathewsi</i>	Rufous Songlark	Ground forager - insects							
<i>Cisticola exilis</i>	Golden-headed Cisticola	Ground forager - insects		X	X	X	X		
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	Generalist - insects					X		1
<i>Corcorax melanoramphos</i>	White-winged Chough	Ground forager - insects							
<i>Corvus coronoides</i>	Australian Raven	Generalist - carnivorous							
<i>Corvus mellori</i>	Little Raven	Generalist - insects							
<i>Corvus orru</i>	Torresian Crow	Ground forager - omnivorous							
<i>Coturnix ypsilophora</i>	Brown Quail	Ground forager - plant based		X	X				

Species	Common Name	Guild	Notes	Rehabilitated Sites					
				W06					
				2011	2012	2013 (Oct)	2013 (Sept)	2014 (Nov)	2015 (Oct)
<i>Cracticus nigrogularis</i>	Pied Butcherbird	Generalist - carnivorous		X			X		
<i>Cracticus tibicen</i>	Australian Magpie	Generalist - carnivorous				X	X	X	20
<i>Cracticus torquatus</i>	Grey Butcherbird	Generalist - carnivorous							
<i>Dacelo novaeguineae</i>	Laughing Kookaburra	Generalist - carnivorous							
<i>Dicaeum hirundinaceum</i>	Mistletoebird	Canopy feeder							
<i>Egretta novaehollandiae</i>	White-faced Heron	Water Bird							
<i>Elanus axillaris</i>	Black-shouldered Kite	Bird of Prey		X	X	X	X		
<i>Entomyzon cyanotis</i>	Blue-faced Honeyeater	Generalist - insects							
<i>Eolophus roseicapillus</i>	Galah	Ground forager - plant based				X	X		1
<i>Eopsaltria australis</i>	Eastern Yellow Robin	Generalist - insects							
<i>Eurystomus orientalis</i>	Dollarbird	Aerial forager							
<i>Falco berigora</i>	Brown Falcon	Bird of Prey							
<i>Falco cenchroides</i>	Nankeen Kestrel	Bird of Prey		X			X	X	1
<i>Falco longipennis</i>	Australian Hobby	Bird of Prey		X	X				
<i>Falco peregrinus</i>	Peregrine Falcon	Bird of Prey		X					
<i>Falco subniger</i>	Black Falcon	Bird of Prey	Vulnerable - TSC Act						
<i>Fulica atra</i>	Eurasian Coot	Water Bird							
<i>Geopelia striata</i>	Peaceful Dove	Ground forager - plant based							
<i>Gerygone fusca</i>	Western Gerygone	Canopy feeder							
<i>Glossopsitta concinna</i>	Musk Lorikeet	Canopy feeder							
<i>Grallina cyanoleuca</i>	Magpie-lark	Ground forager - insects				X			2
<i>Haliastur sphenurus</i>	Whistling Kite	Bird of Prey							
<i>Hieraaetus morphnoides</i>	Little Eagle	Bird of Prey	Vulnerable - TSC Act						
<i>Hirundapus caudacutus</i>	White-throated Needletail	Aerial forager		X					
<i>Hirundo neoxena</i>	Welcome Swallow	Generalist - insects							
<i>Lalage sueurii</i>	White-winged Triller	Aerial forager							
<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater	Canopy feeder							
<i>Lichenostomus virescens</i>	Singing Honeyeater	Generalist				X		X	
<i>Malurus cyaneus</i>	Superb Fairy-wren	Ground forager - insects				X	X	X	3
<i>Malurus leucopterus</i>	White-winged Fairy-wren	Ground forager - insects		X	X	X	X	X	2
<i>Manorina melanocephala</i>	Noisy Miner	Generalist							
<i>Megalurus timoriensis</i>	Tawny Grassbird	Ground forager - insects		X	X		X		
<i>Melanodryas cucullata</i>	Hooded Robin	Ground forager - insects	Vulnerable - TSC Act						
<i>Microeca fascinans</i>	Jacky Winter	Ground forager - insects							

Species	Common Name	Guild	Notes	Rehabilitated Sites					
				W06					
				2011	2012	2013 (Oct)	2013 (Sept)	2014 (Nov)	2015 (Oct)
<i>Mirafra javanica</i>	Horsfield's Bushlark	Generalist - plant based							
<i>Myiagra inquieta</i>	Restless Flycatcher	Generalist - insects							1
<i>Neochmia modesta</i>	Plum-headed Finch	Ground forager - plant based							
<i>Northiella haematogaster</i>	Blue Bonnet	Ground forager - plant based							
<i>Nymphicus hollandicus</i>	Cockatiel	Ground forager - plant based							
<i>Ocyphaps lophotes</i>	Crested Pigeon	Ground forager - plant based							2
<i>Pachycephala pectoralis</i>	Golden Whistler	Generalist - insects							
<i>Pachycephala rufiventris</i>	Rufous Whistler	Canopy feeder							
<i>Pardalotus punctatus</i>	Spotted Pardalote	Canopy feeder							
<i>Pardalotus striatus</i>	Striated Pardalote	Canopy feeder							
<i>Pelecanus conspicillatus</i>	Australian Pelican	Generalist - carnivorous							
<i>Petrochelidon ariel</i>	Fairy Martin	Aerial forager			X			X	
<i>Petrochelidon nigricans</i>	Tree Martin	Aerial forager			X				
<i>Petroica goodenovii</i>	Red-capped Robin	Ground forager - insects							
<i>Phaps chalcoptera</i>	Common Bronzewing	Ground forager - plant based							
<i>Philemon corniculatus</i>	Noisy Friarbird	Canopy feeder							
<i>Platycercus eximius</i>	Eastern Rosella	Generalist - plant based							
<i>Plectorhyncha lanceolata</i>	Striped Honeyeater	Generalist - plant based							
<i>Pomatostomus temporalis</i>	Grey-crowned Babbler	Ground forager - insects	Vulnerable - TCS Act						
<i>Psephotus haematotus</i>	Red-rumped Parrot	Ground forager - plant based							
<i>Rhipidura albiscapa</i>	Grey Fantail	Generalist - insects							
<i>Rhipidura leucophrys</i>	Willie Wagtail	Aerial forager					X		
<i>Scythrops navaehollandiae</i>	Channel-billed Cuckoo	Canopy feeder							
<i>Smicromis brevirostris</i>	Weebill	Canopy feeder						X	6
<i>Struthidea cinerea</i>	Apostlebird	Ground forager - omnivorous							
<i>Sturnus tristis</i>	Common Myna	Generalist	Exotic						
<i>Sturnus vulgaris</i>	Common Starling	Ground forager - omnivorous	Exotic	X					
<i>Tachybaptus novaehollandiae</i>	Australian Grebe	Water Bird							
<i>Taeniopygia bichenovii</i>	Double-barred Finch	Ground forager - plant based							

Species	Common Name	Guild	Notes	Rehabilitated Sites					
				W06					
				2011	2012	2013 (Oct)	2013 (Sept)	2014 (Nov)	2015 (Oct)
<i>Taeniopygia guttata</i>	Zebra Finch	Ground forager - plant based				X			
<i>Threskiornis spinicollis</i>	Straw-necked Ibis	Water Bird							
<i>Todiramphus sanctus</i>	Sacred Kingfisher	Generalist - carnivorous							
<i>Turdus merula</i>	Common Blackbird	Ground forager - omnivorous							
<i>Turnix varia</i>	Painted Button-quail	Ground forager - omnivorous							
<i>Vanellis tricolor</i>	Banded Lapwing	Ground forager - insects							
<i>Vanellus miles</i>	Masked Lapwing	Ground forager - insects							
Total number of species				11	6	12	12	9	13

Table 32: Bird species and associated feeding guilds recorded at W07 in 2011 - 2015 in Spring

Species	Common Name	Guild	Notes	Rehabilitated Sites					
				W07					
				2011	2012	2013 (Oct)	2013 (Sept)	2014 (Nov)	2015 (Oct)
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater	Canopy feeder			X		X	1	
<i>Acanthiza apicalis</i>	Inland Thornbill	Generalist - insects							
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill	Ground forager - insects							
<i>Acanthiza nana</i>	Yellow Thornbill	Canopy feeder							
<i>Acanthiza Uropygialis</i>	Chestnut-rumped Thornbill	Generalist - insects							
<i>Accipiter fasciatus</i>	Brown Goshawk	Bird of Prey							
<i>Anas gracilis</i>	Grey Teal	Water Bird							
<i>Anas superciliosa</i>	Pacific Black Duck	Water Bird							
<i>Anthus novaeseelandiae</i>	Australasian Pipit	Ground forager - insects					X		
<i>Aphelocephala leucopsis</i>	Southern Whiteface	Ground forager - omnivorous							
<i>Aprosmictus erythropterus</i>	Red-winged Parrot	Canopy feeder							
<i>Aquila audax</i>	Wedge-tailed Eagle	Bird of Prey							
<i>Ardea pacifica</i>	White-necked Heron	Ground forager - omnivorous							
<i>Artamus superciliosus</i>	White-browed Woodswallow	Generalist - insects							
<i>Aythya australis</i>	Hardhead	Water Bird							
<i>Barnardius zonarius</i>	Australian Ringneck	Generalist - plant based							
<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	Generalist - plant based							
<i>Cacatua sanguinea</i>	Little Corella	Ground forager - plant based					X		
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo	Generalist - insects							
<i>Chalcites basalis</i>	Horsfield's Bronze-Cuckoo	Generalist - insects				X			
<i>Chenonetta jubata</i>	Australian Wood Duck	Water Bird							
<i>Chthonicola sagittata</i>	Speckled Warbler	Ground forager - insects	Vulnerable - TSC Act						
<i>Cincloramphus mathewsi</i>	Rufous Songlark	Ground forager - insects							
<i>Cisticola exilis</i>	Golden-headed Cisticola	Ground forager - insects		X	X	X			
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	Generalist - insects					X		
<i>Corcorax melanoramphos</i>	White-winged Chough	Ground forager - insects							
<i>Corvus coronoides</i>	Australian Raven	Generalist - carnivorous							
<i>Corvus mellori</i>	Little Raven	Generalist - insects							
<i>Corvus orru</i>	Torresian Crow	Ground forager - omnivorous							
<i>Coturnix ypsilophora</i>	Brown Quail	Ground forager - plant based		X	X	X			

Species	Common Name	Guild	Notes	Rehabilitated Sites					
				W07					
				2011	2012	2013 (Oct)	2013 (Sept)	2014 (Nov)	2015 (Oct)
<i>Cracticus nigrogularis</i>	Pied Butcherbird	Generalist - carnivorous						X	
<i>Cracticus tibicen</i>	Australian Magpie	Generalist - carnivorous		X			X		20
<i>Cracticus torquatus</i>	Grey Butcherbird	Generalist - carnivorous							
<i>Dacelo novaeguineae</i>	Laughing Kookaburra	Generalist - carnivorous							
<i>Dicaeum hirundinaceum</i>	Mistletoebird	Canopy feeder							
<i>Egretta novaehollandiae</i>	White-faced Heron	Water Bird							
<i>Elanus axillaris</i>	Black-shouldered Kite	Bird of Prey			X		X		
<i>Entomyzon cyanotis</i>	Blue-faced Honeyeater	Generalist - insects							
<i>Eolophus roseicapillus</i>	Galah	Ground forager - plant based							
<i>Eopsaltria australis</i>	Eastern Yellow Robin	Generalist - insects							
<i>Eurystomus orientalis</i>	Dollarbird	Aerial forager							
<i>Falco berigora</i>	Brown Falcon	Bird of Prey							
<i>Falco cenchroides</i>	Nankeen Kestrel	Bird of Prey		X	X	X	X		
<i>Falco longipennis</i>	Australian Hobby	Bird of Prey				X			
<i>Falco peregrinus</i>	Peregrine Falcon	Bird of Prey							
<i>Falco subniger</i>	Black Falcon	Bird of Prey	Vulnerable - TSC Act						
<i>Fulica atra</i>	Eurasian Coot	Water Bird							
<i>Geopelia striata</i>	Peaceful Dove	Ground forager - plant based							
<i>Gerygone fusca</i>	Western Gerygone	Canopy feeder							
<i>Glossopsitta concinna</i>	Musk Lorikeet	Canopy feeder							
<i>Grallina cyanoleuca</i>	Magpie-lark	Ground forager - insects							2
<i>Haliastur sphenurus</i>	Whistling Kite	Bird of Prey							
<i>Hieraaetus morphnoides</i>	Little Eagle	Bird of Prey	Vulnerable - TSC Act						
<i>Hirundapus caudacutus</i>	White-throated Needletail	Aerial forager							
<i>Hirundo neoxena</i>	Welcome Swallow	Generalist - insects							
<i>Lalage sueurii</i>	White-winged Triller	Aerial forager							
<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater	Canopy feeder							
<i>Lichenostomus virescens</i>	Singing Honeyeater	Generalist							1
<i>Malurus cyaneus</i>	Superb Fairy-wren	Ground forager - insects			X		X	X	2
<i>Malurus leucopterus</i>	White-winged Fairy-wren	Ground forager - insects		X	X	X	X	X	5
<i>Manorina melanocephala</i>	Noisy Miner	Generalist							
<i>Megalurus timoriensis</i>	Tawny Grassbird	Ground forager - insects		X					
<i>Melanodryas cucullata</i>	Hooded Robin	Ground forager - insects	Vulnerable - TSC Act						
<i>Microeca fascinans</i>	Jacky Winter	Ground forager - insects							

Species	Common Name	Guild	Notes	Rehabilitated Sites					
				W07					
				2011	2012	2013 (Oct)	2013 (Sept)	2014 (Nov)	2015 (Oct)
<i>Mirafra javanica</i>	Horsfield's Bushlark	Generalist - plant based							1
<i>Myiagra inquieta</i>	Restless Flycatcher	Generalist - insects							
<i>Neochmia modesta</i>	Plum-headed Finch	Ground forager - plant based							
<i>Northiella haematogaster</i>	Blue Bonnet	Ground forager - plant based							
<i>Nymphicus hollandicus</i>	Cockatiel	Ground forager - plant based							
<i>Ocyphaps lophotes</i>	Crested Pigeon	Ground forager - plant based							4
<i>Pachycephala pectoralis</i>	Golden Whistler	Generalist - insects							
<i>Pachycephala rufiventris</i>	Rufous Whistler	Canopy feeder							
<i>Pardalotus punctatus</i>	Spotted Pardalote	Canopy feeder							
<i>Pardalotus striatus</i>	Striated Pardalote	Canopy feeder							
<i>Pelecanus conspicillatus</i>	Australian Pelican	Generalist - carnivorous							
<i>Petrochelidon ariel</i>	Fairy Martin	Aerial forager							
<i>Petrochelidon nigricans</i>	Tree Martin	Aerial forager							
<i>Petroica goodenovii</i>	Red-capped Robin	Ground forager - insects							
<i>Phaps chalcoptera</i>	Common Bronzewing	Ground forager - plant based							
<i>Philemon corniculatus</i>	Noisy Friarbird	Canopy feeder							
<i>Platycercus eximius</i>	Eastern Rosella	Generalist - plant based							
<i>Plectorhyncha lanceolata</i>	Striped Honeyeater	Generalist - plant based							
<i>Pomatostomus temporalis</i>	Grey-crowned Babbler	Ground forager - insects	Vulnerable - TSC Act						
<i>Psephotus haematonotus</i>	Red-rumped Parrot	Ground forager - plant based							3
<i>Rhipidura albiscapa</i>	Grey Fantail	Generalist - insects							
<i>Rhipidura leucophrys</i>	Willie Wagtail	Aerial forager				X			
<i>Scythrops navaehollandiae</i>	Channel-billed Cuckoo	Canopy feeder							
<i>Smicromis brevirostris</i>	Weebill	Canopy feeder			X	X			2
<i>Struthidea cinerea</i>	Apostlebird	Ground forager - omnivorous							
<i>Sturnus tristis</i>	Common Myna	Generalist	Exotic						
<i>Sturnus vulgaris</i>	Common Starling	Ground forager - omnivorous	Exotic						
<i>Tachybaptus novaehollandiae</i>	Australian Grebe	Water Bird							
<i>Taeniopygia bichenovii</i>	Double-barred Finch	Ground forager - plant based							

Species	Common Name	Guild	Notes	Rehabilitated Sites					
				W07					
				2011	2012	2013 (Oct)	2013 (Sept)	2014 (Nov)	2015 (Oct)
<i>Taeniopygia guttata</i>	Zebra Finch	Ground forager - plant based		X	X		X		
<i>Threskiornis spinicollis</i>	Straw-necked Ibis	Water Bird							
<i>Todiramphus sanctus</i>	Sacred Kingfisher	Generalist - carnivorous							
<i>Turdus merula</i>	Common Blackbird	Ground forager - omnivorous							
<i>Turnix varia</i>	Painted Button-quail	Ground forager - omnivorous							
<i>Vanellis tricolor</i>	Banded Lapwing	Ground forager - insects							
<i>Vanellus miles</i>	Masked Lapwing	Ground forager - insects							
Total number of species				6	6	8	9	8	10

Table 33: Bird species and associated feeding guilds recorded opportunistically in 2011 - 2015 in Spring

Species	Common Name	Guild	Notes	Opportunistic				
				2012	2013 (Oct)	2014 (Nov)	2013 (Sept)	2015 (Oct)
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater	Canopy feeder						
<i>Acanthiza apicalis</i>	Inland Thornbill	Generalist - insects						
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill	Ground forager - insects						
<i>Acanthiza nana</i>	Yellow Thornbill	Canopy feeder						
<i>Acanthiza Uropygialis</i>	Chestnut-rumped Thornbill	Generalist - insects						
<i>Accipiter fasciatus</i>	Brown Goshawk	Bird of Prey			x			
<i>Anas gracilis</i>	Grey Teal	Water Bird		X				
<i>Anas superciliosa</i>	Pacific Black Duck	Water Bird		X	x		x	
<i>Anthus novaeseelandiae</i>	Australasian Pipit	Ground forager - insects			x		x	
<i>Aphelocephala leucopsis</i>	Southern Whiteface	Ground forager - omnivorous						
<i>Aprosmictus erythropterus</i>	Red-winged Parrot	Canopy feeder						
<i>Aquila audax</i>	Wedge-tailed Eagle	Bird of Prey		X				
<i>Ardea pacifica</i>	White-necked Heron	Ground forager - omnivorous				x		X
<i>Artamus superciliosus</i>	White-browed Woodswallow	Generalist - insects						
<i>Aythya australis</i>	Hardhead	Water Bird		X				
<i>Barnardius zonarius</i>	Australian Ringneck	Generalist - plant based						
<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	Generalist - plant based		X			x	
<i>Cacatua sanguinea</i>	Little Corella	Ground forager - plant based					x	
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo	Generalist - insects						
<i>Chalcites basalis</i>	Horsfield's Bronze-Cuckoo	Generalist - insects						
<i>Chenonetta jubata</i>	Australian Wood Duck	Water Bird						
<i>Chthonicola sagittata</i>	Speckled Warbler	Ground forager - insects	Vulnerable - TSC Act					
<i>Cincloramphus mathewsi</i>	Rufous Songlark	Ground forager - insects						
<i>Cisticola exilis</i>	Golden-headed Cisticola	Ground forager - insects						
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	Generalist - insects						
<i>Corcorax melanorampnos</i>	White-winged Chough	Ground forager - insects						
<i>Corvus coronoides</i>	Australian Raven	Generalist - carnivorous						
<i>Corvus mellori</i>	Little Raven	Generalist - insects				x		
<i>Corvus orru</i>	Torresian Crow	Ground forager - omnivorous						X
<i>Coturnix ypsilophora</i>	Brown Quail	Ground forager - plant based						
<i>Cracticus nigrogularis</i>	Pied Butcherbird	Generalist - carnivorous						
<i>Cracticus tibicen</i>	Australian Magpie	Generalist - carnivorous						
<i>Cracticus torquatus</i>	Grey Butcherbird	Generalist - carnivorous						
<i>Dacelo novaeguineae</i>	Laughing Kookaburra	Generalist - carnivorous						
<i>Dicaeum hirundinaceum</i>	Mistletoebird	Canopy feeder						

Species	Common Name	Guild	Notes	Opportunistic				
				2012	2013 (Oct)	2014 (Nov)	2013 (Sept)	2015 (Oct)
<i>Egretta novaehollandiae</i>	White-faced Heron	Water Bird		x		x		
<i>Elanus axillaris</i>	Black-shouldered Kite	Bird of Prey						
<i>Entomyzon cyanotis</i>	Blue-faced Honeyeater	Generalist - insects				x		
<i>Eolophus roseicapillus</i>	Galah	Ground forager - plant based						
<i>Eopsaltria australis</i>	Eastern Yellow Robin	Generalist - insects						
<i>Eurystomus orientalis</i>	Dollarbird	Aerial forager						
<i>Falco berigora</i>	Brown Falcon	Bird of Prey						
<i>Falco cenchroides</i>	Nankeen Kestrel	Bird of Prey						
<i>Falco longipennis</i>	Australian Hobby	Bird of Prey						
<i>Falco peregrinus</i>	Peregrine Falcon	Bird of Prey						
<i>Falco subniger</i>	Black Falcon	Bird of Prey	Vulnerable - TSC Act					
<i>Fulica atra</i>	Eurasian Coot	Water Bird			X		X	
<i>Geopelia striata</i>	Peaceful Dove	Ground forager - plant based						
<i>Gerygone fusca</i>	Western Gerygone	Canopy feeder						
<i>Glossopsitta concinna</i>	Musk Lorikeet	Canopy feeder				X	X	
<i>Grallina cyanoleuca</i>	Magpie-lark	Ground forager - insects						
<i>Haliastur sphenurus</i>	Whistling Kite	Bird of Prey					X	X
<i>Hieraaetus morphnoides</i>	Little Eagle	Bird of Prey	Vulnerable - TSC Act					
<i>Hirundapus caudacutus</i>	White-throated Needletail	Aerial forager						
<i>Hirundo neoxena</i>	Welcome Swallow	Generalist - insects						
<i>Lalage sueurii</i>	White-winged Triller	Aerial forager						
<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater	Canopy feeder						
<i>Lichenostomus virescens</i>	Singing Honeyeater	Generalist						
<i>Malurus cyaneus</i>	Superb Fairy-wren	Ground forager - insects						
<i>Malurus leucopterus</i>	White-winged Fairy-wren	Ground forager - insects						
<i>Manorina melanocephala</i>	Noisy Miner	Generalist						
<i>Megalurus timoriensis</i>	Tawny Grassbird	Ground forager - insects						
<i>Melanodryas cucullata</i>	Hooded Robin	Ground forager - insects	Vulnerable - TSC Act					
<i>Microeca fascinans</i>	Jacky Winter	Ground forager - insects						
<i>Mirafra javanica</i>	Horsfield's Bushlark	Generalist - plant based						
<i>Myiagra inquieta</i>	Restless Flycatcher	Generalist - insects						
<i>Neochmia modesta</i>	Plum-headed Finch	Ground forager - plant based						
<i>Northiella haematogaster</i>	Blue Bonnet	Ground forager - plant based						
<i>Nymphicus hollandicus</i>	Cockatiel	Ground forager - plant based						
<i>Ocyphaps lophotes</i>	Crested Pigeon	Ground forager - plant based						
<i>Pachycephala pectoralis</i>	Golden Whistler	Generalist - insects						
<i>Pachycephala rufiventris</i>	Rufous Whistler	Canopy feeder						

Species	Common Name	Guild	Notes	Opportunistic				
				2012	2013 (Oct)	2014 (Nov)	2013 (Sept)	2015 (Oct)
<i>Pardalotus punctatus</i>	Spotted Pardalote	Canopy feeder						
<i>Pardalotus striatus</i>	Striated Pardalote	Canopy feeder						
<i>Pelecanusconspicillatus</i>	Australian Pelican	Generalist - carnivorous						X
<i>Petrochelidon ariel</i>	Fairy Martin	Aerial forager						
<i>Petrochelidon nigricans</i>	Tree Martin	Aerial forager						
<i>Petroica goodenovii</i>	Red-capped Robin	Ground forager - insects						
<i>Phaps chalcoptera</i>	Common Bronzewing	Ground forager - plant based						
<i>Philemon corniculatus</i>	Noisy Friarbird	Canopy feeder						X
<i>Platycercus eximius</i>	Eastern Rosella	Generalist - plant based						
<i>Plectorhyncha lanceolata</i>	Striped Honeyeater	Generalist - plant based						
<i>Pomatostomus temporalis</i>	Grey-crowned Babbler	Ground forager - insects	Vulnerable - TSC Act					
<i>Psephotus haematonotus</i>	Red-rumped Parrot	Ground forager - plant based						
<i>Rhipidura albiscapa</i>	Grey Fantail	Generalist - insects						
<i>Rhipidura leucophrys</i>	Willie Wagtail	Aerial forager						
<i>Scythrops navaehollandiae</i>	Channel-billed Cuckoo	Canopy feeder						
<i>Smicromnis brevirostris</i>	Weebill	Canopy feeder						
<i>Struthidea cinerea</i>	Apostlebird	Ground forager - omnivorous						
<i>Sturnus tristis</i>	Common Myna	Generalist	Exotic					X
<i>Sturnus vulgaris</i>	Common Starling	Ground forager - omnivorous	Exotic		X			
<i>Tachybaptus novaehollandiae</i>	Australian Grebe	Water Bird		X			X	
<i>Taeniopygia bichenovii</i>	Double-barred Finch	Ground forager - plant based						
<i>Taeniopygia guttata</i>	Zebra Finch	Ground forager - plant based						
<i>Threskiornis spinicollis</i>	Straw-necked Ibis	Water Bird		X				X
<i>Todiramphus sanctus</i>	Sacred Kingfisher	Generalist - carnivorous						
<i>Turdus merula</i>	Common Blackbird	Ground forager - omnivorous						
<i>Turnix varia</i>	Painted Button-quail	Ground forager - omnivorous						
<i>Vanellus tricolor</i>	Banded Lapwing	Ground forager - insects					X	X
<i>Vanellus miles</i>	Masked Lapwing	Ground forager - insects						X
Total number of species				8	4	6	9	9

Table 34: Bird species and associated feeding guilds recorded at sites WC02 and WC01 in 2011 - 2015 in Winter

Species	Common Name	Guild	Notes	Reference sites			
				WC01		WC02	
				2014 (Aug)	2015 (Jul)	2014 (Aug)	2015 (Aug)
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater	Canopy feeder				X	2
<i>Acanthiza apicalis</i>	Inland Thornbill	Generalist - insects				X	1
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill	Ground forager - insects				X	12
<i>Acanthiza nana</i>	Yellow Thornbill	Canopy feeder					4
<i>Acanthiza Uropygialis</i>	Chestnut-rumped Thornbill	Generalist - insects				X	2
<i>Accipiter fasciatus</i>	Brown Goshawk	Bird of Prey					
<i>Anas gracilis</i>	Grey Teal	Water Bird					
<i>Anas superciliosa</i>	Pacific Black Duck	Water Bird					
<i>Anthus novaeseelandiae</i>	Australasian Pipit	Ground forager - insects					
<i>Aphelocephala leucopsis</i>	Southern Whiteface	Ground forager - omnivorous					
<i>Aprosmictus erythropterus</i>	Red-winged Parrot	Canopy feeder					
<i>Aquila audax</i>	Wedge-tailed Eagle	Bird of Prey					
<i>Ardea pacifica</i>	White-necked Heron	Ground forager - omnivorous					
<i>Artamus superciliosus</i>	White-browed Woodswallow	Generalist - insects					
<i>Aythya australis</i>	Hardhead	Water Bird					
<i>Barnardius zonarius</i>	Australian Ringneck	Generalist - plant based				X	2
<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	Generalist - plant based	X				
<i>Cacatua sanguinea</i>	Little Corella	Ground forager - plant based					
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo	Generalist - insects				X	
<i>Cacomantis pallidus</i>	Pallid Cuckoo	Generalist - insects					2
<i>Chalcites basalis</i>	Horsfield's Bronze-Cuckoo	Generalist - insects					2
<i>Chenonetta jubata</i>	Australian Wood Duck	Water Bird	X	2		X	1
<i>Chthonicola sagittata</i>	Speckled Warbler	Ground forager - insects				X	4
<i>Cincloramphus mathewsi</i>	Rufous Songlark	Ground forager - insects				X	
<i>Cisticola exilis</i>	Golden-headed Cisticola	Ground forager - insects					
<i>Coracina maxima</i>	Ground Cuckoo-shrike	Ground forager - omnivorous					2

Species	Common Name	Guild	Notes	Reference sites			
				WC01		WC02	
				2014 (Aug)	2015 (Jul)	2014 (Aug)	2015 (Aug)
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	Generalist - insects		X	1	X	4
<i>Corcorax melanoramphos</i>	White-winged Cough	Ground forager - insects		X	15	X	
<i>Corvus coronoides</i>	Australian Raven	Generalist - carnivorous		X	1	X	2
<i>Corvus mellori</i>	Little Raven	Generalist - insects					
<i>Corvus orru</i>	Torresian Crow	Ground forager - omnivorous					
<i>Coturnix ypsilophora</i>	Brown Quail	Ground forager - plant based					
<i>Cracticus nigrogularis</i>	Pied Butcherbird	Generalist - carnivorous		X	2	X	1
<i>Cracticus tibicen</i>	Australian Magpie	Generalist - carnivorous			2		3
<i>Cracticus torquatus</i>	Grey Butcherbird	Generalist - carnivorous		X	2		
<i>Dacelo novaeguineae</i>	Laughing Kookaburra	Generalist - carnivorous				X	
<i>Dicaeum hirundinaceum</i>	Mistletoebird	Canopy feeder					
<i>Egretta novaehollandiae</i>	White-faced Heron	Water Bird					
<i>Elanus axillaris</i>	Black-shouldered Kite	Bird of Prey					
<i>Entomyzon cyanotis</i>	Blue-faced Honeyeater	Generalist - insects					
<i>Eolophus roseicapillus</i>	Galah	Ground forager - plant based		X	7	X	2
<i>Eopsaltria australis</i>	Eastern Yellow Robin	Generalist - insects				X	2
<i>Eurystomus orientalis</i>	Dollarbird	Aerial forager					
<i>Falco berigora</i>	Brown Falcon	Bird of Prey					
<i>Falco cenchroides</i>	Nankeen Kestrel	Bird of Prey					
<i>Falco longipennis</i>	Australian Hobby	Bird of Prey		X		X	1
<i>Falco peregrinus</i>	Peregrine Falcon	Bird of Prey					
<i>Falco subniger</i>	Black Falcon	Bird of Prey	Vulnerable - TSC Act				1
<i>Fulica atra</i>	Eurasian Coot	Water Bird					
<i>Geopelia striata</i>	Peaceful Dove	Ground forager - plant based					
<i>Gerygone fusca</i>	Western Gerygone	Canopy feeder				X	
<i>Glossopsitta concinna</i>	Musk Lorikeet	Canopy feeder			2		
<i>Grallina cyanoleuca</i>	Magpie-lark	Ground forager - insects		X		X	1

Species	Common Name	Guild	Notes	Reference sites			
				WC01		WC02	
				2014 (Aug)	2015 (Jul)	2014 (Aug)	2015 (Aug)
<i>Haliastur sphenurus</i>	Whistling Kite	Bird of Prey					
<i>Hieraaetus morphnoides</i>	Little Eagle	Bird of Prey	Vulnerable - TSC Act				
<i>Hirundapus caudacutus</i>	White-throated Needletail	Aerial forager					
<i>Hirundo neoxena</i>	Welcome Swallow	Generalist - insects					
<i>Lalage sueurii</i>	White-winged Triller	Aerial forager			X		
<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater	Canopy feeder			X	8	
<i>Lichenostomus virescens</i>	Singing Honeyeater	Generalist					
<i>Malurus cyaneus</i>	Superb Fairy-wren	Ground forager - insects			X	8	
<i>Malurus leucopterus</i>	White-winged Fairy-wren	Ground forager - insects					
<i>Manorina flavigula</i>	Yellow-throated Miner	Generalist					10
<i>Manorina melanocephala</i>	Noisy Miner	Generalist		X	20	X	8
<i>Megalurus timoriensis</i>	Tawny Grassbird	Ground forager - insects					
<i>Melanodryas cucullata</i>	Hooded Robin	Ground forager - insects	Vulnerable - TSC Act			X	3
<i>Microeca fascinans</i>	Jacky Winter	Ground forager - insects				X	2
<i>Myiagra inquieta</i>	Restless Flycatcher	Generalist - insects					1
<i>Neochmia modesta</i>	Plum-headed Finch	Ground forager - plant based					
<i>Northiella haematogaster</i>	Blue Bonnet	Ground forager - plant based		X		X	2
<i>Nymphicus hollandicus</i>	Cockatiel	Ground forager - plant based		X	1	X	
<i>Ocyphaps lophotes</i>	Crested Pigeon	Ground forager - plant based		X	4	X	
<i>Pachycephala pectoralis</i>	Golden Whistler	Generalist - insects				X	1
<i>Pachycephala rufiventris</i>	Rufous Whistler	Canopy feeder				X	
<i>Pardalotus punctatus</i>	Spotted Pardalote	Canopy feeder				X	5
<i>Pardalotus striatus</i>	Striated Pardalote	Canopy feeder		X			
<i>Pelecanusconspicillatus</i>	Australian Pelican	Generalist - carnivorous					
<i>Petrochelidon ariel</i>	Fairy Martin	Aerial forager					
<i>Petrochelidon nigricans</i>	Tree Martin	Aerial forager					
<i>Petroica boodang</i>	Scarlet Robin	Ground forager - insects					

Species	Common Name	Guild	Notes	Reference sites			
				WC01		WC02	
				2014 (Aug)	2015 (Jul)	2014 (Aug)	2015 (Aug)
<i>Petroica goodenovii</i>	Red-capped Robin	Ground forager - insects				X	2
<i>Phaps chalcoptera</i>	Common Bronzewing	Ground forager - plant based				X	
<i>Philemon corniculatus</i>	Noisy Friarbird	Canopy feeder				X	
<i>Platycercus eximius</i>	Eastern Rosella	Generalist - plant based		X	7	X	1
<i>Plectorhyncha lanceolata</i>	Striped Honeyeater	Generalist - plant based				X	
<i>Pomatostomus temporalis</i>	Grey-crowned Babbler	Ground forager - insects	Vulnerable - TSC Act	X	17		
<i>Psephotus haematonotus</i>	Red-rumped Parrot	Ground forager - plant based			2	X	2
<i>Rhipidura albiscapa</i>	Grey Fantail	Generalist - insects				X	
<i>Rhipidura leucophrys</i>	Willie Wagtail	Aerial forager				X	
<i>Scythrops navaehollandiae</i>	Channel-billed Cuckoo	Canopy feeder					
<i>Smicromnis brevirostris</i>	Weebill	Canopy feeder				X	6
<i>Struthidea cinerea</i>	Apostlebird	Ground forager - omnivorous		X	10	X	10
<i>Sturnus tristis</i>	Common Myna	Generalist	Exotic			X	
<i>Sturnus vulgaris</i>	Common Starling	Ground forager - omnivorous	Exotic	X	1	X	1
<i>Tachybaptus novaehollandiae</i>	Australian Grebe	Water Bird					
<i>Taeniopygia bichenovii</i>	Double-barred Finch	Ground forager - plant based				X	10
<i>Taeniopygia guttata</i>	Zebra Finch	Ground forager - plant based					
<i>Threskiornis spinicollis</i>	Straw-necked Ibis	Water Bird					
<i>Todiramphus sanctus</i>	Sacred Kingfisher	Generalist - carnivorous					
<i>Turdus merula</i>	Common Blackbird	Ground forager - omnivorous					
<i>Turnix varia</i>	Painted Button-quail	Ground forager - omnivorous					
<i>Vanellus tricolor</i>	Banded Lapwing	Ground forager - insects					
Total number of species				19	17	44	37

Table 35: Bird species and associated feeding guilds recorded at sites WC02 and WC01 in 2011 - 2015 in Winter

Species	Common Name	Guild	Notes	Rehabilitated Sites			
				W04		W05	
				2014 (Aug)	2015 (Jul)	2014 (Aug)	2015 (Jul)
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater	Canopy feeder		X	2	X	1
<i>Acanthiza apicalis</i>	Inland Thornbill	Generalist - insects					
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill	Ground forager - insects		X	8	X	10
<i>Acanthiza nana</i>	Yellow Thornbill	Canopy feeder					
<i>Acanthiza Uropygialis</i>	Chestnut-rumped Thornbill	Generalist - insects					
<i>Accipiter fasciatus</i>	Brown Goshawk	Bird of Prey					
<i>Anas gracilis</i>	Grey Teal	Water Bird					
<i>Anas superciliosa</i>	Pacific Black Duck	Water Bird					
<i>Anthus novaeseelandiae</i>	Australasian Pipit	Ground forager - insects					
<i>Aphelocephala leucopsis</i>	Southern Whiteface	Ground forager - omnivorous					
<i>Aprosmictus erythropterus</i>	Red-winged Parrot	Canopy feeder					
<i>Aquila audax</i>	Wedge-tailed Eagle	Bird of Prey					
<i>Ardea pacifica</i>	White-necked Heron	Ground forager - omnivorous					
<i>Artamus superciliosus</i>	White-browed Woodswallow	Generalist - insects					
<i>Aythya australis</i>	Hardhead	Water Bird					
<i>Barnardius zonarius</i>	Australian Ringneck	Generalist - plant based		X		X	2
<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	Generalist - plant based					
<i>Cacatua sanguinea</i>	Little Corella	Ground forager - plant based					
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo	Generalist - insects		X			
<i>Cacomantis pallidus</i>	Pallid Cuckoo	Generalist - insects					
<i>Chalcites basalis</i>	Horsfield's Bronze-Cuckoo	Generalist - insects					
<i>Chenonetta jubata</i>	Australian Wood Duck	Water Bird					
<i>Chthonicola sagittata</i>	Speckled Warbler	Ground forager - insects	Vulnerable - TSC Act				
<i>Cincloramphus mathewsi</i>	Rufous Songlark	Ground forager - insects					
<i>Cisticola exilis</i>	Golden-headed Cisticola	Ground forager - insects					
<i>Coracina maxima</i>	Ground Cuckoo-shrike	Ground forager - omnivorous					
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	Generalist - insects					
<i>Corcorax melanoramphos</i>	White-winged Chough	Ground forager - insects					
<i>Corvus coronoides</i>	Australian Raven	Generalist - carnivorous				X	

Species	Common Name	Guild	Notes	Rehabilitated Sites			
				W04		W05	
				2014 (Aug)	2015 (Jul)	2014 (Aug)	2015 (Jul)
<i>Corvus mellori</i>	Little Raven	Generalist - insects					
<i>Corvus orru</i>	Torresian Crow	Ground forager - omnivorous					
<i>Coturnix ypsilophora</i>	Brown Quail	Ground forager - plant based	X				
<i>Cracticus nigrogularis</i>	Pied Butcherbird	Generalist - carnivorous			X	1	
<i>Cracticus tibicen</i>	Australian Magpie	Generalist - carnivorous					
<i>Cracticus torquatus</i>	Grey Butcherbird	Generalist - carnivorous					
<i>Dacelo novaeguineae</i>	Laughing Kookaburra	Generalist - carnivorous					
<i>Dicaeum hirundinaceum</i>	Mistletoebird	Canopy feeder					
<i>Egretta novaehollandiae</i>	White-faced Heron	Water Bird					
<i>Elanus axillaris</i>	Black-shouldered Kite	Bird of Prey	X	1		1	
<i>Entomyzon cyanotis</i>	Blue-faced Honeyeater	Generalist - insects					
<i>Eolophus roseicapillus</i>	Galah	Ground forager - plant based	X		X		
<i>Eopsaltria australis</i>	Eastern Yellow Robin	Generalist - insects					
<i>Eurystomus orientalis</i>	Dollarbird	Aerial forager					
<i>Falco berigora</i>	Brown Falcon	Bird of Prey					
<i>Falco cenchroides</i>	Nankeen Kestrel	Bird of Prey	X				
<i>Falco longipennis</i>	Australian Hobby	Bird of Prey					
<i>Falco peregrinus</i>	Peregrine Falcon	Bird of Prey					
<i>Falco subniger</i>	Black Falcon	Bird of Prey				Vulnerable - TSC Act	
<i>Fulica atra</i>	Eurasian Coot	Water Bird					
<i>Geopelia striata</i>	Peaceful Dove	Ground forager - plant based					
<i>Gerygone fusca</i>	Western Gerygone	Canopy feeder	X			1	
<i>Glossopsitta concinna</i>	Musk Lorikeet	Canopy feeder					
<i>Grallina cyanoleuca</i>	Magpie-lark	Ground forager - insects	X				
<i>Haliastur sphenurus</i>	Whistling Kite	Bird of Prey					
<i>Hieraaetus morphnoides</i>	Little Eagle	Bird of Prey				Vulnerable - TSC Act	
<i>Hirundapus caudacutus</i>	White-throated Needletail	Aerial forager					
<i>Hirundo neoxena</i>	Welcome Swallow	Generalist - insects					
<i>Lalage sueurii</i>	White-winged Triller	Aerial forager	X		X		
<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater	Canopy feeder					
<i>Lichenostomus virescens</i>	Singing Honeyeater	Generalist	X	3	X	2	

Species	Common Name	Guild	Notes	Rehabilitated Sites			
				W04		W05	
				2014 (Aug)	2015 (Jul)	2014 (Aug)	2015 (Jul)
<i>Malurus cyaneus</i>	Superb Fairy-wren	Ground forager - insects		X	5	X	3
<i>Malurus leucopterus</i>	White-winged Fairy-wren	Ground forager - insects		X	5	X	5
<i>Manorina flavigula</i>	Yellow-throated Miner	Generalist					
<i>Manorina melanocephala</i>	Noisy Miner	Generalist			10		2
<i>Megalurus timoriensis</i>	Tawny Grassbird	Ground forager - insects					
<i>Melanodryas cucullata</i>	Hooded Robin	Ground forager - insects	Vulnerable - TSC Act				
<i>Microeca fascians</i>	Jacky Winter	Ground forager - insects					
<i>Myiagra inquieta</i>	Restless Flycatcher	Generalist - insects					
<i>Neochmia modesta</i>	Plum-headed Finch	Ground forager - plant based					
<i>Northiella haematogaster</i>	Blue Bonnet	Ground forager - plant based					
<i>Nymphicus hollandicus</i>	Cockatiel	Ground forager - plant based					
<i>Ocyphaps lophotes</i>	Crested Pigeon	Ground forager - plant based		X		X	
<i>Pachycephala pectoralis</i>	Golden Whistler	Generalist - insects		X			
<i>Pachycephala rufiventris</i>	Rufous Whistler	Canopy feeder					
<i>Pardalotus punctatus</i>	Spotted Pardalote	Canopy feeder		X			
<i>Pardalotus striatus</i>	Striated Pardalote	Canopy feeder		X			
<i>Pelecanusconspicillatus</i>	Australian Pelican	Generalist - carnivorous					
<i>Petrochelidon ariel</i>	Fairy Martin	Aerial forager					
<i>Petrochelidon nigricans</i>	Tree Martin	Aerial forager					
<i>Petroica boodang</i>	Scarlet Robin	Ground forager - insects					1
<i>Petroica goodenovii</i>	Red-capped Robin	Ground forager - insects					
<i>Phaps chalcoptera</i>	Common Bronzewing	Ground forager - plant based					
<i>Philemon corniculatus</i>	Noisy Friarbird	Canopy feeder					
<i>Platycercus eximius</i>	Eastern Rosella	Generalist - plant based		X	2	X	4
<i>Plectorhyncha lanceolata</i>	Striped Honeyeater	Generalist - plant based					
<i>Pomatostomus temporalis</i>	Grey-crowned Babbler	Ground forager - insects	Vulnerable - TSC Act				
<i>Psephotus haematonotus</i>	Red-rumped Parrot	Ground forager - plant based					
<i>Rhipidura albiscapa</i>	Grey Fantail	Generalist - insects			1		1
<i>Rhipidura leucophrys</i>	Willie Wagtail	Aerial forager			3		1
<i>Scythrops navaehollandiae</i>	Channel-billed Cuckoo	Canopy feeder					
<i>Smicrornis brevirostris</i>	Weebill	Canopy feeder		X	4	X	4

Species	Common Name	Guild	Notes	Rehabilitated Sites			
				W04		W05	
				2014 (Aug)	2015 (Jul)	2014 (Aug)	2015 (Jul)
<i>Struthidea cinerea</i>	Apostlebird	Ground forager - omnivorous					
<i>Sturnus tristis</i>	<i>Common Myna</i>	Generalist	Exotic				
<i>Sturnus vulgaris</i>	Common Starling	Ground forager - omnivorous	Exotic				
<i>Tachybaptus novaehollandiae</i>	Australian Grebe	Water Bird					
<i>Taeniopygia bichenovii</i>	Double-barred Finch	Ground forager - plant based					
<i>Taeniopygia guttata</i>	Zebra Finch	Ground forager - plant based		X	X		
<i>Threskiornis spinicollis</i>	Straw-necked Ibis	Water Bird					
<i>Todiramphus sanctus</i>	Sacred Kingfisher	Generalist - carnivorous					
<i>Turdus merula</i>	Common Blackbird	Ground forager - omnivorous					
<i>Turnix varia</i>	Painted Button-quail	Ground forager - omnivorous					
<i>Vanellus tricolor</i>	Banded Lapwing	Ground forager - insects					
Total number of species				21	11	14	15

Table 36: Bird species and associated feeding guilds recorded at sites WC06, WC07 and opportunistically in 2014 and 2015 in Winter

Species	Common Name	Guild	Notes	Rehabilitated Sites				Opportunistic	
				W06		W07		2014	2015
				2014	2015	2014	2015		
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater	Canopy feeder		X		X			
<i>Acanthiza apicalis</i>	Inland Thornbill	Generalist - insects							
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill	Ground forager - insects							
<i>Acanthiza nana</i>	Yellow Thornbill	Canopy feeder							
<i>Acanthiza Uropygialis</i>	Chestnut-rumped Thornbill	Generalist - insects							
<i>Accipiter fasciatus</i>	Brown Goshawk	Bird of Prey							
<i>Anas gracilis</i>	Grey Teal	Water Bird							
<i>Anas superciliosa</i>	Pacific Black Duck	Water Bird						X	
<i>Anthus novaeseelandiae</i>	Australasian Pipit	Ground forager - insects		X		X			
<i>Aphelocephala leucopsis</i>	Southern Whiteface	Ground forager - omnivorous							
<i>Aprosmictus erythropterus</i>	Red-winged Parrot	Canopy feeder							
<i>Aquila audax</i>	Wedge-tailed Eagle	Bird of Prey							
<i>Ardea pacifica</i>	White-necked Heron	Ground forager - omnivorous							
<i>Artamus superciliosus</i>	White-browed Woodswallow	Generalist - insects							
<i>Aythya australis</i>	Hardhead	Water Bird							
<i>Barnardius zonarius</i>	Australian Ringneck	Generalist - plant based							
<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	Generalist - plant based							
<i>Cacatua sanguinea</i>	Little Corella	Ground forager - plant based							
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo	Generalist - insects							
<i>Cacomantis pallidus</i>	Pallid Cuckoo	Generalist - insects							
<i>Chalcites basalis</i>	Horsfield's Bronze-Cuckoo	Generalist - insects							
<i>Chenonetta jubata</i>	Australian Wood Duck	Water Bird							
<i>Chthonicola sagittata</i>	Speckled Warbler	Ground forager - insects	Vulnerable - TSC Act						
<i>Cincloramphus mathewsi</i>	Rufous Songlark	Ground forager - insects							
<i>Cisticola exilis</i>	Golden-headed Cisticola	Ground forager - insects							
<i>Coracina maxima</i>	Ground Cuckoo-shrike	Ground forager - omnivorous							
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	Generalist - insects					3		
<i>Corcorax melanoramphos</i>	White-winged Chough	Ground forager - insects							
<i>Corvus coronoides</i>	Australian Raven	Generalist - carnivorous			4				
<i>Corvus mellori</i>	Little Raven	Generalist - insects						X	X
<i>Corvus orru</i>	Torresian Crow	Ground forager - omnivorous						X	
<i>Coturnix ypsilophora</i>	Brown Quail	Ground forager - plant based			1	X			

Species	Common Name	Guild	Notes	Rehabilitated Sites				Opportunistic	
				W06		W07		2014	2015
				2014	2015	2014	2015		
<i>Cracticus nigrogularis</i>	Pied Butcherbird	Generalist - carnivorous					4		
<i>Cracticus tibicen</i>	Australian Magpie	Generalist - carnivorous			15		20		
<i>Cracticus torquatus</i>	Grey Butcherbird	Generalist - carnivorous							
<i>Dacelo novaeguineae</i>	Laughing Kookaburra	Generalist - carnivorous							
<i>Dicaeum hirundinaceum</i>	Mistletoebird	Canopy feeder							
<i>Egretta novaehollandiae</i>	White-faced Heron	Water Bird						X	
<i>Elanus axillaris</i>	Black-shouldered Kite	Bird of Prey			1				
<i>Entomyzon cyanotis</i>	Blue-faced Honeyeater	Generalist - insects							
<i>Eolophus roseicapillus</i>	Galah	Ground forager - plant based		X		X			
<i>Eopsaltria australis</i>	Eastern Yellow Robin	Generalist - insects							
<i>Eurystomus orientalis</i>	Dollarbird	Aerial forager							
<i>Falco berigora</i>	Brown Falcon	Bird of Prey							
<i>Falco cenchroides</i>	Nankeen Kestrel	Bird of Prey		X	1				
<i>Falco longipennis</i>	Australian Hobby	Bird of Prey				X			
<i>Falco peregrinus</i>	Peregrine Falcon	Bird of Prey							
<i>Falco subniger</i>	Black Falcon	Bird of Prey	Vulnerable - TSC Act	X					
<i>Fulica atra</i>	Eurasian Coot	Water Bird							
<i>Geopelia striata</i>	Peaceful Dove	Ground forager - plant based							
<i>Gerygone fusca</i>	Western Gerygone	Canopy feeder							
<i>Glossopsitta concinna</i>	Musk Lorikeet	Canopy feeder						X	
<i>Grallina cyanoleuca</i>	Magpie-lark	Ground forager - insects							
<i>Haliastur sphenurus</i>	Whistling Kite	Bird of Prey				X			
<i>Hieraaetus morphnoides</i>	Little Eagle	Bird of Prey	Vulnerable - TSC Act						
<i>Hirundapus caudacutus</i>	White-throated Needle-tail	Aerial forager							
<i>Hirundo neoxena</i>	Welcome Swallow	Generalist - insects							
<i>Lalage sueurii</i>	White-winged Triller	Aerial forager							
<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater	Canopy feeder							
<i>Lichenostomus virescens</i>	Singing Honeyeater	Generalist		X		X			
<i>Malurus cyaneus</i>	Superb Fairy-wren	Ground forager - insects		X	4		5		
<i>Malurus leucopterus</i>	White-winged Fairy-wren	Ground forager - insects		X	6	X	2		
<i>Manorina flavigula</i>	Yellow-throated Miner	Generalist							
<i>Manorina melanocephala</i>	Noisy Miner	Generalist							
<i>Megalurus timoriensis</i>	Tawny Grassbird	Ground forager - insects							

Species	Common Name	Guild	Notes	Rehabilitated Sites				Opportunistic	
				W06		W07		2014	2015
				2014	2015	2014	2015		
<i>Melanodryas cucullata</i>	Hooded Robin	Ground forager - insects	Vulnerable - TSC Act						
<i>Microeca fascinans</i>	Jacky Winter	Ground forager - insects							
<i>Myiagra inquieta</i>	Restless Flycatcher	Generalist - insects							
<i>Neochmia modesta</i>	Plum-headed Finch	Ground forager - plant based							
<i>Northiella haematogaster</i>	Blue Bonnet	Ground forager - plant based							
<i>Nymphicus hollandicus</i>	Cockatiel	Ground forager - plant based							
<i>Ocyphaps lophotes</i>	Crested Pigeon	Ground forager - plant based		X	1				
<i>Pachycephala pectoralis</i>	Golden Whistler	Generalist - insects							
<i>Pachycephala rufiventris</i>	Rufous Whistler	Canopy feeder							
<i>Pardalotus punctatus</i>	Spotted Pardalote	Canopy feeder							
<i>Pardalotus striatus</i>	Striated Pardalote	Canopy feeder							
<i>Pelecanusconspicillatus</i>	Australian Pelican	Generalist - carnivorous						X	
<i>Petrochelidon ariel</i>	Fairy Martin	Aerial forager							
<i>Petrochelidon nigricans</i>	Tree Martin	Aerial forager							
<i>Petroica boodang</i>	Scarlet Robin	Ground forager - insects							
<i>Petroica goodenovii</i>	Red-capped Robin	Ground forager - insects							
<i>Phaps chalcoptera</i>	Common Bronzewing	Ground forager - plant based							
<i>Philemon corniculatus</i>	Noisy Friarbird	Canopy feeder							
<i>Platycercus eximius</i>	Eastern Rosella	Generalist - plant based							
<i>Plectorhyncha lanceolata</i>	Striped Honeyeater	Generalist - plant based							
<i>Pomatostomus temporalis</i>	Grey-crowned Babbler	Ground forager - insects	Vulnerable - TSC Act						
<i>Psephotus haematonotus</i>	Red-rumped Parrot	Ground forager - plant based			2				
<i>Rhipidura albiscapa</i>	Grey Fantail	Generalist - insects							
<i>Rhipidura leucophrys</i>	Willie Wagtail	Aerial forager			1				
<i>Scythrops navaehollandiae</i>	Channel-billed Cuckoo	Canopy feeder							
<i>Smicrornis brevirostris</i>	Weebill	Canopy feeder		X	2	X			
<i>Struthidea cinerea</i>	Apostlebird	Ground forager - omnivorous							
<i>Sturnus tristis</i>	Common Myna	Generalist	Exotic						
<i>Sturnus vulgaris</i>	Common Starling	Ground forager - omnivorous	Exotic						
<i>Tachybaptus novaehollandiae</i>	Australian Grebe	Water Bird							
<i>Taeniopygia bichenovii</i>	Double-barred Finch	Ground forager - plant based							
<i>Taeniopygia guttata</i>	Zebra Finch	Ground forager - plant based				X			
<i>Threskiornis spinicollis</i>	Straw-necked Ibis	Water Bird							

Species	Common Name	Guild	Notes	Rehabilitated Sites				Opportunistic	
				W06		W07		2014	2015
				2014	2015	2014	2015		
<i>Todiramphus sanctus</i>	Sacred Kingfisher	Generalist - carnivorous							
<i>Turdus merula</i>	Common Blackbird	Ground forager - omnivorous							
<i>Turnix varia</i>	Painted Button-quail	Ground forager - omnivorous							
<i>Vanellus tricolor</i>	Banded Lapwing	Ground forager - insects							
Total number of species				10	11	10	5	6	1

Table 37: Bird species and associated feeding guilds recorded at sites W01, W02, W04 and W05 in 2014 and 2015 in Autumn

Species	Common Name	Guild	Notes	Reference site		Rehabilitated sites	
				W01	W02	W04	W05
				2015		2015	
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater	Canopy feeder		1	2	1	
<i>Acanthiza apicalis</i>	Inland Thornbill	Generalist - insects		3			
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill	Ground forager - insects		8	10	10	
<i>Acanthiza nana</i>	Yellow Thornbill	Canopy feeder		6			
<i>Acanthiza Uropygialis</i>	Chestnut-rumped Thornbill	Generalist - insects		3			
<i>Accipiter fasciatus</i>	Brown Goshawk	Bird of Prey					
<i>Anas gracilis</i>	Grey Teal	Water Bird					
<i>Anas superciliosa</i>	Pacific Black Duck	Water Bird					
<i>Anthus novaeseelandiae</i>	Australasian Pipit	Ground forager - insects					
<i>Aphelocephala leucopsis</i>	Southern Whiteface	Ground forager - omnivorous		2			
<i>Aprosmictus erythropterus</i>	Red-winged Parrot	Canopy feeder					
<i>Aquila audax</i>	Wedge-tailed Eagle	Bird of Prey					
<i>Ardea pacifica</i>	White-necked Heron	Ground forager - omnivorous					
<i>Artamus superciliosus</i>	White-browed Woodswallow	Generalist - insects					
<i>Aythya australis</i>	Hardhead	Water Bird					
<i>Barnardius zonarius</i>	Australian Ringneck	Generalist - plant based					
<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	Generalist - plant based					
<i>Cacatua sanguinea</i>	Little Corella	Ground forager - plant based					
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo	Generalist - insects					
<i>Cacomantis pallidus</i>	Pallid Cuckoo	Generalist - insects			1		
<i>Chalcites basalis</i>	Horsfield's Bronze-Cuckoo	Generalist - insects					
<i>Chenonetta jubata</i>	Australian Wood Duck	Water Bird					
<i>Chthonicola sagittata</i>	Speckled Warbler	Ground forager - insects	Vulnerable - TSC Act	2			
<i>Cincloramphus mathewsi</i>	Rufous Songlark	Ground forager - insects					
<i>Cisticola exilis</i>	Golden-headed Cisticola	Ground forager - insects					
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	Generalist - insects		4	2	6	
<i>Corcorax melanoramphos</i>	White-winged Cough	Ground forager - insects		6	10	10	
<i>Corvus coronoides</i>	Australian Raven	Generalist - carnivorous		2	2	1	
<i>Corvus mellori</i>	Little Raven	Generalist - insects					
<i>Corvus orru</i>	Torresian Crow	Ground forager - omnivorous					

Species	Common Name	Guild	Notes	Reference site		Rehabilitated sites	
				W01	W02	W04	W05
				2015		2015	
<i>Coturnix ypsilophora</i>	Brown Quail	Ground forager - plant based					
<i>Cracticus nigrogularis</i>	Pied Butcherbird	Generalist - carnivorous	2	1	3		
<i>Cracticus tibicen</i>	Australian Magpie	Generalist - carnivorous	6	5	2	3	
<i>Cracticus torquatus</i>	Grey Butcherbird	Generalist - carnivorous	2	2		1	
<i>Dacelo novaeguineae</i>	Laughing Kookaburra	Generalist - carnivorous					
<i>Dicaeum hirundinaceum</i>	Mistletoebird	Canopy feeder					
<i>Egretta novaehollandiae</i>	White-faced Heron	Water Bird					
<i>Elanus axillaris</i>	Black-shouldered Kite	Bird of Prey					
<i>Entomyzon cyanotis</i>	Blue-faced Honeyeater	Generalist - insects			2		
<i>Eolophus roseicapillus</i>	Galah	Ground forager - plant based	8	8			
<i>Eopsaltria australis</i>	Eastern Yellow Robin	Generalist - insects		2			
<i>Eurystomus orientalis</i>	Dollarbird	Aerial forager					
<i>Falco berigora</i>	Brown Falcon	Bird of Prey					
<i>Falco cenchroides</i>	Nankeen Kestrel	Bird of Prey	1			2	
<i>Falco longipennis</i>	Australian Hobby	Bird of Prey	1			1	
<i>Falco peregrinus</i>	Peregrine Falcon	Bird of Prey			1	1	
<i>Falco subniger</i>	Black Falcon	Bird of Prey	Vulnerable - TSC Act				
<i>Fulica atra</i>	Eurasian Coot	Water Bird					
<i>Geopelia striata</i>	Peaceful Dove	Ground forager - plant based		1			
<i>Gerygone fusca</i>	Western Gerygone	Canopy feeder				2	
<i>Glossopsitta concinna</i>	Musk Lorikeet	Canopy feeder					
<i>Grallina cyanoleuca</i>	Magpie-lark	Ground forager - insects	2	2			
<i>Haliastur sphenurus</i>	Whistling Kite	Bird of Prey					
<i>Hieraaetus morphnoides</i>	Little Eagle	Bird of Prey	Vulnerable - TSC Act	1			
<i>Hirundapus caudacutus</i>	White-throated Needletail	Aerial forager					
<i>Hirundo neoxena</i>	Welcome Swallow	Generalist - insects				1	
<i>Lalage sueurii</i>	White-winged Triller	Aerial forager					
<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater	Canopy feeder		6			
<i>Lichenostomus virescens</i>	Singing Honeyeater	Generalist			2	3	
<i>Malurus cyaneus</i>	Superb Fairy-wren	Ground forager - insects		9	4	4	
<i>Malurus leucopterus</i>	White-winged Fairy-wren	Ground forager - insects			12	8	
<i>Manorina melanocephala</i>	Noisy Miner	Generalist	15	5	15		

Species	Common Name	Guild	Notes	Reference site		Rehabilitated sites	
				W01	W02	W04	W05
				2015		2015	
<i>Megalurus timoriensis</i>	Tawny Grassbird	Ground forager - insects					
<i>Melanodryas cucullata</i>	Hooded Robin	Ground forager - insects	Vulnerable - TSC Act				
<i>Microeca fascinans</i>	Jacky Winter	Ground forager - insects			2		
<i>Milvus migrans</i>	Black Kite	Generalist - carnivorous		1			
<i>Myiagra inquieta</i>	Restless Flycatcher	Generalist - insects			1		
<i>Neochmia modesta</i>	Plum-headed Finch	Ground forager - plant based					
<i>Northiella haematogaster</i>	Blue Bonnet	Ground forager - plant based			2		
<i>Nymphicus hollandicus</i>	Cockatiel	Ground forager - plant based		20	4		
<i>Ocyphaps lophotes</i>	Crested Pigeon	Ground forager - plant based		3	4	1	2
<i>Pachycephala pectoralis</i>	Golden Whistler	Generalist - insects					
<i>Pachycephala rufiventris</i>	Rufous Whistler	Canopy feeder			5	2	2
<i>Pardalotus punctatus</i>	Spotted Pardalote	Canopy feeder					
<i>Pardalotus striatus</i>	Striated Pardalote	Canopy feeder		3	5	4	
<i>Pelecanus conspicillatus</i>	Australian Pelican	Generalist - carnivorous					
<i>Petrochelidon ariel</i>	Fairy Martin	Aerial forager					
<i>Petrochelidon nigricans</i>	Tree Martin	Aerial forager					
<i>Petroica goodenovii</i>	Red-capped Robin	Ground forager - insects			4		
<i>Phaps chalcoptera</i>	Common Bronzewing	Ground forager - plant based					
<i>Philemon corniculatus</i>	Noisy Friarbird	Canopy feeder					
<i>Platyercus eximius</i>	Eastern Rosella	Generalist - plant based		5	8	3	
<i>Plectorhyncha lanceolata</i>	Striped Honeyeater	Generalist - plant based			2		
<i>Pomatostomus temporalis</i>	Grey-crowned Babbler	Ground forager - insects	Vulnerable - TSC Act	5			
<i>Psephotus haematonotus</i>	Red-rumped Parrot	Ground forager - plant based		15	15		
<i>Rhipidura albiscapa</i>	Grey Fantail	Generalist - insects			5	3	5
<i>Rhipidura leucophrys</i>	Willie Wagtail	Aerial forager			5	2	3
<i>Scythrops navaehollandiae</i>	Channel-billed Cuckoo	Canopy feeder					
<i>Smicronis brevirostris</i>	Weebill	Canopy feeder			8	6	6
<i>Struthidea cinerea</i>	Apostlebird	Ground forager - omnivorous			10		
<i>Sturnus tristis</i>	Common Myna	Generalist	Exotic				
<i>Sturnus vulgaris</i>	Common Starling	Ground forager - omnivorous	Exotic	1			
<i>Tachybaptus novaehollandiae</i>	Australian Grebe	Water Bird					
<i>Taeniopygia bichenovii</i>	Double-barred Finch	Ground forager - plant based			4		

Species	Common Name	Guild	Notes	Reference site		Rehabilitated sites	
				W01	W02	W04	W05
				2015		2015	
<i>Taeniopygia guttata</i>	Zebra Finch	Ground forager - plant based					
<i>Threskiornis spinicollis</i>	Straw-necked Ibis	Water Bird					
<i>Todiramphus sanctus</i>	Sacred Kingfisher	Generalist - carnivorous					
<i>Turdus merula</i>	Common Blackbird	Ground forager - omnivorous					
<i>Turnix varia</i>	Painted Button-quail	Ground forager - omnivorous		1			
<i>Vanellus tricolor</i>	Banded Lapwing	Ground forager - insects					
<i>Vanellus miles</i>	Masked Lapwing	Ground forager - insects					
<i>Zosterops lateralis</i>	Silvereye	Generalist			1		
Total number of species				21	37	21	18

Table 38: Bird species and associated feeding guilds recorded at sites W06, W07 and opportunistically in 2015 in Autumn

Species	Common Name	Guild	Notes	Rehabilitated sites		Opportunistic
				W06	W07	
				2015		2015
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater	Canopy feeder				
<i>Acanthiza apicalis</i>	Inland Thornbill	Generalist - insects				X
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill	Ground forager - insects				
<i>Acanthiza nana</i>	Yellow Thornbill	Canopy feeder				
<i>Acanthiza Uropygialis</i>	Chestnut-rumped Thornbill	Generalist - insects				
<i>Accipiter fasciatus</i>	Brown Goshawk	Bird of Prey				
<i>Anas gracilis</i>	Grey Teal	Water Bird				
<i>Anas superciliosa</i>	Pacific Black Duck	Water Bird				
<i>Anthus novaeseelandiae</i>	Australasian Pipit	Ground forager - insects		1		
<i>Aphelocephala leucopsis</i>	Southern Whiteface	Ground forager - omnivorous				
<i>Aprosmictus erythropterus</i>	Red-winged Parrot	Canopy feeder				
<i>Aquila audax</i>	Wedge-tailed Eagle	Bird of Prey				
<i>Ardea pacifica</i>	White-necked Heron	Ground forager - omnivorous				
<i>Artamus superciliosus</i>	White-browed Woodswallow	Generalist - insects				
<i>Aythya australis</i>	Hardhead	Water Bird				
<i>Barnardius zonarius</i>	Australian Ringneck	Generalist - plant based				
<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	Generalist - plant based				
<i>Cacatua sanguinea</i>	Little Corella	Ground forager - plant based				
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo	Generalist - insects				
<i>Cacomantis pallidus</i>	Pallid Cuckoo	Generalist - insects				
<i>Chalcites basalis</i>	Horsfield's Bronze-Cuckoo	Generalist - insects				
<i>Chenonetta jubata</i>	Australian Wood Duck	Water Bird				
<i>Chthonicola sagittata</i>	Speckled Warbler	Ground forager - insects	Vulnerable - TSC Act			
<i>Cincloramphus mathewsi</i>	Rufous Songlark	Ground forager - insects				
<i>Cisticola exilis</i>	Golden-headed Cisticola	Ground forager - insects				
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	Generalist - insects				
<i>Corcorax melanoramphos</i>	White-winged Chough	Ground forager - insects				
<i>Corvus coronoides</i>	Australian Raven	Generalist - carnivorous		2		
<i>Corvus mellori</i>	Little Raven	Generalist - insects				X
<i>Corvus orru</i>	Torresian Crow	Ground forager - omnivorous				

Species	Common Name	Guild	Notes	Rehabilitated sites		Opportunistic
				W06	W07	
				2015		2015
<i>Coturnix ypsilophora</i>	Brown Quail	Ground forager - plant based		2		
<i>Cracticus nigrogularis</i>	Pied Butcherbird	Generalist - carnivorous		2	2	
<i>Cracticus tibicen</i>	Australian Magpie	Generalist - carnivorous		6	10	
<i>Cracticus torquatus</i>	Grey Butcherbird	Generalist - carnivorous				
<i>Dacelo novaeguineae</i>	Laughing Kookaburra	Generalist - carnivorous				
<i>Dicaeum hirundinaceum</i>	Mistletoebird	Canopy feeder				
<i>Egretta novaehollandiae</i>	White-faced Heron	Water Bird				
<i>Elanus axillaris</i>	Black-shouldered Kite	Bird of Prey				
<i>Entomyzon cyanotis</i>	Blue-faced Honeyeater	Generalist - insects				
<i>Eolophus roseicapillus</i>	Galah	Ground forager - plant based				
<i>Eopsaltria australis</i>	Eastern Yellow Robin	Generalist - insects				
<i>Eurystomus orientalis</i>	Dollarbird	Aerial forager				
<i>Falco berigora</i>	Brown Falcon	Bird of Prey				
<i>Falco cenchroides</i>	Nankeen Kestrel	Bird of Prey		1		
<i>Falco longipennis</i>	Australian Hobby	Bird of Prey				
<i>Falco peregrinus</i>	Peregrine Falcon	Bird of Prey				
<i>Falco subniger</i>	Black Falcon	Bird of Prey	Vulnerable - TSC Act			
<i>Fulica atra</i>	Eurasian Coot	Water Bird				
<i>Geopelia striata</i>	Peaceful Dove	Ground forager - plant based				
<i>Gerygone fusca</i>	Western Gerygone	Canopy feeder				
<i>Glossopsitta concinna</i>	Musk Lorikeet	Canopy feeder				X
<i>Grallina cyanoleuca</i>	Magpie-lark	Ground forager - insects				
<i>Haliastur sphenurus</i>	Whistling Kite	Bird of Prey			1	
<i>Hieraaetus morphnoides</i>	Little Eagle	Bird of Prey	Vulnerable - TSC Act			X
<i>Hirundapus caudacutus</i>	White-throated Needletail	Aerial forager				
<i>Hirundo neoxena</i>	Welcome Swallow	Generalist - insects		1		
<i>Lalage sueurii</i>	White-winged Triller	Aerial forager				
<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater	Canopy feeder				
<i>Lichenostomus virescens</i>	Singing Honeyeater	Generalist		1		
<i>Malurus cyaneus</i>	Superb Fairy-wren	Ground forager - insects		4	4	
<i>Malurus leucopterus</i>	White-winged Fairy-wren	Ground forager - insects		6		
<i>Manorina melanocephala</i>	Noisy Miner	Generalist				

Species	Common Name	Guild	Notes	Rehabilitated sites		Opportunistic
				W06	W07	
				2015		2015
<i>Megalurus timoriensis</i>	Tawny Grassbird	Ground forager - insects				
<i>Melanodryas cucullata</i>	Hooded Robin	Ground forager - insects	Vulnerable - TSC Act			
<i>Microeca fascinans</i>	Jacky Winter	Ground forager - insects				
<i>Milvus migrans</i>	Black Kite	Generalist - carnivorous				
<i>Myiagra inquieta</i>	Restless Flycatcher	Generalist - insects				
<i>Neochmia modesta</i>	Plum-headed Finch	Ground forager - plant based				
<i>Northiella haematogaster</i>	Blue Bonnet	Ground forager - plant based				
<i>Nymphicus hollandicus</i>	Cockatiel	Ground forager - plant based				
<i>Ocyphaps lophotes</i>	Crested Pigeon	Ground forager - plant based				
<i>Pachycephala pectoralis</i>	Golden Whistler	Generalist - insects				
<i>Pachycephala rufiventris</i>	Rufous Whistler	Canopy feeder				
<i>Pardalotus punctatus</i>	Spotted Pardalote	Canopy feeder				
<i>Pardalotus striatus</i>	Striated Pardalote	Canopy feeder				X
<i>Pelecanus conspicillatus</i>	Australian Pelican	Generalist - carnivorous				X
<i>Petrochelidon ariel</i>	Fairy Martin	Aerial forager				
<i>Petrochelidon nigricans</i>	Tree Martin	Aerial forager				
<i>Petroica goodenovii</i>	Red-capped Robin	Ground forager - insects				
<i>Phaps chalcoptera</i>	Common Bronzewing	Ground forager - plant based				
<i>Philemon corniculatus</i>	Noisy Friarbird	Canopy feeder				
<i>Platyercus eximius</i>	Eastern Rosella	Generalist - plant based				
<i>Plectorhyncha lanceolata</i>	Striped Honeyeater	Generalist - plant based				
<i>Pomatostomus temporalis</i>	Grey-crowned Babbler	Ground forager - insects	Vulnerable - TSC Act			
<i>Psephotus haematonotus</i>	Red-rumped Parrot	Ground forager - plant based				
<i>Rhipidura albiscapa</i>	Grey Fantail	Generalist - insects		2		
<i>Rhipidura leucophrys</i>	Willie Wagtail	Aerial forager			3	
<i>Scythrops navaehollandiae</i>	Channel-billed Cuckoo	Canopy feeder				
<i>Smicronis brevirostris</i>	Weebill	Canopy feeder		2	6	
<i>Struthidea cinerea</i>	Apostlebird	Ground forager - omnivorous				
<i>Sturnus tristis</i>	Common Myna	Generalist	Exotic			
<i>Sturnus vulgaris</i>	Common Starling	Ground forager - omnivorous	Exotic			
<i>Tachybaptus novaehollandiae</i>	Australian Grebe	Water Bird				
<i>Taeniopygia bichenovii</i>	Double-barred Finch	Ground forager - plant based				

Species	Common Name	Guild	Notes	Rehabilitated sites		Opportunistic
				W06	W07	
				2015		2015
<i>Taeniopygia guttata</i>	Zebra Finch	Ground forager - plant based				
<i>Threskiornis spinicollis</i>	Straw-necked Ibis	Water Bird				
<i>Todiramphus sanctus</i>	Sacred Kingfisher	Generalist - carnivorous				
<i>Turdus merula</i>	Common Blackbird	Ground forager - omnivorous				
<i>Turnix varia</i>	Painted Button-quail	Ground forager - omnivorous				
<i>Vanellis tricolor</i>	Banded Lapwing	Ground forager - insects				
<i>Vanellus miles</i>	Masked Lapwing	Ground forager - insects				
<i>Zosterops lateralis</i>	Silvereye	Generalist				
Total number of species				11	7	6

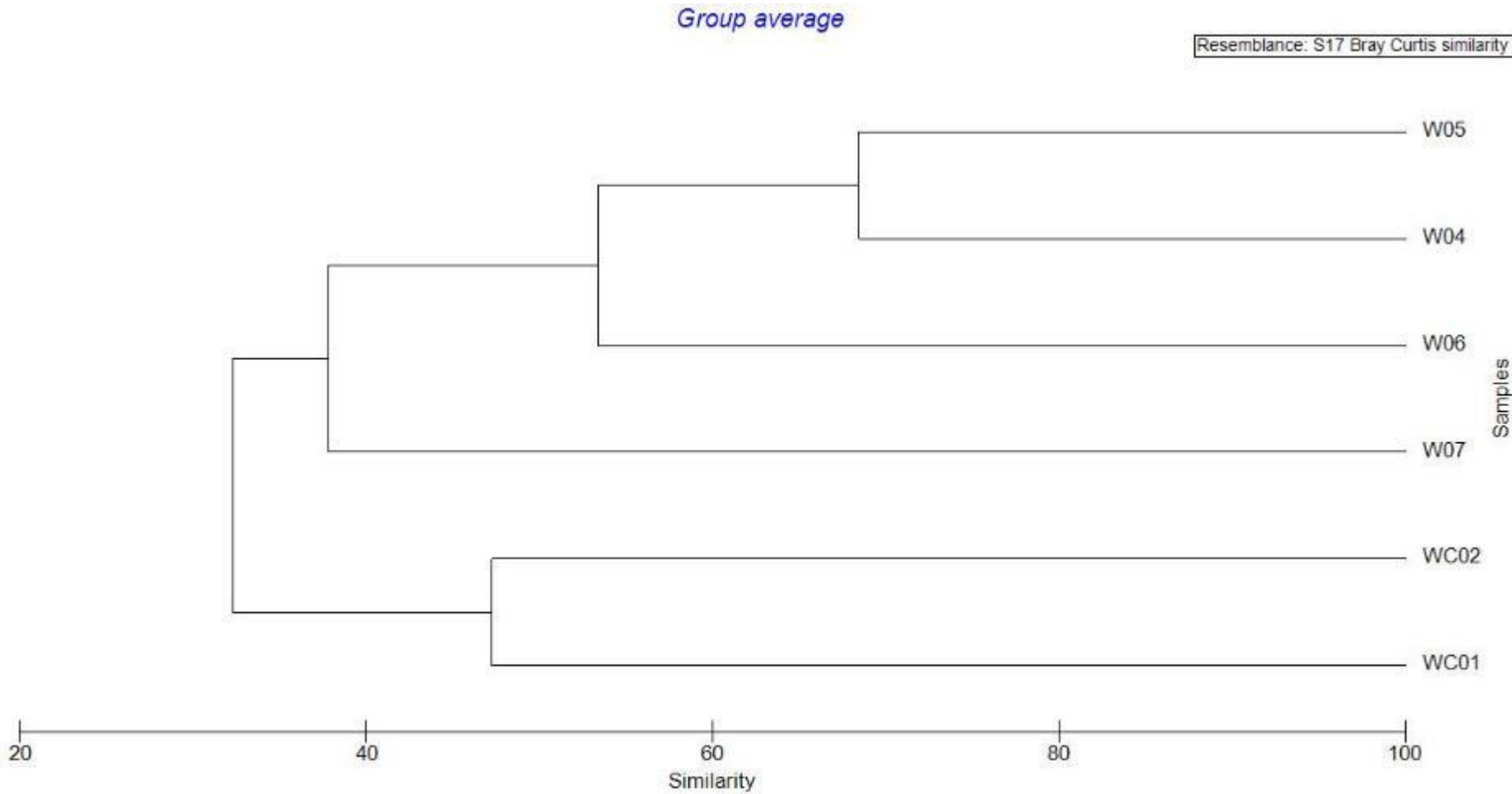


Figure 15: Cluster analysis of bird species recorded in all monitoring plots for the autumn monitoring period (2015)

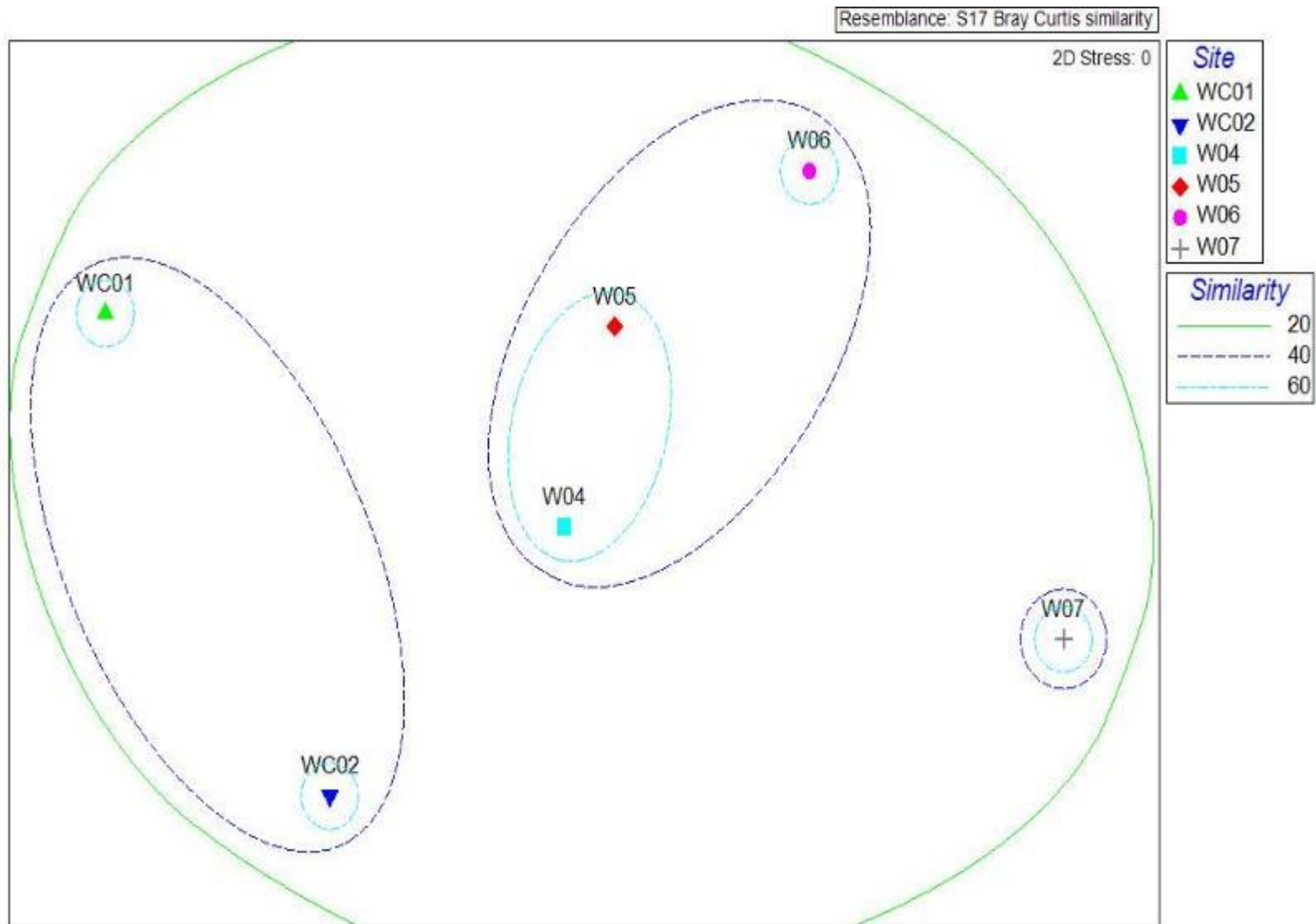


Figure 16: Non-metric multi-dimensional scaling plot for bird species recorded in all monitoring plots for the autumn monitoring period (2015)

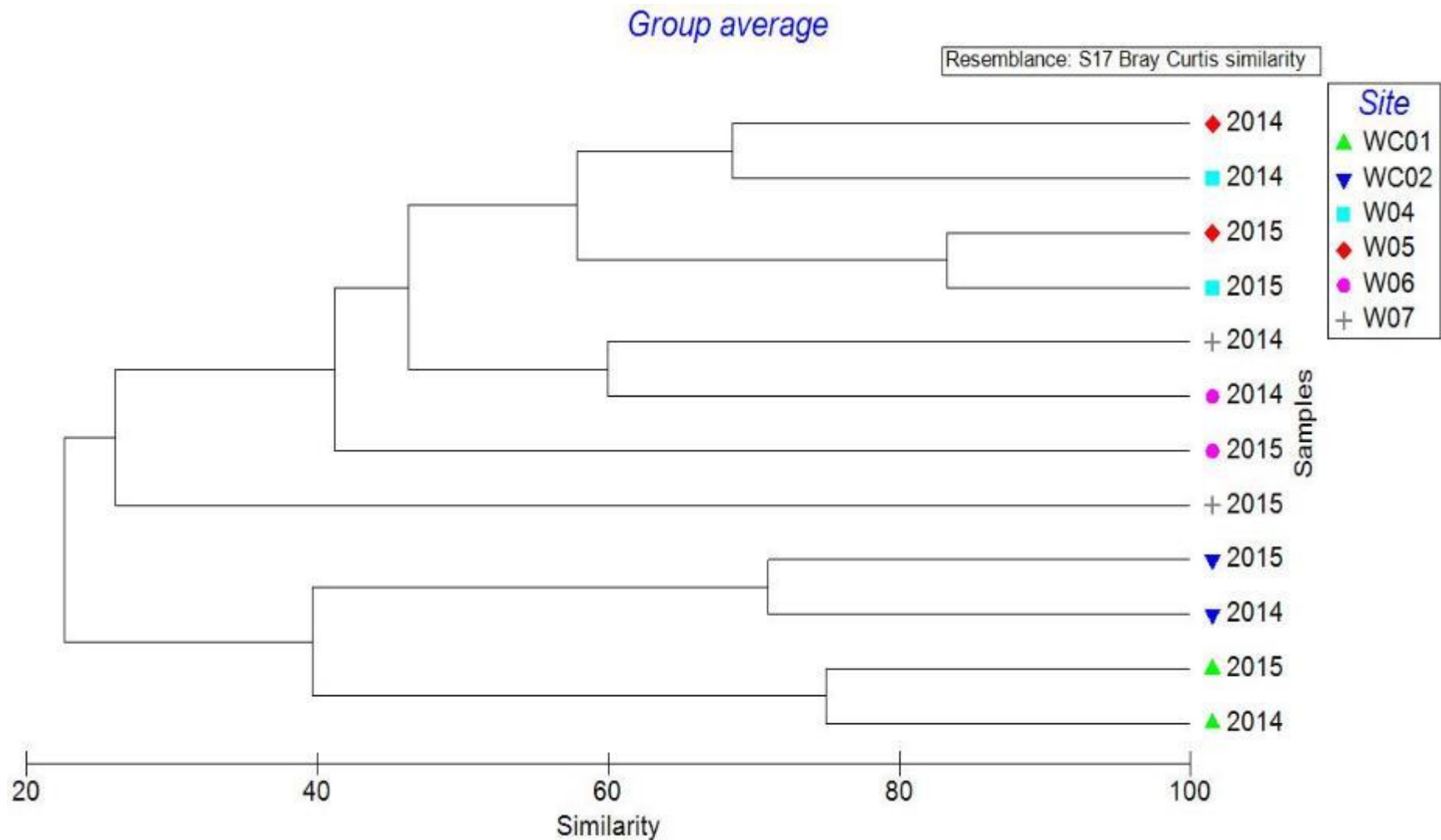


Figure 17: Cluster analysis of bird species recorded in all monitoring plots for the winter monitoring periods (2014 – 2015)

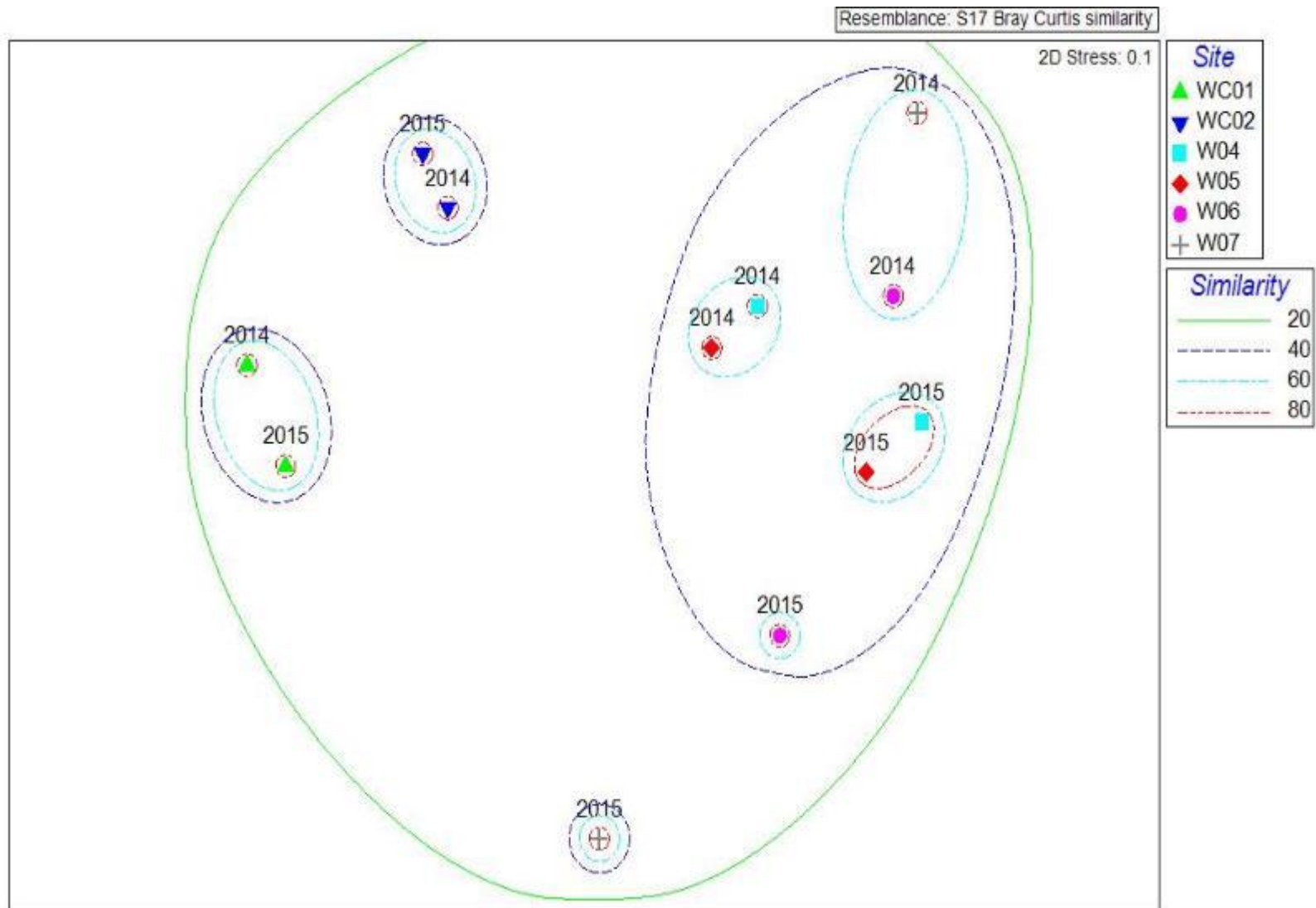


Figure 18: Non-metric multi-dimensional scaling plot for bird species recorded in all monitoring plots for the winter monitoring periods (2014 - 2015)

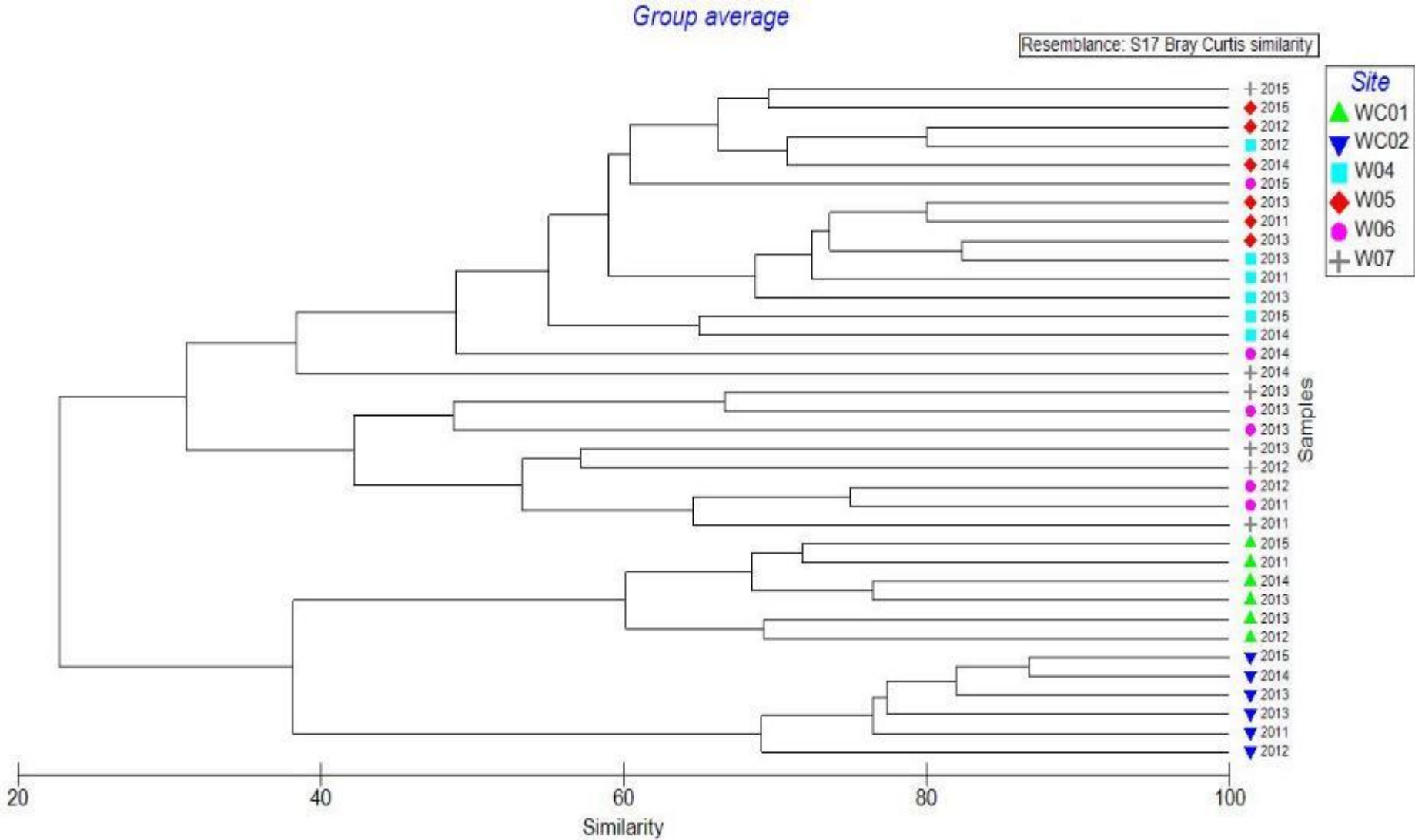


Figure 19: Cluster analysis of bird species recorded in all monitoring plots for the spring monitoring periods (2011 – 2015)

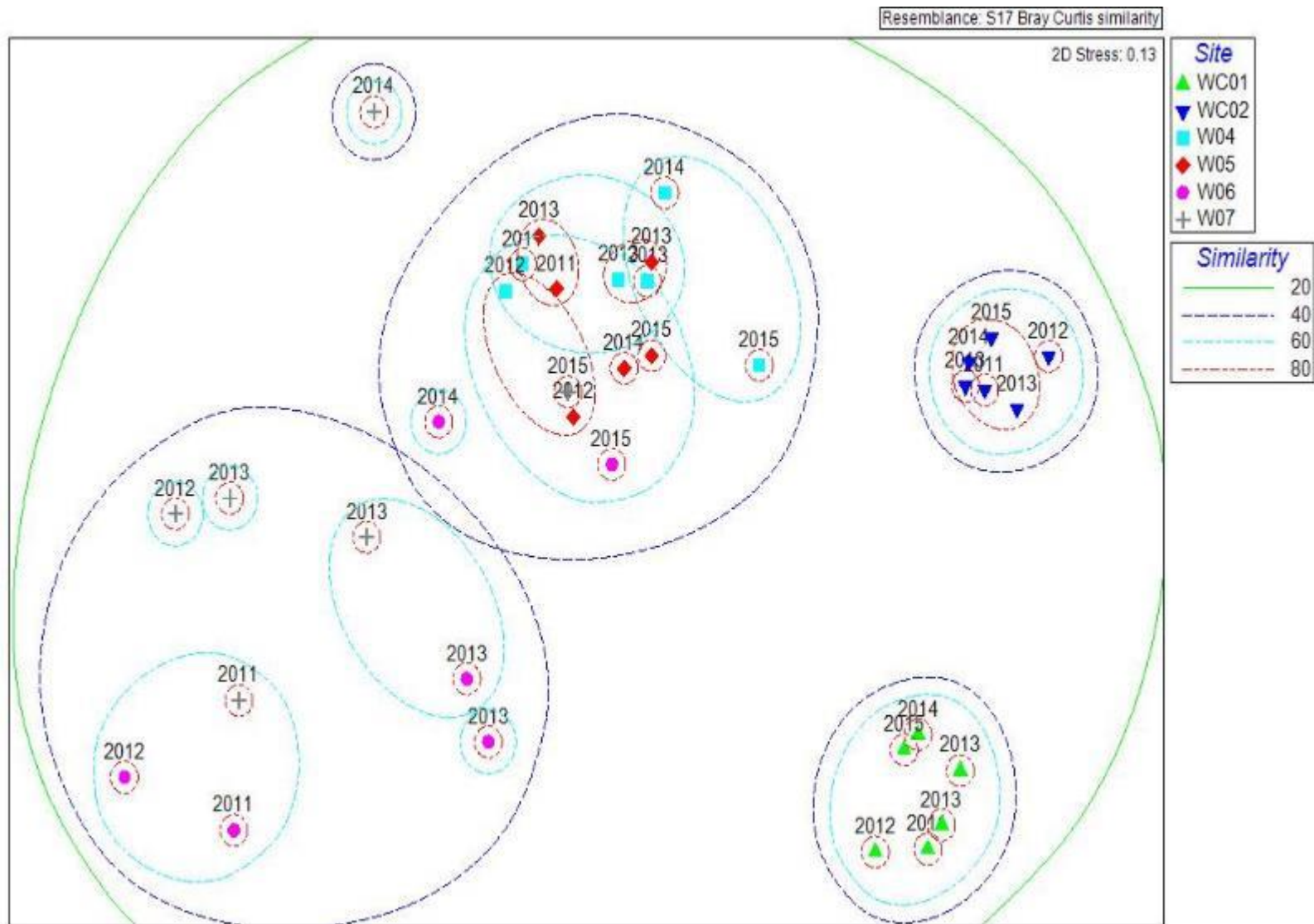


Figure 20: Non-metric multi-dimensional scaling plot for bird species recorded in all monitoring plots for the winter monitoring periods (2011 - 2015)

Table 39: Fauna species recorded within rehabilitated monitoring zones W04, W05 and W06 (2011 - 2015)

Species	Common Name	Notes	Rehabilitated Sites																								
			W04							W05							W06										
			2011	2012	2013 (Sept)	2013 (Oct)	2014 (Aug)	2014 (Nov)	2015 (Apr)	2015 (Jul)	2015 (Oct)	2011	2012	2013 (Sept)	2013 (Oct)	2014 (Aug)	2014 (Nov)	2015 (Apr)	2015 (Jul)	2015 (Oct)	2011	2012	2013 (Sept)	2013 (Oct)	2014 (Aug)	2014 (Nov)	2015 (Apr)
AMPHIBIANS																											
<i>Litoria caerulea</i>	Green Tree-Frog										X	X															
<i>Limnodynastes tasmaniensis</i>	Spotted Grass-Frog																X										
<i>Litoria peronii</i>	Peron's Tree-Frog																										
Total number of species			0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
REPTILES																											
<i>Cryptoblepharus virgatus</i>	Wall Skink					X							X	X													
<i>Egernia striolata</i>	Tree Skink					X								X													
<i>Morethia boulengeri</i>	Boulenger's Skink					X																					
<i>Pogona barbata</i>	Eastern Bearded Dragon																										
<i>Pseudechis porphyriacus</i>	Red-bellied Black Snake																										
Total number of species			0	0	0	3	0	0	0	0	0	0	0	1	2	0	0	0	0	3	0	0	0	2	0	0	0
MAMMALS																											
<i>Felis catus</i>	Cat	Exotic																									
<i>Lepus capensis</i>	Hare	Exotic	X				X									X									X		X
<i>Macropus giganteus</i>	Eastern Grey Kangaroo		X	X			X	X	X		X	X	X		X	X	X	X	X						X	X	X
<i>Macropus robustus</i>	Common Wallaroo			X				X	X	X	X	X	X				X	X	X	X	X	X			X	X	X
<i>Oryctolagus cuniculus</i>	Rabbit	Exotic																									
<i>Phascolarctos cinereus</i>	Koala	Vulnerable - TSC Act																									
<i>Sus scrofa</i>	Feral Pig	Exotic									X															X	
<i>Trichosurus vulpecula</i>	Common Brushtail Possum																										
<i>Vulpes vulpes</i>	Fox	Exotic		X																							
<i>Wallabia bicolor</i>	Swamp Wallaby																										
Total number of species			2	3	0	0	2	2	2	2	2	2	0	0	1	2	2	2	7	1	1	0	0	3	3	2	

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APPENDIX 2 REHABILITATION MONITORING REPORT 2014



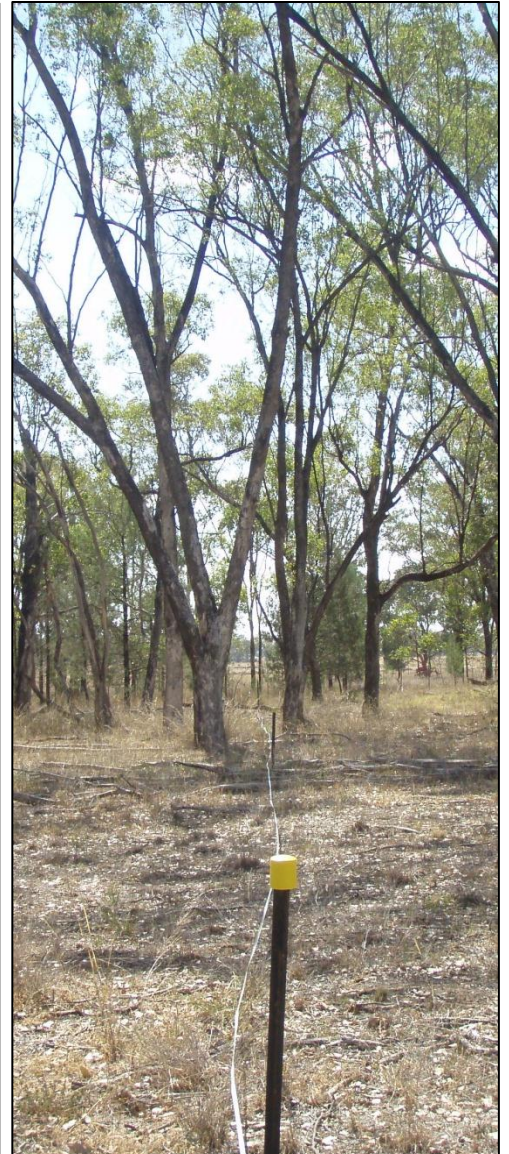
Canyon Coal Mine – Rehabilitation Monitoring Report

Volume 1

Spring 2014

Prepared for
Whitehaven Coal Mining Limited

20 March 2015



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Abbreviations

Abbreviation	Description
DBH	Diameter at Breast Height
DPI	Department of Primary Industries
ELA	Eco Logical Australia
EMS	Environmental Management System
MCP	Mine Closure Plan
MDS	Multidimensional Scaling
MOP	Mining Operations Plan
NDVI	Normalised Differential Vegetation Index
PAB	Photosynthetically Active Biomass
PFC	Projected Foliage Cover
RMP	Rehabilitation Monitoring Program
TPFC	True Projected Foliage Cover
WCM	Whitehaven Coal Mining Limited

Key outcomes

- Few of the trees and shrubs affected by the 2013 fire event appear to be re-sprouting; we recommend planting with endemic species in this zone
- Temporal changes in vegetation cover and composition occurred across all zones and is indicative of dry seasonal conditions, rather than impacts from land management
- Exchangeable phosphorus levels have declined significantly across the pasture rehabilitation zone and in two of the three control monitoring zones.

Recommendations

- Planting of additional endemic trees and shrubs at Wood_10c and Wood_07c to improve habitat complexity. This should be done with reference to control data collected on native species composition and density from remnant vegetation communities adjacent to the site.
- Rhodes Grass can reduce native biodiversity. For future plantings it is important to find an alternative, preferably a mix of groundcover species that are native to the local area
- African Boxthorn and Prickly Pear are present on site, although in low numbers. These weeds should be removed and managed
- Removal of remaining plastic tree guards on planted trees as they are impeding growth
- Pigs were present throughout the woodland sites. Management advice can be obtained from the DPI.
- According to the Rehabilitation Monitoring Program Landscape stability assessment using LiDAR is due in 2015
- In order to better understand the use of rehabilitated woodland areas by fauna we recommend that bird abundance data be collected and used in the analysis
- Erosion remediation works within Plot 1B (Wood_10c) should be monitored opportunistically by WCM staff between monitoring periods until groundcover is re-established.

1 Introduction

This Rehabilitation Monitoring Report has been prepared by Eco Logical Australia (ELA) for Whitehaven Coal Mining Ltd (WCM) in accordance with the *Rehabilitation Monitoring Program for Canyon Coal Mine* (RMP) (ELA 2011). The Canyon Open Cut Coal Mine ceased production in mid-2009 and is currently in mine closure phase.

1.1 Background

Canyon Open Cut Coal Mine (Canyon) is owned and managed by WCM. The mine was established in 2000 as a trial coal mining operation and progressed to long-term operations later that same year. Further expansion towards the south was approved in 2005 to incorporate additional coal reserves, before mining ceased in July 2009.

The mine is located within the Narrabri Shire, approximately 30 km north-west of Gunnedah and 15 km east of Boggabri in the Gunnedah coalfields of NSW. The mine lies within the Mining Leases 1464 and 1471. The mine exists on the former “Whitehaven” and “Womboola” properties, as well as a small section of the “Merton” property. Prior to mining activities, these properties were used for agricultural cultivation and grazing.

Progressive rehabilitation at Canyon aims to restore ecosystem function. Recognising the heterogeneity of the landscape around Canyon, the rehabilitation program has created eight unique rehabilitation zones of either woodland or pasture. Monitoring methods and objectives to assess the effectiveness of rehabilitation are outlined in the RMP (ELA 2011).

1.2 Project scope

Rehabilitation monitoring surveys were undertaken in accordance with the RMP (ELA 2011) and included:

- Remote-sensing based landscape assessment (multi-spectral imagery)
- Soil monitoring in both the pasture and woodland zones
- Native vegetation and fauna surveys
- Analysis of results including statistical analysis (where appropriate).

1.3 Aims & objectives

The aim of this monitoring report is to document the spring 2014 monitoring results and provide a quantitative assessment of rehabilitation performance against nearby control landscapes.

Specific monitoring objectives for 2014 include:

- Quantitative tracking of rehabilitation performance
- Assess key aspects of flora and vegetation structure (upper, mid and lower strata) in woodland areas
- Compare data with previous monitoring events
- Evaluate monitoring results against monitoring triggers and rehabilitation objectives as outlined in the RMP
- Provide recommendations to improve the rehabilitation or monitoring methods and mine closure procedures for WCM.

1.4 Report structure

This report is presented in two volumes. Volume 1 contains a summary of the rehabilitation objectives and provides a summary of the spring 2014 monitoring program, including results, conclusion and recommendations. Volume 2 contains the collated field survey data from 2011, 2012, 2013 and 2014 monitoring periods and 2014 weather data.

1.5 Rehabilitation monitoring - management triggers

A multi-scale, multi-data source rehabilitation monitoring approach has been developed and implemented at Canyon. Remote sensing has been used to monitor the entire target area, including control areas, while targeted field work was used in agricultural and native vegetation environments, both within control and impact areas.

A two-tiered system of triggers for management was developed to respond to any changes identified via remote sensing. The first tier of response is triggered by changes detected in the remote sensing time series analysis. This instigates further investigations such as targeted, rapid, on-ground assessments. The second tier of response is triggered if changes are confirmed or discovered on-ground. These triggers instigate the development of site-specific management responses and remedial actions (ELA 2011).

2 Rehabilitation objectives

A summary of the objectives for rehabilitation at Canyon, as stated in the relevant management plans, is provided in Table 2-1 (ELA 2011).

Table 2-1: Summary of rehabilitation objectives for Canyon Mine

Stated rehabilitation objectives (EMS, MOP, MCP)
Maintain and/or restore biodiversity and ecological integrity of areas affected by mining or agriculture within the mining lease
Maintain and/or re-establish agricultural land (pasture establishment) of comparable land capability to that of the pre-disturbance environment
Provide a revegetated post-mining landform which is consistent with surrounding landforms and, with the exception of the final void, provides no obvious evidence of a prior mining land use
Create low maintenance, geotechnically stable final landform
Minimise visual exposure by ensuring rehabilitation blends with the adjoining landscape
Minimise erosion and sedimentation
Establish rehabilitated areas that will provide habitat for fauna and corridors for fauna movement between rehabilitated areas, regrowth areas and remnant vegetation
Control vermin, feral animals and noxious weeds
Ensure successful implementation of the approved biodiversity offset strategy
Monitor rehabilitation success using selected physical and biological parameters
Re-establish native vegetation communities using locally collected seed
Develop and implement a flora and fauna monitoring program which provides statistically valid conclusions on rehabilitation success and recommendations for improved outcomes (if required)
Exclude bushfires and control noxious weeds and feral animals
Develop native vegetation communities in the stock exclusion zone (i.e. rehabilitated areas and remnants) which emulate the structure and floristics of undisturbed areas (as demonstrated by monitoring)
Establish native vegetation communities more extensive than currently exist in the area of the mine
Create rehabilitated areas that are used by native fauna (as demonstrated by monitoring)
Refine the rehabilitation / offset strategy based on monitoring outcomes, site experience and improved technologies

Stated rehabilitation objectives (EMS, MOP, MCP)

Re-establish approximately 16 ha of Class II capability land (including an area classified as Class III prior to mining) using soils reclaimed from existing Class II areas

Elsewhere, establish landform, soil profiles and vegetation communities consistent with pre-disturbance land capabilities

3 Methods

The Canyon RMP (ELA 2011) recommends that it be reviewed every 3 years. The review is to examine the monitoring program effectiveness and recommend any improvements. After 3 years of implementation, ELA reviewed the implementation and outcomes of the RMP in relation to indicator appropriateness, field survey, analysis and technology changes in August 2014. Key amendments of the RMP are described in Table 3-1.

The spring 2014 monitoring was undertaken in accordance with the methods prescribed in the RMP (ELA 2011) (Table 3-1). Any minor alterations from the original methods are detailed in the following sub-sections.

Table 3-1: Multi-scale monitoring program summary

Data source	Type	Scale	Purpose	Recommended amendments to the RMP in 2014
Remote sensing	LiDAR (every 3 years)	Entire site	Topographic form and change Woodland parameters	Ongoing capture and analysis of LiDAR should be considered.
	Multi-spectral imaging (annually)	Entire site	Agricultural pasture cover/biomass Woodland cover/biomass Erosion monitoring Direct field survey	-
	EM38/31 (every 3 – 5 years)	Pasture zones	Soil moisture and nutrient zones	Removed from the RMP. Replaced by regular inspections and remote sensing.
Woodland survey	Vegetation survey (annually)	Woodland zones	Woodland health and function	-
	Fauna survey (Birds – winter and spring)	Woodland zones	Woodland health and function	-
	Soil survey (every 3 years)	Woodland zones	Soil condition	-
Agricultural survey	Pasture survey (annually)	Pasture zones	Pasture biomass and composition	Removed from the RMP. Replaced by remote sensing and on ground inspections.
	Soil Survey (every 3 years)	Pasture zones	Soil nutrient status	-

3.1 Woodland surveys

Monitoring plots for the woodland vegetation survey were as per those used during the 2013 monitoring period (Figure 3-1).

The RMP (ELA 2011) recommends that five soils pits be established for analysis of horizon boundaries and ecological function, three in the rehabilitation zone and one in each control zone. As one of the soil pits from 2011 was located in the area likely to be disturbed by future operations only two soil pits were established in the rehabilitation zone and subsequently monitored, including for the 2014 survey.

3.2 Soil sampling

As nominated in the RMP (ELA 2011) assessment of key soil parameters are required every three years. Baseline parameters were described in 2011. The 2014 monitoring round included a 150 mm soil core from eight locations within each monitoring zone: the rehabilitated pasture zone, control pasture 1, control pasture 2 and control pasture 2 (Figure 3-2). Each sample was analysed at EastWest EnviroAg Laboratory (NATA Accredited Laboratory 15708) for:

- Electrical conductivity (soil:water 1:5)
- pH (CaCl₂)
- Total nitrogen (Kjeldahl)
- Exchangeable phosphorus (Colwell)
- Organic carbon (Walkley-Black).

Soil profile and condition assessment is also recommended every three years; eight soil pits were dug across the site in order to assess this parameter (Figure 3-3).

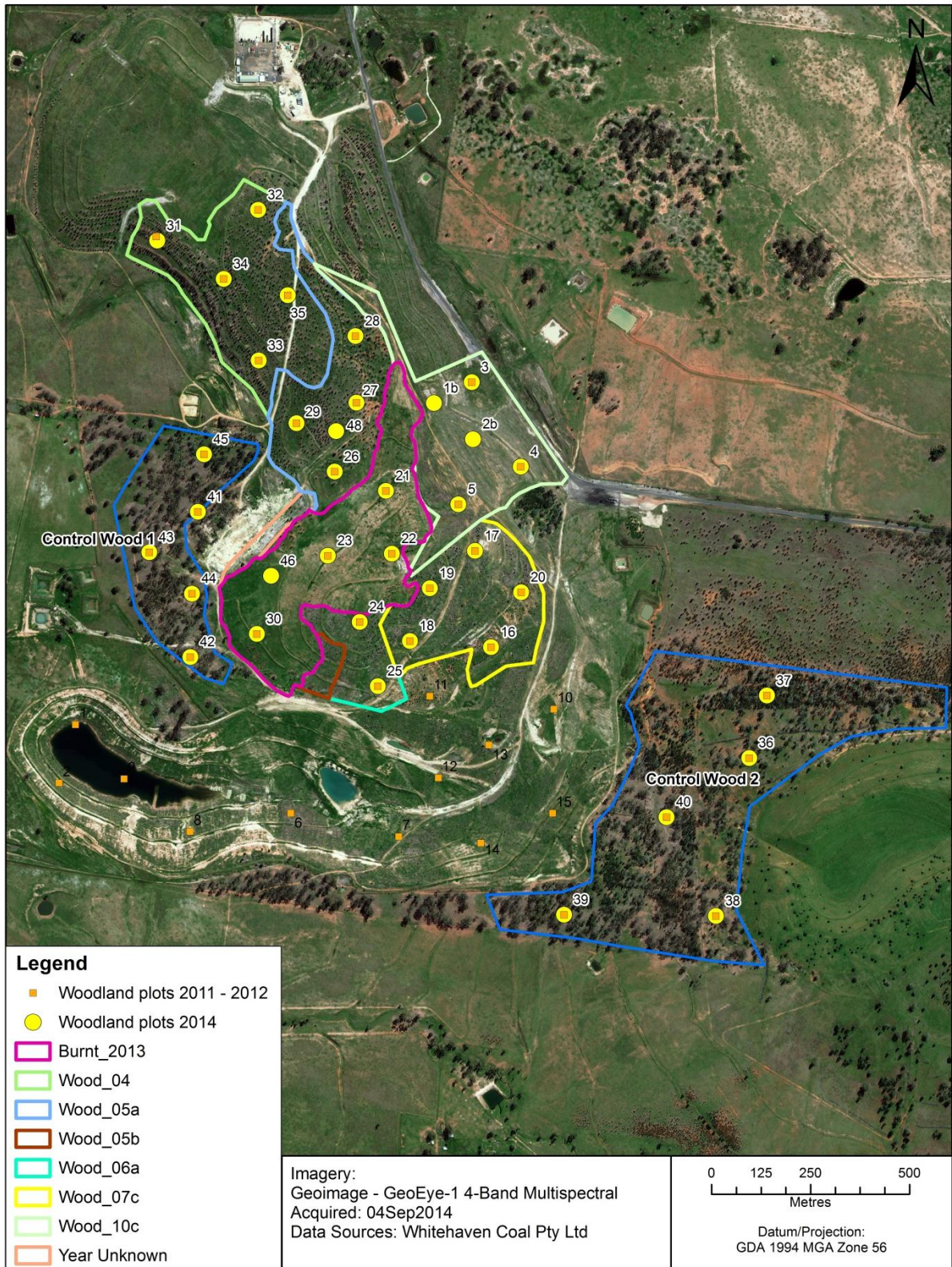
3.3 Survey dates

Multi-spectral imagery was captured across the entire target area (including control areas) on 4 September 2014 using 4-Band GeoEye-1.

Ecologist Dr Stephen Debus undertook terrestrial fauna and habitat monitoring of woodland areas between 25 - 26 August 2014 (winter), and 3 – 4 November 2014 (spring).

Ecologist Ben Martin undertook soil sampling between 8 – 10 October 2014.

Botanist Dr Lachlan Copeland and Environmental Scientist Emily Southwell undertook monitoring of woodland areas (vegetation transects only) between 17 – 21 November 2014.



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Figure 3-1: Woodland vegetation monitoring plots for spring 2014 survey (also shown are monitoring plots from 2011 – 2012) (note: Year Unknown refers to rehabilitation zone where it is unknown in which year rehabilitation took place)



Figure 3-2: Location of soil cores

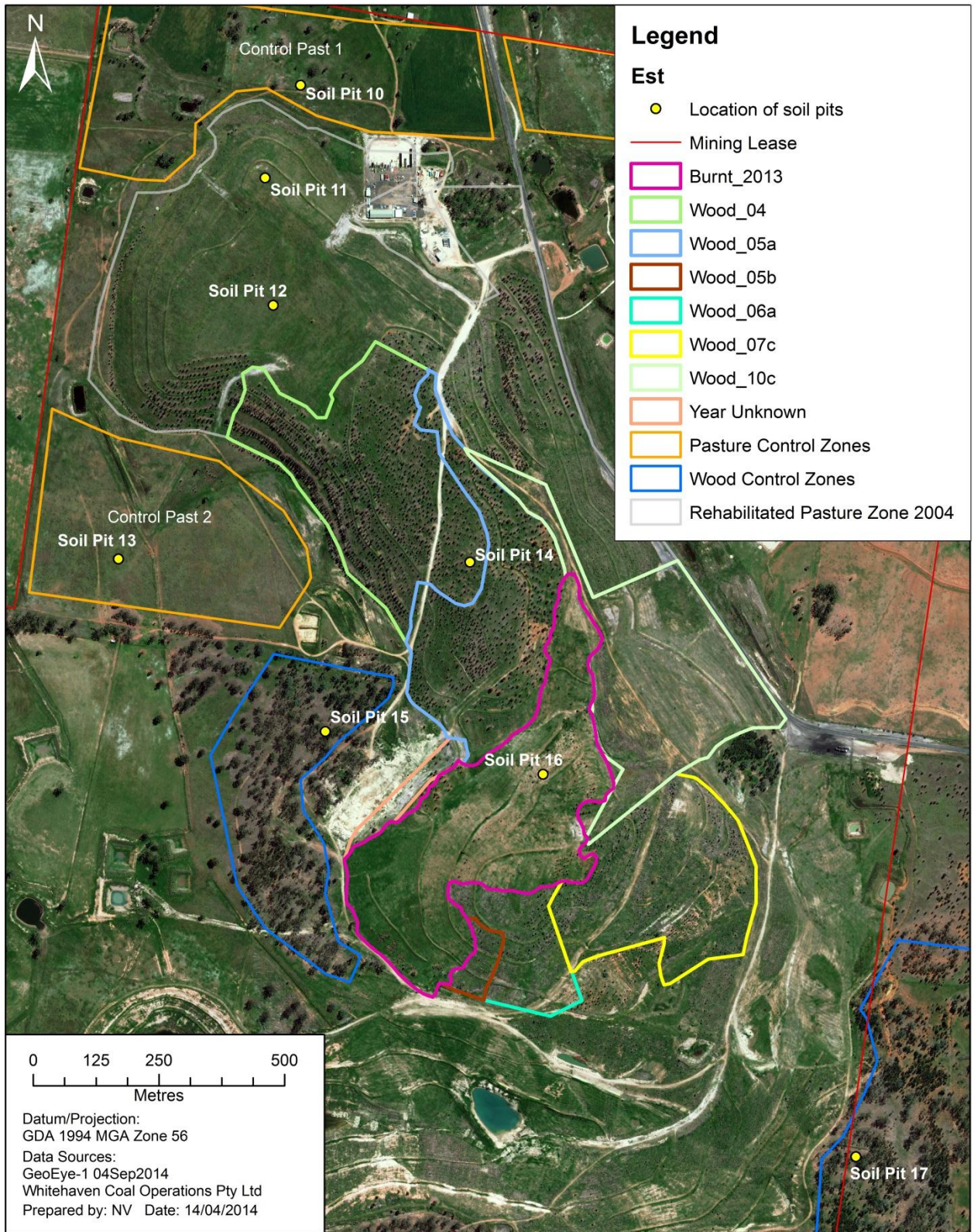


Figure 3-3: Location of soil pits (note: Year Unknown refers to rehabilitation zone where it is unknown in which year rehabilitation took place)

3.4 Weather

Temperatures in the three months preceding the spring monitoring period were cool to warm, with average minimum temperatures lower than the historical mean, and average maximum temperatures higher than the historical mean (Figure 3-4; Volume 2, Section 1). Rainfall in the six months preceding the spring surveys was well below average, with the exception of August 2014 where monthly rainfall was more than twice the historical monthly average (Figure 3-5; Volume 2, Section 1).

Conditions were mostly dry during the winter bird survey; 20.8 mm of rain was recorded on the third day (26 August 2014). Minimum temperatures during the winter survey were lower than historical averages; maximum temperatures were between 7.3 and 8.4°C above the historical average (Volume 2, Section 1).

Conditions for the spring bird survey were dry. The first day was unseasonably cold, recording a minimum temperature 10°C below historical averages; the second day was on par with the historical mean (15.9°C). Maximum temperatures remained relatively constant with historical averages, recording 29.4 and 29.3°C on the first and second day respectively (Volume 2, Section 1).

Conditions were dry during flora surveys. Minimum temperatures for the first three days of the survey were at least 3.9°C below the historical mean, and at least 5.9°C above during the final two days. Maximum temperatures were 4.2 to 11.2°C above the historical mean (Volume 2, Section 1).

The combination of below average rainfall, warmer than average daytime temperatures and consequentially higher evaporation rates means that conditions for all surveys were extremely dry.

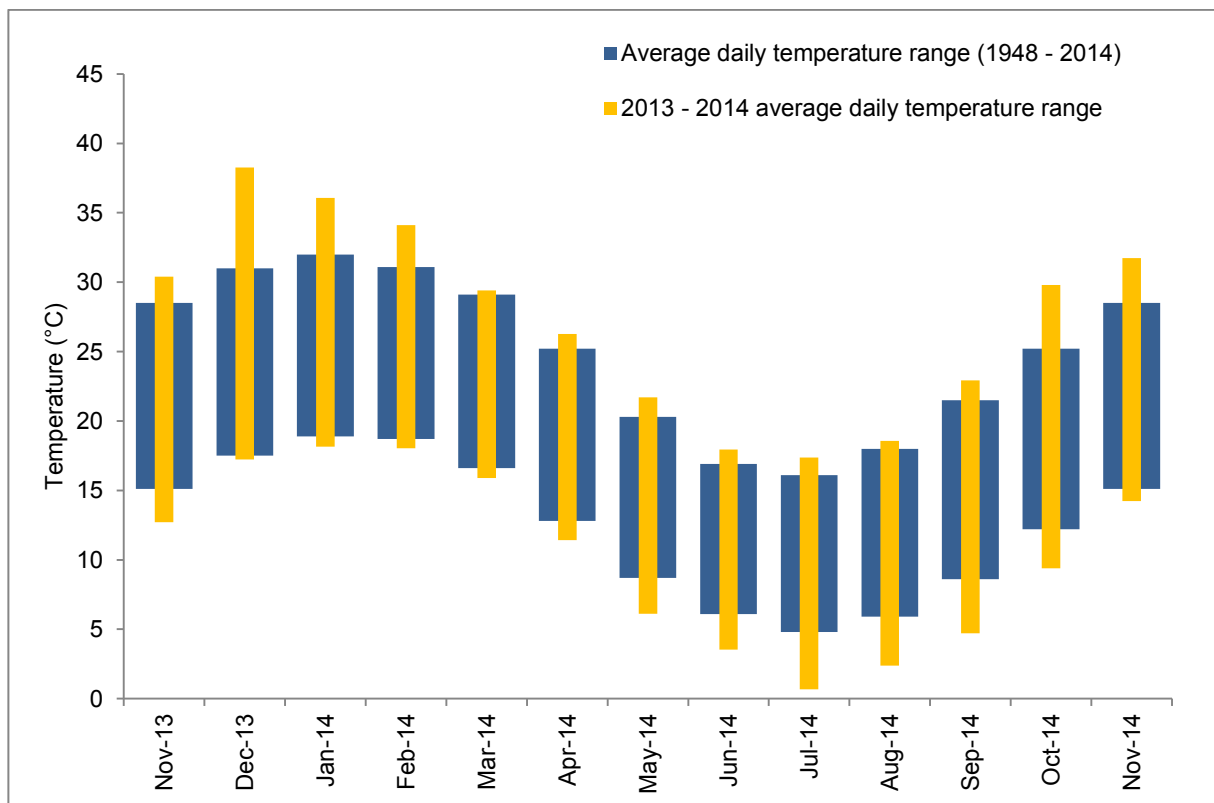


Figure 3-4: Historical average (Gunnedah Resource Centre 55024; BoM 2014) and recorded average daily temperature range (WHC weather station).

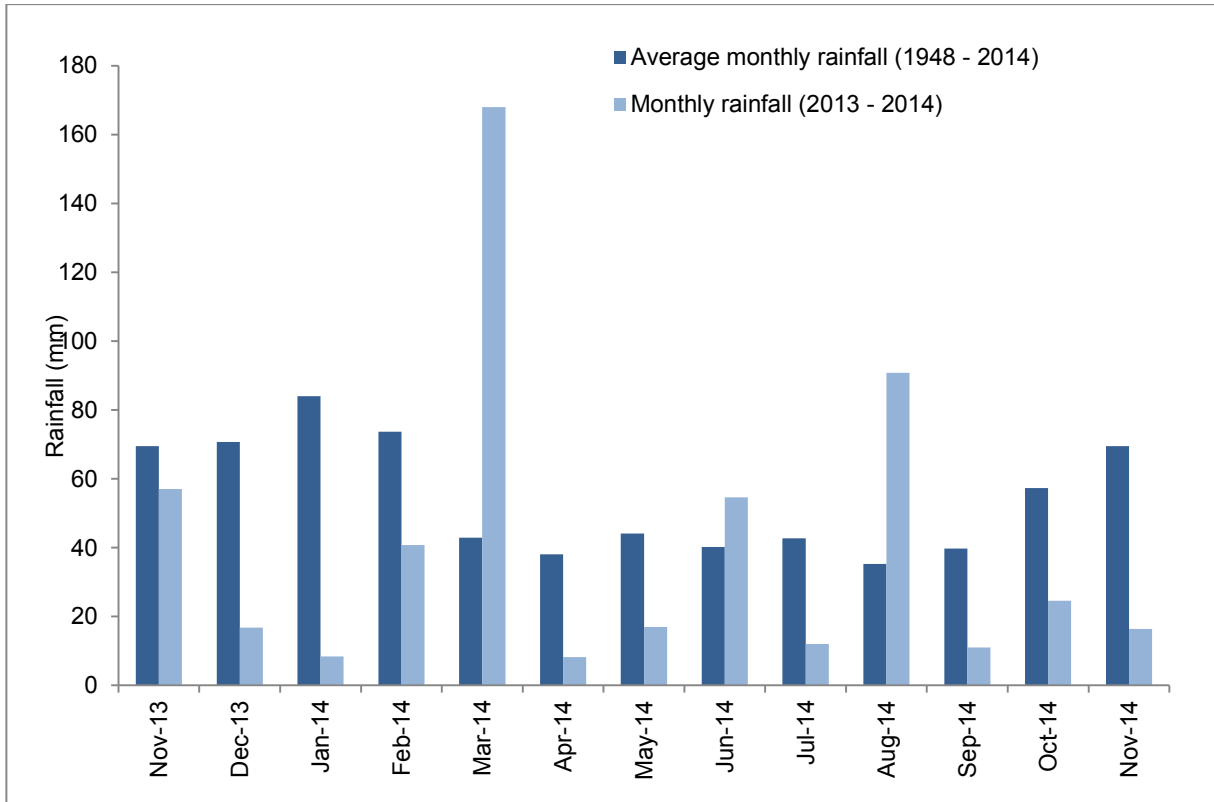


Figure 3-5: Historical average (Gunnedah Resource Centre 55024; BoM 2014) and recorded monthly rainfall (Whitehaven weather station).

4 Results & discussion

4.1 Remote sensing monitoring

4.1.1 Topographic form

Not undertaken in 2014.

4.1.2 Soil electrical conductivity

Not undertaken in 2014

4.1.3 Relative plant biomass & bare soil assessment

Changes in the Normalised Differential Vegetation Index (NDVI) of multi-spectral imagery captured on 2014 and 25 August 2013 were assessed. All rehabilitation zones, excluding Burnt_2013, presented no substantial areas of significant change and only scattered areas of groundcover increase. A substantial area of significant increase in photosynthetically active biomass (PAB) was identified along the eastern boundary of the Burnt_2013 zone.

Scattered areas of increase and decrease in PAB across the image can be attributed to shadow position and slight image shift; this is particularly pronounced around dam perimeters (Figure 4-1).

4.1.4 Monitoring triggers

NDVI analysis identified an area of substantial groundcover increase. Field investigations confirmed that the increase was attributed to the natural response from the 2013 fire event. Exotic groundcover was lower than pre-fire records and species recorded during the survey were not environmental or noxious weeds, so no specific management actions were triggered (ELA 2011) (Table 4-1).

Table 4-1: Remote sensing monitoring triggers for management

Trigger	Investigation	Management
Remote sensing change detection identifies areas of substantial change (> +/-2 std dev from average) in area greater than 0.1 ha	Investigate sources of change via desktop assessment: 1. Obvious external influence e.g. fire, major storm, or unrelated development) 2. Potentially due to weed infestation, erosion / sedimentation, poor cover establishment	Respond to change based on likely source of impact: Identify region of change and tag it as non-project specific impact Undertake directed field investigation via rapid field checking protocol (Table 5-11 in ELA 2011)

4.2 Management actions required

No specific management actions required.

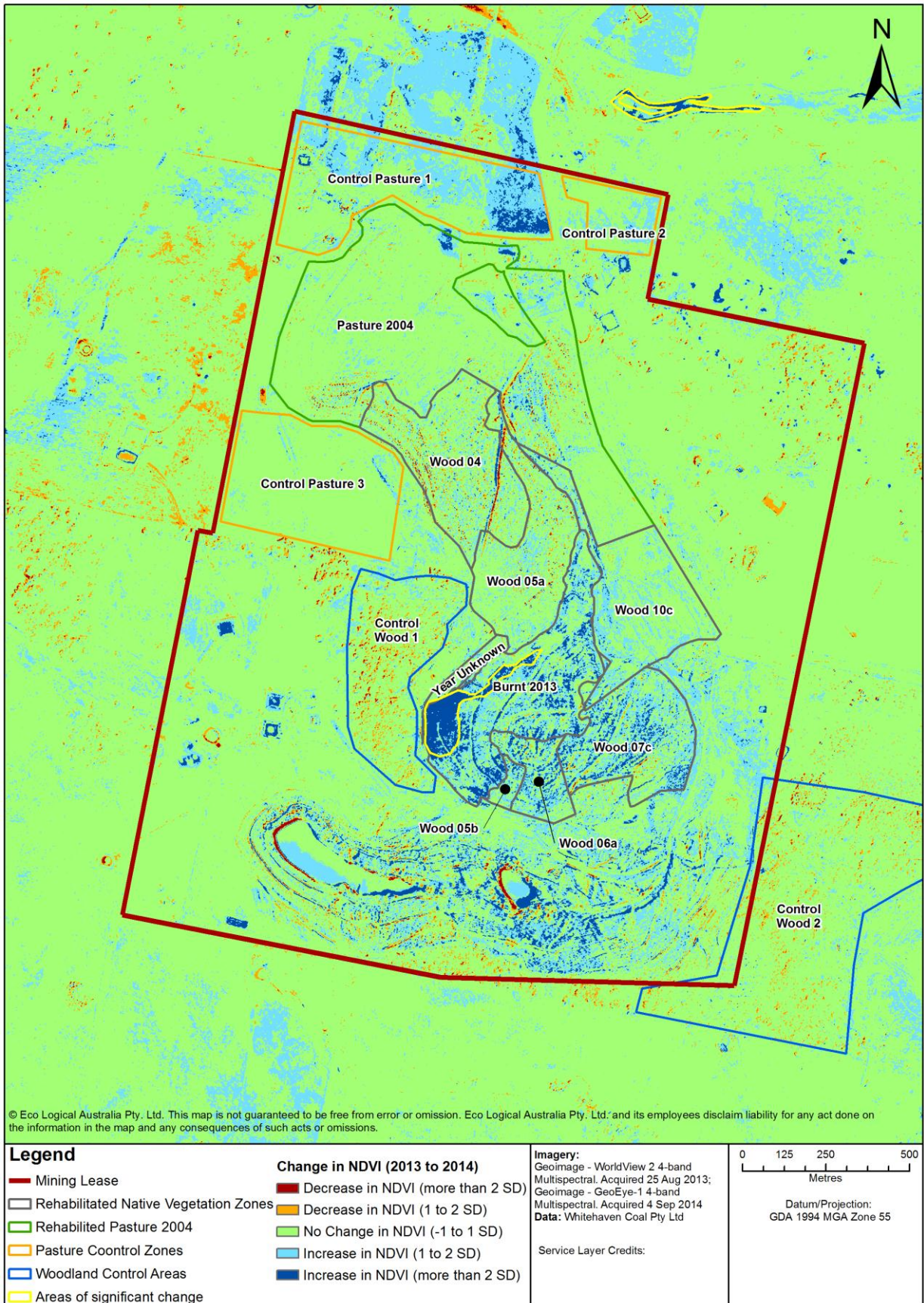


Figure 4-1: NDVI change detection analysis

4.3 Soil sampling

4.3.1 Soil cores

Soils from 24 plots were analysed for chemical attributes (EC, pH, TN, P, OC). The results of soil sampling are summarised in Volume 2, Section 5.1.

Baseline monitoring in 2011 indicated soil pH varied from mid to low, ranging from 4.9 (Control Pasture 2) to 7.91 (Control Pasture 1). Soil analysis in 2014 indicated that there was no significant difference in pH levels within any monitoring zones between monitoring periods. The rehabilitated sites were approximately 10% higher in pH than the control sites, with each averaging 6.76 and 6.17 respectively.

Soil electrical conductivity (EC) varied across all zones, ranging from 0.03 dS/m (Control Pasture 2) to 0.47 dS/m (Control Pasture 1), and averaging at 0.10 dS/m. The threshold suitable for agricultural activities is 0.15 dS/m (Reid & Dirou 2004). All control and rehabilitation sites increased in EC compared to 2011 baseline data, with the exception of two sites, one in the rehabilitated zone and another on Control Pasture 2, which decreased. These changes between monitoring periods were not significant ($p > 0.05$), averaging approximately 10-20% different from 2011 baseline data.

Total nitrogen (TN) varied across all sites, ranging from 413 to 2444 mg/kg, and averaging 982 mg/kg within the rehabilitation zone and 407 to 1744 mg/kg within the control zones, averaging at 910 mg/kg. Average TN increased across all monitoring zones from 2011 baseline data; Control Pasture 1 increased approximately 2%, Control Pasture 2 increased 17% and the rehabilitation zone increased 40%. It should be noted that the average increase at the rehabilitation zone was largely distorted by one site which when removed from the calculations the average increase for the rehabilitation site was only 8%. Hence, there was no significant difference recorded within monitoring zones between monitoring periods.

Baseline monitoring in 2011 indicated exchangeable phosphorus varied across all zones, ranging from 14.60 to 35.80 mg/kg. Monitoring in 2014 indicated exchangeable phosphorus declined significantly at all zones, ranging from 6.75 to 27.90 mg/kg, except Control Pasture 1, which had only marginal decreases across the monitoring zone. Research indicates that diverse perennial native pastures in temperate Australia only persist when the available soil phosphorus is below approximately 20 mg/kg (Colwell) (Dorrrough *et al.* 2008). If soil phosphorus increases above this level, soil fertility favours short-lived fast growing (typically exotic) plants which inevitably outcompete most of the diverse long-lived native plants that originally dominated Australia's temperate woodlands (Figure 4-2) (Dorrrough *et al.* 2008).

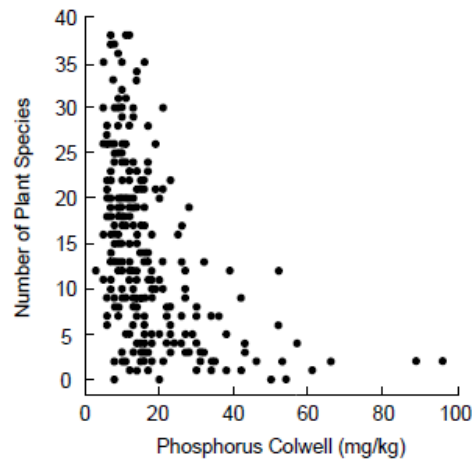


Figure 4-2: Decline in diversity of plants (as measured by number of species) as available soil phosphorus increases (Dorrough *et al.* 2008).

Organic matter increased at all zones compared to baseline values, with 2014 levels ranging from 0.7 to 5.8% in the rehabilitation zone, and 1.3 to 5.0% in the control zones (Control Pasture 2 and Control Pasture 1 respectively). The change was significantly different at Control Pasture 3, which increased by 44%. The increase in organic matter across all sites may be attributed to current land management practices (i.e. minimal soil and pasture disturbance) and seasonal variation (high winter rainfall).

4.3.2 Soil pits

Soil pits on the rehabilitation areas showed variable profile reconstruction with topsoil depth ranging from 16 cm (rehabilitation pit 12) to 31 cm (rehabilitation pit 11). The control sites presented a similar topsoil profile with depths ranging from 18cm (control pit 10) to 17cm (control pit 13). All rehabilitated soil areas showed good establishment with grass and other plant roots penetrating through the top horizon. No roots were found below the top horizon in both the control and rehabilitated pits. Mine overburden was found below 64 cm in rehabilitation pit 11 and below 26 cm in rehabilitation pit 12. Soil fauna were not identified in any pits (Volume 2, Section 5.2).

4.3.3 Monitoring triggers

The statistically significant decline in soil phosphorus triggered a management response (Table 4-2). However, given that diverse native perennial pasture species persist on soils of low fertility, no management recommendation have been made.

Table 4-2: Management recommendations for rehabilitated pasture zones.

Trigger	2014 monitoring outcomes	Management recommendations
Statistically significant change detected in soil character (pH, EC, OM, N or P)	Statistically significant decline detected in P	No management actions required
Soil erosion	None identified	No management actions required

4.4 Woodland monitoring

Woodland zones rehabilitated in 2004 and 2005 (Wood_04 and Wood_05a) continue to increase in structural complexity and show an increase in suitable fauna habitat and a corresponding increase in the number of animals using the sites. More recently rehabilitated sites are yet to show similar trends.

4.4.1 Vegetation

Woodland rehabilitation is yet to reach a stage where there is a canopy layer; therefore there is no True Projected Foliage Cover (TPFC) for any of the rehabilitated sites. Some of the planted trees now form a midstorey layer. All rehabilitation zones have planted seedlings and/or juveniles, however Wood_10c only recorded juveniles within one of five monitoring plots. Fire appears to have killed many of the juvenile trees in Burnt_2013, despite some individuals showing early signs of resprouting during 2013 monitoring.

The established canopy layer within the control plots have a TPFC of approximately 5%, while the rehabilitation plots have not yet established a canopy layer. Average TPFC for the midstorey layer is low for both the rehabilitation and control plots (<2%). The midstorey of the rehabilitated sites are dominated by juvenile tree species that will eventually grow into the canopy; the control plots however, have a combination of juvenile tree and shrub species contributing to the midstorey layer. This suggests that, once mature, the rehabilitated sites may have a midstorey layer that lacks the diversity and structural complexity of the control sites (Volume 2, Section 3.2 and 3.3). The current lack of similarity between control and rehabilitated vegetation communities is confirmed by Non-metric Multidimensional Scale (nMDS) analyses (Volume 2, Figures 3.1 to 3.6). These suggest that at their current stage of succession, the canopy and midstorey of the earliest rehabilitation sites (Wood_04 and Wood_05a) have greater similarity to the control sites than the more recently rehabilitated sites (Wood_06a, Wood_07c, Wood_10c and Burnt_2013). While the nMDS plots indicate temporal trends toward greater similarity between the control and rehabilitation sites, the zones still differ significantly.

Native groundcover communities in the rehabilitated and control areas showed a large amount of spatial and temporal variation for most sites (see Cluster and nMDS analysis in Volume 2, Section 3.6). This indicates that the groundcover vegetation is naturally variable. The earliest zones rehabilitated (Wood_04 and Wood_05a) are more similar to the control zones than those rehabilitated in 2007, 2010 or burnt in 2013.

Native groundcover species richness is still below that recorded in 2011 at most control and rehabilitation sites. The dry conditions appear to have had a more severe impact on native species in the rehabilitated area than in the control plots, where native species have continued to increase from 2012 and 2013, but have not yet reached the highest levels recorded in 2011. This may be because the native groundcover communities in the control sites have been established longer, and as such are better buffered to survive dry periods (i.e. the canopy provides more shade at the control sites therefore the groundcover species endure less stress). Native species richness remains generally higher in Wood_04 and Wood_05a plots than at Wood_07c and at Wood_10c. However, native species richness continued to decline from levels recorded during 2012 and 2013 monitoring at most plots in Wood_04 and Wood_05a, whilst at most plots in Wood_07c and Wood_10c there was an increase during this time (Volume 2, Figure 3-14 to 3-19).

As expected, native groundcover species richness at Burnt_2013 has increased significantly since 2013 survey, which was undertaken only a few months after the area was affected by the 2013 fire event. All Burnt_2013 plots have the highest native groundcover species richness recorded since monitoring commenced in 2011.

Native groundcover species have greater species richness than exotics at all control plots for all monitoring periods, with the exception of two plots within Control Wood 1, which contain just over 50% exotic species, a substantial increase from 2013 results. Exotic groundcover species richness within the rehabilitation sites has generally increased since 2013, with most plots having higher exotic species richness than native (Volume 2, Figure 3-14 to 3-19). Of particular concern are dense patches of

Rhodes Grass in the more recently rehabilitated zones (Wood_10c, Wood_7c and Wood_6a), which can be a major threat to the establishment of native pastures and can eventually become a monoculture. The presence of Rhodes Grass within Burnt_13 has not recovered to the levels recorded prior to the 2013 fire event.

Two noxious weed species persist on site. Prickly Pear was recorded at Control Wood 1, Control Wood 2 and Wood_05a, and African Boxthorn at Wood_07c. The control of noxious weeds on private land is the responsibility of the land owner or occupier and is one of the management objectives for Canyon Mine. Both species are classified as Class 4, so should be managed to reduce spread and inhibit reproduction. WCM should refer to the site MCP for weed management procedures. NSW Department of Primary Industries (DPI) also recommend suitable management methods (DPI 2012).

Groundcover composition varies through time across all monitoring zones, data can be found in Volume 2, Section 3.7. Native species cover and temporal trends in Wood_05a and Wood_04 are similar to the two control zones, which have approximately 25% cover, almost half that recorded in previous years. The remaining proportion of groundcover within the control zones is predominantly leaf litter, while a combination of leaf litter and exotics was present in Wood_05a and Wood_04. Exotic species within the ground layer of the control zones have increased in cover, however still only make up approximately 5% of total cover. Similarly, Wood_04 and Wood_05a have increased in exotic cover since 2013, with the difference in Wood_04 is statistically significant ($p < 0.05$) (Volume 2, Table 3.22).

Mean native species cover increased in all monitoring zones from 2011 to 2012, except for Wood_07c where it remained relatively steady. Mean cover has continued to decrease since 2012, with all sites now below 2011 levels. The decrease in native species cover was significant ($p < 0.05$) in all control and rehabilitation zones, excluding the later rehabilitation zones, Wood_07c, Wood_10c and Burnt_2013 (Volume 2, Section 4.7).

Mean exotic species cover has increased across all control and rehabilitation zones, excluding Wood_10c, which has halved and Wood_6a, which has remained relatively steady. A similar trend has occurred for leaf litter, which has increased across all sites, except Wood_04 and Wood_07c, where it has remained steady. It was noted that more than 75% of the leaf litter recorded at all sites (except Wood_07c), was derived from exotic species, in particular Rhodes Grass and various annual species (Volume 2, Section 4.7).

Remedial works (re-profiling, supplementary topsoil and seeding) were undertaken within one Wood_10c plot (Plot 1B) in September 2014 in response to erosion. As a result of this work, groundcover has declined; to this effect, exotic species richness has also declined and Rhodes Grass is no longer present within this plot.

The amount of Large Woody Debris (LWD) has remained steady across most monitoring plots. Exceptions to this are for some plots in Control Wood 1, where length and number of sections increased between 2012 and 2014, and some plots in Control Wood 2, where fallen logs and debris have been pushed into piles (Volume 2, Section 3.2). This increase in LWD in control plots is because these sites have trees of sufficient maturity to drop branches and contribute to the LWD present as habitat on the ground. As there are no mature trees at rehabilitation sites, the amount of LWD is likely only to decrease until the trees mature, unless brought in from other areas.

4.4.2 Fauna

Analysis of bird species composition shows that bird species composition fluctuates between years at all monitoring zones, but with slightly more stability in the control zones (Volume 2, Figure 4.2 and 4.3).

This is primarily due to the young habitat within the rehabilitated zones being less complex than the more mature woodland control sites.

Bird species richness is consistently highest at Control Wood 2, with up to twice as many species recorded in this zone during each monitoring period compared with the other control and rehabilitation zones. Control Wood 2 is a larger area than Control Wood 1 and has better vegetation structure (more dense and with a shrub layer), so higher bird diversity is expected. Control Wood 1 is also dominated by Noisy Miners, which aggressively exclude some woodland bird species and are now listed as a Key Threatening Process.

Bird species richness at the rehabilitated sites is generally lower than the control sites, however Wood_04 has had a continual increase since monitoring began in 2011 and is now similar to the numbers found in Control Wood 1, although actual species and representative guilds differ. The remaining rehabilitated sites still have lower species richness than the control zones, with the lowest numbers recorded at more recently rehabilitated sites (Wood_06a and Wood_07c). However, the temporal trends at the rehabilitated sites remain consistent with the control zones. Wood_05a and Wood_06a have decreased slightly in species richness from 2013 monitoring similar to Control Wood 2, and Wood_07c has exhibited trends similar to Control Wood 1, remaining relatively constant. The composition of species guilds at the rehabilitation sites are yet to be representative of either control site (Volume 2, Table 4.1 – 4.2).

The Rehabilitation Monitoring Program for Canyon Coal Mine (ELA 2011) recommends targeted monitoring for *Neophema pulchella* (Turquoise Parrot) and *Pomatostomus temporalis* (Grey-crowned Babbler), both listed as threatened under the TSC ACT. Grey-crowned Babblers have been recorded annually since 2011 in both control zones but not in the rehabilitated zones. The Turquoise Parrot has not been recorded on site. In addition to these threatened species, the following were also present:

- *Chthonicola sagittata* (Speckled Warbler) Control Wood 2 in 2011, 2012, 2013 and 2014 (Vulnerable – TSC Act)
- *Falco subniger* (Black Falcon) over Control Wood 1 in 2012 and Wood_07c in 2014 (Vulnerable – TSC Act)
- *Hieraaetus morphnoides* (Little Eagle) over Control Wood 1 in 2011 (Vulnerable – TSC Act)
- *Melanodryas cucullata* (Hooded Robin) Control Wood 2 in 2012 2013 and 2014. (Vulnerable - TSC Act).

Of the non-bird fauna, seven mammal species were observed during monitoring. *Macropus giganteus* (Eastern Grey Kangaroo), *Macropus robustus* (Common Wallaroo), and *Wallabia bicolor* (Swamp Wallaby) have been seen across the control sites in all survey years and appear widespread. Eastern Grey Kangaroo and Common Wallaroo populations also extend into the rehabilitated zones. The remaining four mammal species observed were exotic, including *Lepus capensis* (Hare), *Oryctolagus cuniculus* (Rabbit), *Vulpes vulpes* (Fox) and *Sus scrofa* (Feral Pig). The exotic mammals were recorded within the control and rehabilitation zones; Hare was seen in three rehabilitation zones (Wood_04, Wood_05a and Wood_06a), and the Fox within Wood_06a, whilst pigs were widespread throughout. No reptile or amphibian species were recorded in 2014 (Volume 2, Table 4.3).

4.4.3 Soil pits

Soil pits in the rehabilitation zone (pits 14 and 16) showed a high content of gravel and rock within the top horizon. Two horizons were found above the mine overburden in pit 14, the top horizon was 23 cm deep and the second horizon had finer gravel present and went to 83 cm. Pit 16 had one horizon above the mine overburden, this top horizon was 36 cm deep. In the control pits gravel was present throughout pit 15, but was absent in the lower horizons. Pit 17 was the opposite, with gravel and large rocks increasing with depth (Volume 2, Section 5.2).

No plant roots were identified in the rehabilitation profiles. In the control pits, grass roots were identified in the first horizon of both pits; pit 17 also had tree roots in the first and second horizons. This is primarily due to the vegetation within the control sites being more established and complex than rehabilitation sites. No evidence of soil fauna was recorded (Volume 2, Section 5.2).

4.4.4 Monitoring triggers

Monitoring triggers requiring action are the presence of feral pigs and the presence of weed species (including two that are classed as noxious) (Table 4-3).

Plastic tree guards remain around some of the planted trees and are impeding growth; these should be removed.

Table 4-3: Management recommendations for woodland zones.

Trigger	2014 Monitoring outcomes	Management
Statistically significant change detected in either: Native overstorey (cover, health, richness, recruitment) Mid storey (cover, richness) Ground cover (cover, richness) Weeds (cover, richness) % ground cover	Exotic groundlayer species composition increased significantly in Wood_04. Native groundlayer species richness decreased significantly in Control Wood 1 & 2, Wood_04, Wood_05a and Wood_06a.	No management actions required at this stage as changes are synonymous with control zone trends.
Exotic fauna	Feral Pigs observed on site	Refer to MCP and/or DPI for management procedures
Weed infestation	Rhodes grass is a threat to native groundcover species diversity Prickly Pear and African Boxthorn persist on site	Refer to MCP and/or DPI for management procedures
Soil erosion	None identified	No management actions required at this stage

5 Conclusion & recommendations

5.1 Remote sensing monitoring

Image capture and NDVI analysis identified an area of substantial increase in vegetation growth. Field verification showed that the increase was due to regeneration following the 2013 fire event. Exotic groundcover was lower than pre-fire records and species recorded during the survey were not environmental or noxious weeds, so no specific management action is required.

Land surface stability assessment using LiDAR is recommended in the RMP (ELA 2011). Acquisition of this data will enable quantitative temporal comparison of key land surface condition parameters in both the agricultural and native vegetation environments.

5.2 Pasture monitoring

Groundcover composition and biomass monitoring was not undertaken as previous results have been highly variable and largely attributed to land management regime and seasonal conditions. Remote sensing analysis was used to target investigation of areas showing relative biomass and cover change. ELA recommend that more useful and practical weed assessments be carried and acted upon through continual assessment made by mine site staff, opportunistic assessments (noting significant weed outbreaks including noxious weeds) and via remote sensing following baseline pasture species surveys.

Topsoil character analyses indicated no significant changes in chemical attributes (EC, pH, TN, OC) since 2011 baseline monitoring with the exception of exchangeable phosphorus which has declined significantly across all zones excluding one control zone. Available phosphorus is still within desirable range for re-establishment of native plants, therefore no changes to management are recommended.

Topsoil character (pH, EC, Organic matter, N, P) and soil profile assessment are recommended every 3 years (ELA 2011) and are next due in 2017.

5.3 Woodland monitoring

Monitoring of woodland areas yielded results that are consistent with the 2013 drought conditions, i.e. decrease in native cover and increase in litter, therefore there are no management recommendations in relation to this. The following suggestions have been made in order to improve monitoring and rehabilitation outcomes.

Additional indigenous tree and shrub species should be planted at Wood_10c and Wood_07c to improve habitat complexity. Most trees and shrubs within Burnt_2013 have not recovered, ELA recommend that this zone be replanted. This should be done with reference to control data collected on native species composition and density from remnant vegetation communities adjacent to the site.

Rhodes Grass can reduce native biodiversity. For future plantings it is important to find an alternative, preferably a mix of groundcover species that are native to the local area. African Boxthorn and Prickly Pear are present on site in low abundance. These should be managed to prevent spread.

Many planted trees have had their plastic tree guards removed since 2013 and appear to be responding well. Any plastic guards that remain on planted trees should be removed to encourage growth.

ELA recommends remedial works within Wood_10c zone (plot 1B) be monitored by WCM staff for further evidence of erosion throughout the year, particularly after intense rain events, as risk of erosion still exists due to decreased groundcover.

In order to better understand the use of rehabilitated woodland areas by fauna ELA recommend that bird abundance data be collected and used in the analysis. This will give WCM a better indication as to whether birds are transient or inhabiting the sites. It will also provide a more detailed understanding of bird species assemblages and species interaction in each area; for example, Noisy Miners are known to be aggressive towards other bird species and if a high abundance of Noisy Miners is recorded within an area it is likely that this will be a contributing factor to reduced bird species diversity.

6 References

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APPENDIX 3 ANNUAL BIOBANK REPORT 2016



Whitehaven Coal Mining Pty Ltd

ABN: 65 086 426 253

Biobank Site Annual Report 2015-2016



View from top of Kelvin Range to the south, Yarrari property

Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

Annual reporting template

Biobank Site Annual Report						
Location details						
Biobanking agreement ID: 43				Name of landowner/s: <i>Whitehaven Coal Mining Pty Limited</i>		
Reporting date: <i>29th July 2016</i>				Property address: <i>“Yarrari” & “Belah”, Wean Road, Kelvin 2380</i>		
Records of management actions undertaken						
Management Action	Item Reference Number	Required completion time and frequency	Action completed (Yes/No)	Actual completion date/s	Description of actions undertaken (including where undertaken (including reference to management zones), any variations and the reasons for variation).	Visual observations and other comments (including reasons for non completion)
1. Management of grazing for conservation	<i>1.1</i>	<i>Ongoing from commencement date</i>	<i>Yes Ongoing</i>	<i>Ongoing</i>	<i>Grazing excluded from all areas of biobank during Year 4, except for introduction of stock to reduce bulk of Lovegrass prior to Spring.</i>	<i>Grazing excluded across the biobank with good groundcover % retained across the site as a consequence.</i>
	<i>1.2</i>	<i>Ongoing from first payment date (i.e. Year 1) until end of Year 4</i>	<i>Yes Ongoing</i>	<i>Ongoing</i>	<i>Stock grazing was used within fenced paddocks of MZ1.</i>	<i>As per 1.1</i>
	<i>1.3</i>	<i>Ongoing from first payment date</i>	<i>NA in this period</i>	<i>Ongoing</i>	<i>As per 1.1</i>	<i>As per 1.1</i>

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	1.4	<i>Ongoing from commencement date</i>	<i>Yes Ongoing</i>	<i>Ongoing</i>	<i>As per 1.1</i>	<i>As per 1.1</i>
2. Weed control	2.1	<i>Ongoing from first payment date</i>	<i>Yes</i>	<i>Various</i>	<i>Weed spraying (including African Boxthorn, Noogoora Burr, Horehound and Bathurst Burr) as required, weather/season dependent.</i>	<i>Biobank site generally retains minor areas of weeds, with active management ongoing.</i>
	2.2	<i>Ongoing from first payment date</i>	<i>NA in this period</i>	<i>Ongoing</i>	<i>NA in this reporting period.</i>	<i>NA in this reporting period.</i>
3. Management of fire for conservation	3.1	<i>Ongoing from commencement date</i>	<i>Not yet required</i>	<i>Not yet required</i>	<i>Ecological burns not required during early years of active management.</i>	<i>Ecological burns not required under management plan at this stage.</i>
	3.2	<i>Ongoing from first payment date</i>	<i>Yes</i>	<i>Ongoing</i>	<i>NA in this reporting period.</i>	<i>NA in this reporting period.</i>
	3.3	<i>Ongoing from commencement date</i>	<i>Yes</i>	<i>Ongoing</i>	<i>NA in this reporting period.</i>	<i>NA in this reporting period.</i>
4. Management of human disturbance	4.1	<i>Ongoing from commencement date</i>	<i>Yes Ongoing</i>	<i>Ongoing</i>	<i>The biobank site has generally been off-limits to the public, with only the property manager permitted on site.</i>	<i>No additional human disturbance has been undertaken on the site other than through general site management activities such as fence line repairs, track maintenance, and feral animal control.</i>

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	4.2	<i>Ongoing from commencement date</i>	<i>Ongoing</i>	<i>Ongoing</i>	<i>As per 4.1</i>	<i>As per 4.1</i>
	4.4	<i>Ongoing from commencement date</i>	<i>Ongoing</i>	<i>Ongoing</i>	<i>As per 4.1</i>	<i>As per 4.1</i>
	4.5	<i>Ongoing from commencement date</i>	<i>Ongoing</i>	<i>Ongoing</i>	<i>As per 4.1</i>	<i>As per 4.1</i>
	4.6	<i>Ongoing from commencement date</i>	<i>Yes Ongoing</i>	<i>Ongoing</i>	<i>As per 4.1</i>	<i>As per 4.1</i>
5. Retention of native vegetation	5.1	<i>Ongoing from commencement date</i>	<i>Yes Ongoing</i>	<i>Ongoing</i>	<i>No vegetation removal during Year 4.</i>	<i>No activities have been undertaken on site that have resulted in vegetation removal.</i>
	5.2	<i>Ongoing from commencement date</i>	<i>Ongoing</i>	<i>Ongoing</i>	<i>There have been no requirements to burn native vegetation under the fire management plan.</i>	<i>NA in this reporting period.</i>
6. Planting or seeding	6.1	<i>Commence from first payment date</i>	<i>No – from Year 4 onwards</i>	<i>Commenced Planting in 2014-2015</i>	<i>No planting or seeding during Year 4.</i>	<i>Planting commenced in 2014-2015 of 9 plots with approximately 1180 trees planted.</i>

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	6.3	<i>Conduct the first survey 24 months after the completion of planting or seeding in each area of planting or seeding and then every 12 months thereafter.</i>	<i>As per 6.1</i>	<i>As per 6.1</i>	<i>As per 6.1</i>	<i>As per 6.1</i>
	6.4	<i>As required; from the date that planting or seeding areas are established</i>	<i>As per 6.1</i>	<i>As per 6.1</i>	<i>As per 6.1</i>	<i>As per 6.1</i>
	6.5	<i>As required (from commencement date if relevant to prepare for future planting)</i>	<i>Ongoing</i>	<i>Ongoing</i>	<i>During 2015-2016, seed collection was undertaken on Yarrari & Belah.</i>	<i>In April 2016, seed was collected from White Box, Narrow-leaf Ironbark, Wilga, Rosewood, Belah and Senna.</i>

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	6.6	<i>From the start of Year 4 until the end of Year 6. Enhancement planting start of Year 7 until end of Year 10</i>	<i>As per 6.1</i>	<i>As per 6.1</i>	<i>As per 6.1</i>	<i>As per 6.1</i>
7. Retention of dead timber	7.1	<i>Ongoing from commencement date</i>	<i>Yes Ongoing</i>	<i>Ongoing</i>	<i>No dead timber removed during Year 4.</i>	<i>Dead timber is retained on site in accordance with the management plan.</i>
	7.2	<i>When required</i>	<i>Not yet required</i>	<i>Not yet required</i>	<i>NA in this reporting period.</i>	<i>NA in this reporting period.</i>
8. Erosion control	8.1	<i>Commence from first payment date</i>	<i>No – not yet required</i>	<i>Ongoing</i>	<i>No active erosion identified during Year 4.</i>	<i>There have been no areas of active erosion identified as a cause of concern during this reporting period.</i>
9. Retention of rocks	9.1	<i>Ongoing from commencement date</i>	<i>Yes Ongoing</i>	<i>Ongoing</i>	<i>No rocks have been removed during Year 4.</i>	<i>Rocks retained on site in accordance with the management plan.</i>
	9.2	<i>When required</i>	<i>Not yet required</i>	<i>Not yet required</i>	<i>NA in this reporting period.</i>	<i>NA in this reporting period.</i>
10. Control of feral and over abundant native herbivores	10.1	<i>Ongoing from first payment date</i>	<i>Yes</i>	<i>Ongoing</i>	<i>The resident property manager has undertaken feral animal control throughout the reporting period, removing 1,220 goats and approximately 70 rabbits from the property since 2008.</i>	<i>Feral animal control has been ongoing by the resident property manager.</i>

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	10.2	<i>Ongoing from first payment date</i>	<i>NA in this reporting period.</i>	<i>Ongoing</i>	<i>NA in this reporting period.</i>	<i>NA in this reporting period.</i>
11. Vertebrate pest management	11.1	<i>Ongoing from first payment date</i>	<i>Yes</i>	<i>Ongoing</i>	<i>The resident property manager has undertaken vertebrate pest management, removing 376 pigs and 40 foxes from the property since 2008 by opportunistic shooting and/or trapping. Baiting for foxes occurred during the reporting period.</i>	<i>Vertebrate pest control has been ongoing by the resident property manager.</i>
	11.2	<i>Ongoing from first payment date</i>	<i>NA in this reporting period.</i>	<i>Ongoing</i>	<i>NA in this reporting period.</i>	<i>NA in this reporting period.</i>
12. Nutrient control	12.1	<i>Ongoing from commencement</i>	<i>Yes Ongoing</i>	<i>Ongoing</i>	<i>No fertilisers were applied during Year 4.</i>	<i>Pesticides and herbicides may be applied to the Biobank in accordance with the management plan requirements.</i>
13. Control of exotic fish species	13.1	<i>Not Applicable</i>	<i>Not Applicable</i>	<i>Not Applicable</i>	<i>Not Applicable.</i>	<i>Not Applicable</i>
14. Maintenance or reintroduction of natural flow regimes	14.1	<i>Commence from first payment date</i>	<i>Yes Ongoing</i>	<i>Ongoing</i>	<i>Natural flow regimes maintained during Year 4.</i>	<i>All nominated dams on the bio bank site were filled and seeded in September 2014.</i>

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	14.2	<i>When required from date an artificial structure is removed</i>	<i>Yes Ongoing</i>	<i>Ongoing</i>	<i>A Japanese Millet cover crop was used following original earthworks in September 2014.</i>	<i>Further revegetation of former dam sites is planned to be combined/ incorporated with the revegetation program for MZ1 and will involve a combination of native trees, shrubs and grasses commensurate with a White Box woodland.</i>
	14.3	<i>Ongoing from commencement</i>	<i>Yes Ongoing</i>	<i>Ongoing</i>	<i>NA in this reporting period.</i>	<i>NA in this reporting period.</i>

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Incident or event that has adverse effect on biodiversity values on biobank site	
Incident or event including adverse impacts (eg. natural events)	Action taken and proposed recommended actions
None.	Not required.
Records submitted with this report	
✓ Photographs taken at the photo points set in the biobanking agreement	
✓ Results of the inspections required to be conducted in item 1.3 of Annexure D to the biobanking agreement	
✓ Results of any monitoring, inspections or surveys required in Annexures C and D to the biobanking agreement	
Signature and certification	
I hereby declare that the information supplied in this report is accurate and complies with the reporting requirements under item 2 of the Annexure D to the biobanking agreement. Note: If the land that forms the biobank site is owned by multiple persons, each landowner must sign this annual report.	
Signed	Signed
Date	Date
	28/07/2016

Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

Photo Points

Photo Point 1	E 240629	N 6593772	23/07/16	4:24pm
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From South West Corner



From North West Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

From North East Corner



From South East Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

Photo Point 2	E240925	N6593562	24/07/16	4:40pm
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From South West Corner



From North West Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

From North East Corner



From South East Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

Photo Point 4	E240439	N6592054	23/07/16	4:39pm
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From South West Corner



From North West Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

From North East Corner



From South East Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

Photo Point 5	E240595	N6593324	23/07/16	4:29pm
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From South West Corner



From North West Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

From North East Corner



From South East Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

Photo Point 8	E241170	N6594590	24/07/16	4:20pm
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From South West Corner



From North West Corner



From North East Corner



From South East Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

Photo Point 9	E241424	N6594095	24/07/16	2:26pm
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From South West Corner



From North West Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

From North East Corner



From South East Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

Photo Point 10	E241780	N6591054	25/07/16	7:16am
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From South West Corner



From North West Corner



From North East Corner



From South East Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

Photo Point 11	E241101	N6591953	23/07/16	4:51pm
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From South West Corner



From North West Corner



From North East Corner



From South East Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

Photo Point 12	E241321	N6593399	23/07/16	5:33pm
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From South West Corner



From North West Corner



From North East Corner



From South East Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

Photo Point 14	E241172	N6593839	24/07/16	4:29pm
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From South West Corner



From North West Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

From North East Corner



From South East Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

Photo Point 15	E243373	N6594221	25/07/16	4:00pm
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From South West Corner



From North West Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

From North East Corner



From South East Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

Photo Point 17	E243026	N6593081	25/07/16	3:36pm
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From South West Corner



From North West Corner



From North East Corner



From South East Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

Photo Point 20	E241993	N6595399	24/07/16	2:43am
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From South West Corner



From North West Corner



From North East Corner



From South East Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

Photo Point 21	E241317	N6594719	24/07/16	4:11pm
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From South West Corner



From North West Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

From North East Corner



From South East Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

Photo Point 22	E241476	N6595059	25/06/15	8:45am
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From South West Corner



From North West Corner



From North East Corner



From South East Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

Photo Point 23	E241304	N6595199	24/07/16	3:57pm
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From South West Corner



From North West Corner



From North East Corner



From South East Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

Photo Point 24	E241672	N6597031	24/07/16	3:28pm
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From South West Corner



From North West Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

From North East Corner



From South East Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

Photo Point 26	E241410	N6596513	26/07/16	11:48am
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From South West Corner



From North West Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

From North East Corner



From South East Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

Photo Point 27	E241465	N6591717	25/07/16	7:38am
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From South West Corner



From North West Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

From North East Corner



From South East Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

Photo Point 30	E241383	N6592453	25/07/16	7:48am
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From South West Corner



From North West Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

From North East Corner



From South East Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

Photo Point 35	E241839	N6595941	24/07/16	2:54pm
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From South West Corner



From North West Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

From North East Corner



From South East Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

Photo Point 38	E242139	N6596965	24/07/16	3:16pm
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From South West Corner



From North West Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

From North East Corner



From South East Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

Photo Point 40	E241161	N6595487	24/07/16	3:50pm
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From South West Corner



From North West Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

From North East Corner



From South East Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

Photo Point 42	E240603	N6597014	24/07/16	3:31pm
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Dam site that has been in-filled
From South West Corner



From North West Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

From North East Corner



From South East Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

Photo Point 43	E240603	N6591987	23/07/16	4:44pm
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From South West Corner



From North West Corner



Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

From North East Corner



From South East Corner



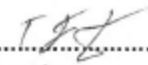
Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

BIOBANKING VERTEBRATE PEST MANAGEMENT ACTIVITIES FORM

MANAGEMENT ACTIVITIES FORM			
Date	Management Zone/s	Description and type of activity undertaken (This column must include details of the feral and overabundant herbivores targeted, control techniques applied and no. controlled.)	Observations & assessment of monitoring
2008-2015	1, 2 and 3	310 pigs removed from biobank through opportunistic trapping and shooting and 36 foxes removed by opportunistic shooting.	Pig numbers were very high when WHC acquired the property. General management by the property manager over this time has significantly reduced pig numbers.
July 2015	2 & 3	7 pigs removed by trapping and shooting	Pig numbers in decline, but there is still evidence of active pigs on site.
August 2015	2 & 3	15 pigs removed by trapping and shooting	Pig numbers in decline, but there is still evidence of active pigs on site.
September 2015	2 & 3	4 pigs removed by trapping and shooting	Pig numbers in decline, but there is still evidence of active pigs on site.
September to October 2015	1/2/3	44 fox baits laid. 12 baits were taken.	Fox numbers relatively low due to stock control on site and ongoing baiting.
October 2015	3	1 pig removed by trapping and shooting	Pig numbers in decline, but there is still evidence of active pigs on site.
October 2015	1 & 2	2 foxes removed by opportunistic shooting	Fox numbers relatively low due to stock control on site and ongoing baiting.
December 2015	2 & 3	7 pigs removed by trapping and shooting	Pig numbers in decline, but there is still evidence of active pigs on site.
April 2016	2 & 3	7 pigs removed by trapping and shooting	Pig numbers in decline, but there is still evidence of active pigs on site.
May 2016	2 & 3	19 pigs removed by trapping and shooting	Pig numbers in decline, but there is still evidence of active pigs on site.
May 2016	1	2 foxes removed by opportunistic shooting	Fox numbers relatively low due to stock control on site and ongoing baiting.
June 2016	2 & 3	6 pigs removed by trapping and shooting	Pig numbers in decline, but there is still evidence of active pigs on site.



 Signature

29-7-2016

 Date

Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

BIOBANKING VERTEBRATE PEST MONITORING ACTIVITIES FORM

MONITORING ACTIVITIES FORM			
Date	Management Zone/s	Current level of impact on vegetation or native fauna <small>(This column must record impact As Negligible, Minimal, Moderate or High)</small>	Minor Variations <small>(details/reasons)</small>
18/1/16	1,2 & 3	Minimal - Pig numbers had generally been high within the biobank site, particularly as they have direct access to site from the adjoining Kelvin range, with thick scrub providing suitable habitat. Evidence of pig activity has been visible throughout the biobank for several years, however, the extent of ground disturbance by pigs is gradually decreasing as a consequence of the management measures in place and the removal of 376 pigs since 2008. Fox numbers have been relatively low as a consequence of no domestic stock held on the biobank site and continued 1080 baiting. There is no direct evidence of excessive fox numbers impacting on native fauna.	Opportunistic shooting and trapping of pigs and foxes will continue to be undertaken across the biobank site to reduce potential impacts on native flora and fauna.



 Signature

29-7-2016

 Date

Biodiversity Banking and Offsets Scheme

Biobanking agreement

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BIOBANKING FERAL ANIMAL AND OVERABUNDANT HERBIVORE MANAGEMENT ACTIVITIES FORM

MANAGEMENT ACTIVITIES FORM			
Date	Management Zone/s	Description and type of activity undertaken <small>(This column must include details of the feral and overabundant herbivores targeted, control techniques applied and numbers controlled.)</small>	Observations & assessment of monitoring
2008-2015	1,2 & 3	1,173 feral goats and 70 rabbits have been removed from site through both trapping and opportunistic shooting.	At commencement of ownership feral goat numbers were excessive, however ongoing management by the property manager has reduced this number substantially to now only occasional sightings. The removal of large numbers of goats will provide better opportunities for native vegetation restoration.
July 2015	2 & 3	6 feral goats removed by trapping and opportunistic shooting.	Goat numbers have substantially reduced across the site and now only being infrequently sighted.
October 2015	1 & 2	41 feral goats removed by trapping and opportunistic shooting.	Goat numbers have substantially reduced across the site and now only being infrequently sighted.



 Signature

29-7-2016

 Date

Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

BIOBANKING FERAL ANIMAL AND OVERABUNDANT HERBIVORE MONITORING ACTIVITIES FORM

MONITORING ACTIVITIES FORM			
Date	Management Zone/s	Current level of impact on vegetation or native fauna <small>(This column must record impact As Negligible, Minimal, Moderate or High)</small>	Minor Variations <small>(details/reasons)</small>
18/01/16	1	Negligible - No observable detrimental impact from overabundant herbivores on native vegetation or fauna. Gradual removal of goats has decreased pressure on native vegetation regeneration.	Removal of goats on an opportunistic basis will continue to enhance native vegetation regeneration opportunities. No evidence of excessive grazing by kangaroos.
18/01/16	2	Negligible - No observable detrimental impact from overabundant herbivores on native vegetation or fauna. Gradual removal of goats has decreased pressure on native vegetation regeneration.	Removal of goats on an opportunistic basis will continue to enhance native vegetation regeneration opportunities. No evidence of excessive grazing by kangaroos.
18/01/16	3	Negligible - No observable detrimental impact from overabundant herbivores on native vegetation or fauna. Gradual removal of goats has decreased pressure on native vegetation regeneration.	Removal of goats on an opportunistic basis will continue, however this can be difficult in this zone due to heavy vegetation cover and steep terrain.



 Signature

29-7-2016

 Date

Biodiversity Banking and Offsets Scheme

Biobanking agreement


ID Number 43

REPORTING FORM – FIRE FOR CONSERVATION MANAGEMENT

Who: Trevor Jones, Property Manager

Date: 15th July 2015

MANAGEMENT ZONES	DATE	OBSERVATIONS AND ASSESSMENT OF MONITORING
All	21 st July 2016	During the Reporting Period burning for conservation purposes was not carried out within the Biobank site. It is not intended that burning for conservation purposes will be utilised for a substantial period (approximately 6 years). Monitoring for bushfire control will continue, and appropriate firebreaks maintained as much as possible in advance of the summer bushfire period.


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Date

Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

BIOBANK SITE VISUAL INSPECTION PROFORMA – ANNUAL GROUNDCOVER %, AND CONDITION OF FENCING INSPECTION

Who: Trevor Jones, Property Manager

Date: 23rd/24th June 2016

INSPECTION ITEM	PHOTO NO.	CO-ORDINATES	COMMENT	ACTION COMPLETED
Percentage of Groundcover across Biobank Site	See all Photo Monitoring Point Photo's.	As per Photo Monitoring Points	Groundcover across the Biobank site would be at approximately 90%, with excellent grasscover across the site, comparative to the initial photo points in the Biobank Management Plan.	No action required.
Physical condition of fencing to determine if they can control the movement of stock, control human disturbance, control movement of overabundant native herbivores and control vertebrate pests	N/A	N/A	General maintenance is ongoing to maintain control of stock movements. As there is no fencing between the Biobank and adjoining Kelvin Aboriginal Area, it can be difficult to control movement of goats and pigs, however ongoing pest control will improve this aspect over time.	No action required.


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29-7-2016
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Date

Biodiversity Banking and Offsets Scheme

Biobanking agreement

ID Number 43

BIOBANK SITE VISUAL INSPECTION PROFORMA – 6 MONTHLY HUMAN DISTURBANCE, EROSION AND WASTE INSPECTION

Who: Trevor Jones, Property Manager

Date: 16th July 2015

INSPECTION ITEM	PHOTO NO.	CO-ORDINATES	COMMENT	ACTION COMPLETED
Evidence of Disturbance	N/A	N/A	Biobank Site is in good condition with no evidence of active human disturbance present across the site.	No action required.
Evidence of Erosion	N/A	N/A	No evidence of active erosion occurring within the Biobank site requiring remediation activities.	No action required.
Evidence of Waste	N/A	N/A	No evidence of waste disposal occurring within the Biobank site.	No action required.

Who: Trevor Jones, Property Manager

Date: 18th January 2016

INSPECTION ITEM	PHOTO NO.	CO-ORDINATES	COMMENT	ACTION COMPLETED
Evidence of Disturbance	N/A	N/A	Biobank Site is in good condition with no evidence of active human disturbance present across the site.	No action required.
Evidence of Erosion	N/A	N/A	No evidence of active erosion occurring within the Biobank site requiring remediation activities.	No action required.
Evidence of Waste	N/A	N/A	No evidence of waste disposal occurring within the Biobank site.	No action required.

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29-7-2016
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Date

Biodiversity Banking and Offsets Scheme

Biobanking agreement

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INSPECTION OUTCOMES (SECTION 1.3 OF ANNEXURE D)

BIOBANK SITE VISUAL INSPECTION PROFORMA – QUARTERLY STOCK ACCESS INSPECTION

Who: Trevor Jones, Property Manager

Date: 17th July 2015

INSPECTION ITEM	PHOTO NO.	CO-ORDINATES	COMMENT	ACTION COMPLETED
Evidence of Stock accessing the Biobank	N/A	N/A	No evidence of stock within Biobank site during this inspection.	No action required.

Who: Trevor Jones, Property Manager

Date: 30th October 2015

INSPECTION ITEM	PHOTO NO.	CO-ORDINATES	COMMENT	ACTION COMPLETED
Evidence of Stock accessing the Biobank	N/A	N/A	60 cows put on Lovegrass to reduce growth for Spring between 5 th September 2015 and 10 th December 2015.	No action required.

Who: Trevor Jones, Property Manager

Date: 18th January 2016

INSPECTION ITEM	PHOTO NO.	CO-ORDINATES	COMMENT	ACTION COMPLETED
Evidence of Stock accessing the Biobank	N/A	N/A	No evidence of stock within Biobank site during this inspection.	No action required.

Who: Trevor Jones, Property Manager

Date: 4th April 2016

INSPECTION ITEM	PHOTO NO.	CO-ORDINATES	COMMENT	ACTION COMPLETED
Evidence of Stock accessing the Biobank	N/A	N/A	12 sheep entered from northern boundary and were removed.	Fence repaired where sheep entered.


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29-7-2016
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APPENDIX 4 SURFACE WATER MONITORING RESULTS

SURFACE WATER MONITORING

Sample No.	Date	Time	Sample Location	pH Field	pH	Electricity Conductivity Field	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Hydioxide Alkalinity as CaCO3	Carbonate Alkalinity as CaCO3	Bicarbonate Alkalinity as CaCO3	Total Alkalinity as CaCO3	Antimony	Arsenic	Molybdenum	Selenium	Chloride	Sodium	Aluminium	Arsenic	Manganese	Iron	Total Organic Carbon (TOC)	Grease & Oil (mg/L)	Comments
ES0909246-001	24 June 2009	1125	WW8		8.42		4110	45															5	<10	Limit of Reporting (LOR) was raised for Oil and Grease due to insufficient samples
ES0909246-002	24 June 2009	1140	WW9		6.77		135	114															43	<10	
ES1000714-001	15 January 2010	1250	WW9		6.82		204	38															20	<5	
ES1000714-002	15 January 2010	1320	WW11		6.77		76	69															5	<5	
ES1000714-003	15 January 2010	1340	WW12		6.5		132	72															9	<5	
ES1103385-001	16 February 2011	1200	VOID SMALL		8.33		264	19															2	<5	
ES1103385-002	16 February 2011	1250	VOID LARGE		8.19		346	14															3	<5	
ES1109073-001	2 May 2011	1240	VOID UPPER		8.66		293	<5															4	<5	
ES1109073-002	2 May 2011	1330	VOID LOWER		8.89		395	48															7	<5	
ES1117879-001	17 August 2011	1350	VOID UPPER		8.39		321	182	<1	3	114	117					17	58	0.29	0.004	0.056	0.17	5	<5	
ES1117879-002	17 August 2011	1410	VOID LOWER		8.52		451	22	<1	12	136	149					31	85	0.41	0.004	0.035	0.33	5	<5	
ES1119820-001	9 September 2011	900	WW 11		7.02		131	147															15	<5	
ES1119820-002	9 September 2011	920	WW 12		6.58		52	282															10	<5	
ES1121348-001	29 September 2011	1015	WW 12		6.97		109	236															16	<5	
ES1121348-002	29 September 2011	1030	WW 11		7.09		58	412															7	<5	
ES1124941-001	14 November 2011	910	WW 12		7.45		84	60															16	<5	
ES1124941-002	14 November 2011	925	WW 11		7.26		183	50															35	<5	
ES1211262-001	8 May 2012	920	VOID UPPER		8.48		242	13															3	<5	
ES1211262-002	8 May 2012	940	VOID LOWER		7.98		376	8															4	<5	
ES1227199-001	15 November 2012	1150	VOID UPPER		8.39		315	20															3	<5	
ES1227199-002	15 November 2012	1230	VOID LOWER		8.68		446	18															4	<5	
ES1303393-001	13 February 2013	1130	VOID UPPER		9.58	9.33	324	330	12														5	<5	
ES1303393-002	13 February 2013	1210	VOID LOWER		9.02	8.79	496	512	23														5	8	
ES1310050-001	1 May 2013	1120	UPPER VOID		8.81	9.68	349	353	17				<0.001	0.004	0.003	<0.01							6	<5	
ES1310050-002	1 May 2013	1150	LOWER VOID		8.78	8.63	523	553	97				<0.001	0.004	0.003	<0.01							7	<5	
ES1313688-001	13 June 2013	1001	WW1 R		7.08		48	74															14	<5	
ES1317466-001	5 August 2013	1135	UPPER VOID		8.7	8.56	574	601	9														6	<5	
ES1317466-002	5 August 2013	1100	LOWER VOID		8.97	9.1	341	348	11														8	6	
ES1323917-001	4 November 2013	1220	UPPER VOID		9.6	9.4	391	429	12	<1	88	117	205				17	71	0.42	0.005	0.017	0.31	8	<5	
ES1323917-002	4 November 2013	1200	LOWER VOID		8.8	8.54	681	776	23	<1	41	234	275				78	119	0.85	0.003	0.072	0.71	8	<5	
ES1402413-001	5 February 2014	1130	UPPER VOID		10.3	9.22	481	533	25				<0.001	0.006	0.003	<0.01							9	<5	
ES1402413-002	5 February 2014	1200	LOWER VOID		9.6	8.74	936	1070	33				<0.001	0.004	0.003	<0.01							7	<5	
ES1409710-001	1 May 2014	905	UPPER VOID		9.6	8.74	478	496	<5	<1	32	202	234				26	90	0.71	0.005	0.075	0.45	7	<5	
ES1409710-002	1 May 2014	935	LOWER VOID		9.4	8.54	1100	1150	<5	<1	26	287	313				165	184	0.25	0.005	0.074	0.18	5	<5	
ES1424402-001	5 November 2014	940	UPPER VOID		10.3	9.66	567	535	6				<0.001	0.004	0.003	<0.01							11	<5	
ES1424402-002	5 November 2014	1015	LOWER VOID		9.2	8.83	1470	1510	36				<0.001	0.003	0.003	<0.01							9	<5	
ES1503935-001	17 February 2015	900	UPPER VOID		10.2	9.34	612	626	44				<0.001	0.005	0.003	<0.01							12	<5	
ES1503935-002	17 February 2015	935	LOWER VOID		9.4	8.5	1800	1900	37				<0.001	0.006	0.005	<0.01							11	7	
ES1521402-001	6 May 2015	1105	UPPER VOID		9.4	8.87	633	626	<5	<1	50	231	280				31	163	0.51	0.005	0.016	0.38	4	9	
ES1521402-002	6 May 2015	1135	LOWER VOID		9.2	8.76	1870	1950	8	<1	71	275	346				425	425	0.53	0.004	0.037	0.42	<1	8	
ES1528268-001	12-August-2015	1100	UPPER VOID		9.8	9.13	617	622	12														15	15	
ES1528268-002	12-August-2015	1025	LOWER VOID		9.3	8.71	1970	1870	46														5	9	
ES1535953-001	10 November 2015	1225	UPPER VOID		9.5	9.3	674	692	12														14	25	
ES1535953-002	10 November 2015	1250	LOWER VOID		9.2	9	2180	2350	20														10	15	
ES1602961-001	9 February 2016	1135	UPPER VOID		9.7	9.06	784	846	19														13	<5	
ES1602961-002	9 February 2016	1205	LOWER VOID		9.5	8.95	2430	2730	111														8	<5	

APPENDIX 5 GROUNDWATER MONITORING RESULTS

