



Local Biodiversity Areas

Annual Report 2021

3 May 2022

Annual report for the period from January to December 2021, for activities described in the Management Plans for all Local Warkworth Mining Limited offsets including:

- Southern Biodiversity Area (including the Putty Road Offset Area)
- Northern Biodiversity Area

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1 INTRODUCTION

This annual report is a requirement of the management plans for all Local Warkworth Mining Limited offsets for the 2021 reporting period (1 January 2021 to 31 December 2021).

The report provides a summary of the key management activities completed across the biodiversity offset located within the Southern (includes the Putty Road Offset Area) and Northern Biodiversity Areas (BAs).

The management plans describe the conservation management strategies and monitoring to achieve and measure improvement and protection of the offsets biodiversity values. It is a compliance requirement of the Commonwealth and NSW environmental approvals to implement the management plans.

The Local OMP (November 2014) was prepared to satisfy the consent requirements for the New South Wales (NSW) Warkworth Mine Development Approval (DA 300-9-2002i) and replaces the former *Flora and Fauna Management Plan* and *Warkworth Sands Woodland (WSW) Offset Area OMP*. In November 2015 the NSW Warkworth Continuation Project Approval (SSD-6464) was granted providing both NSW and Commonwealth approval for the same disturbance area. Phase 2 of the EPBC2009/5081 action also commenced on 16 February 2016. In response to the granting of these new approvals, new Management Plans for the Southern and Northern BA have been prepared to satisfy the Commonwealth approval EPBC2009/5081 and the NSW consent (SSD-6464), replacing both the Local and Putty Road OMPs.

The Biodiversity Offset Portal contains the supporting documentation for this report, including photo point monitoring. Access to the portal is restricted, relevant regulators have been provided with login details; please contact Mount Thorley Warkworth should you require assistance.

2 LOCATION AND LANDHOLDER DETAILS

The locations of the local BAs are shown in **Figure 1**, **Figure 2** and **Figure 3**, details are provided in **Table 1**.

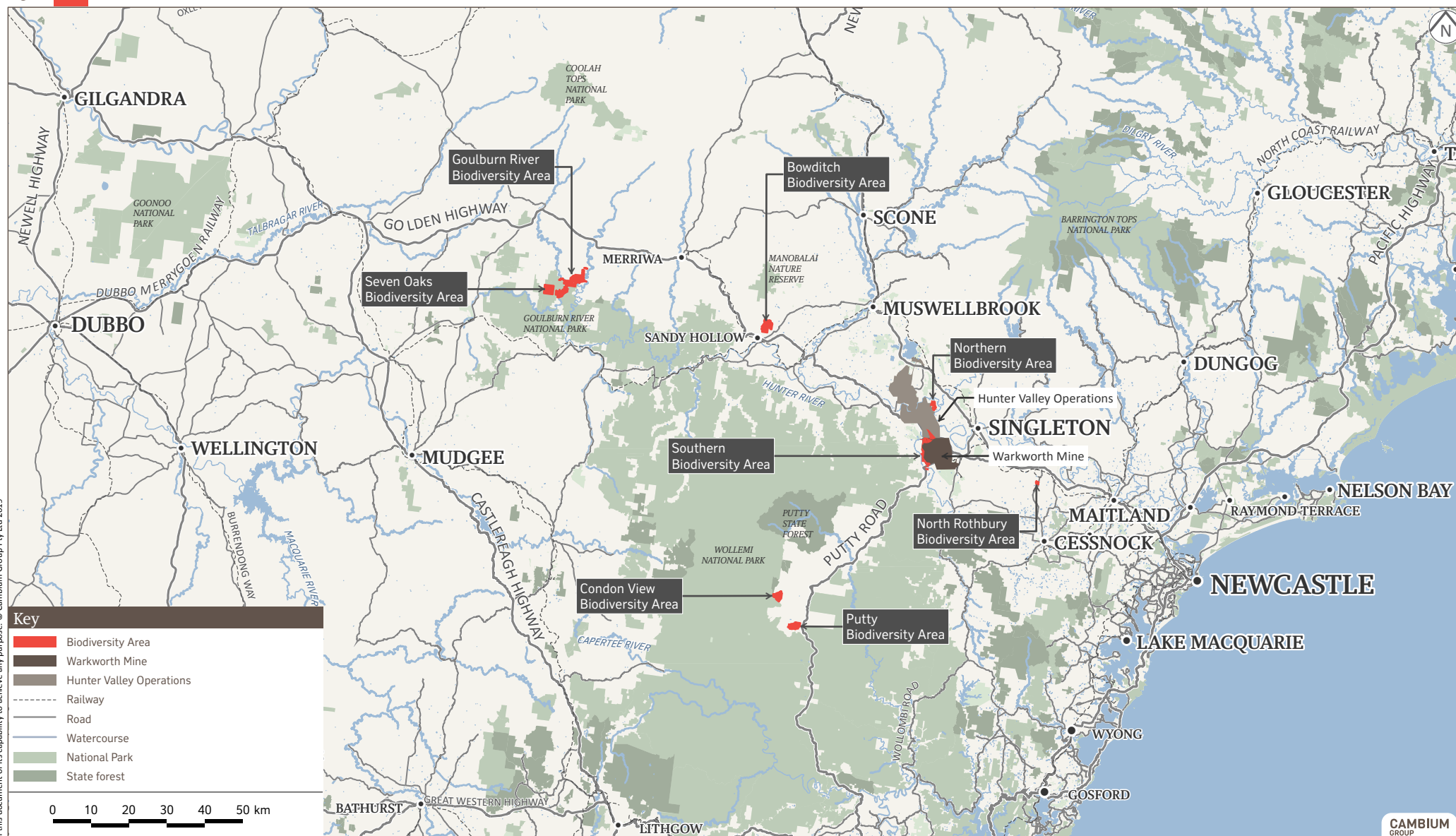
Table 1 Local Biodiversity Areas

Biodiversity Area	Land Owner	Area (ha)	Offset Area (ha)	Location
Northern BA	Coal & Allied Operations Pty Ltd	344	341	Approximately 7km north of the Warkworth Mining Lease and in close proximity to the Hunter Valley Operations. Accessed via Comleroi Road.
Southern BA (including the Putty Road Offset)	Coal & Allied Operations Pty Ltd Miller Pohang Coal Company Pty Ltd Warkworth Mining Limited	1,023	986	Immediately west and north of Warkworth Mine. Intersected by Putty Road in the south, and Wallaby Scrub Road and the Golden Highway in the north.

Location of the Warkworth Mining Limited Biodiversity Areas

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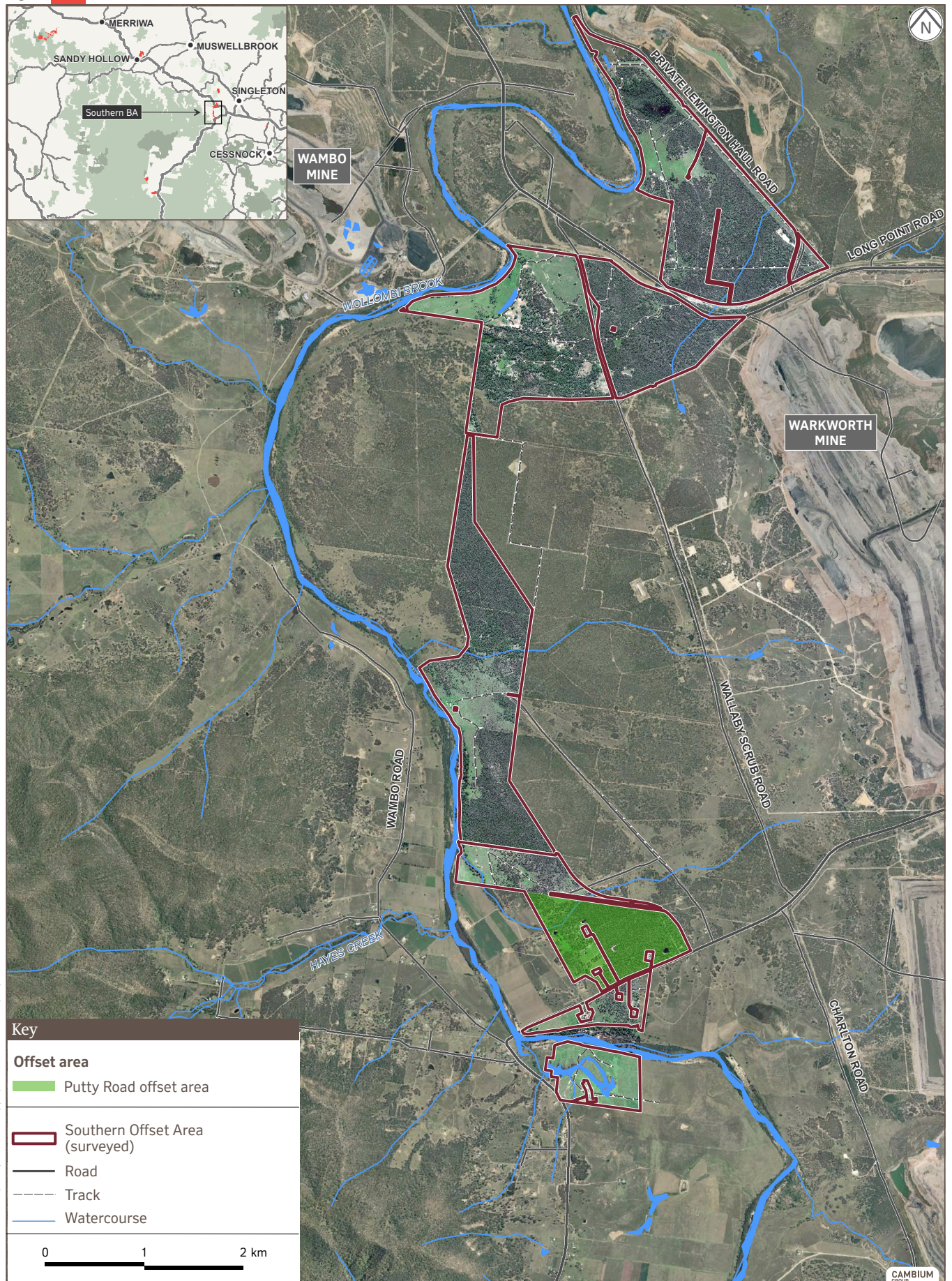
Figure 1



Southern Biodiversity Area - Putty Road offset area

Annual Compliance Report

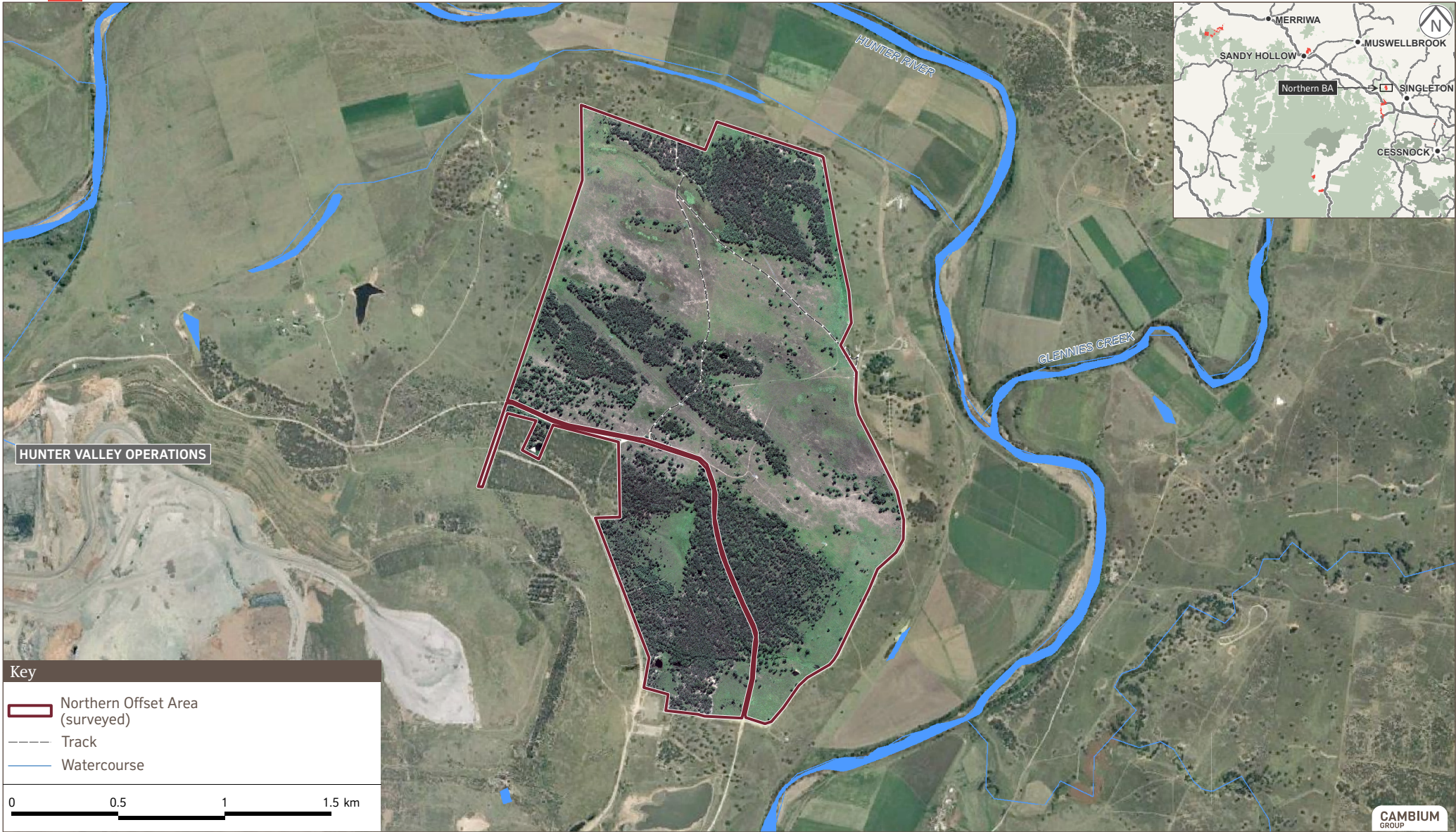
Figure 2



Northern Biodiversity Area
Annual Compliance Report



Figure 3



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3 SUMMARY OF ACTIVITIES – 2021

Table 2 provides a summary of the activities undertaken during the reporting period (year 5) and the progress in attaining the Performance Criteria for the key Conservation Management Strategies in the management plans.

3.1 Summary of climatic conditions

Figure 4 and **Figure 5** show the monthly actual rainfall compared to the long-term average for the Northern BA and Southern BA for the reporting period. In 2021 rainfall was well above average for January, February, March, June, October and November with minimal rainfall in May. The Southern BA received 1,087mm of rainfall which was 551mm above the long-term average and the Northern BA received 1,083mm which was 527mm above the long-term average. The high rainfall was a significant factor in the survival of the Central Hunter Grey Box – Ironbark Woodland, River Oak Forest and Warkworth Sands Woodland tube stock planted from July to December 2021.

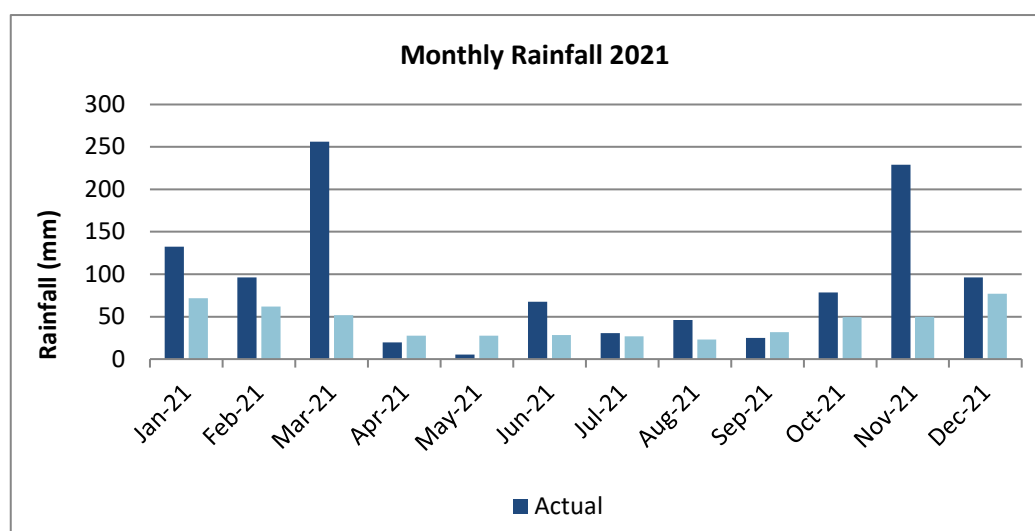


FIGURE 4 MONTHLY RAINFALL – NORTHERN BA

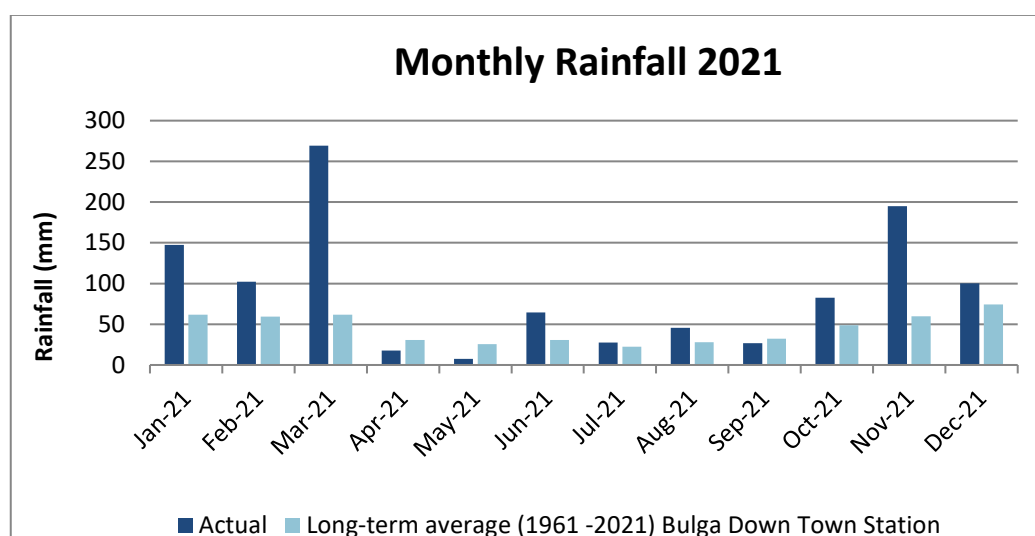


FIGURE 5 MONTHLY RAINFALL –SOUTHERN BA

Table 2 Summary of progress against Performance Criteria

Conservation Actions	Year 1 to Year 5 (2021 is Year 5)	Year 6 to Year 10	Completion Criteria	Actions 2022
ACTIVE RESTORATION				
Southern BA WSW planting (40ha)				
<i>Performance Criteria</i>	<i>Collection of seed. Plant propagation. Tubestock planted. Completed survival assessment.</i>	<i>Ecological monitoring completed</i>	<i>Ecological monitoring demonstrates a trajectory toward the reference site or the benchmark values for HU872 for all attributes measured over the three consecutive assessments (the average of all plots).</i>	
Activity / Progress	Seed collection and plant propagation was undertaken. In 2017 1ha of WSW tubestock was planted in the Southern BA. In 2018 14 ha of WSW Tubestock planted in the Southern BA including replanting the sand quarry and old orchard areas. In 2019 maintenance of planting areas was undertaken and included infill planting of over 9,000 tubestock. In 2020 maintenance of planting areas was undertaken and included infill planting of over 2,000 tubestock. Survival assessments were completed for all planting areas			Collect seed and propagate plants. Undertake survival assessments. Undertake Ecological monitoring. Undertake infill planting to restore Warkworth Sands Woodland in the Southern BA.

Conservation Actions	Year 1 to Year 5 (2021 is Year 5)	Year 6 to Year 10	Completion Criteria	Actions 2022
Southern BA CHGBIW planting (240ha)				
<i>Performance Criteria</i>	<i>Collection of seed. Plant propagation. Tubestock planted.</i> <i>Completed survival assessment.</i>	<i>Ecological monitoring completed.</i>	<i>Ecological monitoring demonstrates a trajectory toward the reference site or the NSW Biometric HU817 for all attributes measured over three consecutive assessments (the average of all plots).</i>	
Activity / Progress	Seed collection and plant propagation was undertaken. Restoration activities included tubestock planting of Central Hunter Grey Box – Ironbark Woodland in the Southern BA. In 2017, 89 ha of the Southern BA was planted with over 13,000 tubestock planted into rip lines. In 2018 118 ha of the Southern BA was planted with over 20,000 tubestock planted into rip lines. In 2019 maintenance of planting areas was undertaken and included infill planting of over 10,000 tubestock. In 2020 maintenance of planting areas was undertaken and included infill planting of over 3,800 tubestock. In 2021 maintenance of planting areas was undertaken and included infill planting of 9,000 tubestock. The site preparation for these sites included ripping by dozer and weed control. To mimic nature the tree species were planted at a spacing of 5 -10m and shrubs species planted in clumps as commonly found with understory species within this vegetation type. All plants were watered, fertilised and protected with a tree guard. Survival Assessments were completed for all planting areas.			Collect seed and propagate plants. Undertake survival assessments. Undertake Ecological monitoring. Undertake infill planting of Central Hunter Grey Box – Ironbark Woodland in the Southern BA.

Conservation Actions	Year 1 to Year 5 (2021 is Year 5)	Year 6 to Year 10	Completion Criteria	Actions 2022
Southern BA ROF planting (26ha)				
Performance Criteria	Collection of seed. Plant propagation. Tubestock planted. Completed survival assessment.		Survival assessment greater than 70%	
Activity / Progress	Seed collection and plant propagation was undertaken. Restoration activities included planting River Oak Forest in the Southern BA. In 2018, 11ha of the Southern BA was planted with over 2,000 tubestock planted into rip lines. In 2019 maintenance of planting areas was undertaken and included infill planting of over 800 tubestock. In 2020 maintenance of planting areas was undertaken and included infill planting of 3,200 tubestock. In 2021 maintenance of planting areas was undertaken and included infill planting of 4,000 tubestock. The site preparation for this site included ripping by dozer and weed control. To mimic nature the tree species were planted at a spacing of 5 -10m and shrubs species planted in clumps as commonly found with understory species within this vegetation type. All plants were watered, fertilised and protected with a tree guard. Survival Assessments were completed for all planting areas.		Collect seed and propagate plants. Undertake survival assessments. Undertake Ecological monitoring. Undertake infill planting of 11ha of River Oak Forest in the Southern BA.	
Northern BA WSW planting (195ha)				
Performance Criteria	Collection of seed. Plant propagation. Tubestock planted. Completed survival assessment.	Ecological monitoring completed.	Ecological monitoring demonstrates a trajectory toward the reference site or the benchmark values for HU872 for all attributes measured over three consecutive assessments (the average of all plots).	

Conservation Actions	Year 1 to Year 5 (2021 is Year 5)	Year 6 to Year 10	Completion Criteria	Actions 2022
Activity / Progress	Seed collection and plant propagation was undertaken. Restoration activities included planting Warkworth Sands Woodland in the Northern BA. In 2014 work commenced to restore over 80 hectares of Warkworth Sands Woodland, this involved the planting of seedlings and the relocation of sand salvaged ahead of mining activities. In 2017, 10,800 tubestock were planted into 44 50x50m patches. Topsoil from ahead of mining operations at MTW was salvaged and hauled to the Biodiversity Area prior to planting commencing. In total Ten patches received 50mm of topsoil over the whole patch, two received 50mm of topsoil over half the patch, 12 received 25mm of topsoil over the patch and ten received no topsoil. Holes were dug for tubestock, either by hand or auger and all plants were watered, fertilised and protected with a tree guard. In 2018 maintenance of planting areas was undertaken and included infill planting of over 8,000 tubestock. In 2019 maintenance of planting areas was undertaken and included infill planting of over 3,000 tubestock. In 2020 planting progressed at the Northern BA with 9,112m³ of WSW sand stripped ahead of mining at MTW and hauled to the Northern Biodiversity Area. 5,480m³ of this WSW sand was spread into strips and seeded with native grasses to increase the groundcover diversity then planted with 4,500 tubestock In 2021 WSW planting progressed with 3,632 m³ of sand from ahead of mining at MTW spread into strips and seeded with native grasses then planted with 1,500 tubestock. Survival Assessments were completed for all planting areas A separate Ecological monitoring program was undertaken in 2021 to capture the WSW planting areas.			Collect seed and propagate plants. Undertake survival assessments Undertake Ecological monitoring. Spread topsoil from ahead of mining operations at MTW into the 2022 Northern BA planting strips. Undertake planting of 15ha of Warkworth Sands Woodland in the Northern BA

Conservation Actions	Year 1 to Year 5 (2021 is Year 5)	Year 6 to Year 10	Completion Criteria	Actions 2022
Northern BA CHGBIW planting (23ha)				
<i>Performance Criteria</i>	<i>Collection of seed. Plant propagation. Tubestock planted. Completed survival assessment.</i>	<i>Ecological monitoring completed.</i>	<i>Ecological monitoring demonstrates a trajectory toward the reference site or the NSW Biometric HU817 for all three attributes measured over three consecutive assessments (the average of all plots).</i>	
Activity / Progress	Restoration activities included tubestock planting of Central Hunter Grey Box – Ironbark Woodland in the Northern BA. In 2017, 6ha of the Northern BA was planted with 2,780 tubestock planted into rip lines. The site preparation for this site included ripping by dozer and weed control. To mimic nature the tree species were planted at a spacing of 5 -10m and shrubs species planted in clumps as commonly found with understory species within this vegetation type. All plants were watered, fertilised and protected with a tree guard. In 2018 maintenance of planting areas was undertaken and included infill planting. Survival Assessments were completed for all planting areas.			Undertake Ecological monitoring.

Conservation Actions	Year 1 to Year 5 (2021 is Year 5)	Year 6 to Year 10	Completion Criteria	Actions 2022
PASSIVE RESTORATION				
Weed control and monitoring				
<i>Performance Criteria</i>	At least two weed control events each year for species listed in Table 14 of Management Plans and other weeds recorded from monitoring activities. All actions recorded in Annual Report. Complete Rapid Condition Assessment and Property Inspections.	At least one weed control event each year for species listed in Table 14 of Management Plans and other weeds recorded from monitoring activities. All actions recorded in Annual Report. Complete Rapid Condition Assessment and Property Inspections.	Ecological monitoring data indicates a trajectory for reduction in exotic plant cover over three consecutive assessments.	
Activity / Progress	Weed contractor engaged to undertake weed control activities at the Northern and Southern BA throughout the year. In 2021 weed control targeted the following species: African boxthorn (<i>Lycium ferocissimum</i>), African lovegrass (<i>Eragrostis curvula</i>), , Blue heliotrope (<i>Heliotropium amplexicaule</i>), Coolatai grass (<i>Cynodon dactylon</i>), Farmers friends (<i>Biden pilosa</i>), Galenia (<i>Galenia pubescens</i>), Green cestrum (<i>Cestrum parqui</i>), Lantana (<i>Lantana camara</i>), Mother of millions (<i>Bryophyllum delagonesse</i>), Paterson's curse (<i>Echium plantagineum</i>), Prickly pear (<i>Opuntia stricta</i>), Telegraph weed (<i>Heterotheca grandiflora</i>), Tiger pear (<i>Optunia aurantiaca</i>), Whisky grass (<i>Andropogon virginicus</i>) and St Johns Wort (<i>Hypericum perforatum</i>). Rapid Condition Assessment and Property Inspections were completed in 2021.			Control noxious species and stop weeds spreading into previously un-infested areas. Undertake Rapid Condition Assessment. Undertake Property Inspections.

Conservation Actions	Year 1 to Year 5 (2021 is Year 5)	Year 6 to Year 10	Completion Criteria	Actions 2022
Pest control and monitoring				
Performance Criteria	At least two control events each year for species listed in Table 20 of Management Plans, and any other species recorded from monitoring activities. Active participation in programme coordinated by HLLS, this may include local control actions. Complete biannual inspection and report all works completed and actions for next year.	At least one control events each year for species listed in Table 17 of Management Plans, and any other species recorded from monitoring activities. Active participation in programme coordinated by HLLS, this may include local control actions. Complete biannual inspection and report all works completed and actions for next year.	No observed vertebrate pest or damage. Ecological monitoring demonstrates a trajectory to benchmark values for all attributes measured over three consecutive assessments (the average of all plots).	
Activity / Progress	In 2021 a vertebrate pest contractor was engaged to undertake programmes across the Southern and Northern BA. Three 1080 ground baiting programmes were undertaken targeting wild dogs and foxes in autumn, winter and spring. Biannual property inspections were undertaken in 2021.			Undertake vertebrate pest management including 1080 ground baiting programmes scheduled for autumn and spring to target wild dogs and foxes. Undertake Property Inspections.
Grazing				
Performance Criteria	Grazing is conducted in accordance with the Management Plan. Boundary fences maintained. Complete Rapid Condition Assessment and Property Inspections.			
Activity / Progress	No strategic grazing was undertaken in the BAs in 2021. Property Inspections and Rapid Condition Assessments were undertaken in 2021.			Undertake Property Inspections. Undertake Rapid Condition Assessment. Maintain boundary fences.

Conservation Actions	Year 1 to Year 5 (2021 is Year 5)	Year 6 to Year 10	Completion Criteria	Actions 2022
Bushfire Management Plan (BFMP), Ecological burn and monitoring				
Performance Criteria	Actions implemented. Review and revise if required. Complete Rapid Condition Assessment and Property Inspections.	Actions implemented. Review and revise if required. Complete Rapid Condition Assessment and Property Inspections. Completed ecological fire management plan for MZ1, MZ3, MZ5, MZ7, MZ8 and MZ9.	All required actions of BFMP have been implemented. BFMP has been reviewed annually and revised if required.	
Activity / Progress	BFMP reviewed. Firebreaks were slashed in 2021. Property Inspections and Rapid Condition Assessment were undertaken in 2021.			Review BFMP. Undertake Property Inspections. Undertake Rapid Condition Assessment. Undertake fuel load assessments. Slash firebreaks.
Infrastructure Improvements and monitoring				
Performance Criteria	Completed GDP for all infrastructure improvement actions. Maintenance of tracks and fences completed at least every 3 years. Property Inspections undertaken.			.
Activity / Progress	GDP completed for track maintenance at Southern BA in 2021. Boundary fences maintained and Property Inspections undertaken in 2021.			Maintain tracks and boundary fences. Undertake Property Inspections
Erosion monitoring inspections and reports				
Performance Criteria	Complete Rapid Condition Assessment and Property Inspections			
Activity / Progress	Rapid Condition Assessment and Property Inspections undertaken in 2021. No significant erosion issues identified at either BA			Undertake Rapid Condition Assessment. Undertake Property Inspections.

Conservation Actions	Year 1 to Year 5 (2021 is Year 5)	Year 6 to Year 10	Completion Criteria	Actions 2022
Dam conversion and rehabilitation and monitoring				
<i>Performance Criteria</i>	<i>Prepare dam conversion plan.</i> <i>Dam conversion complete and rehabilitation has stabilised the site.</i> <i>Property inspections.</i>	<i>Observed natural flow regime and no erosion.</i> <i>Property inspections.</i>	<i>All works completed.</i>	
Activity / Progress	Property inspections undertaken in 2021. Dam conversion plan prepared.			Implement actions from dam conversion plan. Undertake Property Inspections.
Natural Regeneration and monitoring				
<i>Performance Criteria</i>	Annual weed control, vertebrate pest and fire management actions implemented as per management plans. Complete Rapid Condition Assessment and Property Inspections.		<i>Ecological monitoring demonstrates a trajectory to benchmark values for all attributes measured over three consecutive assessments (the average of all plots).</i>	
Activity / Progress	All actions implemented in 2021 as per management plans. Rapid Condition Assessment and Property Inspections undertaken in 2021.			Undertake Property Inspections. Undertake Rapid Condition Assessment.
Controlled Activities				
<i>Performance Criteria</i>	<i>No reported incidents of prohibited actions undertaken Yancoal, contractors, consultants or other agents of Yancoal.</i> <i>Any clearing of vegetation reported in Annual Report.</i> <i>Signage and locks (where required) maintained.</i> <i>Complete risk assessment for any recreation activities.</i> <i>All occupants of residents compliant with requirements of the MP.</i> <i>No Cultural Heritage sites knowingly disturbed and any protective barricading maintained.</i> <i>Damaged and unwanted fences removed.</i> <i>All Property Inspections completed.</i>			

Conservation Actions	Year 1 to Year 5 (2021 is Year 5)	Year 6 to Year 10	Completion Criteria	Actions 2022
Activity / Progress	In 2017 trespassing and illegal tree clearing and timber getting within the Southern Biodiversity Area resulted in felling approximately 40 full sized trees and 100 small trees. This unauthorised activity was reported to both Department of Environment and Energy and Department of Planning and Environment in October 2017. Internal fences and waste were removed from the Southern BA areas to be planted in 2018 and sections of boundary fence at the Northern BA and Southern BA were repaired and replaced where needed. New Biodiversity Area signs were installed in 2017. Regular property inspections were undertaken. In 2021 there were no reported incidents or prohibited actions undertaken on the Biodiversity Areas.			Undertake Property Inspections.

4 MONITORING ACTIVITIES

The following table provides a summary of the monitoring activities undertaken as detailed in the MP. Monitoring reports and results are available on the Biodiversity Offset Portal.

Table 3 Monitoring Activity Summary

Monitoring	2021	Date/s	Completed by
Bird Assemblage	X	July – August 2020, next due July – August 2022	ANU Enterprise
Habitat Restoration	X	November 2021 additional monitoring plots at NBA, next due September – November 2022	Cumberland Plain Seeds
Rapid Condition Assessment	X	November 2021, next due September – November 2022	Advisor – Land Management
Property Inspection	X	April/November 2021, next due April/November 2022	Advisor – Land Management

4.1 Bird assemblages monitoring

Bird assemblage monitoring was not required to be undertaken during 2021. The results from the 2020 bird assemblage monitoring were presented in the 2020 Annual Report for Local Offsets.

The next bird assemblage monitoring is scheduled for July 2022.

4.2 Habitat restoration monitoring

Habitat restoration monitoring was not required to be undertaken during 2021. The results from the last round of habitat restoration monitoring conducted in 2020 were presented in the 2020 Annual Report for Local Offsets.

A separate monitoring program was undertaken across the Northern BA in Spring 2021 and included an additional eight transitional plots to capture the WSW planting activities undertaken between 2014 - 2021. The monitoring demonstrated that the woodland areas were near benchmark condition however the cleared grasslands still require substantial effort to decrease weed density and increase native species diversity and cover.

A combination of weed control, planting, seeding and soil translocation will all be required to improve vegetation condition.

The next habitat restoration monitoring is scheduled for September 2022.

5 PROGRESS IN ATTAINING CONSERVATION OBJECTIVES AGAINST KEY PERFORMANCE INDICATORS

The primary conservation objectives for the local offset areas (including the Putty Road Offset) are to:

- enhance biodiversity values across the BAs;
- protect the WSW Offset Area and Putty Road Offset Area under a legally binding conservation covenant;

- increase the condition of WSW and Ironbark EECs and observe a transition from grassland to woodland;
- enhance habitat and foraging opportunities for the woodland birds; and
- contribute to and enhance the existing network of protected vegetation within the Hunter Valley.

Table 2 indicates the progress in attainment of the long-term conservation objectives, the ecological monitoring data supports the continued implementation of the conservation management strategies.

6 ADAPTIVE MANAGEMENT

No new environmental risks have been identified during the reporting period.

Table 4 Local Offset Areas Biodiversity Values and Key Performance Indicators

Area	Biodiversity Value	Description and baseline metric	KPI	Progress comment
Southern BA	Ironbark Woodland	Total area: 446.7ha RCA Average Health rating 18/20 (MZ1)	Extent and condition of woodland over 10 years.	RCA results: 2014 – 18/20 2015 – 18/20 2016 – 18/20 2017 – 18.5/20 2018 – 18.5/20 2019 – 18/20 2020 – 17.5/20 2021 – 17.5/20 Area and health maintained.
	Ironbark Grassland	Total area: 258.4ha	Transition of grassland to woodland.	2021 monitoring supports continued implementation of the conservation management strategies.
	WSW	Total area: 137ha RCA Average Health rating 17.8/20 (MZ3)	Extent and condition of woodland over 10 years.	RCA results: 2014 – 16/20 2015 – 18/20 2016 – 17/20 2017 – 18/20 2018 – 19/20 2019 – 19/20 2020 – 17/20 2021 – 18.5/20 Area and health maintained.

WS Grassland	Total area:40.3ha	Transition of grassland to woodland.	
Hunter Lowland Red Gum Forest	Total area: 32.4ha RCA Average Health rating 18.6/20 (MZ5)	Extent and condition over 10 years.	RCA results: 2014 – 17/20 2015 – 19/20 2016 – 19/20 2017 – 19/20 2018 – 18.5/20 2019 – 18.5/20 2020 – 19/20 2021 - * *Sites were inaccessible due to flooding
Fauna Habitat	Low potential habitat	Observe maintenance or increase habitat condition rating over 10 years	2021 monitoring supports continued implementation of the conservation management strategies.

Area	Biodiversity Value	Description and baseline metric	KPI	Progress comment
Northern BA	Ironbark Woodland	Total area: 103.6ha RCA Average Health rating 18.6/20 (MZ1)	Extent and condition of woodland over 10 years.	RCA results: 2014 – 18/20 2015 – 18.5/20 2016 – 19.5/20 2017 – 19.5/20 2018 – 18/20 2019 – 18/20 2020 – 19/20 2021 – 18/20 Area and health maintained.

Ironbark Grassland	Total area: 23.1ha	Transition of grassland to woodland.	
WSW	Total area: 19.5ha RCA Average Health rating 18.5/20 (MZ3)	Maintain woodland extent over 10 years.	RCA results: 2014 – 17.5/20 2015 – 18/20 2016 – 19/20 2017 – 19/20 2018 – 18.5/20 2019 – 18.5/20 2020 – 19/20 2021 – 18.5/20 Area and health maintained.
WS Grassland	Total area: 194.5	Transition of grassland to woodland	2021 monitoring supports continued implementation of the conservation management strategies.
Fauna Habitat		Observe maintenance or increase habitat condition rating over 10 years	2021 monitoring supports continued implementation of the conservation management strategies.