



Narrabri Coal Mine Stage 1 and 2 – Revised Biodiversity Offset Strategy

Prepared by AMBS Ecology & Heritage
for Whitehaven Coal Limited

Final Report

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Executive Summary

AMBS Ecology & Heritage Pty Ltd (AMBS) were commissioned by Whitehaven Coal Limited (WHC) on behalf of Narrabri Coal Operations Pty Ltd to prepare a revision to the Biodiversity Offset Strategy (RBOS) for Stages 1 and 2 of the Narrabri Coal Mine (NCM). The NCM Stage 1 and 2 was originally approved under NSW Project Approval 08_0144 in 2010 (latest modification November 2021 MOD7) and the Commonwealth EPBC Approval 2009/5003 in 2011 (latest variation 24 March 2021). In April 2022 the NCM Stage 3 Mine received NSW Approval SSD-10269 to supersede PA 08_0144. WHC established the Narrabri Biodiversity Offset Area (BOA) including Kenna (previously known as the Off-site BOA) and other various Biodiversity Offset Properties (BOPs) each known as Greylands, Omeo, Rosevale, Greylands Road, Kurrajong Park and West Haven (previously collectively known as the On-site BOA).

To prepare and register Conservation Agreements (CAs) for the various BOPs, the NSW Biodiversity Conservation Trust (BCT) required WHC to undertake detailed cadastral surveys and utilise contemporary vegetation mapping. In addition, the BCT required the use of the NSW Plant Community Type (PCT) vegetation mapping classification system. As a result, the original NCM BOS vegetation mapping (undertaken by Ecotone 2009 using an older classification system) needed to be revised utilising quantitative biometrics to define vegetation assemblages for the application of the required PCT mapping. This RBOS outlines how the cadastral survey boundary changes as well as the contemporary PCT vegetation mapping reflected in the registered CAs still meet the requirements of Approvals for NSW SSD-10269 Condition B45 and EPBC Approval 2009/5003 Condition 2.

Overall, the RBOS meets the biodiversity value requirements as per the NCM Stage 1 and 2 Approvals (08_0144 and when it is surrendered to SSD-10269) relating to the extent of offset area “to enhance”, “like for like or better” and “maintain and improve” the habitat restoration (i.e. revegetation and habitat augmentation) for the *Bertya opposens*, Superb Parrot and White Box Grassy Woodland plus Inland Grey Box EEC. A number of vegetation community names have been updated as a result of the preparation of CAs and the application of the contemporary Plant Community Type (PCT) classification (DCCEEW 2024).

Two Threatened Ecological Communities (TEC) are present within the Narrabri RBOS and will result in no significant change to the area of TECs within the offsets. One TEC has been identified in the Kenna BOP. PCT 1383-White Box grassy woodland of the Nandewar and Brigalow Belt South Bioregion’ is consistent with the ‘White Box-Yellow Box-Blakely’s Red Gum grassy woodland’ listed as critically endangered under the BC Act and under the EPBC Act. Currently 477.40ha of this PCT meets the definition of the CEEC. The other TEC has been identified in the Omeo BOP. ‘Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Penepplain, Nandewar and Brigalow Belt South Bioregions’ listed as an Endangered Ecological Community (EEC) under the BC Act and ‘Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia’ listed as Endangered Ecological Community (EEC) under the EPBC Act occurs within areas of PCT 81 Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion. Currently 9.28 ha of this PCT meets the definition of the EEC.

A total of 373.61 ha of habitat for *Bertya opposens* is mapped in this RBOS within the Rosevale, Greylands Road, West Haven and Kurrajong Park BOPs and a further 1,069.02 ha in areas of these PCTs within the NCM rehabilitation area to be secured post mining once subsidence impacts have been ameliorated.

A total of 1,944.28 ha of habitat for the Superb Parrot is mapped in this RBOS within the Kenna, Greylands, Rosevale, Omeo, Greylands Road, West Haven and Kurrajong Park BOPs and the NCM rehabilitation area.

This RBOS does not alter or vary the intent of the original BOS to establish NCM Rehabilitation Area Offset affected by subsidence that has been transferred through to SSD-10269 Condition B45. While this RBOS addresses the external land-based components of the Narrabri RBOS; the description and implementation of the Rehabilitation Area Offset is to be documented in the NCM Rehabilitation Strategy to be submitted for approval within six months of the date of commencement of NCM Stage 3 Mine. The Rehabilitation Area Offset covers up to 1,167.54 ha of woodland vegetation that adjoins four of the adjacent BOPs as part of the overall NCM BOS area of 2,842.02 ha.

The RBOS covers an area of native vegetation of 1,244.06 ha from the Kenna BOP and 430.42 ha from the Greylands, Omeo, Rosevale, Greylands Road, Kurrajong Park and West Haven BOPs (Table 4.5) for a total of 1,674.48 ha. Furthermore, up to 1,167.54 ha of woodland vegetation that may be subject to subsidence impacts and mine site rehabilitation at NCM, adjoining four of the Greylands, Omeo, Rosevale, Greylands Road, Kurrajong Park and West Haven BOPs will be progressed following timing to be outlined in the NCM Rehabilitation Strategy, resulting in an overall NCM BOS of 2,842.02 ha (or could reduce to 2,805.36 if SSD-10269 Condition B45c is triggered).

This RBOS does not alter or vary existing BOS commitments as described in NSW Project Approval PA 08_0144 and SSD-10269 and Commonwealth EPBC Approval 2009/5003. All commitments are maintained or exceeded (Table 5.1)

This RBOS consists of Property adjoining Mount Kaputar National Park that meets 'like for like or better' requirements and 'maintains or improves' conservation outcomes (NSW Approval PA 08_0144 Condition 6c).

This RBOS confirms offsets to the impacts to Inland Grey Box EEC, *Bertya opponens* and Superb Parrot foraging habitat (NSW Approval PA 08_0144 Condition 6d).

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1 Introduction

1.1 Background

AMBS Ecology & Heritage Pty Ltd (AMBS) were commissioned by Whitehaven Coal Limited (WHC) to prepare a revision to the Biodiversity Offset Strategy (RBOS) for Stages 1 and 2 of the Narrabri Coal Mine (NCM). NCM is a joint venture ownership managed by Narrabri Coal Operations Pty Limited (NCO) on behalf of majority owner Narrabri Coal Pty Ltd (both are wholly owned subsidiaries of WHC). The NCM Stage 1 and 2 was originally approved under NSW Project Approval 08_0144 in 2010 (latest modification November 2021 MOD7) and the Commonwealth EPBC Approval 2009/5003 in 2011 (latest variation 24 March 2021). In April 2022, the NCM Stage 3 Mine received NSW Approval SSD-10269 to supersede PA 08_0144. These NCM Approvals outlined a Biodiversity Offset Strategy (BOS) to offset impacts to biodiversity and to meet these BOS Approval requirements; WHC established the Narrabri Biodiversity Offset Area (BOA) including Kenna (previously known as the Off-site BOA) and other various Biodiversity Offset Properties (BOPs) each known as Greylands, Omeo, Rosevale, Greylands Road, Kurrajong Park and West Haven (previously collectively known as the On-site BOA).

The NCM Stage 1 and 2 BOS, (EcoLogical Australia, 2014) confirmed the ability of these properties to meet “like for like or better” and “maintain or improve” conservation outcomes. The BOS was updated in 2019 (EcoLogical Australia, 2019) outlining minor changes in the cadastral boundaries which resulted in a 9 hectare (ha) increase of the former On-site BOA from 422 ha to 431 ha.

To prepare and register Conservation Agreements (CAs) for the various BOPs, the NSW Biodiversity Conservation Trust (BCT) required WHC to undertake detailed cadastral surveys and utilise contemporary vegetation mapping. The cadastral survey was undertaken by registered surveyors and involved redefining the cadastral boundary to a very high accuracy, resulting in variations to the previous extent of the BOPs. In addition, the BCT required the use of the NSW Plant Community Type (PCT) vegetation mapping classification system. As a result, the original NCM BOS vegetation mapping (undertaken by Ecotone 2009 using an older classification system) needed to be revised utilising quantitative biometrics to define vegetation assemblages for the application of the required PCT mapping.

This RBOS outlines how the cadastral survey boundary changes as well as the contemporary PCT vegetation mapping reflected in the registered CAs still meet the requirements of Approvals NSW SSD-10269 Condition B45 and EPBC Approval 2009/5003 Condition 2.

1.2 Relevant approval conditions relating to this RBOS

1.2.1 NSW Approvals for the Narrabri Coal Mine (PA 08_0144 and SSD-10269)

The original NSW Approval for Stages 1 and 2 of the NCM included two conditions, condition 6 and 7 of Schedule 5 of PA 08_0144, regarding the preparation and implementation of a BOS.

Condition 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 BCS;*
- (b) be submitted to the Secretary for approval by 31 December 2010, or as otherwise agreed by the Secretary;*
- (c) provide a detailed assessment of offset proposal/s involving the property/ies (agreed to by BCS) adjoining Mt Kaputar National Park to confirm the ability 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 (i.e. edge effects) of the project; and
- (f) determine the best overall combination of lands to provide a suitable offset.

Condition 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 Secretary, to the satisfaction of the Secretary.*

Approval of Stage 3 of the NCM (SSD-10269) will result in the surrender of NSW Approval PA 08_0144. Therefore, requirements for the Stage 1 and 2 Biodiversity Offset Strategy will transfer to SSD-10269 Conditions B45 and B46 stating:

Condition B45. *The Applicant must implement the approved Biodiversity Offset Strategy prepared under development consent 08_0244 for Stage 2 of the Narrabri Mine through out the life of the development, subject to the following:*

- (a) with the approval of the Planning Secretary (following consultation with BCS), the Strategy may be incorporated into the Biodiversity Management Plan required under condition B42;
- (b) with the approval of the Planning Secretary (following consultation with BCS), the Strategy may be amended; and
- (c) in recognition of the Applicant's decision to forego its right to disturb 14.1 ha of the Stage 2 disturbance footprint (the 'impact reduction area') the Strategy's requirement for the Application to conduct mine site rehabilitation over 2,832.79 ha and to secure this area under a long-term security mechanism is reduced by 36.66 ha to 2,796.13 ha.

Note: *The Stage 2 Biodiversity Offset Strategy, Rehabilitation Strategy and Rehabilitation Management Plan need to be substantially integrated to ensure biodiversity objectives are achieved through rehabilitation of the site.*

Condition B46. *The Applicant must make suitable arrangements to provide appropriate long-term security for the offset areas required by the Biodiversity Offset Strategy within 3 years of commencing development under this consent, or other date agreed by the Secretary, to the satisfaction of the Planning Secretary.*

A summary of the minimum requirements from the NCM NSW Approvals for land-based offsetting are:

- Property adjoining Mount Kaputar National Park meet 'like for like or better' requirements and 'maintain or improve' conservation outcomes.
- Offset the impacts to Inland Grey Box EEC, *Bertya opposens* and Superb Parrot foraging habitat.
- The overall BOS is required to cover an area of 2,832.79 ha (but if Stage 2 disturbance footprint foregoes 14.1 ha then this can be reduced to 2,796.13 ha).

The requirement for 2,832.79 ha will be met with the inclusion of 1,167.54 ha of vegetation in an area in the development footprint which may be subject to subsidence referred to as the Future Onsite Offsets in the BOS (Ecological 2014). Within the Approval for NCM Stage 3 Condition B45(c) (SSD-10269); the area is referred to as 'mine site rehabilitation'. For clarity, this RBOS will refer to the area that may be subject to subsidence, (previously known as the "Future Onsite Offsets") and to be included as part of the offset requirement, as the 'Rehabilitation Area Offset'.

1.2.2 Commonwealth Approval for the Narrabri Coal Mine (EPBC Approval 2009/5003)

The original Commonwealth Approval for Stages 1 and 2 of the NCM included Condition 2 of EPBC Approval 2009/5003 with the following requirements.

Condition 2. *In order to mitigate impacts on EPBC Act listed threatened species and communities, by 30 June 2021, the person taking the action must:*

- a) *secure at least 933 hectares of offset on the “Kenna” property, comprising the area enclosed by the yellow line labelled ‘Proposed Offset’ shown in Annexure 2 under a legal conservation mechanism that has been agreed to in writing by the Department, and.*
- b) *secure at least 422 hectares of offset on-site, comprising the areas enclosed by a yellow line labelled ‘On-site Offset Area (2019)’ shown in Annexure 3, under a legal conservation mechanism that has been agreed to in writing by the Department.*

Evidence of compliance with this condition must be provided to the Department within 30 days of finalising the legal conservation mechanism.

The approval holder must report on progress meeting the requirements of a) and b) in each annual compliance report required under condition 8 and as otherwise requested by the Department.

Condition 14: *In order to mitigate impacts on EPBC Act listed threatened species and communities, the person taking the action must:*

- a) *Develop and implement an active monitoring and management plan for the property mentioned in 2(a) [i.e. the property known as 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, 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.*
- b) *Develop and implement an active monitoring and management plan for the site mentioned in (2b) [i.e. the properties known as Rosevale, Greylands, Omeo, West Haven, Kurrajong Park collectively known as “On-site offset properties”] for a period of 20 years to enhance Red Ironbark-Brown Bloodwood Shrubby Woodland which provides habitat for EPBC listed *Bertya opponens* 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.*

A summary of the minimum requirements from the Commonwealth Approval for land-based offsetting that are relevant to this RBOS is:

- Enhance at least 933 hectares of offset on the Kenna property, which contains White Box Grassy Woodland habitat for the Superb Parrot, (EPBC Approval 2009/5003 Condition 2a and 14a).

- At least 422 hectares of offset on the Greylands, Omeo, Rosevale, Greylands Road, Kurrajong Park and West Haven properties of Red Ironbark – Brown Bloodwood Shrubby Woodland, which is habitat for *Bertya opposens* and the Superb Parrot (EPBC Approval 2009/5003 Condition 2b and 14b).

1.3 Offset securement

The Kenna BOP was secured as a Conservation Agreement VCA0486 on 1 October 2019 under Part 4 Division 12 of the NSW National Parks and Wildlife Act 1974 with the former NSW Department of Planning, Infrastructure and Environment (now NSW Department of Planning, Housing and Infrastructure [NSWDPHI]) and former Commonwealth Department of Environment and Energy (now Commonwealth Department of Climate Change, Energy, the Environment and Water [CDCCEEW]) notified on 25 October 2019.

The next six BOPs (Omeo VC00495, Greylands Road VC00496, Greylands VC00528, Rosevale VC00529, Kurrajong Park VC00530 and West Haven VC00531) were secured as Conservation Agreements between 26th June and 16th July 2021 under Part 4 Division 12 of the NSW National Parks and Wildlife Act 1974 with the former NSW Department of Planning and Environment (now NSWDPHI) and former Commonwealth Department of Agriculture, Water and Environment (now CDCCEEW) notified on 21 July 2021 that compliance had been achieved with EPBC Approval 2009/5003 Condition 2b (as Condition 2a previously compliant on 10 March 2020) and PA 08_0144 Schedule 5 Condition 7).

With PA 08_0144 to be surrendered, going forward the securement of the remaining component of the Stage 2 Biodiversity Offset Strategy, called the Rehabilitation Area Offset, will be guided by SSD 10269 Condition B46 currently designating that suitable arrangements to provide appropriate long-term security within 3 years of commencing development be made. However, if another date is agreed by the Secretary and to the satisfaction of the Planning Secretary then NCM will secure the Rehabilitation Area Offset as per timing to be outlined in the NCM Rehabilitation Strategy to allow for post mining rehabilitation and subsidence mitigation as well as for the Conservation Agreement process managed by NSW Biodiversity Conservation Trust (BCT).

The below listed Lots and Deposited Plans now have CAs registered on title for the following BOPs (excluding the Rehabilitation Area Offset):

- Kenna (CA0060) – Lot 73 DP 754924, Part Lot 94 DP 754924, Part Lot 95 DP 754924, Lot 111 DP 754924, Lot 112 DP 754924, Lot 113 DP 754924, Part Lot 602 DP 854685, Lot 3 DP1210577 and Part Lot 2 DP1210578
- Omeo (VC00495) – Part Lot 83 DP757124;
- Greylands Road (VC00496)– Part Lot 65 DP757114 and Part Lot 1 DP1210797;
- Greylands (VC00528) – Part Lot 841 DP1134385;
- Rosevale (VC00529) – Part Lot 63 DP757114 and Part Lot 1 DP1210797;
- Kurrajong Park (VC00530) – Part Lot DP811171; and
- West Haven (VC00531) – Part Lot 67 DP757104.

1.4 Scope and objectives

This RBOS outlines how the minor cadastral survey boundary changes as well as the contemporary PCT vegetation mapping reflected in the registered CAs still meet the requirements of Approvals for NSW SSD-10269 Condition B45 and EPBC Approval 2009/5003 Condition 2.

The scope of this project is to prepare a RBOS that updates the original BOS and its required biodiversity values, first described in PA 08_0144 and then transferred to SSD-10269 and EPBC Approval 2009/5003 for NCM.

The objectives are to:

- describe the NSW BOS requirements and associated offset areas;
- describe the proposed revisions to the NSW BOS;
- describe the way in which the Commonwealth offset requirements for threatened entities will be met; and
- describe how these NSW and Commonwealth offset biodiversity value requirements will be met by the RBOS.

1.5 Location of the study area

The study area is located on the north western slopes of New South Wales. The BOPs close to the NCM are approximately 19 km south east of Narrabri, and the Kenna BOP is located 55 km south east of Narrabri near to the locality of Maules Creek (Figure 1.1). The study area falls within the Narrabri Shire local government area in the Brigalow Belt South IBRA region and the Pilliga and Liverpool Plains subregions.

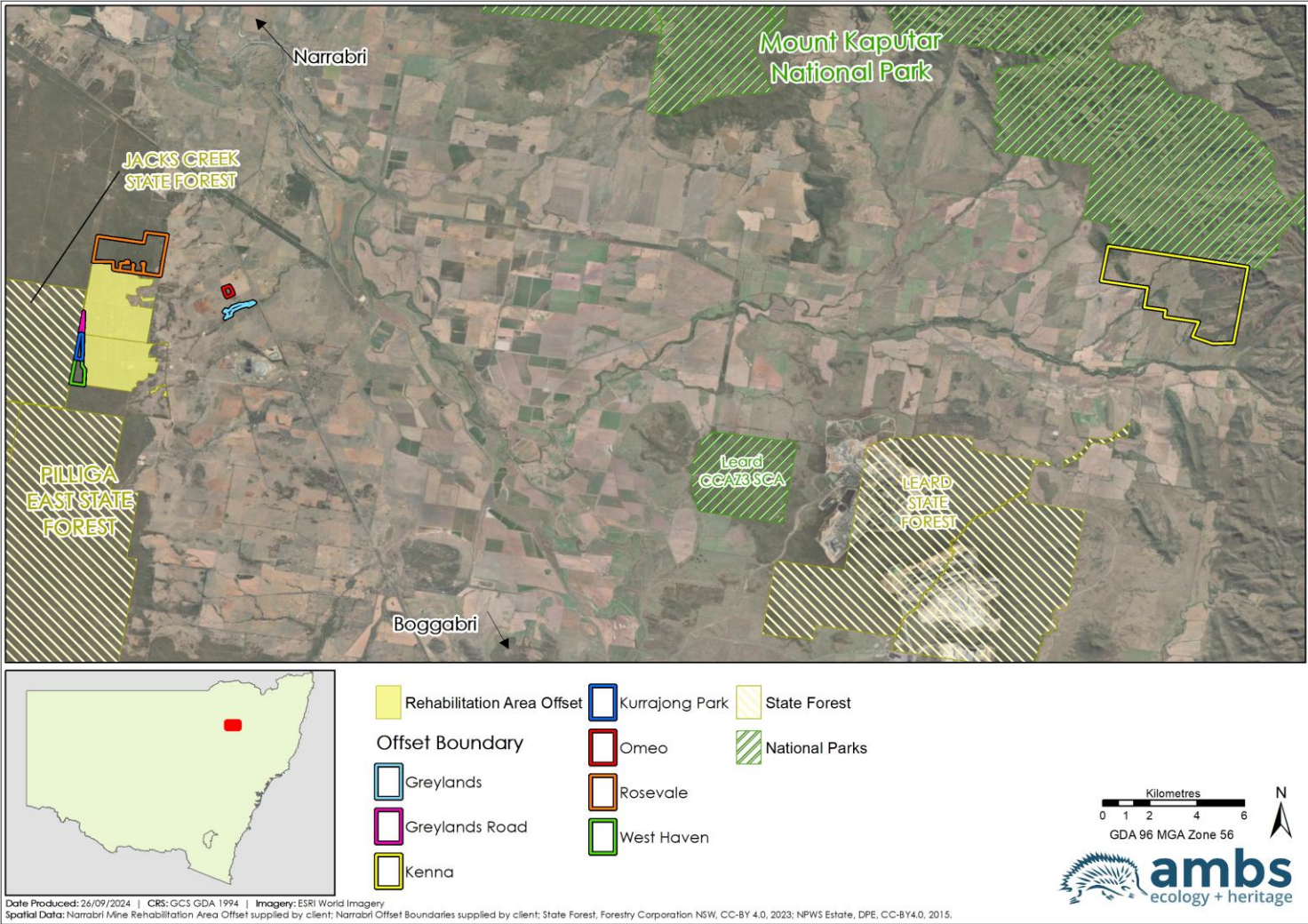


Figure 1.1 Location of the study area

2 Method

2.1 Plant Community Type mapping

A comparison between the BOS mapping and the RBOS mapping shows variation between the vegetation types mapped. The preparation of the RBOS is based on the information held within the CA prepared for each BOP. As part of the preparation of the CAs, the original vegetation types listed within the BOS had to be converted to contemporary vegetation communities.

Vegetation mapping prior to 2016 utilised the Biometric Vegetation Types [BVT]. To apply contemporary plant communities, PCTs, to areas assigned BVTs, the Biometric Vegetation Type Archives DPIE (2017) was consulted for a designated equivalent PCT. Confirmation of this best match was made by reviewing the candidate PCT description in the NSW BioNet Vegetation Classification application (DCCEEW 2024c). An exact match was not achieved for all BVTs. When this occurred, a best fit approach was used to designate a PCT to the BVT.

Allocation of PCTs to BVTs was undertaken on the Kenna BOP in 2019 for preparation of the CA (VCA0486) registered in 2019. During the CA preparation across 2018 and 2019; the PCT assignment was undertaken by the BCT in consultation with Whitehaven Coal Limited to align with the original BVT mapping described in the Kenna Off-site Biodiversity Offset Management Plan (Eco Logical Australia, 2014).

Confirmation of the applied PCT mapping, was undertaken on the Onsite BOPs by AMBS between August and September 2019. Data was collected at 16 assessment sites across the BOPs and compared to the selected PCT to confirm accuracy. A follow up investigation was then undertaken by the NSW Biodiversity Conservation Trust, in October 2019 to confirm the selected PCTs prior to formalisation of the relevant property CA agreements.

Section 3 of this report details the biodiversity values, including the PCTs, of each of the NCM BOPs based on the relevant CA and inquiry of the BioNet Atlas (DCCEEW 2024a) for recent records of threatened species. Table 4.1 in Section 4 of this report provides a comparative appraisal of the changes made to the vegetation mapping as a result of applying a PCT to BVT.

2.2 Threatened Ecological Community mapping

Threatened Ecological Communities (TECs) have been determined and mapped based on the following information sources

- Previous reports and CA agreements relating to each BOP.
- Lists of potential TEC as described in the BioNet Vegetation Classification (DCCEEW 2024a)
- NSW Final Determinations and Commonwealth Listing Advice documents relevant to the potential TEC.
- Comparison of site data, and field surveys (where they have been undertaken).

2.3 Threatened species mapping

Threatened species listed and mapped for each BOP is based on the following information sources.

- The Threatened Biodiversity Data Collection (DCCEEW 2024b).
- NSW BioNet Atlas (DCCEEW 2024a).
- Records from previous reports and CA agreements relating to each BOP (AMBS 2020a; NSW Land Registry Services 2019 and 2021 a – f).
- Recent records from AMBS surveys conducted within the BOPs (AMBS 2019a; 2020a-d, 2022; 2023a; 2023b).

Only threatened species recorded on each BOP or nearby to the BOP have been shown.

3 Overview of the Biodiversity Offset Properties

Prior to purchase for offsetting, the Kenna property was predominantly grazed and cultivated as evidenced by the extent of exotic, low diversity and derived native grasslands. Historic clearing was limited in the central flatter area and the steeper eastern and north-western areas with the overall resilience considered to be moderate to high given the BOP proximity to a large area of remnant vegetation within the adjacent Mount Kaputar National Park. Biodiversity management of the Kenna BOP commenced in 2014 with the property permanently destocked in 2016.

The Greylands, Omeo, Rosevale, Greylands Road, Kurrajong Park and West Haven BOPs had minimal agricultural management such as light grazing and potentially logging. The more eastern extents of the BOPs show evidence of more intensive cultivation/cropping such as localised high weed abundance. The extent of historic clearing was limited to the east (closest to the Kamilaroi Highway) with the majority of the BOPs adjoining the Jacks Creek State Forest to the west showing high flora and fauna diversity in well vegetated areas. Biodiversity management of these BOPs commenced in 2014 with the properties being permanently destocked between 2008 and 2016.

3.1 Kenna

3.1.1 Vegetation

Five plant community types in a range of condition states were mapped across the Kenna BOP (EcoLogical Australia 2014). The PCTs are listed in Table 3.1, shown in Figure 3.1 and described below. Areas that were assigned to cleared land in the Kenna BOP (EcoLogical Australia 2014) have been re assigned to DNG forms of the PCTs determined as occurring in the BOP.

Table 3.1 Area and condition of plant community types on Kenna BOP

PCT ID	Plant Community Type (PCT)	Condition	Area (ha)
78	River Red Gum riparian tall woodland / open forest wetland in the Nandewar and Brigalow Belt South Bioregions	Moderate/Poor	35.10
885	Heathy shrublands on rocky outcrops of the western slopes	Good	17.96
1313	White Cypress Pine - Narrow-leaved Ironbark shrub/grass open forest of the western Nandewar Bioregion	Good/Moderate/DNG	703.11
1314	White Cypress Pine - Silver-leaved Ironbark – Tumbledown Red Gum shrubby open forest of the Nandewar and Brigalow Belt South Bioregions	Good	10.49
1383	White Box grassy woodland of the Nandewar and Brigalow Belt South Bioregions	Good/Moderate/Poor/DNG	477.40
Total			1,244.06

PCT 1383: White Box grassy woodland



PCT Name: White Box Grassy Woodland of the Nandewar and Brigalow Belt South Bioregions

Vegetation Class: Western Slopes Grassy Woodlands

EPBC Status: Critically endangered: White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

BC Status: Critically endangered: White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

Description on the Property

Plant Community Type 1383 is likely to have been the dominant vegetation type across the study area although the majority has been cleared and is now present as derived grassland with the occasional *Eucalyptus albens* (White Box) scattered throughout. The most intact stand is present in the centre of the site. Although all areas have undergone past disturbance and were grazed up until 2016, the species diversity in this area is greater than in the areas of derived grassland with a number of herbs and forbs also present. Four condition types were assigned to this community; a near intact category (good) with all strata present, scattered trees with a native understorey, scattered trees with an exotic understorey and a derived grassland dominated by native species.

The canopy was dominated by *Eucalyptus albens* and *Callitris glaucophylla* (White Cypress Pine). *Eucalyptus crebra* (Narrow-leaved Ironbark) was also scattered throughout. A small number of areas occur within this community where regrowth of *Callitris glaucophylla* is denser, but the vegetation community is the same in terms of species composition and disturbance levels and consequently has been included in the good condition category. Small tree species within this community and scattered throughout grassland areas derived from this community include *Geijera parviflora* (Wilga) and *Brachychiton populneus* (Kurrajong). *Pimelea neo-anglica* (Poison Pimelea) is also present within this community.

The ground layer is dominated by native grasses including *Bothriochloa decipiens* (Pitted Bluegrass), *Austrostipa scabra* (Rough Speargrass), *Eragrostis leptostachya* (Paddock Lovegrass), *Aristida* sp., *Sporobolus creber* (Rat's Tail Grass), *Chloris truncata* (Windmill Grass) and *Rytidosperma* sp. (Wallaby Grass) A variety of herbs and forbs are also present and include *Chrysocephalum apiculatum* (Common Everlasting), *Wurmbea dioica* (Early Nancy), *Vittadinia cuneata* (Fuzzweed), *Cymbonotus lawsonianus* (Bears-ear) and *Oxalis perennans* (Yellow Wood Sorrel).

Within the study area, this PCT is equivalent to the Critically Endangered Ecological Community - White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland under the BC and EPBC Acts.

PCT 1313: White Cypress Pine Narrow-leaved Ironbark shrub/grass open forest



PCT Name: White Cypress Pine - Narrow-leaved Ironbark shrub/grass open forest of the western Nandewar Bioregion

Vegetation Class: Western Slopes Dry Sclerophyll Forest

EPBC Status: not listed

BC Status: not listed

Description on Property

White Cypress Pine - Narrow-leaved Ironbark shrub/grass open forest is the dominant vegetation type across the eastern part of the study area. This community is present on the rises and rocky hills / escarpments. All areas have undergone past logging and consequently some areas support dense *Callitris glaucophylla* (White Cypress Pine) regrowth. This community occurs as woodland, semi cleared areas with scattered trees and DNG.

This community dominates the east of the site on the steep slopes. A smaller stand is also present in the north western corner of the site. The dominant canopy species include White Cypress Pine, *Eucalyptus crebra* (Narrow-leaved Ironbark). *Eucalyptus albens* (White Box) is also present in this community within the central portion of the large stand of vegetation in the east of the site on the lower slopes and *Eucalyptus dealbata* (Tumbledown Red Gum) is also present in some parts of this community. A large number of old stumps from previously clearing present throughout this community. *Alphitonia excelsa* (Red Ash) is also present on the north-western parts of this community. Three condition types were assigned to this community; a near intact category with all strata present, scattered trees with a native understorey and a derived grassland dominated by native species.

Shrub species include *Beyeria viscosa* (Sticky Wallaby Bush) is dominant in most areas with *Olearia elliptica* (Sticky Daisy-Bush) also common throughout. Other less common shrubs include *Notelaea*

microcarpa (Native Olive), *Acacia cheelii* (Motherumbah), *Cassinia quinquefaria* (Cough Bush) (common in the north eastern part of this community), *Melichrus urceolatus* (Urn Heath), *Acacia triptera x cheelii* and *Pimelea neo-anglica* (Poison Pimelea) is also present within this community.

The ground layer is dominated by native species including *Austrostipa scabra* (Rough Speargrass), *Eragrostis* spp. (Lovegrasses), *Aristida ramosa* (Purple Wiregrass), *Enneapogon* sp. (Nineawn Grass), *Cymbopogon refractus* (Barbed Wire Grass), *Rytidosperma* sp. (Wallaby Grass), *Panicum effusum* (Hairy Panic), *Desmodium brachypodum* (Large Tick-trefoil), *Cheilanthes sieberi* (Rockfern), *Dichondra repens* (Kidneyweed), *Gonocarpus elatus* (Raspwort), *Fimbristylis dichotoma* (Common Fringe Sedge) and *Dianella revoluta* (Blue Flax-lily).

The weed species *Opuntia stricta* is scattered within this community and *Medicago* and *Trifolium* species occur in the DNG areas.

PCT 1314: White Cypress Pine Silver-leaved Ironbark-Tumbledown Red Gum shrubby open forest



PCT Name: White Cypress Pine - Silver-leaved Ironbark - Tumbledown Red Gum shrubby open forest of the Nandewar and Brigalow Belt South Bioregions

Vegetation Class: Western Slopes Dry Sclerophyll Forest

EPBC Status: not listed

BC Status: not listed

Description on Property

White Cypress Pine - Silver-leaved Ironbark - Tumbledown Red Gum shrubby open forest is patchily distributed throughout areas of White Cypress Pine - Narrow-leaved Ironbark shrub/grass open forest primarily in the east of the site. This community was present on the rises and slopes / rocky hills. All areas had undergone past logging. Two condition types were assigned to this community; a near intact category with all strata present and scattered trees with a native understorey.

The dominant canopy species include *Callitris glaucophylla* (White Cypress Pine) and *Eucalyptus melanophloia* (Silver-leaved Ironbark). *Eucalyptus dealbata* (Tumbledown Red Gum) is also present in some parts of this community. A large number of old stumps from previous clearing are present throughout this community.

Beyeria viscosa (Sticky Wallaby Bush) is the dominant shrub species within this community. Other shrubs include *Acacia* spp. and *Indigofera adesmiifolia* (Tick Indigo).

The ground layer is dominated by native species and there are large areas of bare ground, rock and litter (up to 85 %). Native species present in the ground layer include *Austrostipa scabra* (Rough Speargrass), *Eragrostis* spp. (Lovegrasses) *Aristida ramosa* (Purple Wiregrass), *Enneapogon* sp. (Nineawn Grass), *Cymbopogon refractus* (Barbed Wire Grass), *Desmodium brachypodum* (Large

Tick-trefoil), *Cheilanthes distans* (Bristly Cloak Fern), *Dichondra* sp. (Kidneyweed), *Lomandra filiformis* (Wattle Matrush) and *Stackhousia* sp. The orchid *Pterostylis* sp. was also recorded within this community.

Exotic species present in more disrobed locations include *Trifolium arvense*, *Medicago* sp., *Hypochaeris radicata* and *Opuntia stricta*.

PCT 78: River Red Gum riverine woodlands and forests



PCT Name: River Red Gum riverine woodlands and forests in the Nandewar and Brigalow Belt South Bioregions

Vegetation Class: Inland Riverine Forests

EPBC Status: not listed

BC Status: not listed

Description on Property

This vegetation type is present in two forms. Along Maules Creek the vegetation is an alluvial woodland characteristic of the Regional Vegetation Community (RVC) 73 (River Red Gum riverine woodlands and forests, Darling Riverine Plains, Brigalow Belt South and Nandewar) with a tall, denser canopy. Along the smaller drainage lines across the site, the vegetation was highly disturbed and more characteristic of Bracteate Honey Myrtle riparian shrubland Brigalow Belt South with a dense small tree layer and scattered Eucalypts.

Canopy species present in this area include *Eucalyptus camaldulensis* (River Red Gum), *Casuarina cunninghamiana* (River Oak) and *Angophora floribunda* (Rough-barked Apple). The small tree / shrub layer was dominated by *Acacia* sp. and *Melaleuca bracteata* (Black Tea-tree) with *Brachychiton populneus* (Kurrajong) also present.

The ground layer was a mixture of native and exotic species dominated by *Austrostipa verticillata* (Slender Bamboo Grass) and the exotic species *Cerastium glomeratum* (Mouse-ear Chickweed). Other groundcover species present include *Microlaena stipoides* (Weeping Grass) and *Dichondra*

repens (Kidneyweed). Dense infestations of the exotic *Araujia sericifera* (Moth Vine) are also present in this area.

Common weed species include *Cerastium glomeratum*, *Hypochaeris radicata*, *Sida rhombifolia*, *Medicago* sp. and *Bidens pilosa*.

PCT 885 Heathy shrublands



PCT Name: Heathy shrublands on rocky outcrops of the western slopes

Vegetation Class: Northern Montane Heaths

EPBC Status: not listed

BC Status: not listed

Description on Property

This vegetation type was present on the rocky outcrops above a waterfall amongst areas of White Cypress Pine - Narrow-leaved Ironbark shrub/grass open forest and White Cypress Pine - Silver-leaved Ironbark - Tumbledown Red Gum shrubby open forest. It had a shrubland structure with emergent small trees. This community is in good condition with the majority of species recorded being native.

Scattered *Eucalyptus dealbata* (Tumbledown Red Gum) and *Callitris glaucophylla* (White Cypress Pine) were present with Tumbledown Red Gum exhibiting a mallee-like form. A dense stand of *Micromyrtus sessilis* with the occasional *Cryptandra propinqua* and *Pimelea neo-anglica* (Poison Pimelea) were present in the shrub strata.

The ground layer supports large areas of mosses and lichens and a diversity of groundcover species including herbs, forbs and grasses sparsely spread across the rocks. Ground layer species included *Cymbopogon refractus* (Barbed Wire Grass), *Aristida* sp., *Austrostipa* sp., *Cheilanthes sieberi* (Rockfern), *Gonocarpus elatus* (Raspwort), *Geranium* sp., *Dichondra repens* (Kidneyweed), *Galium gaudichaudii* (Rough Bedstraw), *Wurmbea dioica* (Early Nancy), *Crassula* sp., *Pterostylis* sp., *Enneapogon* sp. (Nineawn Grass) and *Poa sieberiana* (Snow Grass).

Weed species present included, *Opuntia* sp. (Prickly Pear) was recorded within this community in low numbers as was *Hypochaeris radicata* (Flatweed).

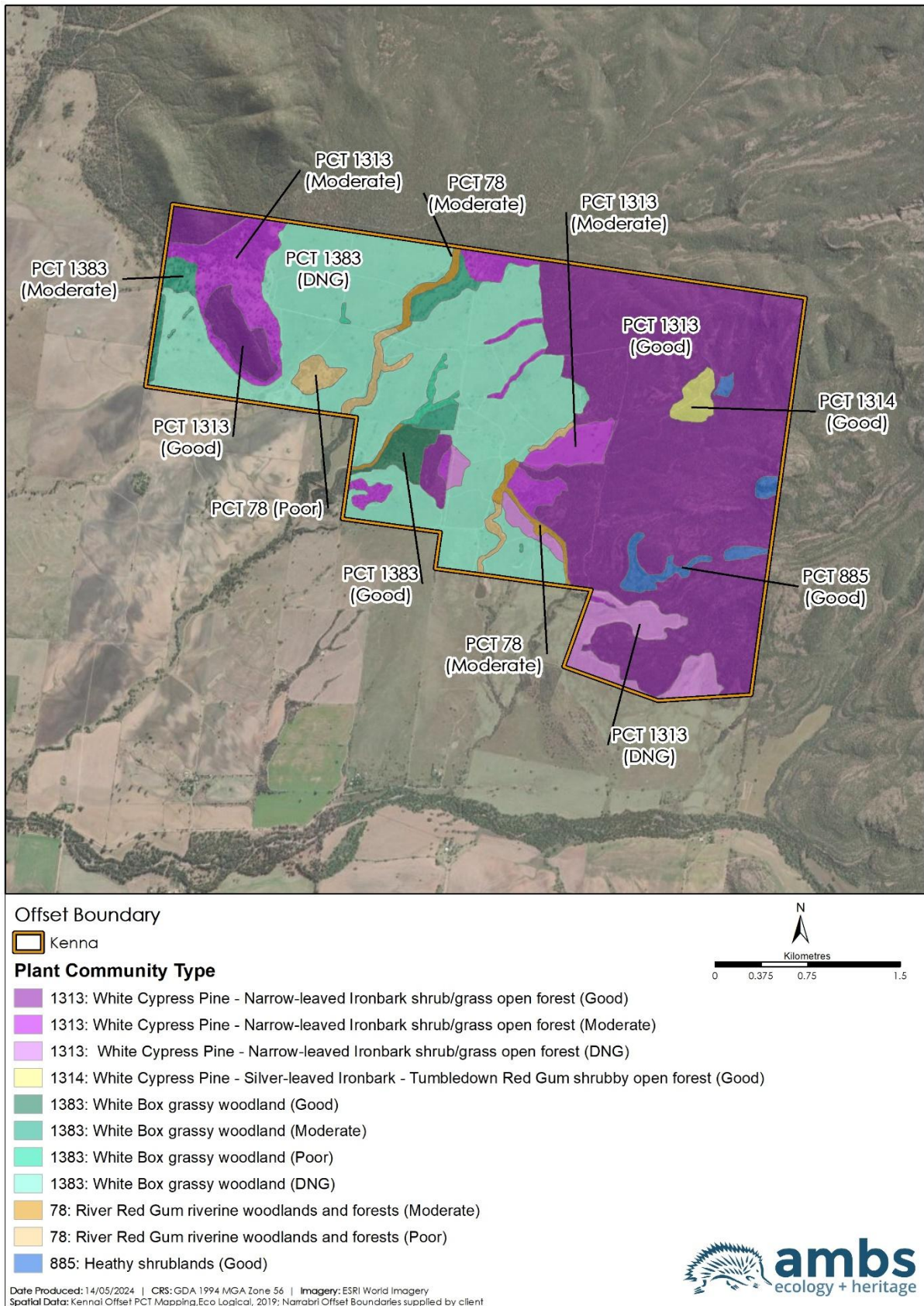


Figure 3.1 Map of the Plant Community Types on the Kenna BOP

3.1.2 Threatened Ecological Communities

One threatened ecological community (TEC) has been recorded in the Conservation Area of the Kenna BOA (Table 3.2; Figure 4.1). PCT 1383-White Box grassy woodland of the Nandewar and Brigalow Belt South Bioregion’ is consistent with the ‘White Box-Yellow Box-Blakely’s Red Gum grassy woodland’ listed as critically endangered under the NSW *Biodiversity Conservation Act 2016* (BC Act) and under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Table 3.2 Threatened ecological communities present in the Kenna BOA

Listed under the BC Act	Listed under the EPBC Act	Kenna Area (ha)
White Box – Yellow Box – Blakely’s Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (CEEC)	White box - yellow box - Blakely's red gum grassy woodlands and derived native grasslands (CEEC)	477.40
Total		477.40

3.1.3 Threatened plants

The Kenna BOP provides habitat for two threatened flora species *Dichanthium setosum* and *Tylophora linearis* (Figure 3.3).

3.1.4 Fauna habitat

A range of fauna habitat has been identified in PCTs across the Kenna BOP (Table 3.3).

Table 3.3 Fauna habitat types identified within the Kenna BOP (Whitehaven 2019).

Plant Community Type	Habitat Values
1383: White Box grassy woodland of the Nandewar and Brigalow Belt South Bioregions	Scattered trees Hollow bearing trees Woody debris Tall grassland
1313: White Cypress Pine - Narrow-leaved Ironbark shrub/grass open forest of the western Nandewar Bioregion	Hollow-bearing trees Woody debris Rocky outcrops Shrubby and grassy formations Abundant leaf litter
1314: White Cypress Pine - Silver-leaved Ironbark - Tumbledown Red Gum shrubby open forest of the Nandewar and Brigalow Belt South Bioregions	Scattered trees Hollow-bearing trees Woody debris Rocky outcrops Shrubby and grassy formations Abundant leaf litter
78: River Red Gum riverine woodlands and forests in the Nandewar and Brigalow Belt South Bioregions	Dense shrubs Hollow bearing trees
885: Heathy shrublands on rocky outcrops of the western slopes	Dense shrubs Rocky outcrops Water pools Waterfalls

The Conservation Area of the Kenna BOP contains 8.4 km of direct connectivity with the Mount Kaputar National Park along the northern and eastern boundaries of the property and reduces the distance to the south to remnant riparian bushland along Maules Creek (1.0 km at the closest

point), other Conservation Area/Biodiversity Offset Areas (Onavale 3.7 km at the closest point) and further south to the Leard State Forest (4.3 km at the closest point).

3.1.5 Threatened fauna

Fourteen threatened species have been recorded on the Kenna BOP (Table 3.4; Figure 3.2). Superb Parrots have not been detected within 10 km of the Kenna BOA, but suitable foraging habitat exists within the property.

Table 3.4 Threatened fauna species that have been recorded on Kenna BOP

Common Species Name	Scientific Species Name	BC Act Listing	EPBC Act Listing
Brown Treecreeper (eastern subspecies)	<i>Climacteris picumnus victoriae</i>	V	V
Diamond Firetail	<i>Stagonopleura guttata</i>	V	V
Dusky Woodswallow	<i>Artamus cyanopterus cyanopterus</i>	V	-
Eastern Cave Bat	<i>Vespadelus troughtoni</i>	-	-
Grey-crowned Babbler (eastern subspecies)	<i>Pomatostomus temporalis temporalis</i>	V	-
Hooded Robin (south-eastern form)	<i>Melanodryas cucullata</i>	V	-
Large-eared Pied Bat	<i>Chalinolobus dwyeri</i>	V	V
Little Lorikeet	<i>Glossopsitta pusilla</i>	V	-
Little Pied Bat	<i>Chalinolobus picatus</i>	V	-
Speckled Warbler	<i>Chthonicola sagittata</i>	V	-
Spotted Harrier	<i>Circus assimilis</i>	V	-
Turquoise Parrot	<i>Neophema pulchella</i>	V	-
Varied Sittella	<i>Daphoenositta chrysoptera</i>	V	-
Yellow-bellied Sheath-tail-bat	<i>Saccolaimus flaviventris</i>	V	-

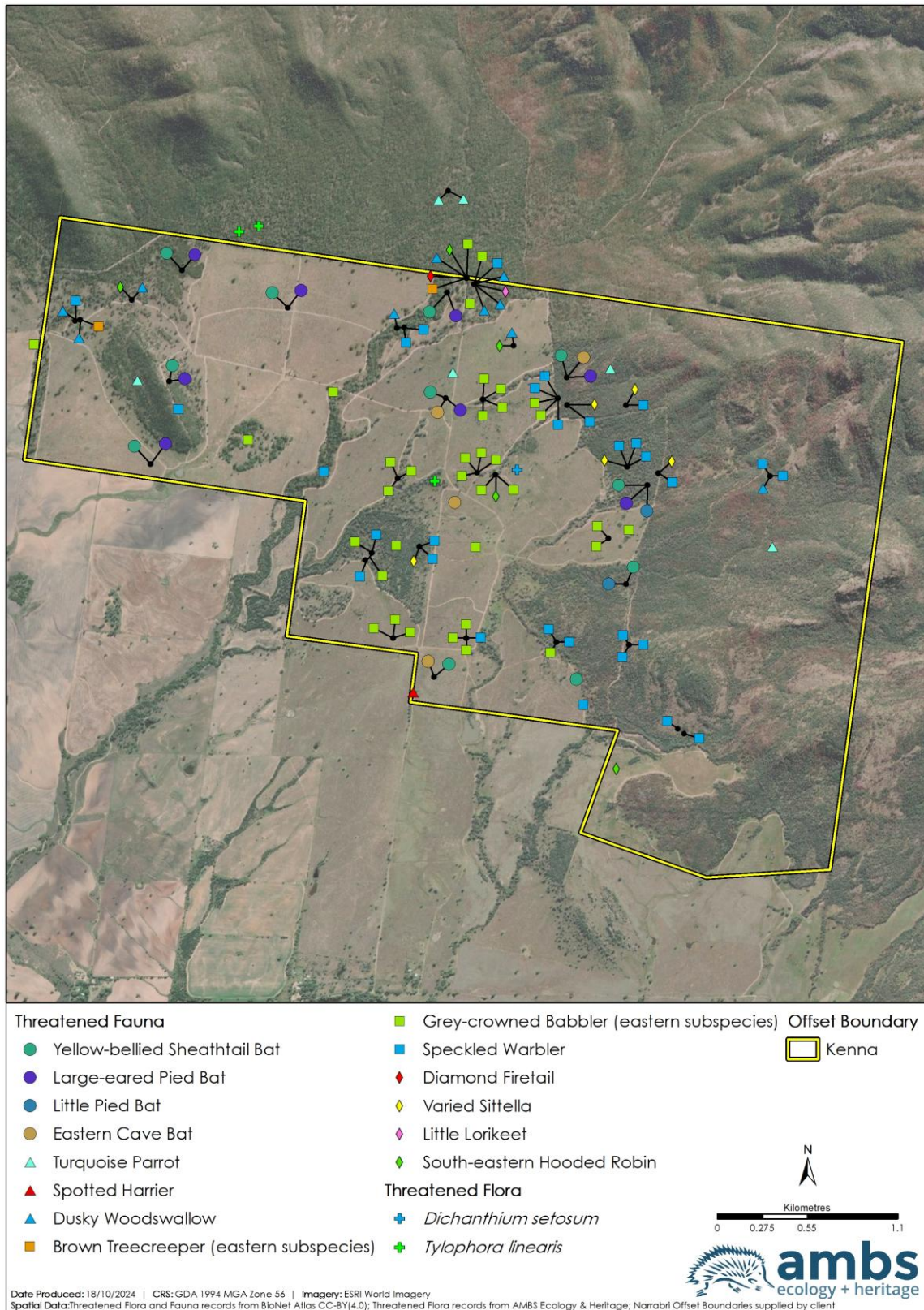


Figure 3.2 Location of Threatened species within the Kenna BOP

3.2 Greylands

3.2.1 Vegetation

Three plant community types were described and mapped across the Greylands BOP. The PCTs are listed in Table 3.5, shown in Figure 3.3 and described below.

Table 3.5 Area and condition of plant community types on Greylands BOA

PCT ID	Plant Community Type (PCT)	Condition	Area (ha)
88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion	Moderate	10.06
101	Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion	Moderate	2.32
619	Derived Wire Grass grassland of the NSW Brigalow Belt South Bioregion and Nandewar Bioregion Assisted natural revegetation to PCT 88/101	DNG	2.59
Total Native Vegetation			14.97
Dam			0.12
Total			15.09

PCT 88: Pilliga Box - White Cypress Pine - Buloke shrubby woodland



PCT Name: Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion

Vegetation Class: Pilliga Outwash Dry Sclerophyll Forests

EPBC Status: not listed

BC Status: not listed

Description on Property

Within the BOP, PCT 88 occurs as a semi cleared woodland with small patches of regrowth.

Is a woodland dominated by *Eucalyptus pilligaensis* (Pilliga Box), often in association with *Callitris glaucophylla* (White Cypress Pine). Common shrub species in this community include *Eremophila mitchellii* (Budda), *Geijera parviflora* (Wilga), *Myoporum montanum* (Western Boobialla), *Acacia deanei* (Dean’s Wattle), *Maireana microphylla* (Small-leaf bluebush) and *Dodonaea viscosa* (Sticky Hop Bush). Regrowth patches may include dense stands of *Callitris glaucophylla* (White Cypress Pine) or *Acacia deanei* (Dean’s Wattle).

The ground layer is sparse, with common grasses including *Aristida ramosa* (Purple Wiregrass), *Aristida jerichoensis* (Jericho Wiregrass), *Austrostipa scabra* (Speargrass), *Enteropogon acicularis* (Curly Windmill Grass) and *Rytidosperma bipartitum* (Wallaby Grass). Common forbs include Corrugated Sida (*Sida corrugata*), *Boerhavia dominii* (Tarvine), *Brunoniella australis* (Blue Trumpet), *Glycine clandestina* and *Rostellularia adscendens*.

PCT 101 Poplar Box - Yellow Box - Western Grey Box grassy woodland



PCT Name: Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion

Vegetation Class: Floodplain Transition Woodlands

EPBC Status: In its current condition state this PCT does not meet the requirements to be listed as a TEC.

BC Status: In its current condition state this PCT does not meet the requirements to be listed as a TEC.

Description on Property

Within the BOA, PCT 101 occurs as a semi cleared woodland grading into PCT 88 to the west.

PCT 101 is a tall woodland dominated by *Eucalyptus populnea* (Poplar Box) in association with *Eucalyptus microcarpa* (Western Grey Box) and *Casuarina cristata* (Belah). Shrubs are typically sparse but may be denser in areas of canopy disturbance and adjacent to cleared areas. Common shrub species include *Geijera parviflora* (Wilga), *Notelaea microcarpa* (Native Olive), *Capparis mitchellii* (Wild Orange) and *Maireana microphylla* (Bluebush).

The ground layer is often dense and is dominated by a diverse range of grass and forb species. Common grass species include *Aristida personata* (Purple Wire Grass), *Aristida ramosa* (Purple Wire Grass), *Austrostipa scabra* (Speargrass), *Bothriochloa decipiens* (Redleg Grass) and *Enteropogon acicularis*. Forb species include *Einadia nutans* (Climbing Saltbush), *Calotis lappulacea* (Burr Daisy), *Sida corrugata* (Corrugated Sida), *Vittadinia cuneata* (Fuzzweed), *Vittadinia muelleri*, *Rumex brownii* (Dock) and *Rostellularia adscendens*.

PCT 619: Derived Wire Grass grassland



PCT Name: Derived Wire Grass grassland of the NSW Brigalow Belt South Bioregion and Nandewar Bioregion

Vegetation Class: Western Slopes Grassland (Derived)

EPBC Status: not listed

BC Status: not listed

Description on Property

Within the BOA, PCT 619 is most likely derived from cleared vegetation communities such as PCT 88 and PCT 101 that still occur nearby in various condition states.

A canopy layer does not occur, but *Eucalyptus* species are regenerating in some locations. Where it occurs, the shrub layer is sparse and may include species such as *Geijera parviflora* (Wilga), *Maireana microphylla* (Small-leaf Bluebush) and *Dodonaea viscosa* (Sticky Hop Bush).

The ground layer is typically dominated by grass species such as *Aristida personata* (Purple Wire Grass), *Aristida vagans* (Threeawn Speargrass) and *Aristida ramosa* (Purple Wire Grass). Other grass species include *Rytidosperma bipartitum* (Wallaby Grass), *Rytidosperma racemosum* (Wallaby Grass), *Austrostipa verticillata* (Slender Bamboo Grass), *Cymbopogon refractus* (Barbed-wire Grass), *Enteropogon acicularis* and *Bothriochloa macra* (Redleg Grass). Typical forbs include *Boerhavia dominii* (Tarvine), *Rumex brownii* (Swamp Dock), *Tribulus micrococcus* (Spineless Caltrop), *Erodium crinitum* (Blue Stalkbill), *Alternanthera denticulata*, *Geranium solanderi* var. *solanderi*, *Dichondra repens* (Kidney Weed), *Oxalis perennans*, *Solanum esuriale*, *Wahlenbergia communis* (Tufted Bluebell), *Portulaca oleracea* (Pigweed).

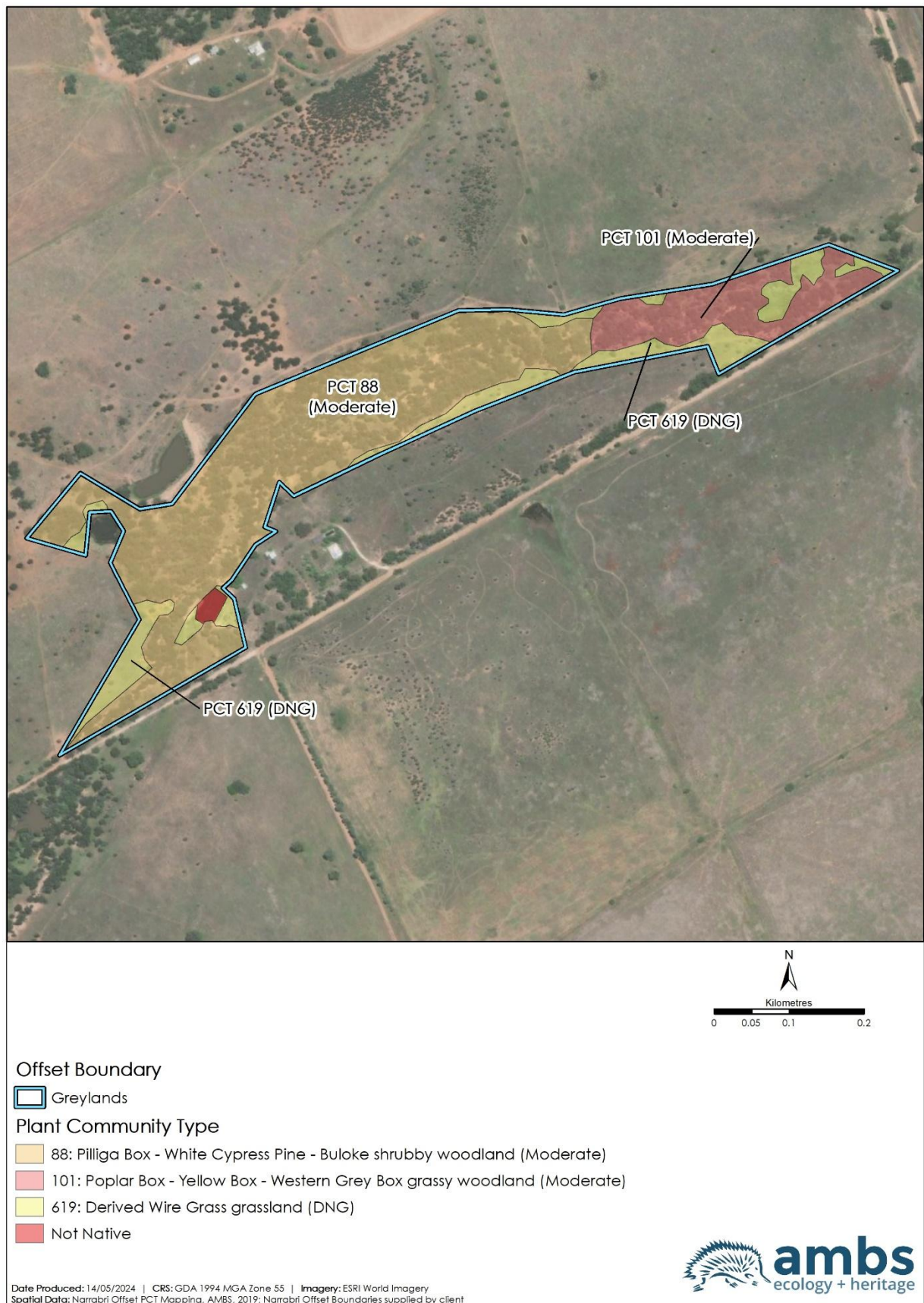


Figure 3.3 Map of the Plant Community Types on the Greylands BOA

3.2.2 Threatened Ecological Communities

No vegetation in a condition to qualify as a Threatened Ecological Communities (TEC) has been recorded within the Greylands BOA.

3.2.3 Threatened plants

The Greylands BOP provides habitat for one threatened plant species recorded on the site, *Pomaderris queenslandica* (Scant Pomaderris) (Figure 3.4).

3.2.4 Fauna habitat

A range of fauna habitat has been identified in PCTs across the Greylands BOP (Table 3.6).

Table 3.6 Fauna habitat types identified within the Greylands BOP

Plant Community Type	Habitat Values
88: Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion	Scattered trees Hollow bearing trees Foraging resources
101: Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion	Hollow-bearing trees Woody debris Foraging and roosting resources

The Greylands BOP is a remnant patch of vegetation associated with an unnamed ephemeral drainage line running from south west to north east. Whilst this connectivity is degraded in many areas to derived native grasslands with scattered trees, the drainage line connects a road reserve in the north east to Jacks Creek State Forest in the west.

3.2.5 Threatened fauna

Three threatened fauna species have been recorded on the Greylands BOP (Table 3.7, Figure 3.4). There are records of the Superb Parrot within 10 km and there is potential foraging habitat on the property.

Table 3.7 Threatened fauna species recorded on the Greylands Conservation Area

Common Name	Scientific Name	BC Act Listing*	EPBC Act Listing*
Grey-crowned Babbler (eastern subspecies)	<i>Pomatostomus temporalis temporalis</i>	V	-
White-throated Needletail	<i>Hirundapus caudacutus</i>	-	V
Yellow-bellied Sheath-tail-Bat	<i>Saccolaimus flaviventris</i>	V	-

* V= Vulnerable, E= Endangered, CE= Critically Endangered



Figure 3.4 Location of threatened species recorded on the Greylands BOA

3.3 Greylands Road

3.3.1 Vegetation

One plant community type was described and mapped across the Greylands Road BOP. The PCT is listed in Table 3.8, shown in Figure 3.5 and described below.

Table 3.8 Area and condition of plant community types on Greylands Road BOA

PCT ID	Plant Community Type (PCT)	Condition	Greylands Road Area (ha)
406	White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests	Good	5.62
Total Native Vegetation			5.62
Tracks			0.05
Total			5.67

PCT 406 White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest



PCT Name: White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests

Vegetation Class: Western Slopes Dry Sclerophyll Forest

EPBC Status: not listed

BC Status: not listed

Description on Property

PCT 406 is the dominant vegetation type across the Greylands Road BOA. This community typically occurs on rocky rises in the eastern Pilliga region. On the northern end of the area PCT 406 intergrades with the surrounding PCT 404 Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests. Across the BOA, this community occurs in a relatively intact (moderate to good) condition.

The community is a mid to tall, shrubby woodland with a canopy dominated by *Eucalyptus fibrosa* (Red Ironbark) often in association with *Corymbia trachyphloia* (White Bloodwood). This community is characterised by a small tree layer dominated by *Acacia cheelii* (Motherumbah). *Eucalyptus dwyeri* (Dwyer's Red Gum) and *Alphitonia excelsa* (Red Ash) may also be present.

The shrub layer is typically dense and dominated by a diverse range of tall shrubs, including *Philotheca difformis* (Small-leaf Wax-flower), *Philotheca salsolifolia*, *Philotheca ciliata*, *Phebalium squamulosum* (Scaly Phebalium) and *Calytrix tetragona* (Common Fringe Myrtle). The vulnerable shrub *Bertya opposens* (Coolabah Bertya) may be dominant in some areas. A sparse low shrub layer is often present and includes *Homoranthus flavescens* and *Melichrus urceolatus* (Urn Heath).

The ground layer is variable and may be sparse or mid to dense in places. Common grass species include *Cleistochloa rigida*, *Thyridolepis mitchelliana* (Mulga Mitchell Grass) and *Aristida ramosa* (Purple Wiregrass). The sedges *Lepidosperma laterale* and *Schoenus kennyi* are often present. The ground layer may also include a range of forb species such as *Goodenia rotundifolia*, *Stypandra glauca* (Nodding Blue Lily) and *Chloanthes parviflora*.

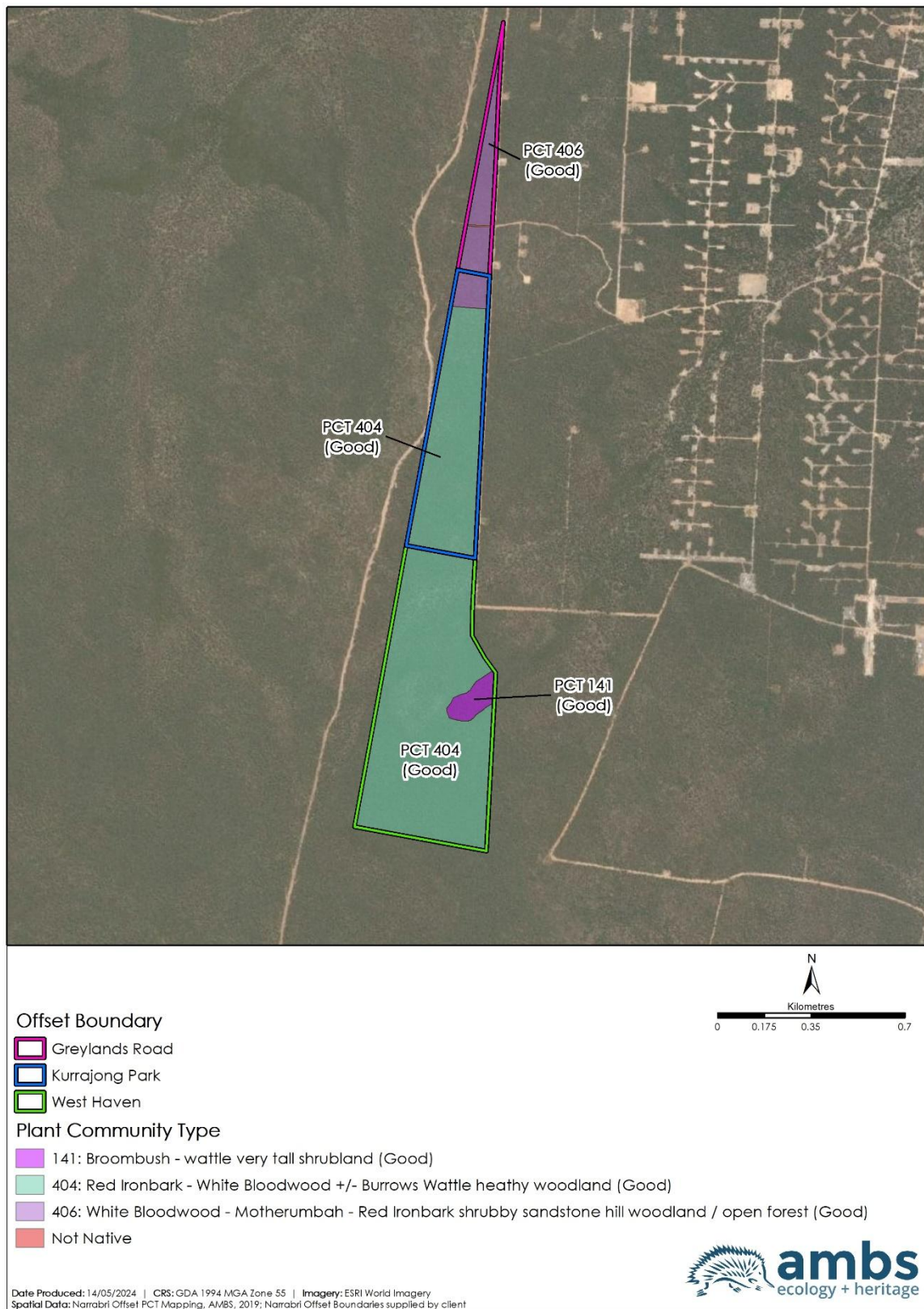


Figure 3.5 Map of the Plant Community Types on the Greylands Road BOA

3.3.2 Threatened Ecological Communities

No Threatened Ecological Communities (TECs) have been recorded in the Greylands Road BOA.

3.3.3 Threatened plants

No threatened plant species has been recorded on the Greylands Road BOP. *Bertya opposens* (Coolabah Bertya) has been recorded nearby (Figure 3.9).

3.3.4 Fauna habitat

Fauna habitat is provided in PCT 406 for a range of fauna species, given the presence rock outcrops, small caves, as well as hollow bearing trees and coarse woody debris.

The Greylands Road BOP is imbedded in vegetation adjacent to the Jacks Creek State Forest which provides good connectivity to the west into the Pilliga National Park and south to the Pilliga Nature Reserve.

3.3.5 Threatened fauna

Five threatened species have been recorded on or immediately adjacent to the Greylands Road BOP (Table 3.9; Figure 3.6). There are records of the Superb Parrot within 10 km and there is potential foraging habitat on the property.

Table 3.9 Threatened fauna species recorded on or adjacent to the Greylands Road BOP

Common Name	Scientific Name	BC Act Listing*	EPBC Act Listing*
Dusky Woodswallow	<i>Artamus cyanopterus cyanopterus</i>	V	-
Grey-crowned Babbler (eastern subspecies)	<i>Pomatostomus temporalis temporalis</i>	V	-
Speckled Warbler	<i>Chthonicola sagittata</i>	V	-
White-throated Needletail	<i>Hirundapus caudacutus</i>	-	V
Yellow-bellied Sheathtail-Bat	<i>Saccolaimus flaviventris</i>	V	-

* V= Vulnerable, E= Endangered, CE= Critically Endangered

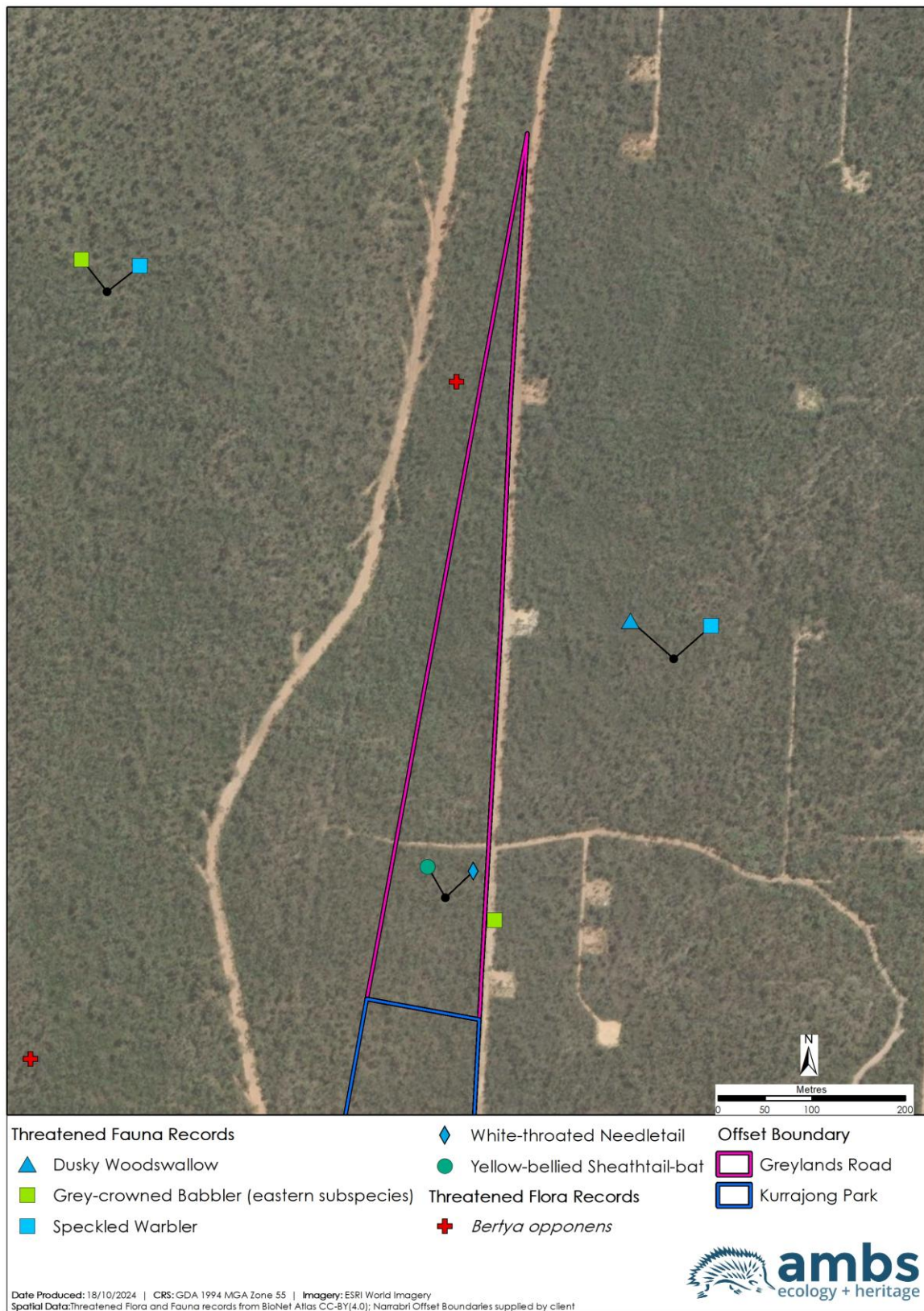


Figure 3.6 Location of threatened species recorded on or adjacent to the Greylands Road BOA

3.4 Omeo

3.4.1 Vegetation

Two plant community type was described and mapped across the Omeo BOP. The PCTs are listed in Table 3.10, shown in Figure 3.7 and described below.

Table 3.10 Area and condition of plant community types on Omeo BOA

PCT ID	Plant Community Type (PCT)	Condition	Omeo Area (ha)
81	Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion	Good	9.28
619	Derived Wire Grass grassland of the NSW Brigalow Belt South Bioregion and Nandewar Bioregion (DNG) Replanted to establish PCT 81	Moderate	1.56
Total			10.84

PCT 81 Western Grey Box - cypress pine shrub grass shrub tall woodland



PCT Name: Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion

Vegetation Class: Floodplain Transition Woodland

EPBC Status Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia

BC Status: Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions

Description on Property

PCT 81 is the dominant vegetation type within the Omeo BOA. Despite the woodland community lacking many old growth trees and adverse seasonal conditions at the time of assessment, the community was in moderate condition.

This community is a tall woodland dominated by *Eucalyptus microcarpa* (Western Grey Box) in association with *Eucalyptus pilligaensis* (Pilliga Box) with scattered *Callitris glaucophylla* (White Cypress Pine). The shrub layer is sparse with thicker patches in parts, with common species including *Geijera parviflora* (Wilga), *Eremophila mitchellii* (Budda), *Capparis mitchellii* (Native Orange) and *Maireana microphylla* (Small-leaf bluebush). The vines *Parsonsia eucalyptophylla* (Gargaloo) and *Marsdenia viridiflora* subsp. *viridiflora* (Native Pear) are also common.

The ground layer is mid to dense and dominated by grasses and forbs. Common grass species include *Austrostipa ramosissima* (Stout Bamboo Grass), *Austrostipa scabra* (Speargrass), *Aristida personata* (Purple Wire-grass) and *Enteropogon acicularis* (Windmill Grass). Common forb species include *Boerhavia dominii* (Tarvine), *Brunoniella australis* (Blue Trumpet), *Dichondra repens* (Kidney Weed) and *Sida corrugata* (Corrugated Sida).

Priority weeds *Opuntia stricta* (Common Prickly Pear), *Lycium ferocissimum* (African Boxthorn) and *Bryophyllum delagoense* (Mother of Millions) were also present.

PCT 619 Derived Wire Grass grassland



PCT Name: Derived Wire Grass grassland of the NSW Brigalow Belt South Bioregion and Nandewar Bioregion.

Vegetation Class: Western Slopes Grassland

EPBC Status: not listed

BC Status: not listed

Description on Property

Within the Omeo BOP PCT 619 occurs in a cleared area likely to have previously supported PCT 81.

A canopy layer does not occur, but *Eucalyptus* species are regenerating in some locations. If present the shrub layer is sparse and may include species such as *Geijera parviflora* (Wilga), *Maireana microphylla* (Small-leaf Bluebush) and *Dodonaea viscosa* (Sticky Hop Bush).

The ground layer is typically dominated by grass species such as *Aristida personata* (Purple Wire Grass), *Aristida vagans* (Threeawn Speargrass) and *Aristida ramosa* (Purple Wire Grass). Other grass species include *Rytidosperma bipartitum* (Wallaby Grass), *Rytidosperma racemosum* (Wallaby Grass), *Austrostipa verticillata* (Slender Bamboo Grass), *Cymbopogon refractus* (Barbed-wire Grass), *Enteropogon acicularis* and *Bothriochloa macra* (Redleg Grass). Typical forbs include *Boerhavia dominii* (Tarvine), *Rumex brownii* (Swamp Dock), *Tribulus micrococcus* (Spineless Caltrop), *Erodium cicutarium* (Blue Stalkbill), *Alternanthera denticulata*, *Geranium solanderi* var. *solanderi*, *Dichondra repens* (Kidney Weed), *Oxalis perennans*, *Solanum esuriale*, *Wahlenbergia communis* (Tufted Bluebell), *Portulaca oleracea* (Pigweed).



Figure 3.7 Map of the Plant Community Types on the Omeo BOA

3.4.2 Threatened Ecological Communities

One threatened Ecological Community has been identified in the Omeo BOP (Table 2.11; Figure 4.2). Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions' listed as an Endangered Ecological Community (EEC) under the BC Act and 'Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia' listed as Endangered Ecological Community (EEC) under the EPBC Act and occurs within areas of PCT 81 Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion.

Table 3.11 Threatened ecological communities present in the Omeo BOA

Listed under the BC Act	Listed under the EPBC Act	Omeo Area (ha)
Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar, and Brigalow Belt South Bioregions (Endangered)	Grey Box (<i>Eucalyptus microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia (Endangered)	9.28
Total		9.28

3.4.3 Threatened plants

One threatened plant species has been recorded on the Omeo BOP, *Tylophora linearis* (Figure 3.8).

3.4.4 Fauna habitat

Fauna roosting and foraging habitat is provided in PCT 81 for a range of fauna species, given the presence of hollow bearing trees, coarse woody debris and foraging resources.

3.4.5 Threatened fauna

Three threatened fauna species have been detected on the Omeo BOP (Table 3.12). There are records of the Superb Parrot within 10 km and there is potential foraging habitat on the property (Figure 3.8).

Table 3.12 Threatened fauna species recorded on the Omeo BOP

Common Name	Scientific Name	BC Act Listing*	EPBC Act Listing*
Grey-crowned Babbler (eastern subspecies)	<i>Pomatostomus temporalis temporalis</i>	V	-
Squirrel Glider	<i>Petaurus norfolcensis</i>	V	-
Yellow-bellied Sheathtail-Bat	<i>Saccolaimus flaviventris</i>	V	-

* V= Vulnerable, E= Endangered, CE= Critically Endangered



Figure 3.8 Location of threatened species on the Omeo BOA

3.5 Rosevale

3.5.1 Vegetation

Six plant community types were described and mapped across the Rosevale. The PCTs are listed in Table 3.13, shown in Figure 3.9 and described below.

Table 3.13 Area and condition of plant community types on Rosevale BOA

PCT ID	Plant Community Type (PCT)	Condition	Rosevale Area (ha)
401	Rough-barked Apple - Blakely's Red Gum - Black Cypress Pine woodland on sandy flats, mainly in the Pilliga Scrub region	Good	1.91
404	Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests	Good/Moderate	250.54
406	White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests	Good/Moderate	54.47
409	Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion	Good	3.01
435	White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion	Moderate	2.33
619	Derived Wire Grass grassland of the NSW Brigalow Belt South Bioregion and Nandewar Bioregion Replanted to establish PCT 404 or natural regeneration	DNG	24.21
Total Native Vegetation			336.47
Dam			0.59
Total			337.06

PCT 401 Rough-barked Apple - Blakely's Red Gum - Black Cypress Pine woodland



PCT Name: Rough-barked Apple - Blakely's Red Gum - Black Cypress Pine woodland on sandy flats, mainly in the Pilliga Scrub region

Vegetation Class: Western Slopes Dry Sclerophyll Forests

EPBC Status: not listed

BC Status: not listed

Description on Property

Within the BOP PCT 401 occurs in a single patch in the south east section. Where it occurs within the study area, this community is in relatively intact (good) condition.

This community is a tall open forest or woodland with a canopy dominated by *Eucalyptus chloroclada* (Dirty Gum), *Angophora floribunda* (Rough-barked Apple) and *Callitris endlicheri* (Black Cypress Pine).

The shrub layer is sparse and includes *Calytrix tetragona* (Common Fringe Myrtle), *Philotheca ciliata* (Wax Flower), *Phebalium squamulosum* (Scaly Phebalium) and *Acacia gladiiformis* (Sword Wattle).

The ground layer is sparse to dense and is dominated by a range of grass and graminoid species, including *Lomandra multiflora* (Many-flowered Mat-rush), *Lomandra leucocephala* (Woolly Mat-rush), *Lomandra longifolia* (Spiny-headed mat-rush), *Gahnia aspera* (Rough Saw Sedge), *Aristida personata* (Purple Wire-grass), *Austrostipa ramosissima* (Stout Bamboo Grass) and *Microlaena stipoides* subsp. *stipoides* (Weeping Grass). A range of forbs are also typically present, including *Chrysocephalum semipapposum* (Yellow Buttons), *Chrysocephalum apiculatum* (Yellow Buttons),

Pomax umbellata (Pomax) and *Calotis cuneifolia* (Purple Burr-daisy). *Cheilanthes sieberi* subsp. *sieberi* (Poison Rock Fern) is also commonly present in the ground layer.

PCT 404 Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland



PCT Name: Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests

Vegetation Class: Western Slopes Dry Sclerophyll Forests

EPBC Status: not listed

BC Status: not listed

Description on Property

Within the BOA, PCT 404 is the dominant vegetation type. This community occurs on sandy soils and grades into PCT 406 White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests, which occur on associated rocky rises. This community is in relatively intact condition (moderate to good).

The community is a mid-high to tall, shrubby woodland with a canopy dominated by *Eucalyptus fibrosa* (Red Ironbark) and *Corymbia trachyphloia* (White Bloodwood). The canopy may also include *Eucalyptus dwyeri* (Dwyer's Red Gum), *Callitris glaucophylla* (White Cypress Pine) or *Callitris endlicheri* (Black Cypress Pine). A small tree layer dominated by *Acacia burrowii* (Burrow's Wattle) and *Allocasuarina diminuta* is often present. In some areas, *Acacia burrowii* may dominate in response to fire.

The shrub layer may be dense and contains a diverse range of species, including *Philotheca ciliata* (Wax Flower), *Phebalium squamulosum* (Scaly Phebalium), *Calytrix tetragona* (Common Fringe Myrtle) and *Harmogia densiflora*. The vulnerable shrub *Bertya opposens* (Coolabah Bertya), may

be dominant in some areas. A sparse low shrub layer is also often present and includes *Homoranthus flavescens* and *Melichrus urceolatus* (Urn Heath).

The ground layer is typically sparse but may be dense in patches and is commonly dominated by grasses including *Thyridolepis mitchelliana* (Mulga Mitchell Grass), *Aristida ramosa* (Purple Wiregrass), *Cleistochloa rigida* and sedges including *Schoenus kennyi* and *Gahnia aspera* (Rough Saw Sedge). Forb species commonly present include *Gonocarpus elatus*, *Goodenia rotundifolia*, *Pomax umbellata* (Pomax), *Actinotus gibbonsii*, *Tricoryne elatior* (Yellow Autumn-lily) and *Chrysocephalum apiculatum* (Yellow Buttons).

PCT 406 White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest



PCT Name: White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests

Vegetation Class: Western Slopes Dry Sclerophyll Forests

EPBC Status: not listed

BC Status: not listed

Description on Property

Within the BOA, PCT 406 typically occurs on rocky rises. PCT 406 intergrades with the surrounding PCT 404 Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests. Across the study area, this community occurs in a relatively intact (moderate to good) condition.

The community is a mid-high to tall shrubby woodland with a canopy dominated by *Eucalyptus fibrosa* (Red Ironbark) and *Corymbia trachyphloia* (White Bloodwood). This community is

characterised by a small tree layer dominated by *Acacia cheelii* (Motherumbah), *Eucalyptus dwyeri* (Dwyer's Red Gum) and *Alphitonia excelsa* (Red Ash) may also be present.

The shrub layer is typically dense and dominated by a diverse range of tall shrubs, including *Philotheca difformis* (Small-leaf Wax-flower), *Philotheca salsolifolia*, *Philotheca ciliata*, *Phebalium squamulosum* (Scaly Phebalium) and *Calytrix tetragona* (Common Fringe Myrtle). The vulnerable shrub *Bertya opposens* (Coolabah Bertya) may be dominant in some areas. A sparse low shrub layer is often present and includes *Homoranthus flavescens* and *Melichrus urceolatus* (Urn Heath).

The ground layer is variable and may be sparse or in mid to dense in places. Common grass species include *Cleistochloa rigida*, *Thyridolepis mitchelliana* (Mulga Mitchell Grass) and *Aristida ramosa* (Purple Wiregrass). The sedges *Lepidosperma laterale* and *Schoenus kennyi* are often present. The ground layer may also include a range of forb species such as *Goodenia rotundifolia*, *Stypandra glauca* (Nodding Blue Lily) and *Chloanthes parviflora*.

PCT 409 Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland



PCT Name: Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion

Vegetation Class: Western Slopes Dry Sclerophyll Forests

EPBC Status: not listed

BC Status: not listed

Description on Property

Within the BOP PCT 409 occurs in the south eastern corner where it grades into PCT 401. This community occurs as an intact woodland in good condition.

PCT 409 in a tall woodland dominated by *Eucalyptus chloroclada* (Dirty Gum) in association with *Corymbia trachyphloia* (White Bloodwood) and *Callitris glaucophylla* (White Cypress Pine). The small tree *Acacia cheelii* (Motherumbah) is also often present. The shrub layer is sparse to mid-dense and may include a diverse range of shrub species. Common shrubs include *Styphelia triflora* (Pink Five Corners), *Cassinia sifton* (Sifton Bush), *Acacia penninervis* (Mountain Hickory), *Melichrus urceolatus* (Urn Heath), *Boronia glabra* and *Homoranthus flavescens*. The cycad *Macrozamia glaucophylla* is often present.

The ground layer is typically sparse to very sparse and commonly includes grasses such as *Austrostipa scabra* (Speargrass), *Aristida personata* (Purple Wire Grass), *Aristida ramosa* (Purple Wire Grass) and *Microlaena stipoides* (Weeping Grass). Common forb species include *Chrysocephalum semipapposum* (Clustering Everlasting Daisy), *Xerochrysum bracteatum* (Golden Everlasting Daisy), *Glycine clandestina* and *Gonocarpus elatus*. The sedges *Gahnia aspera* (Rough Saw-sedge) and *Schoenus ericetorum* are often present and may be dense in patches.

PCT 435 White Box - White Cypress Pine shrub grass hills woodland



PCT Name: White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion

Vegetation Class: North-west Slopes Dry Sclerophyll Woodlands

EPBC Status: not listed

BC Status: not listed

Description on Property

Within the BOP PCT 435 occurs in a small patch in the south-east. This community is in relatively intact (moderate) condition. PCT 435 in the BOP does not meet the criteria to be listed as a TEC.

PCT 435 is a tall woodland dominated by *Eucalyptus albens* (White Box) often in association with *Callitris glaucophylla* (White Cypress Pine). *Brachychiton populneus* subsp. *populneus* (Kurrajong) is also often present in the canopy. The shrub layer is typically sparse and may include a range of species such as *Geijera parviflora* (Wilga), *Acacia implexa* (Hickory Wattle), *Dodonaea viscosa* (Sticky Hop Bush) and *Teucrium betchei*.

The ground layer is typically relatively dense and dominated by grasses, including *Aristida personata* (Purple Wire-grass), *Cymbopogon refractus* (Barbed-wire Grass), *Rytidosperma racemosum* (Wallaby Grass), *Austrostipa verticillata* (Slender Bamboo Grass) and *Austrostipa scabra* (Speargrass). Common forb species include *Calotis lappulacea* (Yellow Burr-daisy), *Einadia nutans* (Climbing Saltbush), *Wahlenbergia communis* (Tufted Bluebell), *Dianella longifolia* (Blue Flax-Lily), *Daucus glochidiatus* (Native Carrot), *Desmodium brachypodum* (Large Tick-trefoil) and *Desmodium varians* (Slender Tick-trefoil).

PCT 619 Derived Wire Grass grassland



PCT Name: Derived Wire Grass grassland of the NSW Brigalow Belt South Bioregion and Nandewar Bioregion.

Vegetation Class: Western Slopes Grassland

EPBC Status: not listed

BC Status: not listed

Description on Property

Within the BOP PCT 619 occurs in areas most likely derived from cleared woodland communities that still occur nearby in various condition states.

A canopy layer does not occur, but *Eucalyptus* species are regenerating in some locations such as the north east corner of the “Rosevale” section. If present, the shrub layer is sparse and may include species such as *Geijera parviflora* (Wilga), *Maireana microphylla* (Small-leaf Bluebush) and *Dodonaea viscosa* (Sticky Hop Bush).

The ground layer is typically dominated by grass species such as *Aristida personata* (Purple Wire Grass), *Aristida vagans* (Threeawn Speargrass) and *Aristida ramosa* (Purple Wire Grass). Other grass species include *Rytidosperma bipartitum* (Wallaby Grass), *Rytidosperma racemosum* (Wallaby Grass), *Austrostipa verticillata* (Slender Bamboo Grass), *Cymbopogon refractus* (Barbed-wire Grass), *Enteropogon acicularis* and *Bothriochloa macra* (Redleg Grass). Typical forbs include *Boerhavia dominii* (Tarvine), *Rumex brownii* (Swamp Dock), *Tribulus micrococcus* (Spineless Caltrop), *Erodium crinitum* (Blue Stalkbill), *Alternanthera denticulata*, *Geranium solanderi* var. *solanderi*, *Dichondra repens* (Kidney Weed), *Oxalis perennans*, *Solanum esuriale*, *Wahlenbergia communis* (Tufted Bluebell), and *Portulaca oleracea* (Pigweed).

It is intended for the area mapped as PCT 619 to be revegetated and/or facilitate natural regeneration to be consistent with PCT 404. Canopy species characteristic of PCT 404 that have been included in revegetation efforts include *Eucalyptus fibrosa* (Red Ironbark), *Corymbia trachyphloia* subsp. *amphistomatica* (White Bloodwood) and *Callitris glaucophylla* (White Cypress Pine).

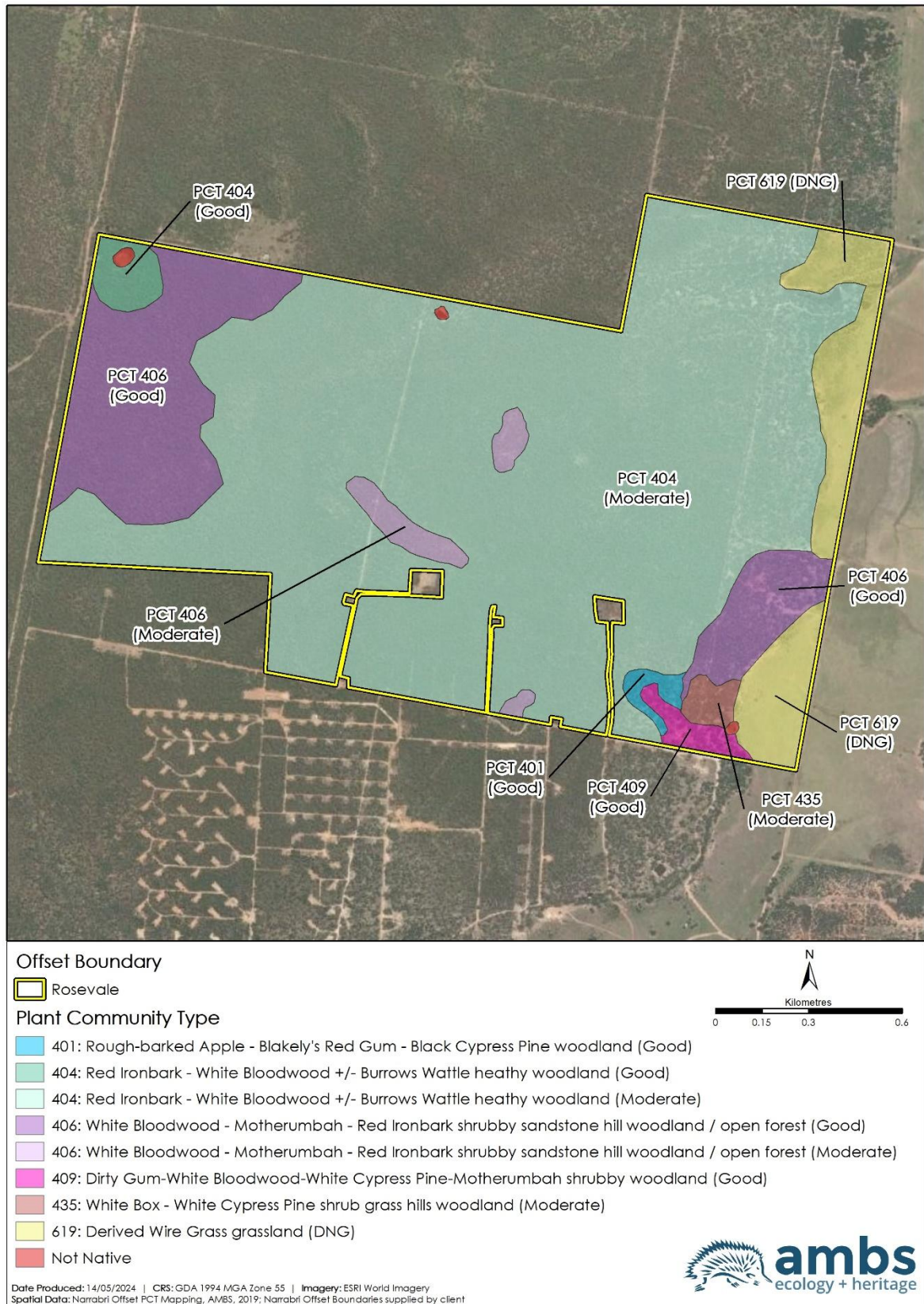


Figure 3.9 Map of the Plant Community Types on the Rosevale BOP

3.5.2 Threatened Ecological Communities

No Threatened Ecological Communities (TECs) have been designated to vegetation in the Rosevale BOP.

3.5.3 Threatened plants

Three threatened plant species have been recorded on the BOP, *Tylophora linearis*, *Bertya opposens* (Coolabah Bertya), and *Pomaderris queenslandica* (Scant Pomaderris) (Figure 3.10).

3.5.4 Fauna habitat

A range of fauna habitat has been identified in PCTs across the Rosevale BOP (Table 3.14)

Table 3.14 Fauna habitat types identified within the Rosevale BOP

Plant Community Type	Habitat Values
401: Rough-barked Apple - Blakely's Red Gum - Black Cypress Pine woodland on sandy flats, mainly in the Pilliga Scrub region	Hollow-bearing trees Woody debris
404: Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests	Hollow-bearing trees Woody debris
406: White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests	Rocky outcrops and small caves Hollow-bearing trees Woody debris
409: Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion	Hollow-bearing trees Woody debris
435: White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion	Hollow-bearing trees Woody debris

The Rosevale BOP is connected to the Jack Creek State Forest in the west. Jacks Creek State Forest is connected to the Pilliga National Park and Pilliga Nature Reserve.

3.5.5 Threatened fauna

Eight threatened species have been recorded on the Rosevale BOP (Table 3.15; Figure 3.1). There are records of the Superb Parrot within 10 kms of the property and areas of foraging habitat is present.

Table 3.15 Threatened fauna species recorded on the Rosevale BOP

Common Name	Scientific Name	BC Listing*	Act Listing*	EPBC Listing*	Act Listing*
Black-striped Wallaby	<i>Macropus dorsalis</i>		E	-	
Brown Treecreeper (eastern subspecies)	<i>Climacteris picumnus victoriae</i>		V		V
Grey-crowned Babbler (eastern subspecies)	<i>Pomatostomus temporalis temporalis</i>		V	-	
Little Lorikeet	<i>Glossopsitta pusilla</i>		V	-	
Speckled Warbler	<i>Chthonicola sagittata</i>		V	-	
Varied Sittella	<i>Daphoenositta chrysoptera</i>		V	-	
White-throated Needletail	<i>Hirundapus caudacutus</i>		-		V
Yellow-bellied Sheathtail-Bat	<i>Saccolaimus flaviventris</i>		V	-	

* V= Vulnerable, E= Endangered, CE= Critically Endangered

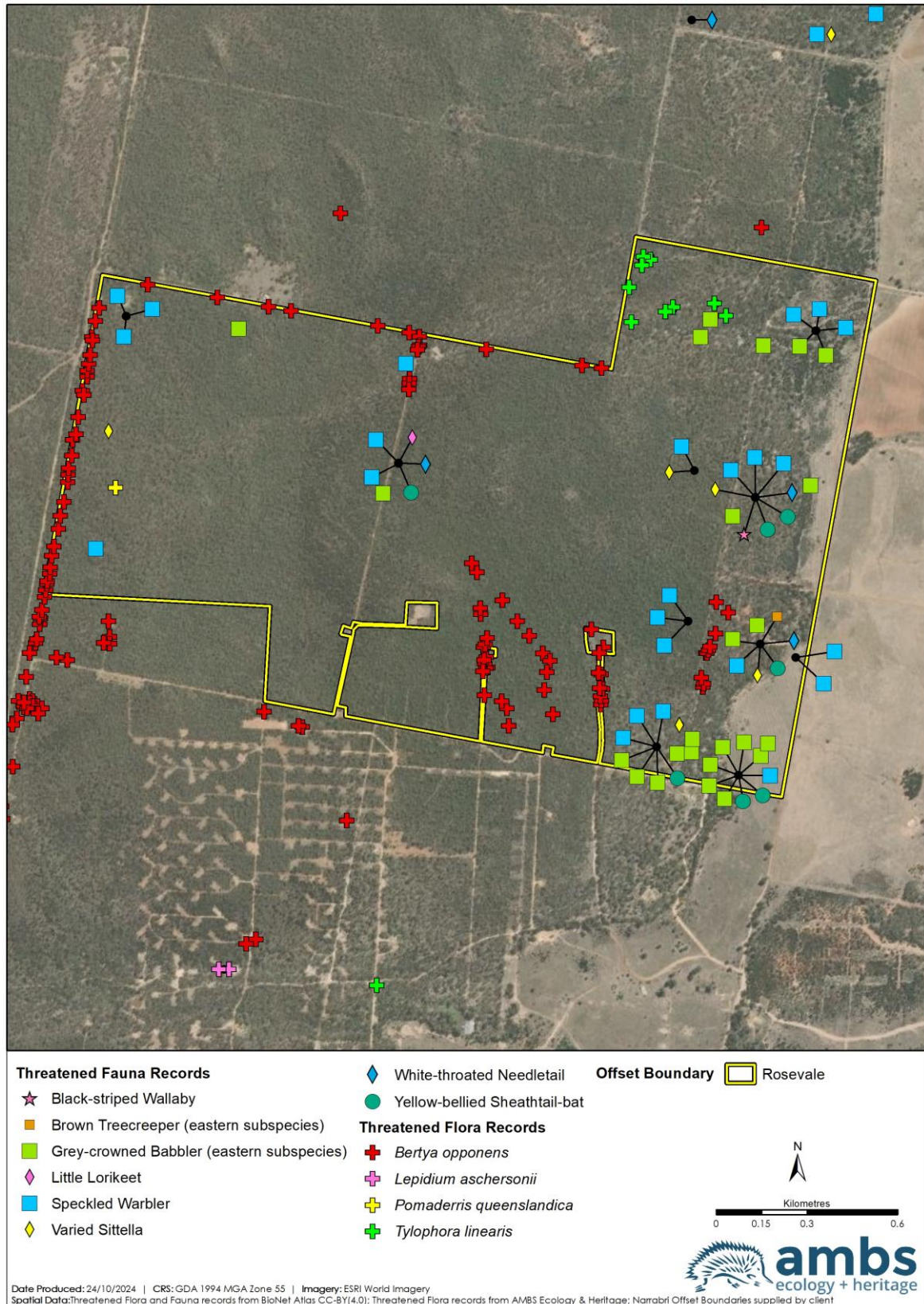


Figure 3.10 Location of Threatened species recorded on the Rosevale BOP

3.6 Kurrajong Park

3.6.1 Vegetation

Two plant community types were described and mapped across the Kurrajong Park BOP. The PCTs are listed in Table 3.16, shown in Figure 3.11 and described below.

Table 3.16 Area and condition of plant community types on Kurrajong Park BOP

PCT ID	Plant Community Type (PCT)	Condition	Kurrajong Park Area (ha)
404	Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests	Good	18.28
406	White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests	Good	1.72
Total Native Vegetation			20

PCT 404 Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland



PCT Name: Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests

Vegetation Class: Western Slopes Dry Sclerophyll Forests

EPBC Status: not listed

BC Status: not listed

Description on Property

Within the BOP PCT 404 is the dominant vegetation type. This community occurs on sandy soils and grades into PCT 406 White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests, which occur on associated rocky rises. This community is in relatively intact condition (moderate to good).

The community is a mid-high to tall, shrubby woodland with a canopy dominated by *Eucalyptus fibrosa* (Red Ironbark) and *Corymbia trachyphloia* (White Bloodwood). The canopy may also include *Eucalyptus dwyeri* (Dwyer's Red Gum), *Callitris glaucophylla* (White Cypress Pine) or *Callitris endlicheri* (Black Cypress Pine). A small tree layer dominated by *Acacia burrowii* (Burrow's Wattle) and *Allocasuarina diminuta* is often present. In some areas, *Acacia burrowii* may dominate in response to fire.

The shrub layer may be dense and contains a diverse range of species, including *Philotheca ciliata* (Wax Flower), *Phebalium squamulosum* (Scaly Phebalium), *Calytrix tetragona* (Common Fringe Myrtle) and *Harmogia densiflora*. The vulnerable shrub *Bertya opposens* (Coolabah Bertya), may be dominant in some areas. A sparse low shrub layer is also often present and includes *Homoranthus flavescens* and *Melichrus urceolatus* (Urn Heath).

The ground layer is typically sparse but may be dense in patches and is commonly dominated by grasses including *Thyridolepis mitchelliana* (Mulga Mitchell Grass), *Aristida ramosa* (Purple Wiregrass), *Cleistochloa rigida* and sedges including *Schoenus kennyi* and *Gahnia aspera* (Rough Saw Sedge). Forb species commonly present include *Gonocarpus elatus*, *Goodenia rotundifolia*, *Pomax umbellata* (Pomax), *Actinotus gibbonsii*, *Tricoryne elatior* (Yellow Autumn-lily) and *Chrysocephalum apiculatum* (Yellow Buttons).

PCT 406 White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest



PCT Name: White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests

Vegetation Class: Western Slopes Dry Sclerophyll Forests

EPBC Status: not listed

BC Status: not listed

Description on Property

Within the BOP PCT 406 occurs in the north. This community typically occurs on rocky rises in the eastern Pilliga region. PCT 406 intergrades with the surrounding PCT 404 Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests. Across the study area, this community occurs in a relatively intact (moderate to good) condition.

The community is a mid-high to tall shrubby woodland with a canopy dominated by *Eucalyptus fibrosa* (Red Ironbark) and *Corymbia trachyphloia* (White Bloodwood). This community is characterised by a small tree layer dominated by *Acacia cheelii* (Motherumbah). *Eucalyptus dwyeri* (Dwyer's Red Gum) and *Alphitonia excelsa* (Red Ash) may also be present.

The shrub layer is typically dense and dominated by a diverse range of tall shrubs, including *Philotheca difformis* (Small-leaf Wax-flower), *Philotheca salsolifolia*, *Philotheca ciliata*, *Phebalium squamulosum* (Scaly Phebalium) and *Calytrix tetragona* (Common Fringe Myrtle). The vulnerable shrub *Bertya opposens* (Coolabah Bertya) may be dominant in some areas. A sparse low shrub layer is often present and includes *Homoranthus flavescens* and *Melichrus urceolatus* (Urn Heath).

The ground layer is variable and may be sparse or in mid to dense in places. Common grass species include *Cleistochloa rigida*, *Thyridolepis mitchelliana* (Mulga Mitchell Grass) and *Aristida ramosa* (Purple Wiregrass). The sedges *Lepidosperma laterale* and *Schoenus kennyi* are often present. The ground layer may also include a range of forb species such as *Goodenia rotundifolia*, *Stypandra glauca* (Nodding Blue Lily) and *Chloanthes parviflora*.

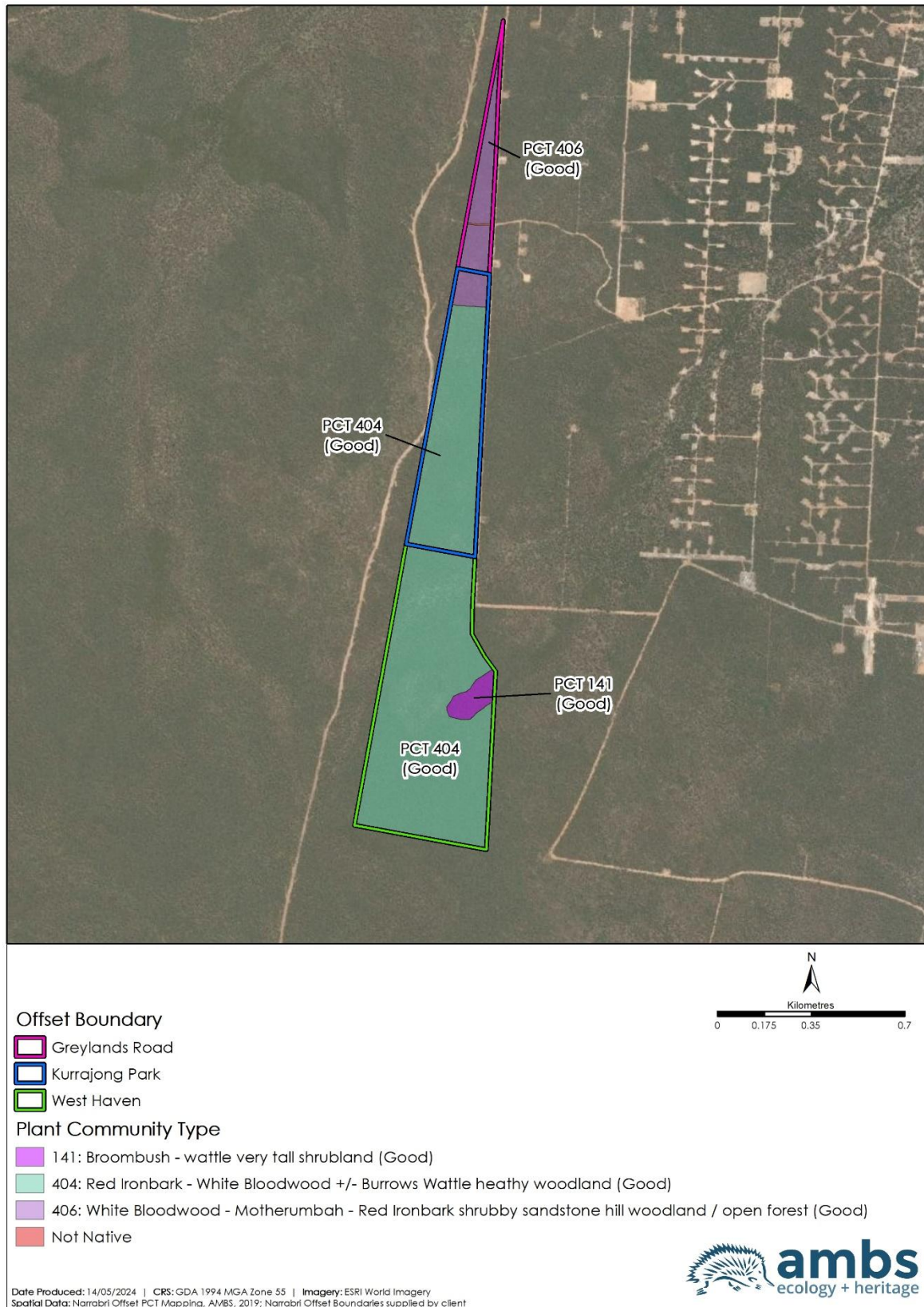


Figure 3.11 Map of the Plant Community Types on the Kurrajong Park BOP

3.6.2 Threatened Ecological Communities

No Threatened Ecological Communities (TECs) have been designated to vegetation in the Kurrajong Park BOP.

3.6.3 Threatened plants

One threatened flora species, *Bertya opponens* (Coolabah Bertya), has been recorded on the Kurrajong BOP (Figure 3.12).

3.6.4 Fauna habitat

A range of fauna habitat has been identified in PCTs across the Kurrajong BOP given the presence of hollow bearing trees, coarse woody debris, rock outcrops and small caves.

The Kurrajong Park BOP is imbedded in vegetation adjacent to the Jacks Creek State Forest which provides good connectivity to the west into the Pilliga National Park and south to the Pilliga Nature Reserve.

3.6.5 Threatened fauna

Three threatened species have been recorded on or immediately adjacent to the Kurrajong Park BOP (Table 3.17; Figure 3.12). There are records of the Superb Parrot within 10 km and there is potential foraging habitat on the property.

Table 3.17 Threatened fauna species recorded on or adjacent to the Kurrajong Park BOP

Common Name	Scientific Name	BC Listing*	Act Listing*	EPBC Listing*	Act Listing*
Grey-crowned Babbler (eastern subspecies)	<i>Pomatostomus temporalis temporalis</i>		V		-
Speckled Warbler	<i>Chthonicola sagittata</i>		V		-
White-throated Needle-tail	<i>Hirundapus caudacutus</i>		-		V

* V= Vulnerable, E= Endangered, CE= Critically Endangered

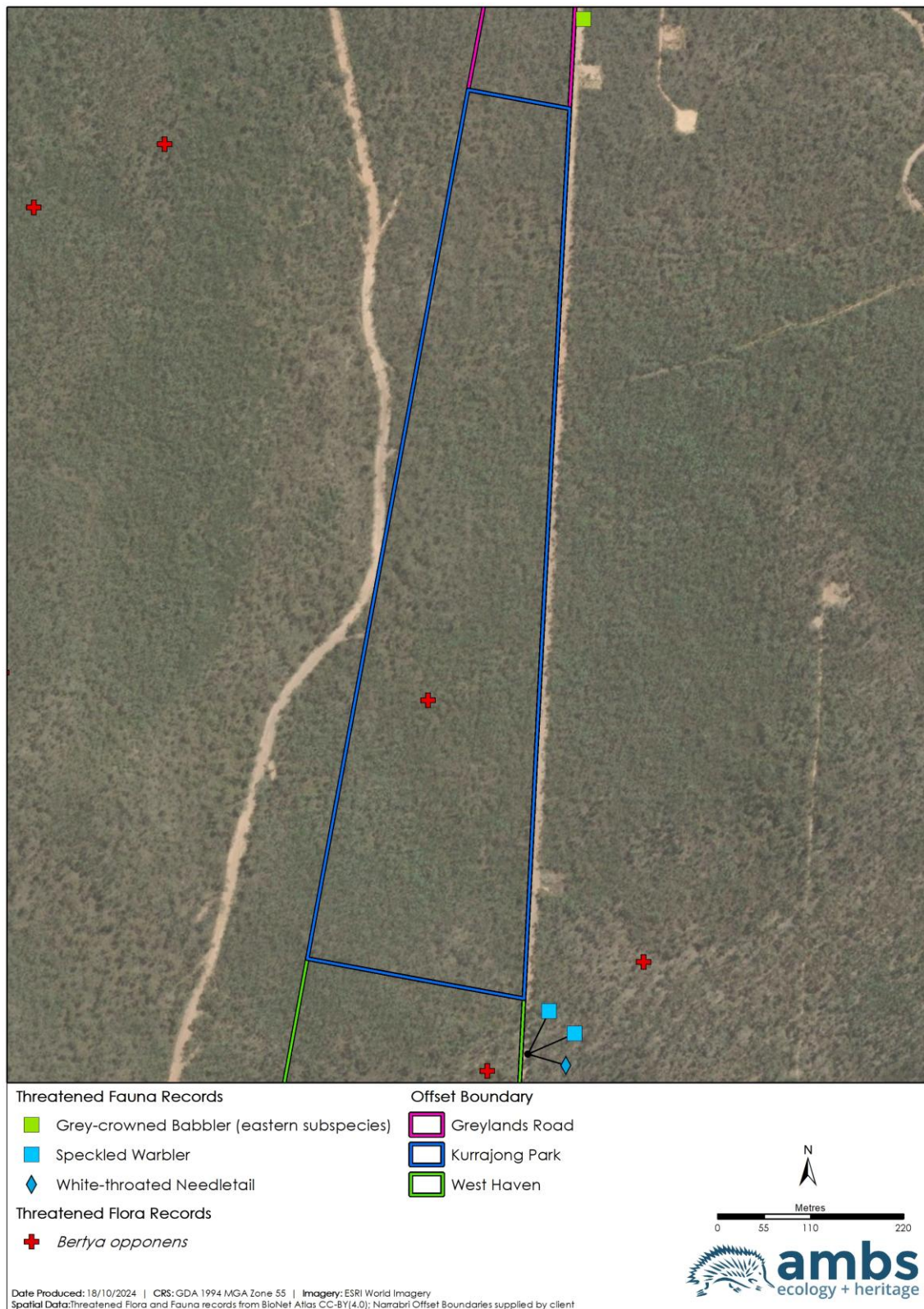


Figure 3.12 Location of threatened species recorded on or adjacent to the Kurrajong Park BOP

3.7 West Haven

3.7.1 Vegetation

Two plant community types were described and mapped across the West Haven BOP. The PCTs are listed in Table 3.18, shown in Figure 3.13 and described below.

Table 3.18 Area and condition of plant community types on West Haven BOP

PCT ID	Plant Community Type (PCT)	Condition	West Haven Area (ha)
141	Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion	Good	1.87
404	Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests	Good	40.65
Total			42.52

PCT 141 Broombush - wattle very tall shrubland



PCT Name: Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion

Vegetation Class: Pilliga Outwash Dry Sclerophyll Forests

EPBC Status: not listed

BC Status: not listed

Description on Property

Within the West Haven BOP PCT 141 occurs in a single patch in the central east, this community is in relatively intact (good) condition.

This community is a tall shrubland, dominated by *Melaleuca uncinata* (Broombush), sometimes in association with *Acacia burrowii* (Burrow's Wattle). A sparse tree layer including *Eucalyptus fibrosa* (Red Ironbark) and *Corymbia trachyphloia* (White Bloodwood) may be present. A range of smaller shrubs also occur, including *Calytrix tetragona* (Common Fringe Myrtle), *Philotheca ciliata* (Wax Flower), *Phebalium squamulosum* (Scaly Phebalium) and Mint Bushes *Prostanthera ringens* (Gaping Mint-bush) and *Prostanthera granitica* (Granite Mintbush).

The ground layer is typically sparse and includes *Microlaena stipoides* subsp. *stipoides* (Weeping Grass), *Cheilanthes sieberi* subsp. *sieberi* (Poison Rock Fern), *Dianella revoluta* (Blue Flax-Lily) and *Goodenia rotundifolia*.

PCT 404 Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland



PCT Name: Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests

Vegetation Class: Western Slopes Dry Sclerophyll Forests

EPBC Status: not listed

BC Status: not listed

Description on Property

Within the Biodiversity Offset Area, PCT 404 is the dominant vegetation type in West Haven. This community occurs on sandy soils and grades into PCT 406 White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests, which occur on associated rocky rises. This community is in relatively intact condition (moderate to good).

The community is a mid-high to tall, shrubby woodland with a canopy dominated by *Eucalyptus fibrosa* (Red Ironbark) and *Corymbia trachyphloia* (White Bloodwood). The canopy may also include *Eucalyptus dwyeri* (Dwyer's Red Gum), *Callitris glaucophylla* (White Cypress Pine) or *Callitris endlicheri* (Black Cypress Pine). A small tree layer dominated by *Acacia burrowii* (Burrow's Wattle) and *Allocasuarina diminuta* is often present. In some areas, *Acacia burrowii* may dominate in response to fire.

The shrub layer may be dense and contains a diverse range of species, including *Philotheca ciliata* (Wax Flower), *Phebalium squamulosum* (Scaly Phebalium), *Calytrix tetragona* (Common Fringe Myrtle) and *Harmogia densiflora*. The vulnerable shrub *Bertya opposens* (Coolabah Bertya), may be dominant in some areas. A sparse low shrub layer is also often present and includes *Homoranthus flavescens* and *Melichrus urceolatus* (Urn Heath).

The ground layer is typically sparse but may be dense in patches and is commonly dominated by grasses including *Thyridolepis mitchelliana* (Mulga Mitchell Grass), *Aristida ramosa* (Purple Wiregrass), *Cleistochloa rigida* and sedges including *Schoenus kennyi* and *Gahnia aspera* (Rough Saw Sedge). Forb species commonly present include *Gonocarpus elatus*, *Goodenia rotundifolia*, *Pomax umbellata* (Pomax), *Actinotus gibbonsii*, *Tricoryne elatior* (Yellow Autumn-lily) and *Chrysocephalum apiculatum* (Yellow Buttons).

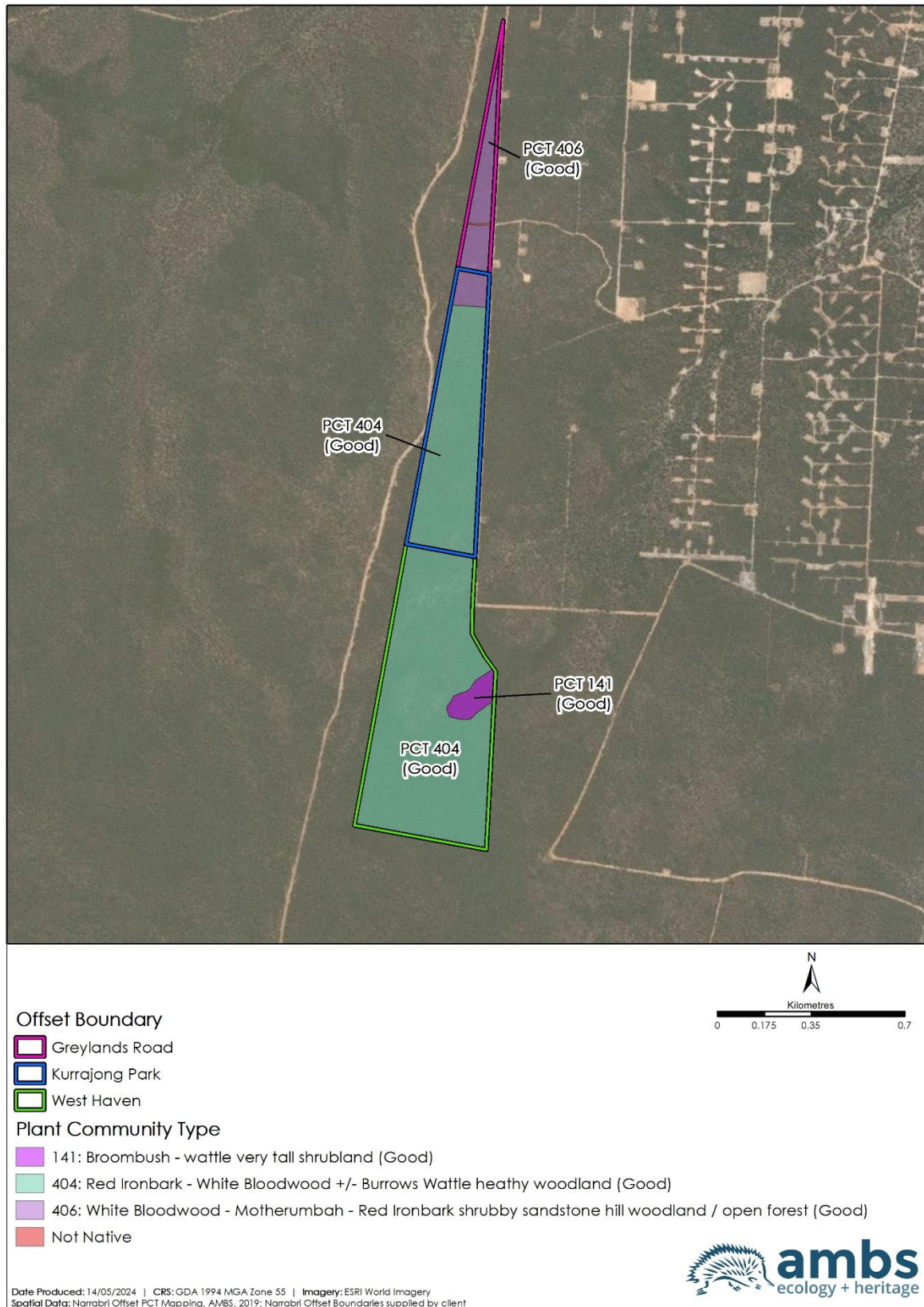


Figure 3.13 Map of the Plant Community Types on the West Haven BOP

3.7.2 Threatened Ecological Communities

No Threatened Ecological Communities (TECs) have been designated to vegetation in the West Haven BOP.

3.7.3 Threatened plants

Two threatened flora species have been recorded on the BOP, *Tylophora linearis* and *Bertya opposens* (Coolabah Bertya); with *Pomaderris queenslandica* (Scant Pomaderris) recorded nearby (Figure 3.14).

3.7.4 Fauna habitat

A range of fauna habitat has been identified in PCTs across the West Haven BOP given the presence of a dense shrub layer, hollow bearing trees, coarse woody debris, rock outcrops and small caves.

The West Haven BOP is imbedded in vegetation adjacent to the Jacks Creek State Forest which provides good connectivity to the west into the Pilliga National Park and south to the Pilliga Nature Reserve.

3.7.5 Threatened fauna

Three threatened species have been detected on or immediately adjacent to the Kurrajong Park BOP (Table 3.19; Figure 3.14). There are records of the Superb Parrot within 10 km and there is potential foraging habitat on the property.

Table 3.19 Threatened fauna species recorded on or adjacent to the West Haven BOP

Common Name	Scientific Name	BC Act Listing*	EPBC Act Listing*
Grey-crowned Babbler (eastern subspecies)	<i>Pomatostomus temporalis temporalis</i>	V	-
Speckled Warbler	<i>Chthonicola sagittata</i>	V	-
White-throated Needletail	<i>Hirundapus caudacutus</i>	-	V

* V= Vulnerable, E= Endangered, CE= Critically Endangered

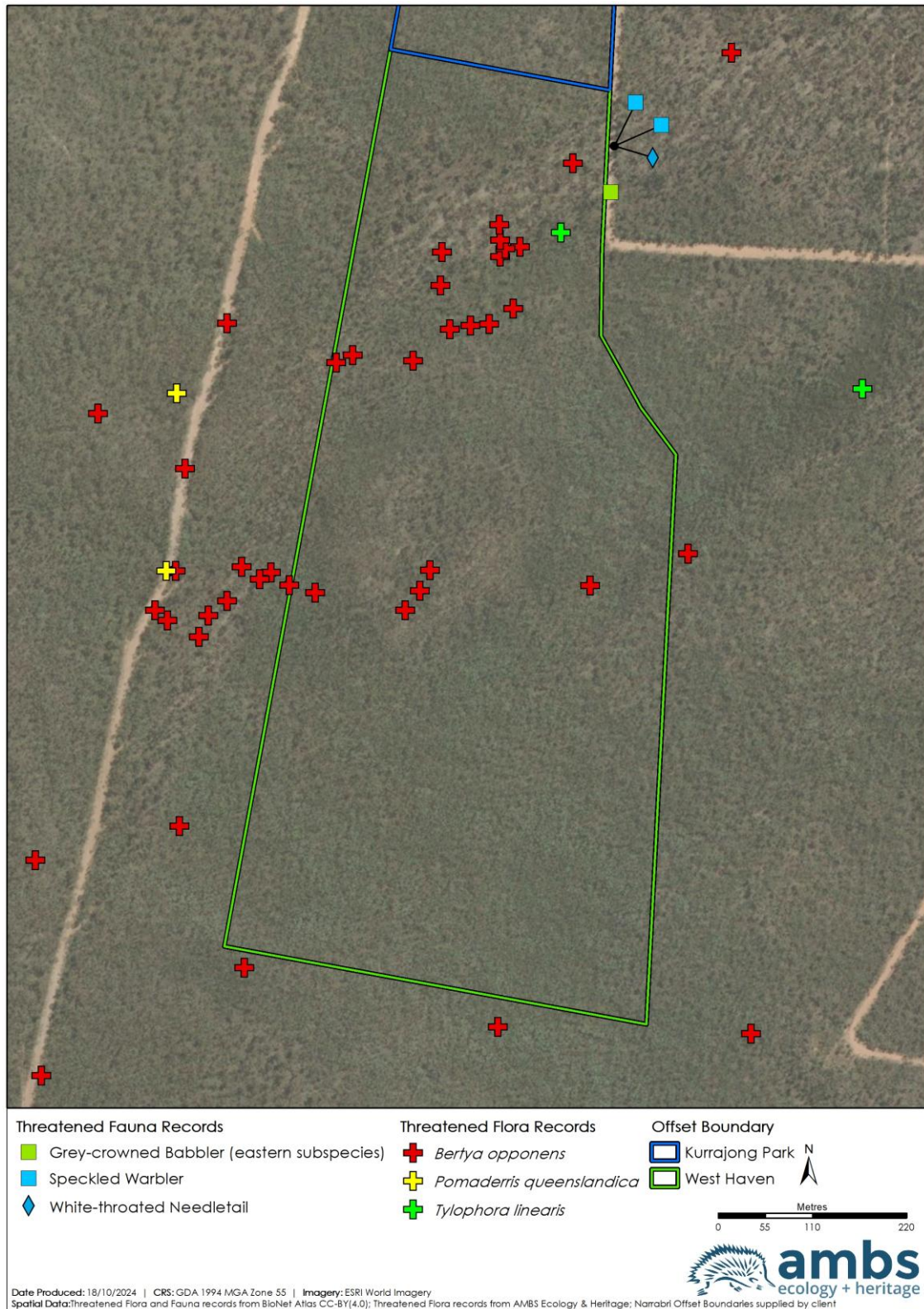


Figure 3.14 Location of threatened species recorded on or adjacent to the West Haven BOP

3.8 Description of Rehabilitation Area Offset

The Rehabilitation Area Offset covers up to 1,167.54 ha of woodland vegetation that may be subject to subsidence impacts (Figure 3.15) and mine site rehabilitation at NCM. This area adjoins four of the adjacent offset properties and is to be progressed following timing to be outlined in the NCM Rehabilitation Strategy, resulting in an overall NCM BOS of 2,842.02 ha (or reduces to 2,805.36 ha as per SSD-10269 Condition B45c). The vegetation mapped in this area has been equated to the following PCTs.

- Riparian Forest = PCT 101: Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion (8.63 ha).
- Inland Grey Box Woodland = PCT 81: Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion (89.89 ha).
- Brown Bloodwood Shrubby woodland = PCT 404: Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests; PCT 406: White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests; and PCT 409: Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region (1,069.02 ha).

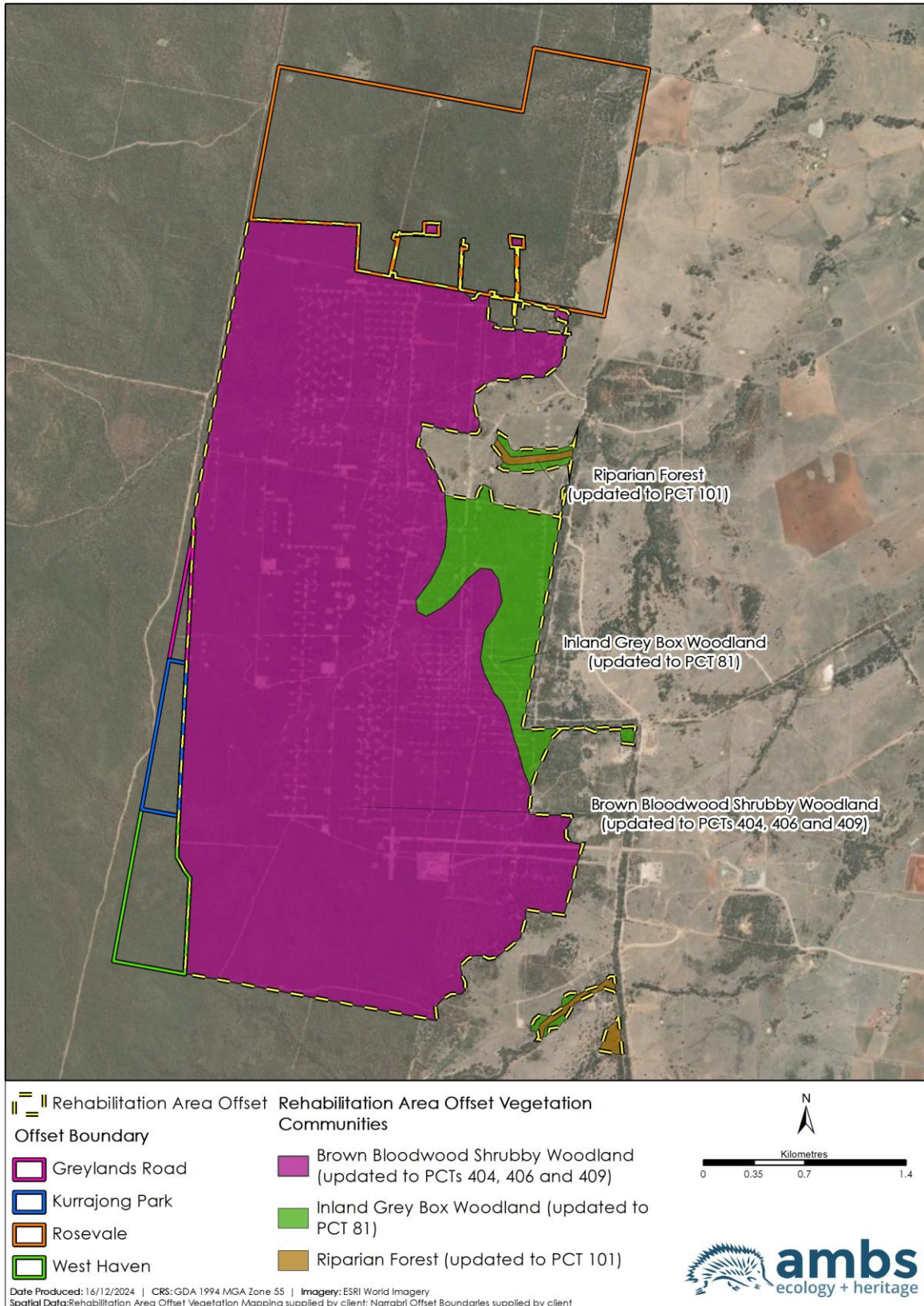


Figure 3.15 Location of the Mine Rehabilitation Area Offset

4 Summary of Findings

The following section provides a comparative summary of the proposed RBOS. NCM Stage 1 and 2 was originally approved under NSW Project Approval 08_0144 in 2010 (latest modification November 2021 MOD7) and the Commonwealth EPBC Approval 2009/5003 in 2011 (latest variation 24 March 2021). In April 2022 the NCM Stage 3 Mine received NSW Approval SSD-10269 to supersede PA 08_0144

4.1 Plant Community Types

Overall, the RBOS meets the biodiversity value requirements as per the NCM Stage 1 and 2 Approvals (08_0144 and when it is surrendered to SSD-10269 & EPBC 2009/5003) relating to the extent of offset area “to enhance”, “like for like or better” and “maintain and improve” the habitat restoration (i.e. revegetation and habitat augmentation) for the *Bertya opposens*, Superb Parrot and White Box Grassy Woodland plus Inland Grey Box EEC. A number of vegetation community names have been updated as a result of the preparation of CAs and the application of the contemporary Plant Community Type (PCT) classification (DCCEEW 2024c). Table 4.1 provides a comparison of the vegetation community names used in the original BOS with the PCTs applied in this RBOS.

Please note that for the following community, *Red Ironbark - Brown Bloodwood shrubby woodland of the Brigalow Belt South Bioregion* described in the original BOS, *Corymbia trachyphloia* subsp. *amphistomatica* (Brown Bloodwood) is the same species referred to by the common name White Bloodwood and used in the following updated PCTs.

- PCT 404: Red Ironbark - **White Bloodwood** +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
- PCT 406: **White Bloodwood** - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
- PCT 409: Dirty (Baradine) Gum - **White Bloodwood** - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion

A total of 430.43 ha of native vegetation is preserved in the Greylands, Omeo, Rosevale, Greylands Road, Kurrajong Park and West Haven BOPs and 1,244.06 ha in the Kenna BOP.

Table 4.1 Comparison from original BOS to changes to Plant Community Names and area in hectares for each by BOP in the RBOS

Plant Community Name	Plant Community Name in Original BOS	Narrabri RBOS						
		Kenna (ha)	Greylands (ha)	Greylands Road (ha)	Omeo (ha)	Rosevale (ha)	Kurrajong Park (ha)	West Haven (ha)
PCT 78: River Red Gum riverine woodlands and forests in the Nandewar and Brigalow Belt South Bioregions	Same	35.10						
PCT 101: Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion	New		2.32					
PCT 1313: White Cypress Pine - Narrow-leaved Ironbark shrub/grass open forest of the western Nandewar Bioregion	Same	703.11						
PCT 1314: White Cypress Pine - Silver-leaved Ironbark - Tumbledown Red Gum shrubby open forest of the Nandewar and Brigalow Belt South Bioregions	Same	10.49						
PCT 1383: White Box grassy woodland of the Nandewar and Brigalow Belt South Bioregions	Same	477.40						
PCT 141: Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion	New							1.87

Plant Community Name	Plant Community Name in Original BOS	Narrabri RBOS						
		Kenna (ha)	Greylands (ha)	Greylands Road (ha)	Omeo (ha)	Rosevale (ha)	Kurrajong Park (ha)	West Haven (ha)
PCT 401: Rough-barked Apple - Blakely's Red Gum - Black Cypress Pine woodland on sandy flats, mainly in the Pilliga Scrub region	New					1.91		
PCT 404: Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests	New					250.54	18.28	40.65
PCT 406: White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests	New			5.62		54.47	1.72	
PCT 409: Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion	New					3.01		
PCT 435: White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion	New					2.33		
PCT 619: Derived Wire Grass grassland of the NSW Brigalow Belt South Bioregion and Nandewar Bioregion	Pilliga Box - Poplar Box- White Cypress Pine grassy open woodland on alluvial loams (DNG); White Box Grassy Woodland (DNG);		2.59		1.56	24.21		

Plant Community Name	Plant Community Name in Original BOS	Narrabri RBOS						
		Kenna (ha)	Greylands (ha)	Greylands Road (ha)	Omeo (ha)	Rosevale (ha)	Kurrajong Park (ha)	West Haven (ha)
PCT 81: Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion	New				9.28			
PCT 88: Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion	Inland Grey Box Woodland		10.06					
PCT 885: Heathy shrublands on rocky outcrops of the western slopes	Same	17.96						
BVT: Inland Grey Box tall grassy woodland on clay soils in the Brigalow Belt South and Nandewar bioregions	Replaced with PCT 435					x		
BVT: Pilliga Box - Poplar Box- White Cypress Pine grassy open woodland on alluvial loams	Replaced with PCT435/81				x	x		
BVT: Red Ironbark - Brown Bloodwood shrubby woodland of the Brigalow Belt South Bioregion	Replaced with PCT 404/406/409			x		x	x	x
BVT: River Oak Riparian woodland of the Brigalow Belt South and Nandewar Bioregions	Replaced with PCT 88/101		x					
BVT: Rough-barked Apple riparian forb/grass open forest of the Nandewar Bioregion (Box Gum Woodland CEEC)	Replaced with PCT 88		x					
Total Native Vegetation		1,244.06	14.97	5.62	10.84	336.47	20	42.52

Plant Community Name	Plant Community Name in Original BOS	Narrabri RBOS						
		Kenna (ha)	Greylands (ha)	Greylands Road (ha)	Omeo (ha)	Rosevale (ha)	Kurrajong Park (ha)	West Haven (ha)
Not Native/Dam	-		0.12			0.59		
Not Native/Track	-			0.05				
Total Area of BOP		1,244.06	15.09	5.67	10.84	337.06	20	42.52

4.2 Threatened Ecological Communities

Overall, two Threatened Ecological Communities (TEC) are present within the Narrabri RBOS. One TEC has been identified in the Kenna BOP (Table 4.2, Figures 4.1). PCT 1383-White Box grassy woodland of the Nandewar and Brigalow Belt South Bioregion’ is consistent with the ‘White Box-Yellow Box-Blakely’s Red Gum grassy woodland’ listed as critically endangered under the BC Act and under the EPBC Act. Currently 447.40 ha of this PCT meets the definition of the CEEC.

The other TEC has been identified in the Omeo BOP (Table 4.2; Figure 4.2). Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Penneplain, Nandewar and Brigalow Belt South Bioregions’ listed as an Endangered Ecological Community (EEC) under the BC Act and ‘Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia’ listed as Endangered Ecological Community (EEC) under the EPBC Act and occurs within areas of PCT 81 Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion. Currently 9.28 ha of this PCT meets the definition of the EEC.

The RBOS will result in no significant change to the area of TECs within the offsets (Table 4.2).

Table 4.2 Summary Table BOA previous and revised TEC areas

Threatened Ecological Community	Original BOS		Revised BOS	
	Kenna	Omeo	Kenna	Omeo
Grey Box Grassy Woodland EEC		10		9.28
White Box Yellow Box Blakely’s Red Gum Woodland CEEC	476.91		477.40	
Total Threatened Ecological Community	486.91		486.68	

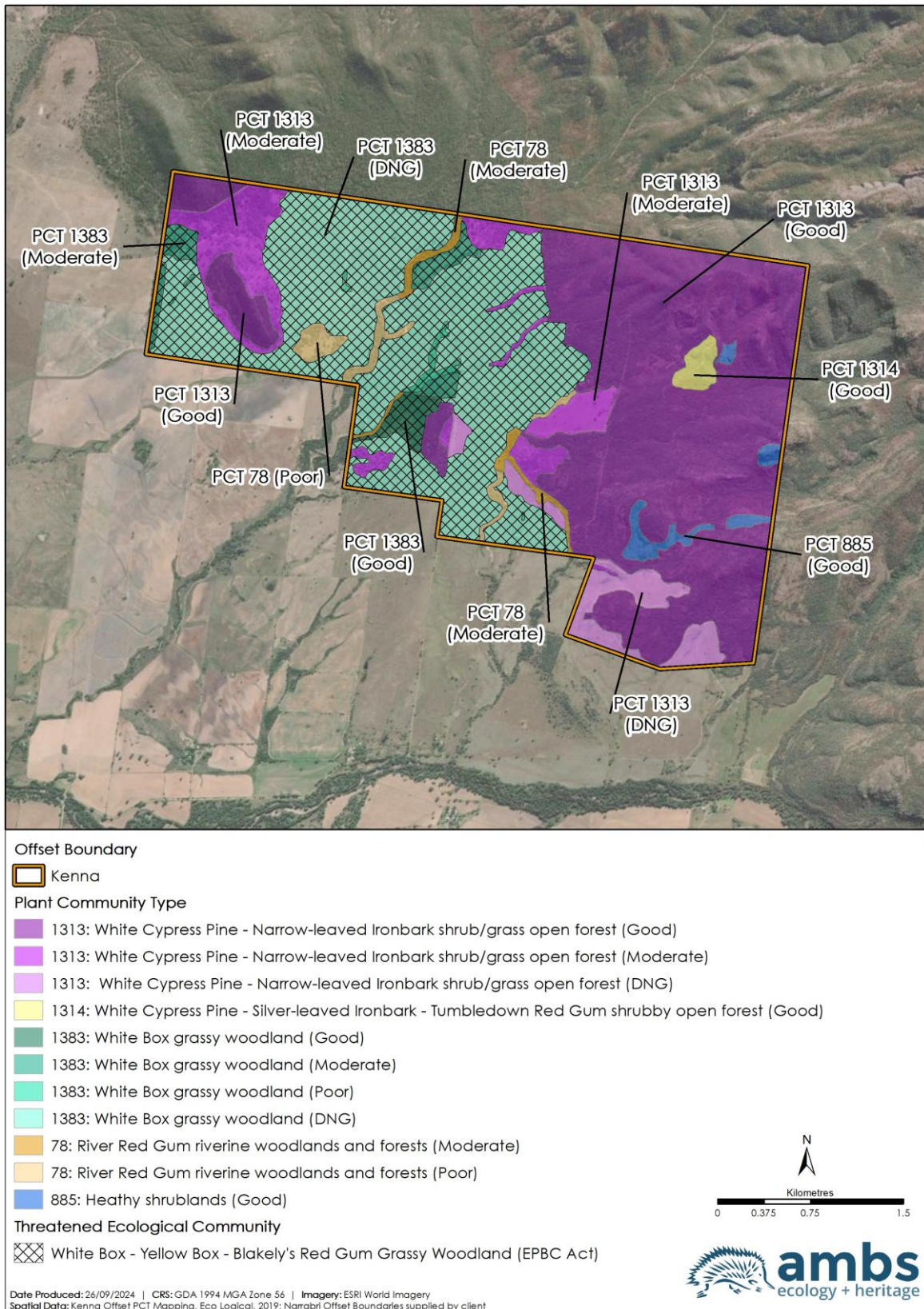


Figure 4.1 Map of Threatened Ecological communities on Kenna BOP

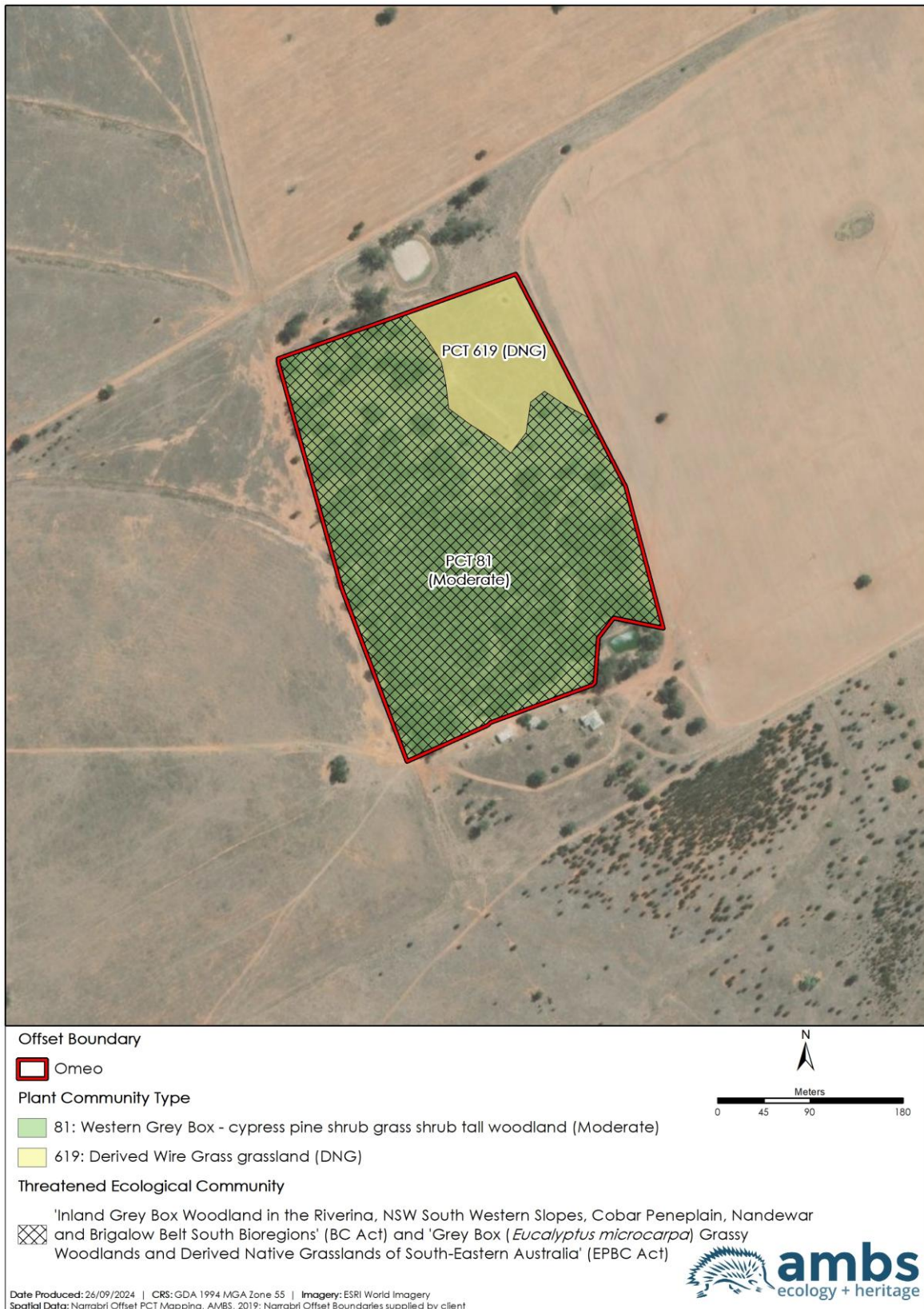


Figure 4.2 Map of Threatened Ecological communities on Omeo BOP

4.3 Threatened plants

Habitat for the threatened plant *Bertya opposens*, which is listed as Vulnerable under the BC and EPBC Acts, is required to be protected under the EPBC Act Approval 2009/5003 that forms a portion of the total 422 ha former on-site offset specifically within the Rosevale, Greylands Road and Kurrajong Park BOPs.

The original BOS package for *Bertya opposens* included the protection of nearly 380 ha of Red Ironbark – Brown Bloodwood shrubby woodland (not affected by any direct or indirect impacts of the project) and a further 297 ha of the same vegetation community occupied by *Bertya opposens* which is located within the 1,069.02 affected by subsidence. Contemporary mapping has designated two PCTs to this original vegetation community, PCT 404 Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests and PCT 406 White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests. The original area covered by Brown Bloodwood shrubby woodland also included PCT 409 Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion (3.01 ha on Rosevale), however this PCT is not listed as potential habitat for *Bertya opposens* and has been excluded from the Habitat for *Bertya opposens* in Table 4.3

A total of 373.61 ha of habitat for *Bertya opposens* is mapped in this RBOS within the Rosevale, Greylands Road, Kurrajong Park and West Haven BOPs and a further 1,069.02 ha in areas of these PCTs effected by subsidence within the NCM rehabilitation area (Table 4.3; Figure 4.3).

Table 4.3 Habitat for *Bertya opposens* on the BOPs

BOP	Area in BOP (ha)	PCT
Rosevale	250.54	PCT 404: Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
Kurrajong Park	18.28	PCT 404: Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
Greylands Road	5.62	PCT 406: White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
Rosevale	54.47	PCT 406: White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
Kurrajong Park	1.72	PCT 406: White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
Rosevale	2.33	PCT 435: White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
West Haven	40.65	PCT 404: Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
Subtotal	373.61	

BOP	Area in BOP (ha)	PCT
Within NCM rehabilitation subsidence affected area	1,069.02	PCT 406: White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests; PCT 404: Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests;
Total	1,442.63	

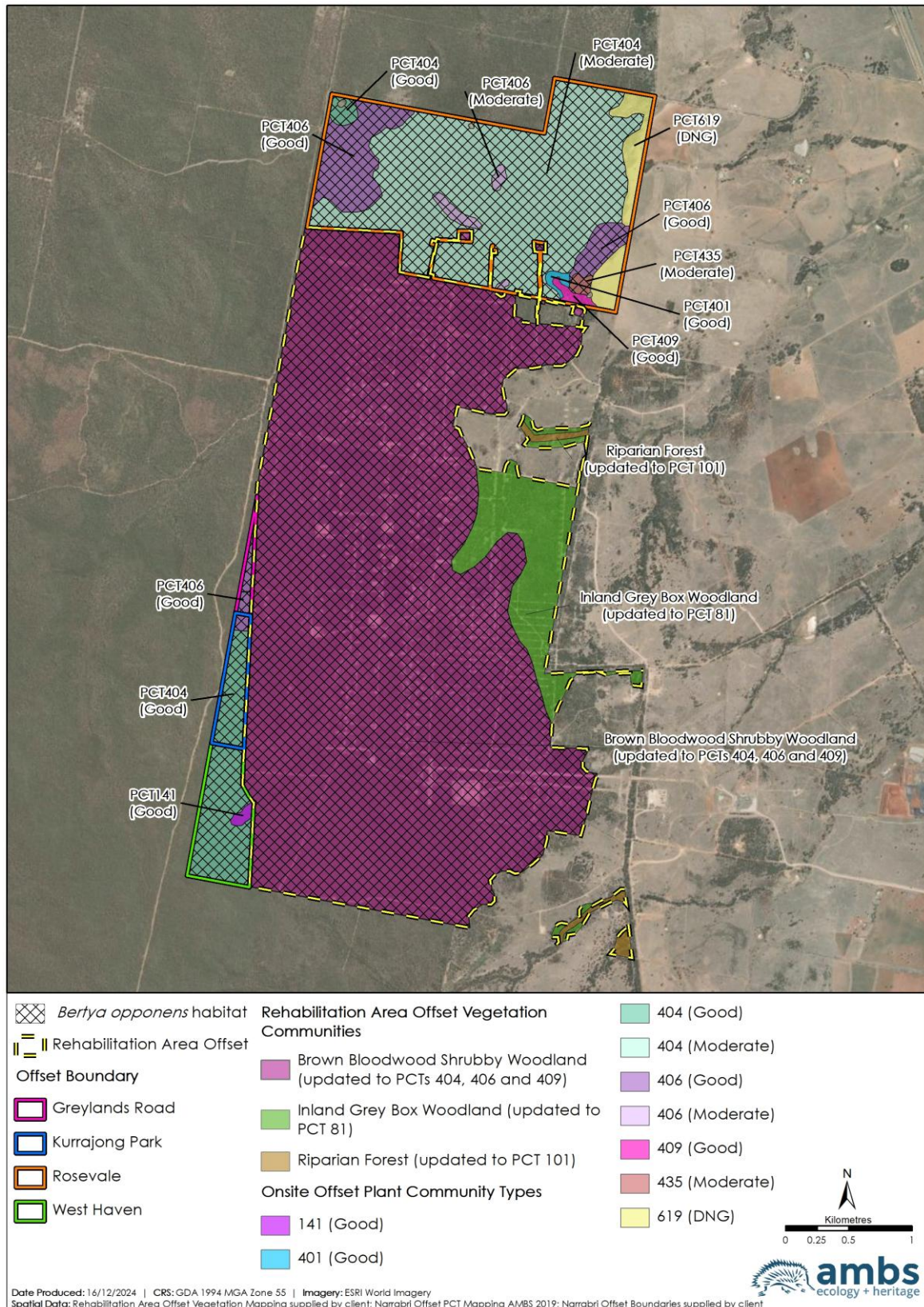


Figure 4.3 Location of *Bertya opposens* habitat in onsite BOPs and NCM rehabilitation area

4.4 Threatened fauna

The key focus of this RBOS in regard to threatened fauna is providing, rehabilitating and managing habitat for the Superb Parrot, specifically;

- White Box Grassy Woodland habitat for the Superb Parrot, located on the Kenna BOP, requires management and enhancement through the implementation of vegetation rehabilitation and restoration measures, pest management, fencing, weed control, fire management, sediment and erosion control, exclusion of livestock and restrictions of access, and,
- Red Ironbark – Brown Bloodwood Shrubby Woodland habitat on the Greylands, Omeo, Rosevale, Greylands Road, Kurrajong Park and West Haven BOPs requires management and enhancement through the implementation of vegetation rehabilitation and restoration measures, pest management, fencing, weed control, fire management, sediment and erosion control, exclusion of livestock and restrictions of access.

Areas of White Box Grassy Woodland on Kenna and Red Ironbark – Brown Bloodwood Shrubby Woodland on the Greylands, Omeo, Rosevale, Greylands Road, Kurrajong Park and West Haven BOPs providing habitat for the threatened species are listed in Table 4.4 and shown on Figures 4.4 and 4.5. WHC has revegetated 434.92 ha of White Box Grassy Woodland DNG in the Kenna BOP.

A total of 1,944.28 ha of habitat for the Superb Parrot is mapped in this RBOS within the Kenna, Greylands, Rosevale, Omeo, Greylands Road, West Haven and Kurrajong Park BOPs and the subsidence affected area.

Table 4.4 Habitat for the Superb Parrot on the BOPs

BOPs	Area in BOP	PCT
Kenna	477.40	1383: White Box grassy woodland of the Nandewar and Brigalow Belt South Bioregions
Greylands	2.32	PCT 101: Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion
Rosevale	1.91	PCT 401: Rough-barked Apple - Blakely's Red Gum - Black Cypress Pine woodland on sandy flats, mainly in the Pilliga Scrub region
Omeo	9.28	PCT 81: Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion
Greylands	10.06	PCT 88: Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
Greylands Road	5.62	406: White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
Rosevale	250.54	404: Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
Rosevale	54.47	406: White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
Rosevale	3.01	409: Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
Kurrajong Park	18.28	404: Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests

BOPs	Area in BOP	PCT
Kurrajong Park	1.72	406: White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
West Haven	40.65	404: Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
Subsidence effected area	1,069.02	PCT 404: Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests; and PCT 409: Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
Total	1,944.28	

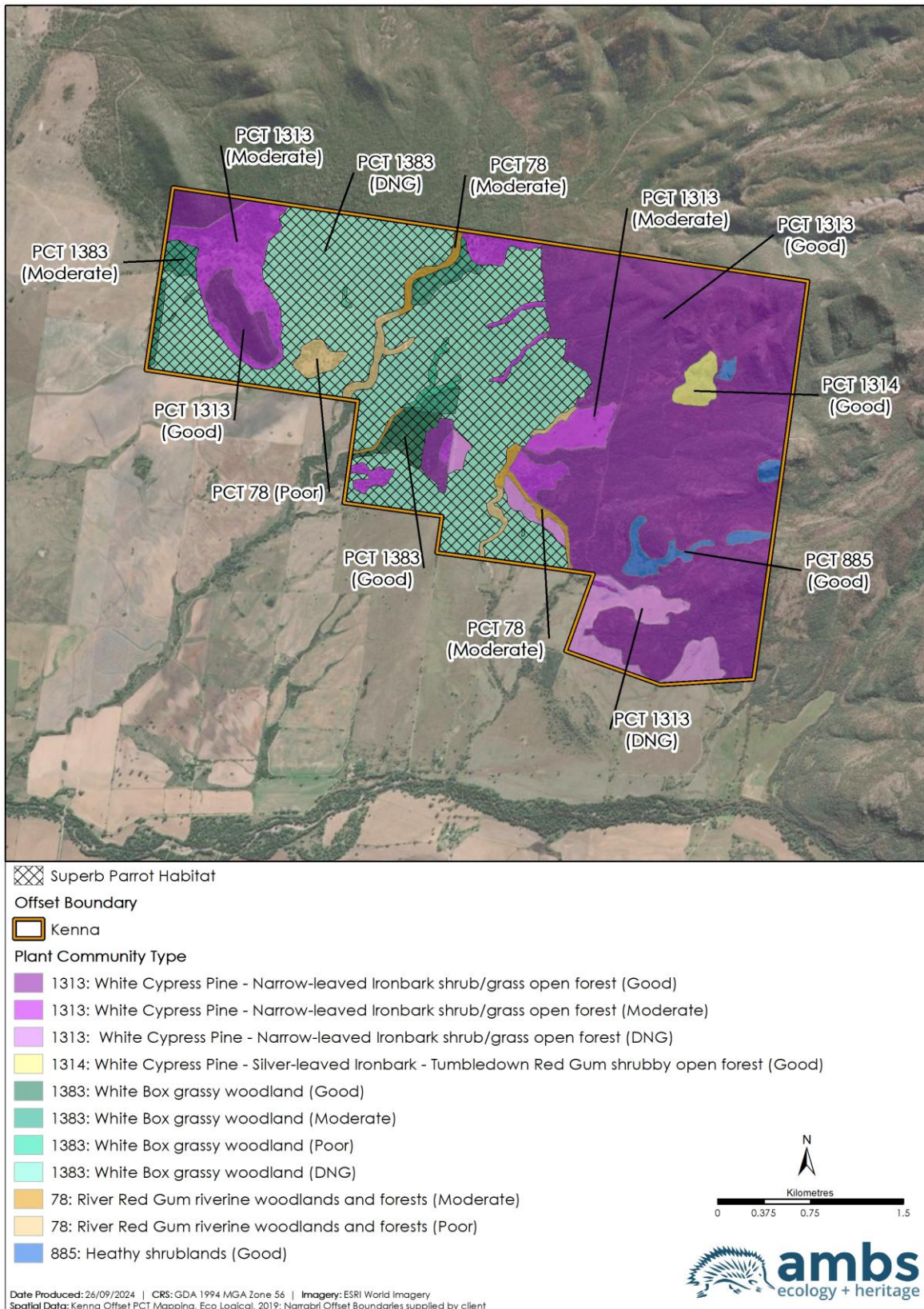


Figure 4.4 Location of Superb Parrot habitat in the Kenna BOP

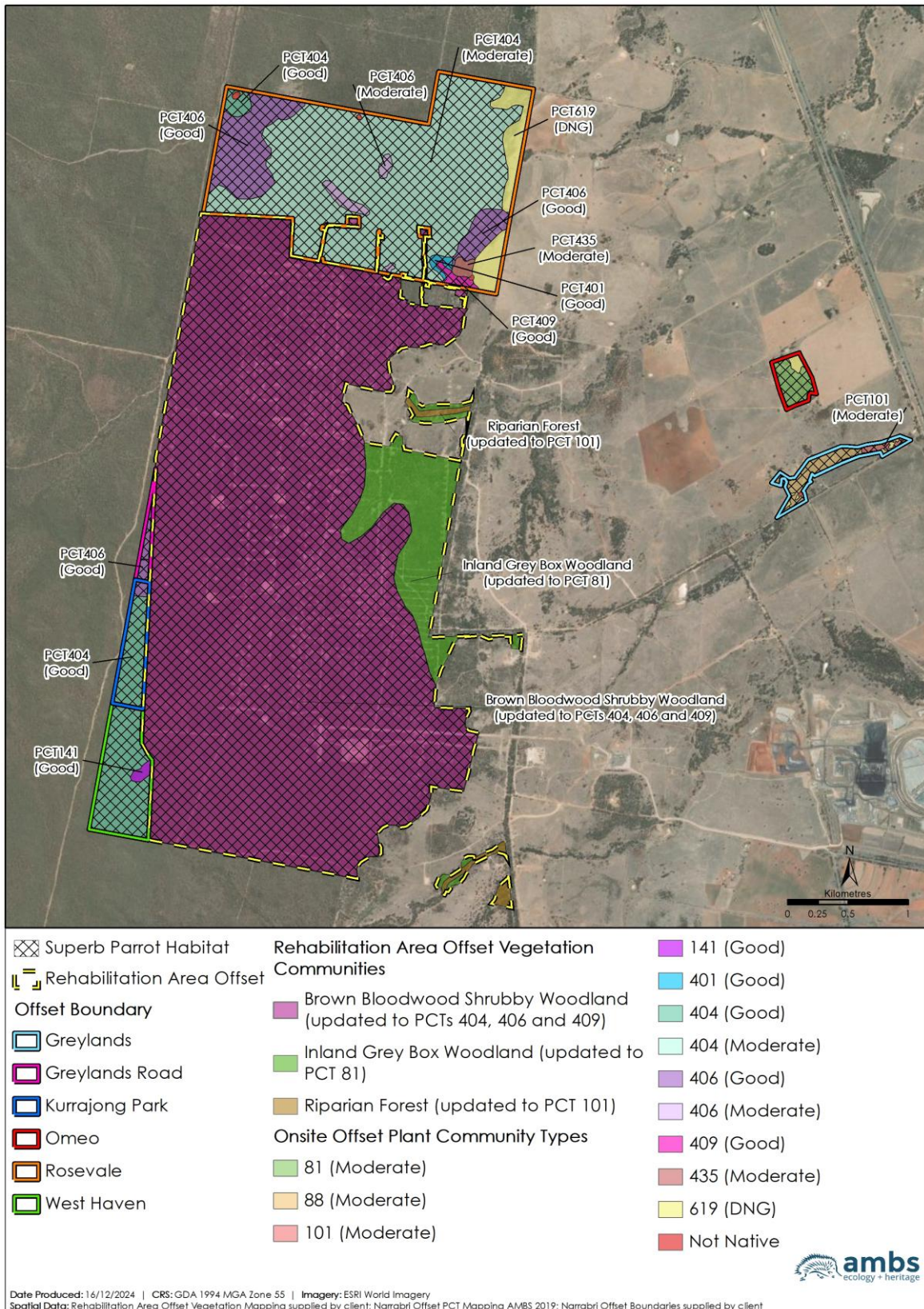


Figure 4.5 Location of Superb Parrot habitat in the Greylands, Omeo, Rosevale, Greylands Road, Kurrajong Park and West Haven BOPs

4.5 Rehabilitation Area as part of the approved BOS

This RBOS does not alter or vary the intent of the original BOS to establish a NCM Rehabilitation Area Offset affected by subsidence that has been transferred through to SSD-10269 Condition B45. While this RBOS addresses the external land-based components of the Narrabri RBOS; the description and implementation of the Rehabilitation Area Offset is to be documented in the NCM Rehabilitation Strategy. As described above in Section 3.8; the Rehabilitation Area Offset covers up to 1,167.54 ha of woodland vegetation that adjoins four of the adjacent BOPs as part of the overall NCM BOS area of 2,842.02 ha.

With PA 08_0144 to be surrendered, going forward the securement of the remaining component of the Stage 2 BOS, called the Rehabilitation Area Offset, will be guided by SSD-10269 Condition B46 currently designating that suitable arrangements to provide appropriate long-term security within 3 years of commencing development be made. However, if another date is agreed by the Secretary and to the satisfaction of the Planning Secretary then NCM will secure the Rehabilitation Area Offset with timing to be outlined in the NCM Rehabilitation Strategy to allow for post mining rehabilitation and subsidence mitigation as well as for the Conservation Agreement process managed by NSW BCT.

4.6 Required area of NCM RBOS

Approval SSD-10269 requires NCM to have a BOS with a minimum area of 2,832.79 ha (not considering if NCM decides to forego Stage 2 footprint 14.1 ha of disturbance, which could reduce the minimum BOS area by 36.66 ha to 2,796.13 ha under SSD-10269 Condition B45c).

The RBOS covers an area of native vegetation of 1,244.06 ha from the Kenna offset property and 430.42 ha from the Greylands, Omeo, Rosevale, Greylands Road, Kurrajong Park and West Haven BOPs (Table 4.5) a total of 1,674.48 ha. Furthermore, up to 1,167.54 ha of woodland vegetation that may be subject to subsidence impacts and mine site rehabilitation at NCM, adjoining four of the Greylands, Omeo, Rosevale, Greylands Road, Kurrajong Park and West Haven BOPs will be progressed following timing to be outlined in the NCM Rehabilitation Strategy, resulting in an overall NCM BOS of 2,842.02 ha (or reduces to 2,805.36 as per SSD-10269 Condition B45c).

Table 4.5 Required Areas of Native Vegetation covered by the RBOS

Plant Community Type described in this RBOS	Vegetation Type Required	Biodiversity Offset Property	Total Area in BOPs	NCM Rehabilitation Offset Area	Final Area
<p>PCT 404: Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests;</p> <p>PCT 406: White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests;</p> <p>PCT 409: Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion</p>	Red Ironbark - Brown Bloodwood shrubby woodland of the Brigalow Belt South Bioregion	Rosevale, Greylands Road, Kurrajong Park and West Haven	374.29	1,069.02	1,443.31
PCT 1383: White Box grassy woodland of the Nandewar and Brigalow Belt South Bioregions	At least 933 hectares of offset on the Kenna property, which contains White Box Grassy Woodland	Kenna	477.40	0	477.40
PCT 401: Rough-barked Apple - Blakely's Red Gum - Black Cypress Pine woodland on sandy flats, mainly in the Pilliga Scrub region	Other Native Vegetation	Rosevale	1.91	0	1.91
PCT 1313: White Cypress Pine - Narrow-leaved Ironbark shrub/grass open forest of the western Nandewar Bioregion	Other Native Vegetation	Kenna	703.11	0	703.11
PCT 81: Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion;	Other Native Vegetation	Omeo	9.28	89.89	99.17
PCT 101: Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion	Other Native Vegetation	Greylands	2.32	8.63	10.95
PCT 435: White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion	Other Native Vegetation	Rosevale	2.33	0	2.33

Plant Community Type described in this RBOS	Vegetation Type Required	Biodiversity Offset Property	Total Area in BOPs	NCM Rehabilitation Offset Area	Final Area
PCT 141: Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion	Other Native Vegetation	West Haven	1.87	0	1.87
PCT 78: River Red Gum riverine woodlands and forests in the Nandewar and Brigalow Belt South Bioregions	Other Native Vegetation	Kenna	35.10	0	35.10
PCT 1314: White Cypress Pine - Silver-leaved Ironbark - Tumbledown Red Gum shrubby open forest of the Nandewar and Brigalow Belt South Bioregions	Other Native Vegetation	Kenna	10.49	0	10.49
PCT 885: Heathy shrublands on rocky outcrops of the western slopes	Other Native Vegetation	Kenna	17.96	0	17.96
PCT 88: Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion	Other Native Vegetation	Greylands	10.06	0	10.06
PCT 619: Derived Wire Grass grassland of the NSW Brigalow Belt South Bioregion and Nandewar Bioregion	Other Native Vegetation	Greylands, Omeo, Rosevale	28.36	0	28.36
Totals			1,674.48	1,167.54	2,842.02

5 Conclusion

This RBOS covers an area of native vegetation on the Kenna offset property of 1,244.06 ha and on the Greylands, Omeo, Rosevale, Greylands Road, Kurrajong Park and West Haven BOPs of 430.42ha. Furthermore, up to 1,167.54 ha of woodland vegetation that may be subject to subsidence impacts and mine site rehabilitation at NCM, adjoining four of the other BOPs will be progressed following timing to be outlined in the NCM Rehabilitation Strategy, resulting in an overall NCM BOS of 2,842.02 ha (or reduces to 2,805.36 ha as per SSD-10269 Condition B45c).

This RBOS does not alter or vary exiting BOS commitments as described in NSW Project Approval PA 08_0144 and SSD-10269 and Commonwealth EPBC Approval 2009/5003. All commitments are maintained or exceeded (Table 6.1)

This RBOS does not alter or vary the commitment as described in the original BOS (NSW Approval SSD-10269 Condition B45c) for a Rehabilitation Area as part of the Offset package. This RBOS only addresses the external land-based components of the NCM BOS; and as such the description and implementation of the Rehabilitation Area Offset (1,167.54 ha of native woodland vegetation) is to be outlined in the NCM Rehabilitation Strategy.

Table 5.1 Summary of requirements of NSW Project Approval SSD-10269 and EPBC Approval 2009/5003 and how they have been met

Biodiversity Offset Strategy Criteria (SSD-10269 and/or EPBC 2009/5003)	Required Quantum for Biodiversity Offset Strategy (ha)	Quantum in Revised Biodiversity Offset Strategy (ha)	Difference (Revised BOS – Required BOS) (ha)
Enhance at least 933 hectares of offset on the Kenna property, which contains White Box Grassy Woodland habitat for the Superb Parrot (EPBC Approval 2009/5003 Condition 2a and 14a)	933	1,244.06	311.06 +
At least 422 hectares of offset on the Greylands, Omeo, Rosevale, Greylands Road, Kurrajong Park and West Haven properties of Red Ironbark – Brown Bloodwood Shrubby Woodland, which is habitat for <i>Bertya opposens</i> and the Superb Parrot (EPBC Approval 2009/5003 Condition 2b and 14b)	422	1,442.63 (<i>Bertya opposens</i>) 1,944.28 (Superb Parrot)	1,020.63 + 1,522.28+
The overall BOS is required to cover an area of 2,832.79 ha (but if Stage 2 disturbance footprint foregoes 14.1 ha then this can be reduced to 2,796.13 ha) (NSW Approval SSD-10269 Condition B45c)	2,832.79 (or reduced by 36.66 to 2,796.13)	2,842.02 (or 2,805.36 if reduced)	9.23 +

The RBOS consists of Property adjoining Mount Kaputar National Park that meets 'like for like or better' requirements and 'maintains or improves' conservation outcomes (NSW Approval PA 08_0144 Condition 6c)

The RBOS confirms offsets to the impacts to Inland Grey Box EEC, *Bertya opposens* and Superb Parrot foraging habitat (NSW Approval PA 08_0144 Condition 6d).

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