



ENVIRONMENTAL MANAGEMENT SYSTEM

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BIODIVERSITY OFFSET MANAGEMENT PLAN

NARRABRI MINE ON-SITE BIODIVERSITY OFFSET MANAGEMENT PLAN

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Acronyms used in this document

ABBREVIATION	DESCRIPTION
ACHMP	Aboriginal Cultural Heritage Management Plan
AEMR	Annual Environmental Management Report
BACI	Before – After – Control - Intervention
BOA	Biodiversity Offset Area
BOS	Biodiversity Offset Strategy
BOMP	Biodiversity Offset Management Plan
CMA	Catchment Management Authority
Director-General	The Director-General of the NSW Department of Planning and Infrastructure
DP&I	NSW Department of Planning and Infrastructure
DNG	Derived Native Grassland
DSEWPAC	Commonwealth Department of Sustainability, Water, Population and Communities
EEC	Endangered Ecological Community
EA Report	Environmental Assessment Report
ELA	Eco Logical Australia Pty Ltd
EP	Extraction Plan
EP&A Act	NSW <i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>
HBT	Hollow-bearing tree
LMP	Landscape Management Plan
OEH	NSW Office of Environment & Heritage
NCOPL	Narrabri Coal Operations Pty Ltd
NV Act	NSW Native Vegetation Act 2003
NW Act	NSW Noxious Weeds Act 1993
PA	Project Approval
PCO	Pest Control Order
RMP	Rehabilitation Management Plan
RFS	NSW Rural Fire Service
TSC Act	NSW <i>Threatened Species Conservation 1995</i>



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Executive Summary

This Biodiversity Offset Management Plan (BOMP) for the on-site Biodiversity Offset Area has been prepared by Eco Logical Australia Pty Ltd on behalf of Narrabri Coal Operations Pty Ltd (NCOPL) in accordance with Project Approval 2009/5003 under the Commonwealth *Environment Protection and Biodiversity Conservation Act* (EPBC) 1999 and PA 08_0144 under the NSW *Environmental Planning and Assessment Act* (EP&A) 1979. This plan applies for a period of twenty years, or until the completion criteria are met, in compliance with condition 2e (EPBC 2009/5003) and the commitment made in the Biodiversity Offset Strategy (ELA 2013a).

The on-site Biodiversity Offset Area covers an area of 422 hectares (ha) and consists of five vegetation types that meet the 'like for like' requirements consistent with condition 6a of the EP&A Act project approval. The on-site offset area will be protected, in perpetuity, in accordance with conditions of both the NSW EP&A Act and Commonwealth EPBC Act approvals.

Biodiversity management objectives and management zones are established for the offset area and biodiversity performance criteria provided to enable an adaptive management framework to achieve conservation outcomes. Management strategies are similar to the 'Kenna' Biodiversity Offset Area and are broadly consistent with the Narrabri Mine environmental management system.

There are several threatening processes that are affecting the site, the most significant being the effects of former cattle grazing and infestations of exotic plants and agricultural weeds in parts of the offset area. The management of threatening processes has been addressed in **Section 6** of this plan. Methods for monitoring the success of management actions are provided in **Section 8**.

NCOPL will appoint a Property Manager responsible for the coordination and implementation of this plan. The Property Manager will be responsible for approving any access or activities on site to ensure they are consistent with the objectives of this plan and not contradictory to the project approvals.

This BOMP includes provisions for the Independent Environmental Audit of the Biodiversity Offset Area. An additional 1,168 hectares of vegetation will be added to the biodiversity offset area following completion of longwall mining, subject to meeting rehabilitation completion criteria. This additional area will be subject to subsidence and includes up to approximately 210.5 ha of post disturbance rehabilitation that provides a long term consolidated conservation area of 1,590 ha.

Annual monitoring and reporting requirements set out in this BOMP are consistent with the monitoring program from the Narrabri Mine Extraction Plan - Biodiversity Management Plan (ELA 2012a) and Landscape Management Plan (ELA 2011b). This will provide efficient data gathering and an improved landscape perspective for all management responses.



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1 Introduction

This Biodiversity Offset Management Plan (BOMP) has been prepared by Eco Logical Australia Pty Ltd (ELA) on behalf of Narrabri Coal Operations Pty Ltd (NCOPL). The plan identifies management actions to be implemented by the assigned Property Manager as part of the overall Biodiversity Offset Strategy (BOS).

The Biodiversity Offset Strategy for Stage 2 of the Narrabri Mine requires conservation on two land parcels; this “on-site” offset and a 1,243 hectares (ha) off-site offset (‘Kenna’ property) 40 km west of the project site (**Figure 1**).

The BOMP objectives are to:

- Identify the land that will be required to be managed in accordance with this BOMP;
- Provide a clear, concise, staged and instructional working document outlining the management actions for the biodiversity offset area (BOA);
- Apply an adaptive management framework to ongoing management of conservation outcomes in the BOA such that monitoring results inform the location and extent of future management activities to meet established biodiversity performance criteria;
- Provide a management framework that will lead to an improvement in the condition of native vegetation on the site utilising expert knowledge of resilience in natural landscapes and through specific bushland restoration techniques;
- Outline management actions to enhance Red Ironbark-Brown Bloodwood Shrubby Woodland which provides habitat for *Bertya opposens*, a listed species under Commonwealth Environment Protection Biodiversity Conservation Act 1999 and NSW Threatened Species Conservation Act 1995;
- Outline management actions to enhance White Box Grassy Woodland which provides habitat for *Polytelis swainsonii* (Superb Parrot) a listed species under Commonwealth Environment Protection Biodiversity Conservation Act 1999 and NSW Threatened Species Conservation Act 1995;
- Minimise the impacts of key threats to the site through specific management actions. Key threats include weeds and feral animals; and
- Outline the monitoring, performance evaluation and reporting procedures that are practical and able to be implemented and understood by the Property Manager.

The ‘On-site’ BOA is located approximately 28 km south west of the township of Narrabri in northern NSW (**Figure 1** and **Figure 2**). The offset site covers 422 ha of the Narrabri Mine owned land at the mine site. The offset site largely consists of five biometric vegetation types:

- Inland Grey Box tall grassy woodland on clay soils in the Brigalow Belt South and Nandewar Bioregions;
- Red Ironbark - Brown Bloodwood shrubby woodland of the Brigalow Belt South Bioregion;
- Pilliga Box - Poplar Box- White Cypress Pine grassy open woodland on alluvial loams mainly of the temperate (hot summer) climate zone (Benson 88);
- River Oak Riparian woodland of the Brigalow Belt South and Nandewar Bioregions; and
- Rough-barked Apple riparian forb/grass open forest of the Nandewar Bioregion.

An additional 1,168 hectares (ha) will be added to the Biodiversity Offset Area following completion of longwall mining subject to minimal (<10%) impacts to surface ecology from underground mining activity. This



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includes up to 210.5 ha of post-disturbance rehabilitation subject to meeting rehabilitation completion criteria as informed by the Mine Landscape and Rehabilitation Plans (ELA 2011a and 6).

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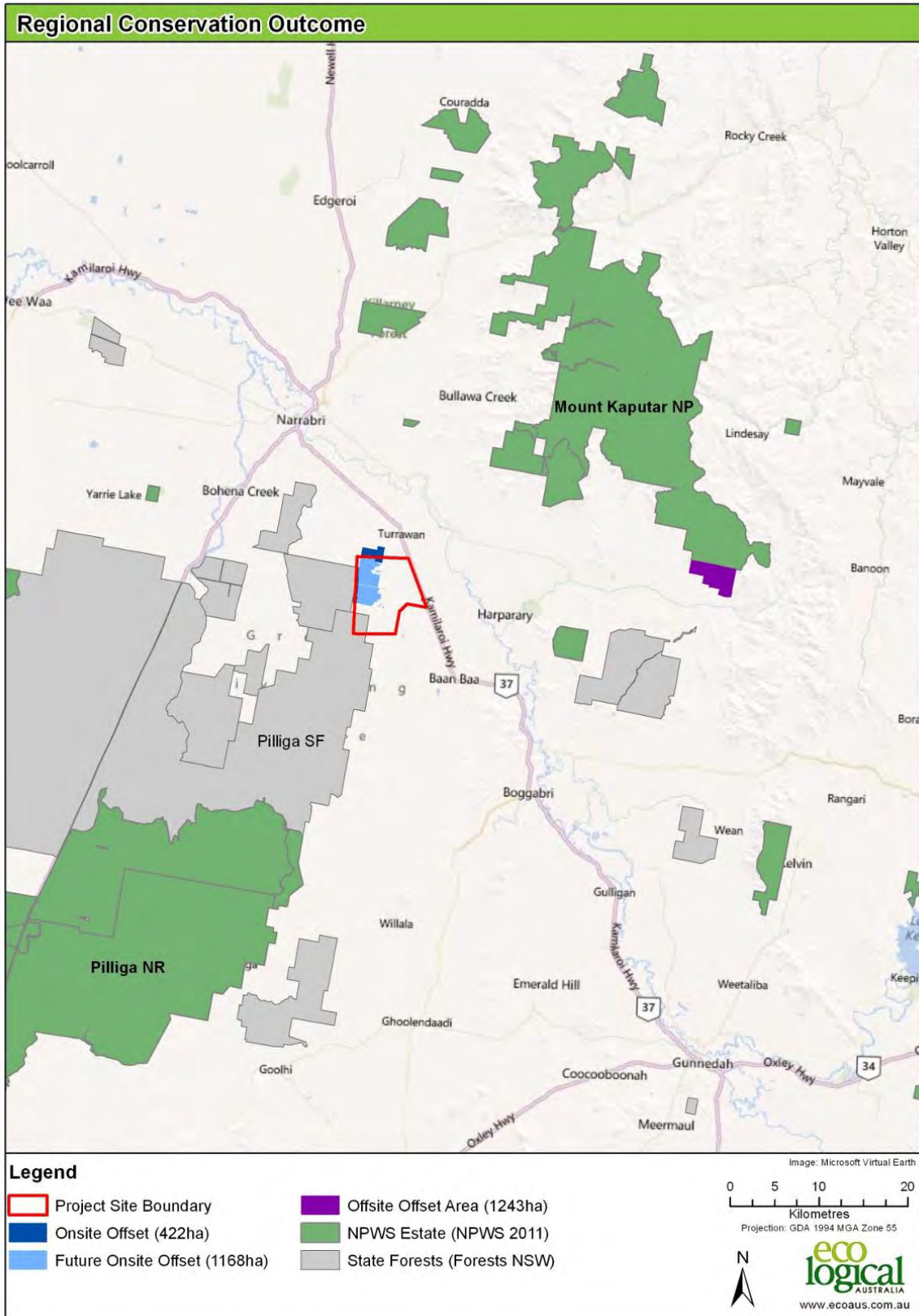


Figure 1: Regional Location of Biodiversity Offset Areas



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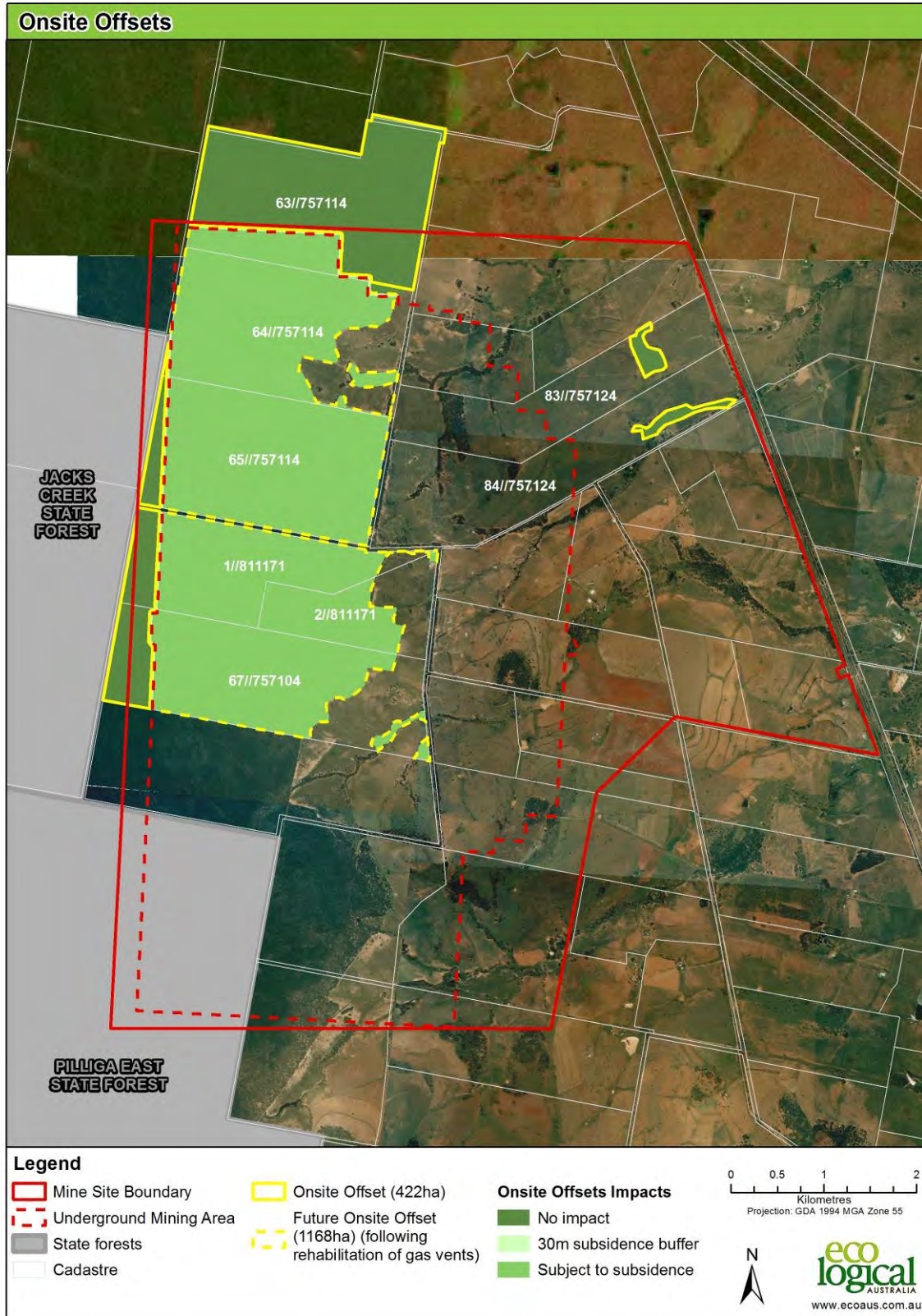


Figure 2: On-site Biodiversity Offset Area – Narrabri Mine



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2 Responsibilities

NCOPL are responsible for the implementation of this plan in accordance with the conditions of approval under the Commonwealth EPBC Act 2009/5003 and NSW EP&A Act PA 08_0144.

NCOPL will appoint a Property Manager responsible for the coordination and implementation of this plan. The Property Manager will be responsible for approving any access or activities on site to ensure they are consistent with the objectives of this plan and not contradictory to the project approvals.

Management actions beyond the scope of this BOMP may be carried out at the discretion of the Property Manager as long as they are consistent with this BOMP. Actions contrary to the approved BOMP, approved Extraction Plan (EP) and approved Landscape Management Plan require prior written Ministerial approval of the varied strategy.

Table 1: Accountabilities for implementing the Management Plan

POSITION	RESPONSIBILITY	REPORTING
NCOPL Group Environmental Manager	Adequate, compliant implementation of the BOMP in the BOA Timely delivery of quality annual reporting in accordance with the BOMP	Technical Services Manager, Narrabri Coal Operations Pty Ltd Coal
NCOPL assigned Property Manager	Timely, proficient implementation of management actions using qualified, experienced contractors where required in adherence with BOMP protocols, risk management, annual visual inspections and annual reporting	Group Environmental Manager

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3 Requirements

The conversion of the Narrabri Mine from a continuous mining operation with an annual production rate of 2.5Mtpa to a long wall mining operation with maximum production rate of 8 Mtpa, has been approved under Section 75J of the NSW Environmental Planning and Assessment Act 1979 and under Sections 130(1) and 133 of the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 subject to specified conditions in:

- Project Approval 08-0144 ‘Narrabri Coal Project – Stage 2’ proponent Narrabri Coal Operations Pty Ltd granted by NSW Minister for Planning 26 July 2010; and
- Approval EPBC Act Re 2009/5003 granted to Narrabri Coal Operations Pty Ltd by the Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) 21 January 2011.

In addition to the BOS, this BOMP addresses the following Office of Environment and Heritage offset principles (DECC 2008):

- To ‘enhance condition by management actions and the removal of threats’ in accordance with OEH Offset Principle 10;
- To provide ‘additional management or increased security’ OEH Offset Principle 6; and
- To manage ‘uncertainties and risks associated with actions such as revegetation’ OEH Offset Principle 6

Table 2 provides a summary of the relevant biodiversity offset conditions from the NSW Department of Planning and Infrastructure (DP&I) and DSEWPaC approvals and identifies how/where these have been addressed in this BOMP.

The management actions in this plan are consistent with Narrabri Mines’ Environmental Policy and other mine plans listed in **Table 21**. The monitoring methods in this BOMP are consistent with the on-site biodiversity monitoring of subsidence impacts.



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Table 2: Compliance with Conditions of Approval

EP&A ACT PA 08_0144 REQUIREMENT	EPBC ACT APPROVAL 2009/5003 REQUIREMENT	SECTION ADDRESSED
<p>Schedule 5, Condition 6</p> <p>a. Preparation of a Biodiversity Offset Strategy in consultation with DECCW</p> <p>b. Biodiversity Offset Strategy submitted to Director General by 31st Dec 2011</p> <p>c. Provide detailed assessment of 'like for like or better' and 'maintain or improve outcomes'</p>	<p>2. The final version of biodiversity offset strategy must be submitted to the Minister for approval.</p>	<p>Final Biodiversity Offset Strategy (BOS) prepared (ELA 2013a)</p> <p>a. in consultation with OEH (formerly DECCW), DP&I and DSEWPaC.</p> <p>b. Final BOS addressing NSW requirements submitted to DP&I 4 October 2011</p> <p>c. 'Like for like' addressed section 3.1 and 'maintain or improve' in section 3.2 in BOS (ELA 2012a)</p> <p>This BOMP addresses the active management of the 'on site' offset area as one of two parcels comprising the BOS.</p> <p>This BOMP and the BOS (ELA 2013a) will be formally submitted to the Australian Government Minister for Sustainability, Environment, Water, Population and Communities for approval.</p>
<p>Schedule 5, Condition 7 provide long term security for the offset areas (by 31 Dec 2011) or other date agreed by the Director-General</p>	<p>2.d. Secure the 422 ha offset area in a legally binding conservation covenant on title approved in writing by the Minister.</p>	<p>NCOPL has received an extension to arrange for the long-term security of the offset. Once the appropriate mechanism has been identified NCOPL will update and resubmit this management plan for approval (Section 6)</p>
<p>Schedule 5. Condition 6 d. Offset impacts to <i>Bertya opponens</i></p>	<p>2.e. Develop and implement an active monitoring and management plan to enhance Red Ironbark – Brown Bloodwood Shrubby Woodland as habitat for the EPBC listed <i>Bertya opponens</i> and White Box Grassy Woodland as habitat</p>	<p>Section 6 and 8.</p>



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EP&A ACT PA 08_0144 REQUIREMENT	EPBC ACT APPROVAL 2009/5003 REQUIREMENT	SECTION ADDRESSED
	for the EPBC listed Superb Parrot.	
Schedule 5, Condition 6 e. Offset direct and indirect impacts (i.e. edge effects) of the proposal f. Determine best overall combination of lands to provide a suitable offset	2.f. Define biodiversity off set area boundaries in map, text and shape file (digital format).	EP&A 6e & 6f addressed in BOS EPBC Act 2f described in BOS (ELA 2013a) Figure 2 and Section 4 of this BOMP ESRI shapefile provided with BOMP.
Schedule 5, Condition 6 d. Offset impacts to Inland Grey Box EEC		24.8 direct impacts and 20.5 estimated indirect impacts offset by 591 hectares “like for like” of equivalent vegetation types across two Biodiversity Offset Areas (Section 4 BOS).
Schedule 6, Condition 6.a-f. Annual review and reporting of works completed and monitoring results (trend & discrepancies of impact) and forecast improvement actions and works for year ahead.	2.e.i. & ii. management actions and responsibilities for monitoring, reviewing and implementing the plan	Section 2 Responsibilities Section 6 management Actions Section 8 Monitoring Section 11 Reporting Section 12 Review.
	10. Actions contrary to the approved Biodiversity Offset Management Plan and approved Extraction Plan require prior written Ministerial approval of the varied strategy.	Section 2 Property Manager will be responsible for reporting need for any variations contrary to this BOMP



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4 Baseline Condition

A preliminary assessment of conservation values on the BOA was undertaken based on Namoi Catchment Management Authority (CMA) vegetation mapping and ground-truthing completed ELA between 17 and 19 August 2010. Rapid biometric vegetation condition assessment plots (20 m x 20 m) were undertaken in each vegetation type and condition to assess native species richness; native and exotic species cover; hollow bearing trees; over-storey regeneration; and length of fallen logs. Native cover in each structural layer was visually estimated. Many of the mature remnant trees along the drainage lines were observed to be utilised by native birds such as Cockatoos and Galahs. Parsons Brinkerhoff (2013) has since completed detailed baseline studies of the flora and fauna in November 2012.

4.1 VEGETATION COMMUNITIES

Five BioMetric vegetation types were recorded across the offset area in a range of condition states from derived native grasslands, advanced regeneration to selectively logged remnants (**Table 3**). The vast majority of the offset site had been clear-felled approximately 20-30 years ago, and now consists predominantly of moderately dense advanced regrowth. Mature remnant trees occur along minor drainage lines in the north and south of the offset site as well as in a relatively large rectangular patch in the east of the proposed offset area. Small patches of derived native grassland occur along the eastern boundary where the soils are likely to be of greater fertility. The major vegetation type at the offset site has been identified as Red Ironbark - Brown Bloodwood shrubby woodland of the Brigalow Belt South Bioregion (**Figure 3**).

The vegetation types present within the study area include:

- Inland Grey Box tall grassy woodland on clay soils in the Brigalow Belt South and Nandewar Bioregions;
- Red Ironbark - Brown Bloodwood shrubby woodland of the Brigalow Belt South Bioregion;
- Pilliga Box - Poplar Box- White Cypress Pine grassy open woodland on alluvial loams mainly of the temperate (hot summer) climate zone (Benson 88);
- River Oak Riparian woodland of the Brigalow Belt South and Nandewar Bioregions; and
- Rough-barked Apple riparian forb/grass open forest of the Nandewar Bioregion.

The vegetation types were divided into broad condition categories based on the structure, age and disturbance history of the vegetation. The following disturbance categories were assigned:

- Good - All native strata present with evidence of under-scrubbing/thinning;
- Moderate - Dense advanced canopy regrowth with limited mature trees and hollows; and
- Poor - Derived native grassland with canopy and shrub layers removed.

The vegetation type 'Rough-barked Apple riparian forb/grass open forest of the Nandewar Bioregion' corresponds to the 'White Box-Yellow Box-Blakely's Red Gum grassy woodland' as listed under the



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NSW *Threatened Species Conservation Act 1995* (TSC Act) and the 'White Box – Yellow Box Blakely's Red Gum grassy woodland and derived native grassland' as listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Table 3: Vegetation types in the Biodiversity Offset Area

VEGETATION TYPES	GOOD	MODERATE	POOR (DNG)	TOTAL AREA (HA)
Inland Grey Box tall grassy woodland on clay soils in the Brigalow Belt South and Nandewar Bioregions		10		10
Red Ironbark - Brown Bloodwood shrubby woodland of the Brigalow Belt South Bioregion	112.83	266.73		379.56
Pilliga Box - Poplar Box- White Cypress Pine grassy open woodland on alluvial loams			17.09	17.09
River Oak Riparian woodland of the Brigalow Belt South and Nandewar Bioregions		10		10
Rough-barked Apple riparian forb/grass open forest of the Nandewar Bioregion (White Box - Yellow Box - Blakely's Red Gum EEC)	5.91			5.91
	118.74	286.73	17.09	422.56

4.2 FAUNA

Field surveys on the adjacent mine site undertaken for the Environmental Assessment recorded 161 fauna species including 99 birds, 37 mammals, 16 reptiles and 10 frogs (Appendix 4 in Ecotone 2009). The BOA adjoins the mine site with continuous vegetation cover, therefore, these fauna species would be likely to occur on the BOA. Site reconnaissance on the BOA undertaken by ELA in August 2010 recorded the general fauna habitat values of the different vegetation types at the BOA (**Table 4**).



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Table 4: General fauna habitat values by vegetation type and condition

BIOMETRIC VEGETATION TYPE	FAUNA HABITAT VALUES
Inland Grey Box tall grassy woodland on clay soils in the Brigalow Belt South and Nandewar Bioregions	Open shrub-grass woodland, modified by past and current grazing activities. Provides habitat for woodland birds, reptiles and foraging /roosting resources for larger avifauna and bats. Noted as potential foraging resource for Superb Parrot
Red Ironbark - Brown Bloodwood shrubby woodland of the Brigalow Belt South Bioregion	Dense shrub layer present is likely to be shelter for small birds. Remnant hollow bearing trees are likely to support larger avifauna and bats. The diversity of flowering shrubs is likely to provide significant fauna foraging resources. The farm dam in the north-eastern corner is likely to provide foraging and roosting habitat for a range of fauna species
Pilliga Box - Poplar Box- White Cypress Pine grassy open woodland on alluvial loams	The habitat value is limited with some small birds such as Songlarks and Quails likely to seek shelter in the tall grass. This area would also be utilised by reptiles and birds of prey for foraging on small mammals such as the House Mouse (<i>Mus musculus</i>) that are likely to use this vegetation
River Oak Riparian woodland of the Brigalow Belt South and Nandewar Bioregions	This area supports a number of remnant hollow bearing trees which provide resources for roosting microbats and are likely to support larger avifauna. Noted as potential foraging resource for Superb Parrot
Rough-barked Apple riparian forb/grass open forest of the Nandewar Bioregion (White Box - Yellow Box - Blakely's Red Gum EEC)	This area supports a number of remnant hollow bearing trees which provide resources for roosting microbats and are likely to support larger avifauna. Noted as potential foraging resource for Superb Parrot

All the remnant natural vegetation including scattered trees within the site has ecological value in that it facilitates movement of fauna and exchange of genetic material between native flora species locally, from one part of the study area to another via remnant connections and riparian corridors (Ecotone 2009).

4.3 THREATENED FAUNA

Fifteen threatened fauna species were recorded on the adjacent mine site by Ecotone (2009) as shown in **Table 5**. Two migratory birds; Merops ornatus (Rainbow Bee-eater) and Hirundapus caudacutus (White-throated Needle-tail), were recorded on the adjacent mine site. In addition, Squirrel Glider and Spotted-tailed Quoll are likely to occur but were not recorded during field surveys (Ecotone 2009).

Subsequent surveys by Parsons Brinkerhoff (2103) in November 2012 as part of the baseline flora and fauna monitoring program recorded 11 TSC Act listed threatened fauna species in the offset area including seven bird species (Barking Owl, Varied Sittella, Square-tailed Kite, Speckled warbler, Grey-crowned babbler, Glossy Black Cockatoo and Little Eagle) and four bat species (Eastern Bent-wing Bat, Yellow-bellied Sheath-tail Bat, Eastern Falsistrelle and Eastern Cave Bat).



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The BOA includes 43ha of preferred Superb Parrot foraging habitat including Inland Grey Box, Blakely's Red Gum, Pilliga Box – Poplar Box and River Oak Riparian woodland. These areas will be fenced to protect vegetation (including paddock trees) and allow regeneration of canopy species providing enhanced long term habitat values for the Superb Parrot.

Table 5: Threatened flora and fauna records adjacent to the Biodiversity Offset Area

CLASS (NUMBER OF SPECIES)	SCIENTIFIC NAME	COMMON NAME	TSC STATUS	EPBC STATUS	RECORDED ON MINE SITE BY ECOTONE (2009)	RECORDED BY PARSONS BRINKERHOFF (2013) IN OFFSET AREA
Birds (6)	<i>Polytelis swainsonii</i>	Superb Parrot	V	V	Recorded	No
	<i>Neophema pulchella</i>	Turquoise Parrot	V	-	Recorded	No
	<i>Calyptorhynchus lathami</i>	Glossy-black Cockatoo	V	-	Recorded	Yes
	<i>Pomatostomus temporalis temporalis</i>	Grey-crowned Babbler	V	-	Recorded	Yes
	<i>Stagonopleura guttata</i>	Diamond Firetail	V	-	Recorded	No
	<i>Chthonicola sagittata</i>	Speckled Warbler	V	-	Recorded	Yes
	<i>Daphoenositta chrysoptera</i>	Varied Sittella	V	-	Recorded	Yes
Mammals (7)	<i>Phascolarctos cinereus</i>	Koala	V	-	Recorded	No
	<i>Cercartetus nanus</i>	Eastern Pygmy Possum,	E	-	Recorded	No
	<i>Macropus dorsalis</i>	Black Striped Wallaby,	E1	-	Recorded	No
	<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-Tail Bat	V	-	Recorded	Yes
	<i>Chalinolobus</i>	Little Pied Bat	V	-	Recorded	No



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CLASS (NUMBER OF SPECIES)	SCIENTIFIC NAME	COMMON NAME	TSC STATUS	EPBC STATUS	RECORDED ON MINE SITE BY ECOTONE (2009)	RECORDED BY PARSONS BRINKERHOFF (2013) IN OFFSET AREA
	<i>picatus</i>					
	<i>Nyctophilus timoriensis</i> (South-eastern form)	Greater Long-eared Bat	V	-	Recorded	No
	<i>Pseudomys delicatulus</i>	Delicate Mouse	E	E	Recorded	No
Reptile (1)	<i>Hoplocephalus bitorquatus</i>	Pale-headed Snake	V	-	Recorded	No

4.4 THREATENED FLORA

One threatened flora species has been recorded onsite (OEH 2012, ELA 2011). *Bertya opposens* (Coolabah Bertya) is listed as Vulnerable under NSW TSC Act and Commonwealth EPBC Act. The on-site BOA contains 380 ha of suitable habitat for *Bertya opposens* with an estimated 327,094 plants (ELA 2011). Survey locations of *Bertya opposens* shown in **Figure 3** represent the survey results from August 2010 and additional locations are likely.

Additional threatened flora species may occur in the vegetation types present in the BOA, although no records are shown in the NSW Wildlife Atlas in a 10km search or were recorded by Ecotone (2009). Monitoring of the BOA in 2012 by Parsons Brinkerhoff (Parsons Brinkerhoff 2013) recorded *Pomaderris queenslandica* in the offset area.



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Table 6: Threatened flora species associated with regional vegetation communities in the Biodiversity Offset Area

BIOMETRIC VEGETATION TYPE	EQUIVALENT RVC	ASSOCIATED THREATENED FLORA SPECIES *
Inland Grey Box tall grassy woodland on clay soils in the Brigalow Belt South and Nandewar Bioregions	21	<i>Dichanthium setosum</i> (Bluegrass) <i>Digitaria porrecta</i> (Finger Panic Grass) <i>Diuris tricolor</i> (Pine Donkey Orchid) <i>Swainsona murrayana</i> (Slender Darling Pea)
Red Ironbark - Brown Bloodwood shrubby woodland of the Brigalow Belt South Bioregion	33	<i>Dichanthium setosum</i> (Bluegrass) <i>Bertya opponens</i> (Coolabah Bertya) <i>Cyperus conicus</i> <i>Polygala linariifolia</i> (Native Milkwort)
Pilliga Box - Poplar Box- White Cypress Pine grassy open woodland on alluvial loams	32	<i>Philotheca ericifolia</i> <i>Pterostylis cobarensis</i> <i>Rulingia procumbens</i> <i>Tylophora linearis</i>
River Oak Riparian woodland of the Brigalow Belt South and Nandewar Bioregions	71	<i>Callistemon pungens</i> <i>Haloragis exalata</i> ssp. <i>exalata</i> , <i>Haloragis exalata</i> ssp. <i>velutina</i> , <i>Asterolasia</i> sp (<i>Dungowan Starbush</i>)
Rough-barked Apple riparian forb/grass open forest of the Nandewar Bioregion (White Box - Yellow Box - Blakely's Red Gum EEC)	30	<i>Thesium australe</i> (<i>Austral Toadflax</i>) <i>Dichanthium setosum</i> (<i>Bluegrass</i>) <i>Callistemon pungens</i> <i>Digitaria porrecta</i> (<i>Finger Panic Grass</i>) <i>Polygala linariifolia</i> (<i>Native Milkwort</i>) <i>Diuris tricolor</i> (<i>Pine Donkey Orchid</i>) <i>Pomaderris queenslandica</i>

*Source: ELA 2009

RVC = Regional Vegetation community



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4.5 WEEDS

Baseline surveys are recommended to determine the extent and location of exotic flora species present on the BOA. Site reconnaissance surveys report commonly observed weeds as *Lolium perenne* (Perennial Ryegrass) and *Medicago sp.* (Burr Medic) (ELA 2012a). In addition, Ecotone (2009) report eight noxious weeds present on the adjacent mine site (listed in **Table 7**).

Table 7: Noxious weeds on Narrabri mine site

SCIENTIFIC NAME	COMMON NAME	NOXIOUS WEED CLASS*
<i>Lycium ferocissimum</i>	African boxthorn	Class 4
<i>Xanthium spinosum</i>	Bathurst burr	Class 4
<i>Oxalis corniculata</i>	Creeping oxalis	Class 5
<i>Sorghum halepense</i>	Johnson Grass	Class 4
<i>Bryophyllum delagoense</i>	Mother of millions	Class 4
<i>Xanthium occidentale</i>	Noogoora burr	Class 4
<i>Opuntia stricta</i>	Prickly pear	Class 4
<i>Cenchrus longispinus</i>	Spiny burrgrass	Class 4

Source (Narrabri Shire Council 2006).

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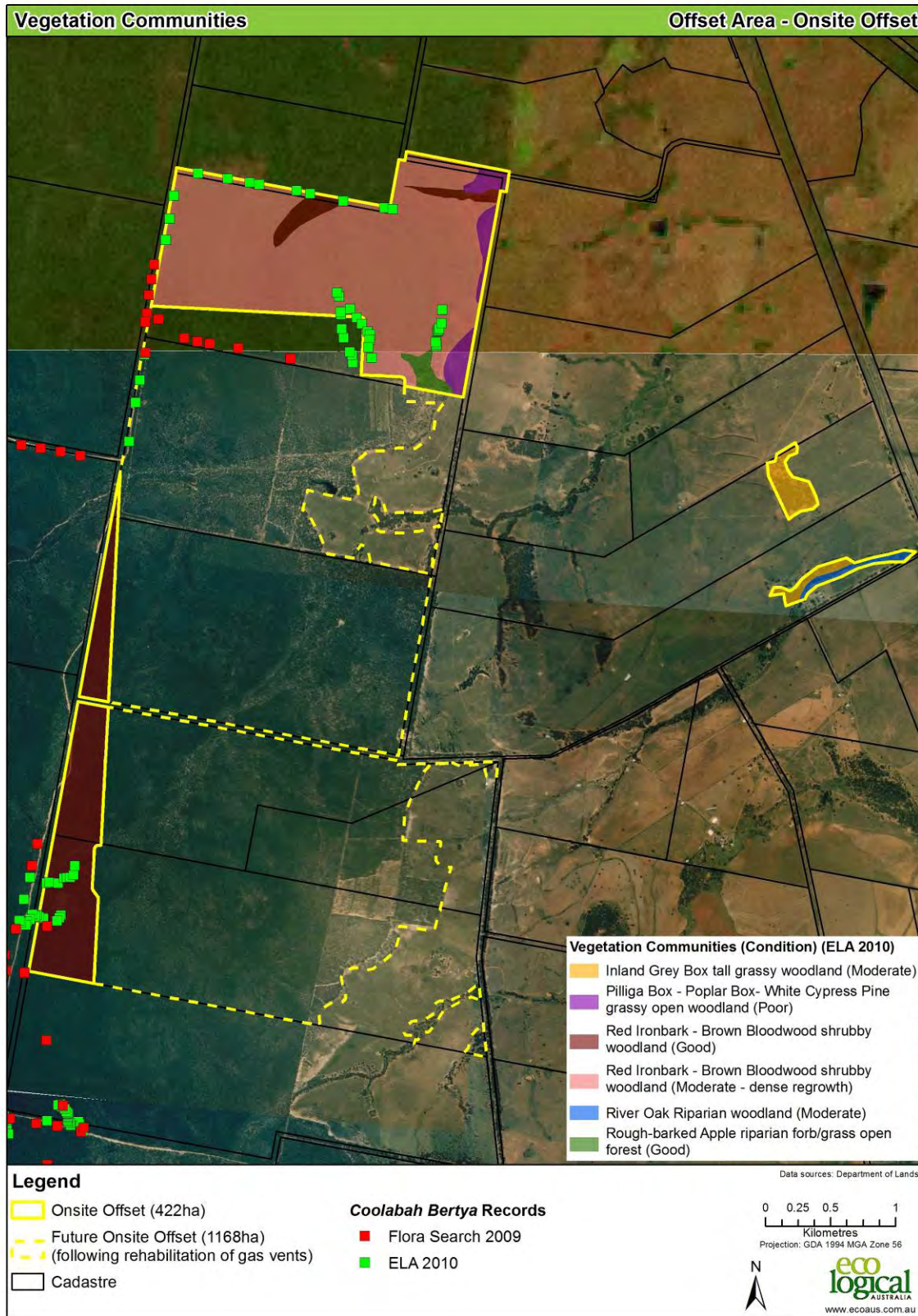


Figure 3: Biodiversity Offset Area vegetation type and condition with *Bertya opposens* records



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5 Objectives and Targets

The strategic objectives of the BOMP are outlined in **Section 1**. Within the overall aim to improve conservation values in the BOA, management actions outlined in **Section 6** are targeted to improve the condition of native vegetation on the site by minimising or removing key threats to biodiversity and through strategic revegetation activities in select areas.

This BOMP is required to:

- 'Improve or maintain' environmental outcomes (as defined in the project approval)
- enhance Red Ironbark-Brown Bloodwood Shrubby Woodland which provides habitat for *Bertya opposens*, a listed species under Commonwealth Environment Protection Biodiversity Conservation Act 1999 and NSW Threatened Species Conservation Act 1995
- to enhance White Box Grassy Woodland which provides habitat for *Polytelis swainsonii* (Superb Parrot) a listed species under the Commonwealth Environment Protection Biodiversity Conservation Act 1999 and NSW Threatened Species Conservation Act 1995

Table 8 details the performance criteria by which the success of the conservation actions will be measured.

Table 8: Biodiversity management performance criteria

MANAGEMENT ACTION	EXPECTED OUTCOME	TARGET	TIMING
Vegetation Restoration (natural rehabilitation and direct planting)	Increased native plant diversity	Restore native plant species richness, and native canopy, mid-storey and grass cover to within 75% of benchmark condition (Refer Table 12) within specified timeframes and ultimately 100% as part of in perpetuity protection and management	Canopy:15 years
			Midstorey:10 years
			Groundcover: 5 years
Supplementary Planting	Increased Canopy/Mid-storey cover (if required), ground cover species richness (if required)	25% survival of seedlings (direct seeding) to achieve a future canopy cover within benchmark range 75% survival of direct landscape plantings	After 3 years of activity
Management of human disturbance, fencing, signage	Reduction of resource competition and soil disturbance	Site access restricted to approved personnel No timber clearing or removal	<1 year and throughout project life



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MANAGEMENT ACTION	EXPECTED OUTCOME	TARGET	TIMING
Grazing management		Stock exclusion from BOA	<1 year and throughout project life
Weed management	Reduction in weed cover	<p>New infestations of problem grasses controlled</p> <p>Exotic ground cover to be reduced to <10% in zones 2 & 3 by Year 10 and maintained at less than 5% in all zones thereafter</p> <p>Woody weeds in all zones to be maintained at less than 1% after year 5</p> <p>All infestations of noxious weeds managed as per NW Act</p>	<p>6 months after identification of infestation</p> <p>Throughout project life</p>
Feral fauna management	Reduction in feral fauna	Feral fauna control undertaken as per Vertebrate Pest Management Plan	<1 year and throughout project life, minimum quarterly inspections.

Should the completion criteria not be met in the timeframes identified in **Table 8** or if some environmental event delays the recovery of the offset area, e.g. bushfire, NCOPL will continue to manage the offset area until the completion criteria are met. Once this is achieved, the offset area will then be managed in perpetuity via the security mechanism which is yet to be finalised.



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6 Management Strategies and Measures

The on-site BOA will be managed for conservation through the implementation of this management plan.

The BOA comprises land owned by NCOPL namely Lot 63 DP 757114, western parts of Lot 64 and Lot 65 DP 757144, western parts of Lot 1 DP 811171 and Lot 67 DP 757104, and eastern parts of Lots 83 & 84 DP 757124 (**Figure 2**).

The 422 ha BOA will be secured for biodiversity outcomes in accordance with conditions of both the EP&A and EPBC Act approvals. The appropriate mechanism for long-term security is still being negotiated and the management plans will be updated and resubmitted for approval once the preferred mechanism has been identified.

The BOA has been divided into management zones according to vegetation condition and resilience, and therefore similar intervention and recovery strategies. The zones are described below and illustrated in **Figure 4**.

Ecological resilience is defined as the capacity to recover from disturbance. The resilience of the site was categorised as follows:

- Very High resilience – sufficient native vegetation remaining in-situ to enable the natural regeneration of native vegetation. Low levels of management is required to facilitate restoration (Management zone 1). Management zone 1 includes areas of vegetation assessed as being in good or moderate (dense regrowth) condition.
- High resilience – native vegetation is present, but native species richness needs augmenting. Low levels of management is required to facilitate restoration (Management zone 2). Management zone 2 includes areas of vegetation assessed as being in moderate condition.
- Low resilience – no or very little native vegetation is present and the over-storey has been removed or remains only as isolated paddock trees. Significant levels of active management is required to facilitate restoration (Management zone 3). Management zone 3 includes areas of vegetation assessed as being in poor condition

Zones 1 and 2 have high levels of resilience and only require minor intervention works including weed/feral animal control, removing stock and implementing sensitive fire management regimes. These zones are expected to regenerate naturally from the native species diversity present. Zone 2 may need supplementary landscape plantings if insufficient regeneration occurs in the understorey and mid-storey naturally. Isolated vegetation remnants on the 'Omeo' and 'Greylands' properties (owned by NCOL) may need additional signage and fencing to provide protection from adjacent land uses.



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Zone 3 has relatively low resilience and therefore limited ability for native vegetation to naturally regenerate. Zone 3 will require intervention through active revegetation works and weed/feral animal control.

The BOMP has been designed to be part of an 'adaptive management' framework, whereby should any one aspect of the BOMP be identified as performing poorly against the performance criteria, then additional aspects of the BOMP are to be implemented to ensure positive outcomes are achieved.

The revegetation methodologies provided are indicative only and used as a basis for developing management actions. The property manager has the ability to vary the specified revegetation methodology because of issues with availability of numbers and diversity of species and/or equipment/labour. Also opportunities for direct seeding will be undertaken in circumstances that allow and rates/densities may be modified given changes in environmental conditions (either natural regrowth or poor soil moisture etc.).



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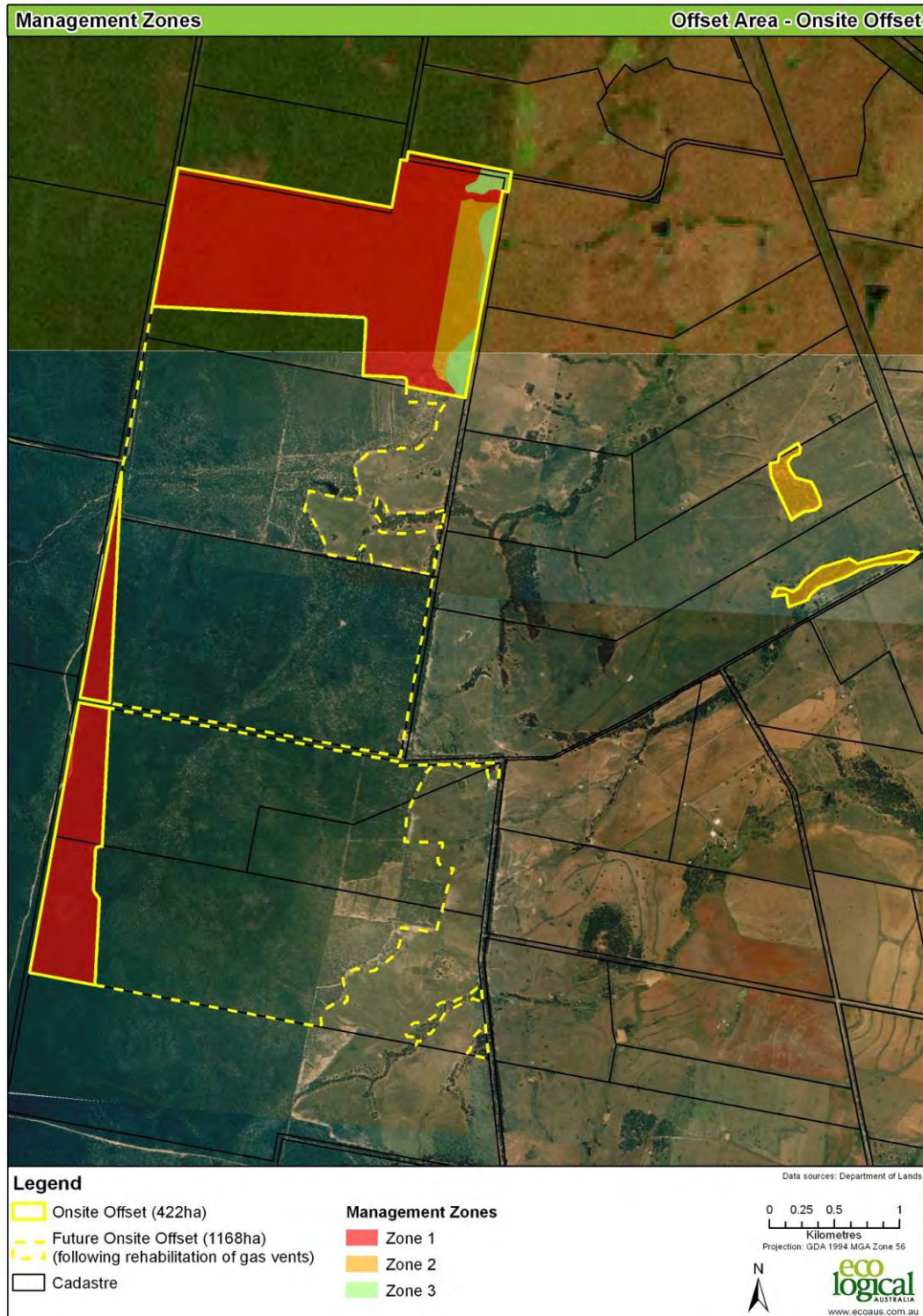


Figure 4: Biodiversity Offset Area management zones



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6.1 MANAGEMENT STRATEGIES BY ZONE

The management objectives and actions for each zone are tailored to improve upon the baseline condition towards the benchmark condition (Refer to Table 12) for each vegetation type and to improve fauna habitat values as assessed in 2012 by Parsons Brinkerhoff (Parsons Brinkerhoff (2013).

The management strategies address the protection and enhancement of Red Ironbark-Brown Bloodwood Shrubby Woodland which provides habitat for TSC and EPBC listed *Bertya opposens* and for the White Box Grassy Woodland which provides habitat for the TSC and EPBC Act listed *Polytelis swainsonii* (Superb Parrot), in accordance with conditions of approval EPBC 2009/5003 (conditions 2e(i) and (ii) and PA 08_0144 (Schedule 5 Condition 6d).

6.1.1 Management Zone 1 – Very High Resilience

Management zone 1 is approximately 376 ha and located in the eastern portion of Lot 63 DP 757114 (in north) and the western portions of Lot 64 and Lot 65 DP 757144, Lot 1 DP 811171 and Lot 67 DP 757104. Management zone 1 is characterised by Red Ironbark-Brown Bloodwood Shrubby Woodland on infertile, often rocky, shallow sandy soils and a small patch of Rough-barked Apple riparian forb/grass open forest of the Nandewar Bioregion (refer to **Table 9**). Rough-barked Apple - Blakely's Red Gum riparian grassy woodlands, Brigalow Belt South and Nandewar forms part of the NSW listed EEC White Box Yellow Box Blakely's Red Gum Woodland and provides habitat for the Superb Parrot. *Bertya opposens* is distributed across the site.

The vegetation in the south western portions was not surveyed by floristic plots as part of site reconnaissance. Whilst the majority vegetation type is Red Ironbark-Brown Bloodwood Shrubby Woodland in this area, the dominant eucalyptus species and shrub species may vary near riparian zones. It is recommended this area be surveyed as part of baseline surveys undertaken across the BOA (refer to Flora monitoring).

Vegetation condition ranges in zone 1 from good to moderate. The west and south west part of zone 1 contains patches of dense regrowth that has excluded much of the ground cover species. Jacks Creek State Forest adjoins the property in the west. Whilst all areas have undergone some level of disturbance in the past there is greater species diversity than in other zones and zone 1 provides a variety of good fauna habitat.

The primary management objectives in this zone are to enhance habitat for *Bertya opposens* and the Superb Parrot, control vertebrate pest species, including feral pigs and goats, replace current external fencing which is in poor condition and undertake targeted weed control.

Table 9: Vegetation characteristics in management zone 1

VEGETATION TYPE	DOMINANT CANOPY SPECIES	MID STOREY SPECIES	GROUND COVER SPECIES
Red Ironbark-Brown Bloodwood Shrubby Woodland	<i>Eucalyptus. fibrosa</i> , <i>Corymbia trachyphloia</i> <i>ssp. amphistomatica</i>	<i>Callitris glaucophylla</i> , <i>Acacia cheelii</i> , <i>Acacia burrowii</i> , <i>Philotheca ciliata</i> <i>Boronia</i> ,	<i>Aristida spp.</i> , <i>Eragrostis brownie</i> , <i>Cheilanthes sieberi</i> , <i>Goodenia</i>



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VEGETATION TYPE	DOMINANT CANOPY SPECIES	MID STOREY SPECIES	GROUND COVER SPECIES
	Scattered <i>E. blakelyi</i> , <i>E. Dwyeri</i> , <i>E pilligaensis</i> , <i>E. albens</i>)\	<i>Bertya opposens</i> , <i>Casuarina cristata</i> , <i>Acacia deanei</i>	<i>hederacea</i> , <i>Homoranthus flavescens</i> , <i>Dianella revolute</i>
Rough-barked Apple riparian forb/grass open forest of the Nandewar Bioregion	<i>Eucalyptus blakelyi</i> , <i>Angophora floribunda</i> , <i>Callitris glaucophylla</i> , <i>Brachychiton populneus</i>	absent	<i>Aristida spp.</i> , <i>Cymbopogon refractus</i> , <i>Dianella revolute</i> , <i>Dichondra repens</i>

Management actions in this zone include:

- Conduct baseline flora and fauna surveys to identify original reference condition for measuring future changes in condition, and to inform extent and location of weed management interventions (**Section 6.2.5**)
- Repair or replace external fencing sections in Lot 63 DP 757114 that are in poor condition, to prevent unauthorised access, including uncontrolled grazing
- Install signage on all external boundaries to BOA, including southern boundary of Lot 63 DP 757114 to mine site to inform other staff and conduct periodic compliance checks to prevent unauthorised entry/use
- Retain all timber (standing, dead/alive) including remnant hollow bearing trees which are likely to support larger avifauna and bats
- Monitor areas of dense regrowth and consider ‘thinning’ of canopy species if thinning does not occur naturally as the stands age and thinning is considered appropriate by a qualified restoration ecologist
- Minor weed removal and ongoing monitoring to compliment adjacent areas.
- Targeted control of foxes, rabbits, goats and pigs required across whole BOA, preferably in conjunction with State Forests (SF) NSW vertebrate pest control activities.

6.1.2 Management Zone 2

Management zone 2 is located in the east of Lot 63 DP 757114 and has two 10 ha remnant patches of woodland on the ‘Omeo’ and ‘Greylands’ properties (owned by NCOL) and covers approximately 49 ha. It is characterised largely by Red Ironbark-Brown Bloodwood Shrubby Woodland and remnant, isolated stands of Inland Grey Box and Riparian Forest (**Table 10**). All native strata are present, however the area has been under-scrubbed and some regeneration is required to enhance the fauna and flora values. This zone still has high resilience to recover from disturbance; therefore natural management will focus on removal of threats to allow for natural regeneration. If monitoring shows natural regeneration isn’t successful after five years, supplementary landscape plantings may be required.



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Table 10: Vegetation characteristics in management zone 2

VEGETATION TYPE	DOMINANT CANOPY SPECIES	MID STOREY SPECIES	GROUND COVER SPECIES
Inland Grey Box tall grassy woodland on clay soils in the Brigalow Belt South and Nandewar Bioregions	<i>Eucalyptus microcarpa</i> , <i>E. populnea</i> , <i>E. blakelyi</i>	<i>Geijera parviflora</i> , <i>Callitris glaucophylla</i> , <i>casuarina cristata</i> , <i>Capparis mitchellii</i>	<i>Aristida benthamii</i> , <i>Austrostipa ramosissima</i> , <i>Gonocarpus elatus</i> , <i>Chloris truncata</i> , <i>Wahlenbergia spp.</i>
Red Ironbark-Brown Bloodwood Shrubby Woodland	<i>Eucalyptus. fibrosa</i> , <i>Corymbia trachyphloia</i> ssp. <i>Amphistomatica</i> , <i>E pilligaensis</i> , <i>E. Albens</i>	<i>Callitris glaucophylla</i> , <i>Bertya opposens</i> , <i>Casuarina cristata</i> , <i>Acacia deanei</i>	<i>Aristida spp.</i> , <i>Eragrostis brownie</i> , <i>Cheilanthes sieberi</i> , <i>Goodenia hederacea</i> , <i>Homoranthus flavescens</i> , <i>Dianella revolute</i>
River Oak Riparian woodland of the Brigalow Belt South and Nandewar Bioregions	<i>Casuarina cunninghamiana</i> , <i>C. cristata</i> , <i>E. populnea</i>	<i>Eremophila mitchellii</i> , <i>Myoporum montanum</i> , <i>Geijera parviflora</i> , <i>Acacia penninervis</i> , <i>Notelaea microcarpa</i>	<i>Aristida benthamii</i> , <i>Austrostipa aristiglumis</i> , <i>A. ramosissima</i> , <i>Dichondra repens</i> , <i>Glycine clandestina</i> , <i>Gonocarpus elatus</i> , <i>Einadia trigonos</i> , <i>Cheilanthes sieberi</i>

Management actions in this zone include:

- Conduct baseline flora and fauna surveys to identify original reference condition for measuring future changes in condition, and to inform extent and location of weed management interventions (**Section 6.2.5**);
- Periodic, light grazing is permitted if actively managed to balance the objectives of overstorey regeneration, agricultural weed suppression and bushfire management. Temporary stock exclusion fencing will be required to protect high conservation areas (zone 1) and isolated vegetation remnants on the 'Omeo' and 'Greylands' properties (owned by NCOL). In the mid-term (>5yrs) grazing will be excluded to accommodate supplementary plantings or promote further maturation of natural regeneration. Grazing removal to be timed to coincide with maximum native ground cover (typically associated with seasonal rains in mid-late summer) and minimum exotic species dominance of ground cover to avoid interim deterioration of condition and avoid resource competition for the Superb Parrot;
- Management of human disturbance including signage at external access points to the BOA (and compliance checks) to prevent unauthorised entry/use;
- Retain dead timber including standing and fallen (prevent fire wood collection) to protect habitat niches;
- Weed removal to support adjacent core areas (Management Zone 1);
- Feral animal management to support adjacent core areas. Targeted control of foxes, rabbits, goats and pigs required across whole BOA preferably in conjunction with SFNSW vertebrate pest control activities; and



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- Revegetation plantings will be undertaken in instances where monitoring indicates that natural regeneration is poor after five years (refer to **Section 9** Inspections). Revegetation species selection, density and methods are outlined in **Section 6.2.13**.

6.1.3 Management Zone 3

Management zone 3 is approximately 18 hectares of derived native grassland of Pilliga Box - Poplar Box- White Cypress Pine grassy open woodland on alluvial loams (**Table 11**). It is restricted to the eastern boundary of Lot 63 Dp 757114. The management objectives in this zone are to improve biodiversity values and restore structural integrity to the remnant vegetation. Regeneration of both the shrub and canopy layers was observed to be occurring, particularly along the edges of the adjoining woodland. White Cypress Pine has the potential to vigorously regenerate and dominate areas such as this.

Table 11: Vegetation characteristics in management zone 3

VEGETATION TYPE	DOMINANT CANOPY SPECIES	MID STOREY SPECIES	GROUND COVER SPECIES
Pilliga Box - Poplar Box- White Cypress Pine grassy open woodland	Absent	Absent	<i>Bothriochloa decipiens</i> , <i>Cymbopogon refractus</i> , <i>Cheilanthes sieberi</i> , <i>Sporobolus creber</i> , <i>Aristida spp</i>

Management actions in this zone include:

- Conduct baseline flora and fauna surveys to identify original reference condition for measuring future changes in condition, and to inform extent and location of weed management interventions (**Section 6.2.5**);
- Periodic, light grazing permitted if actively managed to maintain ground cover to prevent further weed infestation. Periodic grazing will assist in agricultural weed suppression if removal to be timed to coincide with maximum native ground cover (typically associated with seasonal rains in mid-late summer) and minimum exotic species dominance of ground cover to avoid interim deterioration of condition. Temporary stock exclusion fencing will be required to protect high conservation areas (zone 1). In the mid-term (>5yrs) grazing will be excluded to accommodate supplementary plantings or promote further maturation of natural regeneration;
- Management of human disturbance including signage at external access points to the BOA (and compliance checks) to prevent unauthorised entry/use;
- Weed control through conservation grazing and or regular slashing for environmental weeds. Targeted control of noxious weeds as required;
- Feral animal management to support adjacent core areas. Targeted control of foxes, rabbits, goats and pigs required across whole BOA preferably in conjunction with SFNSW vertebrate pest control activities; and
- Strategic revegetation plantings of canopy and mid storey species will be undertaken following weed control. Revegetation species selection, density and methods are outlined in **Section 13**.

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6.2 MANAGEMENT ACTIONS

6.2.1 Management of Aboriginal Cultural Heritage Items/Sites

Aboriginal Cultural items/sites in the onsite offset areas within the Mine Lease boundary will be managed in accordance with the NCOPL Aboriginal Cultural Heritage Management Plan (ACHMP). The following management measures are reproduced from the NCOPL ACHMP:

- In areas where there is a low potential for archaeological material and the disturbance footprint is considered minor, e.g. soil stripping in areas previously cleared for agriculture and >100 meters from a drainage line, NCOPL will undertake these works without the presence of site monitors. In areas other than those outlined above, NCOPL will invite a representative member of the Narrabri LALC and representative member of the Gomerioi Narrabri People to monitor areas subject to soil stripping activities;
- In the event of the discovery of a potential site or artefact, the following procedure will be followed.
 1. Work will cease in the area of discovery.
 2. If the area of discovery is in deposited material, then work will also cease in the area where the material originated from.
 3. The person discovering the artefact will notify the Property Manager who will ensure that work has ceased and area(s) is(are) cordoned off with tape.
 4. The Property Manager will:
 - (a) request a qualified archaeologist to attend the site and advise on its archaeological significance;
 - (b) request the site monitor from the Narrabri LALC and the Gomerioi Narrabri People if not already present to attend and advise on its cultural significance in consultation with the qualified archaeologist; and
 - (c) if the find is determined to be a site, notify the OEHL with the advice from the archaeologist and the Narrabri LALC and Gomerioi Narrabri People for determination of further procedures.
 5. If the find is confirmed as a site, the archaeologist will complete a Sites Register Card and forward to the OEHL for inclusion on the Aboriginal Heritage Information Management System (AHIMS) database.
 6. Subject to the recommendations of the archaeologist, the Narrabri LALC and Gomerioi Narrabri People, the appropriate permit to transfer (under Section 85A of the *National Parks and Wildlife Act 1974* (NPW Act)) will be applied for prior to further work being undertaken in the vicinity of the site. Any such action to disturb or transfer Aboriginal items will also require the development of excavation and/or salvage plans, which require the approval of the Director-General, in consultation with OEHL.
 7. The Property Manager will implement any other procedures or recommendations issued by the OEHL.
- Should any bone(s) be uncovered, work should cease immediately in the area of the find, a suitably qualified person should be contacted to clearly identify the bone(s). If the bone(s)



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cannot be identified as animal bones, the police and Aboriginal stakeholder representatives will be advised of the discovery. Work will not recommence until both the police and the representatives of the Aboriginal community have given their permission to do so.

- Failure to report a discovery and those responsible for the damage or destruction occasioned by unauthorised removal or alteration to a site or to archaeological material may be prosecuted under the NPW Act (as amended).

Aboriginal Cultural items/sites in the onsite offset areas that are outside of the Mine Lease boundary will be managed in accordance with the “*NSW Minerals Industry Due Diligence Code of Practice for the Protection of Aboriginal Objects*”, developed by the NSW Minerals Council in 2010.

This minerals industry due diligence code of practice outlines six (6) steps that should be followed for surface disturbance works. These steps are outlined below and will be adopted for surface disturbance works on the ‘Kenna’ BOA:

Step 1: Check for records of Aboriginal Objects and Places in the Area of Proposed Activity. This will be undertaken utilising the Aboriginal Heritage information Management System (AHIMS) and the list of Aboriginal Places on the OEH website.

Step 2: Is the Activity a ‘Low Impact Activity’, as Defined by the NPW Regulation? ‘Low Impact Activities’, as defined by the *National Parks and Wildlife Amendment Regulation 2010* (NPW Regulation), may be undertaken without the need for due diligence, e.g. land management activities such as maintaining existing fences. It is important to note that the ‘Low Impact Activity’ does not apply where scarred trees are present and that a search as mentioned in Step 1 will be undertaken prior to any surface disturbance activities.

Step 3: Are there any Landscape Features on Undisturbed Land that are Likely to Indicate the Presence of Aboriginal Objects? Further investigations will be required if the proposed activity is not on disturbed land and is: within 200m of waters; located within a sand dune system; located on a ridge top, ridge line, or headland; located within 200m below or above a cliff face; and/or within 20m of or in a cave, rock shelter, or a cave mouth.

Step 4: Does a Desktop Assessment and Visual Inspection Confirm that there are Aboriginal Objects Present or Likely to be Present? If there is undisturbed land and landscape features mentioned above then a desktop assessment and visual inspection will be required. The visual inspection should be conducted by a person with expertise in locating and identifying Aboriginal objects.

Step 5: Can the Activity be Relocated Away from the Known/Likely Area for Aboriginal Objects? Relocation of the activity is the preferred alternative where Aboriginal objects are present, or a likely to be present. If it is not possible to move the activity then further assessment and consideration of an Aboriginal Heritage Impact Permit (AHIP) application should be made. Any culturally modified trees will remain *in situ*.

Step 6: Commence Investigations for an AHIP. Professional advice will be sought to prepare an AHIP application required under the *National Parks and Wildlife Act 1974* (NPW Act).



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In addition to the above, in the event of the discovery of a potential site or artefact, the following procedure will be followed.

1. Work will cease in the area of discovery.
2. If the area of discovery is in deposited material, then work will also cease in the area where the material originated from.
3. The person discovering the artefact will notify the Property Manager who will ensure that work has ceased and area(s) is(are) cordoned off with tape.
4. The Property Manager will:
 - (a) request a qualified archaeologist to attend the site and advise on its archaeological significance;
 - (b) request the site monitor from the Narrabri LALC and the Gomeroi Narrabri People if not already present to attend and advise on its cultural significance in consultation with the qualified archaeologist; and
 - (c) if the find is determined to be a site, notify the OEH with the advice from the archaeologist and the Narrabri LALC and Gomeroi Narrabri People for determination of further procedures.
5. If the find is confirmed as a site, an AHIP will be applied for as outlined in Step 6 above.

6.2.2 Management of human disturbance/restricting access

Unauthorised access to the BOA will be prohibited and actively enforced by NCOPL. This will prevent soil disturbance, weed dispersal, fauna habitat disturbance and illegal rubbish dumping. Avoiding soil disturbance is an effective means to prevent weed establishment (McIntyre et al. 2002)

NCOPL will appoint a Biodiversity Offset Area Property Manager who will be responsible for coordinating the implementation and reporting on all aspects of this management plan. The approval of the Property Manager must be obtained for any access to or activities on or in the BOA. Personnel will only be permitted into the offset area to undertake management and monitoring actions identified through this BOMP.

6.2.3 Fencing and signage

NCOPL will maintain external fencing around the entire BOA to restrict human and stock access. Signage will be erected to identify the site as a BOA and prohibit 4WD, trail bikes, rubbish dumping, camping, shooting, fires and unauthorised access. The signage will be supplemented by a direct communication strategy with mine site staff, adjoining landholders and mine site contractors to encourage compliance and support for conservation objectives.

Temporary stock exclusion fencing is recommended to manage grazing pressure and enable natural regeneration. Barbed wire is not recommended for new temporary, internal fencing. The long term objective will be to remove all internal fencing to minimise obstructions to fauna movements.

6.2.4 Management of grazing for conservation

Light, periodic grazing is permitted in Zone 2 and 3 to suppress weeds. In the mid- term grazing will be excluded from the BOA once weed infestations have been minimised and plantings completed.



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6.2.5 Weed control

There are two aspects to weed control in the BOA:

1. General control of environmental weeds; and
2. Targeted control of noxious weeds

The removal and on-going control of noxious and environmental weeds will be undertaken to improve the condition of remnant vegetation in the BOA. Baseline condition surveys will be conducted as part of this BOMP and will inform the type and extent of weed infestations on site.

The proposed weed control strategy involves:

- Mapping and control of all noxious weeds across BOA;
- Conservation grazing management to suppress environmental and pasture weeds in Zones 2 and 3. Alternative control for environmental weeds in open areas is regular slashing to prevent seed dispersal and reduce competition for native species;
- Maintenance of ground cover in grazed areas to prevent new infestations. Grazing to be selectively removed to facilitate maximum native ground cover;
- Spot spraying infestations of environmental weeds using a selective herbicide prior to flowering;
- Spot spraying of environmental weeds as part of annual works program with a minimum three years consecutive control of persistent infestations to reduce seed bank;
- Specific spot spraying events ahead of planting schedule (to minimise competition for newly established plants); and
- Follow up work will be required for all species to control new growth.

6.2.6 Bushfire management

Prescribed Burning Regime

No prescribed burning will be implemented in Management Zones 2 & 3 until planted trees are mature and able to withstand the impact of fire. Prescribed burning may be conducted in Zone 1 in liaison with the Rural Fire Service (RFS). Burns should be low intensity ground burns only. Recommended fire intervals for 'dry sclerophyll forest (shrub/grass formation)' intervals range from five years to fifty years (Bush Fire Coordinating Committee 2008).

Small fire breaks will be maintained along existing or new fence lines installed as part of this BOMP. These breaks will double as access for the RFS in the event of wildfire, and will be maintained annually by slashing the fire breaks.

Any wildfires that do occur in the BOA in the interim will be managed through an appropriate response from the RFS to extinguish or contain the spread of the fire.

Fire Fighting Equipment

NCOPL will maintain a suitable fire control unit on site to address and control any fire outbreaks in conjunction with the local RFS brigade. In particular:



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- A provision of fire equipment will be kept on-site in accordance with the requirements of NSW Coal Mines Health and Safety Regulation 2008;
- All fire fighting equipment will be kept in operational condition and routinely inspected to ensure that equipment is operational; and
- Location of watering points will be mapped across the BOA.

6.2.7 Retention of regrowth and remnant native vegetation

Natural regrowth of remnant vegetation will be preferentially retained to promote recovery of native vegetation. Dense patches of native regrowth will be allowed to self-thin unless thinning is recommended by a qualified restoration ecologist. Clearing native vegetation in the BOA will not be permitted.

Exceptions to this rule include maintenance of fence lines and management tracks associated with the BOA. For example if a tree or shrub is growing through or falls on the fence line this will damage the fence and potentially provide access for livestock to the offset area. This vegetation will be removed using minimal disturbance techniques. All waste from the clearance of this vegetation will remain in situ in the BOA away from any fence lines or management tracks.

6.2.8 Retention of dead timber

Dead standing and fallen timber will be retained in all Management Zones except in designated boundary fire breaks. This will provide micro habitats for roosting, breeding and shelter. In addition to fauna habitat for insects, reptiles, birds, and mammals, fallen timber is recognised as an important successional habitat for specialised colonising plants (DEC 2003).

6.2.9 Erosion & sedimentation control

Erosion and sediment control is required along drainage lines and around the agricultural dam in the north east. Erosion will be controlled through:

- Periodically monitor the status of creek lines to identify significant erosion hotspots that require remediation (methods may include retaining natural snags to slow water velocity, battering off steep areas, jute matting and rock lining of creek banks); and
- Increase vegetation cover in the creek lines and on the banks, making them more stable and less vulnerable to soil erosion.

Control of grassy or herbaceous weeds along the creek lines will be selective until there is greater than 50% cover of native vegetation, as all vegetation cover (native and exotic) will aid in the stabilisation of the creek line. Selective weed control works will be required to prevent the creation of bare areas of soil. All woody weeds found occurring in the creek line will be controlled by the cut and paint method as this will retain the root structure of the plant in the bank and assist in holding the soil together. Woody debris from weed control is to be left in the creek bed provided the species cannot shoot from vegetative material.

6.2.10 Soil and water management

There are currently no soil and water management actions required outside of erosion and sedimentation control measures outlined above.

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6.2.11 Retention of rocks

All rocky habitat in the BOA will be retained and will not be removed for any purpose.

6.2.12 Vertebrate Pest Management Program

Control of feral animals and over abundant native herbivores will be undertaken in all zones of the BOA. The total grazing pressure from native and feral animals will be monitored annually and an adaptive management approach used. A Vertebrate Pest Management Program will be developed in consultation with adjoining landholders for maximum efficacy. The proposed strategy includes:

- Poisoning and/or capture of feral pigs and goats using fenced areas around water holes. Firearms are not permitted in the Mining lease.
- Obtaining a permit from OEH for controlled culling (by shooting) Eastern Grey Kangaroos on surrounding NCOPL owned land not within the Mining lease, if required.
- Fox baiting using buried 1080 poison or Pindone bait stations with safety precautions. Fox control will be undertaken through a baiting programme across the BOA as necessary. Fox control should be undertaken in autumn, when young foxes are leaving the den and dispersing and in spring, when foxes are breeding.
- Rabbit control by warren destruction and Pindone baits in bait stations.

The feral animal control strategy will consider potential adverse impacts to the Superb Parrot which is vulnerable to poisoning from rabbit and fox baiting (Baker-Gabb 2011). Surface ground baiting will not be permitted in the BOA.

6.2.13 Revegetation strategy

The Revegetation Strategy uses two approaches to encourage and establish native vegetation across the BOA (natural regeneration and landscape planting).

The approach recommended for each zone applies adaptive management principles;

- Zone 1: Natural regeneration to be facilitated by weed and stock management. No planting is proposed
- Zone 2: Natural regeneration to be facilitated by weed and stock management. Landscape planting will only be undertaken to re-establish understorey species if natural regeneration is not observed after five years of commencement of stock exclusion.
- Zone 3: Landscape planting of canopy and midstorey species will be undertaken to improve native species richness after control of pasture weeds

Wherever possible, the seed for the planting program will be collected from the BOA. Seeds should be prepared for planting as 'Hiko' tube stock by a specialist native species propagation nursery.

Areas to be planted with tube stock are to be deep ripped to 500 mm followed by topsoil cultivation. Weed control including knockdown and pre-emergent herbicide are likely to be required prior to and after planting. Tube stock in 'Hiko' cells are to be planted in autumn and spring to capitalise on greater soil moisture and reduced heat stress with follow up watering as required.

Plant density will depend on the amount of existing vegetation and the results of natural regeneration. All vegetation types are to be managed towards the benchmark range canopy cover per Biometric



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vegetation type (**Table 12**). Planting is recommended with one tree every 10 metres. The objective canopy cover is between 25-40% for the Pilliga Box - Poplar Box- White Cypress Pine grassy open woodland on alluvial loams mainly of the temperate (hot summer) climate zone (Benson 88) vegetation type. This planting density allows for time lag to maturation and mixed success of plantings over time. Planting configuration should reflect natural density and patchiness in other parts of the BOA.

Species selection will be determined by parent vegetation type.

Table 13 outlines recommended species for each vegetation type based on previous floristic surveys and regional vegetation profiles (ELA 2009).



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Table 12: Biometric benchmark values per vegetation type

VEG TYPE NAME	NATIVE OVER- STOREY COVER*	NATIVE MID- STOREY COVER *	NATIVE GROUND COVER* (grasses)	NATIVE GROUND COVER (shrubs) *	NATIVE GROUND COVER * (other)	NATIVE PLANT SPECIES RICHNESS
Inland Grey Box tall grassy woodland on clay soils in the Brigalow Belt South and Nandewar Bioregions	6-25	3-20	20-30	0-0	3-5	25
Pilliga Box - Poplar Box- White Cypress Pine grassy open woodland on alluvial loams mainly of the temperate (hot summer) climate zone (Benson 88)	25-40	6-25	20-30	3-10	3-5	30
Red Ironbark - Brown Bloodwood shrubby woodland of the Brigalow Belt South Bioregion	25-40	6-25	20-30	3-10	3-5	30
River Oak Riparian woodland of the Brigalow Belt South and Nandewar Bioregions	10-40	1-60	1-35	1-10	3-20	21
Rough-barked Apple riparian forb/grass open forest of the Nandewar Bioregion	6-25	0-5	30-40	3-10	3-5	25

Cover as % (DECC 2008a)



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Table 13: Recommended species for revegetation by vegetation type

VEGETATION TYPE	OVERSTOREY	MID-STOREY	UNDERSTOREY (GRASSES)	UNDERSTOREY (HERBS/FORBS)
Inland Grey Box tall grassy woodland on clay soils in the Brigalow Belt South and Nandewar Bioregions	<i>Eucalyptus microcarpa</i> , <i>E. populnea</i> , <i>E. blakelyi</i>	<i>Geijera parviflora</i> , <i>Callitris glaucophylla</i> , <i>casuarina cristata</i> , <i>Capparis mitchellii</i>	<i>Aristida benthamii</i> , <i>Austrostipa ramosissima</i> , <i>Austrostipa verticillata</i> , <i>Chloris truncata</i> , <i>Bothriochloa macra</i>	<i>Gonocarpus elatus</i> , <i>Chrysocephalum semipapposum</i>
Pilliga Box - Poplar Box- White Cypress Pine grassy open woodland on alluvial loams mainly of the temperate (hot summer) climate zone (Benson 88)	<i>Eucalyptus pilligaensis</i> , <i>E. populnea ssp. bimbil</i> , <i>Callitris glaucophylla</i> , <i>E. crebra</i>	<i>Geijera parviflora</i> , <i>Allocasuarina luehmannii</i> , <i>Alectryon oleifolius</i> , <i>Myoporum</i> , <i>Montanum</i> , <i>Acacia deanei</i> , <i>Eremophila mitchellii</i> , <i>Dodonaea viscosa ssp. viscosa</i>	<i>Bothriochloa decipiens</i> , <i>Sporobolus creber</i> , <i>Aristida spp</i>	<i>Einadia nutans</i> , <i>Enchylaena tomentosa</i>
Red Ironbark - Brown Bloodwood shrubby woodland of the Brigalow Belt South Bioregion	<i>Eucalyptus fibrosa</i> , <i>Corymbia trachyphloia ssp. amphistomatica</i> Minority species <i>E. blakelyi</i> , <i>E. Dwyeri</i> ,	<i>Callitris glaucophylla</i> , <i>Acacia cheelii</i> , <i>Acacia burrowii</i> , <i>Philotheca ciliata</i> <i>Boronia</i> , <i>Bertya opposens</i> , <i>Casuarina cristata</i> , <i>Acacia deanei</i>	<i>Aristida spp.</i> , <i>Eragrostis brownie</i> , <i>Austrostipa scabra</i> , <i>Panicum effusum</i>	<i>Dianella revolute</i> , <i>Actinotus helianthi</i>
River Oak Riparian woodland of the Brigalow Belt South and Nandewar Bioregions	<i>Casuarina cunninghamiana</i> , <i>C. cristata</i> , <i>E. populnea</i>	<i>Eremophila mitchellii</i> , <i>Myoporum montanum</i> , <i>Geijera parviflora</i> , <i>Acacia penninervis</i> , <i>Notelaea microcarpa</i>	<i>Aristida benthamii</i> , <i>Austrostipa aristiglumis</i> , <i>A. ramosissima</i> ,	<i>Dichondra repens</i> , <i>Gonocarpus elatus</i> , <i>Einadia trigonos</i> , <i>Lomandra longifolia</i>
Rough-barked Apple riparian forb/grass open forest of the Nandewar Bioregion	<i>Eucalyptus blakelyi</i> , <i>Angophora floribunda</i> , <i>Callitris glaucophylla</i> , <i>C. Endlicheri</i> , <i>Casuarina cunninghamiana</i>	<i>Brachychiton populneus</i> , <i>Notelaea microcarpa</i> , <i>Leptospermum polygalifolium</i> , <i>Acacia implexa</i> <i>Dodonaea viscosa ssp. angustifolia</i> , <i>Bursaria spinosa</i> , <i>Acacia decora</i> , <i>Acacia deanei</i>	<i>Aristida spp.</i> , <i>Cymbopogon refractus</i> , <i>Arundinella nepalensis</i> , <i>Microlaena stipoides</i> , <i>Imperata cylindrica var. major</i>	<i>Dianella revolute</i> , <i>Lomandra longifolia</i> , <i>Carex appressa</i>



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7 Risk Assessment

The following risk assessment considers impact of risks from management actions in the BOA. The risk model is based on the Australian Standard ISO 31000:2009 (Standards Australia 2009) and the project Environmental Assessment (RW Corkery 2009). In addition to NCOPL policy, this risk assessment addresses OEH Offset Principle 6 to manage ‘uncertainties and risks associated with actions such as revegetation’.

Risk is defined as the effect of uncertainty on objectives (Standards Australia 2009). The likelihood of risk occurring and the level of impact of that risk are used to assess each risk and inform management responses (**Table 14**). The higher the risk score, the more urgent the response. Red colour denotes High environmental significance requiring immediate substantial action. Orange colour denotes Moderate environmental significance requiring substantial action within 3-6 months. Yellow colour denotes Moderate environmental significance requiring substantial action within 6-12 months.

Table 14: Risk assessment of non-achievement of management plan objectives

		Likelihood of risk occurring		
		Certain	Likely	Less Likely
Level of Environmental impact	High	9	6	3
	Moderate	6	4	2
	Low	3	2	1

To address the risks identified in **Table 14** the Property Manager will:

1. Educate NCOPL staff, contractors and neighbouring properties of the BOA objectives and location
2. Avoid potential impacts by following the recommended protocol in this BOMP for each management action
3. Mitigate potential impacts by regular monitoring (**Section 8 & 9**) and applying corrective action under an adaptive management framework
4. Report incidences and responses in the Annual Report (**Section 11**) to facilitate managerial review and if necessary trigger systemic change of practices.



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Table 15: Risk assessment

ENVIRONMENTAL ISSUE	RISK SOURCE/POTENTIAL INCIDENTS	POTENTIAL CONSEQUENCE	RECEPTOR/SURROUNDING ENVIRONMENT	POTENTIAL ENVIRONMENTAL IMPACTS	LIKELIHOOD	IMPACT	RISK SCORE	PROPOSED RISK CONTROL(S)
Revegetation	Failure of natural regeneration	Reduced biodiversity values	Remnant vegetation	Unimproved vegetation condition	Likely	Moderate	4	Stock removal. Supplementary landscape plantings
		Additional cost resourcing	Derived Native grasslands		Likely	Moderate	4	Supplementary landscape plantings
	Failure of revegetation plantings	Repeat plantings required	Derived Native grasslands		Likely	Moderate	4	Adequate ground preparation/weed suppression prior to plantings. Plant quality stock. Follow up watering regularly during establishment
Weed control	Spray drift causing accidental death of native flora	Death of native flora	Remnant vegetation	Decreased native species richness in local patches	Likely	High	6	Use experienced contractors. Inform contractors of BOA objectives. Avoid spot spraying in high wind conditions.



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ENVIRONMENTAL ISSUE	RISK SOURCE/POTENTIAL INCIDENTS	POTENTIAL CONSEQUENCE	RECEPTOR/SURROUNDING ENVIRONMENT	POTENTIAL ENVIRONMENTAL IMPACTS	LIKELIHOOD	IMPACT	RISK SCORE	PROPOSED RISK CONTROL(S)
	Misidentification of exotic species				Less likely	Low	1	Use experienced, qualified contractors.
Feral Animal control	Accidental poisoning	Death of native fauna	Native fauna	Reduced fauna population	Less likely	High	3	Address fauna conflicts in preparation of feral animal control plan. Use alternative methods than poisoning e.g. den ripping, shooting.
Management of disturbance sources	Unauthorised access	Soil disturbance/compaction	Native ground cover	Increased opportunity for weed invasion	Less likely	Low	1	Install signage to prohibit unauthorised access. Periodic compliance checks. Internal and external education strategy.
		Trampling vegetation		Delayed regeneration	Less likely	Low	1	
		Timber removal	Remnant vegetation (alive/dead)	Reduced fauna habitat	Less likely	High	3	
		Rubbish dumping	BOA	Vegetation smothering Reduced habitat	Less likely	Moderate	2	



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ENVIRONMENTAL ISSUE	RISK SOURCE/POTENTIAL INCIDENTS	POTENTIAL CONSEQUENCE	RECEPTOR/SURROUNDING ENVIRONMENT	POTENTIAL ENVIRONMENTAL IMPACTS	LIKELIHOOD	IMPACT	RISK SCORE	PROPOSED RISK CONTROL(S)
				values				
		Cattle grazing	Remnant vegetation	Restricted regeneration Trampling Resource competition	Less likely	High	3	Maintain existing fences and install stock exclusion fencing as required.
		Weed dispersal	BOA	Weed infestations	Less likely	Moderate	2	Apply Introduction to Site protocols for any equipment when moving into and out of BOA
Bushfire Management	Wildfire	Death of native flora/fauna	BOA	Delayed 'improve or maintain' outcomes	Less likely	High	3	Regular liaison with local RFS brigade and mine site fire control officer. Maintain fire equipment on adjacent mine site. Maintain staff fire fighting training.
		Death of young plantings	Revegetation areas		Less likely	High	3	



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8 Monitoring

The management of this BOA is designed to be part of an adaptive management framework to achieve conservation objectives in a cost-effective manner. The objective of the monitoring program is to evaluate the vegetation and fauna habitat condition in the BOA to identify where rehabilitation is performing poorly and additional actions are required. The performance criteria by which the success of the conservation actions will be measured are listed in **Table 8**.

Monitoring will be undertaken over a period of 20 years in compliance with EPBC Approval Condition 2(e). Should the key completion criteria not be met in this timeframe or if some environmental event delays the recovery of the offset area, e.g. bushfire, NCOPL will continue to manage the offset area until the completion criteria are met. Once this is achieved, the offset area will then be managed in perpetuity via the security mechanism which is yet to be finalised. The monitoring program is based on sound statistical principals and is generally consistent with the standard flora and fauna assessment guidelines (DECC 2004). The monitoring program is broken up into the following components of annual visual inspections, annual flora and annual fauna monitoring.

8.1 FLORA MONITORING

The Flora Monitoring program outlined is comprised of two elements;

1. General flora monitoring; and
2. Targeted survey of the abundance and health for *Bertya opposens*

8.1.1 General Flora Surveys

The general flora monitoring is consistent with the flora monitoring on the off-site BOA and the woodland and riparian vegetation monitoring for Longwall panels 101-105 on the adjacent mine site (**Section 7.2** in ELA 2012c). This flora monitoring approach has been adapted from the NSW Biobanking assessment methodology (DECC 2009) and new National Protocol for Measuring Change in Vegetation Condition in Caring for Country projects (ELA 2012d). The methods differ slightly from the Biobanking methods in the units measured, however, all units may be calculated for equivalency to Biobanking if required, with the exception of count of hollow bearing trees which may be collected in addition to the attributes in Error! Reference source not found. The benefit of consistent monitoring approaches is the ability to share control sites and to build a cumulative picture of biodiversity values across the Mine Lease.



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Table 16: Ecological attributes to be measured in monitoring plots

THEME	ATTRIBUTE	DESCRIPTION
Native overstorey (canopy)	Cover	Measured as Projected Crown Cover along a 100m transect Measured as Projected Foliage Cover under three canopies
	Health	Categorised into four simple categories based on proportion of canopy dieback
	Richness	List of native overstorey species (including emergents)
	Recruitment	Presence/absence of trees in the juvenile and sapling diameter classes
Native midstorey (shrub and small tree)	Cover	Measured as Projected Crown Cover along a 100m transect
	Richness	List of native midstorey species
Native ground layer	Cover	Measured as Projected Foliage Cover of native groundcover plants at each of 100 points along a 100 m transect
	Richness	List of native groundcover species
Exotic species	Cover	Measured as Projected Crown Cover along a 100m transect for exotic canopy and exotic midstorey species. Measured as Projected Foliage Cover at each of 100 points along a 100 m transect in exotic ground layer species.
	Richness	List of exotic flora species
Groundcover	Large woody debris	Measured in the sub-plot as the total number and combined length of all sections of dead fallen timber ≥ 10 cm diameter, ≥ 0.5 m in length, and completely detached from living or dead standing trees
	Organic litter	Recorded as a 'hit' or 'miss' at each of 100 points along a 100 m transect, then calculated as % litter cover
	Cryptograms	Recorded as a 'hit' or 'miss' at each of 100 points along a 100 m transect, then calculated as cryptogram
	Bare ground	Recorded as a 'hit' or 'miss' at each of 100 points along a 100 m transect, then calculated as bare ground
	Rock	Recorded as a 'hit' or 'miss' at each of 100 points along a 100m transect, then calculated as rock



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Table 17: Sampling units

ATTRIBUTES MEASURED	SAMPLING UNIT
Photo Point	Point from which plot is located and oriented, and from which plot image is recorded 5 m back behind reference point (taken after plot laid out)
Reference point	Site marker post with ID tag and flagging tape attached
Alignment Point	Positioned 20 m from photo point along the transect
Baseplot (100 m x 20 m)	Native canopy health Native and exotic canopy species Native and exotic midstorey species (shrub and small tree) Large tree density (native species only) Recruitment of native canopy species
Subplot (20 m x 20 m)	Native and exotic ground layer species Coarse woody debris
Transect (100 m)	Native canopy cover Native midstorey cover Native groundcover Exotic cover Organic litter Cryptogram Rock Bare ground

It is proposed that field surveys in permanent plots will occur annually and will be supplemented with additional photo monitoring. Field survey is to be undertaken in spring to maximise the detection of cryptic species.

The location of permanent plots will be determined in conjunction with the results of baseline surveys. Plots should be located applying a random, stratified sampling regime. The BOA will be divided into eight strata (environmental sampling units) based on vegetation type, condition, management zone and location. To determine plot locations in the first round of survey, random points are allocated in each strata on a field map prior to field surveys to avoid potential sampling bias.

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A Before-After-Control-Intervention (BACI) design is recommended for flora monitoring to enable comparison of changes in vegetation condition against baseline data collected on site and between sites that are actively managed and sites that are not. This will measure changes effected by interventions and the variability due to prevailing climatic conditions to provide a more useful management measure of the amount and need for intervention measures. As biometric benchmark data (Table 12) are quite broad, local reference sites may be used as benchmarks but must be in similar vegetation type/condition and not be subject to management interventions. For practical purposes, reference sites may be located on the BOA, on the adjacent mine site in areas not subject to direct impacts or in the adjacent Jacks Creek State Forest. A total of sixteen (16) flora monitoring sites will be required to measure changes to vegetation condition in control and intervention sites. The total number of permanent sites may be varied following baseline surveys **Table 16** and **17**).

8.1.2 Targeted Flora Surveys

Targeted surveys for *Bertya opposens* will occur concurrently in Red Ironbark – Brown Bloodwood Shrubby Woodland. Species counts of *Bertya opposens* will be undertaken along the 100m transects in the permanent plots. Additional random meander transects in suitable habitat will be undertaken in the BOA. Survey effort involves traversing the area, recording the GPS track and spot location and spot count of *Bertya opposens* encountered. The distribution and abundance of *Bertya opposens* will be mapped and reported in the annual report.

Flora monitoring plots are undertaken in a standard 100m by 20m plot as shown in **Figure 5**.

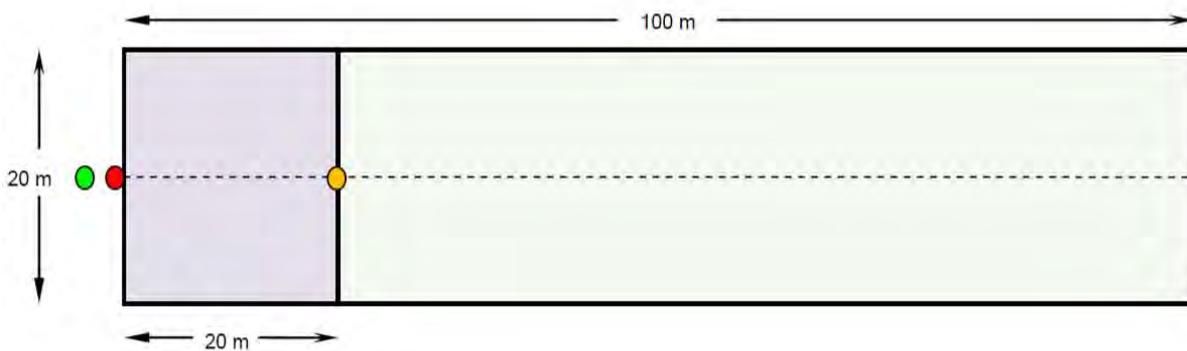


Figure 5: Plot design



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8.2 FAUNA MONITORING

The fauna monitoring program comprises three elements:

- General fauna surveys across all management zones;
- Quarterly inspections for presence of feral animal species; and
- Targeted surveys for threatened species likely to occur on site, including Superb Parrot in preferred habitat

Except for the quarterly visual inspections, fauna monitoring will be undertaken by appropriately qualified, licensed and trained ecologists.

8.2.1 General fauna surveys

The monitoring will sample each vegetation type and condition class (six locations). Control sites will be required to be established for each corresponding terrestrial fauna habitat area to allow for comparison. Control areas may correspond with those selected for long wall monitoring if they are similar vegetation type and condition. In total eight fauna sites will be surveyed in general fauna surveys.

The first year of monitoring will cover all species groups to establish baseline data sets for ongoing comparison (i.e. ongoing data collected will be directly comparable using the same methodology). Elliot trapping is not required in areas of derived native grasslands. All methods are applicable to Zones 1 and 2 throughout the monitoring program.

In zone 3 a stepped fauna monitoring program is recommended to account for recovery time in habitat values. Years two to ten will focus on woodland birds, microbats and reptiles in zone 3. These mobile species will provide more information on the progress of woodland restoration than other fauna groups, particularly in the first 10 years of restoration activity. An adaptive management approach will be applied if early surveys detect significant species e.g. quolls. Years ten to twenty will monitor the full suite of fauna using methods outlined in **Table 18** after DECC (2004).

For nocturnal bird monitoring, the standard survey methodology requires separation of 1km between sites (DECC 2004).

The location of the fauna monitoring sites will be selected at the most relevant vegetation monitoring sites for consistency. This will be established in consultation with the expert ecologists.

Table 18: Fauna monitoring methods and intensity in each vegetation community/condition class

METHOD	DETAIL	REQUIREMENT PER SITE	FREQUENCY	SEASON	LOCATION
Elliot traps	Small traps placed in straight lines on the ground, primarily to target small and medium sized mammals. Traps will be set for 3 consecutive nights	10 medium Elliot traps (Elliot A); 3 large cage traps.	1st year baseline and then 10th year* and then every third year after 10 years	Spring	All strata except DNG



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METHOD	DETAIL	REQUIREMENT PER SITE	FREQUENCY	SEASON	LOCATION
Hair funnels	At each site for a minimum of 4 nights and possibly set in habitat trees if present. These target small and medium sized mammals.	10 hair funnels.	1st year baseline and then 10th year* and then every third year after 10 years	Spring.	All strata
Spotlighting	Pedestrian spotlight survey, 2 nights at each site. Targets nocturnal mammals, birds, reptiles and amphibians.	1 hr spotlighting transect covering 1km distance. Repeated over 2 nights	Annually	Spring.	All strata
Call playback	Nocturnal broadcasting of calls, two nights at each site in conjunction with spotlighting. Targets nocturnal birds.	5 minutes of broadcasting plus 10 minutes listening.	Annually	Spring.	As necessary
Bat detection	Anabat recordings to identify microbat species occurring on site. 2 nights at each site	2 detector for 2 nights set for a minimum of 4 hrs	Annually	Spring.	All strata
Bird survey	Timed, fixed area surveys for diurnal birds, observing and listening.	20 minutes count morning and dusk over 2 days	Annually	Spring.	All strata
Herpetological searches	Timed, fixed area, direct searches for reptiles, scanning surfaces, rolling logs and rocks and raking leaf litter.	0.5 hrs searching of microhabitat on 2 separate days.	Annually	Spring.	All strata
Collection of scats	Collect scats and send to laboratory for analysis of predator and prey species.	Opportunistic.	In line with other activities	Year round.	All strata



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METHOD	DETAIL	REQUIREMENT PER SITE	FREQUENCY	SEASON	LOCATION
Quarterly visual inspections	Inspections by the Property Manager	General inspections of all areas	Quarterly or in response to incidents, e.g. bushfire	Year round	All strata

* - Lower frequency for the time taken for habitat development following vegetation establishment (hollows, logs and litter on ground) and slow response time of ground mammalian fauna.

8.2.2 Targeted Fauna Surveys

The terrestrial fauna and habitat monitoring will target threatened species listed under either the TSC Act and/or EPBC Act that are known to occur or potentially occur within the BOA area. Targeted fauna surveys will be undertaken in preferred habitat types for target species and will aim to sample habitat condition classes to enable measurement of improvements to biodiversity over time in response to management interventions. The location of surveys may correspond to general fauna survey sites in some cases.

Terrestrial fauna monitoring will focus on rapid approaches to species identification and notes on habitat use. Where suitable proxy measures for fauna (e.g. evidence of usage such as nests, scratching or scats) will also be assessed.

Targeted faunal groups for monitoring and methodologies for survey will be as per **Table 19**.

Table 19: Targeted fauna survey methods

PARAMETER	ANALYSIS	PURPOSE	SURVEY METHOD	SAMPLING FREQUENCY
Superb Parrot	Presence/absence Habitat usage	Establish presence and habitat usage	A standardised search with a stopping rule as per Watson (2004) will be used to survey for woodland birds at dawn and dusk. At each site, from a fixed point position, two randomly selected transects will be established. Birds will be recorded while walking in a meandering path along each transect, with all birds recorded either through observation or calls. All birds seen or heard will be recorded in 5 minute intervals and recording continued until no new species are recorded for three consecutive 5 minute periods	Baseline Annual in autumn
Grey-crowned Babblers	Presence/absence Habitat usage	Establish presence and habitat usage		Baseline Annual in spring
Woodland birds	Presence/absence Habitat usage	Establish presence and habitat usage		Baseline Bi-annual in spring & winter
Koalas	Presence/absence Habitat usage	Establish presence and habitat usage	Koala searches to be conducted at each mammal site and include observations along a transect line, identifying direct sightings, scratching and scats.	Baseline Annual in spring
Infra-red Camera	Mammal species diversity & feral animals	Establish presence and presence of	Infra-red Camera with a closed baited trap placed at each site over four nights.	Baseline Annual in spring



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PARAMETER	ANALYSIS	PURPOSE	SURVEY METHOD	SAMPLING FREQUENCY
		feral animals		

If new populations of existing threatened species or additional threatened species are identified through the course of monitoring or other observations, records will be assessed by a qualified ecologist to advise on any changes required to the management of the BOA. This may result in:

- Certain planned activities being postponed or modified;
- Modification of the monitoring program; or
- Immediate survey and assessment of the new record, and an assessment of the impact of any proposed revegetation activities on it.

If further threatened species or significant new records of existing threatened species are collected, the significance of such records will be reviewed, as will the likely impact of existing or proposed management activities, and any options for minimising impacts on these species.



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9 Inspections

In addition to the flora and fauna monitoring the Property Manager will ensure regular visual inspections of the whole BOA to detect:

- Disturbance factors including fire and unauthorised access e.g. fire wood collection;
- Presence of feral animal species;
- Grazing pressure from over-abundant native herbivores; and
- Presence of exotic weed species

Visual inspections will be undertaken at least quarterly or in response to incidents, e.g. bushfire, and may occur more frequently if disturbance is detected. Inspection results will be reported annually as part of the Reporting Protocol (**Section 11**).

The Vertebrate Pest Management Plan will incorporate a monitoring regime to assess the effectiveness of control programs.

10 Training

NCOPL staff working on the adjacent mine site will be informed of the establishment of the formal offset area, its location, boundaries and restricted access arrangements. NCOPL will ensure that all staff (and contractors) working in the vicinity of the BOA are aware of the site management objectives and the nominated property manager responsible for all actions in the BOA. The Property Manager will be responsible for the education of any personnel entering the BOA of the relevant management protocols in this BOMP that pertain to their reason for access. It is not envisaged that this will require formal training.

. Access from the State Forest is restricted with locked gates blocking access to NCOPL owned land.

Management actions with specific expertise require the use of trained personnel or contractors as set out in **Section 6**.



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11 Reporting

The annual BOA report will be incorporated into Narrabri Mines' Annual Environmental Management Report (AEMR)/Annual Review reporting period and will consist of two parts:

- Summary of the implementation of management actions within the BOMP including inspection results and review findings; and
- The results of the flora and fauna monitoring program.

11.1 BOMP IMPLEMENTATION

The annual BOMP implementation report will provide a summary of all the actions implemented during the previous year. Any significant events that occurred during the year (e.g. wildfire, outbreak of any weeds or incidence of any new threats) and any recommended changes to the management actions, their duration, intensity or relative priority identified through the annual review will be included.

11.2 VEGETATION MONITORING REPORTING

Annual vegetation monitoring reporting is to include a written summary of the methodology and the current year's findings for each vegetation plot, including the average results of each variable recorded. Photo monitoring records and field data sheets will be included in an appendix. A flora species list with corresponding plot numbers where species were recorded is also to be included in an appendix.

A discussion section is to be included that compares the results from the current monitoring year with previous years either through actual annual records or a mean value where several previous years are being compared. The annual report is to include statistical graphs illustrating changes in diversity and cover/abundance of each attribute recorded within each management zone.

11.3 FAUNA MONITORING REPORTING

The report is to include methods and results of fauna monitoring and significant findings, including any new records of threatened species. The results of monitoring will be analysed and compared to previous survey results to determine general population trends, including trends in the presence of feral animals. In the event that negative trends are identified indicating the decline of particular threatened species, appropriate amelioration measures will be recommended.

A fauna species list with corresponding transect numbers/survey site numbers where species were recorded will be included as an appendix.

A discussion section will be included that compares the species diversity results, as absolute numbers and grouped into various guilds representing the diversity of habitat types present from the current monitoring year with previous years will be compared.

The annual report will include statistical graphs and tables illustrating changes in the nocturnal birds, bats, diurnal birds and reptiles abundance and diversity over time. The key species groups targeted to be monitored includes:-



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Bats

Bat diversity will be measured in three different groups:

- Megachiropteran (i.e. Flying-foxes)
- Microchiropteran (micro bats) that forage in the sub canopy
- Microchiropteran that are canopy or above canopy forages

For each group the report will include a species list and species count. Statistical graphs or tables that illustrate changes in bat diversity in each of these three groups are to be developed for each monitoring plot.

Birds

Bird diversity is to be measured in three different groups:

- Raptors or birds of prey including nocturnal and diurnal
- Ground and shrub guild, including woodland birds such as finches, wrens and warblers including Pomatostomus temporalis temporalis (Grey-crowned Babbler)
- Generalists such as parrots including Superb Parrot and honeyeaters

For each group the report will include a species list and species count. Statistical graphs or tables that illustrate changes in avian diversity in each of these three groups are to be developed for each strata (vegetation type /fauna habitat type). Data will be summarised and reported by management zone to track trend in condition.

Reptiles

Reptile results will be reported as a species list and species count. Data will be reported by management zone to detect changes in reptile usage under different management regimes.

11.4 REPORT RECOMMENDATIONS AND CONCLUSION

A concluding section within the annual on-site BOA report that highlights and describes significant findings, either positive or negative, is to be prepared. Changes to any management recommendations for the following year will also be suggested.



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12 Review

PA 08_0144 and EPBC Act Approval 2009/5003 requires NCOPL to annually review performance against the BOMP and if necessary, revise the BOS/BOMP to the satisfaction of the Director-General and Federal Minister. To facilitate the annual review, a Review Protocol has been developed in Appendix F to be completed by the Property Manager. Annual reviews are conducted to assess the effectiveness of management strategies against the objectives of this BOMP. A review protocol for the BOMP will be completed annually in March of each year. The findings of the annual review of the BOMP will be reported to NCOPL management and in the AEMR/Annual Review, and if required the BOMP will be updated for DP&I and Federal Minister approval.

In general, the BOMP will be revised due to:

- Deficiencies being identified;
- Outcomes from the Annual Review;
- Recommendations from the Annual on-site BOA Report;
- Changing environmental requirements;
- Improvements in knowledge or new technology becomes available;
- Change in legislation or relevant approvals; or
- Change in the activities or operations associated with Narrabri Mine operations.

12.1 AUDITING

Schedule 6, Condition 7 of PA 08_0144 and Condition 9 of EPBC Act 2009/5003 approval requires an independent audit of this BOMP to be completed prior to 13 September 2010 and every three years thereafter paid for by NCOPL. A suitably qualified, experienced and independent person approved by the DP&I Director-General will assess the performance of the BOMP and recommend actions or measures to improve the performance of the BOMP.

As a minimum, this BOMP will be updated with the findings of either the annual reviews or independent audits and submitted to DP&I at a maximum of every three years for approval. A copy will also be provided to the Department of Sustainability, Environment, Water, Population and Communities, when available.



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13 Contingency Plan

Management requirements from the project conditions of approval set out in **Section 3** of this BOMP and actions contrary to the approved BOMP may require written Ministerial approval of the varied strategy. The monitoring program outlined in **Section 8** will detect changes in biodiversity values and enable reporting against the biodiversity management performance criteria in **Table 8**.

Contingency plans are required if issues of non-compliance, exceedence, or new information about species present comes to light.

The responsible agent for each incident, response management actions and reporting requirements are outlined in **Table 20**.

Table 20: Contingency plan

INCIDENT	RESPONSIBILITY	RESPONSE MANAGEMENT ACTION	REPORTING REQUIREMENTS
New information on BOA	BOA Property Manager	<ol style="list-style-type: none"> 1. Provide written advice to Approval Authorities for all new threatened (listed) species. 2. Review management actions and adapt BOMP to protect (native) or control (pest) species as appropriate. 3. Include species in future monitoring surveys. 	<ol style="list-style-type: none"> 1. Inform Group Environmental Manager 2. Report result and response action in Annual report 3. In case of threatened species advise Office of Environment and Heritage and Dept. Sustainability, Environment, Water, Populations and Community
Flood	Group Environmental Manager	<ol style="list-style-type: none"> 1. Apply EMS standard procedures 2. Assess need for replacement fencing, signage. 3. Additional weed control measures may be required following flood. 	Report result and response action in Annual report
Fire	Group Environmental Manager	<ol style="list-style-type: none"> 1. Apply EMS standard procedures 2. Assess need for replacement fencing, 	Report result and response action in Annual report



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INCIDENT	RESPONSIBILITY	RESPONSE MANAGEMENT ACTION	REPORTING REQUIREMENTS
		<p>signage.</p> <p>3. Exclude stock and control native herbivores to allow natural regeneration</p>	
Erosion	BOA Property Manager	<p>Remove source.</p> <p>Assess need for soil stabilisation works e.g. bunding, rock cages.</p>	Report result and response action in Annual report
Seed failure	BOA Property Manager	<p>1. Repeat collection if season permits</p> <p>2. Source alternate local provenance stock from native nursery</p>	Report result and response action in Annual report
Revegetation failure	BOA Property Manager	<p>1. Stock exclusion</p> <p>2. Supplementary landscape planting</p>	Report result and response action in Annual report
Chemical Spills/ Poisoning (Flora/Fauna)	BOA Property Manager	<p>1. Report incidents to Group Environmental Manager</p> <p>2. Apply risk mitigation measures to avoid reoccurrence</p>	<p>1. Inform Group Environmental Manager</p> <p>2. Report result and response action in annual report</p>
Unauthorised Access/ Major Disturbance	BOA Property Manager	<p>3. Fence maintenance (if required)</p> <p>4. Additional signage</p> <p>5. Additional spot checks for unauthorised entry</p>	Report result and response action in Annual report
Vegetation Clearing	BOA Property Manager	<p>Report location and extent of clearing. Collect photo evidence.</p> <p>Undertake follow up compliance checks.</p>	Report all illegal clearing to Office of Environment and Heritage and the Department of Sustainability, Environment, Water, Population and Communities.



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14 References

Baker-Gabb, D. (2011) *National Recovery Plan for the Superb Parrot *Polytelis swainsonii**. Department of Sustainability and Environment, Melbourne.

Bush Fire Coordinating Committee (2008) *Annex B to Bush Fire Coordinating Committee Policy No. 1/2008 Bush Fire Risk Management Planning Guidelines for Bushfire Management Committees*. NSW Rural Fire Service, Granville, NSW.

Department of Environment and Conservation (2003) *Removal of Dead Wood as a Key Threatening Process*. Hurstville, NSW. December 2003.

Department of Environment and Conservation (2004) *Threatened Biodiversity Survey and Assessment Guidelines for Developments and Activities Working Draft*. November 2004.

Department of Environment and Climate Change (2008a) *Biobanking Assessment Methodology*. Department of Environment and Climate Change NSW, Sydney.

Department of Environment and Climate Change (2008b) *Vegetation Condition Benchmarks Website*:- <http://www.environment.nsw.gov.au/projects/BiometricTool.htm> Date Retrieved 23/4/12.

Ecotone Ecological Consultants Pty Ltd (2009) *Narrabri Coal Project Flora and Fauna Impact Assessment*. Specialist Consultant Studies Compendium Volume 2, Part 4 for Environmental Assessment Prepared for R.W. Corkery and Co Pty Ltd. Warratah, NSW.

Eco Logical Australia (2009) *Regional Vegetation Community Profiles for the Namoi Catchment*. Project report for the Namoi Catchment Management Authority. Sutherland, NSW September 2009.

Eco Logical Australia (2011a) *Narrabri Mine Landscape Management Plan*. Report prepared for Narrabri Coal Operations Pty Ltd. Eco Logical Australia, Sutherland, NSW, 30 June 2011.

Eco Logical Australia (2011b) *Narrabri Coal Mine Rehabilitation Management Plan*. Report prepared for Narrabri Coal Operations Pty Ltd. Eco Logical Australia, Sutherland, NSW, 30 June 2011.

Eco Logical Australia (2012a) *Biodiversity Management Plan, Version 3, February 2012 – Appendix H of Extraction Plan: Narrabri Mine Longwalls 101-105, Revision B 29 November 2011*.

Eco Logical Australia (2012b) *Land Management Plan, Version 7, February 2012 – Appendix I of Extraction Plan: Narrabri Mine Longwalls 101-105, Revision B 29 November 2011*.

Eco Logical Australia (2012c). *Measuring Change in Vegetation Condition: A Nationally Consistent Methodology for Caring for our Country Projects - Version 1*. Department of Sustainability, Environment, Water, Population and Communities. February 2012.

Eco Logical Australia (2012d) *Werris Creek Coal LOM Biodiversity Offset Management Plan*. Report prepared for Werris Creek Coal Pty Ltd. Sutherland, NSW, January 2012.



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Eco Logical Australia (2013a) *Narrabri Coal Mine Stage 1 and 2 Final Biodiversity Offset Strategy*. Project report for Narrabri Coal Operations Pty Ltd. Sutherland, NSW 14 August 2013.

Eco Logical Australia (2013b) *Kenna Biodiversity Offset Management Plan*. Report prepared for Narrabri Coal Operations Pty Ltd. Eco Logical Australia, Sutherland, NSW, 22 May 2012.

McIntyre S, Mclvor JG, Heard KM (Eds) (2002) *Managing & Conserving Grassy Woodlands*. CSIRO Publishing Collingwood, Victoria.

Narrabri Shire Council (2006) *Noxious Weeds List*. Revised 13/12/2006. [http://narrabri.cfm.predelegation.com/files/uploaded/file/Resident%20Services%20PDFs/Noxious_Weeds_List\[1\].pdf](http://narrabri.cfm.predelegation.com/files/uploaded/file/Resident%20Services%20PDFs/Noxious_Weeds_List[1].pdf) Date Retrieved 14/4/12.

NSW Minerals Council (2010) *NSW Minerals Industry Due Diligence Code of Practice for the Protection of Aboriginal Objects*, NSW Minerals Council Ltd, Sydney NSW.

Office of Environment and Heritage (2011) *Principles for the use of biodiversity offsets in NSW*. Updated 17 June 2011. <http://www.environment.nsw.gov.au/biocertification/offsets.htm> Data retrieved 20/4/12.

Office of Environment and Heritage (2012) *NSW Wildlife Atlas Search (Threatened Flora and Fauna)* in selected area [North: -30.45 West: 149.795 East: 149.895 South: -30.55] www.bionet.nsw.gov.au data retrieved 26/4/12.

Parsons Brinkerhoff (2013) *Narrabri Mine Biodiversity Offset Areas, Baseline Monitoring Report*. Report prepared for Narrabri Coal Operation Pty Ltd by Parsons Brinkerhoff, April 2013.

RW Corkery & Co Pty Ltd (2009) *Environmental Assessment. Narrabri Coal Mine – Stage 2 Longwall Project Report No. 67416 (Section 3 – Issue Identification and Prioritisation)*. Report prepared for Narrabri Coal Operations Pty Ltd. Brooklyn, NSW.

Standards Australia (2009) *AS/NZS ISO 31000:2009 Joint Australian/New Zealand Standard. Prepared by Joint Technical Committee OB-007, Risk Management*. Approved on behalf of the Council of Standards Australia on 6 November 2009 and on behalf of the Council of Standards New Zealand on 16 October 2009. Published on 20 November 2009.

Watson, D.M. (2004) Comparative evaluation of new approaches to survey birds in *Wildlife Research* 31, pp.1-11.



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Appendix A: Related correspondence with Government Agencies

Extract from NSW Department of Planning (now Department of Planning and Infrastructure) Approval PA08-0144



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Project Approval

Section 75J of the *Environmental Planning and Assessment Act 1979*

I approve the project referred to in schedule 1, subject to the conditions in schedules 2 to 7.

These conditions are required to:

- prevent, minimise and/or offset adverse environmental impacts;
- set standards and performance measures for acceptable environmental performance;
- require regular monitoring and reporting; and
- provide for the ongoing environmental management of the project.

Richard Pearson
Deputy Director-General, DASP
as delegate for the Minister for Planning

Sydney

26th July

2010

SCHEDULE 1

Application No: 08_0144
 Proponent: Narrabri Coal Operations Pty Limited
 Approval Authority: Minister for Planning
 Land: See Appendix 1
 Project: Narrabri Coal Project – Stage 2



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- controlling weeds, feral pests, and access;
 - managing bushfires; and
 - managing any potential conflicts between rehabilitation works and Aboriginal cultural heritage.
- (f) detailed performance and completion criteria for the rehabilitation of the site;
- (g) a detailed description of how the performance of the rehabilitation works would be monitored over time to achieve the stated objectives and against the relevant performance and completion criteria; and
- (h) details of who is responsible for monitoring, reviewing and implementing the plan.

Note: In accordance with condition 11 of schedule 2, the preparation and implementation of Rehabilitation Management Plans is likely to be staged, with each plan covering a defined area (or domain) for rehabilitation. In addition, while mining operations are being carried out, some of the proposed remediation or rehabilitation measures may be included in the detailed management plans that form part of the Extraction Plan. If this is the case, however, then the Proponent will be required to ensure that there is good cross-referencing between the various management plans.

Mine Closure Plan

5. The Mine Closure Plan must:
- (a) define the objectives and criteria for mine closure;
 - (b) investigate options for the future use of the site;
 - (c) provide a detailed methodology for decommissioning the site's evaporation/storage ponds and the treatment of any accumulated salt within or around those ponds;
 - (d) investigate ways to minimise the adverse socio-economic effects associated with mine closure, including reduction in local and regional employment levels;
 - (e) describe the measures that would be implemented to minimise or manage the on-going environmental effects of the project; and
 - (f) describe how the performance of these measures would be monitored over time.

OFFSETS

Biodiversity Offset Strategy

6. The Proponent shall provide a suitable biodiversity offset strategy to compensate for the impacts of Stages 1 and 2 of the project. This offset strategy must:
- (a) be prepared in consultation with DECCW;
 - (b) be submitted to the Director-General for approval by 31 December 2010, or as otherwise agreed by the Director-General;
 - (c) provide a detailed assessment of offset proposal/s involving the property/ies (agreed to by DECCW) adjoining Mt Kaputar National Park to confirm the ability of either of these property/ies to meet "like for like or better" and "maintain or improve" conservation outcomes;
 - (d) include and assess proposals to offset impacts to the Inland Grey Box EEC, *Bertya opposens*, and foraging habitat for the Superb Parrot;
 - (e) include proposals on offsetting both direct and indirect impacts (ie edge effects) of the project; and
 - (f) determine the best overall combination of lands to provide a suitable offset.
7. The Proponent shall make suitable arrangements to provide appropriate long-term security for the offset areas by 31 December 2011, or other date agreed by the Director-General, to the satisfaction of the Director-General.



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SCHEDULE 6

ENVIRONMENTAL MANAGEMENT, MONITORING, AUDITING AND REPORTING

Note: This schedule should be read in conjunction with sections 15, 18 and 17 of the revised Statement of Commitments.

ENVIRONMENTAL MANAGEMENT

Environmental Management Strategy

1. The Proponent shall revise the Environmental Management Strategy for the Stage 1 project to encompass all proposed mine activities and potential impacts associated with environmental management for the site (Stages 1 and 2) and subsequently implement this revised version of the Environmental Management Strategy to the satisfaction of the Director-General. This strategy must:
 - (a) be submitted to the Director-General for approval prior to 30 June 2011;
 - (b) provide the strategic context for environmental management of the project;
 - (c) identify the statutory requirements that apply to the project;
 - (d) describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the project
 - (e) describe the procedures that would be implemented to:
 - keep the local community and relevant agencies informed about the operation and environmental performance of the project;
 - receive, handle, respond to, and record complaints;
 - resolve any disputes that may arise during the course of the project;
 - respond to any non-compliance; and
 - respond to emergencies; and
 - (f) include a clear plan depicting all the monitoring currently being carried out in the project area.

Management Plan Requirements

2. The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include:
 - (a) detailed baseline data;
 - (b) a description of:
 - the relevant statutory requirements (including any relevant approval, licence or lease conditions);
 - any relevant limits or performance measures/criteria;
 - the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures;
 - (c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;
 - (d) a program to monitor and report on the:
 - impacts and environmental performance of the project;
 - effectiveness of any management measures (see (c) above);
 - (e) a contingency plan to manage any unpredicted impacts and their consequences;
 - (f) a program to investigate and implement ways to improve the environmental performance of the project over time;
 - (g) a protocol for managing and reporting any:
 - incidents;
 - complaints;
 - non-compliances with statutory requirements; and
 - exceedances of the impact assessment criteria and/or performance criteria; and
 - (h) a protocol for periodic review of the plan.

Revision of Strategies, Plans and Programs

3. Within 3 months of the submission of an:
 - (a) audit under condition 7 of schedule 6;
 - (b) incident report under condition 4 of schedule 6; and
 - (c) annual review under condition 5 of schedule 6,the Proponent shall review, and if necessary revise, the strategies, plans, and programs required under this approval to the satisfaction of the Director-General.



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Commonwealth Department of Sustainability, Environment, Water, Population and Communities
Approval EPBC Ref 2009/5003.



Australian Government

Department of Sustainability, Environment, Water, Population and Communities

Approval

Narrabri Coal Operations Pty Ltd, Narrabri, NSW
EPBC Ref 2009/5003

This decision is made under sections 130(1) and 133 of the *Environment Protection and Biodiversity Conservation Act 1999*.

Proposed action

person to whom the approval is granted	Narrabri Coal Operations Pty Ltd
proponent's ACN	107 813 963
proposed action	The conversion of the Narrabri Coal Mine from a continuous mining operation with an annual production rate of 2.5 Mtpa to a longwall mining operation with a maximum production rate of 8 Mtpa, as described in the Referral Documentation received on 20 July 2009, Preliminary Documentation dated 19 March 2010 and the NSW Director General's Environmental Assessment Report & Project Approval dated 26 July 2010.

Approval decision

Controlling Provision	Decision
Listed threatened species and communities (sections 18 & 18A)	Approved

conditions of approval

This approval is subject to the conditions specified below.

expiry date of approval

This approval has effect until 31 December 2040.

Decision-maker

name and position	James Barker A/g Assistant Secretary Environment Assessment Branch
signature	
date of decision	21/1/11



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Approval conditions:

1. The person undertaking the action must carry out the action in accordance with **Annexure 1** and the following documents: Referral Documentation received on 20 July 2009, Preliminary Documentation dated 19 March 2010 and the NSW Director General's Environmental Assessment Report & Approval Conditions dated 26 July 2010 and conditions of this approval. The conditions of this approval prevail to the extent of the inconsistency.
2. In order to mitigate impacts on EPBC Act listed threatened species and communities, by 31 December 2011, the person taking the action must implement the approved version of the biodiversity offset strategy which requires the following:
 - a) Secure the 933 hectare property known as "Kenna" as outlined in **Annexure 2**. The person taking the action must place a legally binding conservation covenant on title over the 933 hectare property which must be approved in writing by the Minister.
 - b) Develop and implement an active monitoring and management plan for "Kenna" for a period of 20 years to enhance White Box Grassy Woodland on the site as it provides habitat for the EPBC listed Superb Parrot. The active management plan must include:
 - i. Management actions including but not limited to, land rehabilitation and restoration measures, pest management, fencing, weed control, fire management, sediment and erosion control, exclusion of livestock and restrictions of access.
 - ii. Details of who is responsible for monitoring, reviewing and implementing the plan.
 - c) Clearly defined boundaries of "Kenna" offset area, through maps and textual descriptions as well as an accompanying shapefile.
 - d) Secure the 422 hectare property as outlined in **Annexure 3**. The person taking the action must place a legally binding conservation covenant on title over the 422 hectare property which must be approved in writing by the Minister.
 - e) Develop and implement an active monitoring and management plan for the site mentioned in (d) for a period of 20 years to enhance Red Ironbark – Brown Bloodwood Shrubby Woodland which provides habitat for EPBC listed *Bertya opposens* and for the White Box Grassy Woodland which provides habitat for the EPBC listed Superb Parrot. The active management plan must include:
 - i. Management actions including but not limited to, land rehabilitation and restoration measures, pest management, fencing, weed control, fire management, sediment and erosion control, exclusion of livestock and restrictions of access.
 - ii. Details of who is responsible for monitoring, reviewing and implementing the plan.
 - f) Clearly defined boundaries of the 422 hectare property mentioned in (d), through maps and textual descriptions as well as an accompanying shapefile.

The final version of the biodiversity offset strategy must be submitted to the Minister for approval. The approved strategy must be implemented.



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3. In order to minimise potential impacts on EPBC Act listed threatened species and communities within the mine site, prior to any Works commencing and in accordance with the NSW Director General's Assessment Report and approval conditions (26 July 2010), the person undertaking the action must develop and implement an *Extraction Plan*. The final version of this plan must be submitted to the Department.
4. In order to minimise potential impacts on EPBC Act listed threatened species and communities within the mine site, prior to any Works commencing and in accordance with the NSW Director General's Assessment Report and approval conditions (26 July 2010), the person undertaking the action must develop and implement a *Water Management Plan*. The final version of this plan must be submitted to the Department.
5. In order to minimise potential impacts on EPBC Act listed threatened species and communities within the mine site, the person undertaking the action must actively manage progressive disturbance of the mine site in accordance with a *Rehabilitation Management Plan* for the life of the mine. The *Rehabilitation Management Plan* must be developed and implemented prior to any Works commencing and in accordance with the NSW Director General's Assessment Report and approval conditions (26 July 2010). The final version of this plan must be submitted to the Department.
6. Within 12 months prior to the Cessation of Operation of the Action and in accordance with the NSW Director General's Assessment Report and approval conditions (26 July 2010), the person undertaking the action must submit and implement a *Mine Closure Plan*. The person taking the action must have consideration to matters protected under the EPBC Act at this time and ensure that these matters will not be significantly impacted by the mine closure. The final version of this plan must be submitted to the Department.
7. Within 30 days of Commencement of the Action, the person undertaking the action must advise the Department in writing of the actual date of commencement.
8. Within three months of every 12 month anniversary of the Commencement of the Action, the person undertaking the action must provide a report to the Department demonstrating compliance with the conditions of this approval over the previous 12 months. This report must include details of how the plans required by the conditions of this approval have been implemented. Annual reports must be provided until the Minister is satisfied that the person undertaking the action has complied with all conditions of the approval.
9. Upon the direction of the Minister, the person undertaking the action must ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the Minister. The independent auditor must be approved by the Minister prior to the commencement of the audit. Audit criteria must be agreed to by the Minister and the audit report must address the criteria to the satisfaction of the Minister.



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10. If the person undertaking the action wishes to carry out any activity otherwise than in accordance with the strategies referred to in conditions 2 or 3 of this approval, the person undertaking the action must submit for the Minister's approval a revised version of any such strategy. The varied activity shall not commence until the Minister has approved the varied strategy in writing. If the Minister approves such a revised strategy, that strategy must be implemented in place of the strategy originally approved.
11. If the Minister believes that it is necessary or desirable for the better protection of EPBC Act listed threatened species and communities to do so, the Minister may request that the person undertaking the action make specified revisions to the strategies approved pursuant to conditions 2 or 3 of this approval and submit the revised strategies for the Minister's approval. The person undertaking the action must comply with any such request. The revised approved strategy must be implemented. Unless the Minister has approved the revised strategy then the person taking the action must continue to implement the strategy originally approved.
12. If, at any time after five years from the date of this approval, the person undertaking the action has not commenced the action, then the person undertaking the action must not commence the action without the written consent of the Minister.
13. The person undertaking the action must maintain accurate records substantiating all activities associated with or relevant to the above conditions of approval, including measures taken to implement the management plans and strategies required by this approval, and make them available upon request to the Department. Such records may be subject to audit by the Department or an independent auditor in accordance with section 458 of the EPBC Act, or used to verify compliance with the conditions of approval. Summaries of audits may be posted on the Department's website. The results of audits may also be publicised through the general media.



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Definitions:

Commencement of the Action: Commencement of any works on-site.

Cessation of Operation of the Action: Cessation of the operation of the mine site.

Department: The Australian Government Department responsible for the *Environment Protection and Biodiversity Conservation Act 1999*.

EPBC Act: The *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

MtPa: Million tonnes per annum.

Minister: The Minister responsible for the EPBC Act.

Shapefile: an ESR Shapefile, containing '.shp', '.shx' and '.dbf' files and other files capturing attributes including at least the EPBC reference ID number and EPBC protected matters present at the relevant site. Attributes should also be captured in '.xls' format.

Superb Parrot: Fauna species listed as vulnerable under the EPBC Act

Works: Includes all preparatory works required to be undertaken including clearing vegetation, the erection of any on-site temporary structures and the use of heavy equipment for the purpose of breaking the ground for buildings or infrastructure.



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Appendix B: Environmental Policy

The management actions in this plan are designed to be consistent with the mine plans outlined in **Table 21**. The conservation management of this on-site BOA and the off-site BOA on 'Kenna' collectively contributes to the overall Biodiversity Offset Strategy as part of project approval and within the guidelines of NCOPL Environmental Policy.

Table 21: Mine plans related to this Biodiversity Offset Management Plan

TITLE	SUBJECT
Narrabri Mine Stage 1 and 2 Biodiversity Offset Strategy	Overarching strategy directing biodiversity offset management including this BOMP. Strategy addresses direct and indirect mine impacts. Conservation to be undertaken on two properties; 422ha parcel of mine site land and 12,43ha on "Kenna" (ELA 2012d)
Revised Landscape Management Plan	Coordination and direction for landscape management responsibilities of Stage 1 & 2 Narrabri Mine, applies to whole mine site (ELA 2011a)
Rehabilitation Management Plan	Key component of LMP, applies to whole mine site Management protocols for feral animals, weeds, bushfire and vegetation rehabilitation have been applied to this BOMP (ELA 2011b)
Mine Closure Plan	Key component of LMP, applies to whole mine site Long term management objectives for site post closure including environmental impact management. Supplementary Biodiversity Offset Area located over long walls subject to performance criteria
Long Wall 101-105 Biodiversity Management Plan	Component of NM LW 101-105 Extraction Plan (EP) addressing flora and fauna impacts identified by the Mine Subsidence Effect Predictions and Impact Assessment (DGS 2011) Informs BOMP monitoring framework to ensure compatible methods and provide for cost efficiencies (ELA 2012a)
Long Wall 101-105 Land Management Plan – Narrabri Mine	Component of NM LW 101-105 Extraction Plan (EP) addressing potential impacts and/or environmental consequences of general land impacts identified by the Mine Subsidence Effect Predictions and Impact Assessment (DGS 2011) Informs onsite BOMP where supplementary BOA located over long walls (ELA2012b)
Aboriginal Cultural Heritage Management Plan	Coordination and implementation for management actions in relation to items/sites of cultural heritage significance, applies to the whole mine site.



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Appendix C: Works Program

Management will be staged to occur in four management periods as follows:

- Management Period 1 – Years 1 to 3
- Management Period 2 – Years 4 to 5
- Management Period 3 – Years 6 to 20
- Management Period 4 - >20 years, subject to meeting completion criteria.

MANAGEMENT PERIOD	TASK/OBJECTIVE	ZONE (S)	MANAGEMENT ACTION	TIMING	PERFORMANCE MEASURE (BY END OF PERIOD)
Period 1	Collect baseline flora and fauna data Inform adaptive management to refine this annual works program, establish monitoring plots and weed/feral animal abundance/distribution.	All	Baseline surveys applying visual inspection, flora and fauna monitoring methods	<1 yr	Baseline property data for flora, fauna values and general management issues pertaining to this BOMP
All	Grazing exclusion	1, 2 (see below for Zone 3)	Repair external fencing	<1 yr	Stock exclusion
Period 1			exclude stock from zones 1 & 2		
Period 1	Signage/ Awareness Raising of BOA boundaries, access and objectives	External boundary	Install signage to identify BOA and prohibit unauthorised access	<1yr	Site access restricted to approved personnel



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MANAGEMENT PERIOD	TASK/OBJECTIVE	ZONE (S)	MANAGEMENT ACTION	TIMING	PERFORMANCE MEASURE (BY END OF PERIOD)
		fences to BOA including to other portion of BOA	Liaise with neighbouring properties to encourage compliance with BOA restrictions and identify opportunities to collaborate on weed/pest management		
All	Retain Dead Timber	All	Install signage prohibiting unauthorised access and conduct periodic compliance checks	<1yr	
All	Weed control	All	Map weed infestations	1-20 yrs	Location and severity of weed infestations mapped across BOA
			Develop and implement weed control strategy for <ol style="list-style-type: none"> 1. general control of environmental weeds 2. targeted control of noxious weeds 		<p>All infestations of noxious weeds managed per NW Act</p> <p>Exotic ground cover to be reduced to <10% in zones 2 & 3 and by Year 10 and maintained at less than 5% in all zones thereafter</p> <p>Woody weeds in all zones to be maintained at less than 1% after year 5</p>



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MANAGEMENT PERIOD	TASK/OBJECTIVE	ZONE (S)	MANAGEMENT ACTION	TIMING	PERFORMANCE MEASURE (BY END OF PERIOD)
			Maintenance of ground cover in grazed areas to prevent new infestations		New infestations of problem grasses controlled
All	Spot spraying environmental weeds	All	Spot spraying regime to be included in the weed control strategy	1-20 yrs	Existing infestations controlled New infestations of problem grasses controlled Undertaken in accordance with the requirements of the <i>Pesticides Act 1999</i> .
All	Targeted Revegetation Strategy (if required)	Zone 3	Local Seed Collection	<3 years	Local seed sourced for revegetation
			Contracted hiko tube stock preparation using local seed	<5yr	Hiko tube stock prepared in time for landscape plantings. Local seed from BOA used where possible
			Preliminary weed control – slashing and spot spraying	5yr	Weed suppression and ground preparation for plantings
			Deep rip 500m planting area		Timely preparation of planting area
			Landscape plantings		75% survival rate of plantings after 3 years
			Follow up watering	5-20	75% survival rate of plantings after 3 years
All	Annual slashing of fire breaks	All	Slashing fire breaks along inside of all external boundary fences	1-20 yrs	Fire breaks maintained along external fences



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MANAGEMENT PERIOD	TASK/OBJECTIVE	ZONE (S)	MANAGEMENT ACTION	TIMING	PERFORMANCE MEASURE (BY END OF PERIOD)
Period 1-2	Monitoring grazing pressure, excluded after 5 years	3	Conservation grazing to be checked quarterly at the beginning of each season for presence of regenerating saplings, amount of native ground cover and amount of exotic species	Quarterly 0-5 yrs	Native ground cover maintained or increased in grazed areas
All	Monitoring erosion along creek lines	All	Baseline survey to identify existing management issues. Annual visual inspection of bank stability to inform any erosion control required. Implement erosion controls as required.	Annually 1-20 yrs	Soil erosion controlled if required



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Appendix D: Procedures

Weed Control

All weed management works outlined should be undertaken by a suitably qualified and experienced contractor and/or site personnel. Details of specific weed control techniques to be used such as hand pulling weeds, grass control and the use of herbicides are described in detail in Muyt (2001) and summarised in **Table 7**.

The following is a description of appropriate methods to carry out the management actions.

Weed Treatment

Weed control techniques within the BOA will be undertaken using minimal disturbance techniques so as to minimise disturbance to the soil. Disturbance to the soil will result in increased weed germination and potentially lead to soil erosion.

Hand Pulling

Hand pulling is suited to individual plants, small patches or restricted areas. Hand pulling of weeds includes:

- Selecting the most appropriate tool for the weed being removed (if required)
- Minimise soil disturbance by controlling weeds when the soil is moist
- Control plants before fruits or other propagules develop
- Remove excess soil from the root system when there is no risk of spreading vegetative material
- Cover disturbed soil or gaps with leaf litter and twigs
- Ensure bulbs, corms, tubers, rhizomes or stolons are carefully dug out
- Bag all propagules before removing them off-site (Muyt 2001)

Herbicide Use

Herbicides are required for use for the spraying of herbaceous and re-shooting woody weeds. Only a non-specific herbicide (e.g. glyphosate) will be used for this work. Herbicide use near waterways is restricted as all waterways are ephemeral. Spraying in the vicinity of any waterways with flowing water will only be undertaken on a spot spraying basis using Roundup BioActive. Any use of herbicides will be undertaken in accordance with the requirements of the NSW *Pesticides Act 1999* including the use of registered chemicals, maintaining training and chemical use records and disposal records. Also refer to the Noxious and Environmental Weed Control Handbook (NSW Department of Primary Industries, 2011) and the Narrabri Shire Council website for more information on noxious weed management.

Spot Spraying

Spot spraying will be required for seedlings and the regrowth of woody weeds. These species will be controlled using a non-selective herbicide mixed appropriately with water. When spot spraying, ensure the target plant has been correctly identified and that the target plant is sprayed with the herbicide. Off-target damage should be minimised through the correct identification of target weed species. Spot spraying with diesel (fuel) mixed with surfactant (using back pack sprayer) can be undertaken as alternative way to control *Opuntia stricta*, however if utilising this method refer to the NSW DPI Noxious and Environmental Weed Control Handbook for application rates etc.

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Cut and Paint Technique

The plant needs to be actively growing with green foliage present. *Opuntia stricta* is usually actively growing in February and October. Control will be undertaken during summer months prior to fruiting occurring. The plant needs to be cut horizontally as close to the base as possible and below any branches. Either a chainsaw, handsaw or secateurs can be used to make the cut, depending on the size of the plant. Remove any dirt from the stump and immediately apply the neat herbicide directly to the stump using a dabber bottle or brush. Plants may re-sprout and follow up work maybe required.

Cut-Paint method

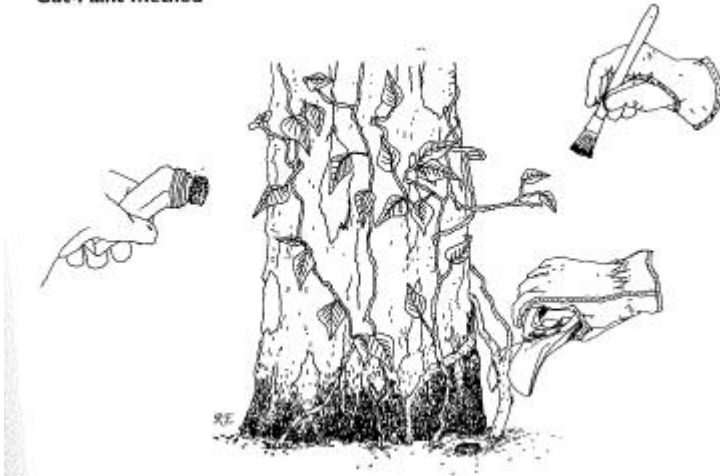


Figure 6: The cut and paint method

Slashing

Regular slashing of agricultural weeds in paddocks not subject to periodic grazing may be suitable to prevent seed set and dispersal. This is control method rather than a removal method.

Feral Animal Control

Pesticide Baiting

Pesticide Control Orders (PCOs) exist for the use of Pindone and 1080 under Part 4 of the NSW *Pesticides Act 1999* and associated regulations. These PCOs stipulate that only Authorised Control Officers are authorised to implement the use of concentrated Pindone and 1080 baits, although ready-made baits can be used by landowners/managers. Furthermore, as of 1 September 2005, training in the use of pesticides has been compulsory if pesticides are used in a job or business (including farming).

The following is a broad outline of the process for using each chemical, notwithstanding the requirement for the operator to be trained in the use of these chemicals. Advice should be sought from OEHL as to the most effective methods to minimise off-target kills and animal ethics in relation to the disposal of un-used bait and carcasses.

It is highly recommended that any baiting that takes place within the BOA is supported by a strategic off-site baiting program with cooperation from adjacent landowners (including SFNSW).

All stock should be removed from the site prior to baiting program.

Pindone (Rabbits)

- Under take baiting in summer or when there is limited green feed on the BOA
- Select appropriate sites – it is recommended to locate sites near known rabbit harbour



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- Acquire Pindone Baits (mixing of Pindone concentrate must be carried out by an Authorised Control Officer)
- 'Free feed' rabbits on non-toxic bait prior to baiting commencing
- Place Pindone baits in bait stations with safety precautions in selected locations and repeat dose three to four days apart for the entirety of the baiting treatment period
- If possible destroy warrens once a kill of the rabbit population has been assured. This prevents recolonisation of warrens

1080 Baits (Foxes and Feral Pigs)

Foxes

- Seek approval from relevant agencies (e.g. Livestock Health and Pest Authority (LHPA), Department of Agriculture) for baiting program
- Notify neighbours
- Erect signage
- Acquire 1080 fox baits and feral pig baits
- Foxes using guidelines developed by OEH (2010)
 - a) Bury baits 8-10 cm below the surface
 - b) Place baits at least 500 metres apart or 1 per 10 ha (50 baits will be sufficient for the 422 hectare on-site offset area)
 - c) Conduct baiting in autumn (juveniles dispersing) and spring (breeding season)
 - d) Check baits regularly and replace taken baits during treatment
 - e) Collect and dispose of unused baits after treatment

Feral Pigs

- Establish bait stations near known areas of feral pig occupation (wallows, tracks, feeding areas, etc.)
- Establish a pre-feed program over several months with small, strategically placed piles of grain or other food-stuffs
- Create muddy or sandy swept pads to identify if Feral Pigs are eating the pre-feed
- Over months gradually reduce bait stations to encourage Feral Pigs to feed from only a couple of points (or one central point if possible)
- Place baits at bait stations in clusters and monitor uptake daily and replace taken baits until uptake ceases
- Collect and dispose of unused baits after treatment

Trapping Feral Goats & Pigs

- Select appropriate sites – it is recommended to locate sites near water sources where goats and pigs will congregate
- Notify neighbours

Native Vegetation Revegetation

- Specialist native species propagation nursery engaged to collect, propagate and supply locally endemic plants as 'Hiko' tube stock
- Species to be sourced from those listed in **Table 13**



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- Tractor mounted ripper required to rip lines to a depth of 500 mm followed by topsoil cultivation for tubestock planting
- No tillage required for direct seeding following slashing
- Planting to be carried out in autumn or spring during favourable weather conditions
- Plants to be planted with fertiliser pellets. One pellet per plant

Plants to be watered on the day of planting and twice in the following week. Additional watering may be required depending on weather conditions.



ENVIRONMENTAL MANAGEMENT SYSTEM

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BIODIVERSITY OFFSET MANAGEMENT PLAN

Appendix E: Inspection Proforma

Who:

Date of Inspection:

INSPECTION ITEM	PHOTO NO.	CO-ORDINATES	COMMENT	ACTION COMPLETED
Narrabri On-site Biodiversity Offset Area				
Evidence of disturbance (provide details)				
Evidence of erosion (e.g. sheet, rilling, gullyng etc.)				
Presence of. weeds				
Evidence of feral animals and pests				
Growth Rates				
Evidence of plant mortality or dieback				
Presence of overstorey species (Y/N)				
Presence of mid-storey species (Y/N)				
Presence of understorey species (Y/N)				



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INSPECTION ITEM	PHOTO NO.	CO-ORDINATES	COMMENT	ACTION COMPLETED
Evidence of reproductive potential include presence of buds, flowers, fruits, juveniles and second generations				
Grazing pressure from over abundant native herbivores				
Stock grazing pressure (measure of native ground cover and rejuvenating native plants)				
Evidence of contamination or other limitations to vegetative establishment (e.g. surface crusting, nutrient deficiency)				



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Appendix F: Review Proforma

BOMP SECTION	CLAUSE	COMPLIANT	EVIDENCE/COMMENT	RECOMMENDATION
	Manage human disturbance <ul style="list-style-type: none"> Rubbish dumping Timber removal/clearing Restrict access and use signage to identify area as a biodiversity offset area 			
	Exclusion of Grazing stock <ul style="list-style-type: none"> No stock present Fence Maintenance 			
	Weed Control <ul style="list-style-type: none"> MZ1 MZ2 MZ3 			
	Bushfire Mgt <ul style="list-style-type: none"> Slashing of firebreaks Prescribed Fire Fire Fighting Equipment 			
	Retention of regrowth and remnant vegetation			



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BIODIVERSITY OFFSET MANAGEMENT PLAN

BOMP SECTION	CLAUSE	COMPLIANT	EVIDENCE/COMMENT	RECOMMENDATION
	In fill plantings <ul style="list-style-type: none"> MZ 2 (if natural regeneration insufficient) MZ3 (Paddock Trees as per Table 8) MZ4 (Native ground cover, midstorey and tree plantings to vegetation type) 			
	Retention of Dead Trees			
	Erosion and Sedimentation Control (if required)			
	Soil and Water Management			
	Retention of Rocks			
	Control of Feral and overabundant native herbivores <ul style="list-style-type: none"> Rabbits (Poisoning) Goats (Trapping) Kangaroos (Shooting under Licence, only off the mining lease) 			
	Vertebrate Pest Management <ul style="list-style-type: none"> Foxes (1080 baiting) Cats (Trapping) Pigs (Baiting and trapping) 			