APPENDIX C

MAULES CREEK COAL MINE OFFSET AREA VEGETATION MAPPING REPORT

Maules Creek Coal Mine
Offset Area Vegetation Mapping

Prepared by AMBS Ecology & Heritage Pty Ltd
for Whitehaven Coal Limited

October 2021

AMBS Reference: 19764

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Executive Summary

AMBS Ecology & Heritage Pty Ltd (AMBS) was engaged to undertake vegetation surveys across the Maules Creek Coal Mine offset areas. The study involved a desktop review of relevant information and field surveys.

A number of previous surveys within and surrounding the offset areas were considered, as was the data from contemporary databases and mapping layers.

Several field surveys were undertaken across the study area by AMBS between 26 May 2020 and 21 August 2020 and an additional survey of selected areas was undertaken on 26 March 2021. The primary tasks included verifying and mapping plant community types (PCTs), identifying vegetation condition, collecting floristic data and identifying threatened ecological communities (TECs) listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and New South Wales (NSW) *Biodiversity Conservation Act 2016* (BC Act).

The survey methods included 117 "full floristic" 20 metre (m) x 20 m quadrats (nested within a 20 m x 50 m transect) and 197 rapid data points. A cluster analysis of full floristic plot data was undertaken, utilising a number of additional plots outside the present study areas. The identification of TECs was undertaken in accordance with the relevant listings under the EPBC Act and BC Act.

A total of 733 plant species in 87 families were recorded during surveys to determine the PCTs in the offset areas (Appendix A). Of these, 519 were native plant species.

This study has confirmed the following range of PCTs within the offset areas:

55: Belah woodland on alluvial plains and low rises

78: River Red Gum riparian tall woodland / open forest wetland

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

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

112: Black Tea-tree - River Oak - Wilga riparian low forest/shrubland wetland

147: Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket

244: Poplar Box grassy woodland

413: Silver-leaved Ironbark - White Cypress Pine - box dry shrub grass woodland

427: Cypress pine - Tumbledown Red Gum low open woodland to grassland

429: White Cypress Pine - Poplar Box - Silver-leaved Ironbark viney shrub woodland

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

439: Mock Olive - Tumbledown Red Gum - Red Ash - Wilga siliceous rocky hill low woodland / shrubland

492: Silvertop Stringybark - Yellow Box - Apple Box - Rough-barked Apple shrub grass open forest

508: Blakely's Red Gum - Stringybark - Rough-barked Apple open forest

510: Blakely's Red Gum - Yellow Box grassy woodland

563: White Box - Silvertop Stringybark +/- White Cypress Pine grass shrub open forest

569: Derived Snow Grass +/- Kangaroo Grass +/- Wild Sorghum tussock grassland

571: Ribbon Gum - Rough-barked Apple - Yellow Box grassy woodland

572: Silvertop Stringybark - Bendemeer White Gum - Ribbon Gum open forest

574: Tea-tree riparian shrubland / heathland wetland

581: Tumbledown Red Gum - Dwyer's Red Gum - Wallaby Bush shrubby woodland

588: White Box - White Cypress Pine shrubby hills open forest

592: Narrow-leaved Ironbark - cypress pine - White Box shrubby open forest

599: Blakely's Red Gum - Yellow Box grassy tall woodland

619: Derived Wire Grass grassland

736: Broad-leaved Stringybark - Mountain Gum - Apple Box open forest

1165: Silvertop Stringybark - Orange Gum shrubby open forest

1306: White Box - Red Stringybark shrubby woodlands

Four TECs listed under the EPBC Act were identified in the offset areas:

- *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland Critically Endangered Ecological Community* (comprising 1,847.6 hectares [ha] of woodland and 1,512.6 ha of Derived Native Grassland [DNG], total of 3,360.2 ha);
- *Poplar Box Grassy Woodland on Alluvial Plains Endangered Ecological Community* (comprising 63.6 ha of woodland);
- *Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-east Australia Endangered Ecological Community* (comprising 2.2 ha of woodland); and
- *Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions Endangered Ecological* (comprising 0.3 ha of woodland).

Three TECs listed under the BC Act were identified in the offset areas:

- *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 Critically Endangered Ecological Community* (comprising 1,858.6 ha of woodland and 1,512.6 ha of DNG, total of 3,371.2 ha);
- *Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions Endangered Ecological Community* (comprising 2.2 ha of woodland); and
- *Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions Endangered Ecological Community* (comprising 0.3 ha of woodland).

Two threatened plant species were recorded in the offset areas, one of which is listed as threatened under the BC Act and both under the EPBC Act:

- *Dichanthium setosum* (Bluegrass).
- *Callistemon pungens*.

An additional four threatened species have been previously recorded in the offset areas, namely, *Tylophora linearis, Thesium australe, Digitaria porrecta* and *Homoranthus prolixus*.

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1 Introduction

1.1 Background

AMBS Ecology & Heritage Pty Ltd (AMBS) was engaged to undertake vegetation surveys across various offset areas for the Maules Creek Coal Mine (MCCM).

1.2 Scope and Objectives

The scope of work for this study involves the survey and documentation of native vegetation communities and threatened ecological communities (TECs) within the study area. The objectives of the study include the following:

- description of plant community types (PCTs) within the study area, including:
  - species relied upon for identification of vegetation type and relative abundance;
  - justification of evidence used to identify a PCT;
  - mapping of the extent of vegetation communities within the study area, including cleared areas; and
- identification and mapping of TECs according to the relevant State and Commonwealth listings under the New South Wales (NSW) *Biodiversity Conservation Act 2016* (BC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

1.3 Location of the Study Area

The study area contains numerous properties grouped and identified as Northern, Eastern, Western and Southern Offsets occurring in the Narrabri Shire Council (Eastern and Western Offsets), Gunnedah Shire Council (Southern Offsets) and Tamworth Regional Council (Northern Offsets) Local Government Areas of NSW.

The offset areas are adjacent to various State Forests and Protected Areas (Figure 1.1). Parts of the Eastern and Western Offsets are adjacent to Leard State Forest. Parts of the Western Offsets are adjacent to Leard State Conservation Area. The Northern Offsets are adjacent to Mount Kaputar National Park and the Southern Offsets are adjacent to Boonalla Community Conservation Area Zone 2 Aboriginal Area (Figure 1.1).

In some cases, adjacent properties have been grouped for the purposes of preparing Conservation Agreements. Table 1.1 provides a breakdown of the size of each offset area and corresponding Conservation Agreement Group. The total study area is approximately 11,974.9 hectares (ha) (Table 1.1).

Table 1.1 Summary of Study Area by Conservation Agreement Group and Offset Group

Conservation Agreement Group	Offset Area	Total Size of the Offset Area (ha)
Kelso, Velyama, Louenville	Kelso	489.4
	Velyama	702.6
	Louenville	213.1
Teston South	Teston South	336.2
Wollandilly	Wollandilly	804.4
Onavale	Onavale	557.7
Roseglass, Bimbooria	Roseglass	1,465.3
	Bimbooria	622.5
Wirradale and Wongala South	Wirradale and Wongala South	4,446.6
Mt Lindesay	Mt Lindesay	2,337.1
	Total	**11,974.9**

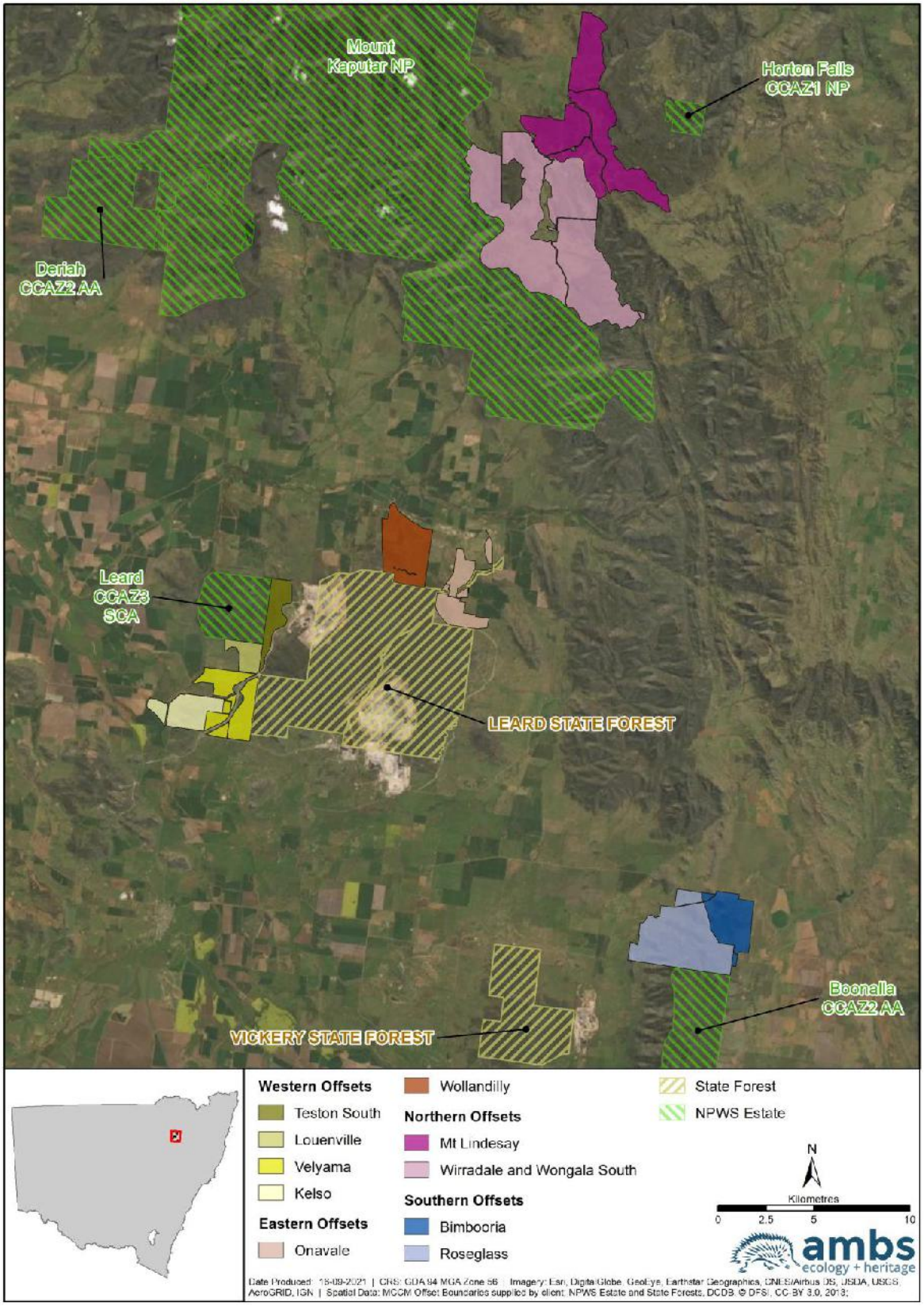

Figure 1.1 Location of the Study Area

1.4 Bioregion and Landscape

The Eastern and Western Offsets occur wholly within the Liverpool Plains Interim Biogeographic Regionalisation for Australia (IBRA) Sub-region of the Brigalow Belt South IBRA Region (Department of Agriculture, Water and Environment [DAWE], 2020).

The Northern Offsets occur across the Kaputar and Peel IBRA Sub-regions of the Nandewar IBRA Region. The majority of the Southern Offsets also occur in the Peel IBRA Sub-region of the Nandewar IBRA Region, with small areas within the Liverpool Plains Sub-region, of the Brigalow Belt South IBRA Region (DAWE, 2020).

Eastern and Western Offsets are predominantly mapped as Bugaldie Uplands Mitchell Landscape with minor occurrence of Liverpool Alluvial Plains (Mitchell, 2002). The Northern Offsets are predominantly mapped as Kaputar Slopes and Tamworth Keepit Slopes and Plains, with minor occurrence of Split Yard Plateau Mitchell Landscapes and the Southern Offsets consist of the Kelvin Range landscape and Liverpool Alluvial Plains to a lesser extent (Mitchell, 2002).

The vegetation occurring throughout the study area largely consists of Dry Sclerophyll Forests with grassy and/or shrubby sub-formation, Grassy Woodlands, and secondary grasslands due to historical clearing (Keith and Simpson, 2020).

1.5 Climate

Weather records were obtained from the nearby Bureau of Meteorology (BoM) weather stations at Boggabri (Kanownda) (Station ID 55076), Boggabri Post Office (Station ID 55007) and Narrabri Airport Automatic Weather Station (AWS) (Station ID 54038), located approximately 3 kilometres (km), 25 km and 40 km away from the centre of the study areas, respectively. Data displayed in Figure 1.2 below is taken from the Boggabri (Kanownda), except for various years from 2002 to 2019 where data was incomplete and data from the Boggabri Post Office or Narrabri Airport AWS was used.

The locality receives an average of about 575.5 millimetres (mm) of rainfall per annum (as shown by the orange line on Figure 1.2), based on long-term data from 1899 to the most recent available records (BoM, 2020). Rainfall varies widely from year to year, as shown in Figure 1.2 with a lowest recorded total annual rainfall of 206.2 mm recorded in 2019 (at Narrabri Airport AWS) and highest of 938.7 mm in 2004 (at Boggabri Post Office). The seven years from 2013 to 2019 had mostly below average annual rainfall, with 2019 being the lowest on record. During February, March and April of 2020, monthly rainfall was greater than average monthly rainfall (Figure 1.3).

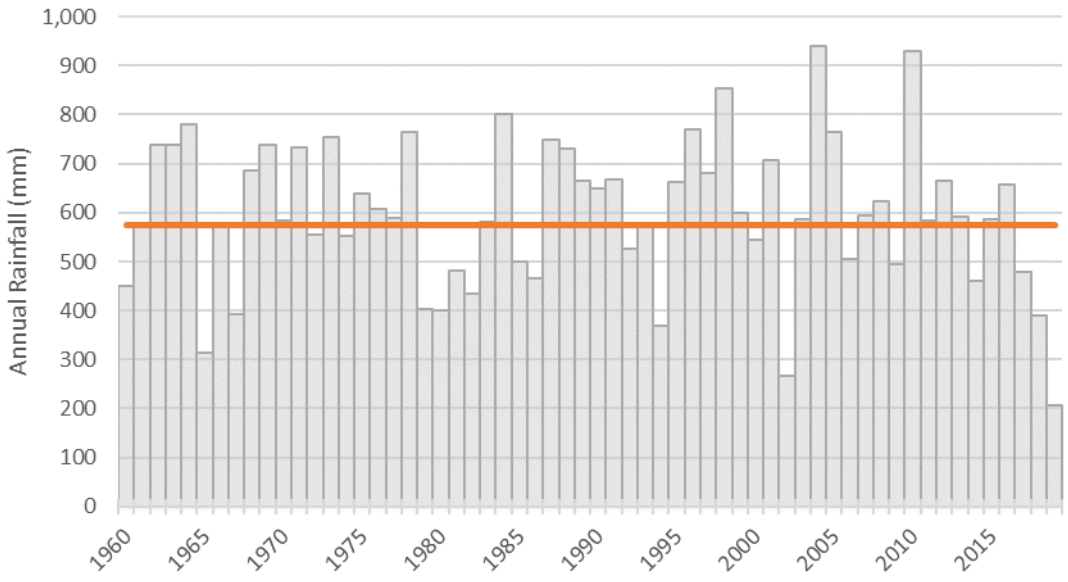

Figure 1.2 Annual Rainfall at Boggabri (Kanownda) (Station ID 55076) from 1960 to 2019 and Long-term Average of 575.5 mm

Note that missing data has been supplemented using Boggabri Post Office (Station ID 55007) and Narrabri Airport AWS (Station ID 54038) records.

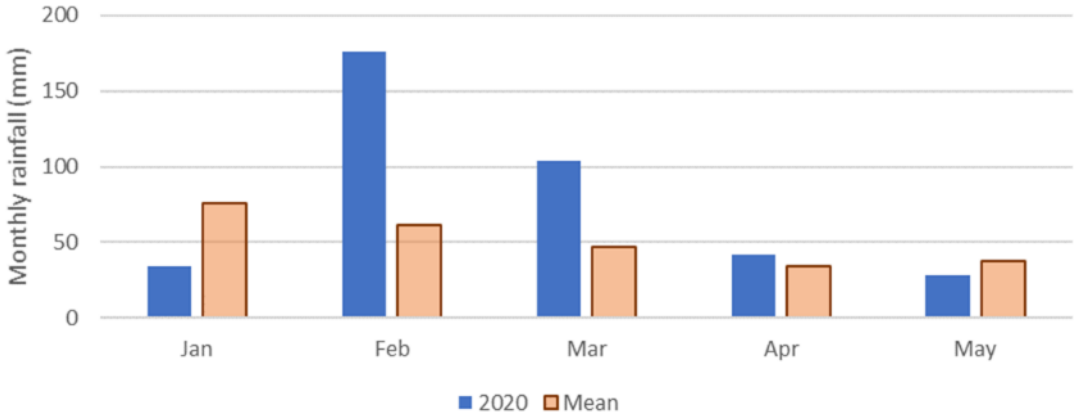

Figure 1.3 Rainfall at Boggabri (Kanownda) (Station ID 55076) from 2020 (Source: BoM, 2020)

Average temperatures range from between 4 degrees Celsius (°C) to 18.1 °C in the coldest month of July and between 20.7 °C to 35 °C in the warmest month of January (Narrabri Airport AWS; BoM, 2020).

1.6 Topography and Drainage

The topography of the study area is variable. Table 1.2 provides the minimum and maximum elevation within each offset group.

Table 1.2 Summary of Elevation within Offset Groups Derived from Geoscience Australia 1 Second DEMs

Offset Group	Min (m)	Max (m)
Northern	568	1069
Eastern	263	396
Western	231	448
Southern	323	810

Note: m = metres.

The Eastern, Western and Southern Offsets are within the Namoi River Catchment (Murray Darling Basin Authority [MDBA], 2019) and natural drainage generally flows to the west. There are a number of named watercourses within the study area. Back Creek (Stream Orders 5 and 6), Whiskey Creek (Stream Order 4) and Stewarts Gully (Stream Orders 4 and 3) traverse the Eastern Offsets. Part of the Western Offsets (Kelso) occurs on the floodplain of the Namoi River (Stream Order 9) (Department of Primary Industries – Water [DPI-Water], 2020).

The Northern Offsets are partly in the Namoi River Catchment (which drains to the south-west) and partly within the Gwydir River Catchment (which drains to the north-east) (MDBA, 2019). The Northern Offsets have a number of named watercourses, namely, Second Water Creek (Stream Order 5), Horton River (Stream Order 5), Cut Road Creek (Stream Orders 2, 3 and 4), Gap Station Creek (Stream Orders 4 and 3), Oaky Gully (Stream Orders 3 and 2), Teatree Creek (Stream Order 3), Deep Creek (Stream Orders 4 and 3), Maules Creek (Stream Orders 5 and 3), and Basin Creek (Stream Orders 3 and 2) (DPI-Water, 2020).

1.7 Geology and Soils

As mentioned above, the Eastern and Western Offsets are predominantly mapped as Bugaldie Uplands Mitchell Landscape with minor occurrence of Liverpool Alluvial Plains (Mitchell, 2002). In regard to geology and soils, the Bugaldie Uplands Mitchell Landscape consists of (Mitchell, 2002):

> *Stepped stony ridges on Jurassic quartz sandstone with some conglomerate, shale and occasional interbedded basaltic volcanic rocks. Abundant outcrop on ridge tops with thin discontinuous soils with stony, sandy profiles and low nutrients. Down slope texture-contrast soils are more common typically with harsh clay subsoils and deep uniform or gradational yellow-brown sands on the valley floors.*

The Liverpool Alluvial Plains Mitchell Landscape consists of (Mitchell, 2002):

> *Quaternary alluvial plains and outwash fans derived from Tertiary basalts. Permian and Triassic quartz sandstones with minor basalt caps. Undulating hills and sloping plains with alluvial channels and floodplains. Extensive black earths on low angle slopes. Deep black and brown cracking clays, alluvial soils and red or brown texture-contrast soils on slopes below sandstone.*

The Northern Offsets are predominantly mapped as Kaputar Slopes and Tamworth Keepit Slopes and Plains, with minor occurrence of Split Yard Plateau Mitchell Landscapes and the Southern Offsets consist of the Kelvin Range landscape and Liverpool Alluvial Plains to a lesser extent (Mitchell, 2002).

In regard to geology and soils, the Kaputar Slopes Mitchell Landscape consists of (Mitchell, 2002):

> *Lower slopes of the Kaputar volcanic complex with radiating finger-like ridges capped by basalt over lower Permian and Triassic quartz sandstone, lithic sandstone, silty sandstone, conglomerate and thin coal measures. Shallow stony red-brown loam and clay loam in uniform profiles on basalt, yellow and yellow-brown texture-contrast profile on sandstone, deep black earths in lowest valleys.*

The Tamworth Keepit Slopes and Plains Mitchell Landscape consists of (Mitchell, 2002):

> *Extensive area of undulating to rolling slopes and plains with low hills and low ranges forming the western fall of the New England plateau. Complex geology of folded and faulted sedimentary and metamorphic rocks with minor interbedded volcanics. Rock types include; Silurian-Devonian chert, slate, phyllite, tuff, schist and Carboniferous conglomerate, sandstone, mudstone, andesite and small areas of limestone. Shallow stony soils on ridges. Texture-contrast soils on almost all slopes shifting in colour from red-brown on upper slopes to yellow with harsh subsoils prone to gully development on lower slopes.*

The Split Yard Plateau Mitchell Landscape consists of (Mitchell, 2002):

> *Complex ranges and steep sided peaks on folded and faulted Devonian and Carboniferous conglomerate, sandstone, mudstone, andesite and tuff. The main range has a central valley within a synclinal fold and the high peaks are formed by a rhyodacite unit. Shallow stony sandy loam on ridges, stony gradational loam and red-yellow texture-contrast on lower slopes.*

The Kelvin Range Mitchell Landscape consists of (Mitchell, 2002):

> *Steep ranges with wide debris aprons on moderately dipping Carboniferous sandstone, conglomerate, rhyodacite and tuff. General elevation 300 to 890m, local relief 500m. Shallow stony sandy loam on ridges and slopes, texture-contrast in rubbly debris on the colluvial apron shifting in colour from red brown on upper slopes to yellow on lower slopes.*

A summary of Greater Soil Group (GSG) and Australian Soil Classification (ASC) soils mapped within the offset areas is provided in Table 1.3 (Department of Planning, Industry and Environment [DPIE], 2020b, 2020c).

Table 1.3 Summary of GSG and ASC Soils Mapped within the Offset Areas

Offset Group	GSG	ASC
Northern	**[Lithosols, Euchrozems]**, Chocolate Soils, Brown Podzolic Soils, Yellow Podzolic Soils, Black Earths, Kraznozems, Prairie Soils	**[Ferrosols, Rudosols and Tenosols]**, Kurosols, Chromosols, Vertosols, Sodosols
Eastern	**[Non-Calcic Brown Soils, Solodic Soils]**, Lithosols, Grey Brown and Red Clays	**[Chromosols, Sodosols]**, Rudosol and Tenosol, Vertosols
Western	**[Lithosols, Solodic Soils]**, Grey Brown and Red Clays	**[Rudosols and Tenosols, Sodosols]**, Vertosols
Southern	**[Lithosols]**, Non-Calcic Brown Soils, Grey Brown and Red Clays, Black Earths, Red Brown Earth	**[Rudosols and Tenosols]**, Chromosols, Vertosols

Note: Bold soil types enclosed in square brackets comprise at least 80% of the area for the corresponding Offset Group.

1.8 Land Use and Disturbance

All of the offset areas are located on properties that were formerly used for farming, mainly livestock grazing but with some dryland cropping. The offset areas have varying amounts of cleared land, with more cleared land in the Eastern and Western Offsets. Livestock grazing has progressively been removed from the offset areas.

Revegetation works in the offset areas have been ongoing since 2016, with targeted plantings completed on large areas within the Eastern, Western, Southern and Northern Offsets.

1.9 Fire History

Based on the fire history supplied by the National Parks and Wildlife Service (NPWS) (2020), the southern portion of the Southern Offsets were burnt by a wildfire in November 2009 (Figure 1.4) and a portion of the Northern Offsets were burnt by a wildfire, the Kaputar Fire, in November 2019 (Figure 1.5). Several controlled burns were undertaken within the Eastern and Western Offsets in 2017, and the Southern and Northern Offsets in 2018, and a fire ignited by lightning strike in the northern portion of the Northern Offsets was recorded in 2016 (Whitehaven supplied data) (Figures 1.5, 1.6, and 1.7). A prescribed burn within the Leard State Conservation Area to the west of the Western Offsets was undertaken in 2014 and several other fires are recorded within Mount Kaputar National Park bordering the Northern Offsets in 1993, 2009, and 2019 (NPWS, 2020) (Figure 1.5).

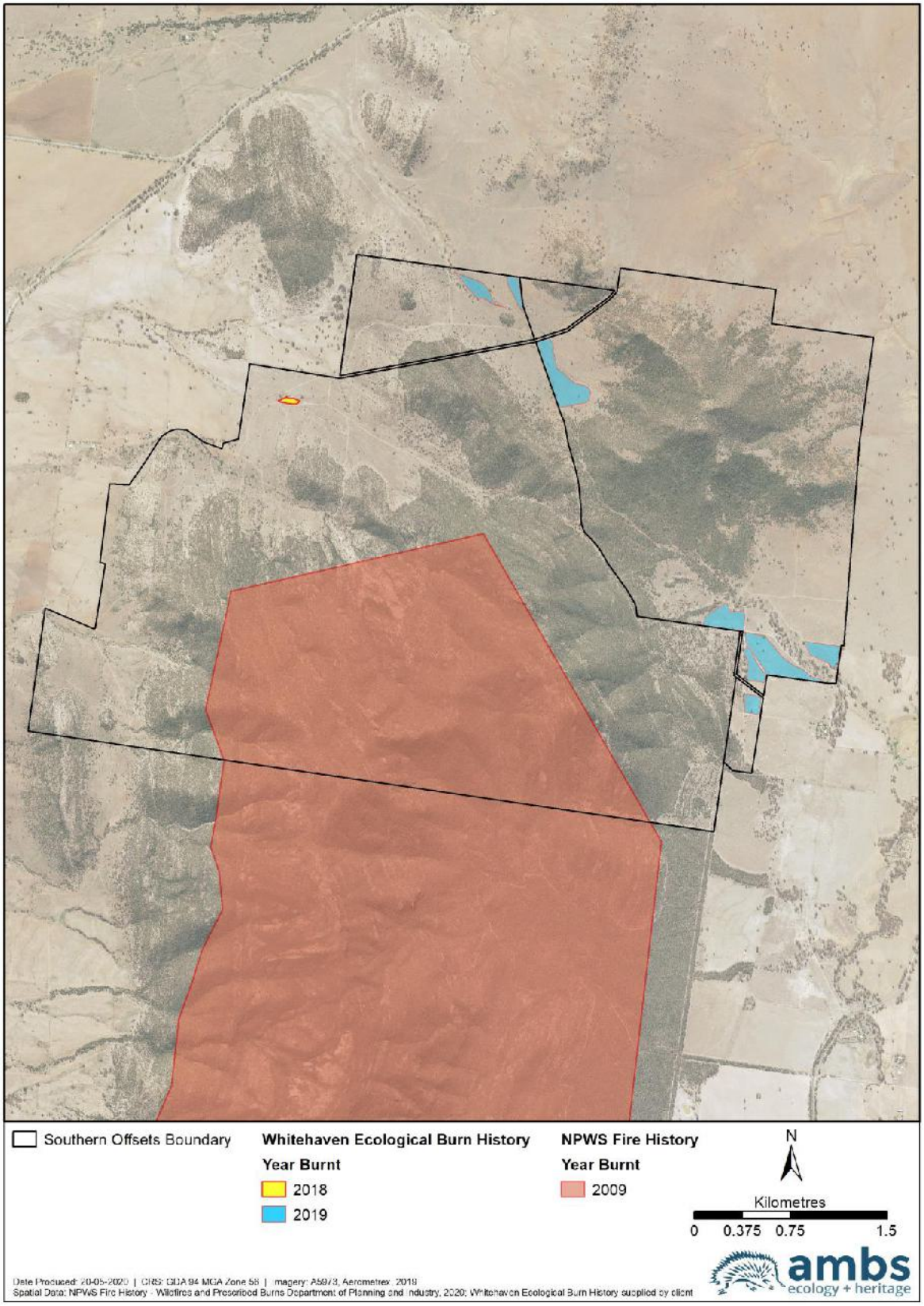

Figure 1.4: Fire History for the Southern Offsets

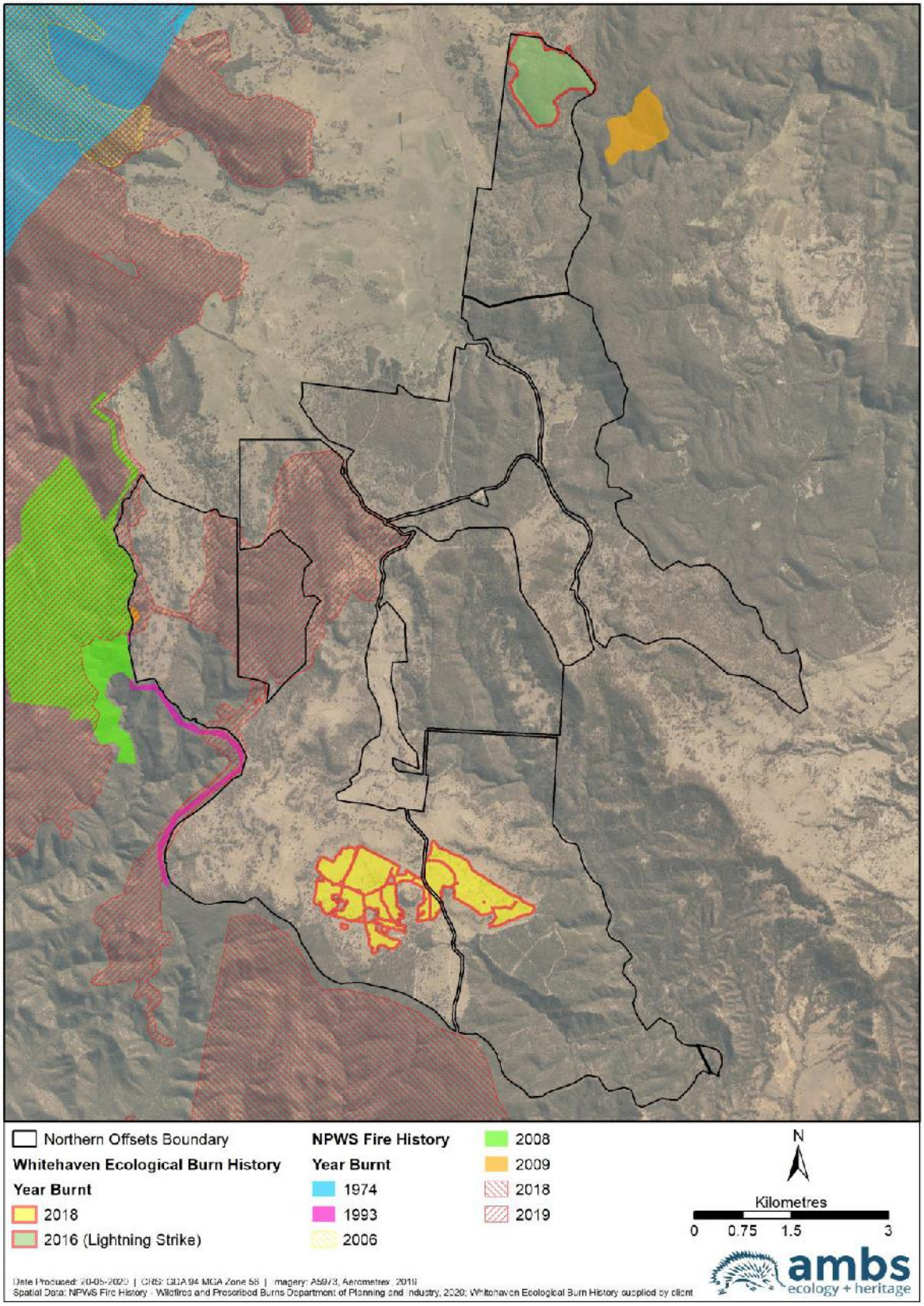

Figure 1.5 Fire History for the Northern Offsets

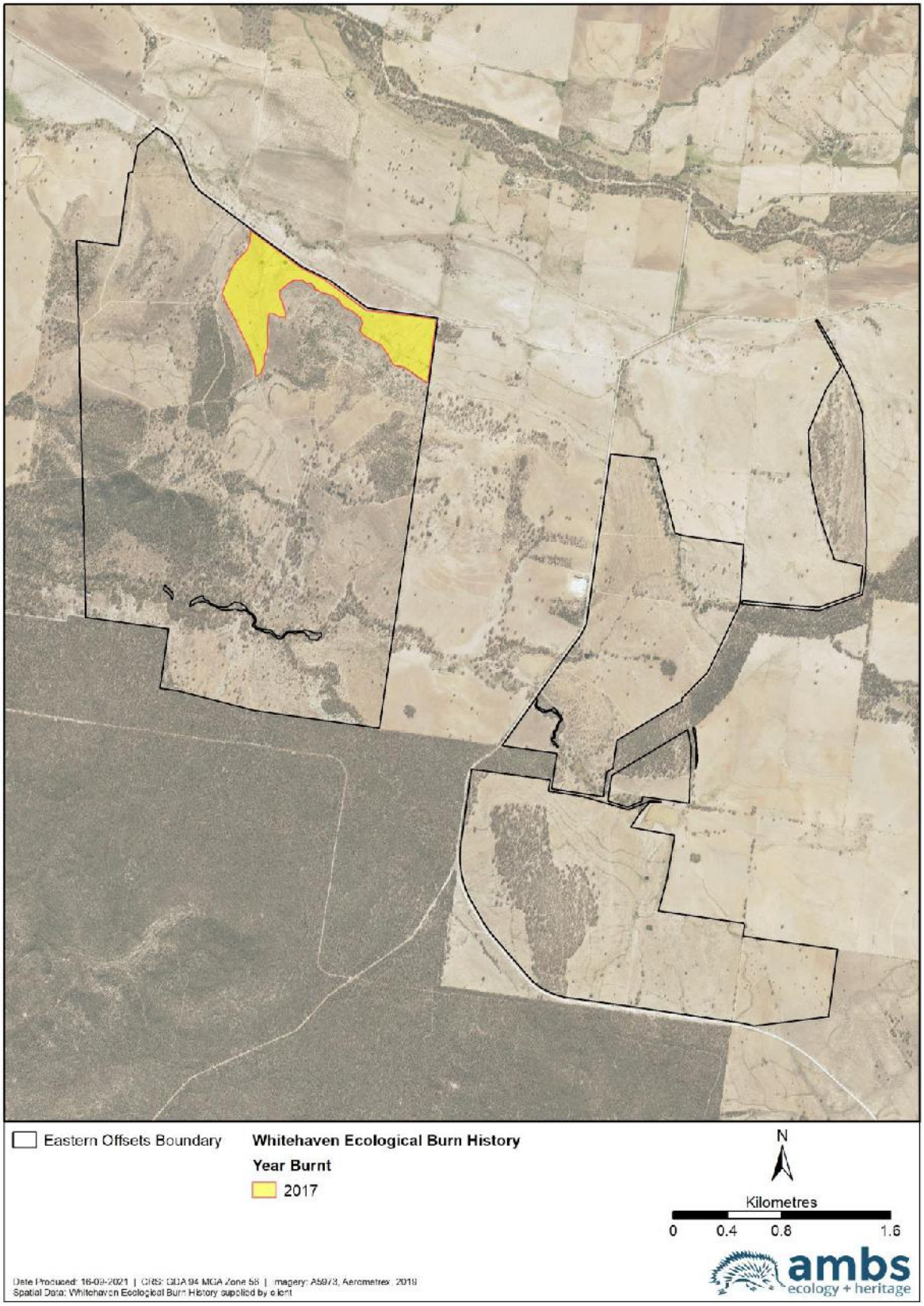

Figure 1.6: Fire History for the Eastern Offsets

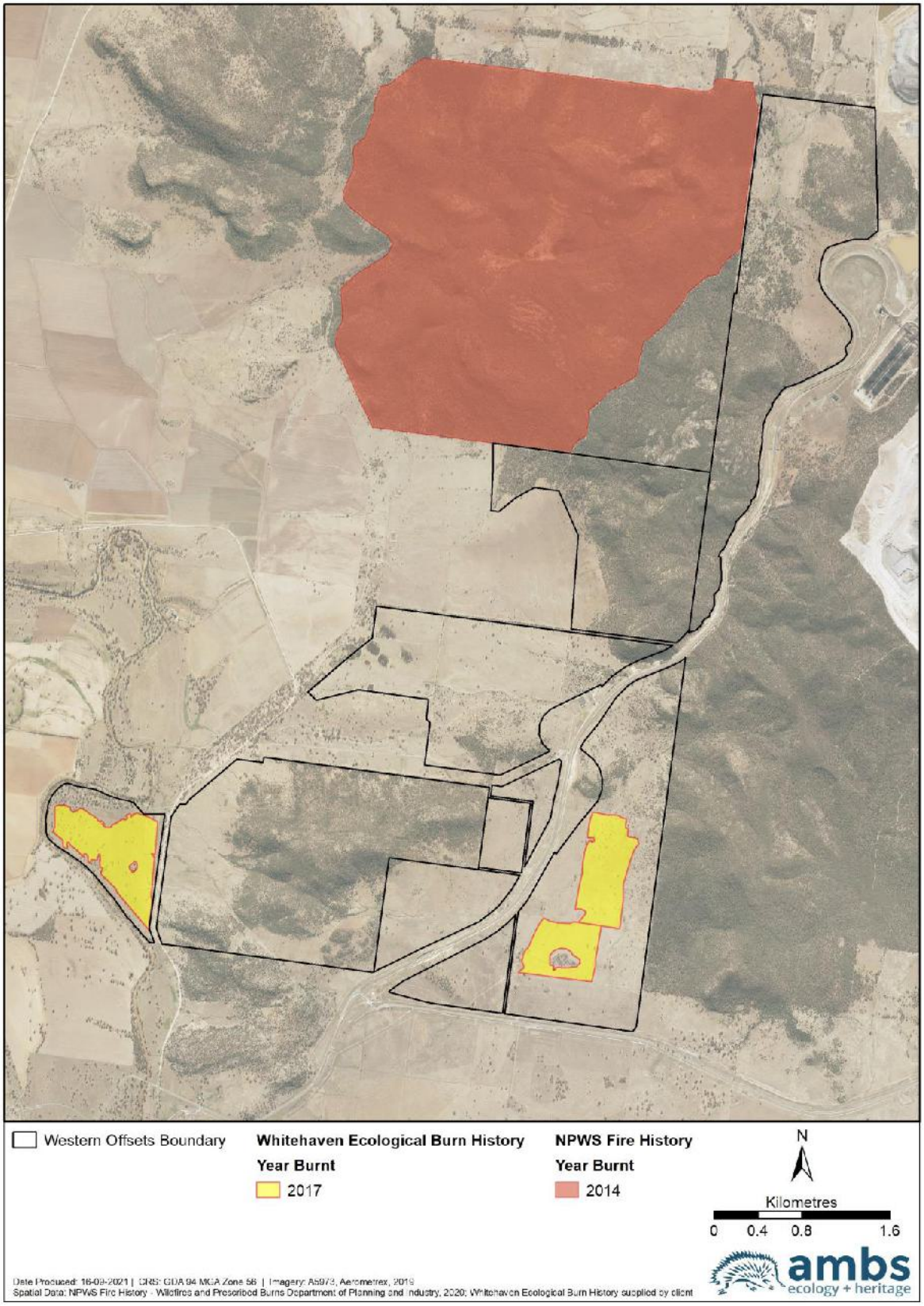

Figure 1.7: Fire History for the Western Offsets

1.10 Previous Vegetation Surveys

An overview of previous surveys is provided below.

Maules Creek Coal Project Ecological Assessment (Cumberland Ecology, 2011a)

As part of the Environmental Impact Assessment (EIA) (Hansen Bailey, 2011), Cumberland Ecology (2011a) undertook preliminary site inspections between September 2010 and May 2011 to identify potential offset receiving sites. Site inspections included limited ground surveying and assessments of the vegetation type and condition. Additional notes were about threatened species and their associated habitat, key habitat features, and weed infestations.

Maules Creek Coal Project Biodiversity Offset Management Plan (Cumberland Ecology, 2011b)

Additional survey work was undertaken by Cumberland Ecology in September 2011 for the *Maules Creek Coal Project Biodiversity Offset Management Plan* (Cumberland Ecology, 2011b) in responses to submissions on the EIA (Hansen Bailey, 2011). Quadrat data sampled from the offsets was included in the plan along with information about the condition classes of Box Gum Woodland. The details on the survey methods were provided in Cumberland Ecology (2011b). Updated versions of the Biodiversity Offset Management Plan were subsequently provided including in 2013 and 2014.

Roseglass Offset Area Flora and Fauna Assessment (Niche Environment and Heritage, 2012)

Niche Environment and Heritage (2012) undertook a desktop assessment (preliminary vegetation map derived from aerial phot interpretation; threatened entities database search) and seven days of vegetation surveys in 2012 that included full floristic plots, rapid data points (RDPs) and random meanders searching for threatened flora. Niche Environment and Heritage (2012) identified twenty [20] vegetation types, provided a map and interpreted their map units in the context of TECs.

Maules Creek Coal Project: Analysis of Offset Potential of the Brennan Property (Cumberland Ecology, 2013a)

Cumberland Ecology (2013a) undertook reconnaissance surveys on the Brennan Property, “Onavale”, in December 2013. The field survey methods predominantly involved rapid assessment points. The mapping was described by Cumberland Ecology (2013a) as broadly indicative and likely to change with more detailed study. Greenloaning Biostudies (2014) describes that the vegetation mapping by Cumberland Ecology (2013a) was undertaken in severe drought conditions.

Maules Creek Coal Project: Analysis of Offset Potential of the Phillips Property (Cumberland Ecology, 2013b)

Cumberland Ecology (2013b) undertook a desktop review including integrating mapping layers and brief field verification to assess the Phillips Property, “Bimbooria”, for the presence of Box-Gum Woodland Critically Endangered Ecological Community (CEEC). The broad vegetation identified and mapped includes Woodlands (4 types) and Derived Native Grasslands (DNG) (2 types). Cumberland Ecology (2013b) calculated the area of Box-Gum Woodland CEEC (woodland form and DNG form). Cumberland Ecology (2013b) state under survey limitations that a subsequent detailed survey may alter vegetation and habitat boundaries.

Independent Peer Review of Offsets for the Maules Creek Coal Project – EPBC 2010/5566 (Greenloaning Biostudies, 2013)

Greenloaning Biostudies (2013) undertook an independent review to verify the quantity and condition class of Box-Gum Woodland CEEC in the Eastern, Northern and Western offsets and habitat values for targeted threatened fauna (Swift Parrot, *Lathamus discolor*; Regent Honeyeater, *Anthochaera phyrgia*); and South-Eastern [or Corben's] Long-eared Bat, *Nyctophilus corbeni*). The review entailed a desktop review, field surveys (plot based and rapid assessments), and adjustments to existing mapping, particularly regarding Box-Gum Woodland CEEC (woodland form and DNG form) in the context of consent conditions and habitat quality/condition.

Greenloaning Biostudies (2013) concluded that 3,827.7 ha of the CEEC conformed as being in good condition and that 1,874.2 ha was of low to moderate condition with the ultimate conclusion that the offsets complied with consent conditions and that were of equivalent or better condition than the mine site project area.

Independent Peer Review of Offsets for the Maules Creek Coal Project – EPBC 2010/5566 Verification Report for Additional Offsets (Greenloaning Biostudies, 2014)

Greenloaning Biostudies (2014) undertook an independent review to verify the quantity and condition class of Box-Gum Woodland CEEC on additional offset areas including Bimbooria, Roseglass, Onavale and Wongala. The study included field surveys predominantly involving rapid assessment points but also a small number of plots (20 x 50 m), verification of vegetation mapping boundaries and a review of additional information sources (e.g. Niche Environment and Heritage, 2012).

Greenloaning Biostudies (2014) concluded that within the additional offsets there was a total CEEC area of 5,660 ha comprising 1,862 ha of low to moderate condition DNG and 3,798 ha of good condition Box-Gum Woodland.

Maules Creek Coal Mine Biodiversity Offset Areas - Vegetation Descriptions (Greenloaning Biostudies, 2015)

Greenloaning Biostudies (2015) prepared descriptions of the vegetation communities in the offset areas and these were included in the *Maules Creek Coal Project Biodiversity Offset Management Plan* (Whitehaven, 2017).

Conservation Agreements (Greenloaning Biostudies, 2019-2020)

Greenloaning undertook vegetation mapping on several properties for Conservation Agreements (dated 2019) as directed by the NSW Biodiversity Conservation Trust.

Flora Monitoring (AMBS, 2015-2019, 2020)

Flora monitoring of 52 plot locations across the offset areas commenced in 2015 and has been regularly undertaken in spring and more recently in autumn at some sites (AMBS, 2015-2019, 2020). The sample design was before-after-control-impact design and collected data sets from nested subplots within 20 m x 20 m plots in offset management areas, with reference plot data also collected (AMBS, 2020a). The sampling design was developed to test management treatments and the plots were a compatible size to standard survey methods.

2 Methods

2.1 Desktop and Literature Review

A desktop assessment and review of previous vegetation mapping and reports for the offset areas was undertaken. A range of other data sources, relevant to vegetation, were also reviewed. The desktop assessment included a review of the following sources:

- *Maules Creek Coal Project Ecological Assessment* (Cumberland Ecology, 2011a).
- *Maules Creek Coal Project Biodiversity Offset Management Plan* (Cumberland Ecology, 2011b).
- *Maules Creek Coal Project: Analysis of Offset Potential of the Brennan Property* (Cumberland Ecology, 2013a).
- *Maules Creek Coal Project: Analysis of Offset Potential of the Phillips Property* (Cumberland Ecology, 2013b).
- *Independent Peer Review of Offsets for the Maules Creek Mine Project – EPBC 2010/5566* (Greenloaning Biostudies, 2013).
- *Independent Peer Review of Offsets for the Maules Creek Mine Project – EPBC 2010/5566 Verification Report for Additional Offsets* (Greenloaning Biostudies, 2014).
- *NSW Office of Environment and Heritage* (OEH) *regional vegetation mapping for the Border River/ Gwydir and Namoi regions* (OEH, 2015).
- *BioNet Atlas Systematic Flora Survey Database* (DPIE, 2020a).
- *MCCM Offset Vegetation Monitoring Data* (AMBS, 2015 - 2019, 2020).
- Threatened plant records from a survey undertaken in Wirradale (AMBS, 2017).
- *Australian Soil Classification Mapping, NSW* (DPIE, 2020b).
- *Great Soils Group Mapping, NSW* (DPIE, 2020c).
- *Geoscience Australia 1:250 000 geological map series* (Geoscience Australia, 2020a).
- *Geoscience Australia Surface Hydrology Lines- Regional* (Geoscience Australia, 2020b).
- *Fires in Australia's Forests 2011-16* (Australian Bureau of Agriculture and Resource Economics and Sciences, 2018).
- *NPWS Fire History - Wildfires and Prescribed Burns* (NPWS, 2020);
- *Atlas of Living Australia* (ALA) (ALA, 2020).

2.2 Field Surveys

Field surveys were undertaken across the study area between 26 May 2020 and 13 August 2020, with an additional day of field survey at selected sites on 26 March 2021. Target plot locations were selected based on previous vegetation mapping, visual assessment of vegetation patterns, topographic position, and condition to ensure the full range of vegetation types and condition states was sampled. The flora surveys primarily involved identification and mapping of PCTs and identification and assessment of areas of TECs listed under the BC Act and EPBC Act.

Field surveys were supervised by Michael Somerville. Michael is a botanist with over 14 years' professional experience and specialist technical knowledge in the field. Michael is an accredited Biodiversity Assessment Method (BAM) assessor. Field data were collected by Michael Somerville, Belinda Pellow, Mark Robinson, Michael Doherty, Dr James Schlunke, Tom O'Sullivan and Dan Clarke with the assistance of Gabriella Hoban, Corey O'Brien and Noel Ruting. The experience and qualifications of the ecologists collecting the field data are provided in Table 2.1.

Table 2.1 Experience and Qualifications of Survey Personnel

Name	Qualifications	Experience
Michael Somerville	Bachelor of Science	14 years' experience
	Graduate Diploma in Natural Resource Management	
	Accredited BAM Assessor	
Belinda Pellow	Diploma in Applied Science (Agriculture)	30 years' experience
	Associate Diploma in Arts (Aboriginal Studies)	
	Accredited BAM Assessor	
	Certified Practicing Ecological Consultant (ECA NSW No:3)	
Mark Robinson	Associate Diploma in Horticulture	30 years' experience
	Graduate Diploma in Environment Management	
	Master of Environment & Restoration	
Michael Doherty	Ongoing Part-time PhD	30 years' experience
	Fenner School of Environment and Society, ANU	
	BSc. (Hons.), Botany Department, University of Sydney	
	Undergraduate Science Degree, University of Sydney	
James Schlunke	Bachelor of Science (Honours)	10 years' experience
	PhD	
	Accredited BAM Assessor	
Tom O'Sullivan	Master of Environmental Studies	24 years' experience
Daniel Clarke	Bachelor of Science (Honours)	14 years' experience
	Certificate IV General Horticulture	
Gabriella Hoban	Bachelor of Environmental Management (Ecology)	4 years' experience
Corey O'Brien	Bachelor of Science (Advanced; General Biology)	2 years' experience
	Master of Research	
Noel Ruting	Master of Philosophy (Natural & Physical Sciences)	30 years' experience
	Environment & Sustainability Science	
	Bachelor of Landscape Architecture	

2.2.1 Timing

A summary of the field survey dates, areas surveyed, and personnel are provided in Table 2.2.

Table 2.2 Survey Timing and Personnel

Dates	Offsets Surveyed	Personnel
26-29 May 2020	Southern Offsets (Bimbooria)	Michael Somerville, Mark Robinson
16-20 June 2020	Northern Offsets	Michael Somerville, James Schlunke, Tom O'Sullivan, Mark Robinson, Gabby Hoban, Corey O'Brien, Noel Ruting
30 June to 2 July 2020	Northern Offsets	Belinda Pellow, Mark Robinson, Tom O'Sullivan, Dan Clarke, Gabby Hoban, Corey O'Brien
7-14 July 2020	Eastern, Western and Southern Offsets	Michael Somerville, James Schlunke, Michael Doherty, Mark Robinson, Tom O'Sullivan, Gabby Hoban, Corey O'Brien, Noel Ruting
21-24 July 2020	All Offsets	James Schlunke, Mark Robinson, Tom O'Sullivan, Gabby Hoban
11-13 August 2020	Eastern and Western Offsets	James Schlunke, Tom O'Sullivan
26 March 2021	Northern Offsets	Michael Somerville

2.2.2 Weather Conditions

Weather data were obtained from the Tarrawonga Meteorological Station (Coordinates 230878 E, 6605850 S). Total rainfall, average maximum temperatures and average minimum temperatures for each survey period are given in Table 2.3.

Table 2.3 Weather Conditions During Survey Periods

Dates	Offsets Surveyed	Rainfall Total (mm)	Temp Av. Max (°C)	Temp Av. Min (°C)
26-29 May 2020	Southern Offsets (Bimbooria)	0.3	21.7	20.7
16-20 June 2020	Northern Offsets	0.1	20.8	0.1
30 June to 2 July 2020	Northern Offsets	0.1	22.6	21.6
7-14 July 2020	Eastern, Western and Southern Offsets	7.9	20.8	-1.4
21-24 July 2020	All Offsets	0	21.2	-4
11-14 August 2020	Eastern & Western Offsets	6.2	19.1	5.14

2.2.3 Floristic Plots

A total of 117 full floristic surveys were undertaken across the offset areas and their locations are shown in Figures 2.1 to 2.4. Each full floristic plot was a 20 m x 20 m quadrat, nested within a 20 m x 50 m transect. The attributes listed in Table 2.4 were recorded in the full floristic plots. Additional plots sourced from the *MCCM Offset Vegetation Monitoring Data* (AMBS, 2015-2019, 2020) and the *BioNet Atlas Systematic Flora Survey Database* (DPIE, 2020a) were also used during this study (see Figures 2.1 to 2.4).

Table 2.4 Attributes Collected in Full Floristic Plots

Attribute	20 m x 20 m	20 m x 50 m
Notes on landform	Yes	
Notes on soils and parent geology	Yes	
Overall cover of each stratum	Yes	
All flora species along with cover, abundance, stratum and growth form	Yes	
Assessment of native shrub cover at 5 m intervals		Yes
Assessment of native grass cover at 5 m intervals		Yes
Count of total number of regenerating overstorey individuals <5 m Diameter at Breast Height (DBH) (also recorded by species)		Yes
Count of total number of regenerating overstorey individuals 5-40 centimetre (cm) DBH (also recorded by species)		Yes
Count of total number of mature overstorey individuals >40 cm DBH (also recorded by species)		Yes
Total length of fallen logs		Yes
Count of trees with hollows		Yes
Landscape and portrait photo taken from each end of transect		Yes

Threatened plant species were opportunistically recorded (rather than targeted) during the survey work.

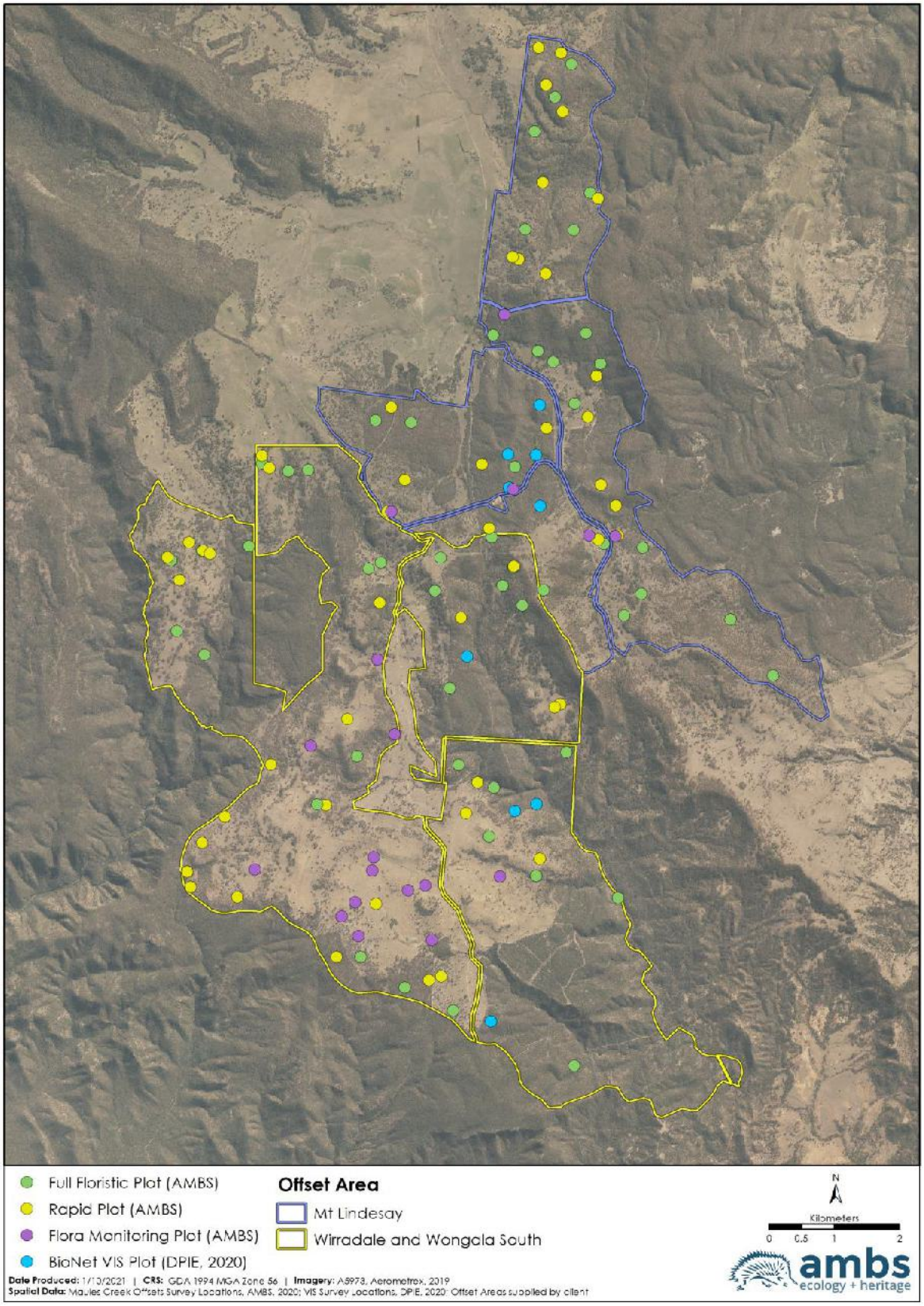

Figure 2.1 Plot Locations for the Northern Offsets

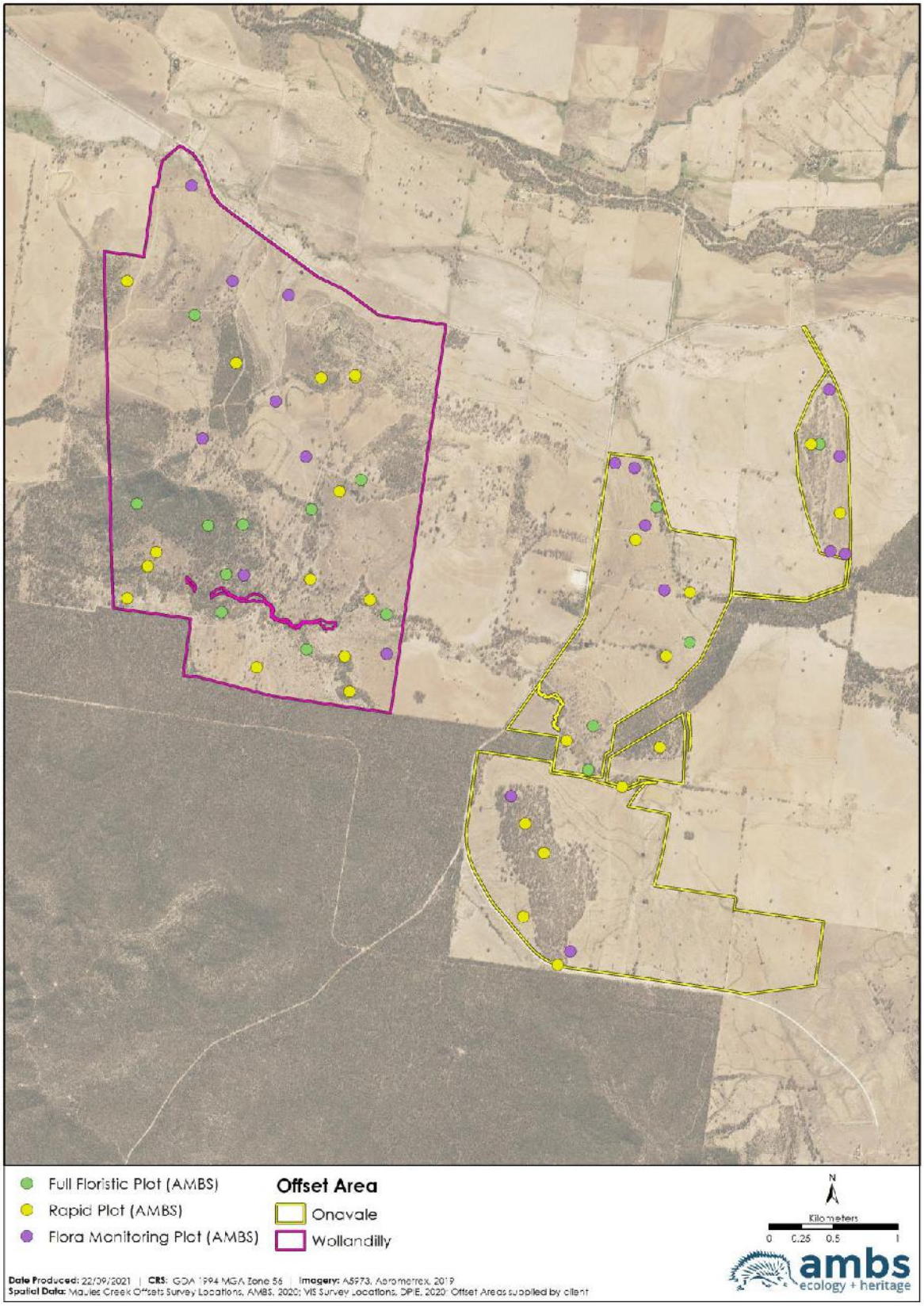

Figure 2.2 Plot Locations for the Eastern Offsets

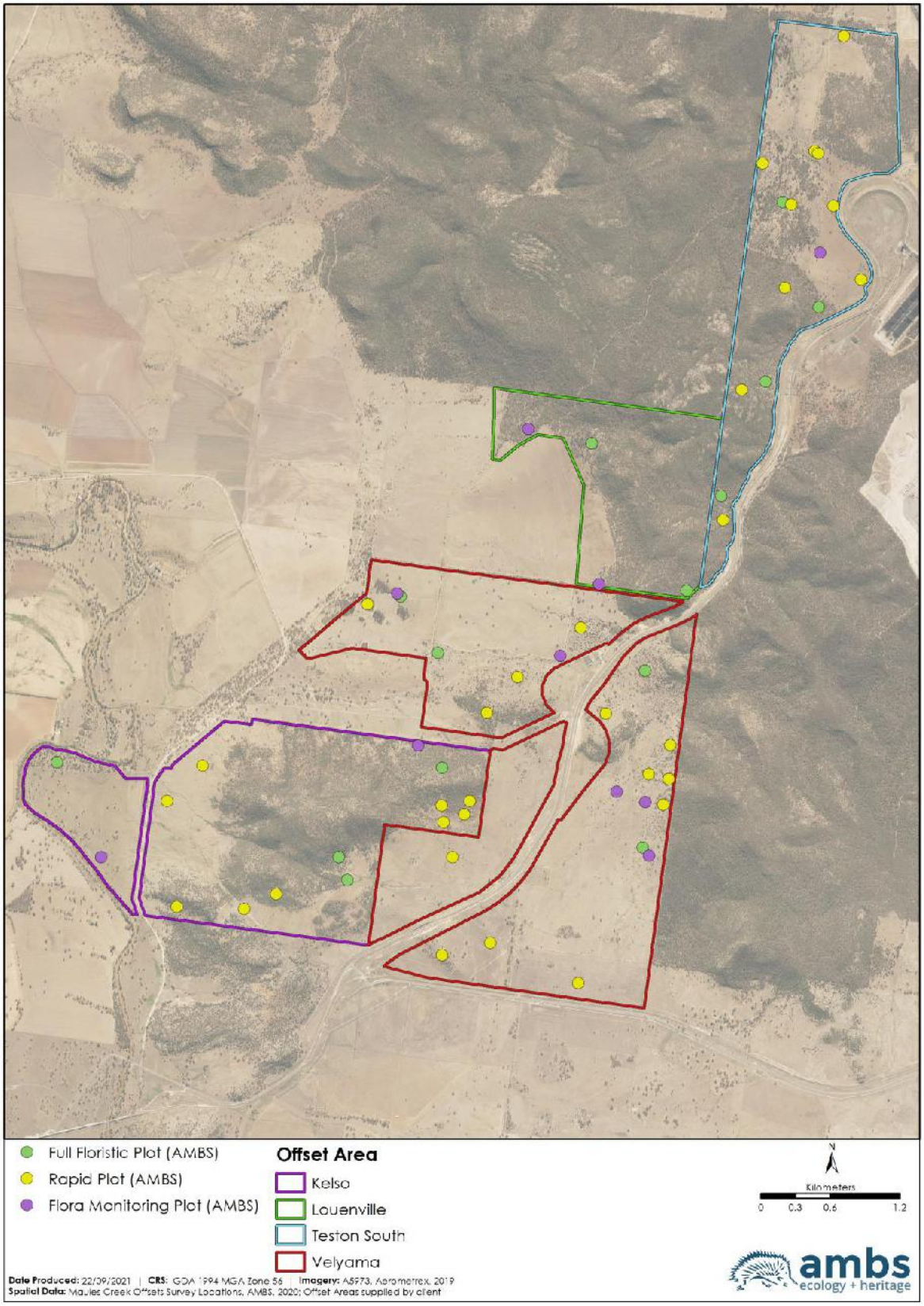

Figure 2.3 Plot Locations for the Western Offsets

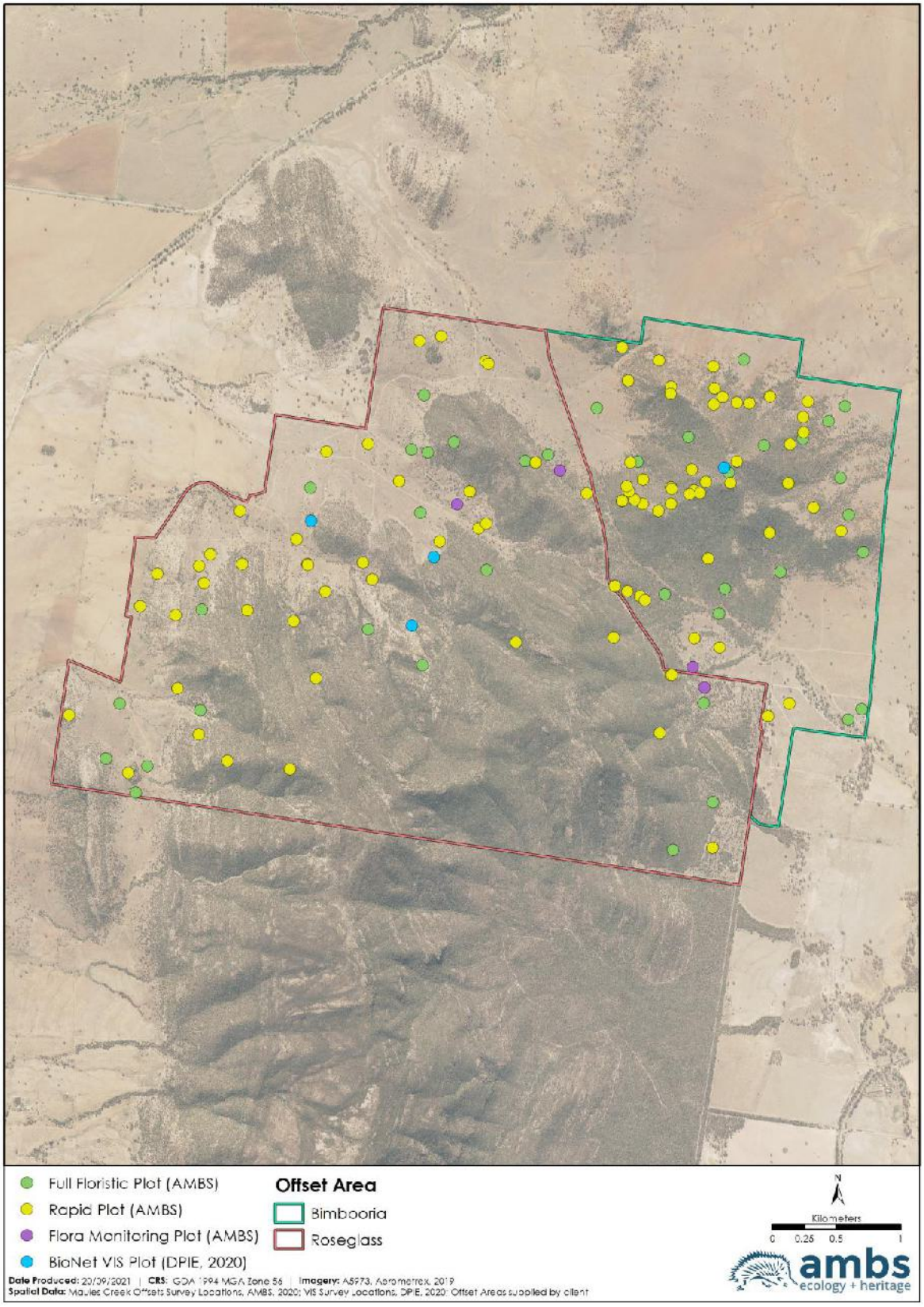

Figure 2.4 Plot Locations for the Southern Offsets

2.2.4 Rapid Data Points

A total of 197 RDPs were used to assist in the delineation of vegetation mapping boundaries and to provide additional information for the identification of TECs listed under the BC Act and EPBC Act. An assessment of native cover and height of each stratum, and the dominant native species in each stratum, was recorded at each rapid plot as well as information on abiotic variables (soils, landform, aspect and slope), notes on other relevant features and a photograph of the vegetation. The locations of RDPs sampled by AMBS within the offset areas are shown in Figures 2.1 to 2.4.

2.2.5 Plant Community Type Identification

A multivariate cluster analysis of full floristic plot data was undertaken to develop a set of floristic groups. The cluster analysis is described in more detail in Section 2.3. The resulting groups were then assigned to PCTs based on the characteristic species of the group as well as abiotic variables of the associated plot locations, including soils, geology and topography. Assignment of groups to PCTs was based on the published descriptions and associated data for PCTs included in the *BioNet Vegetation Classification Database* (DPIE, 2020d). RDPs and a small number of full floristic plots that were surveyed after the cluster analysis were then assigned individually to PCTs based on dominant species and abiotic features.

2.2.6 Box-Gum Woodland CEEC Identification and Mapping

Box-Gum Woodland CEEC listed under the EPBC Act

Areas with the potential to fit the criteria for the *White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland Critically Endangered Ecological Community* (Box-Gum Woodland CEEC) were sampled with both full floristic plots and RDPs. This data was used to assess patches against the *Commonwealth Listing Advice on White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* (Box-Gum Woodland CEEC Listing Advice) (Threatened Species Scientific Committee [TSSC], 2006). Vegetation community boundaries were assigned on the basis of data and observations collected in the field and aerial photograph interpretation. The following criteria, taken from the Box-Gum Woodland CEEC Listing Advice (TSSC, 2006), were used to assess areas for mapping as the Box-Gum Woodland CEEC:

- *Box – Gum Grassy Woodlands and Derived Grasslands are characterised by a species-rich understorey of native tussock grasses, herbs and scattered shrubs, and the dominance, or prior dominance, of White Box, Yellow Box or Blakely's Red Gum trees. In the Nandewar Bioregion, Grey Box (Eucalyptus microcarpa or E. moluccana) may also be dominant or codominant. The tree-cover is generally discontinuous and consists of widely-spaced trees of medium height in which the canopies are clearly separated.*
- *Associated, and occasionally co-dominant, trees include, but are not restricted to: Grey Box (Eucalyptus microcarpa), Fuzzy Box (E. conica), Apple Box (E. bridgesiana), Red Box (E. polyanthemos), Red Stringybark (E. macrorhyncha), White Cypress Pine (Callitris glaucophylla), Black Cypress Pine (C. endlicheri), Long-leaved Box (E. goniocalyx), New England Stringybark (E. caliginosa), Brittle Gum (E. mannifera), Candlebark (E. rubida), Argyle Apple (E. cinerea), Kurrajong (Brachychiton populneus) and Drooping She-oak (Allocasuarina verticillata).*
- *Ecological community occurs in areas where rainfall is between 400 and 1200 mm per annum, on moderate to highly fertile soils at altitudes of 170 metres to 1200 metres.*

- *Shrub cover in this ecological community is naturally patchy, and shrubs may be dominant only over a very localised area. Shrub cover should therefore be assessed over the entire remnant, not just in a localised area. A remnant with a significant ground layer of tussock grasses, and where the distribution of shrubs is scattered or patchy, is part of the ecological community. In shrubby woodlands, the dominance of native tussock grasses in the ground layer of vegetation is lost. Therefore, a remnant with a continuous shrub layer, in which the shrub cover is greater than 30%, is considered to be a shrubby woodland and so is not part of the listed ecological community.*
- *Remnant attributes, such as shrubbiness, should be measured on a scale of 0.1 hectares or greater.*
- *Areas in which an overstorey exists without a substantially native understorey are degraded and are no longer a viable part of the ecological community. Although some native species may remain, in most of these areas the native understorey is effectively irretrievable. In order for an area to be included in the listed ecological community, a patch must have a predominantly native understorey.*
- *Therefore, in order to be the listed ecological community, an understorey patch, in the absence of overstorey trees, must have a high level of native floral species diversity, but only needs to be 0.1 hectares or greater in size. A patch in which the perennial vegetation of the ground layer is dominated by native species, and which contains at least 12 native, non-grass understorey species (such as forbs, shrubs, ferns, grasses and sedges) is considered to have a sufficiently high level of native diversity to be the listed ecological community. At least one of the understorey species should be an important species (e.g. grazing-sensitive, regionally significant or uncommon species; such as Kangaroo Grass or orchids) in order to indicate a reasonable condition.*
- *Areas with both an overstorey and understorey present are also considered of sufficiently good condition to be part of the listed ecological community if the understorey meets any of the conditions above, or if they have a predominantly native understorey, are two hectares or above in size, and have either natural regeneration of the overstorey species or 20 or more mature trees per hectare.*

Box-Gum Woodland CEEC listed under the BC Act

Areas of potential Box-Gum Woodland CEEC were also assessed against the criteria set out in the *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 – Critically Endangered Ecological Community listing NSW Threatened Species Scientific Committee – Final Determination* (TSSC, 2020). The key difference between the NSW BC Act listing and the Commonwealth EPBC Act listing is that the latter requires one of the following:

- An intact tree layer and predominately native ground layer; or
- An intact native ground layer with a high diversity of native plant species but no remaining tree layer.

For listing under the BC Act, areas with predominately native canopy, dominated by the relevant species, but with a predominately non-native ground layer, are also included within the Box-Gum Woodland CEEC.

2.3 Quantitative Data Analysis

A hierarchical cluster analysis of full floristic plot data was undertaken to group plots into floristic groups and inform the assignment of plots to PCTs (Appendix B). Full floristic plots used in this analysis included plots collected by AMBS for this study, as well as AMBS vegetation monitoring plots on the offset areas (AMBS, 2015-2019; 2020), full floristic plots held in the *BioNet Systematic Flora Survey Database* (DPIE, 2020a), and some additional plots surveyed for the *Maules Creek Coal Mine Vegetation Mapping on Areas External to the Maules Creek Offset Areas* report (AMBS, 2021). Only native flora species were included in the analysis and species which occurred in only a single plot were removed. All cover and abundance scores were converted to a Braun-Blanquet style cover score of 1-6.

The cluster analysis was undertaken using the PATN software package (Belbin, 2003) based on Bray-Curtis dissimilarity values. An agglomerative hierarchical classification using a flexible unweighted pair group method with arithmetic mean clustering strategy was applied to derive 40 groups. The resulting groups were assigned to the best fit PCT based on dominant species and abiotic variables of the member plots. Additional PCTs, which were not returned in the output of the cluster analysis due to the level of sampling, were added intuitively based on plot data. Some plots were reassigned to a different PCT than the original statistical group based on consideration of landscape position, soils, geology and dominant flora species.

2.4 Rounding

All of the PCT areas, CEEC areas and Endangered Ecological Community (EEC) areas tabled in this report are expressed to one decimal place and have been rounded down to be conservative. This results in a cumulative rounding down effect in some of the totals.

3 Results

3.1 Overview

A total of 11,438.9 ha of native vegetation in 28 different PCTs was mapped across all offset areas. This included four TECs listed under the EPBC Act and three TECs listed under the BC Act. Table 3.1 below lists all mapped PCTs and associated TECs. Photographs of PCTs are provided in Appendix C. A detailed record of the area of the PCTs and TECs mapped in each offset property is provided in Appendix D.

Table 3.1 Mapped Plant Community Types for All Offset Areas

PCT Label		BC Act Status*	EPBC Act Status*	Area (ha)
55:	Belah woodland on alluvial plains and low rises			17.6
78:	River Red Gum riparian tall woodland / open forest wetland			40.9
81:	Western Grey Box - cypress pine shrub grass shrub tall woodland	E[1]	E[1]	2.2
101:	Poplar Box - Yellow Box - Western Grey Box grassy woodland		E[2]	70.9
101:	Derived Native Grassland			135.6
112:	Black Tea-tree - River Oak - Wilga riparian low forest/shrubland wetland			7.5
147:	Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket	E[3]	E[3]	0.3
244:	Poplar Box grassy woodland		E[4]	14.6
244:	Derived Native Grassland			255.8
413:	Silver-leaved Ironbark - White Cypress Pine - box dry shrub grass woodland			143.4
413:	Derived Native Grassland			324.3
427:	Cypress pine - Tumbledown Red Gum low open woodland to grassland			49.6
429:	White Cypress Pine - Poplar Box - Silver-leaved Ironbark viney shrub woodland			7.1
435:	White Box - White Cypress Pine shrub grass hills woodland	CE[5]	CE[6]	987.4
435:	Derived Native Grassland	CE[7]	CE[7]	1,280.1
439:	Mock Olive - Tumbledown Red Gum - Red Ash - Wilga siliceous rocky hill low woodland / shrubland			9.2
492:	Silvertop Stringybark - Yellow Box - Apple Box - Rough-barked Apple shrub grass open forest			652.4
492:	Derived Native Grassland			53.5
508:	Blakely's Red Gum - Stringybark - Rough-barked Apple open forest	CE[8]	CE[8]	15.5
510:	Blakely's Red Gum - Yellow Box grassy woodland	CE[8]	CE[8]	991
510:	Derived Native Grassland	CE[9]	CE[9]	338.6
563:	White Box - Silvertop Stringybark +/- White Cypress Pine grass shrub open forest			381.1
563:	Derived Native Grassland			8.2
569:	Derived Snow Grass +/- Kangaroo Grass +/- Wild Sorghum tussock grassland	CE[10]	CE[10]	133.9
571:	Ribbon Gum - Rough-barked Apple - Yellow Box grassy woodland	CE[8]	CE[8]	35.8
571:	Derived Native Grassland	CE[8]	CE[8]	45.7
572:	Silvertop Stringybark - Bendemeer White Gum - Ribbon Gum open forest			515.9
572:	Derived Native Grassland			1.8
574:	Tea-tree riparian shrubland / heathland wetland			1.9
581:	Tumbledown Red Gum - Dwyer's Red Gum - Wallaby Bush shrubby woodland			134.6
588:	White Box - White Cypress Pine shrubby hills open forest			379.7
588:	Derived Native Grassland			127.5

PCT Label	BC Act Status*	EPBC Act Status*	Area (ha)
592: Narrow-leaved Ironbark - cypress pine - White Box shrubby open forest			2,584.4
592: Derived Native Grassland			248.3
599: Blakely's Red Gum - Yellow Box grassy tall woodland	CE[8]	CE[8]	24.8
599: Derived Native Grassland	CE[11]	CE[11]	21.5
619: Derived Wire Grass grassland			221.5
736: Broad-leaved Stringybark - Mountain Gum - Apple Box open forest			24.1
736: Derived Native Grassland			4.3
1165: Silvertop Stringybark - Orange Gum shrubby open forest			491.5
1165: Derived Native Grassland			44
1306: White Box - Red Stringybark shrubby woodlands			564.2
1306: Derived Native Grassland			46.7
	Total Native Vegetation		**11,438.9**
Cleared Land/Infrastructure			530.9
		Total	**11,969.8**

* Conservation status under the BC Act and/or EPBC Act (current as of June 2021). CE = Critically Endangered; E = Endangered.

1 Equivalent to the Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-east Australia listed under the EPBC Act and Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions Endangered Ecological Community listed under the BC Act (Grey Box Woodland EEC listed under the BC Act and EPBC Act).

2 Approximately 50.3 ha equivalent to the Poplar Box Grassy Woodland on Alluvial Plains Endangered Ecological Community listed under the EPBC Act (Poplar Box Grassy Woodland EEC listed under the EPBC Act).

3 Equivalent to the Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions Endangered Ecological Community listed under the EPBC Act and Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions Endangered Ecological Community listed under the BC Act (Semi-evergreen Vine Thicket EEC listed under the BC Act and EPBC Act).

4 Approximately 13.3 ha equivalent to the Poplar Box Grassy Woodland EEC listed under the EPBC Act.

5 Approximately 791.5 ha equivalent to the Box-Gum Woodland CEEC listed under the BC Act.

6 Approximately 780.5 ha equivalent to the Box-Gum Woodland CEEC listed under the EPBC Act.

7 Approximately 1,009.6 ha equivalent to the Box-Gum Woodland CEEC listed under the BC Act and EPBC Act.

8 Equivalent to the Box-Gum Woodland CEEC listed under the BC Act and EPBC Act

9 Approximately 336.9 ha equivalent to the Box-Gum Woodland CEEC listed under the BC Act and EPBC Act.

10 Approximately 103.1 ha equivalent to the Box-Gum Woodland CEEC listed under the BC Act and EPBC Act.

11 Approximately 17.3 ha equivalent to the Box-Gum Woodland CEEC listed under the BC Act and EPBC Act.

3.2 Roseglass and Bimbooria

3.2.1 Plant Community Types and Descriptions

Approximately 2,085.9 ha of native vegetation was mapped on Roseglass and Bimbooria, across seven separate PCTs. Table 3.2 below provides a list of the mapped PCTs and total areas mapped of each. Detailed descriptions of mapped PCTs are provided below. A map showing the distribution of PCTs across this offset group is included as Figure 3.1.

Table 3.2 Mapped Plant Community Types for Roseglass and Bimbooria

PCT Label		BC Act Status*	EPBC Act Status*	Area (ha)
147:	Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket	E[1]	E[1]	0.3
413:	Silver-leaved Ironbark - White Cypress Pine - box dry shrub grass woodland			25
427:	Cypress pine - Tumbledown Red Gum low open woodland to grassland			49.6
435:	White Box - White Cypress Pine shrub grass hills woodland	CE[2]	CE[2]	277.3
435:	Derived Native Grassland	CE[3]	CE[3]	399.3
439:	Mock Olive - Tumbledown Red Gum - Red Ash - Wilga siliceous rocky hill low woodland / shrubland			9.2
581:	Tumbledown Red Gum – Dwyer's Red Gum - Wallaby Bush shrubby woodland			117.6
592:	Narrow-leaved Ironbark - cypress pine - White Box shrubby open forest			1,085.1
592:	Derived Native Grassland			122.5
			Total	**2,085.9**

* Conservation status under the BC Act and/or EPBC Act (current as of June 2021). CE = Critically Endangered; E = Endangered.

1 Equivalent to the Semi-evergreen Vine Thicket EEC listed under the EPBC Act and BC Act.

2 Approximately 232.4 ha equivalent to the Box-Gum Woodland CEEC listed under the EPBC Act and BC Act.

3 Approximately 254.6 ha equivalent to the Box-Gum Woodland CEEC listed under the EPBC Act and BC Act.

PCT 147

PCT Name: *Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion*

Vegetation Class: Western Vine Thickets

EPBC Status: Semi-evergreen Vine Thicket EEC

BC Status: Semi-evergreen Vine Thicket EEC

PCT 147 is a mid-high to low closed or open forest known as semi-evergreen vine thicket dominated by rich diversity of low trees and shrubs to about 6 m high. Low trees include *Notelaea microcarpa* var. *microcarpa* (Mock Olive), *Geijera parviflora* (Wilga), *Ehretia membranifolia* (Peach Bush) along with *Elaeodendron australe* var. *integrifolia, Ventilago viminalis, Psydrax oleiofolia, Alectryon subdentatus* and *Alstonia constricta*. Emergent trees to 15 m high are often present including *Eucalyptus albens* (White Box), *Eucalyptus melanophloia* (Silver-leaved Ironbark), *Callitris glaucophylla* (White Cypress Pine) and *Casuarina cristata* (Belah). The shrub layer may be mid-dense or dense and includes *Carissa ovata, Beyeria viscosa, Spartothamnella juncea, Solanum parvifolium, Rhagodia parabolica, Olearia elliptica, Senna coronilloides, Indigofera adesmiifolia, Indigofera brevidens, Breynia cernua, Solanum semiarmatum, Cassinia laevis, Myoporum montanum, Capparis lasiantha, Pimelea neo-anglica* and *Phyllanthus subcrenulatus.* Vines are common and include *Pandorea pandorana* (Wonga Vine), *Parsonsia eucalyptophylla* (Gargaloo), *Clematis microphylla var. microphylla, Cayratia clematidea* (Native Grape) and *Jasminum lineare* (Desert Jasmine). Mistletoes include *Lysiana exocarpi, Lysiana subfalcata* and *Amyema miraculosum.* The ground cover is mid-dense in open areas or sparse under dense tree or shrub canopies. Common grass species include *Austrostipa verticillata, Leptochloa asthenes, Poa sieberiana var. hirtilli, Elymus scaber, Panicum queenslandicum var. queenslandicum, Chloris ventricosa, Rytidpsperma bipartitum, Paspalidium gracile* and *Cymbopogon refractus*. The climber *Desmodium brachypodum* is often abundant. Other groundcover species include *Boerhavia dominii*, *Dichondra sp. A*, *Carex inversa* and *Cheilanthes sieberi subsp. sieberi*.

Within the offset group, this community was mapped in a single patch on a rocky outcrop and scree slope. Other areas were too small to map and/or occurred as an understorey within another community.

PCT 413

PCT Name: *Silver-leaved Ironbark - White Cypress Pine - box dry shrub grass woodland of the Pilliga Scrub - Warialda region, Brigalow Belt South Bioregion*

Vegetation Class: North-west Slopes Dry Sclerophyll Woodlands

EPBC Status: N/A

BC Status: N/A

PCT 413 is a tall to mid-high woodland or open forest dominated by *Eucalyptus melanophloia* (Silver-leaved Ironbark) and *Callitris glaucophylla* (White Cypress Pine) sometimes with *Eucalyptus albens*. The small tree *Alectryon oleifolius* subsp. *elongatus* may be present. The shrub layer is usually sparse but mid-dense in places and includes *Acacia deanei* subsp*. paucijuga, Solanum ferocissimum, Beyeria viscosa*, several subspecies of *Dodonaea viscosa, Acacia decora, Geijera parviflora and Abutilon oxycarpum*. The ground cover is sparse and includes grasses such as A*ristida vagans, Cymbopogon refractus, Poa sieberiana, Enteropogon acicularis, Austrostipa verticillata, Austrostipa scabra* subsp. *scabra* and *Microlaena stipoides*. The mat-rushes *Lomandra multiflora subsp. multiflora* or *Lomandra filiformis* subsp*. filiformis* are often present. Forbs include *Einadia hastata, Calotis cuneifolia, Einadia nutans* subsp*. nutans, Eremophila debilis, Chrysocephalum apiculatum, Opercularia diphylla, Bulbine semibarbata* and *Ranunculus sessiliflorus*. Climbers include *Glycine tabacina* and *Desmodium varians*.

Within the offset group, this community occurs on exposed slopes on Bimbooria.

PCT 427

PCT Name: *Cypress pine - Tumbledown Red Gum low open woodland to grassland on rocky benches, mainly in the Nandewar Bioregion*

Vegetation Class: Inland Rocky Hill Woodlands

EPBC Status: N/A

BC Status: N/A

PCT 427 is an open woodland composed of *Callitris glaucophylla* (White Cypress Pine) and/or *Eucalyptus dealbata* (Tumbledown Red Gum). The shrub-layer is very sparse and includes *Notelaea microcarpa* var. *microcarpa, Beyeria viscosa, Psydrax oleifolia, Pimelea neo-anglica, Acacia decora, Melichrus urceolatus, Solanum parvifolium and Solanum ferocissimum.* The main vegetation structure may be low to mid-high open grassland dominated by herbaceous ground cover species including the grasses *Cymbopogon refractus, Tripogon loliiformis, Enneapogon gracilis, Poa sieberiana* and *Aristida ramosa;* forbs such as *Vittadinia muelleri, Wahlenbergia communis, Sigesbeckia australiensis, Swainsona galegifolia, Evolvulus alsinoides* var*. decumbens, Scleria mackaviensis, Hypericum gramineum, Haloragis serra;* sedges such as *Cyperus gracilis and Fimbristylis dichotoma;* the rock ferns *Cheilanthes sieberi* and *C. distans* also may be common*.*

Within the offset group, this community occurs on skeletal soils on rock outcrops in ridgetop positions.

PCT 435

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: Box-Gum Woodland CEEC (Part)

BC Status: Box-Gum Woodland CEEC (Part)

PCT 435 is a mid-high woodland dominated by *Callitris glaucophylla* (White Cypress Pine) and *Eucalyptus albens* (White Box), with *Eucalyptus blakleyi* (Blakely's Red Gum) and *Brachychiton populneus* subsp*. populneus* (Kurrajong) also sometimes present in the overstory. Depending on grazing intensity, the shrub layer can be sparse to dense and includes *Cassinia quinquefaria, Acacia implexa* (Hickory Wattle), *Acacia penninervis* var. *penninervis* (Mountain Hickory), *Geijera parviflora* (Wilga), *Olearia elliptica* subsp. *elliptica* (Sticky Daisy Bush), *Dodonaea viscosa* subsp*. angustifolia* (Hop-bush), *Teucrium betchei* and *Cassinia sifton* (Sifton Bush). The ground cover is mid-dense and includes grass species such as *Aristida personata* (Purple Wire Grass)*, Cymbopogon refractus* (Barbed Wire Grass)*, Themeda australis* (Kangaroo Grass)*, Rytidosperma racemosum* var. *racemosum, Austrostipa verticillata* (Slender Bamboo Grass) and *Austrostipa scabra* subsp. *scabra* (Spear Grass). Common forb species include *Calotis lappulacea* (Yellow Burr Daisy)*, Vittadinia sulcata, Einadia nutans* subsp. *nutans* (Climbing Saltbush)*, Wahlenbergia communis* (Tufted Bluebell)*, Dianella longifolia* var. *longifolia* (Blue Flax-Lily)*, Swainsona galegifolia* (Smooth Darling Pea)*, Dichondra* sp. *A* and *Daucus glochidiatus* (Native Carrot). The scramblers *Desmodium brachypodum* or *Desmodium varians* may be common.

Within the offset group, this community occurs on more fertile soils on flats as well as lower, mid and upper slopes. On slopes this community may become more shrubby. This community occurs as both as woodland and DNG. This community is equivalent to the Box-Gum Woodland CEEC (EPBC Act and BC Act) in some cases, however it may not conform where shrub cover is too high or where condition is too low.

PCT 439

PCT Name: *Mock Olive - Tumbledown Red Gum - Red Ash - Wilga siliceous rocky hill low woodland / shrubland in the Gunnedah - Tambar Springs region, Brigalow Belt South Bioregion*

Vegetation Class: Inland Rocky Hill Woodlands

EPBC Status: N/A

BC Status: N/A

PCT 439 is a tall open shrubland or shrubland dominated by *Notelaea microcarpa* (Mock Olive) and *Alphitonia excelsa* (Red Ash), with emergent trees such as *Eucalyptus dealbata* (Tumbledown Red Gum). The shrub layer is mid-dense to sparse and includes *Beyeria viscosa* (Sticky Wallaby Bush), *Geijera parviflora* (Wiliga), *Dodonea viscosa* subsp. *angustifolia* (Sticky Hop-bush) and *Abutilon oxycarpum* (Lantern Bush). The ground cover is sparse, commonly containing species such as *Aristida personata, Cymbopogon refractus, Paspalidium gracile, Eragrostis megalosperma, Solanum parvifolium, Desmodium brachypodum, Wahlenbergia gracilis, Calotis lappulacea, Boerhavia dominii, Daucus glochidiatus, Erodium crinitum, Sigesbeckia orientalis* subsp*. orientalis, Sida spinosa, Cheilanthes sieberi* subsp*. sieberi* and *Cheilanthes distans*.

Within the offset group, this community occurs on protected slopes on rocky ridgelines.

PCT 581

PCT Name: *Tumbledown Red Gum - Dwyer's Red Gum - Wallaby Bush shrubby woodland of the Nandewar Bioregion*

Vegetation Class: Western Slopes Dry Sclerophyll Forests

EPBC Status: N/A

BC Status: N/A

PCT 581 is a mid-high woodland that has a variable overstory composition. The overstory is usually dominated by *Eucalyptus dealbata* (Tumbledown Red Gum), however other overstory species that may be present include *Callitris glaucophylla, Eucalyptus dwyeri, Eucalyptus albens, Eucalyptus crebra* and *Eucalyptus melanophloia.* Sometimes a tall shrub or small tree layer is present, containing *Acacia cheelii, Alphitonia excelsa, Geijera parviflora or Acacia deanei* subsp. *deanei.* There is usually a dense to mid-dense shrub layer dominated by *Beyeria viscosa* and *Notelaea microcarpa* var. *microcarpa,* along with other shrub species *Olearia* sp. aff. *elliptica, Dodonaea viscosa* subsp. *angustifolia, Cassinia quinquefaria* and *Bursaria spinosa* subsp. *spinosa.* The ground layer is very sparse with common species including *Teucrium junceum, Pomax umbellata, Lomandra confertifolia* subsp. *pallida, Cheilanthes sieberi* subsp*. sieberi* and grass species such as *Aristida caput-medusae, Austrostipa scabra* subsp*. scabra, Rytidosperma longifolium, Cymbopogon refractus, Aristida ramosa, Microlaena stipoides* var. *stipoides and Paspalidium gracile.*

Within the offset group, this community occurs on slopes and ridgetops on rocky hills.

PCT 592

PCT Name: *Narrow-leaved Ironbark - cypress pine - White Box shrubby open forest in the Brigalow Belt South Bioregion and Nandewar Bioregion*

Vegetation Class: Western Slopes Dry Sclerophyll Forests

EPBC Status: N/A

BC Status: N/A

PCT 592 is a tall or mid-high open forest to woodland dominated by *Eucalyptus crebra* (Narrow-leaved Ironbark), *Callitris glaucophylla* (White Cypress Pine) and/or *Eucalyptus albens* (White Box). Other trees may include *Eucalyptus dealbata* (Tumbledown Red Gum) or *Eucalyptus melanophloia* (Silver-leaved Ironbark). There is usually a sparse shrubby understorey with the most common species including *Beyeria viscosa* (Wallaby Bush)*, Notelaea microcarpa* var. *microcarpa* (Native Olive) and *Dodonaea viscosa* subsp. *angustifolia* (Sticky Hop Bush). Other shrubs present include *Breynia cernua, Solanum parvifolium, Melichrus urceolatus, Spartothamnella juncea* and *Psydrax oleifolia*. The ground layer includes *Desmodium brachypodum* and grass species such as *Austrostipa scabra* subsp*. scabra, Rytidosperma racemosum* var. *obtusatum, Microlaena stipoides* var. *stipoides, Aristida ramosa* and *Cymbopogon refractus.* Forb species include *Dichondra* sp. A*, Calotis anthemoides, Vernonia cinerea* var. *cinerea, Brunoniella australis, Arthropodium sp. B, Desmodium varians* and *Glycine clandestina*.

Within the study area, this community occurs on rocky hills and slopes. On rocky upper slopes and ridgetops, this community may be shrubbier with *E. dealbata* a more common component of the canopy. This community occurs as both as woodland and DNG.

3.2.2 Threatened Ecological Communities

On Roseglass and Bimbooria two TECs were mapped. Approximately 487 ha of the Box-Gum Woodland CEEC listed under the EPBC Act and BC Act was mapped across relevant parts of PCT 435, *White Box - White Cypress Pine shrub grass hills woodland*. Approximately 0.3 ha of the Semi-evergreen Vine Thicket EEC listed under the EPBC Act and BC Act was mapped across the entirety of PCT 147 *Mock Olive – Wilga – Peach Bush – Cassinia semi-evergreen vine thicket* (Figure 3.1).

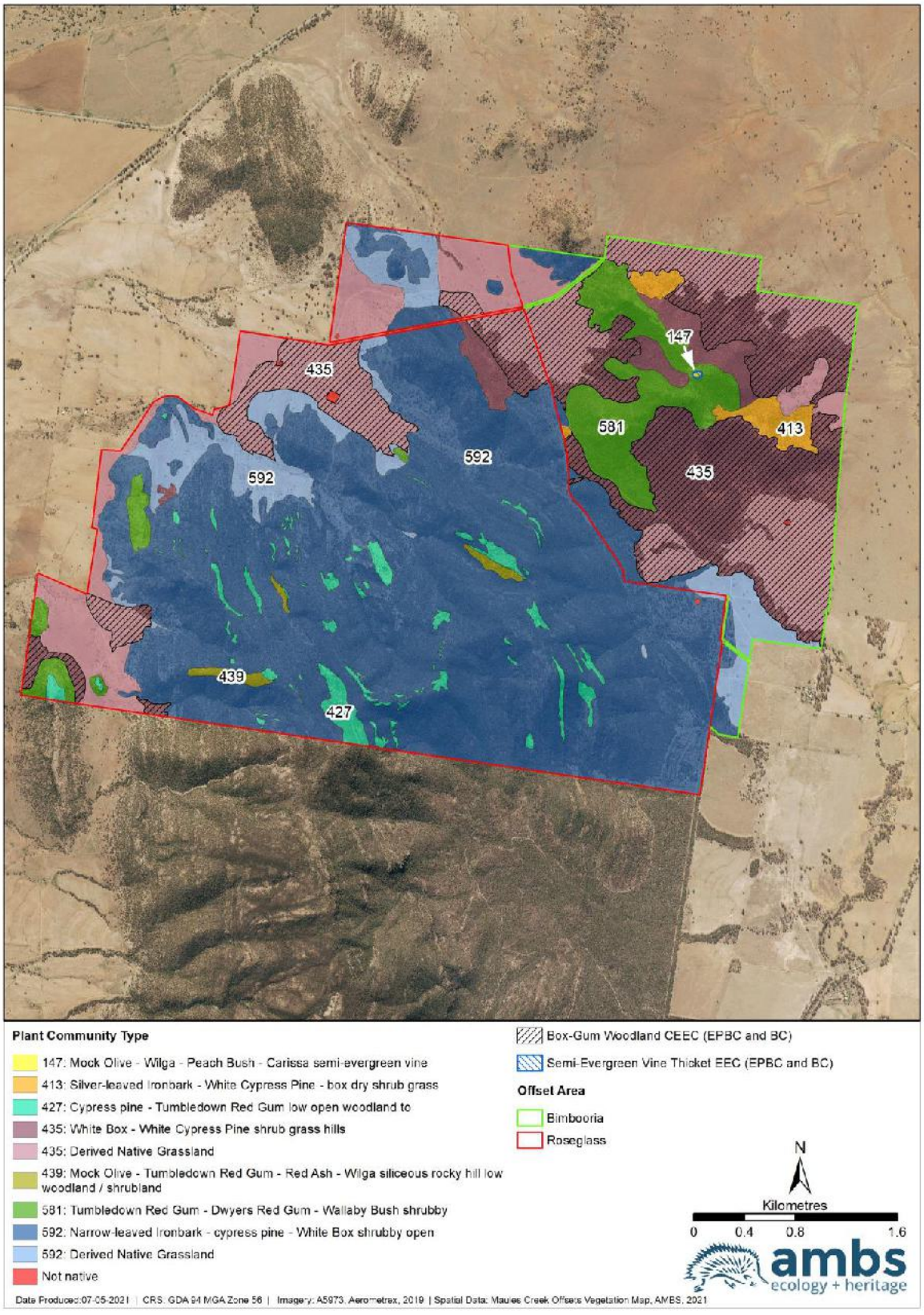

Figure 3.1 Plant Community Type Map for Roseglass and Bimbooria

3.3 Teston South

3.3.1 Plant Community Types and Descriptions

Approximately 335.6 ha of native vegetation was mapped on Teston South, across six separate PCTs. In addition, a small area (0.2 ha) of non-native vegetation was mapped. Table 3.3 below provides a list of the mapped PCTs and total areas mapped of each. Detailed descriptions of mapped PCTs are provided below. A map showing the distribution of PCTs across this offset group is included as Figure 3.2.

Table 3.3 Mapped Plant Community Types for Teston South

PCT Label		BC Act Status*	EPBC Act Status*	Area (ha)
55:	Belah woodland on alluvial plains and low rises			10.4
81:	Western Grey Box – cypress pine shrub grass shrub tall woodland	E[1]	E[1]	2.2
435:	White Box – White Cypress Pine shrub grass hills woodland	CE[2]	CE[2]	112.3
435:	Derived Native Grassland	CE[3]	CE[3]	44.8
581:	Tumbledown Red Gum – Dwyer's Red Gum – Wallaby Bush shrubby woodland			11.3
592:	Narrow-leaved Ironbark – cypress pine – White Box shrubby open forest			103
592:	Derived Native Grassland			7
619:	Derived Wire Grass grassland			44.6
			Total	**335.6**

* Conservation status under the BC Act and/or EPBC Act (current as of June 2021). CE = Critically Endangered; E = Endangered.

1 Equivalent to the Grey Box Woodland EEC listed under the BC Act and EPBC Act.

2 Approximately 63.1 ha equivalent to the Box-Gum Woodland CEEC listed under the BC Act and EPBC Act.

3 Approximately 17.6 ha equivalent to the Box-Gum Woodland CEEC listed under the BC Act and EPBC Act.

PCT 55

PCT Name: *Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions*

Vegetation Class: North-west Floodplain Woodlands

EPBC Status: N/A

BC Status: N/A

Belah Woodland (PCT 55) is a tall woodland dominated by *Casaurina cristata* (Belah). Tall shrubs often present include *Geijera parviflora* (Wilga), *Alectryon oleifolius* (Western Rosewood), *Eremophila mitchellii* (Budda), *Capparis mitchellii* (Wild Orange) and *Ventilago viminalis* (Supplejack). The mid-storey includes *Myoporum montanum* (Western Boobialla) and *Rhagodia spinescens* (Thorny Rhagodia). The ground layer includes low shrubs such as *Enchylaena tomentosa* (Ruby Saltbush), *Sclerolaena birchii* (Galvanised Burr) and *Maireana enchylaenoides,* grasses such as *Enteropogon acicularis* (Curly Windmill Grass), *Monachather paradoxus, Rytidosperma setaceum* (syn. *Austrodanthonia setaceae*), *Austrostipa scabra, Rytidosperma fluvum* (syn. *Austrodanthonia fluva*), *Austrostipa aristiglumis, Austrostipa verticillata, Aristida leptopoda, Paspalidium gracile, Sporobolus caroli and Panicum queenslandicum.* Forbs include *Einadia nutans, Oxalis chnoodes, Vittadinia cuneifolia, Boerhavia dominii, Goodenia fascicularis* and *Solanum esuriale.* Sedges such as *Eleocharis pallens,* rushes such as *Juncus radula* and *Marsilea drummondii* (Nardoo) occur in depressions. Common weed species include *Rapistrum rugosum, Carthamus lanatus* and *Medicago polymorpha.*

Within the offset group, this community occurs on alluvial floodplains and drainage lines.

PCT 81

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

Vegetation Class: Floodplain Transition Woodlands

EPBC Status: Grey Box Woodland EEC

BC Status: Grey Box Woodland EEC

PCT 81 is a tall woodland dominated by *Eucalyptus microcarpa* (Western Grey Box), often in association with *Callitris glaucophylla*. Shrubs are typically sparse or absent and may include *Maireana microphylla* (Small-leaved Bluebush)*, Senna artemisioides* (Silver Cassia) and *Acacia deanei* subsp. *deanei* (Dean's Wattle). The ground layer usually is mid-dense to dense and is dominated by grass and forb species. Common grass species include *Austrostipa scabra* (Speargrass)*, Aristida ramosa* (Purple Wire Grass) and *Bothriochloa decipiens* (Pitted Bluegrass). Common forb species include *Desmodium varians* (Slender Tick-trefoil)*, Glycine tabacina, Dichondra repens* (Kidney Weed) and *Oxalis perennans*. The ground fern *Cheilanthes sieberi* (Poison Rock Fern) is also often present.

Within the offset group, this community occurs on alluvial flats.

PCT 435

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: Box-Gum Woodland CEEC (Part)

BC Status: Box-Gum Woodland CEEC (Part)

PCT 435 is a mid-high woodland dominated by *Callitris glaucophylla* (White Cypress Pine) and *Eucalyptus albens* (White Box), with *Eucalyptus blakleyi* (Blakely's Red Gum) and *Brachychiton populneus* subsp. *populneus* (Kurrajong) also sometimes present in the overstory. Depending on grazing intensity, the shrub layer can be sparse to dense and includes *Cassinia quinquefaria, Acacia implexa* (Hickory Wattle), *Acacia penninervis* var. *penninervis* (Mountain Hickory), *Geijera parviflora* (Wilga), *Olearia elliptica* subsp. *elliptica* (Sticky Daisy Bush), *Dodonaea viscosa* subsp. *angustifolia* (Hop-bush), *Teucrium betchei* and *Cassinia sifton* (Sifton Bush). The ground cover is mid-dense and includes grass species such as *Aristida personata* (Purple Wire Grass)*, Cymbopogon refractus* (Barbed Wire Grass)*, Themeda australis* (Kangaroo Grass)*, Rytidosperma racemosum* var. *racemosum, Austrostipa verticillata* (Slender Bamboo Grass) and *Austrostipa scabra* subsp. *scabra* (Spear Grass). Common forb species include *Calotis lappulacea* (Yellow Burr Daisy)*, Vittadinia sulcata, Einadia nutans* subsp. *nutans* (Climbing Saltbush)*, Wahlenbergia communis* (Tufted Bluebell)*, Dianella longifolia* var. *longifolia* (Blue Flax-Lily)*, Swainsona galegifolia* (Smooth Darling Pea)*, Dichondra* sp. A and *Daucus glochidiatus* (Native Carrot). The scramblers *Desmodium brachypodum* or *Desmodium varians* may be common.

Within the offset group, this community occurs primarily on hill slopes and adjacent flats as both an intact woodland and DNG. This community is equivalent to the Box-Gum Woodland CEEC (EPBC Act and BC Act) in some cases, however it may not be equivalent where shrub cover is too high or where condition is too low.

PCT 581

PCT Name: *Tumbledown Red Gum – Dwyer's Red Gum - Wallaby Bush shrubby woodland of the Nandewar Bioregion*

Vegetation Class: Western Slopes Dry Sclerophyll Forests

EPBC Status: N/A

BC Status: N/A

PCT 581 is a mid-high woodland that has a variable overstory composition. The overstory is usually dominated by *Eucalyptus dealbata* (Tumbledown Red Gum), however other overstory species that may be present include *Callitris glaucophylla* (White Cypress Pine)*, Eucalyptus dwyeri* (Dwyer's Red Gum)*, Eucalyptus albens* (White Box)*, Eucalyptus crebra* (Narrow-leaved Ironbark) and *Eucalyptus melanophloia* (Silver-leaved Ironbark)*.* Sometimes a tall shrub or small tree layer is present, containing *Acacia cheelii* (Motherumbah)*, Alphitonia excelsa* (Red Ash)*, Geijera parviflora* (Wilga) *or Acacia deanei* subsp. *deanei* (Green Wattle)*.* There is usually a dense to mid-dense shrub layer dominated by *Beyeria viscosa* (Sticky Wallaby Bush) and *Notelaea microcarpa* var. *microcarpa* (Mock Olive)*,* along with other shrub species *Olearia* sp. aff. *elliptica* (Sticky Daisy Bush)*, Dodonaea viscosa* subsp. *angustifolia* (Sticky Hop-bush)*, Cassinia quinquefaria* and *Bursaria spinosa* subsp. *spinosa* (Blackthorn)*.* The ground layer is very sparse with common species including *Teucrium junceum, Pomax umbellata, Lomandra confertifolia* subsp. *pallida, Cheilanthes sieberi* subsp*. sieberi* and grass species such as *Aristida caput-medusae, Austrostipa scabra* subsp. *scabra, Rytidosperma longifolium, Cymbopogon refractus, Aristida ramosa, Microlaena stipoides* var. *stipoides* and *Paspalidium gracile.*

Within the study area, this community occurs on rocky slopes and hilltops.

PCT 592

PCT Name: *Narrow-leaved Ironbark - cypress pine - White Box shrubby open forest in the Brigalow Belt South Bioregion and Nandewar Bioregion*

Vegetation Class: Western Slopes Dry Sclerophyll Forests

EPBC Status: N/A

BC Status: N/A

PCT 592 is a tall or mid-high open forest to woodland dominated by *Eucalyptus crebra* (Narrow-leaved Ironbark), *Callitris glaucophylla* (White Cypress Pine) and/or *Eucalyptus albens* (White Box). Other trees may include *Eucalyptus dealbata* (Tumbledown Red Gum) or *Eucalyptus melanophloia* (Silver-leaved Ironbark). There is usually a sparse shrubby understorey with the most common species including *Beyeria viscosa* (Wallaby Bush)*, Notelaea microcarpa* var. *microcarpa* (Native Olive) and *Dodonaea viscosa* subsp. *angustifolia* (Sticky Hop-bush). Other shrubs present include *Breynia cernua, Solanum parvifolium, Melichrus urceolatus, Spartothamnella juncea* and *Psydrax oleifolia*. The ground layer includes *Desmodium brachypodum* and grass species such as *Austrostipa scabra* subsp*. scabra, Rytidosperma racemosum* var. *obtusatum, Microlaena stipoides var. stipoides, Aristida ramosa and Cymbopogon refractus.* Forb species include *Dichondra* sp. A*, Calotis anthemoides, Vernonia cinerea* var. *cinerea, Brunoniella australis, Arthropodium* sp. B, *Desmodium varians* and *Glycine clandestina*.

Within the study area, this community occurs on rocky slopes and hilltops, as both an intact woodland and DNG and grades into PCT 581 in some locations.

PCT 619

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

Vegetation Class: Western Slopes Grasslands

EPBC Status: N/A

BC Status: N/A

Mid-high derived tussock grassland dominated by species of *Aristida* (wire grass) including *Aristida personata, Aristida vagans* and *Aristida ramosa*. Other grass species include *Rytidosperma bipartitum, Austrostipa aristiglumis, Austrostipa verticellata, Cymbopogon refractus, Rytidosperma racemosum* var. *obtusatum, Enteropogon acicularis, Leptochloa digitata, Cynodon dactylon, Bothriochloa macra, Themeda australis* and *Eulalia aurea*. The rush *Juncus subglaucus* may be present. Typical forbs include *Boerhavia dominii, Rumex brownii, Tribulus micrococcus, Erodium crinitum, Alternanthera denticulata, Geranium solanderi* var. *solanderi, Dichondra repens, Sida spinosa, Oxalis perennans, Solanum esuriale, Wahlenbergia communis, Portulaca oleracea* and *Einadia polygonoides*.

Within the offset group, this community occurs mainly on alluvial flats and is derived from a range of communities, including box gum woodlands, belah woodlands and ironbark woodlands.

3.3.2 Threatened Ecological Communities

On Teston South, two TECs were mapped. Approximately 80.7 ha of the Box-Gum Woodland CEEC listed under the EPBC Act and BC Act was mapped across relevant parts of PCT 435, *White Box - White Cypress Pine shrub grass hills woodland*. In addition, a small (2.2 ha) patch of the Grey Box Woodland EEC listed under the BC Act and EPBC Act was mapped (Figure 3.2).

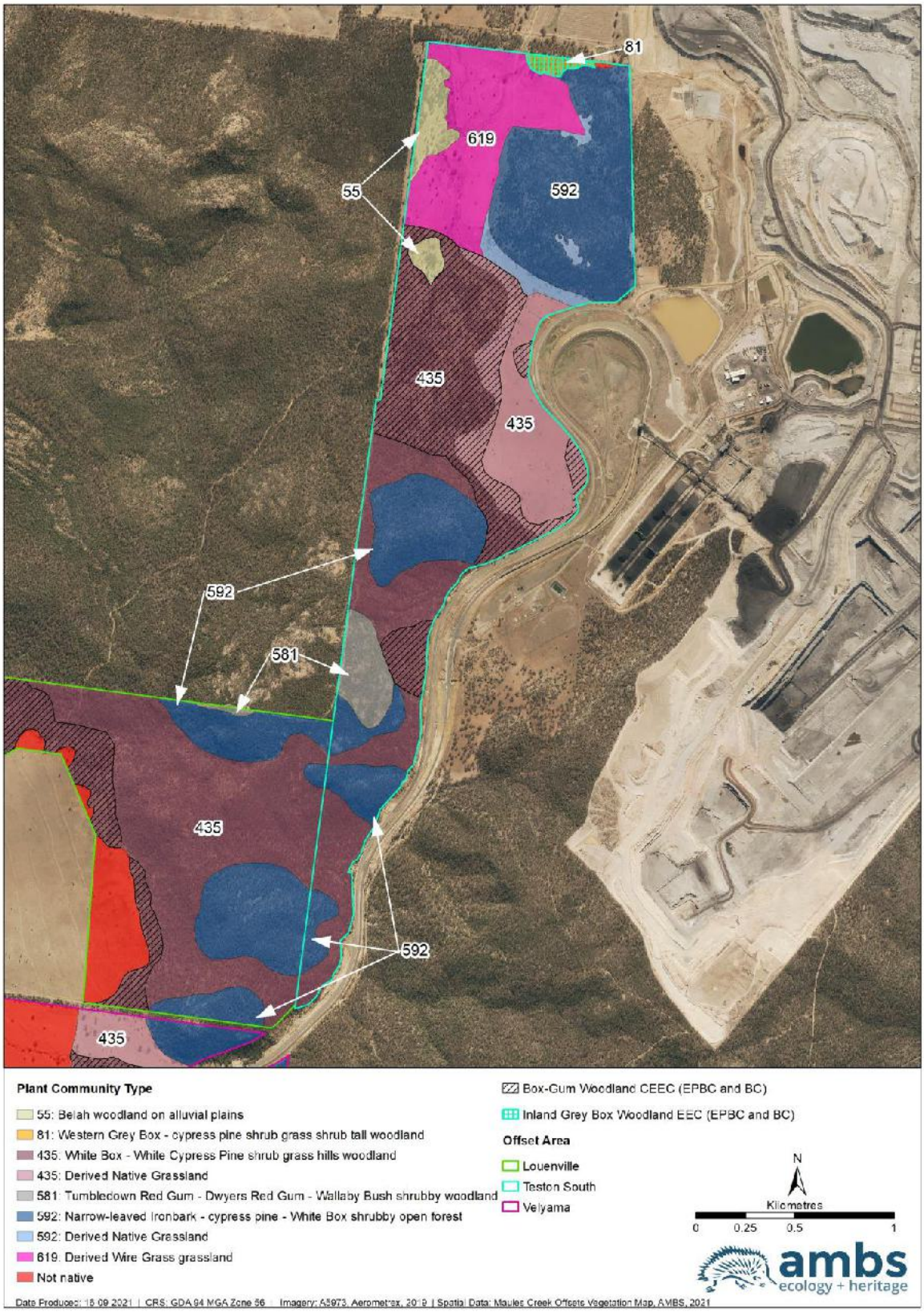

Figure 3.2 Plant Community Type Map for Teston South

3.4 Kelso, Velyama and Louenville

3.4.1 Plant Community Types and Descriptions

Approximately 1,195.8 ha of native vegetation was mapped on Kelso, Velyama and Louenville, across nine separate PCTs. In addition, a large area (208.3 ha) of non-native vegetation was mapped, largely made up of previously cultivated areas, with a high cover of exotic flora species. Table 3.4 below provides a list of the mapped PCTs and total areas mapped of each. Detailed descriptions of mapped PCTs are provided below. A map showing the distribution of PCTs across this offset group is included as Figure 3.3.

Table 3.4 Mapped Plant Community Types for Kelso, Velyama and Louenville

PCT Label		BC Act Status*	EPBC Act Status*	Area (ha)
55:	Belah woodland on alluvial plains and low rises			6
78:	River Red Gum riparian tall woodland / open forest wetland			40.9
244:	Poplar Box grassy woodland		E[1]	14.6
244:	Derived Native Grassland			255.8
413:	Silver-leaved Ironbark - White Cypress Pine - box dry shrub grass woodland			5.3
413:	Derived Native Grassland			2.3
429:	White Cypress Pine – Poplar Box – Silver-leaved Ironbark viney shrub woodland			7.1
435:	White Box - White Cypress Pine shrub grass hills woodland	CE[2]	CE[3]	211.6
435:	Derived Native Grassland	CE[4]	CE[4]	65.9
581:	Tumbledown Red Gum – Dwyer's Red Gum - Wallaby Bush shrubby woodland			0.7
592:	Narrow-leaved Ironbark - cypress pine - White Box shrubby open forest			382.3
592:	Derived Native Grassland			83.5
619:	Derived Wire Grass grassland			119.8
			Total	**1195.8**

* Conservation status under the BC Act and/or EPBC Act (current as of June 2021). CE = Critically Endangered; E = Endangered.

1 Approximately 13.3 ha equivalent to the Poplar Box Grassy Woodland EEC listed under the EPBC Act.

2 Approximately 109.8 ha equivalent to the Box-Gum Woodland CEEC listed under the BC Act.

3 Approximately 98.8 ha equivalent to the Box-Gum Woodland CEEC listed under the EPBC Act.

4 Approximately 3 ha equivalent to the Box-Gum Woodland CEEC listed under the BC Act and EPBC Act.

PCT 55

PCT Name: *Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions*

Vegetation Class: North-west Floodplain Woodlands

EPBC Status: N/A

BC Status: N/A

Belah Woodland (PCT 55) is a tall woodland dominated by *Casuarina cristata* (Belah). Tall shrubs often present include *Geijera parviflora* (Wilga), *Alectryon oleifolius* (Western Rosewood), *Eremophila mitchellii* (Budda), *Apophyllum anomalum* (Warrior Bush), *Capparis mitchellii* (Wild Orange) and *Ventilago viminalis* (Supplejack). The mid-storey includes *Myoporum montanum* (Western Boobialla), *Rhagodia spinescens* (Thorny Rhagodia), *Maireana enchylaenoides.* The ground layer includes low shrubs such as *Enchylaena tomentosa* (Ruby Saltbush), *Sclerolaena birchii* (Galvanised Burr), *Sclerolaena divaricata,* grasses such as *Enteropogon acicularis* (Curly Windmill Grass), *Monachather paradoxus, Rytidosperma setaceum* (syn. *Austrodanthonia setaceae*), *Austrostipa scabra, Rytidosperma fluvum* (syn. *Austrodanthonia fluva*), *Austrostipa aristiglumis, Austrostipa verticillata, Aristida leptopoda, Paspalidium gracile, Sporobolus caroli* and *Panicum queenslandicum.* Forbs include *Einadia nutans, Oxalis chnoodes, Vittadinia cuneifolia, Boerhavia dominii, Goodenia fascicularis* and *Solanum esuriale.* Sedges such as *Eleocharis pallens,* rushes such as *Juncus radula* and *Marsilea drummondii* (Nardoo) occur in depressions. Common weed species include *Rapistrum rugosum, Carthamus lanatus* and *Medicago polymorpha.*

Within the offset group, this community occurs on alluvial floodplains and drainage lines.

PCT 78

PCT Name: *River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow* Belt South Bioregion

Vegetation Class: Inland Riverine Forests

EPBC Status: N/A

BC Status: N/A

PCT 78 is a tall open forest or woodland dominated by *Eucalyptus camaldulensis* (River Red Gum), often in association with *Angophora floribunda* (Rough-barked Apple), *Eucalyptus melliodora* (Yellow Box) or Casuarina cunninghamiana (River Oak). Small trees include *Melaleuca bracteata* (Black Tea-tree). The shrub layer is sparse but may contain species such as *Callistemon sieberi* (River Bottlebrush), *Acacia deanei* (Dean's Wattle), *Leptospermum polygalifolium* (Tantoon), *Leptospermum brachyandrum* and *Notelaea microcarpa* var. *microcarpa* (Mock Olive). Small shrubs include *Swainsona galegifolia* (Smooth Darling Pea), *Nyssanthes erecta* and *Maireana microphylla* (Bluebush). The ground cover is often dense and is composed of *Alternanthera denticulata, Commelina cyanea, Einadia hastata, Ajuga australis, Urtica incisa, Lomandra longifolia, Arundinella nepalensis, Austrostipa verticillata, Cynodon dactylon, Aristida vagans, Cymbopogon refractus, Paspalidium aversum, Lachnagrostis filiformis, Paspalum distichum, Paspalidium jubiflorum, Cyperus gracilis, Cyperus gymnocaulos, Carex incomitata* and *Carex appressa.*

Within the offset group, this community occurs on alluvial river flats.

PCT 244

PCT Name: *Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt)*

Vegetation Class: Floodplain Transition Woodlands

EPBC Status: Poplar Box Grassy Woodland EEC (Part)

BC Status: N/A

PCT 244 is a mid-high to tall woodland or open woodland dominated by *Eucalyptus populnea* (Poplar Box), often in association with *Callitris glaucophylla* (White Cypress Pine) or *Casuarina cristata* (Belah). Shrubs are typically sparse and may include a range of tall shrubs or small trees, including *Geijera parviflora* (Wilga), *Eremophila mitchellii* (Budda) and *Alectryon oleifolius* (Western Rosewood). Common low shrubs include *Maireana microphylla* (Small-leaf Bluebush), *Sclerolaena birchii* (Galvanised Burr) and *Rhagodia spinescens* (Spiny Saltbush). The ground layer is usually dominated by grasses, with common species including *Enteropogon acicularis* (Curly Windmill Grass), *Austrostipa scabra* (Spear Grass) and *Bothriochloa decipiens* (Redleg Grass). A range of forbs may also be present in the ground layer, including *Sida corrugata* (Corrugated Sida), *Wahlenbergia communis* (Tufted Bluebell) and *Glycine tabacina*.

Within the offset group, occurs on alluvial floodplains as both an intact woodland and DNG.

PCT 413

PCT Name: *Silver-leaved Ironbark - White Cypress Pine - box dry shrub grass woodland of the Pilliga Scrub - Warialda region, Brigalow Belt South Bioregion*

Vegetation Class: North-west Slopes Dry Sclerophyll Woodlands

EPBC Status: N/A

BC Status: N/A

PCT 413 is a tall to mid-high woodland or open forest dominated by *Eucalyptus melanophloia* (Silver-leaved Ironbark) and *Callitris glaucophylla* (White Cypress Pine) sometimes with *Eucalyptus pilligaensis, Callitris endlicheri, Eucalyptus albens, Allocasuarina luehmannii* or *Eucalyptus populnea* subsp. *bimbil*. The small tree *Alectryon oleifolius* subsp. *elongatus* may be present. The shrub layer is usually sparse but mid-dense in places and includes *Acacia deanei* subsp. *paucijuga, Solanum ferocissimum, Beyeria viscosa*, several subspecies of *Dodonaea viscosa, Acacia decora, Geijera parviflora, Abutilon oxycarpum, Pimelea microcephala* subsp. *microcephala* and *Cassinia laevis*. The ground cover is sparse and includes grasses such as A*ristida vagans, Cymbopogon refractus, Poa sieberiana, Enteropogon acicularis, Austrostipa verticillata, Austrostipa scabra subsp. scabra* and *Microlaena stipoides*. The mat-rushes *Lomandra multiflora* subsp. *multiflora* or *Lomandra filiformis* subsp. *filiformis* are often present. Forbs include *Einadia hastata, Calotis cuneifolia, Einadia nutans* subsp. *nutans Eremophila debilis, Chrysocephalum apiculatum, Opercularia diphylla, Bulbine semibarbata* and *Ranunculus sessiliflorus*. Climbers include *Glycine tabacina* and *Desmodium varians*.

Within the offset group, this community occurs on hillslopes as both an intact woodland and DNG.

PCT 429

PCT Name: *White Cypress Pine - Poplar Box - Silver-leaved Ironbark viney shrub woodland of the Brigalow Belt South Bioregion*

Vegetation Class: North-west Slopes Dry Sclerophyll Woodlands

EPBC Status: N/A

BC Status: N/A

PCT 429 is a tall woodland dominated by *Callitris glaucophylla* (White Cypress Pine), *Eucalyptus populnea* subsp. *bimbil* (Poplar Box) or *Eucalyptus melanophloia* (Silver-leaved Ironbark) often with smaller trees of *Acacia leiocalyx* subsp. *leiocalyx, Alphitonia excelsa* or *Allocasuarina luehmannii*. The shrub layer contains tall and short shrubs and overall is dense to sparse with a species composition containing elements of semi-evergreen vine thicket (PCT 147). Shrub species include *Carissa spinarum, Notelaea microcarpa* var. *microcarpa* (Mock Olive), *Beyeria viscosa* (Sticky Wallaby Bush), *Psydrax odorata* (Lamboto), *Acacia deanei* subsp. *paucijuga* (Green Wattle), *Teucrium junceum, Myoporum montanum* (Western Boobialla), *Alstonia constricta* (Quinine Bush), *Dodonaea viscosa* subsp. *angustifolia* (Sticky Hop Bush), *Elaeodendron australe* var. *angustifolium* (Narrow-leaved Red Olive Plum), *Solanum ferocissimum* (Spiney Potato Bush), *Capparis mitchellii* (Native Orange) and *Abutilon oxycarpum* (Lantern Bush). Vines include *Parsonsia eucalyptophylla* (Gargaloo)*, Clematis microphylla* and *Pandorea pandorana* (Wonga Vine). The ground cover is sparse to very sparse and includes species such as *Aristida vagans, Aristida ramosa, Austrostipa scabra* subsp. *scabra, Ancistrachne uncinulata, Eragrostis leptostachya*, *Eragrostis lacunaria,* E*inadia hastata, Ranunculus sessiliflorus* var. *sessiliflorus, Calotis lappulacea, Vittadinia sulcata, Vittadinia dissecta* var. *hirta, Daucus glochidiatus sens lat., Plantago debilis* and *Dichondra* sp. A.

Within the offset group, this community occurs on lower slopes and flats as a disturbed woodland.

PCT 435

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: Box-Gum Woodland CEEC (Part)

BC Status: Box-Gum Woodland CEEC (Part)

PCT 435 is a mid-high woodland dominated by *Callitris glaucophylla* (White Cypress Pine) and *Eucalyptus albens* (White Box), with *Eucalyptus blakleyi* (Blakely's Red Gum) and *Brachychiton populneus* subsp. *populneus* (Kurrajong) also sometimes present in the overstory. Depending on grazing intensity, the shrub layer can be sparse to dense and includes *Cassinia quinquefaria, Acacia implexa* (Hickory Wattle), *Acacia penninervis* var. *penninervis* (Mountain Hickory), *Geijera parviflora* (Wilga), *Olearia elliptica* subsp. *elliptica* (Sticky Daisy Bush), *Dodonaea viscosa* subsp. *angustifolia* (Hop-bush), *Teucrium betchei* and *Cassinia sifton* (Sifton Bush). The ground cover is mid-dense and includes grass species such as *Aristida personata* (Purple Wire Grass)*, Cymbopogon refractus* (Barbed Wire Grass)*, Themeda australis* (Kangaroo Grass)*, Rytidosperma racemosum* var. *racemosum, Austrostipa verticillata* (Slender Bamboo Grass) and *Austrostipa scabra* subsp*. scabra* (Spear Grass). Common forb species include *Calotis lappulacea* (Yellow Burr Daisy)*, Vittadinia sulcata, Einadia nutans* subsp. *nutans* (Climbing Saltbush)*, Wahlenbergia communis* (Tufted Bluebell)*, Dianella longifolia* var. *longifolia* (Blue Flax-Lily)*, Swainsona galegifolia* (Smooth Darling Pea)*, Dichondra* sp. A and *Daucus glochidiatus* (Native Carrot). The scramblers *Desmodium brachypodum* or *Desmodium varians* may be common.

Within the offset group, this community occurs on hill slopes and adjacent flats as both an intact woodland and as DNG. This community is equivalent to the Box-Gum Woodland CEEC (EPBC Act and BC Act) in some cases, however it may not conform where shrub cover is too high or where condition is too low.

PCT 581

PCT Name: *Tumbledown Red Gum – Dwyer's Red Gum - Wallaby Bush shrubby woodland of the Nandewar Bioregion*

Vegetation Class: Western Slopes Dry Sclerophyll Forests

EPBC Status: N/A

BC Status: N/A

PCT 581 is a mid-high woodland that has a variable overstory composition. The overstory is usually dominated by *Eucalyptus dealbata* (Tumbledown Red Gum), however other overstory species that may be present include *Callitris glaucophylla, Eucalyptus dwyeri, Eucalyptus albens, Eucalyptus crebra* and *Eucalyptus melanophloia.* Sometimes a tall shrub or small tree layer is present, containing *Acacia cheelii, Alphitonia excelsa, Geijera parviflora* or *Acacia deanei* subsp. *deanei.* There is usually a dense to mid-dense shrub layer dominated by *Beyeria viscosa* and *Notelaea microcarpa* var. *microcarpa,* along with other shrub species *Olearia* sp. aff. *elliptica, Dodonaea viscosa* subsp. *angustifolia, Cassinia quinquefaria* and *Bursaria spinosa* subsp*. spinosa.* The ground layer is very sparse with common species including *Teucrium junceum, Pomax umbellata, Lomandra confertifolia* subsp. *pallida, Cheilanthes sieberi* subsp*. sieberi* and grass species such as *Aristida caput-medusae, Austrostipa scabra* subsp*. scabra, Rytidosperma longifolium, Cymbopogon refractus, Aristida ramosa, Microlaena stipoides* var. *stipoides* and *Paspalidium gracile.*

Within the study area, this community occurs on rocky slopes and hilltops.

PCT 592

PCT Name: *Narrow-leaved Ironbark - cypress pine - White Box shrubby open forest in the Brigalow Belt South Bioregion and Nandewar Bioregion*

Vegetation Class: Western Slopes Dry Sclerophyll Forests

EPBC Status: N/A

BC Status: N/A

PCT 592 is a tall or mid-high open forest to woodland dominated by *Eucalyptus crebra* (Narrow-leaved Ironbark), *Callitris glaucophylla* (White Cypress Pine) and/or *Eucalyptus albens* (White Box). Other trees may include *Eucalyptus dealbata* (Tumbledown Red Gum) or *Eucalyptus melanophloia* (Silver-leaved Ironbark). There is usually a sparse shrubby understorey with the most common species including *Beyeria viscosa* (Wallaby Bush)*, Notelaea microcarpa* var. *microcarpa* (Native Olive) and *Dodonaea viscosa* subsp. *angustifolia* (Sticky Hop Bush). Other shrubs present include *Breynia cernua, Solanum parvifolium, Melichrus urceolatus, Spartothamnella juncea* and *Psydrax oleifolia*. The ground layer includes *Desmodium brachypodum* and grass species such as *Austrostipa scabra* subsp*. scabra, Rytidosperma racemosum* var. *obtusatum, Microlaena stipoides* var. *stipoides, Aristida ramosa* and *Cymbopogon refractus.* Forb species include *Dichondra* sp. A, *Calotis anthemoides, Vernonia cinerea* var. *cinerea, Brunoniella australis, Arthropodium* sp. B, *Desmodium varians* and *Glycine clandestina*.

Within the study area, this community occurs on rocky slopes and hilltops, as both an intact woodland and DNG and grades into PCT 581 in some locations.

PCT 619

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

Vegetation Class: Western Slopes Grasslands

EPBC Status: N/A

BC Status: N/A

PCT 619 is a mid-high derived tussock grassland dominated by species of *Aristida* (wire grass) including *Aristida personata, Aristida vagans* and *Aristida ramosa*. Other grass species include *Rytidosperma bipartitum, Austrostipa aristiglumis, Austrostipa verticellata, Cymbopogon refractus, Rytidosperma racemosum* var. *obtusatum, Rytidosperma laeve, Rytidosperma erianthum, Enteropogon acicularis, Leptochloa digitata, Cynodon dactylon, Bothriochloa macra, Themeda australis* and *Eulalia aurea*. The rush *Juncus subglaucus* may be present. Typical forbs include *Boerhavia dominii, Rumex brownii, Tribulus micrococcus, Erodium crinitum, Alternanthera denticulata, Geranium solanderi* var. *solanderi, Dichondra repens, Sida spinosa, Oxalis perennans, Solanum esuriale, Wahlenbergia communis, Portulaca oleracea* and *Einadia polygonoides*.

Within the offset group, this community occurs mainly on alluvial flats and is derived from a range of communities, including box gum woodlands, belah woodlands and ironbark woodlands.

3.4.2 Threatened Ecological Communities

On Kelso, Velyama and Louenville, two TECs were mapped. Approximately 101.8 ha of the Box-Gum Woodland CEEC listed under the EPBC Act and 112.8 ha under the BC Act was mapped across relevant parts of PCT 435, *White Box – White Cypress Pine shrub grass hills woodland* (both woodland and DNG forms). A 13.3 ha patch of the Poplar Box Grassy Woodland EEC listed under the EPBC Act was also mapped (Figure 3.3).

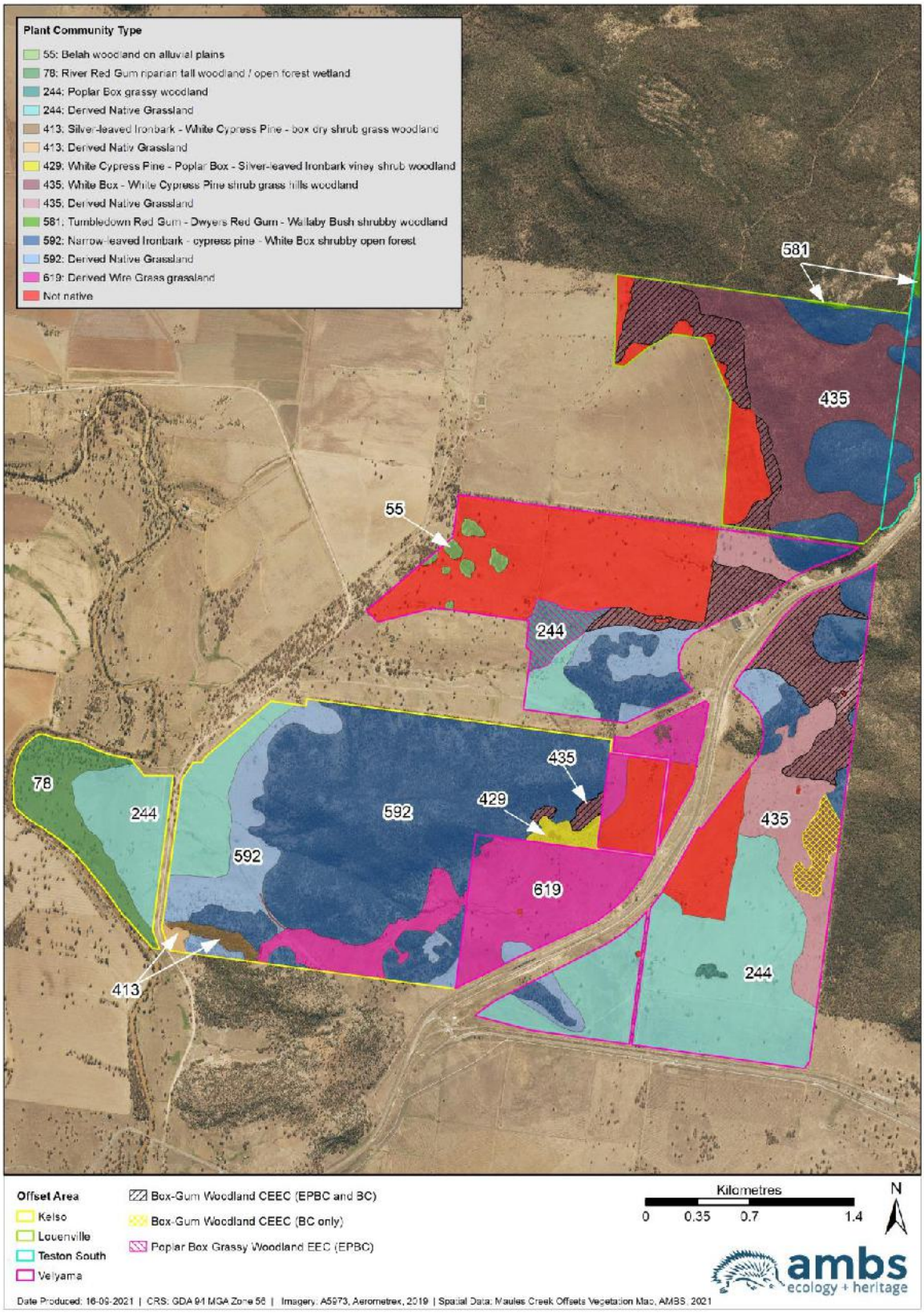

Figure 3.3 Plant Community Type Map for Kelso, Velyama and Louenville

3.5 Onavale

3.5.1 Plant Community Types and Descriptions

Approximately 249.6 ha of native vegetation was mapped on Onavale, across six separate PCTs. In addition, a large area (307.5 ha) of non-native vegetation was mapped, largely made up of previously cultivated areas, with a high cover of exotic flora species. Table 3.5 below provides a list of the mapped PCTs and total areas mapped of each. Detailed descriptions of mapped PCTs are provided below. A map showing the distribution of PCTs across this offset is included as Figure 3.4.

Table 3.5 Mapped Plant Community Types for Onavale

PCT Label		BC Act Status*	EPBC Act Status*	Area (ha)
55:	Belah woodland on alluvial plains			1.2
101:	Poplar Box - Yellow Box - Western Grey Box grassy woodland			18.6
101:	Derived Native Grassland			19.7
413:	Silver-leaved Ironbark – White Cypress Pine – box dry shrub grass woodland			27.8
413:	Derived Native Grassland			56.8
435:	White Box - White Cypress Pine shrub grass hills woodland	CE[1]	CE[1]	10.3
435:	Derived Native Grassland	CE[1]	CE[1]	30
581:	Tumbledown Red Gum – Dwyer's Red Gum - Wallaby Bush shrubby woodland			5
592:	Narrow-leaved Ironbark – cypress pine – White Box shrubby open forest			76.5
592:	Derived Native Grassland			3.7
			Total	**249.6**

* Conservation status under the BC Act and/or EPBC Act (current as of June 2021). CE = Critically Endangered.

1 Equivalent to the Box-Gum Woodland CEEC listed under the BC Act and EPBC Act.

PCT 55

PCT Name: *Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions*

Vegetation Class: North-west Floodplain Woodlands

EPBC Status: N/A

BC Status: N/A

Belah Woodland (PCT 55) is a tall woodland dominated by *Casaurina cristata* (Belah). Tall shrubs often present include *Geijera parviflora* (Wilga), *Alectryon oleifolius* (Western Rosewood), *Eremophila mitchellii* (Budda), *Apophyllum anomalum* (Warrior Bush), *Capparis mitchellii* (Wild Orange) and *Ventilago viminalis* (Supplejack). The mid-storey includes *Myoporum montanum* (Western Boobialla), *Rhagodia spinescens* (Thorny Rhagodia), *Maireana enchylaenoides.* The ground layer includes low shrubs such as *Enchylaena tomentosa* (Ruby Saltbush), *Sclerolaena birchii* (Galvanised Burr), *Sclerolaena divericata,* grasses such as *Enteropogon acicularis* (Curly Windmill Grass), *Monachather paradoxus, Rytidosperma setaceum* (syn. *Austrodanthonia setaceae*), *Austrostipa scabra, Rytidosperma fluvum* (syn. *Austrodanthonia fluva*), *Austrostipa aristiglumis, Austrostipa verticillata, Aristida leptopoda, Paspalidium gracile, Sporobolus caroli* and *Panicum queenslandicum.* Forbs include *Einadia nutans, Oxalis chnoodes, Vittadinia cuneifolia, Boerhavia dominii, Goodenia fascicularis* and *Solanum esuriale.* Sedges such as *Eleocharis pallens,* rushes such as *Juncus radula* and *Marsilea drummondii* (Nardoo) occur in depressions. Common weed species include *Rapistrum rugosum, Carthamus lanatus* and *Medicago polymorpha.*

Within the offset group, this community occurs on alluvial floodplains.

PCT 101

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: Brigalow Clay Plain Woodlands

EPBC Status: N/A

BC Status: N/A

PCT 101 is tall woodland or open woodland dominated by *Eucalyptus populnea* subsp. *bimbil* (Poplar Box) sometimes with *Eucalyptus melliodora* (Yellow Box), *Callitris glaucophylla* (White Cypress Pine), *Eucalyptus melanophloia* (Silver-leaved Ironbark). A very sparse shrub layer may be present. Shrub species include *Geijera parviflora* (Wilga), *Notalea microcarpa* (Mock Olive), *Maireana microphylla, Capparis mitchellii* (Wild Orange) and *Alectryon oleifolius* (Western Rosewood). The ground cover is usually dense and is dominated by a rich array of grass and forb species. Grass species include *Austrostipa verticillata*, *Dichanthium sericeum* subsp. *sericeum, Bothriochloa decipiens, Rytidosperma bipartitum, Enteropogon acicularis, Aristida personata, Aristida ramosa, Austrostipa aristiglumis, Austrostipa scabra* subsp. *scabra, Themeda australis, Eulalia aurea, Paspalidium jubiflorum, Chloris truncata* and *Chloris ventricosa*. Forb species include *Rumex brownii, Einadia nutans, Cotula australis, Maireana enchylaenoides, Erodium crinitum, Calotis lappulacea, Rostellularia adscendens* subsp. *adscendens, Sida corrugata, Oxalis exilis, Einadia hastata, Vittadinia dissecta* var. *hirta, Vittadinia muelleri, Vittadinia sulcata, Chrysocephalum apiculatum, Solanum cinereum, Abutilon oxycarpum, Dichondra* sp. A, *Wahlenbergia stricta* subsp. *stricta, Pycnosorus globosus, Goodenia fascicularis* and *Brunoniella australis*.

Within the offset group, this community occurs on alluvial flats along drainage lines, both as an intact woodland and as DNG.

PCT 413

PCT Name: *Silver-leaved Ironbark - White Cypress Pine - box dry shrub grass woodland of the Pilliga Scrub - Warialda region, Brigalow Belt South Bioregion*

Vegetation Class: North-west Slopes Dry Sclerophyll Woodlands

EPBC Status: N/A

BC Status: N/A

PCT 413 is a tall to mid-high woodland or open forest dominated by *Eucalyptus melanophloia* (Silver-leaved Ironbark) and *Callitris glaucophylla* (White Cypress Pine) sometimes with *Eucalyptus pilligaensis, Callitris endlicheri, Eucalyptus albens, Allocasuarina luehmannii* or *Eucalyptus populnea* subsp. *bimbil*. The small tree *Alectryon oleifolius* subsp. *elongatus* may be present. The shrub layer is usually sparse but mid-dense in places and includes *Acacia deanei* subsp. *paucijuga, Solanum ferocissimum, Beyeria viscosa*, several subspecies of *Dodonaea viscosa, Acacia decora, Geijera parviflora, Abutilon oxycarpum, Pimelea microcephala* subsp. *microcephala* and *Cassinia laevis*. The ground cover is sparse and includes grasses such as *Aristida vagans, Cymbopogon refractus, Poa sieberiana, Enteropogon acicularis, Austrostipa verticillata, Austrostipa scabra subsp. scabra* and *Microlaena stipoides*. The mat-rushes *Lomandra multiflora* subsp. *multiflora* or *Lomandra filiformis* subsp. *filiformis* are often present. Forbs include *Einadia hastata, Calotis cuneifolia, Einadia nutans* subsp. *nutans Eremophila debilis, Chrysocephalum apiculatum, Opercularia diphylla, Bulbine semibarbata* and *Ranunculus sessiliflorus*. Climbers include *Glycine tabacina* and *Desmodium varians*.

Within the offset group, this community occurs on flats and low hills as both as intact woodland and DNG.

PCT 435

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: Box-Gum Woodland CEEC

BC Status: Box-Gum Woodland CEEC

PCT 435 is a mid-high woodland dominated by *Callitris glaucophylla* (White Cypress Pine) and *Eucalyptus albens* (White Box), with *Eucalyptus blakleyi* (Blakely's Red Gum) and *Brachychiton populneus* subsp. *populneus* (Kurrajong) also sometimes present in the overstory. Depending on grazing intensity, the shrub layer can be sparse to dense and includes *Cassinia quinquefaria, Acacia implexa* (Hickory Wattle), *Acacia penninervis* var. *penninervis* (Mountain Hickory), *Geijera parviflora* (Wilga), *Olearia elliptica* subsp. *elliptica* (Sticky Daisy Bush), *Dodonaea viscosa* subsp. *angustifolia* (Hop-bush), *Teucrium betchei* and *Cassinia sifton* (Sifton Bush). The ground cover is mid-dense and includes grass species such as *Aristida personata* (Purple Wire Grass)*, Cymbopogon refractus* (Barbed Wire Grass)*, Themeda australis* (Kangaroo Grass)*, Rytidosperma racemosum* var. *racemosum, Austrostipa verticillata* (Slender Bamboo Grass) and *Austrostipa scabra* subsp. *scabra* (Spear Grass). Common forb species include *Calotis lappulacea* (Yellow Burr Daisy)*, Vittadinia sulcata, Einadia nutans* subsp. *nutans* (Climbing Saltbush)*, Wahlenbergia communis* (Tufted Bluebell)*, Dianella longifolia* var. *longifolia* (Blue Flax-Lily)*, Swainsona galegifolia* (Smooth Darling Pea)*, Dichondra* sp. A and *Daucus glochidiatus* (Native Carrot). The scramblers *Desmodium brachypodum* or *Desmodium varians* may be common.

Within the offset group, this community occurs on flats and low hills as both as intact woodland and DNG. This community is equivalent to the Box-Gum Woodland CEEC (EPBC Act and BC Act) in some cases, however it may not be equivalent where shrub cover is too high or where condition is too low.

PCT 581

PCT Name: *Tumbledown Red Gum – Dwyer's Red Gum - Wallaby Bush shrubby woodland of the Nandewar Bioregion*

Vegetation Class: Western Slopes Dry Sclerophyll Forests

EPBC Status: N/A

BC Status: N/A

PCT 581 is a mid-high woodland that has a variable overstory composition. The overstory is usually dominated by *Eucalyptus dealbata* (Tumbledown Red Gum), however other overstory species that may be present include *Callitris glaucophylla, Eucalyptus dwyeri, Eucalyptus albens, Eucalyptus crebra* and *Eucalyptus melanophloia.* Sometimes a tall shrub or small tree layer is present, containing *Acacia cheelii, Alphitonia excelsa, Geijera parviflora* or *Acacia deanei* subsp. *deanei.* There is usually a dense to mid-dense shrub layer dominated by *Beyeria viscosa* and *Notelaea microcarpa* var. *microcarpa,* along with other shrub species *Olearia* sp. aff. *elliptica, Dodonaea viscosa* subsp. *angustifolia, Cassinia quinquefaria* and *Bursaria spinosa* subsp. *spinosa.* The ground layer is very sparse with common species including *Teucrium junceum, Pomax umbellata, Lomandra confertifolia* subsp. *pallida, Cheilanthes sieberi* subsp. *sieberi* and grass species such as *Aristida caput-medusae, Austrostipa scabra* subsp. *scabra, Rytidosperma longifolium, Cymbopogon refractus, Aristida ramosa, Microlaena stipoides* var. *stipoides* and *Paspalidium gracile.*

Within the offset group, this community occurs on rocky rises.

PCT 592

PCT Name: *Narrow-leaved Ironbark - cypress pine - White Box shrubby open forest in the Brigalow Belt South Bioregion and Nandewar Bioregion*

Vegetation Class: Western Slopes Dry Sclerophyll Forests

EPBC Status: N/A

BC Status: N/A

PCT 592 is a tall or mid-high open forest to woodland dominated by *Eucalyptus crebra* (Narrow-leaved Ironbark), *Callitris glaucophylla* (White Cypress Pine) and/or *Eucalyptus albens* (White Box). Other trees may include *Eucalyptus dealbata* (Tumbledown Red Gum) or *Eucalyptus melanophloia* (Silver-leaved Ironbark). There is usually a sparse shrubby understorey with the most common species including *Beyeria viscosa* (Wallaby Bush)*, Notelaea microcarpa* var. *microcarpa* (Native Olive) and *Dodonaea viscosa* subsp. *angustifolia* (Sticky Hop Bush). Other shrubs present include *Breynia cernua, Solanum parvifolium, Melichrus urceolatus, Spartothamnella juncea* and *Psydrax oleifolia*. The ground layer includes *Desmodium brachypodum* and grass species such as *Austrostipa scabra* subsp*. scabra, Rytidosperma racemosum* var. *obtusatum, Microlaena stipoides* var. *stipoides, Aristida ramosa* and *Cymbopogon refractus.* Forb species include *Dichondra* sp. A, *Calotis anthemoides, Vernonia cinerea* var. *cinerea, Brunoniella australis, Arthropodium* sp. B, *Desmodium varians* and *Glycine clandestina*.

Within the offset group, this community occurs on hilltops and slopes as both an intact woodland and DNG.

3.5.2 Threatened Ecological Communities

On Onavale, one TEC was mapped. Approximately 40.3 ha of the Box-Gum Woodland CEEC listed under the EPBC Act and BC Act was mapped across all of PCT 435, *White Box - White Cypress Pine shrub grass hills woodland* (Figure 3.4).

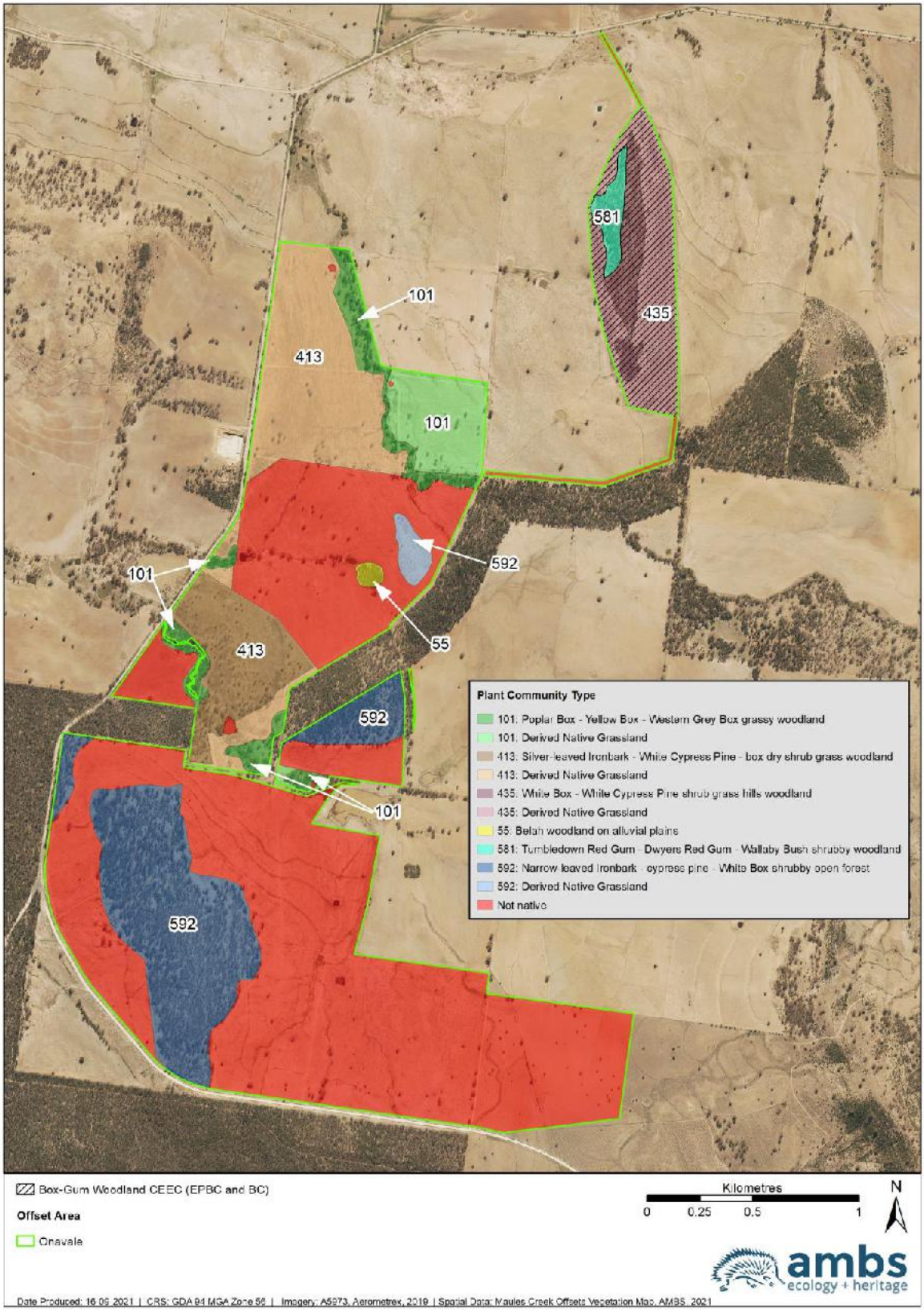

Figure 3.4 Plant Community Type Map for Onavale

3.6 Wollandilly

3.6.1 Plant Community Types and Descriptions

Approximately 799.4 ha of native vegetation was mapped on Wollandilly, across six separate PCTs. Table 3.6 below provides a list of the mapped PCTs and total areas mapped of each. Detailed descriptions of mapped PCTs are provided below. A map showing the distribution of PCTs across this offset is included as Figure 3.5.

Table 3.6 Mapped Plant Community Types for Wollandilly

PCT Label		BC Act Status*	EPBC Act Status*	Area (ha)
101:	Poplar Box - Yellow Box - Western Grey Box grassy woodland		E[1]	52.3
101:	Derived Native Grassland			115.9
413:	Silver-leaved Ironbark - White Cypress Pine - box dry shrub grass woodland			85.3
413:	Derived Native Grassland			265.2
435:	White Box - White Cypress Pine shrub grass hills woodland	CE[2]	CE[2]	27.5
435:	Derived Native Grassland			35.2
592:	Narrow-leaved Ironbark - cypress pine - White Box shrubby open forest			86.2
592:	Derived Native Grassland			28.4
599:	Blakely's Red Gum - Yellow Box grassy tall woodland	CE[2]	CE[2]	24.8
599:	Derived Native Grassland	CE[3]	CE[3]	21.5
619:	Derived Wire Grass grassland			57.1
			Total	**799.4**

* Conservation status under the BC Act and/or EPBC Act (current as of June2021). CE = Critically Endangered; E = Endangered.

1 Approximately 50.3 ha equivalent to the Poplar Box Grassy Woodland EEC listed under the EPBC Act.

2 Equivalent to the Box-Gum Woodland CEEC listed under the BC Act and EPBC Act.

3 Approximately 17.3 ha equivalent to the Box-Gum Woodland CEEC listed under the BC Act and EPBC Act.

PCT 101

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: Brigalow Clay Plain Woodlands

EPBC Status: Poplar Box Grassy Woodland EEC (Part)

BC Status: N/A

PCT 101 is tall woodland or open woodland dominated by *Eucalyptus populnea* subsp. *bimbil* (Poplar Box) sometimes with *Eucalyptus melliodora* (Yellow Box), *Callitris glaucophylla* (White Cypress Pine), *Eucalyptus melanophloia* (Silver-leaved Ironbark). A very sparse shrub layer may be present, or it is absent. Shrub species include *Geijera parviflora* (Wilga), *Notalea microcarpa* (Mock Olive), *Maireana microphylla, Capparis mitchellii* (Wild Orange) and *Alectryon oleifolius* (Western Rosewood). The ground cover is usually dense and is dominated by a rich array of grass and forb species. Grass species include *Austrostipa verticillata*, *Dichanthium sericeum* subsp. *sericeum, Bothriochloa decipiens, Rytidosperma bipartitum, Enteropogon acicularis, Aristida personata, Aristida ramosa, Austrostipa aristiglumis, Austrostipa scabra* subsp. *scabra, Themeda australis, Eulalia aurea, Paspalidium jubiflorum, Chloris truncata* and *Chloris ventricosa*. Forb species include *Rumex brownii, Einadia nutans, Cotula australis, Maireana enchylaenoides, Erodium crinitum, Calotis lappulacea, Rostellularia adscendens* subsp. *adscendens, Sida corrugata, Oxalis exilis, Einadia hastata, Vittadinia dissecta* var. *hirta, Vittadinia muelleri, Vittadinia sulcata, Chrysocephalum apiculatum, Solanum cinereum, Abutilon oxycarpum, Dichondra* sp. A, *Wahlenbergia stricta* subsp. *stricta, Pycnosorus globosus, Goodenia fascicularis* and *Brunoniella australis*.

Within the offset group, this community occurs on alluvial flats along watercourses as both an intact woodland and DNG.

PCT 413

PCT Name: *Silver-leaved Ironbark - White Cypress Pine - box dry shrub grass woodland of the Pilliga Scrub - Warialda region, Brigalow Belt South Bioregion*

Vegetation Class: North-west Slopes Dry Sclerophyll Woodlands

EPBC Status: N/A

BC Status: N/A

PCT 413 is a tall to mid-high woodland or open forest dominated by *Eucalyptus melanophloia* (Silver-leaved Ironbark) and *Callitris glaucophylla* (White Cypress Pine) sometimes with *Eucalyptus pilligaensis, Callitris endlicheri, Eucalyptus albens, Allocasuarina luehmannii or Eucalyptus populnea* subsp. *bimbil*. The small tree *Alectryon oleifolius* subsp. *elongatus* may be present. The shrub layer is usually sparse but mid-dense in places and includes *Acacia deanei* subsp. *paucijuga, Solanum ferocissimum, Beyeria viscosa*, several subspecies of *Dodonaea viscosa, Acacia decora, Geijera parviflora, Abutilon oxycarpum, Pimelea microcephala* subsp. *microcephala* and *Cassinia laevis*. The ground cover is sparse and includes grasses such as A*ristida vagans, Cymbopogon refractus, Poa sieberiana, Enteropogon acicularis, Austrostipa verticillata, Austrostipa scabra subsp. scabra* and *Microlaena stipoides*. The mat-rushes *Lomandra multiflora* subsp. *multiflora* or *Lomandra filiformis* subsp. *filiformis* are often present. Forbs include *Einadia hastata, Calotis cuneifolia, Einadia nutans* subsp. *nutans Eremophila debilis, Chrysocephalum apiculatum, Opercularia diphylla, Bulbine semibarbata* and *Ranunculus sessiliflorus*. Climbers include *Glycine tabacina* and *Desmodium varians*.

Within the offset group, this community occurs on low hills and flats as both an intact woodland and DNG.

PCT 435

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: Box-Gum Woodland CEEC (woodland)

BC Status: Box-Gum Woodland CEEC (woodland)

PCT 435 is a mid-high woodland dominated by *Callitris glaucophylla* (White Cypress Pine) and *Eucalyptus albens* (White Box), with *Eucalyptus blakleyi* (Blakely's Red Gum) and *Brachychiton populneus* subsp. *populneus* (Kurrajong) also sometimes present in the overstory. Depending on grazing intensity, the shrub layer can be sparse to dense and includes *Cassinia quinquefaria, Acacia implexa* (Hickory Wattle), *Acacia penninervis* var. *penninervis* (Mountain Hickory), *Geijera parviflora* (Wilga), *Olearia elliptica* subsp. *elliptica* (Sticky Daisy Bush), *Dodonaea viscosa* subsp. *angustifolia* (Hop-bush), *Teucrium betchei* and *Cassinia sifton* (Sifton Bush). The ground cover is mid-dense and includes grass species such as *Aristida personata* (Purple Wire Grass)*, Cymbopogon refractus* (Barbed Wire Grass)*, Themeda australis* (Kangaroo Grass)*, Rytidosperma racemosum* var. *racemosum, Austrostipa verticillata* (Slender Bamboo Grass) and *Austrostipa scabra* subsp. *scabra* (Spear Grass). Common forb species include *Calotis lappulacea* (Yellow Burr Daisy)*, Vittadinia sulcata, Einadia nutans* subsp. *nutans* (Climbing Saltbush)*, Wahlenbergia communis* (Tufted Bluebell)*, Dianella longifolia var. longifolia* (Blue Flax-Lily)*, Swainsona galegifolia* (Smooth Darling Pea)*, Dichondra* sp. A and *Daucus glochidiatus* (Native Carrot). The scramblers *Desmodium brachypodum* or *Desmodium varians* may be common.

Within the offset group, this community occurs on low hills and flats as both an intact woodland and DNG. This community is equivalent to the Box-Gum Woodland CEEC (EPBC Act and BC Act) in some cases, however it may not be equivalent where shrub cover is too high or where condition is too low.

PCT 592

PCT Name: *Narrow-leaved Ironbark - cypress pine - White Box shrubby open forest in the Brigalow Belt South Bioregion and Nandewar Bioregion*

Vegetation Class: Western Slopes Dry Sclerophyll Forests

EPBC Status: N/A

BC Status: N/A

PCT 592 is a tall or mid-high open forest to woodland dominated by *Eucalyptus crebra* (Narrow-leaved Ironbark), *Callitris glaucophylla* (White Cypress Pine) and/or *Eucalyptus albens* (White Box). Other trees may include *Eucalyptus dealbata* (Tumbledown Red Gum) or *Eucalyptus melanophloia* (Silver-leaved Ironbark). There is usually a sparse shrubby understorey with the most common species including *Beyeria viscosa* (Wallaby Bush)*, Notelaea microcarpa* var. *microcarpa* (Native Olive) and *Dodonaea viscosa* subsp. *angustifolia* (Sticky Hop Bush). Other shrubs present include *Breynia cernua, Solanum parvifolium, Melichrus urceolatus, Spartothamnella juncea* and *Psydrax oleifolia*. The ground layer includes *Desmodium brachypodum* and grass species such as *Austrostipa scabra* subsp*. scabra, Rytidosperma racemosum* var. *obtusatum, Microlaena stipoides* var. *stipoides, Aristida ramosa* and *Cymbopogon refractus.* Forb species include *Dichondra* sp. A, *Calotis anthemoides, Vernonia cinerea var. cinerea, Brunoniella australis, Arthropodium sp. B, Desmodium varians* and *Glycine clandestina*.

Within the offset group, this community occurs on slopes and ridgetops as both an intact woodland and DNG.

PCT 599

PCT Name: *Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion*

Vegetation Class: Western Slopes Grassy Woodlands

EPBC Status: Box-Gum Woodland CEEC (woodland, part DNG)

BC Status: Box-Gum Woodland CEEC (woodland, part DNG)

PCT 599 is a tall woodland dominated by *Eucalyptus blakelyi* (Blakely's Red Gum) and *Eucalyptus melliodora* (Yellow Box). The shrub layer is absent to sparse and includes species such as *Acacia implexa, Olearia elliptica subsp. elliptica, Geijera parviflora, Myoporum montanum*, or *Pimelea neo-anglica*. The ground cover is usually mid-dense to dense dominated by grasses and forbs. Grass species include *Aristida personata, Austrostipa verticillata, Themeda australis, Bothriochloa macra* or *Dichanthium sericeum*. Forb species *include Dichondra repens, Geranium solanderi, Hydrocotyle laxiflora, Rumex brownii, Scutellaria humilis, Hypericum gramineum, Senecio quadridentatus, Haloragis heterophylla, Dianella longifolia var. longifolia* and *Chrysocephalum apiculatum.*

Within the offset group, this community occurs mainly on alluvial flats as both an intact woodland and DNG.

PCT 619

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

Vegetation Class: Western Slopes Grasslands

EPBC Status: N/A

BC Status: N/A

PCT 619 is a mid-high derived tussock grassland dominated by species of *Aristida* (wire grass) including *Aristida personata, Aristida vagans* and *Aristida ramosa*. Other grass species include *Rytidosperma bipartitum, Austrostipa aristiglumis, Austrostipa verticellata, Cymbopogon refractus, Rytidosperma racemosum var. obtusatum, Rytidosperma laeve, Rytidosperma erianthum, Enteropogon acicularis, Leptochloa digitata, Cynodon dactylon, Bothriochloa macra, Themeda australis* and *Eulalia aurea*. The rush *Juncus subglaucus* may be present. Typical forbs include *Boerhavia dominii, Rumex brownii, Tribulus micrococcus, Erodium crinitum, Alternanthera denticulata, Geranium solanderi var. solanderi, Dichondra repens, Sida spinosa, Oxalis perennans, Solanum esuriale, Wahlenbergia communis, Portulaca oleracea* and *Einadia polygonoides*.

Within the offset group, this community occurs mainly on alluvial flats and slopes and is derived from a range of communities, including box gum woodlands.

3.6.2 Threatened Ecological Communities

On Wollandilly two Commonwealth and one State listed TECs were mapped. Approximately 69.6 ha of the Box-Gum Woodland CEEC listed under the EPBC Act and BC Act was mapped across relevant parts of PCT 435*, White Box - White Cypress Pine shrub grass hills woodland* and PCT 599*, Blakely's Red Gum - Yellow Box grassy tall woodland.* In addition, approximately 50.3 ha of the Poplar Box Grassy Woodland EEC listed under the EPBC Act was mapped across relevant parts of PCT 101, *Poplar Box - Yellow Box - Western Grey Box grassy woodland* (Figure 3.5).

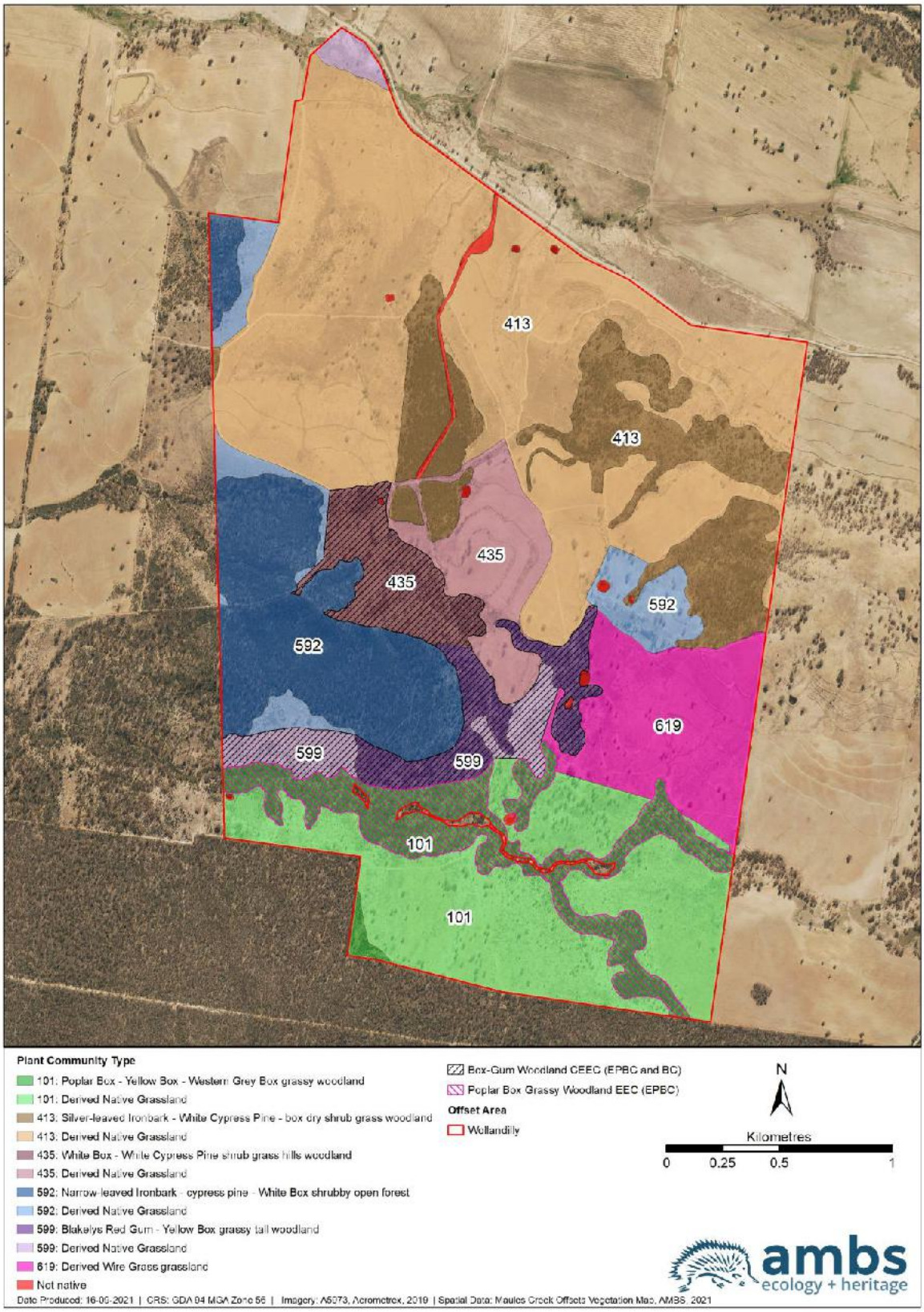

Figure 3.5 Plant Community Type Map for Wollandilly

3.7 Mt Lindesay

3.7.1 Plant Community Types and Descriptions

Approximately 2,334.3 ha of native vegetation was mapped on Mt Lindesay, across nine separate PCTs. Table 3.7 below provides a list of the mapped PCTs and total areas mapped of each. Detailed descriptions of mapped PCTs are provided below. A map showing the distribution of PCTs across this offset is included as Figure 3.6.

Table 3.7 Mapped Plant Community Types for Mt Lindesay

PCT Label		BC Act Status*	EPBC Act Status*	Area (ha)
492:	Silvertop Stringybark - Yellow Box - Apple Box - Rough-barked Apple shrub grass open forest			505.6
492:	Derived Native Grassland			42.9
508:	Blakely's Red Gum – Stringybark – Rough-barked Apple open forest	CE[1]	CE[1]	15.5
510:	Blakely's Red Gum - Yellow Box grassy woodland	CE[1]	CE[1]	609.6
510:	Derived Native Grassland	CE[2]	CE[2]	82.7
569:	Derived Snow Grass +/- Kangaroo Grass +/- Wild Sorghum tussock grassland	CE[3]	CE[3]	123.3
571:	Ribbon Gum - Rough-barked Apple - Yellow Box grassy woodland	CE[1]	CE[1]	35.8
571:	Derived Native Grassland	CE[1]	CE[1]	45.7
572:	Silvertop Stringybark - Bendemeer White Gum - Ribbon Gum open forest			435.4
572:	Derived Native Grassland			0.6
574:	Tea-tree riparian shrubland / heathland wetland			1.9
1165:	Silvertop Stringybark - Orange Gum shrubby open forest			385.3
1165:	Derived Native Grassland			0.5
1306:	White Box - Red Stringybark shrubby woodlands			49.5
			Total	**2,334.3**

* Conservation status under the BC Act and/or EPBC Act (current as of June 2021). CE = Critically Endangered.

1 Equivalent to the Box-Gum Woodland CEEC listed under the BC Act and EPBC Act.

2 Approximately 81 ha equivalent to the Box-Gum Woodland CEEC listed under the BC Act and EPBC Act.

3 Approximately 92.5 ha equivalent to the Box-Gum Woodland CEEC listed under the BC Act and EPBC Act.

PCT 492

PCT Name: *Silvertop Stringybark - Yellow Box - Apple Box - Rough-barked Apple shrub grass open forest mainly on southern slopes of the Liverpool Range, Brigalow Belt South Bioregion*

Vegetation Class: New England Grassy Woodlands

EPBC Status: N/A

BC Status: N/A

PCT 492 is a tall or mid-high open forest dominated by *Eucalyptus laevopinea* (Silvertop Stringybark), *Eucalyptus melliodora* (Yellow Box) and *Angophora floribunda* (Rough-barked Apple). The shrub layer varies from mid-dense with species including *Olearia elliptica* subsp. *elliptica* (Sticky Daisy Bush)*, Bursaria spinosa* subsp. *spinosa* (Blackthorn)*, Melicytus dentatus* (Tree Violet)*, quinquefaria, Pittosporum undulatum* (Sweet Pittosporum). Vines include *Eustrephus latifolius* (Wombat Berry), *Pandorea pandorana* (Wonga Vine) and *Clematis glycinoides* (Headache Vine). The scramblers *Desmodium varians* and *Glycine clandestina* may also be common. The ground layer is sparse and usually grassy, with common grass species including *Rytidosperma racemosum* var. *racemosum, Elymus scaber* var. *scaber, Bothriochloa macra, Rytidosperma laeve, Microlaena stipoides* var. *stipoides, Echinopogon ovatus* and *Poa labillardierei* var. *labillardierei*. Sedges include *Carex breviculmis* and *Carex incomitata*. Forb species include *Dichondra repens, Hydrocotyle laxiflora, Sigesbeckia orientalis* subsp. *orientalis, Geranium solanderi* var. *solanderi, Acaena novae-zelandiae, Swainsona galegifolia, Arthropodium milleflorum, Asperula conferta, Hypericum gramineum, Galium gaudichaudii,* and *Plantago debilis*.

Within the offset group, this community occurs on slopes in hilly terrain as both an intact woodland and DNG.

PCT 508

PCT Name: *Blakely's Red Gum - Stringybark - Rough-barked Apple open forest of the Nandewar Bioregion and western New England Tableland Bioregion*

Vegetation Class: Northern Tableland Dry Sclerophyll Forests

EPBC Status: Box-Gum Woodland CEEC

BC Status: Box-Gum Woodland CEEC

PCT 508 is a tall woodland to open forest with an overstorey dominated by *Eucalyptus blakelyi* (Blakely's Red Gum), *Angophora floribunda* (Rough-barked Apple) and a stringybark species, most commonly *Eucalyptus macrorhyncha*. The shrub layer is usually absent, but when present it is sparse and may contain *Acacia neriifolia, Leptospermum brevipes, Cassinia quinquefaria, Leucopogon muticus, Hibbertia obtusifolia, Melichrus urceolatus, Pultenaea* sp. G, *Brachyloma daphnoides* subsp. *glabrum, Lissanthe strigosa, Olearia elliptica, Olearia viscidula, Hibbertia riparia, Dodonaea viscosa* var. *angustifolia, Acacia brownii* or *Grevillea triternata*. The ground layer comprises a mix of grasses and forbs such as *Cheilanthes sieberi* subsp. *sieberi, Aristida ramosa, Cymbopogon refractus, Aristida vagans, Geranium solanderi* var. *solanderi, Dichelachne micrantha, Lomandra multiflora, Eragrostis leptostachya, Echinopogon caespitosus* var. *caespitosus* and *Panicum effusum* as the most frequent species along with occasional *Wahlenbergia planifolia* subsp. *pilosa, Oxalis chnoodes, Joycea pallida, Acaena novae-zelandiae, Viola betonicifolia, Veronica calycina, Goodenia rotundifolia, Stylidium laricifolium, Laxmannia gracilis, Poranthera microphylla,* and *Adiantum hispidulum.*

Within the offset group, this community occurs on slopes in hilly terrain.

PCT 510

PCT Name: *Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion*

Vegetation Class: New England Grassy Woodlands

EPBC Status: Box-Gum Woodland CEEC (woodland, part DNG)

BC Status: Box-Gum Woodland CEEC (woodland, part DNG)

PCT 510 is a tall open forest or woodland that is dominated by *Angophora floribunda* (Rough-barked Apple), *Eucalyptus melliodora* (Yellow Box) and/or *Eucalyptus blakelyi* (Red Gum). The shrub layer is either sparse or absent, with typical species including *Acacia implexa* (Hickory Wattle), *Acacia fimbriata* (Fringed Wattle), *Cassinia quinquefaria* or *Olearia elliptica* subsp. *elliptica* (Sticky Daisy Bush). The ground layer is well developed with dominant species including *Themeda australis* (Kangaroo Grass), *Poa sieberiana* (Snow Grass), *Cymbopogon refractus* (Barbed Wire Grass) and *Lespedeza juncea* subsp. *sericea*. Less frequent groundcover species include *Aristida ramosa, Sorghum leiocladum, Dianella revoluta* var. *revoluta, Microlaena stipoides* var. *stipoides, Desmodium brachypodum, Viola betonicifolia, Chrysocephalum apiculatum, Glycine tabacina, Lomandra longifolia, Bothriochloa macra* and *Carex breviculmis*.

Within the offset group, this community occurs on flats and lower slopes as both an intact woodland and DNG.

PCT 569

PCT Name: *Derived Snow Grass +/- Kangaroo Grass +/- Wild Sorghum tussock grassland of the NSW Northern Tablelands*

Vegetation Class: Temperate Montane Grasslands

EPBC Status: Box-Gum Woodland CEEC (Part)

BC Status: Box-Gum Woodland CEEC (Part)

PCT 569 is a mid-high to tall tussock grassland dominated by *Poa sieberiana* or *labillardierei* var. *labillardierei* (Snow Grass), often with *Themeda australis* (Kangaroo Grass), *Sorghum leiocladum* (Wild Sorghum), *Echinopogon caespitosus* var. *caespitosus, Echinopogon ovatus*, *Imperata cylindrica* var. *major* (Blady Grass), *Panicum effusum* or *Bothriochloa macra* (Redleg Grass) and *Microlaena stipoides*. The sub-shrubs *Lespedeza juncea* subsp. *sericea* and *Pimelea curviflora* var. *divergens* may be present. Scattered tall shrubs include *Bursaria spinosa* subsp*. spinosa, Acacia filicifolia, Melicytus dentatus, Leucopogon lanceolatus* var. *lanceolatus*. Forb species include *Dichondra repens, Geranium solanderi* var. *solanderi, Asperula conferta, Dianella revoluta* var. *revoluta, Acaena ovina, Scleranthus biflorus, Swainsona galegifolia, Senecio lautus* var. *dissectifolius, Viola betonicifolia* and *Chrysocephalum apiculatum*.

Within the offset group, this community occurs mainly on flats and lower slopes at higher elevations and is derived from a range of box and stringybark dominated communities.

PCT 571

PCT Name: *Ribbon Gum - Rough-barked Apple - Yellow Box grassy woodland of the New England Tableland Bioregion and NSW North Coast Bioregion*

Vegetation Class: New England Dry Sclerophyll Forests

EPBC Status: Box-Gum Woodland CEEC

BC Status: Box-Gum Woodland CEEC

PCT 571 is a tall open forest with a canopy dominated by *Eucalyptus viminalis* (Ribbon Gum), *Angophora floribunda* (Rough-barked Apple) and *Eucalyptus melliodora* (Yellow Box), often in association with *Eucalyptus blakelyi* (Blakely's Red Gum). A sparse shrub layer may be present, with common shrubs including *Lissanthe strigosa* (Peach Heath), *Cassinia quinquefaria, Bursaria spinosa* subsp. *spinosa* (Blackthorn), *Olearia elliptica* (Sticky Daisy Bush). The ground layer is usually well developed and dominated by grasses, with common species including *Poa sieberiana* subsp. *sieberiana* (Snow Grass), *Themeda australis* (Kangaroo Grass), *Bothriochloa macra* (Red Grass) and *Sporobolus creber*. Common forb species include *Geranium solanderi* var. *solanderi* (Native Geranium), *Lespedeza juncea* subsp. *sericea, Lotus australis* (Australian Trefoil), *Mentha satureioides* (Creeping Mint).

Within the offset group, this community occurs on lower slopes and alluvial flats along watercourses as both an intact woodland and a derived native grassland.

PCT 572

PCT Name: *Silvertop Stringybark - Bendemeer White Gum - Ribbon Gum open forest in the Kaputar area of the Nandewar Bioregion*

Vegetation Class: New England Dry Sclerophyll Forests

EPBC Status: N/A

BC Status: N/A

PCT 572 is a tall to very tall open forest community dominated by *Eucalyptus laevopinea* (Silvertop Stringybark), *Eucalyptus elliptica* (Bendemeer White Gum) and *Eucalyptus viminalis* (Ribbon Gum). Low shrubs are very sparse, with *Olearia viscidula* (Wallaby Weed), *Melichrus urceolatus* (Urn Heath) and *Lissanthe strigosa* subsp. *subulata* (Peach Heath) occasionally forming a low shrub layer in drier sites. Other shrub species recorded in moister sites include *Polyscias sambucifolia, Bursaria spinosa, Acacia maidenii, Hibbertia obtusifolia, Coprosma quadrifida, Syzygium smithii* and *Acacia pruinosa*. There is a well developed ground layer of forbs, grasses and ferns with *Poa sieberiana* (Snow Grass), *Rytidosperma racemosum* var. *racemosum, Lomandra longifolia (*Spiny-headed Mat-rush), *Geranium solanderi* var. *solanderi, Themeda australis, Swainsona galegifolia, Desmodium varians, Ranunculus lappaceus, Eustrephus latifolius, Rubus parvifolius, Doodia aspera, Adiantum aethiopicum* and *Echinopogon caespitosus* var. *caespitosus* most frequent.

Within the offset group, this community occurs on slopes in hilly terrain, often along watercourses, as both an intact woodland and DNG.

PCT 574

PCT Name: *Tea-tree riparian shrubland / heathland wetland on drainage areas of Nandewar Bioregion and New England Tableland Bioregion*

Vegetation Class: Northern Montane Heaths

EPBC Status: N/A

BC Status: N/A

PCT 574 is a mid-high to very tall shrubland dominated by a variety of shrubs including *Leptospermum polygalifolium* subsp. *transmontanum, Leptospermum novae-angliae, Callistemon sieberi* and *Callistemon viminalis.* The most prominent ground layer species include *Haloragis heterophylla, Schoenus apogon, Microlaena stipoides* var. *stipoides, Dichondra repens*, *Poa sieberiana* (Snow Grass) and *Lomandra longifolia* (Spiny-headed Mat-rush).

Within the offset group, this community occurs along drainage lines and creeks.

PCT 1165

PCT Name: *Silvertop Stringybark - Orange Gum shrubby open forest of the central parts of the Nandewar Bioregion*

Vegetation Class: North-west Slopes Dry Sclerophyll Woodlands

EPBC Status: N/A

BC Status: N/A

PCT 1165 is a shrubby open forest dominated by *Eucalyptus macrorhyncha* (Silvertop Stringybark) and *Eucalyptus prava* (Orange Gum). The mid-story consists of *Olearia elliptica* (Sticky Daisy Bush) and *Olearia viscidula* (Viscid Daisy Bush). The ground layer predominately consists of *Dichelachne micrantha* (Shorthair Plumegrass)*, Poa sieberiana* var. *sieberiana* (Snow Grass)*, Glycine clandestina* and *Desmodium brachypodum*.

Within the offset group, this community occurs on slopes and low hills as both an intact woodland and DNG.

PCT 1306

PCT Name: *White Box - Red Stringybark shrubby woodlands on basalt slopes of the Nandewar Bioregion and Brigalow Belt South Bioregion*

Vegetation Class: North-west Slopes Dry Sclerophyll Woodlands

EPBC Status: N/A

BC Status: N/A

PCT 1306 is a shrubby woodland by *Eucalyptus albens* (White Box) and *Eucalyptus macrorhyncha* (Red Stringybark), with *Brachychiton populneus* subsp. *Populneus* (Kurrajong) and *Callitris glaucophylla* (White Cypress Pine). The shrub layer consists of *Alphitonia excelsa, Cassinia quinquefaria, Dodonaea viscosa* subsp. *angustifolia*. The ground layer consists of *Adiantum aethiopicum, Aristida ramosa, Cheilanthes sieberi* subsp. *sieberi, Cyperus eragrostis*. The climber *Clematis glycinoides* var. *glycinoides* may also be present.

Within the offset group, this community occurs on slopes in hilly terrain.

3.7.2 Threatened Ecological Communities

On Mt Lindesay one TEC was mapped. Approximately 880.1 ha of the Box-Gum Woodland CEEC listed under the EPBC Act and BC Act was mapped across relevant parts of PCT 508, *Blakely's Red Gum - Stringybark - Rough-barked Apple open forest,* PCT 510*, Blakely's Red Gum - Yellow Box grassy woodland,* PCT 571, *Ribbon Gum - Rough-barked Apple - Yellow Box grassy woodland*, PCT 569*, Derived Snow Grass +/- Kangaroo Grass +/- Wild Sorghum tussock grassland* and PCT 571, *Ribbon Gum - Rough-barked Apple - Yellow Box grassy woodland* (Figure 3.6)*.*

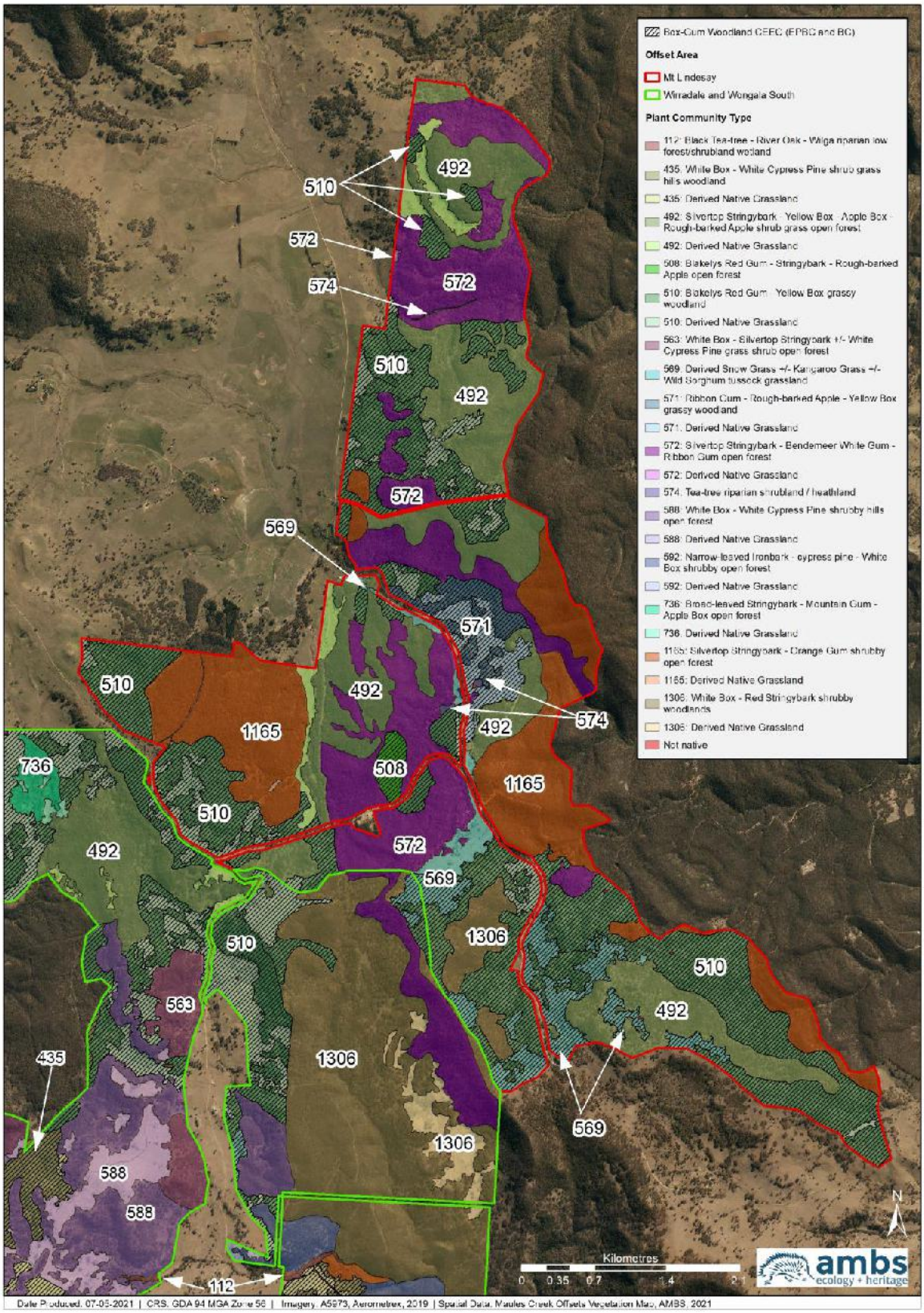

Figure 3.6 Plant Community Type Map for Mt Lindesay

3.8 Wirradale and Wongala South

3.8.1 Plant Community Types and Descriptions

Approximately 4,438.3 ha of native vegetation was mapped on Wirradale and Wongala South, across twelve separate PCTs. Table 3.8 below provides a list of the mapped PCTs and total areas mapped of each. Detailed descriptions of mapped PCTs are provided below. A map showing the distribution of PCTs across this offset is included as Figure 3.7.

Table 3.8 Mapped Plant Community Types for Wirradale and Wongala South

PCT Label		BC Act Status*	EPBC Act Status*	Area (ha)
112:	Black Tea-tree - River Oak - Wilga riparian low forest/shrubland wetland			7.5
435:	White Box - White Cypress Pine shrub grass hills woodland	CE[1]	CE[1]	348.4
435:	Derived Native Grassland	CE[2]	CE[2]	704.9
492:	Silvertop Stringybark - Yellow Box - Apple Box - Rough-barked Apple shrub grass open forest			146.8
492:	Derived Native Grassland			10.6
510:	Blakely's Red Gum - Yellow Box grassy woodland	CE[1]	CE[1]	381.4
510:	Derived Native Grassland	CE[1]	CE[1]	255.9
563:	White Box - Silvertop Stringybark +/- White Cypress Pine grass shrub open forest			381.1
563:	Derived Native Grassland			8.2
569:	Derived Snow Grass +/- Kangaroo Grass +/- Wild Sorghum tussock grassland	CE[1]	CE[1]	10.6
572:	Silvertop Stringybark - Bendemeer White Gum - Ribbon Gum open forest			80.5
572:	Derived Native Grassland			1.2
588:	White Box - White Cypress Pine shrubby hills open forest			379.7
588:	Derived Native Grassland			127.5
592:	Narrow-leaved Ironbark - cypress pine - White Box shrubby open forest			851.3
592:	Derived Native Grassland			3.2
736:	Broad-leaved Stringybark - Mountain Gum - Apple Box open forest			24.1
736:	Derived Native Grassland			4.3
1165:	Silvertop Stringybark - Orange Gum shrubby open forest			106.2
1165:	Derived Native Grassland			43.5
1306:	White Box - Red Stringybark shrubby woodlands			514.7
1306:	Derived Native Grassland			46.7
			Total	**4,438.3**

* Conservation status under the BC Act and/or EPBC Act (current as of June 2021). CE = Critically Endangered.

1 Equivalent to the Box-Gum Woodland CEEC listed under the BC Act and EPBC Act.

2 Approximately 704.4 ha equivalent to the Box-Gum Woodland CEEC listed under the BC Act and EPBC Act.

PCT 112

PCT Name: *Black Tea-tree - River Oak - Wilga riparian low forest/shrubland wetland of rich soil depressions in the Brigalow Belt South Bioregion*

Vegetation Class: Inland Riverine Forests

EPBC Status: N/A

BC Status: N/A

PCT 112 is a low open forest or very tall shrubland dominated by *Melaleuca bracteata* (Black Tea-tree). Other tree species include *Casuarina cunninghamiana* (River Oak) and *Angophora floribunda* (Rough-barked Apple). Shrubs are sparse and include *Geijera parviflora* (Wilga), *Pimelea neo-anglica, Phyllanthus subcrenulatus, Breynia cernua, Dodonaea viscosa* subsp. *angustifolia, Pimelea curviflora* var. *curviflora, Psydrax oleifolia* and *Abutilon oxycarpum*. Vines include *Pandorea pandorana* subsp. *pandorana* or *Clematis microphylla* var. *leptophylla.* The ground cover contains the forbs *Urtica incisa, Persicaria decipiens, Plantago debilis, Wahlenbergia communis, Rorippa eustylis, Geranium solanderi* var. *solanderi, Hydrocotyle laxiflora, Wahlenbergia communis* and *Daucus glochidiatus.* Grasses include *Austrostipa verticillata, Lachnagrostis filiformis, Sporobolus creber, Ancistrachne uncinulata, Bothrichloa macra, Oplismenus aemulus, Cynodon dactylon* and *Leptochloa digitata*. Sedges include *Cyperus gracilis, Carex incomitata, Carex appressa, Cyperus gunnii, Cyperus vaginatus* and *Cyperus victoriensis*. Ground cover weeds include *Lycium ferocissimum, Medicago minima, Sida rhombifolia, Modiola caroliniana, Verbascum virgatum, Galium aparine, Stellaria media, Fumaria muralis, Vicia sativa* subsp. *sativa* and *Cirsium vulgare*.

Within the offset group, this community occurs along drainage lines and water courses.

PCT 435

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: Box-Gum Woodland CEEC (woodland, part DNG)

BC Status: Box-Gum Woodland CEEC (woodland, part DNG)

PCT 435 is a mid-high woodland dominated by *Callitris glaucophylla* (White Cypress Pine) and *Eucalyptus albens* (White Box), with *Eucalyptus blakleyi* (Blakely's Red Gum) and *Brachychiton populneus* subsp. *populneus* (Kurrajong) also sometimes present in the overstory. Depending on grazing intensity, the shrub layer can be sparse to dense and includes *Cassinia quinquefaria, Acacia implexa* (Hickory Wattle), *Acacia penninervis* var. *penninervis* (Mountain Hickory), *Geijera parviflora* (Wilga), *Olearia elliptica* subsp. *elliptica* (Sticky Daisy Bush), *Dodonaea viscosa* subsp. *angustifolia* (Hop-bush), *Teucrium betchei* and *Cassinia sifton* (Sifton Bush). The ground cover is mid-dense and includes grass species such as *Aristida personata* (Purple Wire Grass)*, Cymbopogon refractus* (Barbed Wire Grass)*, Themeda australis* (Kangaroo Grass)*, Rytidosperma racemosum* var. *racemosum, Austrostipa verticillata* (Slender Bamboo Grass) and *Austrostipa scabra* subsp. *scabra* (Spear Grass). Common forb species include *Calotis lappulacea* (Yellow Burr Daisy)*, Vittadinia sulcata, Einadia nutans* subsp. *nutans* (Climbing Saltbush)*, Wahlenbergia communis* (Tufted Bluebell)*, Dianella longifolia* var. *longifolia* (Blue Flax-Lily)*, Swainsona galegifolia* (Smooth Darling Pea)*, Dichondra* sp. A and *Daucus glochidiatus* (Native Carrot). The scramblers *Desmodium brachypodum* or *Desmodium varians* may be common.

Within the offset group, this community occurs mainly on lower slopes and flats on better soils as both an intact woodland and DNG. This community is equivalent to the Box-Gum Woodland CEEC (EPBC Act and BC Act) in some cases, however it may not be equivalent where shrub cover is too high or where condition is too low.

PCT 492

PCT Name: *Silvertop Stringybark - Yellow Box - Apple Box - Rough-barked Apple shrub grass open forest mainly on southern slopes of the Liverpool Range, Brigalow Belt South Bioregion*

Vegetation Class: New England Grassy Woodlands

EPBC Status: N/A

BC Status: N/A

PCT 492 is a tall or mid-high open forest dominated by *Eucalyptus laevopinea* (Silvertop Stringybark), *Eucalyptus melliodora* (Yellow Box) and *Angophora floribunda* (Rough-barked Apple). The shrub layer varies from mid-dense with species including *Olearia elliptica* subsp. *elliptica* (Sticky Daisy Bush)*, Bursaria spinosa* subsp. *spinosa* (Blackthorn)*, Melicytus dentatus* (Tree Violet)*, quinquefaria, Pittosporum undulatum* (Sweet Pittosporum). Vines include *Eustrephus latifolius* (Wombat Berry), *Pandorea pandorana* (Wonga Vine) and *Clematis glycinoides* (Headache Vine). The scramblers *Desmodium varians* and *Glycine clandestina* may also be common. The ground layer is sparse and usually grassy, with common grass species including *Rytidosperma racemosum* var. *racemosum, Elymus scaber* var. *scaber, Bothriochloa macra, Rytidosperma laeve, Microlaena stipoides* var. *stipoides, Echinopogon ovatus* and *Poa labillardierei* var. *labillardierei*. Sedges include *Carex breviculmis* and *Carex incomitata*. Forb species include *Dichondra repens, Hydrocotyle laxiflora, Sigesbeckia orientalis* subsp. *orientalis, Geranium solanderi* var. *solanderi, Acaena novae-zelandiae, Swainsona galegifolia, Arthropodium milleflorum, Asperula conferta, Hypericum gramineum, Galium gaudichaudii,* and *Plantago debilis*. Ferns such as *Adiantum atroviride* occur in protected sites.

Within the offset group, this community occurs on slopes in hilly terrain as both an intact woodland and DNG.

PCT 510

PCT Name: *Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion*

Vegetation Class: New England Grassy Woodlands

EPBC Status: Box-Gum Woodland CEEC

BC Status: Box-Gum Woodland CEEC

PCT 510 is a tall open forest or woodland that is dominated by *Angophora floribunda* (Rough-barked Apple), *Eucalyptus melliodora* (Yellow Box) and/or *Eucalyptus blakelyi* (Red Gum). The shrub layer is either sparse or absent, with typical species including *Acacia implexa* (Hickory Wattle), *Acacia fimbriata* (Fringed Wattle), *Cassinia quinquefaria* or *Olearia elliptica* subsp. *elliptica* (Sticky Daisy Bush). The ground layer is well developed with dominant species including *Themeda australis* (Kangaroo Grass), *Poa sieberiana* (Snow Grass), *Cymbopogon refractus* (Barbed Wire Grass) and *Lespedeza juncea* subsp. *sericea*. Less frequent groundcover species include *Aristida ramosa, Sorghum leiocladum, Dianella revoluta* var. *revoluta, Microlaena stipoides* var. *stipoides, Desmodium brachypodum, Viola betonicifolia, Chrysocephalum apiculatum, Glycine tabacina, Lomandra longifolia, Bothriochloa macra* and *Carex breviculmis*.

Within the offset group, this community occurs on flats and lower slopes as both an intact woodland and DNG.

PCT 563

PCT Name: *White Box - Silvertop Stringybark +/- White Cypress Pine grass shrub open forest of the southern Nandewar Bioregion and New England Tableland Bioregion*

Vegetation Class: North-west Slopes Dry Sclerophyll Woodlands

EPBC Status: N/A

BC Status: N/A

PCT 563 is a tall open forest with a variable overstorey dominated by *Eucalyptus albens* (White Box), *Eucalyptus laevopinea* (Silver-top Stringybark), *Angophora floribunda* (Rough-barked Apple), *Callitris glaucophylla* (White Cypress Pine), *Eucalyptus blakelyi* (Blakely's Red Gum) and/or *Eucalyptus melliodora* (Yellow Box). There is a well-developed shrub layer with *Olearia elliptica, Notelaea microcarpa* var. *microcarpa* and *Cassinia quinquefaria* the most frequent species. The ground layer is usually sparse to mid-dense with common species including *Poa sieberiana* (Snow Grass), *Desmodium brachypodum, Aristida ramosa* and *Dichondra repens*. Other frequent groundcover species include *Swainsona galegifolia, Rytidosperma racemosa* var. *racemosa, Vittadinia cuneata, Themeda australis, Cheilanthes sieberi* subsp. *sieberi* and *Cymbopogon refractus*.

Within the offset group, this community occurs on slopes in hilly terrain as both an intact woodland and DNG.

PCT 569

PCT Name: *Derived Snow Grass +/- Kangaroo Grass +/- Wild Sorghum tussock grassland of the NSW Northern Tablelands*

Vegetation Class: Temperate Montane Grasslands

EPBC Status: Box-Gum Woodland CEEC

BC Status: Box-Gum Woodland CEEC

PCT 569 to mid-high to tall tussock grassland dominated by *Poa sieberiana, Poa labillardierei* var. *labillardierei* (Snow Grass) often with *Themeda australis* (Kangaroo Grass), *Sorghum leiocladum* (Wild Sorghum), *Echinopogon caespitosus* var. *caespitosus, Echinopogon ovatus, Imperata cylindrica* var. *major* (Blady Grass), *Panicum effusum* or *Bothriochloa macra* (Redleg Grass) and *Microlaena stipoides.* The sub-shrubs *Lespedeza juncea* subsp. *sericea* and *Pimelea curviflora* var. *divergens* may be present. Scattered tall shrubs include *Bursaria spinosa* subsp. *spinosa, Acacia filicifolia, Melicytus dentatus, Leucopogon lanceolatus* var. *lanceolatus* and the sub-shrub *Desmodium brachypodum.* Forb species include *Dichondra repens, Geranium solanderi* var. *solanderi, Asperula conferta, Dianella revoluta* var. *revoluta, Acaena ovina, Scleranthus biflorus, Swainsona galegifolia, Senecio lautus* var. *dissectifolius, Viola betonicifolia* and *Chrysocephalum apiculatum.* The scrambler *Glycine tabacina* may be present.

Within the offset group, this community occurs mainly on flats and lower slopes at higher elevations and is derived from a range of box and stringybark dominated communities.

PCT 572

PCT Name: *Silvertop Stringybark - Bendemeer White Gum - Ribbon Gum open forest in the Kaputar area of the Nandewar Bioregion*

Vegetation Class: New England Dry Sclerophyll Forests

EPBC Status: N/A

BC Status: N/A

PCT 572 is a tall to very tall open forest community dominated by *Eucalyptus laevopinea* (Silvertop Stringybark), *Eucalyptus elliptica* (Bendemeer White Gum) and *Eucalyptus viminalis* (Ribbon Gum). Low shrubs are very sparse, with *Olearia viscidula* (Wallaby Weed), *Melichrus urceolatus* (Urn Heath) and *Lissanthe strigosa* subsp. *subulata* (Peach Heath) occasionally forming a low shrub layer in drier sites. Other shrub species recorded in moister sites include *Polyscias sambucifolia, Bursaria spinosa, Acacia maidenii, Hibbertia obtusifolia, Coprosma quadrifida, Syzygium smithii* and *Acacia pruinosa*. There is a well developed ground layer of forbs, grasses and ferns with *Poa sieberiana* (Snow Grass), *Rytidosperma racemosum* var. *racemosum, Lomandra longifolia (*Spiny-headed Mat-rush), *Geranium solanderi* var. *solanderi, Themeda australis, Swainsona galegifolia, Desmodium varians, Ranunculus lappaceus, Eustrephus latifolius, Rubus parvifolius, Doodia aspera, Adiantum aethiopicum* and *Echinopogon caespitosus* var. *caespitosus* most frequent.

Within the offset group, this community occurs on slopes in hilly terrain, often along watercourses, as both an intact woodland and DNG.

PCT 588

PCT Name: *White Box - White Cypress Pine shrubby hills open forest mainly in the Nandewar Bioregion*

Vegetation Class: North-west Slopes Dry Sclerophyll Woodlands

EPBC Status: N/A

BC Status: N/A

PCT 588 is an open forest to woodland dominated by *Eucalyptus albens* (White Box) and *Callitris glaucophylla* (White Cypress Pine) with a shrubby understorey. Other tree species include *Eucalyptus melliodora* (Yellow Box), *Angophora floribunda* (Rough-barked Apple), *Eucalyptus dealbata* (Tumbledown Red Gum) or *Eucalyptus melanophloia* (Silver-leaved Ironbark) may also occur. Contains a mid-dense to sparse shrub layer including *Notelaea microcarpa* var. *microcarpa* (Native Olive), *Geijera parviflora* (Wilga), *Beyeria viscosa* (Sticky Wallaby Bush), *Olearia elliptica* (Sticky Daisy Bush), *Dodonaea viscosa* subsp. *angustifolia* (Sticky Hop Bush), *Acacia decora* (Western Silver Wattle), *Bursaria spinosa* var. *spinosa* (Blackthorn), *Psydrax odorata* (Lamboto), *Cassinia laevis* and *Olearia ramosissima*. There is usually a mid-dense ground cover of grass species such as *Aristida ramosa* (Purple Wiregrass)*, Aristida vagans* (Threeawn Speargrass)*, Cymbopogon refractus* (Barbedwire Grass)*, Austrostipa scabra* (Speargrass)*, Elymus scaber* and *Dichelachne micrantha* (Shorthair Plumegrass). The sub-shrub *Desmodium brachypodum* and climber *Glycine tabacina* are often present. Other ground layer species include *Rostellularia adscendens, Boerhavia repleta, Swainsona galegifolia, Swainsona queenslandica, Vittadinia muelleri, Galium propinquum, Dichondra* sp. A, *Desmodium brachypodum* and *Glycine tabacina*.

Within the offset group, this community occurs on slopes and low hills as both an intact woodland and DNG.

PCT 592

PCT Name: *Narrow-leaved Ironbark - cypress pine - White Box shrubby open forest in the Brigalow Belt South Bioregion and Nandewar Bioregion*

Vegetation Class: Western Slopes Dry Sclerophyll Forests

EPBC Status: N/A

BC Status: N/A

PCT 592 is a tall or mid-high open forest to woodland dominated by *Eucalyptus crebra* (Narrow-leaved Ironbark), *Callitris glaucophylla* (White Cypress Pine) and/or *Eucalyptus albens* (White Box). Other trees may include *Eucalyptus dealbata* (Tumbledown Red Gum) or *Eucalyptus melanophloia* (Silver-leaved Ironbark). There is usually a sparse shrubby understorey with the most common species including *Beyeria viscosa* (Wallaby Bush)*, Notelaea microcarpa* var. *microcarpa* (Native Olive) and *Dodonaea viscosa* subsp. *angustifolia* (Sticky Hop Bush). Other shrubs present include *Breynia cernua, Solanum parvifolium, Melichrus urceolatus, Spartothamnella juncea* and *Psydrax oleifolia*. The ground layer includes *Desmodium brachypodum* and grass species such as *Austrostipa scabra* subsp*. scabra, Rytidosperma racemosum* var. *obtusatum, Microlaena stipoides* var. *stipoides, Aristida ramosa* and *Cymbopogon refractus.* Forb species include *Dichondra* sp. A, *Calotis anthemoides, Vernonia cinerea* var. *cinerea, Brunoniella australis, Arthropodium* sp. B, *Desmodium varians* and *Glycine clandestina*.

Within the offset group, this community occurs on slopes and ridgetops as both an intact woodland and DNG.

PCT 736

PCT Name: *Broad-leaved Stringybark - Mountain Gum - Apple Box open forest*

Vegetation Class: North-west Slopes Dry Sclerophyll Woodlands

EPBC Status: N/A

BC Status: N/A

PCT 736 is an open forest dominated by *Eucalyptus dalrympleana* (Mountain Gum) and *Eucalyptus bridgesiana*, often in association with *Eucalyptus caliginosa* (Broad-leaved stringybark). Shrubs are sparse or absent and may include *Brachyloma daphnoides* (Daphne Heath)*, Hibbertia obtusifolia* and *Melichrus urceolatus* (Urn Heath). The ground layer is dominated by grasses, including *Rytidosperma racemosum*, *Bothriochloa macra* and *Elymus scaber*. A range of forbs, such as *Desmodium varians* and *Dichondra repens* are also often present.

Within the offset group, this community mainly occurs on flats and lower slopes as both an intact woodland and DNG.

PCT 1165

PCT Name: *Silvertop Stringybark - Orange Gum shrubby open forest of the central parts of the Nandewar Bioregion*

Vegetation Class: North-west Slopes Dry Sclerophyll Woodlands

EPBC Status: N/A

BC Status: N/A

PCT 1165 is a shrubby open forest dominated by *Eucalyptus macrorhyncha* (Silvertop Stringybark) and *Eucalyptus prava* (Orange Gum). The mid-story consists of *Olearia elliptica* (Sticky Daisy Bush) and *Olearia viscidula* (Viscid Daisy Bush). The ground layer predominately consists of *Dichelachne micrantha* (Shorthair Plumegrass)*, Poa sieberiana* var. *sieberiana* (Snow Grass)*, Glycine clandestina* and *Desmodium brachypodum*.

Within the offset group, this community occurs on slopes in hilly terrain as both an intact woodland and DNG.

PCT 1306

PCT Name: *White Box - Red Stringybark shrubby woodlands on basalt slopes of the Nandewar Bioregion and Brigalow Belt South Bioregion*

Vegetation Class: North-west Slopes Dry Sclerophyll Woodlands

EPBC Status: N/A

BC Status: N/A

PCT 1306 is a shrubby woodland by *Eucalyptus albens* (White Box) and *Eucalyptus macrorhyncha* (Red Stringybark), with *Brachychiton populneus* subsp. *populneus* (Kurrajong) and *Callitris glaucophylla* (White Cypress Pine). The shrub layer consists of *Alphitonia excelsa, Cassinia quinquefaria* and *Dodonaea viscosa* subsp*. angustifolia*. The ground layer consists of *Adiantum aethiopicum, Aristida ramosa, Cheilanthes sieberi* subsp. *sieberi* and *Cyperus eragrostis*. The climber *Clematis glycinoides* var. *glycinoides* may also be present.

Within the offset group, this community occurs on slopes in hilly terrain as both an intact woodland and DNG.

3.8.2 Threatened Ecological Communities

On Wirradale and Wongala South, one TEC was mapped. Approximately 1,700.7 ha of the Box-Gum Woodland CEEC listed under the EPBC Act and BC Act was mapped across relevant parts of PCT 435*, White Box - White Cypress Pine shrub grass hills woodland,* PCT 510*, Blakely's Red Gum - Yellow Box grassy woodland* and PCT 569, *Derived Snow Grass +/- Kangaroo Grass +/- Wild Sorghum tussock grassland* (Figure 3.7).

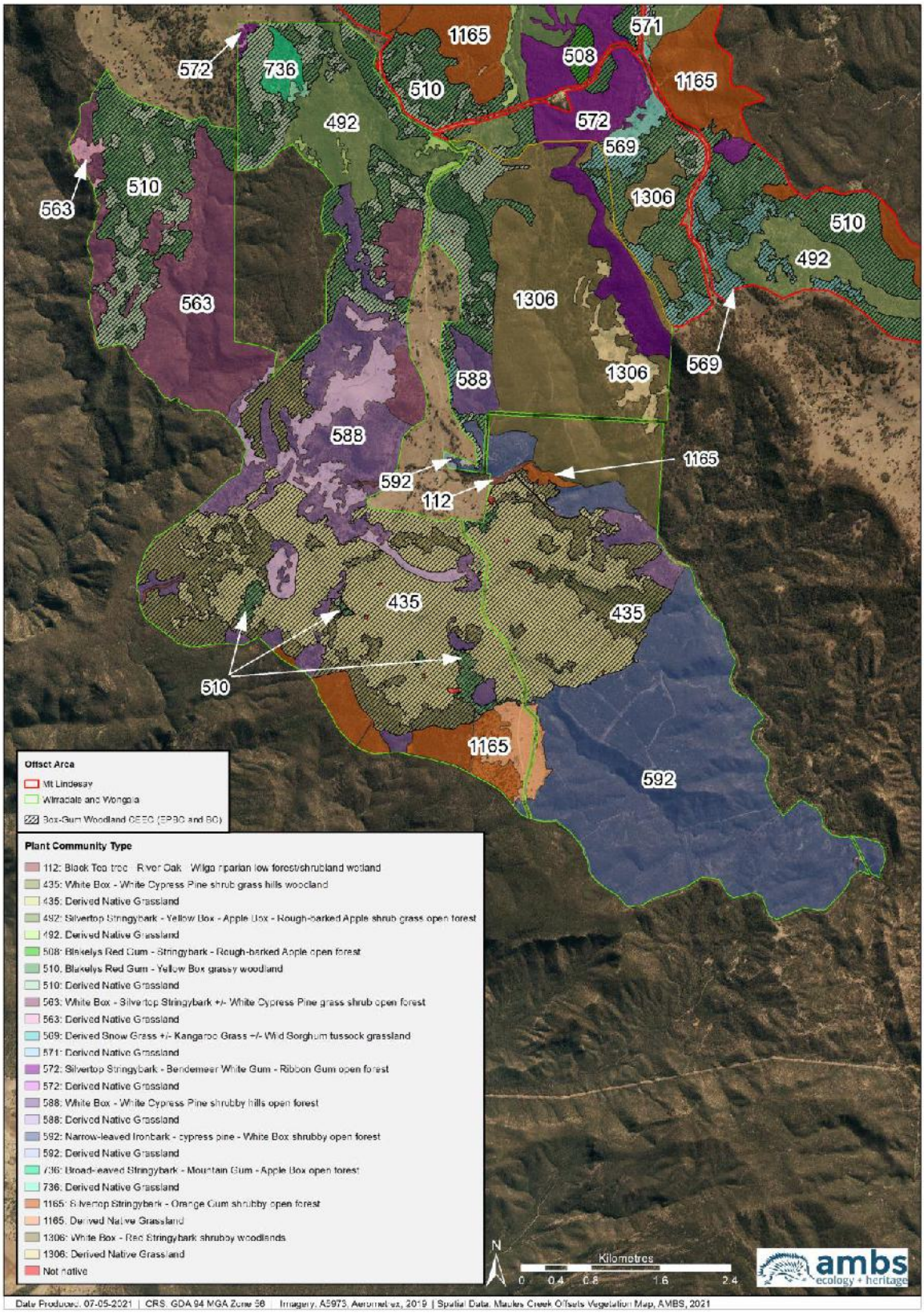

Figure 3.7 Plant Community Type Map for Wirradale and Wongala South

4 Summary of the Threatened Ecological Communities

4.1 Box-Gum Woodland CEEC (EPBC Act)

A total of approximately 3,360.2 ha of the Box-Gum Woodland CEEC listed under the EPBC Act was mapped across all offset areas. This includes 1,512.6 ha of grassland form and 1,847.6 ha of woodland form. The Box-Gum Woodland CEEC is a grassy woodland with an overstorey dominated by *Eucalyptus albens* (White Box), *Eucalyptus melliodora* (Yellow Box) and *Eucalyptus blakelyi* (Blakely's Red Gum) often in association with *Angophora floribunda* (Rough-barked Apple). The shrub layer is typically sparse or absent, with common species including *Geijera parviflora* (Wilga), *Acacia deanei* (Dean's Wattle) and *Maireana microphylla* (Small-leaved Bluebush). The ground layer is typically dominated by grasses and forbs, with common grass species including *Austrostipa scabra* (Speargrass), *Austrostipa verticillata* (Slender Bamboo Grass), *Aristida ramosa* (Purple Wire Grass), *Themeda australis* (Kangaroo Grass) and *Bothriochloa* spp. (Red Grass).

Box-Gum Woodland CEEC occurs on higher fertility soils in a range of landscape positions, from slopes to alluvial flats. The Box-Gum Woodland CEEC occurs in the study area as an intact woodland, as a DNG and as a disturbed woodland with a regenerating canopy woodland, which may be dominated by dense stands of *C. glaucophylla* in some cases. Table 4.1 below provides a summary of the area of Box-Gum Woodland CEEC listed under the EPBC Act mapped on each of the offset areas.

Table 4.1 Area of Box-Gum Woodland CEEC Listed Under the EPBC Act Mapped by Offset Group

Offset Group	Box-Gum Woodland CEEC (Grassland Form) (ha)	Box-Gum Woodland CEEC (Woodland Form) (ha)	Total (ha)
Kelso, Velyama and Louenville	3	98.8	**101.8**
Mt Lindesay	219.2	660.9	**880.1**
Onavale	30	10.3	**40.3**
Roseglass and Bimbooria	254.6	232.4	**487**
Teston South	17.6	63.1	**80.7**
Wirradale and Wongala South	970.9	729.8	**1,700.7**
Wollandilly	17.3	52.3	**69.6**
Total	**1,512.6**	**1,847.6**	**3,360.2**

4.2 Box-Gum Woodland CEEC (BC Act)

A total of approximately 3,371.2 ha of the Box-Gum Woodland CEEC listed under the BC Act was mapped across all offset areas. This includes 1,512.6 ha of grassland form and 1,858.6 ha of woodland form. The description of the Box-Gum Woodland CEEC listed under the BC Act is the same as for the CEEC listed under the EPBC Act, with the main difference being that areas with an intact canopy, but disturbed ground layer, may be included under the BC Act, but not under the EPBC Act. This means that additional areas were mapped as fitting the Box-Gum Woodland CEEC listed under the BC Act.

Table 4.2 Area of Box-Gum Woodland CEEC Listed Under the BC Act Mapped by Offset Group

Offset Group	Box-Gum Woodland CEEC (Grassland Form) (ha)	Box-Gum Woodland CEEC (Woodland Form) (ha)	Total (ha)
Kelso, Velyama and Louenville	3	109.8	**112.8**
Mt Lindesay	219.2	660.9	**880.1**
Onavale	30	10.3	**40.3**
Roseglass and Bimbooria	254.6	232.4	**487**
Teston South	17.6	63.1	**80.7**
Wirradale and Wongala South	970.9	729.8	**1,700.7**
Wollandilly	17.3	52.3	**69.6**
Total	**1,512.6**	**1,858.6**	**3,371.2**

4.3 Grey Box Woodland EEC (EPBC Act and BC Act)

The EPBC Act-listed endangered ecological community *Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-east Australia* (TSSC, 2010) and BC Act-listed endangered ecological community *Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions* (TSSC, 2011a) are woodlands dominated by *Eucalyptus microcarpa* (Western Grey Box), often in association with *Callitris glaucophylla* (White Cypress Pine) and *Brachychiton populneus* (Kurrajong). A small amount of this TEC (2.2 ha) was mapped on Teston South (see Table 4.3).

4.4 Poplar Box Grassy Woodland EEC (EPBC Act)

The EPBC Act-listed endangered ecological community *Poplar Box Woodland on Alluvial Plains* (TSSC, 2019) is a grassy woodland dominated by *Eucalyptus populnea* (Poplar Box), often in association with *Callitris glaucophylla* (White Cypress Pine) and *Casuarina cristata* (Belah). Shrubs are sparse or absent and may include *Geijera parviflora* (Wilga) and *Capparis mitchellii* (Native Orange). The ground layer is typically grassy, with common grass species including *Bothriochloa macra* (Red Grass), *Dichanthium sericeum* (Blue Grass) and *Aristida ramosa* (Purple Wire Grass). Approximately 63.6 ha of this TEC was mapped across two offset groups (see Table 4.3).

4.5 Semi-evergreen Vine Thicket EEC (EPBC Act and BC Act)

The EPBC Act-listed endangered ecological community *Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions* (TSSC, 2011b) and BC Act-listed endangered ecological community *Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions* are low, dense dry rainforests dominated by rainforest small trees and vines. Common canopy species include *Notelaea microcarpa* (Native Mock Olive), *Geijera parviflora* (Wilga), *Alstonia constricta* (Quinine Bush) and *Ehretia membranifolia* (Peach Bush). Common vines include *Pandorea pandorana* (Wonga Vine) and *Parsonsia eucalyptaphylla* (Gargaloo). A small amount of this TEC (0.3 ha) was mapped across one offset group (see Table 4.3).

Table 4.3 Area of Other TECs Mapped by Offset Group

Offset Group	Grey Box Woodland EEC Listed Under the BC Act and EPBC Act (ha)	Poplar Box Grassy Woodland EEC Listed Under the EPBC Act (ha)	Semi-evergreen Vine Thicket EEC Listed Under the BC Act and EPBC Act (ha)	Total (ha)
Kelso, Velyama and Louenville	0	13.3	0	13.3
Roseglass and Bimbooria	0	0	0.3	0.3
Teston South	2.2	0	0	2.2
Wollandilly	0	50.3	0	50.3
Total	**2.2**	**63.6**	**0.3**	**66.1**

5 Summary of the Threatened Plant Species

Two threatened plant species were recorded in the offset areas, one of which is listed as threatened under the BC Act and both under the EPBC Act. Table 5.1 lists the threatened species recorded and their status under the EPBC Act and BC Act. Approximately 1,040 individuals of *Dichanthium setosum* were recorded from five locations on the Northern Offsets.

Table 5.1 Threatened Species Recorded

Scientific Name	Common Name	EPBC Act Status*	BC Act Status*
Dichanthium setosum	Bluegrass	Vulnerable	Vulnerable
Callistemon pungens	-	Vulnerable	-

* Conservation status under the BC Act and/or EPBC Act (current as of June 2021).

An additional four species have been previously recorded in the offset areas. Recorded locations of *Tylophora linearis*, *Thesium* and *Digitaria porrecta* (ALA, 2020; AMBS, 2015-2019; AMBS, 2017) are shown on Figure 5.1 and Niche Environment and Heritage (2012) also recorded *Homoranthus prolixus* on Roseglass, but the co-ordinates were not reported.

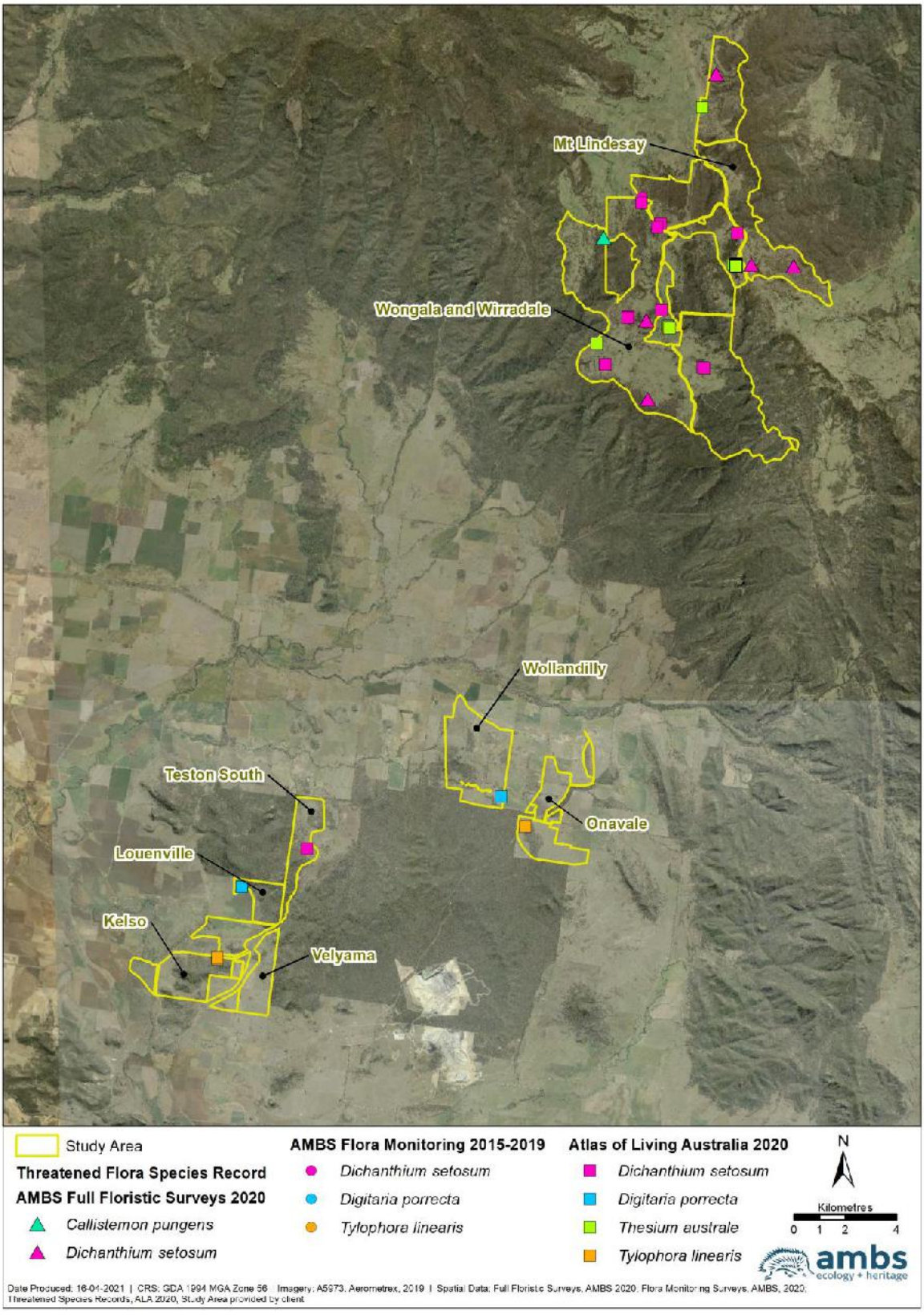

Figure 5.1 Records of Threatened Plant Species within the Offset Areas

6 Conclusions

A total of 733 plant species in 87 families were recorded during surveys to determine the PCTs in the offset areas. Of these, 519 were native plant species.

This study has confirmed the following range of PCTs within the offset areas:

55: Belah woodland on alluvial plains and low rises

78: River Red Gum riparian tall woodland / open forest wetland

81: Western Grey Box – cypress pine shrub grass shrub tall woodland

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

112: Black Tea-tree – River Oak – Wilga riparian low forest/shrubland wetland

147: Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket

244: Poplar Box grassy woodland

413: Silver-leaved Ironbark – White Cypress Pine – box dry shrub grass woodland

427: Cypress pine - Tumbledown Red Gum low open woodland to grassland

429: White Cypress Pine - Poplar Box - Silver-leaved Ironbark viney shrub woodland

435: White Box – White Cypress Pine shrub grass hills woodland

439: Mock Olive - Tumbledown Red Gum - Red Ash - Wilga siliceous rocky hill low woodland / shrubland

492: Silvertop Stringybark – Yellow Box – Apple Box – Rough-barked Apple shrub grass open forest

508: Blakely's Red Gum - Stringybark - Rough-barked Apple open forest

510: Blakely's Red Gum - Yellow Box grassy woodland

563: White Box – Silvertop Stringybark +/- White Cypress Pine grass shrub open forest

569: Derived Snow Grass +/- Kangaroo Grass +/- Wild Sorghum tussock grassland

571: Ribbon Gum - Rough-barked Apple - Yellow Box grassy woodland

572: Silvertop Stringybark – Bendemeer White Gum – Ribbon Gum open forest

574: Tea-tree riparian shrubland / heathland wetland

581: Tumbledown Red Gum – Dwyer's Red Gum – Wallaby Bush shrubby woodland

569: Derived Snow Grass +/- Kangaroo Grass +/- Wild Sorghum tussock grassland

592: Narrow-leaved Ironbark – cypress pine – White Box shrubby open forest

599: Blakely's Red Gum - Yellow Box grassy tall woodland

619: Derived Wire Grass grassland

736: Broad-leaved Stringybark – Mountain Gum – Apple Box open forest

1165: Silvertop Stringybark - Orange Gum shrubby open forest

1306: White Box - Red Stringybark shrubby woodlands

Four TECs listed under the EPBC Act were identified in the offset areas:

- Box-Gum Woodland CEEC listed under the EPBC Act (comprising 1,847.6 ha of woodland and 1,512.6 ha of DNG);
- Poplar Box Grassy Woodland EEC listed under the EPBC Act;
- Grey Box Woodland EEC listed under the EPBC Act; and
- Semi-evergreen Vine Thicket EEC listed under the EPBC Act.

Three TECs listed under the BC Act were identified in the offset areas:

- Box-Gum Woodland CEEC listed under the BC Act (comprising 1,858.6 ha of woodland and 1,512.6 ha of DNG);
- Grey Box Woodland EEC listed under the BC Act; and
- Semi-evergreen Vine Thicket EEC listed under the BC Act.

Two threatened plant species were recorded in the offset areas, one of which is listed as threatened under the BC Act and both under the EPBC Act:

- *Dichanthium setosum* (Bluegrass); and
- *Callistemon pungens*.

An additional four threatened plant species have been previously recorded in the offset areas, namely, *Tylophora linearis, Thesium australe, Digitaria porrecta* and *Homoranthus prolixus.*

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Appendix A: Plant Species List

Family	Current Scientific Name	Common Name	Exotic
Acanthaceae	*Brunoniella australis*	Blue Trumpet	No
Acanthaceae	*Rostellularia adscendens*	Pink Tongues	No
Acanthaceae	*Rostellularia adscendens var. adscendens*		No
Adiantaceae	*Pellaea calidirupium*		No
Adiantaceae	*Pellaea paradoxa*		No
Aizoaceae	*Tetragonia tetragonioides*	New Zealand Spinach	No
Alliaceae	*Nothoscordum borbonicum*	Onion Weed	Yes
Amaranthaceae	*Alternanthera denticulata*	Lesser Joyweed	No
Amaranthaceae	*Alternanthera nana*	Hairy Joyweed	No
Amaranthaceae	*Alternanthera sp. A*		No
Amaranthaceae	*Alternanthera spp.*	Joyweed	No
Amaranthaceae	*Amaranthus hybridus*	Slim Amaranth	Yes
Amaranthaceae	*Amaranthus powellii*	Powell's Amaranth	Yes
Amaranthaceae	*Amaranthus spp.*	Amaranth	-
Amaranthaceae	*Gomphrena celosioides*	Gomphrena Weed	Yes
Amaryllidaceae	*Crinum flaccidum*	Darling Lily	No
Anthericaceae	*Anthericaceae indeterminate*		-
Anthericaceae	*Arthropodium spp.*		No
Anthericaceae	*Dichopogon fimbriatus*	Nodding Chocolate Lily	No
Anthericaceae	*Dichopogon spp.*	Chocolate Lily	No
Anthericaceae	*Dichopogon strictus*	Chocolate Lily	No
Anthericaceae	*Tricoryne elatior*	Yellow Autumn-lily	No
Apiaceae	*Ammi majus*	Bishop's Weed	Yes
Apiaceae	*Cyclospermum leptophyllum*	Slender Celery	Yes
Apiaceae	*Daucus glochidiatus*	Native Carrot	No
Apiaceae	*Daucus spp.*		-
Apiaceae	*Eryngium vesiculosum*	Prostrate Blue Devil	No
Apiaceae	*Hydrocotyle laxiflora*	Stinking Pennywort	No
Apiaceae	*Hydrocotyle sibthorpioides*		No
Apiaceae	*Hydrocotyle spp.*		-
Apiaceae	*Hydrocotyle tripartita*	Pennywort	No
Apocynaceae	*Alstonia constricta*	Quinine Bush	No
Apocynaceae	*Gomphocarpus fruticosus*	Narrow-leaved Cotton Bush	Yes
Apocynaceae	*Marsdenia australis*	Doubah	No
Apocynaceae	*Marsdenia pleiadenia*		No
Apocynaceae	*Marsdenia spp.*		No
Apocynaceae	*Marsdenia viridiflora subsp. viridiflora*	Native Pear	No
Apocynaceae	*Parsonsia eucalyptophylla*	Gargaloo	No
Apocynaceae	*Rhyncharrhena linearis*	Purple Pentatrope	No
Asphodelaceae	*Bulbine bulbosa*	Bulbine Lily	No
Asphodelaceae	*Bulbine semibarbata*	Wild Onion	No

Family	Current Scientific Name	Common Name	Exotic
Asphodelaceae	*Bulbine spp.*		No
Asteraceae	*Arctotheca calendula*	Capeweed	Yes
Asteraceae	*Asteraceae indeterminate*	Daisies	-
Asteraceae	*Bidens pilosa*	Cobbler's Pegs	Yes
Asteraceae	*Bidens subalternans*	Greater Beggar's Ticks	Yes
Asteraceae	*Brachycome spp.*		No
Asteraceae	*Brachyscome chrysoglossa*		No
Asteraceae	*Brachyscome formosa*	Pillaga Daisy	No
Asteraceae	*Brachyscome kaputarensis*		No
Asteraceae	*Brachyscome microcarpa*		No
Asteraceae	*Brachyscome spp.*		No
Asteraceae	*Calotis hispidula*	Bogan Flea	No
Asteraceae	*Calotis lappulacea*	Yellow Burr-daisy	No
Asteraceae	*Carthamus lanatus*	Saffron Thistle	Yes
Asteraceae	*Cassinia quinquefaria*		No
Asteraceae	*Cassinia spp.*		No
Asteraceae	*Centaurea melitensis*	Maltese Cockspur	Yes
Asteraceae	*Centaurea solstitialis*	St Barnabys Thistle	Yes
Asteraceae	*Centaurea spp.*	Thistle	Yes
Asteraceae	*Chondrilla juncea*	Skeleton Weed	Yes
Asteraceae	*Chrysocephalum apiculatum*	Common Everlasting	No
Asteraceae	*Chrysocephalum semipapposum*	Clustered Everlasting	No
Asteraceae	*Chrysocephalum spp.*		No
Asteraceae	*Cirsium vulgare*	Spear Thistle	Yes
Asteraceae	*Conyza spp.*		Yes
Asteraceae	*Cotula australis*	Common Cotula	No
Asteraceae	*Crepis capillaris*	Smooth Hawksbeard	Yes
Asteraceae	*Cymbonotus lawsonianus*	Bear's Ear	No
Asteraceae	*Cymbonotus preissianus*	Austral Bear's Ear	No
Asteraceae	*Cymbonotus spp.*		No
Asteraceae	*Eclipta platyglossa*	Yellow Twin-heads	No
Asteraceae	*Euchiton japonicus*		No
Asteraceae	*Euchiton sphaericus*	Star Cudweed	No
Asteraceae	*Euchiton spp.*		No
Asteraceae	*Facelis retusa*		Yes
Asteraceae	*Gamochaeta coarctata*		Yes
Asteraceae	*Gamochaeta spp.*		Yes
Asteraceae	*Glossocardia bidens*	Cobbler's Tack	No
Asteraceae	*Hypochaeris albiflora*	White Flatweed	Yes
Asteraceae	*Hypochaeris glabra*	Smooth Catsear	Yes
Asteraceae	*Hypochaeris radicata*	Catsear	Yes
Asteraceae	*Hypochaeris spp.*		Yes
Asteraceae	*Isoetopsis graminifolia*	Grass Cushion	No
Asteraceae	*Lactuca saligna*	Willow-leaved Lettuce	Yes
Asteraceae	*Lactuca serriola*	Prickly Lettuce	Yes

Family	Current Scientific Name	Common Name	Exotic
Asteraceae	*Lactuca serriola f. integrifolia*		Yes
Asteraceae	*Lagenifera stipitata*	Blue Bottle-daisy	No
Asteraceae	*Lagenophora gracilis*	Slender Lagenophora	No
Asteraceae	*Lagenophora stipitata*	Common Lagenophora	No
Asteraceae	*Leiocarpa panaetioides*	Wooly Buttons	No
Asteraceae	*Leiocarpa spp.*		No
Asteraceae	*Leontodon rhagadioloides*	Cretan Weed	Yes
Asteraceae	*Leontodon spp.*		Yes
Asteraceae	*Leptorhynchos squamatus*	Scaly Buttons	No
Asteraceae	*Olearia elliptica*	Sticky Daisy-bush	No
Asteraceae	*Olearia spp.*		No
Asteraceae	*Olearia viscidula*	Wallaby Weed	No
Asteraceae	*Olearia viscosa*		No
Asteraceae	*Pycnosorus globosus*	Drumsticks	No
Asteraceae	*Schkuhria pinnata var. abrotanoides*	Dwarf Marigold	Yes
Asteraceae	*Scolymus hispanicus*	Golden Thistle	Yes
Asteraceae	*Senecio diaschides*		No
Asteraceae	*Senecio microbasis*		No
Asteraceae	*Senecio prenanthoides*		No
Asteraceae	*Senecio quadridentatus*	Cotton Fireweed	No
Asteraceae	*Senecio spp.*	Groundsel, Fireweed	-
Asteraceae	*Sigesbeckia australiensis*		No
Asteraceae	*Sigesbeckia orientalis subsp. orientalis*	Indian Weed	No
Asteraceae	*Sigesbeckia spp.*		No
Asteraceae	*Silybum marianum*	Variegated Thistle	Yes
Asteraceae	*Solenogyne bellioides*	Solengyne	No
Asteraceae	*Solenogyne dominii*		No
Asteraceae	*Solenogyne spp.*		No
Asteraceae	*Soliva sessilis*	Bindyi	Yes
Asteraceae	*Sonchus asper*	Prickly Sowthistle	Yes
Asteraceae	*Sonchus oleraceus*	Common Sowthistle	Yes
Asteraceae	*Stuartina spp.*		No
Asteraceae	*Tagetes minuta*	Stinking Roger	Yes
Asteraceae	*Taraxacum officinale*	Dandelion	Yes
Asteraceae	*Triptilodiscus pygmaeus*	Common Sunray	No
Asteraceae	*Vittadinia cervicularis*		No
Asteraceae	*Vittadinia cuneata*		No
Asteraceae	*Vittadinia cuneata var. cuneata*		No
Asteraceae	*Vittadinia dissecta*		No
Asteraceae	*Vittadinia muelleri*		No
Asteraceae	*Vittadinia pterochaeta*	Rough Fuzzweed	No
Asteraceae	*Vittadinia pustulata*	Fuzzweed	No
Asteraceae	*Vittadinia spp.*	Fuzzweed	No
Asteraceae	*Vittadinia sulcata*		No

Family	Current Scientific Name	Common Name	Exotic
Asteraceae	*Xanthium occidentale*	Noogoora Burr	Yes
Asteraceae	*Xanthium spinosum*	Bathurst Burr	Yes
Asteraceae	*Xanthium spp.*		Yes
Asteraceae	*Xerochrysum bracteatum*	Golden Everlasting	No
Asteraceae	*Xerochrysum viscosum*	Sticky Everlasting	No
Bignoniaceae	*Pandorea jasminoides*	Bower Vine	No
Bignoniaceae	*Pandorea pandorana*	Wonga Wonga Vine	No
Boraginaceae	*Buglossoides arvensis*	Sheepweed	Yes
Boraginaceae	*Cynoglossum australe*		No
Boraginaceae	*Cynoglossum spp.*		Yes
Boraginaceae	*Echium plantagineum*	Patterson's Curse	Yes
Boraginaceae	*Ehretia membranifolia*	Peach Bush	No
Boraginaceae	*Ehretia spp.*		No
Boraginaceae	*Hackelia latifolia*		No
Boraginaceae	*Plagiobothrys plurisepaleus*		No
Brassicaceae	*Brassica spp.*	Brassica	Yes
Brassicaceae	*Capsella bursa-pastoris*	Shepherd's Purse	Yes
Brassicaceae	*Cardamine spp.*		-
Brassicaceae	*Lepidium africanum*	Common Peppercress	Yes
Brassicaceae	*Lepidium bonariense*	Argentine Peppercress	Yes
Brassicaceae	*Lepidium didymum*	Lesser Swinecress	Yes
Brassicaceae	*Lepidium spp.*		-
Brassicaceae	*Rapistrum rugosum*	Turnip Weed	Yes
Brassicaceae	*Sisymbrium erysimoides*	Smooth Mustard	Yes
Brassicaceae	*Sisymbrium irio*	London Rocket	Yes
Brassicaceae	*Sisymbrium orientale*	Indian Hedge Mustard	Yes
Cactaceae	*Opuntia aurantiaca*	Tiger Pear	Yes
Cactaceae	*Opuntia spp.*		Yes
Cactaceae	*Opuntia stricta*	Common Prickly Pear	Yes
Cactaceae	*Opuntia tomentosa*	Velvet Tree Pear	Yes
Campanulaceae	*Wahlenbergia communis*	Tufted Bluebell	No
Campanulaceae	*Wahlenbergia gracilenta*	Annual Bluebell	No
Campanulaceae	*Wahlenbergia gracilis*	Sprawling Bluebell	No
Campanulaceae	*Wahlenbergia luteola*	Bluebell	No
Campanulaceae	*Wahlenbergia spp.*	Bluebell	No
Campanulaceae	*Wahlenbergia stricta*	Tall Bluebell	No
Campanulaceae	*Wahlenbergia stricta subsp. stricta*	Tall Bluebell	No
Capparaceae	*Capparis lasiantha*	Nepine	No
Capparaceae	*Capparis mitchellii*	Native Orange	No
Capparaceae	*Capparis spp.*		No
Caryophyllaceae	*Arenaria leptoclados*	Lesser Thyme-leaved Sandwort	Yes
Caryophyllaceae	*Caryophyllaceae indeterminate*	Pinks	-
Caryophyllaceae	*Cerastium glomeratum*	Mouse-ear Chickweed	Yes
Caryophyllaceae	*Cerastium spp.*		Yes

Family	Current Scientific Name	Common Name	Exotic
Caryophyllaceae	*Cerastium vulgare*	Mouse-ear Chickweed	Yes
Caryophyllaceae	*Gypsophila tubulosa*	Annual Chalkwort	No
Caryophyllaceae	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian Whitlow	Yes
Caryophyllaceae	*Petrorhagia nanteuilii*	Proliferous Pink	Yes
Caryophyllaceae	*Petrorhagia spp.*		Yes
Caryophyllaceae	*Polycarpon tetraphyllum*	Four-leaved Allseed	Yes
Caryophyllaceae	*Scleranthus diander*		No
Caryophyllaceae	*Scleranthus spp.*		No
Caryophyllaceae	*Silene gallica*	French Catchfly	Yes
Caryophyllaceae	*Silene spp.*		Yes
Caryophyllaceae	*Stellaria angustifolia*	Swamp Starwort	No
Caryophyllaceae	*Stellaria angustifolia subsp. angustifolia*		No
Caryophyllaceae	*Stellaria flaccida*		No
Caryophyllaceae	*Stellaria leptoclada*		No
Caryophyllaceae	*Stellaria media*	Common Chickweed	Yes
Caryophyllaceae	*Stellaria multiflora*		No
Caryophyllaceae	*Stellaria pallida*		Yes
Caryophyllaceae	*Stellaria pungens*	Prickly Starwort	No
Caryophyllaceae	*Stellaria spp.*	Prickly Starwort	-
Casuarinaceae	*Casuarina cristata*	Belah	No
Celastraceae	*Denhamia cunninghamii*		No
Chenopodiaceae	*Atriplex spinibractea*	Spiny-fruit Saltbush	No
Chenopodiaceae	*Chenopodiaceae indeterminate*	Salt-bushes	-
Chenopodiaceae	*Chenopodium auricomum*	Queensland Bluebush	No
Chenopodiaceae	*Chenopodium murale*	Nettle-leaf Goosefoot	Yes
Chenopodiaceae	*Dysphania carinata*	Keeled Goosefoot	No
Chenopodiaceae	*Dysphania cristata*	Crested Crumbweed	No
Chenopodiaceae	*Dysphania pumilio*	Small Crumbweed	No
Chenopodiaceae	*Dysphania spp.*		No
Chenopodiaceae	*Einadia hastata*	Berry Saltbush	No
Chenopodiaceae	*Einadia nutans*	Climbing Saltbush	No
Chenopodiaceae	*Einadia nutans subsp. linifolia*	Climbing Saltbush	No
Chenopodiaceae	*Einadia nutans subsp. nutans*	Climbing Saltbush	No
Chenopodiaceae	*Einadia polygonoides*	Knotweed Goosefoot	No
Chenopodiaceae	*Einadia spp.*		No
Chenopodiaceae	*Einadia trigonos*	Fishweed	No
Chenopodiaceae	*Einadia trigonos subsp. leiocarpa*		No
Chenopodiaceae	*Enchylaena tomentosa*	Ruby Saltbush	No
Chenopodiaceae	*Maireana enchylaenoides*	Wingless Fissure-weed	No
Chenopodiaceae	*Maireana microphylla*	Small-leaf Bluebush	No
Chenopodiaceae	*Salsola australis*		No
Chenopodiaceae	*Salsola kali var. kali*	Buckbush	No
Chenopodiaceae	*Sclerolaena bicornis*	Goathead Burr	No
Chenopodiaceae	*Sclerolaena birchii*	Galvinized Burr	No

Family	Current Scientific Name	Common Name	Exotic
Chenopodiaceae	*Sclerolaena muricata*	Black Rolypoly	No
Clusiaceae	*Hypericum gramineum*	Small St John's Wort	No
Colchicaceae	*Wurmbea biglandulosa*		No
Colchicaceae	*Wurmbea dioica subsp. dioica*	Early Nancy	No
Colchicaceae	*Wurmbea spp.*		No
Convolvulaceae	*Convolvulaceae indeterminate*	Morning glories	-
Convolvulaceae	*Convolvulus erubescens*	Pink Bindweed	No
Convolvulaceae	*Convolvulus spp.*		-
Convolvulaceae	*Dichondra repens*	Kidney Weed	No
Convolvulaceae	*Dichondra sp. Inglewood*		No
Convolvulaceae	*Dichondra spp.*		No
Convolvulaceae	*Evolvulus alsinoides*	Bindweed	No
Convolvulaceae	*Evolvulus alsinoides var. decumbens*		No
Crassulaceae	*Crassula decumbens var. decumbens*	Spreading Stonecrop	No
Crassulaceae	*Crassula helmsii*	Swamp Stonecrop	No
Crassulaceae	*Crassula sieberiana*	Australian Stonecrop	No
Crassulaceae	*Crassula spp.*	Stonecrop	No
Cucurbitaceae	*Citrullus amarus*	Camel Melon	Yes
Cucurbitaceae	*Citrullus spp.*		Yes
Cucurbitaceae	*Cucumis myriocarpus subsp. leptodermis*	Paddy Melon	Yes
Cucurbitaceae	*Cucumis spp.*		Yes
Cupressaceae	*Callitris endlicheri*	Black Cypress Pine	No
Cupressaceae	*Callitris glaucophylla*	White Cypress Pine	No
Cyperaceae	*Carex appressa*	Tall Sedge	No
Cyperaceae	*Carex breviculmis*		No
Cyperaceae	*Carex inversa*	Knob Sedge	No
Cyperaceae	*Carex spp.*		-
Cyperaceae	*Cyperaceae indeterminate*	Sedges	-
Cyperaceae	*Cyperus difformis*	Dirty Dora	No
Cyperaceae	*Cyperus fulvus*	Sticky Sedge	No
Cyperaceae	*Cyperus gracilis*	Slender Flat-sedge	No
Cyperaceae	*Cyperus rigidellus*		No
Cyperaceae	*Cyperus sanguinolentus*		No
Cyperaceae	*Cyperus spp.*		-
Cyperaceae	*Cyperus victoriensis*		No
Cyperaceae	*Eleocharis pusilla*		No
Cyperaceae	*Fimbristylis dichotoma*	Common Fringe-sedge	No
Cyperaceae	*Fimbristylis spp.*		No
Cyperaceae	*Gahnia spp.*		No
Cyperaceae	*Lepidosperma laterale*	Variable Sword-sedge	No
Cyperaceae	*Lepidosperma spp.*		No
Cyperaceae	*Schoenus spp.*		No
Cyperaceae	*Scleria mackaviensis*		No

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Cyperaceae	*Scleria spp.*		No
Dilleniaceae	*Hibbertia acicularis*		No
Dilleniaceae	*Hibbertia obtusifolia*	Hoary Guinea Flower	No
Dilleniaceae	*Hibbertia spp.*		No
Ericaceae	*Astroloma humifusum*	Native Cranberry	No
Ericaceae	*Brachyloma daphnoides*	Daphne Heath	No
Ericaceae	*Epacridaceae indeterminate*	Austral heaths	-
Ericaceae	*Lissanthe strigosa*	Peach Heath	No
Ericaceae	*Lissanthe strigosa subsp. subulata*	Peach Heath	No
Ericaceae	*Melichrus urceolatus*	Urn Heath	No
Euphorbiaceae	*Beyeria viscosa*	Sticky Wallaby Bush	No
Euphorbiaceae	*Chamaesyce dallachyana*		No
Euphorbiaceae	*Chamaesyce drummondii*	Caustic Weed	No
Euphorbiaceae	*Euphorbia planiticola*	Plains Spurge	No
Euphorbiaceae	*Euphorbia spp.*		-
Fabaceae (Caesalpinioideae)	*Senna barclayana*	Smooth Senna	No
Fabaceae (Caesalpinioideae)	*Senna clavigera*		No
Fabaceae (Caesalpinioideae)	*Senna coronilloides*		No
Fabaceae (Caesalpinioideae)	*Senna spp.*		-
Fabaceae (Faboideae)	*Cullen tenax*	Emu-foot	No
Fabaceae (Faboideae)	*Daviesia genistifolia*	Broom Bitter Pea	No
Fabaceae (Faboideae)	*Daviesia mimosoides*		No
Fabaceae (Faboideae)	*Daviesia ulicifolia*	Gorse Bitter Pea	No
Fabaceae (Faboideae)	*Desmodium gunnii*	Slender Tick-trefoil	No
Fabaceae (Faboideae)	*Desmodium varians*	Slender Tick-trefoil	No
Fabaceae (Faboideae)	*Dillwynia phylicoides*	Parrot-pea	No
Fabaceae (Faboideae)	*Fabaceae indeterminate*	Legumes	-
Fabaceae (Faboideae)	*Glycine canescens*	Silky Glycine	No
Fabaceae (Faboideae)	*Glycine clandestina*	Twining glycine	No
Fabaceae (Faboideae)	*Glycine microphylla*	Small-leaf Glycine	No
Fabaceae (Faboideae)	*Glycine spp.*		No
Fabaceae (Faboideae)	*Glycine stenophita*		No
Fabaceae (Faboideae)	*Glycine tabacina*	Variable Glycine	No
Fabaceae (Faboideae)	*Glycine tabacina 'l' form f. 'l'*		No
Fabaceae (Faboideae)	*Gompholobium huegelii*	Pale Wedge Pea	No
Fabaceae (Faboideae)	*Hardenbergia violacea*	False Sarsaparilla	No
Fabaceae (Faboideae)	*Hovea heterophylla*		No
Fabaceae (Faboideae)	*Hovea lanceolata*		No
Fabaceae (Faboideae)	*Hovea spp.*		No
Fabaceae (Faboideae)	*Indigofera adesmiifolia*	Tick Indigo	No
Fabaceae (Faboideae)	*Indigofera australis*	Australian Indigo	No
Fabaceae (Faboideae)	*Lespedeza juncea subsp. sericea*		No
Fabaceae (Faboideae)	*Lotus australis*	Australian Trefoil	No
Fabaceae (Faboideae)	*Medicago arabica*	Spotted Burr Medic	Yes
Fabaceae (Faboideae)	*Medicago laciniata*	Cut-leaved Medic	Yes

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Fabaceae (Faboideae)	*Medicago minima*	Woolly Burr Medic	Yes
Fabaceae (Faboideae)	*Medicago polymorpha*	Burr Medic	Yes
Fabaceae (Faboideae)	*Medicago spp.*		Yes
Fabaceae (Faboideae)	*Medicago truncatula*	Barrel Medic	Yes
Fabaceae (Faboideae)	*Oxytes brachypoda*	Large Tick-trefoil	No
Fabaceae (Faboideae)	*Pultenaea cuneata*		No
Fabaceae (Faboideae)	*Pultenaea retusa*		No
Fabaceae (Faboideae)	*Pultenaea setulosa*		No
Fabaceae (Faboideae)	*Pultenaea spp.*		No
Fabaceae (Faboideae)	*Rhynchosia minima*		No
Fabaceae (Faboideae)	*Swainsona galegifolia*	Smooth Darling Pea	No
Fabaceae (Faboideae)	*Swainsona spp.*		No
Fabaceae (Faboideae)	*Trifolium angustifolium*	Narrow-leaved Clover	Yes
Fabaceae (Faboideae)	*Trifolium arvense*	Haresfoot Clover	Yes
Fabaceae (Faboideae)	*Trifolium campestre*	Hop Clover	Yes
Fabaceae (Faboideae)	*Trifolium cernuum*	Drooping-flowered Clover	Yes
Fabaceae (Faboideae)	*Trifolium dubium*	Yellow Suckling Clover	Yes
Fabaceae (Faboideae)	*Trifolium glomeratum*	Clustered Clover	Yes
Fabaceae (Faboideae)	*Trifolium hirtum*	Rose Clover	Yes
Fabaceae (Faboideae)	*Trifolium repens*	White Clover	Yes
Fabaceae (Faboideae)	*Trifolium scabrum*	Rough Clover	Yes
Fabaceae (Faboideae)	*Trifolium spp.*		Yes
Fabaceae (Faboideae)	*Trifolium striatum*	Knotted Clover	Yes
Fabaceae (Faboideae)	*Trifolium subterraneum*	Subterranean Clover	Yes
Fabaceae (Faboideae)	*Vicia sativa*	Common vetch	Yes
Fabaceae (Faboideae)	*Vicia spp.*	Vetch	Yes
Fabaceae (Faboideae)	*Zornia dyctiocarpa var. dyctiocarpa*	Zornia	No
Fabaceae (Mimosoideae)	*Acacia cheelii*	Motherumbah	No
Fabaceae (Mimosoideae)	*Acacia deanei*	Green Wattle	No
Fabaceae (Mimosoideae)	*Acacia deanei subsp. deanei*	Deane's Wattle	No
Fabaceae (Mimosoideae)	*Acacia decora*	Western Silver Wattle	No
Fabaceae (Mimosoideae)	*Acacia implexa*	Hickory Wattle	No
Fabaceae (Mimosoideae)	*Acacia rubida*	Red-stemmed Wattle	No
Fabaceae (Mimosoideae)	*Acacia spp.*	Wattle	No
Fabaceae (Mimosoideae)	*Acacia stenophylla*	River Cooba	No
Fabaceae (Mimosoideae)	*Archidendron grandiflorum*	Pink Lace Flower	No
Gentianaceae	*Centaurium erythraea*	Common Centaury	Yes
Gentianaceae	*Centaurium tenuiflorum*	Branched Centaury, Slender centaury	Yes
Geraniaceae	*Erodium cicutarium*	Common Crowfoot	Yes
Geraniaceae	*Erodium crinitum*	Blue Crowfoot	No
Geraniaceae	*Erodium spp.*	Crowfoot	-
Geraniaceae	*Geranium retrorsum*	Cranesbill Geranium	No
Geraniaceae	*Geranium solanderi*	Native Geranium	No
Geraniaceae	*Geranium solanderi var. solanderi*		No

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Geraniaceae	*Geranium spp.*		-
Geraniaceae	*Pelargonium australe*	Native Storksbill	No
Geraniaceae	*Pelargonium spp.*		-
Goodeniaceae	*Brunonia australis*	Blue Pincushion	No
Goodeniaceae	*Goodenia cycloptera*	Cut-leaf Goodenia	No
Goodeniaceae	*Goodenia fascicularis*	Mallee Goodenia	No
Goodeniaceae	*Goodenia glabra*	Smooth Goodenia	No
Goodeniaceae	*Goodenia hederacea*	Ivy Goodenia	No
Goodeniaceae	*Goodenia hederacea subsp. hederacea*		No
Goodeniaceae	*Goodenia pinnatifida*	Scrambles Eggs	No
Goodeniaceae	*Goodenia rotundifolia*		No
Goodeniaceae	*Goodenia spp.*		No
Haloragaceae	*Gonocarpus spp.*	Raspwort	No
Haloragaceae	*Gonocarpus tetragynus*	Poverty Raspwort	No
Haloragaceae	*Haloragaceae indeterminate*	Raspworts and milfoils	-
Haloragaceae	*Haloragis aspera*	Rough Raspwort	No
Haloragaceae	*Haloragis heterophylla*	Variable Raspwort	No
Iridaceae	*Patersonia sericea*	Silky Purple-Flag	No
Juncaceae	*Juncus bufonius*	Toad Rush	Yes
Juncaceae	*Juncus filicaulis*		No
Juncaceae	*Juncus homalocaulis*		No
Juncaceae	*Juncus spp.*		No
Juncaceae	*Juncus subglaucus*	Rush	No
Juncaceae	*Juncus subsecundus*	Finger Rush	No
Juncaceae	*Luzula spp.*		No
Lamiaceae	*Ajuga australis*	Austral Bugle	No
Lamiaceae	*Lamiaceae indeterminate*	Mints and balms	-
Lamiaceae	*Lamium amplexicaule*	Dead Nettle	Yes
Lamiaceae	*Marrubium vulgare*	White Horehound	Yes
Lamiaceae	*Mentha diemenica*	Slender Mint	No
Lamiaceae	*Mentha satureioides*	Native Pennyroyal	No
Lamiaceae	*Plectranthus parviflorus*		No
Lamiaceae	*Salvia plebeia*	Austral Sage	No
Lamiaceae	*Salvia reflexa*	Mintweed	Yes
Lamiaceae	*Salvia verbenaca*	Vervain	Yes
Lamiaceae	*Scutellaria humilis*	Dwarf Skullcap	No
Lamiaceae	*Scutellaria spp.*		No
Lamiaceae	*Stachys arvensis*	Stagger Weed	Yes
Lamiaceae	*Teucrium betchei*		No
Lamiaceae	*Teucrium junceum*		No
Lamiaceae	*Teucrium spp.*		No
Lemnaceae	*Lemna spp.*		No
Linaceae	*Linum marginale*	Native Flax	No
Loganiaceae	*Mitrasacme spp.*		No

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Lomandraceae	*Lomandra confertifolia subsp. pallida*	Matrush	No
Lomandraceae	*Lomandra filiformis*	Wattle Matt-rush	No
Lomandraceae	*Lomandra filiformis subsp. coriacea*	Wattle Matt-rush	No
Lomandraceae	*Lomandra filiformis subsp. filiformis*		No
Lomandraceae	*Lomandra filiformis subsp. flavior*	Wattle Matt-rush	No
Lomandraceae	*Lomandra longifolia*	Spiny-headed Mat-rush	No
Lomandraceae	*Lomandra multiflora subsp. multiflora*	Many-flowered Mat-rush	No
Lomandraceae	*Lomandra spp.*	Mat-rush	No
Loranthaceae	*Amyema pendula*		No
Loranthaceae	*Amyema quandang*	Grey Mistletoe	No
Loranthaceae	*Amyema spp.*	Mistletoe	No
Luzuriagaceae	*Eustrephus latifolius*	Wombat Berry	No
Luzuriagaceae	*Geitonoplesium cymosum*	Scrambling Lily	No
Malaceae	*Cotoneaster spp.*		Yes
Malaceae	*Pyracantha crenulata*		Yes
Malaceae	*Pyracantha spp.*		Yes
Malvaceae	*Abutilon oxycarpum*	Straggly Lantern-bush	No
Malvaceae	*Abutilon spp.*	Lantern-bush	No
Malvaceae	*Abutilon tubulosum*		No
Malvaceae	*Brachychiton populneus*	Kurrajong	No
Malvaceae	*Brachychiton populneus subsp. populneus*		No
Malvaceae	*Brachychiton spp.*		No
Malvaceae	*Hibiscus sturtii*	Hill Hibiscus	No
Malvaceae	*Malva parviflora*	Small-flowered Mallow	Yes
Malvaceae	*Malva spp.*	Mallow	Yes
Malvaceae	*Malvaceae indeterminate*	Mallows, jutes and lantern bushes	-
Malvaceae	*Malvastrum americanum*	Spiked Malvastrum	Yes
Malvaceae	*Modiola caroliniana*	Red-flowered Mallow	Yes
Malvaceae	*Sida corrugata*	Corrugated Sida	No
Malvaceae	*Sida cunninghamii*	Ridge Sida	No
Malvaceae	*Sida fibulifera*	Pin Sida	No
Malvaceae	*Sida hackettiana*	Golden Rod, Spiked Sida, Queensland Hemp	No
Malvaceae	*Sida spinosa*		Yes
Malvaceae	*Sida spp.*		-
Malvaceae	*Sida trichopoda*	High Sida	No
Marsileaceae	*Marsilea spp.*		No
Myoporaceae	*Eremophila debilis*	Amulla	No
Myoporaceae	*Eremophila mitchellii*	Budda	No
Myoporaceae	*Myoporum montanum*	Western Boobialla	No
Myrtaceae	*Angophora floribunda*	Rough-barked Apple	No
Myrtaceae	*Callistemon pungens**		No
Myrtaceae	*Eucalyptus albens*	White Box	No

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Myrtaceae	*Eucalyptus andrewsii*	Gum-topped Peppermint	No
Myrtaceae	*Eucalyptus blakelyi*	Blakely's Red Gum	No
Myrtaceae	*Eucalyptus bridgesiana*	Apple Box	No
Myrtaceae	*Eucalyptus camaldulensis*	River Red Gum	No
Myrtaceae	*Eucalyptus crebra*	Narrow-leaved Ironbark	No
Myrtaceae	*Eucalyptus dalrympleana*	Mountain Gum	No
Myrtaceae	*Eucalyptus dealbata*	Tumbledown Red Gum	No
Myrtaceae	*Eucalyptus elliptica*	Bendemeer White Gum	No
Myrtaceae	*Eucalyptus laevopinea*	Silver-top Stringybark	No
Myrtaceae	*Eucalyptus macrorhyncha*	Red Stringybark	No
Myrtaceae	*Eucalyptus melanophloia*	Silver-leaved Ironbark	No
Myrtaceae	*Eucalyptus melliodora*	Yellow Box	No
Myrtaceae	*Eucalyptus microcarpa*	Western Grey Box	No
Myrtaceae	*Eucalyptus populnea subsp. bimbil*	Bimble Box	No
Myrtaceae	*Eucalyptus prava*	Orange Gum	No
Myrtaceae	*Eucalyptus spp.*		No
Myrtaceae	*Eucalyptus viminalis*	Ribbon Gum	No
Myrtaceae	*Leptospermum polygalifolium subsp. transmontanum*		No
Myrtaceae	*Leptospermum spp.*	Tea-tree	No
Myrtaceae	*Melaleuca bracteata*	Black Tea-tree	No
Nyctaginaceae	*Boerhavia dominii*	Tarvine	No
Oleaceae	*Jasminum lineare*	Desert Jasmine	No
Oleaceae	*Jasminum suavissimum*		No
Oleaceae	*Ligustrum vulgare*	European Privet	Yes
Oleaceae	*Notelaea microcarpa*	Native Olive	No
Oleaceae	*Notelaea microcarpa var. microcarpa*		No
Oleaceae	*Olea europaea*	Common Olive	Yes
Onagraceae	*Epilobium billardierianum subsp. billardierianum*		No
Ophioglossaceae	*Ophioglossum lusitanicum*	Adder's Tongue	No
Ophioglossaceae	*Ophioglossum spp.*		No
Orchidaceae	*Cymbidium canaliculatum*	Tiger Orchid	No
Orchidaceae	*Microtis unifolia*	Common Onion Orchid	No
Orchidaceae	*Pterostylis spp.*	Greenhood	No
Oxalidaceae	*Oxalis chnoodes*		No
Oxalidaceae	*Oxalis exilis*		No
Oxalidaceae	*Oxalis perennans*		No
Oxalidaceae	*Oxalis spp.*		No
Papaveraceae	*Argemone ochroleuca subsp. ochroleuca*	Mexican Poppy	Yes
Phormiaceae	*Dianella caerulea*	Blue Flax-lily	No
Phormiaceae	*Dianella longifolia*	Blueberry Lily	No
Phormiaceae	*Dianella longifolia var. stenophylla*		No
Phormiaceae	*Dianella revoluta*	Blueberry Lily	No
Phormiaceae	*Dianella revoluta var. revoluta*		No

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Phormiaceae	*Dianella spp.*		No
Phyllanthaceae	*Breynia oblongifolia*	Coffee Bush	No
Phyllanthaceae	*Phyllanthus gunnii*		No
Phyllanthaceae	*Phyllanthus spp.*		-
Phyllanthaceae	*Phyllanthus virgatus*	Wiry Spurge	No
Phyllanthaceae	*Poranthera microphylla*	Small Poranthera	No
Pittosporaceae	*Bursaria spinosa*	Native Blackthorn	No
Pittosporaceae	*Pittosporum angustifolium*	Butterbush	No
Pittosporaceae	*Rhytidosporum procumbens*		No
Plantaginaceae	*Plantago debilis*	Shade Plantain	No
Plantaginaceae	*Plantago hispida*		No
Plantaginaceae	*Plantago lanceolata*	Lamb's Tongues	Yes
Plantaginaceae	*Plantago spp.*	Plantain	-
Plantaginaceae	*Plantago turrifera*	Small Sago-weed	No
Plantaginaceae	*Plantago varia*		No
Plantaginaceae	*Veronica arvensis*	Wall Speedwell	Yes
Plantaginaceae	*Veronica calycina*	Hairy Speedwell	No
Plantaginaceae	*Veronica plebeia*	Trailing Speedwell	No
Plantaginaceae	*Veronica spp.*		-
Poaceae	*Anthosachne scabra*	Wheatgrass, Common Wheatgrass	No
Poaceae	*Anthoxanthum odoratum*	Sweet Vernal Grass	Yes
Poaceae	*Aristida acuta*		No
Poaceae	*Aristida calycina*		No
Poaceae	*Aristida caput-medusae*	Many-headed Wiregrass	No
Poaceae	*Aristida jerichoensis*	Jericho Wiregrass	No
Poaceae	*Aristida leptopoda*	White Speargrass	No
Poaceae	*Aristida personata*		No
Poaceae	*Aristida ramosa*	Purple Wiregrass	No
Poaceae	*Aristida spp.*		No
Poaceae	*Aristida vagans*	Threeawn Speargrass	No
Poaceae	*Arundinella nepalensis*	Reedgrass	No
Poaceae	*Austrostipa aristiglumis*	Plains Grass	No
Poaceae	*Austrostipa bigeniculata*	Yanganbil	No
Poaceae	*Austrostipa nitida*		No
Poaceae	*Austrostipa scabra*	Speargrass	No
Poaceae	*Austrostipa setacea*	Corkscrew Grass	No
Poaceae	*Austrostipa spp.*		No
Poaceae	*Austrostipa verticillata*	Slender Bamboo Grass	No
Poaceae	*Avena barbata*	Bearded Oats	Yes
Poaceae	*Avena ludoviciana*	Ludo Wild Oats	Yes
Poaceae	*Avena sativa*	Oats	Yes
Poaceae	*Bothriochloa decipiens var. decipiens*	Pitted Bluegrass	No
Poaceae	*Bothriochloa macra*	Red Grass	No
Poaceae	*Bothriochloa spp.*	Redgrass, Bluegrass	No

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Poaceae	*Briza minor*	Shivery Grass	Yes
Poaceae	*Bromus catharticus*	Praire Grass	Yes
Poaceae	*Cenchrus ciliaris*	Buffel Grass	Yes
Poaceae	*Cenchrus longisetus*	Feathertop, White Foxtail	Yes
Poaceae	*Cenchrus spp.*		Yes
Poaceae	*Chloris spp.*		-
Poaceae	*Chloris truncata*	Windmill Grass	No
Poaceae	*Chloris ventricosa*	Tall Chloris	No
Poaceae	*Chloris virgata*	Feathertop Rhodes Grass	Yes
Poaceae	*Cymbopogon refractus*	Barbed Wire Grass	No
Poaceae	*Cynodon dactylon*	Common Couch	No
Poaceae	*Dactyloctenium radulans*	Button Grass	No
Poaceae	*Deyeuxia spp.*		No
Poaceae	*Dichanthium sericeum^*	Queensland Bluegrass	No
Poaceae	*Dichanthium sericeum subsp. sericeum*	Queensland Bluegrass	No
Poaceae	*Dichanthium setosum*	Bluegrass	No
Poaceae	*Dichanthium spp.*		No
Poaceae	*Dichelachne crinita*	Longhair Plumegrass	No
Poaceae	*Dichelachne micrantha*	Shorthair Plumegrass	No
Poaceae	*Dichelachne sieberiana*		No
Poaceae	*Dichelachne spp.*		No
Poaceae	*Digitaria brownii*	Cotton Panic Grass	No
Poaceae	*Digitaria diffusa*	Open Summer-grass	No
Poaceae	*Digitaria divaricatissima*	Umbrella Grass	No
Poaceae	*Digitaria ramularis*	Finger Panic Grass	No
Poaceae	*Digitaria spp.*		No
Poaceae	*Echinochloa crus-galli*	Barnyard Grass	Yes
Poaceae	*Echinochloa esculenta*	Japanese Millet	Yes
Poaceae	*Echinopogon intermedius*	Erect Hedgehog Grass	No
Poaceae	*Echinopogon ovatus*	Forest Hedgehog Grass	No
Poaceae	*Echinopogon spp.*		No
Poaceae	*Eleusine spp.*		Yes
Poaceae	*Eleusine tristachya*	Goose Grass	Yes
Poaceae	*Elymus plurinervis*		No
Poaceae	*Elymus spp.*		No
Poaceae	*Enneapogon gracilis*	Slender Nineawn	No
Poaceae	*Enneapogon nigricans*	Niggerheads	No
Poaceae	*Enneapogon spp.*	Nineawn Grass, Bottlewashers	No
Poaceae	*Enneapogon truncatus*	Bottlewashers	No
Poaceae	*Enteropogon acicularis*	Curly Windmill Grass	No
Poaceae	*Eragrostis brownii*	Brown's Lovegrass	No
Poaceae	*Eragrostis cilianensis*	Stinkgrass	Yes
Poaceae	*Eragrostis curvula*	African Lovegrass	Yes
Poaceae	*Eragrostis elongata*	Clustered Lovegrass	No

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Poaceae	*Eragrostis lacunaria*	Purple Lovegrass	No
Poaceae	*Eragrostis leptostachya*	Paddock Lovegrass	No
Poaceae	*Eragrostis megalosperma*		No
Poaceae	*Eragrostis parviflora*	Weeping Lovegrass	No
Poaceae	*Eragrostis spp.*		-
Poaceae	*Eriochloa crebra*	Cup Grass, Tall Cupgrass	No
Poaceae	*Eriochloa pseudoacrotricha*	Early Spring Grass	No
Poaceae	*Eriochloa spp.*		No
Poaceae	*Eulalia aurea*	Silky Browntop	No
Poaceae	*Glyceria spp.*		Yes
Poaceae	*Hordeum leporinum*	Barley Grass	Yes
Poaceae	*Hordeum spp.*		Yes
Poaceae	*Hyparrhenia hirta*	Coolatai Grass	Yes
Poaceae	*Imperata cylindrica*	Blady Grass	No
Poaceae	*Lachnagrostis filiformis*		No
Poaceae	*Lolium perenne*	Perennial Ryegrass	Yes
Poaceae	*Lolium spp.*		Yes
Poaceae	*Microlaena stipoides*	Weeping Grass	No
Poaceae	*Microlaena stipoides var. stipoides*	Weeping Grass	No
Poaceae	*Panicum buncei*	Native Panic	No
Poaceae	*Panicum effusum*	Hairy Panic	No
Poaceae	*Panicum spp.*	Panicum	No
Poaceae	*Paspalidium distans*		No
Poaceae	*Paspalidium gracile*	Slender Panic	No
Poaceae	*Paspalidium spp.*		No
Poaceae	*Paspalum dilatatum*	Paspalum	Yes
Poaceae	*Paspalum spp.*		Yes
Poaceae	*Poa annua*	Winter Grass	Yes
Poaceae	*Poa labillardierei var. labillardierei*	Tussock	No
Poaceae	*Poa sieberiana*	Snowgrass	No
Poaceae	*Poa spp.*		-
Poaceae	*Poaceae indeterminate*	Grasses, reeds and bamboos	-
Poaceae	*Rytidosperma bipartitum*	Wallaby Grass	No
Poaceae	*Rytidosperma caespitosum*	Ringed Wallaby Grass	No
Poaceae	*Rytidosperma fulvum*	Wallaby Grass	No
Poaceae	*Rytidosperma laeve*	Wallaby Grass	No
Poaceae	*Rytidosperma longifolium*	Long-leaved Wallaby Grass	No
Poaceae	*Rytidosperma pallidum*	Redanther Wallaby Grass; Silvertop Wallaby Grass	No
Poaceae	*Rytidosperma racemosum*	Wallaby Grass	No
Poaceae	*Rytidosperma racemosum var. obtusatum*	Wallaby Grass	No
Poaceae	*Rytidosperma racemosum var. racemosum*	Wallaby Grass	No
Poaceae	*Rytidosperma setaceum*	Small-flowered Wallaby-grass	No

Family	Current Scientific Name	Common Name	Exotic
Poaceae	*Rytidosperma spp.*		No
Poaceae	*Setaria parviflora*		Yes
Poaceae	*Setaria spp.*		Yes
Poaceae	*Setaria viridis*	Green Pigeon Grass	Yes
Poaceae	*Sorghum leiocladum*	Wild Sorghum	No
Poaceae	*Sporobolus caroli*	Fairy Grass	No
Poaceae	*Sporobolus creber*	Slender Rat's Tail Grass	No
Poaceae	*Sporobolus spp.*	Rat's Tail Couch	-
Poaceae	*Themeda triandra*		No
Poaceae	*Thyridolepis mitchelliana*	Mulga Mitchell Grass	No
Poaceae	*Tragus australianus*	Small Burrgrass	No
Poaceae	*Tripogon loliiformis*	Fiveminute Grass	No
Poaceae	*Urochloa panicoides*	Urochloa Grass	Yes
Poaceae	*Urochloa spp.*		Yes
Polygalaceae	*Polygala japonica*	Dwarf Milkwort	No
Polygonaceae	*Emex australis*	Spiny Emex	Yes
Polygonaceae	*Fallopia convolvulus*	Black Bindweed	Yes
Polygonaceae	*Persicaria maculosa*	Redshank	Yes
Polygonaceae	*Polygonum aviculare*	Wireweed	Yes
Polygonaceae	*Rumex brownii*	Swamp Dock	No
Portulacaceae	*Calandrinia eremaea*	Small Purslane	No
Portulacaceae	*Portulaca oleracea*	Pigweed	No
Primulaceae	*Lysimachia arvensis*	Scarlet Pimpernel	Yes
Proteaceae	*Hakea microcarpa*	Small-fruited Hakea	No
Proteaceae	*Hakea spp.*		No
Proteaceae	*Persoonia sericea*		No
Pteridaceae	*Cheilanthes austrotenuifolia*	Rock Fern	No
Pteridaceae	*Cheilanthes distans*	Bristly Cloak Fern	No
Pteridaceae	*Cheilanthes sieberi*	Rock Fern	No
Pteridaceae	*Cheilanthes sieberi subsp. sieberi*	Rock Fern	No
Ranunculaceae	*Clematis aristata*	Old Man's Beard	No
Ranunculaceae	*Clematis glycinoides*	Headache Vine	No
Ranunculaceae	*Clematis microphylla*	Small-leaved Clematis	No
Ranunculaceae	*Clematis spp.*		No
Ranunculaceae	*Ranunculus inundatus*	River Buttercup	No
Ranunculaceae	*Ranunculus lappaceus*	Common Buttercup	No
Ranunculaceae	*Ranunculus pumilio*	Ferny Buttercup	No
Ranunculaceae	*Ranunculus pumilio var. politus*		No
Ranunculaceae	*Ranunculus sessiliflorus*	Small-flowered Buttercup	No
Ranunculaceae	*Ranunculus sessiliflorus var. sessiliflorus*		No
Ranunculaceae	*Ranunculus spp.*		No
Resedaceae	*Reseda luteola*	Weld	Yes
Rhamnaceae	*Alphitonia excelsa*	Red Ash	No
Rhamnaceae	*Cryptandra amara*	Bitter Cryptandra	No

Family	Current Scientific Name	Common Name	Exotic
Rhamnaceae	*Cryptandra spp.*		No
Rhamnaceae	*Discaria pubescens*	Australian Anchor Plant	No
Rosaceae	*Acaena novae-zelandiae*	Bidgee-widgee	No
Rosaceae	*Acaena ovina*	Acaena	No
Rosaceae	*Acaena spp.*	Sheep's Burr	No
Rosaceae	*Rosa rubiginosa*	Sweet Briar	Yes
Rosaceae	*Rubus fruticosus sp. agg.*	Blackberry complex	Yes
Rosaceae	*Rubus parvifolius*	Native Raspberry	No
Rubiaceae	*Asperula conferta*	Common Woodruff	No
Rubiaceae	*Galium aparine*	Goosegrass	Yes
Rubiaceae	*Galium gaudichaudii*	Rough Bedstraw	No
Rubiaceae	*Galium leptogonium*		No
Rubiaceae	*Galium microlobum*		No
Rubiaceae	*Galium propinquum*	Maori Bedstraw	No
Rubiaceae	*Galium spp.*		-
Rubiaceae	*Opercularia aspera*	Coarse Stinkweed	No
Rubiaceae	*Opercularia diphylla*	Stinkweed	No
Rubiaceae	*Opercularia spp.*		No
Rubiaceae	*Opercularia varia*	Variable Stinkweed	No
Rubiaceae	*Psydrax odorata*	Shiny-leaved Canthium	No
Rubiaceae	*Psydrax oleifolia*		No
Rutaceae	*Correa reflexa*	Native Fuschia	No
Rutaceae	*Geijera parviflora*	Wilga	No
Santalaceae	*Exocarpos cupressiformis*	Cherry Ballart	No
Santalaceae	*Santalum lanceolatum*	Northern Sandalwood	No
Sapindaceae	*Alectryon oleifolius*	Western Rosewood	No
Sapindaceae	*Atalaya hemiglauca*	Whitewood	No
Sapindaceae	*Dodonaea sinuolata*		No
Sapindaceae	*Dodonaea spp.*		No
Sapindaceae	*Dodonaea viscosa*	Sticky Hop-bush	No
Sapindaceae	*Dodonaea viscosa subsp. angustifolia*		No
Sapindaceae	*Dodonaea viscosa subsp. angustissima*	Narrow-leaf Hop-bush	No
Scrophulariaceae	*Linaria arvensis*		Yes
Scrophulariaceae	*Linaria vulgaris*		Yes
Scrophulariaceae	*Misopates orontium*	Lesser Snapdragon	Yes
Scrophulariaceae	*Scrophulariaceae indeterminate*	Toadflaxes and mulleins	-
Scrophulariaceae	*Verbascum spp.*		Yes
Scrophulariaceae	*Verbascum thapsus subsp. thapsus*	Great Mullein	Yes
Scrophulariaceae	*Verbascum virgatum*	Twiggy Mullein	Yes
Solanaceae	*Datura ferox*	Fierce Thornapple	Yes
Solanaceae	*Lycium ferocissimum*	African Boxthorn	Yes
Solanaceae	*Nicotiana suaveolens*	Native Tobacco	No
Solanaceae	*Physalis ixocarpa*	Ground Cherry	Yes
Solanaceae	*Physalis spp.*		Yes

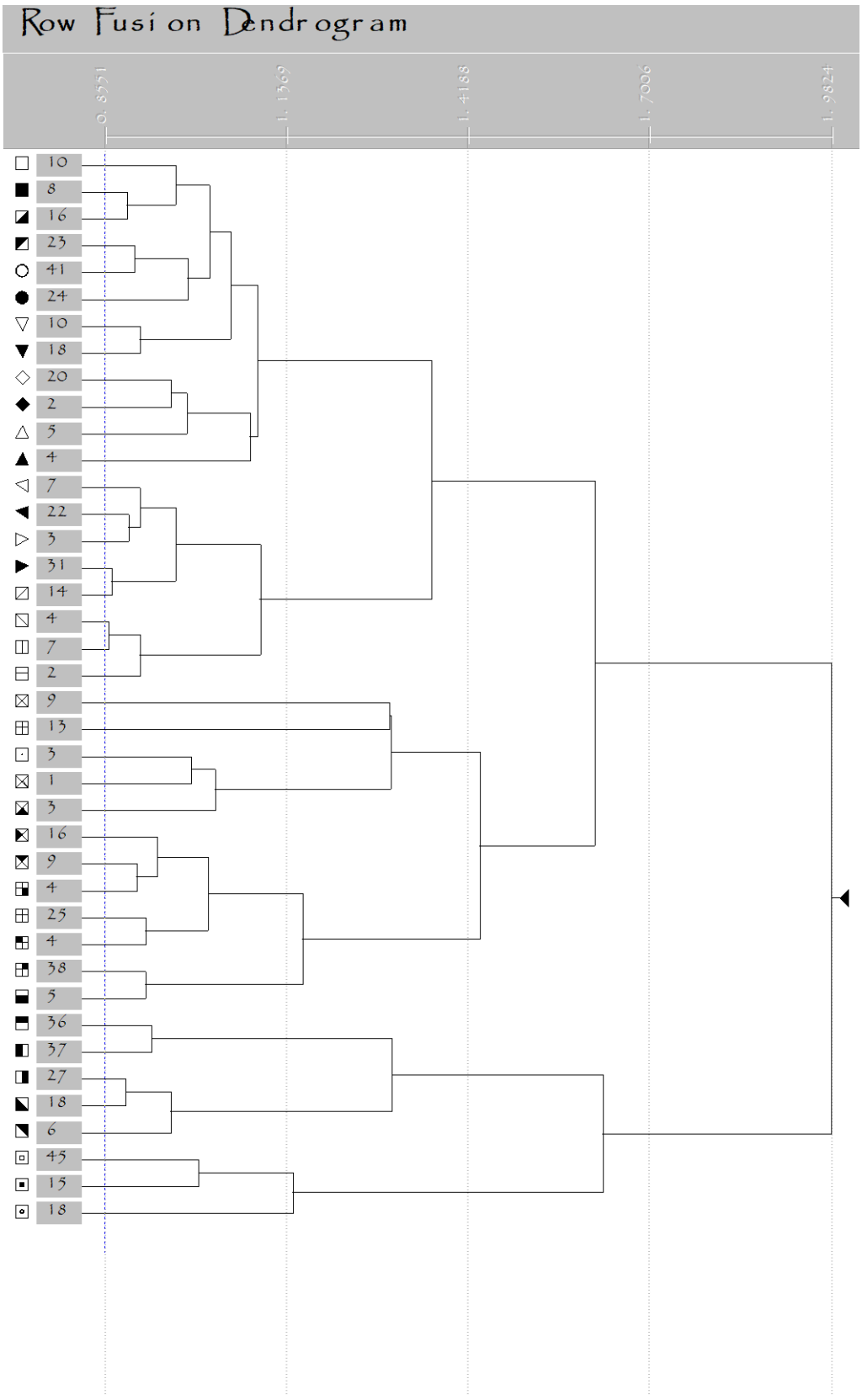
Family	Current Scientific Name	Common Name	Exotic
Solanaceae	*Solanum amblymerum*		No
Solanaceae	*Solanum cinereum*	Narrawa Burr	No
Solanaceae	*Solanum esuriale*	Quena	No
Solanaceae	*Solanum jucundum*		No
Solanaceae	*Solanum nigrum*	Black-berry Nightshade	Yes
Solanaceae	*Solanum parvifolium subsp. parvifolium*	Nightshade	No
Solanaceae	*Solanum spp.*		-
Stackhousiaceae	*Stackhousia monogyna*	Creamy Candles	No
Stackhousiaceae	*Stackhousia muricata*	Stackhousia	No
Stackhousiaceae	*Stackhousia spp.*		No
Thymelaeaceae	*Pimelea curviflora*	Rice Flower	No
Thymelaeaceae	*Pimelea curviflora var. sericea*		No
Thymelaeaceae	*Pimelea glauca*	Smooth Rice-flower	No
Thymelaeaceae	*Pimelea linifolia*	Slender Rice Flower	No
Thymelaeaceae	*Pimelea neo-anglica*	Poison Pimelea	No
Thymelaeaceae	*Pimelea spp.*		No
Thymelaeaceae	*Pimelea strigosa*		No
Urticaceae	*Parietaria debilis*	Native Pellitory	No
Urticaceae	*Parietaria judaica*	Pellitory	Yes
Urticaceae	*Urtica dioica*	Giant Nettle	Yes
Urticaceae	*Urtica incisa*	Stinging Nettle	No
Urticaceae	*Urtica spp.*		-
Verbenaceae	*Phyla canescens*	Lippia	Yes
Verbenaceae	*Verbena africana*		Yes
Verbenaceae	*Verbena bonariensis*	Purpletop	Yes
Verbenaceae	*Verbena gaudichaudii*	Verbena	No
Verbenaceae	*Verbena spp.*		-
Verbenaceae	*Verbena supina*	Trailing Verbena	Yes
Violaceae	*Melicytus dentatus*	Tree Violet	No
Violaceae	*Viola betonicifolia*	Native Violet	No
Violaceae	*Viola spp.*		-
Xanthorrhoeaceae	*Xanthorrhoea spp.*		No
Zygophyllaceae	*Tribulus micrococcus*	Spineless Caltrop	No
Zygophyllaceae	*Tribulus spp.*	Cat-head, Caltrop	-
Zygophyllaceae	*Zygophyllum glaucum*	Pale Twinleaf	No
Zygophyllaceae	*Zygophyllum iodocarpum*	Violet Twinleaf	No

* Listed as Vulnerable under the EPBC Act

^ Listed as Vulnerable under the BC Act and EPBC Act

Appendix B: Output of Floristic Analysis

Dendrogram



Plot Group Membership

Survey ID	Site ID	Group
NARROM_99	NRM99-14	1
NARROM_99	NRM99-10	1
NVMP-NPWS	NBFF0363	1
JTH_PY	PY08	1
JTH_PY	PY21	1
JTH_PY	PY16	1
JTH_PY	PY19	1
JTH_RU	RU06	1
JTH_RU	RU02	1
JTH_RU	RU09	1
STH_KAP_98	MTKAPP03	2
STH_KAP_98	MTKAPP39	2
STH_KAP_98	MTKAPP37	2
STH_KAP_98	MTKAPP47	2
STH_KAP_98	MTKAPP48	2
NVMP-NPWS	NBFF0005	2
NVMP-NPWS	NBFF0006	2
NVMP-NPWS	NBFF0007	2
STH_KAP_98	MTKAPP35	3
NANDE_WRA	NBFF1295	3
NANDE_WRA	NBFF1300	3
NVMP-NPWS	NBFF0364	3
NVMP-NPWS	NBFF0365	3
NVMP-NPWS	NBFF0483	3
PLAINSF_99	WKDLB017	3
JTH_KV	KV07	3
JTH_KV	KV08	3
JTH_KV	KV10	3
JTH_KV	KV02	3
JTH_KV	KV09	3
JTH_PY	PY20	3
JTH_RU	RU08	3
NO	NOFF0082	3
SO	SOFF0070	3
NARROM_99	NRM99-15	4
NARROM_99	NRM99-11	4
NARROM_99	NRM99-12	4
NARROM_99	NRM99-13	4
NARROM_99	NRM99-16	4
NARROM_99	NRM99-09	4
BOGGABRI	BGB104	4
BOGGABRI	BGB013	4
BOGGABRI	BGB057	4
BOGGABRI	BGB060	4
BOGGABRI	BGB061	4
BOGGABRI	BGB071	4

Survey ID	Site ID	Group
BOGGABRI	BGB068	4
BOGGABRI	BGB098	4
BOGGABRI	BGB099	4
JVMPDB	JV_JW003	4
JVMPDB	JV_JW004	4
JVMPDB	JV_JW006	4
JVMPDB	JV_JW007	4
JVMPDB	JV_JW002	4
JVMPDB	JV_JW005	4
JVMPDB	JV_JW008	4
PLAINSF_99	WLDLB099	4
BOGGABRI	BGB009	5
BOGGABRI	BGB070	5
JTH_KV	KV12	5
JTH_KV	KV06	5
JTH_KV	KV11	5
JTH_KV	KV01	5
JTH_KV	KV03	5
JTH_KV	KV17	5
JTH_KV	KV18	5
JTH_KV	KV21	5
JTH_KV	KV19	5
JTH_KV	KV20	5
JTH_LE	LE11	5
JTH_LE	LE09	5
JTH_LE	LE10	5
JTH_LE	LE03	5
JTH_LE	LE13	5
JTH_LE	LE14	5
JTH_PY	PY01	5
JTH_PY	PY02	5
JTH_PY	PY03	5
JTH_PY	PY09	5
JTH_PY	PY04	5
JTH_PY	PY14	5
JTH_PY	PY10	5
JTH_PY	PY11	5
JTH_PY	PY12	5
JTH_PY	PY13	5
JTH_PY	PY22	5
JTH_PY	PY29	5
JTH_PY	PY30	5
JTH_PY	PY17	5
JTH_PY	PY24	5
JTH_PY	PY18	5
JTH_PY	PY23	5
JTH_PY	PY25	5

Survey ID	Site ID	Group
JTH_PY	PY26	5
JTH_PY	PY27	5
JTH_RU	RU07	5
JTH_RU	RU01	5
JTH_RU	RU03	5
JVMPDB	JV_DB153	6
JVMPDB	JV_SF008	6
JVMPDB	JV_SF007	6
PLAINSF_99	WVDLB046	6
PLAINSF_99	WVDLB047	6
PLAINSF_99	WLDLB100	6
PLAINSF_99	WLDLB097	6
PLAINSF_99	WLDLB098	6
PLAINSF_99	WLDLB101	6
PLAINSF_99	WLDLB095	6
PLAINSF_99	WLDLB094	6
PLAINSF_99	WLDLB096	6
PLAINSF_99	WLDLB093	6
PLAINSF_99	WKDLB043	6
PLAINSF_99	WKDLB018	6
FS_TARRAWONGA10	TRWNGA05	6
FS_TARRAWONGA10	TRWNGA04	6
FS_TARRAWONGA10	TRWNGA06	6
FS_TARRAWONGA10	TRWNGA01	6
FS_TARRAWONGA10	TRWNGA07	6
FS_TARRAWONGA10	TRWNGA10	6
FS_TARRAWONGA10	TRWNGA02	6
FS_TARRAWONGA10	TRWNGA03	6
FS_TARRAWONGA10	TRWNGA11	6
NANDE_WRA	NBFF1292	7
NANDE_WRA	NBFF1299	7
JTH_LE	LE05	7
JTH_LE	LE04	7
JTH_LE	LE12	7
JTH_PY	PY06	7
JTH_PY	PY28	7
JTH_RU	RU05	7
JTH_RU	RU15	7
JTH_RU	RU10	7
BOGGABRI	BGB135	8
BOGGABRI	BGB016	8
BOGGABRI	BGB136	8
BOGGABRI	BGB050	8
BOGGABRI	BGB049	8
BOGGABRI	BGB066	8
BOGGABRI	BGB080	8
BOGGABRI	BGB095	8

Survey ID	Site ID	Group
BOGGABRI	BGB093	8
JTH_PY	PY05	8
JTH_PY	PY15	8
JTH_PY	PY31	8
JTH_RU	RU04	8
FS_TARRAWONGA10	TRWNGA12	8
FS_TARRAWONGA10	TRWNGA13	8
FS_TARRAWONGA10	TRWNGA14	8
FS_TARRAWONGA11	TRWNGA25	8
FS_TARRAWONGA11	TRWNGA24	8
BOGGABRI	BGB001	9
BOGGABRI	BGB002	9
BOGGABRI	BGB003	9
BOGGABRI	BGB005	9
BOGGABRI	BGB010	9
BOGGABRI	BGB109	9
BOGGABRI	BGB134	9
BOGGABRI	BGB019	9
BOGGABRI	BGB036	9
BOGGABRI	BGB054	9
BOGGABRI	BGB056	9
BOGGABRI	BGB079	9
BOGGABRI	BGB082	9
BOGGABRI	BGB075	9
BOGGABRI	BGB077	9
JVMPDB	JV_JW001	9
JVMPDB	JV_JW009	9
JTH_LE	LE06	9
JTH_RU	RU16	9
FS_TARRAWONGA11	TRWNGA31	9
BOGGABRI	BGB117	10
BOGGABRI	BGB074	10
BOGGABRI	BGB033	11
BOGGABRI	BGB040	11
BOGGABRI	BGB055	11
BOGGABRI	BGB081	11
BOGGABRI	BGB076	11
JVMPAO	AOSF093	12
JVMPAO	AOSF094	12
JVMPAO	AOSF095	12
JVMPAO	AOSF096	12
BOGGABRI	BGB113	13
BOGGABRI	BGB108	13
JVMPDB	JV_DB144	13
JTH_LE	LE01	13
JTH_LE	LE02	13
JTH_LE	LE07	13

Survey ID	Site ID	Group
MC	MCFF0014	13
BOGGABRI	BGB078	14
JTH_KV	KV04	14
JTH_LE	LE08	14
EW	EWFF0073	14
EW	EWFF0093	14
EW	EWFF0081	14
SO	SOFF0059	14
SO	SOFF0058	14
SO	SOFF0066	14
SO	SOFF0040	14
SO	SOFF0067	14
SO	SOFF0043	14
SO	SOFF0034	14
SO	SOFF0052	14
SO	SOFF0011	14
SO	SOFF0069	14
MC	MCFF0013	14
MC	MCFF0012	14
MC	MCFF0024	14
MC	MCFF0023	14
SO	SOFF1009	14
EW	EWFF0074	14
SO	SOFF0048	15
SO	SOFF0031	15
EW	EWFF1013	15
EW	EWFF0079	16
EW	EWFF0104	16
EW	EWFF0053	16
EW	EWFF0022	16
EW	EWFF0102	16
EW	EWFF0082	16
EW	EWFF0100	16
EW	EWFF0048	16
EW	EWFF0090	16
SO	SOFF0036	16
EW	EWFF0010	16
SO	SOFF0014	16
SO	SOFF0002	16
SO	SOFF0018	16
EW	EWFF0007	16
EW	EWFF1015	16
EW	EWFF1012	16
EW	EWFF0101	16
CL	CLEA5001	16
CL	CLEA5002	16
CL	CLEA5003	16

Survey ID	Site ID	Group
CL	CLEA5004	16
BI	BIMB3001	16
BI	BIMB3002	16
BI	BIMB3008	16
BI	BIMB3009	16
BI	BIMB3003	16
BI	BIMB3006	16
BI	BIMB3011	16
BI	BIMB3012	16
BI	BIMB3013	16
EW	EWFF0025	17
EW	EWFF0003	17
EW	EWFF0006	17
EW	EWFF0005	17
EW	EWFF0077	17
SO	SOFF0054	17
EW	EWFF0033	17
EW	EWFF0027	17
EW	EWFF0024	17
CL	CLEA5000	17
BI	BIMB3010	17
BI	BIMB3007	17
BI	BIMB3005	17
BI	BIMB3004	17
EW	EWFF0000	18
EW	EWFF0063	18
EW	EWFF0071	18
EW	EWFF1014	18
EW	EWFF0012	19
SO	SOFF0029	19
SO	SOFF0063	19
SO	SOFF0068	19
SO	SOFF0055	19
SO	SOFF1011	19
SO	SOFF1010	19
MC	MCFF0000	20
MC	MCFF0022	20
OOLINE	OOL11	21
OOLINE	OOL17	21
OOLINE	OOL20	21
OOLINE	OOL19	21
OOLINE	OOL21	21
OOLINE	OOL12	21
OOLINE	OOL13	21
OOLINE	OOL16	21
OOLINE	OOL18	21
STH_KAP_98	MTKAPP23	22

Survey ID	Site ID	Group
STH_KAP_98	MTKAPP38	22
NANDE_WRA	NBFF1293	22
NVMP-NPWS	NBFF0473	22
NVMP-NPWS	NBFF0485	22
NVMP-NPWS	NBFF0486	22
TCRF	TCRF076	22
TCRF	TCRF075	22
TCRF	TCRF069	22
TCRF	TCRF077	22
JTH_PY	PY07	22
JTH_RU	RU14	22
JTH_HF	HTFL19	22
BOGGABRI	BGB100	23
BOGGABRI	BGB027	23
BOGGABRI	BGB028	23
EW	EWFF0023	24
BOGGABRI	BGB039	25
BOGGABRI	BGB026	25
BOGGABRI	BGB097	25
STH_KAP_98	MTKAPP19	26
STH_KAP_98	MTKAPP20	26
STH_KAP_98	MTKAPP36	26
NVMP-NPWS	NBFF0021	26
NVMP-NPWS	NBFF0023	26
NVMP-NPWS	NBFF0478	26
NVMP-NPWS	NBFF0472	26
NVMP-NPWS	NBFF0956	26
NVMP-NPWS	NBFF0958	26
NVMP-NPWS	NBFF0954	26
NVMP-NPWS	NBFF0957	26
NVMP-NPWS	NBFF0960	26
MTKAP2000	KAPJH053	26
JTH_HF	HTFL20	26
JTH_HF	HTFL12	26
JTH_HF	HTFL18	26
NVMP-NPWS	NBFF0022	27
BRG-CMA	060405-1	27
BRG-CMA	060405-2	27
BRG-FF	070509-1	27
BRG-FF	070510-1	27
BRG-FF	070510-2	27
MTKAP2000	KAPJH005	27
MTKAP2000	KAPJH003	27
MTKAP2000	KAPJH002	27
NVMP-NPWS	NBFF0976	28
MTKAP2000	KAPJH006	28
MTKAP2000	KAPJH004	28

Survey ID	Site ID	Group
MTKAP2000	KAPJH052	28
STH_KAP_98	MTKAPP15	29
NVMP-NPWS	NBFF0477	29
NVMP-NPWS	NBFF0471	29
NVMP-NPWS	NBFF0476	29
NVMP-NPWS	NBFF0479	29
NVMP-NPWS	NBFF0474	29
NVMP-NPWS	NBFF0475	29
NVMP-NPWS	NBFF0481	29
NVMP-NPWS	NBFF0484	29
NVMP-NPWS	NBFF0480	29
NVMP-NPWS	NBFF0487	29
NVMP-NPWS	NBFF0482	29
NVMP-NPWS	NBFF0492	29
NVMP-NPWS	NBFF0971	29
NVMP-NPWS	NBFF0962	29
NVMP-NPWS	NBFF0972	29
NVMP-NPWS	NBFF0973	29
JTH_HF	HTFL17	29
JTH_HF	HTFL21	29
JTH_HF	HTFL13	29
JTH_HF	HTFL16	29
JTH_HF	HTFL14	29
JTH_HF	HTFL15	29
NO	NOFF0052	29
NO	NOFF0002	29
NVMP-NPWS	NBFF0953	30
NVMP-NPWS	NBFF0951	30
NVMP-NPWS	NBFF0959	30
NVMP-NPWS	NBFF0952	30
NO	NOFF0006	31
NO	NOFF0018	31
NO	NOFF0027	31
NO	NOFF0040	31
NO	NOFF0073	31
NO	NOFF0007	31
NO	NOFF0021	31
NO	NOFF0058	31
NO	NOFF0009	31
NO	NOFF0012	31
NO	NOFF0013	31
NO	NOFF0004	31
NO	NOFF0020	31
NO	NOFF0019	31
NO	NOFF0039	31
NO	NOFF1000	31
NO	NOFF1001	31

Survey ID	Site ID	Group
NO	NOFF0011	31
NO	NOFF0057	31
NO	NOFF0085	31
NO	NOFF0075	31
NO	NOFF0035	31
NO	NOFF0099	31
NO	NOFF0024	31
NO	NOFF0016	31
NO	NOFF0095	31
NO	NOFF0025	31
NO	NOFF0074	31
NO	NOFF0046	31
NO	NOFF0000	31
NO	NOFF0083	31
NO	NOFF0097	31
NO	NOFF0098	31
NO	NOFF0096	31
NO	NOFF0032	31
NO	NOFF0022	31
NO	NOFF0001	31
NO	NOFF0045	31
NO	NOFF0003	32
NO	NOFF0084	32
NO	NOFF1002	32
NO	NOFF1007	32
NO	NOFF0053	32
BOG_2015	VS14	33
BOG_2015	VS11	33
BOG_2015	VS12	33
BOG_2015	VS17	33
BOG_2015	VS19	33
BOG_2015	VS20	33
BOG_2015	VS21	33
BOG_2015	VS22	33
BOG_2015	VS23	33
BOG_2015	VS24	33
BOG_2015	VS25	33
BOG_2015	VS18	33
BOG_2015	VS14	33
BOG_2015	VS11	33
BOG_2015	VS12	33
BOG_2015	VS17	33
BOG_2015	VS18	33
BOG_2015	VS19	33
BOG_2015	VS20	33
BOG_2015	VS22	33
BOG_2015	VS23	33

Survey ID	Site ID	Group
BOG_2015	VS24	33
BOG_2015	VS25	33
BOG_2015	VS21	33
BOG_2015	VS14	33
BOG_2015	VS12	33
BOG_2015	VS17	33
BOG_2015	VS18	33
BOG_2015	VS19	33
BOG_2015	VS20	33
BOG_2015	VS21	33
BOG_2015	VS22	33
BOG_2015	VS23	33
BOG_2015	VS24	33
BOG_2015	VS25	33
BOG_2015	VS11	33
BOG_2015	RF01	34
BOG_2015	RF02	34
BOG_2015	RF03	34
BOG_2015	RF04	34
BOG_2015	RF07	34
BOG_2015	RF08	34
BOG_2015	VS13	34
BOG_2015	RF01	34
BOG_2015	RF02	34
BOG_2015	RF03	34
BOG_2015	RF04	34
BOG_2015	RF07	34
BOG_2015	RF08	34
BOG_2015	VS13	34
BOG_2015	RF01	34
BOG_2015	RF02	34
BOG_2015	RF03	34
BOG_2015	RF04	34
BOG_2015	RF07	34
BOG_2015	RF08	34
BOG_2015	VS13	34
BOG_2015	RF01	34
BOG_2015	RF02	34
BOG_2015	RF03	34
BOG_2015	RF04	34
BOG_2015	RF07	34
BOG_2015	RF08	34
BOG_2015	RF01	34
BOG_2015	RF02	34
BOG_2015	RF03	34
BOG_2015	RF04	34
BOG_2015	RF07	34

Survey ID	Site ID	Group
BOG_2015	RF08	34
BOG_2015	RF02	34
BOG_2015	RF03	34
BOG_2015	RF04	34
BOG_2015	RF07	34
BOG_2015	CC06	35
BOG_2015	VS15	35
BOG_2016	VS27	35
BOG_2015	VS10	35
BOG_2015	CC05	35
BOG_2016	VS26	35
BOG_2016	VS31	35
BOG_2016	VS33	35
BOG_2015	CC07	35
BOG_2015	CC06	35
BOG_2015	VS15	35
BOG_2016	VS27	35
BOG_2015	CC05	35
BOG_2015	CC07	35
BOG_2015	VS10	35
BOG_2016	VS31	35
BOG_2016	VS33	35
BOG_2016	VS26	35
BOG_2015	CC06	35
BOG_2015	VS15	35
BOG_2016	VS27	35
BOG_2016	VS26	35
BOG_2016	VS31	35
BOG_2015	CC05	35
BOG_2015	CC07	35
BOG_2015	VS10	35
BOG_2016	VS33	35
BOG_2015	VS16	36
BOG_2016	VS34	36
BOG_2015	CC08	36
BOG_2016	VS30	36
BOG_2016	VS32	36
BOG_2016	VS35	36
BOG_2015	CC08	36
BOG_2015	VS16	36
BOG_2016	VS30	36
BOG_2016	VS32	36
BOG_2016	VS34	36
BOG_2016	VS35	36
BOG_2015	VS16	36
BOG_2016	VS30	36
BOG_2015	CC08	36

Survey ID	Site ID	Group
BOG_2016	VS32	36
BOG_2016	VS34	36
BOG_2016	VS35	36
BOG_2016	VS28	37
BOG_2016	VS29	37
BOG_2016	VS28	37
BOG_2016	VS29	37
BOG_2016	VS28	37
BOG_2016	VS29	37
BOG_2015	VS01	38
BOG_2015	CC02	38
BOG_2015	CC03	38
BOG_2015	CC04	38
BOG_2015	VS02	38
BOG_2015	VS03	38
BOG_2015	VS08	38
BOG_2015	VS09	38
BOG_2016	VS36	38
BOG_2016	VS38	38
BOG_2016	VS39	38
BOG_2015	CC01	38
BOG_2015	VS04	38
BOG_2015	VS05	38
BOG_2015	VS07	38
BOG_2016	VS39	38
BOG_2015	VS01	38
BOG_2015	CC01	38
BOG_2015	CC03	38
BOG_2015	CC04	38
BOG_2015	VS03	38
BOG_2015	VS05	38
BOG_2015	VS09	38
BOG_2016	VS36	38
BOG_2015	CC02	38
BOG_2015	VS02	38
BOG_2015	VS04	38
BOG_2015	VS07	38
BOG_2015	VS08	38
BOG_2016	VS38	38
BOG_2015	VS09	38
BOG_2015	CC01	38
BOG_2015	CC03	38
BOG_2015	CC04	38
BOG_2015	VS03	38
BOG_2016	VS36	38
BOG_2016	VS39	38
BOG_2015	VS08	38

Survey ID	Site ID	Group
BOG_2015	CC02	38
BOG_2015	VS01	38
BOG_2015	VS02	38
BOG_2015	VS07	38
BOG_2015	VS05	38
BOG_2016	VS38	38
BOG_2015	VS04	38
BOG_2015	RF06	39
BOG_2015	RF05	39
BOG_2015	VS06	39
BOG_2015	RF06	39
BOG_2015	RF05	39
BOG_2015	VS06	39
BOG_2015	RF05	39
BOG_2015	RF06	39
BOG_2015	VS06	39
BOG_2015	RF06	39
BOG_2015	RF05	39
BOG_2015	RF06	39
BOG_2015	RF05	39
BOG_2015	RF06	39
BOG_2015	RF05	39
BOG_2016	VS50	40
BOG_2016	VS51	40
BOG_2016	VS52	40
BOG_2016	VS37	40
BOG_2016	VS48	40
BOG_2016	VS49	40
BOG_2016	VS50	40
BOG_2016	VS51	40
BOG_2016	VS52	40
BOG_2016	VS49	40
BOG_2016	VS48	40
BOG_2016	VS37	40
BOG_2016	VS50	40
BOG_2016	VS37	40
BOG_2016	VS52	40
BOG_2016	VS49	40
BOG_2016	VS51	40
BOG_2016	VS48	40

Appendix C: PCT Photographs

PCT 55: Belah Woodland on Alluvial Plains

78: River Red Gum riparian tall woodland / open forest wetland

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

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

112: Black Tea-tree - River Oak - Wilga riparian low forest/shrubland wetland

147: Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket

244: Poplar Box grassy woodland

413: Silver-leaved Ironbark - White Cypress Pine - box dry shrub grass woodland

427: Cypress pine - Tumbledown Red Gum low open woodland to grassland

429: White Cypress Pine - Poplar Box - Silver-leaved Ironbark viney shrub woodland

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

439: Mock Olive - Tumbledown Red Gum - Red Ash - Wilga siliceous rocky hill low woodland / shrubland

492: Silvertop Stringybark - Yellow Box - Apple Box - Rough-barked Apple shrub grass open forest

508: Blakely's Red Gum - Stringybark - Rough-barked Apple open forest

510: Blakely's Red Gum - Yellow Box grassy woodland

563: White Box - Silvertop Stringybark +/- White Cypress Pine grass shrub open forest

569: Derived Snow Grass +/- Kangaroo Grass +/- Wild Sorghum tussock grassland

571: Ribbon Gum - Rough-barked Apple - Yellow Box grassy woodland

572: Silvertop Stringybark - Bendemeer White Gum - Ribbon Gum open forest

574: Tea-tree riparian shrubland / heathland wetland (right hand side of photo)

581: Tumbledown Red Gum - Dwyer's Red Gum - Wallaby Bush shrubby woodland

588: White Box - White Cypress Pine shrubby hills open forest

592: Narrow-leaved Ironbark - cypress pine - White Box shrubby open forest

599: Blakely's Red Gum - Yellow Box grassy tall woodland

619: Derived Wire Grass grassland

736: Broad-leaved Stringybark - Mountain Gum - Apple Box open forest

1165: Silvertop Stringybark - Orange Gum shrubby open forest

1306: White Box - Red Stringybark shrubby woodlands

Appendix D: PCT and TEC Areas by Conservation Agreement Group

Table A. Area of PCTs within MCCM Offset Areas

Conservation Agreement Group	Kelso, Velyama and Louenville			Mt Lindsay	Oakleigh/Onavale	Teston South	Roseglass and Bimbooria		Wirradale and Wongala South	Wollandilly	Total
Plant Community Type	Kelso	Louenville	Velyama	Mt Lindsay	Onavale	Teston South	Bimbooria	Roseglass	Wirradale and Wongala South	Wollandilly	
101: Derived Native Grassland					19.7					115.9	135.6
101: Poplar Box - Yellow Box - Western Grey Box grassy woodland					18.6					52.3	70.9
112: Black Tea-tree - River Oak - Wilga riparian low forest/shrubland wetland									7.5		7.5
1165: Derived Native Grassland				0.5					43.5		44
1165: Silvertop Stringybark - Orange Gum shrubby open forest				385.3					106.2		491.5
1306: Derived Native Grassland									46.7		46.7
1306: White Box - Red Stringybark shrubby woodlands				49.5					514.7		564.2
147: Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket							0.3				0.3
244: Derived Native Grassland	78.5		177.3								255.8
244: Poplar Box grassy woodland			14.6								14.6
413: Derived Native Grassland	2.3				56.8					265.2	324.3
413: Silver-leaved Ironbark - White Cypress Pine - box dry shrub grass woodland	5.3				27.8		25			85.3	143.4
427: Cypress pine - Tumbledown Red Gum low open woodland to grassland								49.6			49.6
429: White Cypress Pine - Poplar Box - Silver-leaved Ironbark viney shrub woodland	7.1										7.1
435: Derived Native Grassland			65.9		30	44.8	185.2	214.1	704.9	35.2	1280.1

Conservation Agreement Group	Kelso, Velyama and Louenville			Mt Lindsay	Oakleigh/Onavale	Teston South	Roseglass and Bimbooria		Wirradale and Wongala South	Wollandilly	Total
Plant Community Type	**Kelso**	**Louenville**	**Velyama**	**Mt Lindsay**	**Onavale**	**Teston South**	**Bimbooria**	**Roseglass**	**Wirradale and Wongala South**	**Wollandilly**	
435: White Box - White Cypress Pine shrub grass hills woodland	4	136.9	70.7		10.3	112.3	242.2	35.1	348.4	27.5	987.4
439: Mock Olive - Tumbledown Red Gum - Red Ash - Wilga siliceous rocky hill low woodland / shrubland								9.2			9.2
492: Derived Native Grassland				42.9					10.6		53.5
492: Silvertop Stringybark - Yellow Box - Apple Box - Rough-barked Apple shrub grass open forest				505.6					146.8		652.4
508: Blakelys Red Gum - Stringybark - Rough-barked Apple open forest				15.5							15.5
510: Blakelys Red Gum - Yellow Box grassy woodland				609.6					381.4		991
510: Derived Native Grassland				82.7					255.9		338.6
55: Belah woodland on alluvial plains			6		1.2	10.4					17.6
563: Derived Native Grassland									8.2		8.2
563: White Box - Silvertop Stringybark +/- White Cypress Pine grass shrub open forest									381.1		381.1
569: Derived Snow Grass +/- Kangaroo Grass +/- Wild Sorghum tussock grassland				123.3					10.6		133.9
571: Derived Native Grassland				45.7							45.7
571: Ribbon Gum - Rough-barked Apple - Yellow Box grassy woodland				35.8							35.8
572: Derived Native Grassland				0.6					1.2		1.8
572: Silvertop Stringybark - Bendemeer White Gum - Ribbon Gum open forest				435.4					80.5		515.9
574: Tea-tree riparian shrubland / heathland wetland				1.9							1.9
581: Tumbledown Red Gum - Dwyers Red Gum - Wallaby Bush shrubby woodland		0.7			5	11.3	96.8	20.8			134.6

Conservation Agreement Group	Kelso, Velyama and Louenville			Mt Lindsay	Oakleigh/Onavale	Teston South	Roseglass and Bimbooria		Wirradale and Wongala South	Wollandilly	Total
Plant Community Type	**Kelso**	**Louenville**	**Velyama**	**Mt Lindsay**	**Onavale**	**Teston South**	**Bimbooria**	**Roseglass**	**Wirradale and Wongala South**	**Wollandilly**	
588: Derived Native Grassland									127.5		127.5
588: White Box - White Cypress Pine shrubby hills open forest									379.7		379.7
592: Derived Native Grassland	52		31.5		3.7	7	32.1	90.4	3.2	28.4	248.3
592: Narrow-leaved Ironbark - cypress pine - White Box shrubby open forest	270.4	49.3	62.6		76.5	103	40.8	1044.3	851.3	86.2	2584.4
599: Blakelys Red Gum - Yellow Box grassy tall woodland										24.8	24.8
599: Derived Native Grassland										21.5	21.5
619: Derived Wire Grass grassland	28.5		91.3			44.6				57.1	221.5
736: Broad-leaved Stringybark - Mountain Gum - Apple Box open forest									24.1		24.1
736: Derived Native Grassland									4.3		4.3
78: River Red Gum riparian tall woodland / open forest wetland	40.9										40.9
81: Western Grey Box - cypress pine shrub grass shrub tall woodland						2.2					2.2
Not native	0.1	26	182.2	2.1	307.5	0.2	0.1	1	7.2	4.5	530.9
Total by Offset Area	**489.1**	**212.9**	**702.1**	**2336.4**	**557.1**	**335.8**	**622.5**	**1464.5**	**4445.5**	**803.9**	11969.8
Total by Conservation Agreement Group	**1404.1**			**2336.4**	**557.1**	**335.8**	**2087**		**4445.5**	**803.9**	11969.8

Table B. Area of Box-Gum Woodland CEEC Listed Under the EPBC Act within MCCM Offset Areas

Conservation Agreement Group		Kelso, Velyama and Louenville			Mt Lindsay	Oakleigh / Onavale	Roseglass and Bimbooria		Teston South	Wirradale and Wongala South	Wollandilly	Total
Offset Area		**Kelso**	**Louenville**	**Velyama**	**Mt Lindsay**	**Onavale**	**Bimbooria**	**Roseglass**	**Teston South**	**Wirradale and Wongala South**	**Wollandilly**	
Box Gum Woodland CEEC (Grassland Form)	435: Derived Native Grassland			3		30	160.3	94.3	17.6	704.4		1009.6
	510: Derived Native Grassland				81					255.9		336.9
	569: Derived Snow Grass +/- Kangaroo Grass +/- Wild Sorghum tussock grassland				92.5					10.6		103.1
	571: Derived Native Grassland				45.7							45.7
	599: Derived Native Grassland										17.3	17.3
Total Box Gum Woodland CEEC (Grassland Form) by Offset Area				3	219.2	30	160.3	94.3	17.6	970.9	17.3	1512.6
Total Box Gum Woodland CEEC (Grassland Form) by Conservation Agreement Group		3			219.2	30	254.6			970.9	17.3	1495
Box Gum Woodland CEEC (Woodland Form)	435: White Box - White Cypress Pine shrub grass hills woodland	4	36	58.8		10.3	212.9	19.5	63.1	348.4	27.5	780.5
	508: Blakelys Red Gum - Stringybark - Rough-barked Apple open forest				15.5							15.5
	510: Blakelys Red Gum - Yellow Box grassy woodland				609.6					381.4		991
	571: Ribbon Gum - Rough-barked Apple - Yellow Box grassy woodland				35.8							35.8
	599: Blakelys Red Gum - Yellow Box grassy tall woodland										24.8	24.8
Total Box Gum Woodland CEEC (Woodland Form) by Offset Area		4	36	58.8	660.9	10.3	212.9	19.5	63.1	729.8	52.3	1847.6
Total Box Gum Woodland CEEC (Woodland Form) by Conservation Agreement Group		98.8			660.9	10.3	232.4		63.1	729.8	52.3	1784.5
Total Box Gum Woodland CEEC by Offset Area		**4**	**36**	**61.8**	**880.1**	**40.3**	**373.2**	**113.8**	**80.7**	**1700.7**	**69.6**	3360.2
Total Box Gum Woodland CEEC by Conservation Agreement Group		**101.8**			**880.1**	**40.3**	**487**		**80.7**	**1700.7**	**69.6**	3360.2

Table C. Area of Endangered Ecological Communities Listed Under the EPBC Act within MCCM Offset Areas

Conservation Agreement Group		Kelso, Velyama and Louenville			Mt Lindsay	Oakleigh / Onavale	Roseglass and Bimbooria		Teston South	Wirradale and Wongala South	Wollandilly	Total
EEC Listed Under the EPBC Act	**Plant Community Type**	**Kelso**	**Louenville**	**Velyama**	**Mt Lindsay**	**Onavale**	**Bimbooria**	**Roseglass**	**Teston South**	**Wirradale and Wongala South**	**Wollandilly**	
Grey Box (Eucalyptus macrocarpa) Grassy Woodlands and Derived Native Grasslands of South-east Australia	81: Western Grey Box - cypress pine shrub grass shrub tall woodland								2.2			**2.2**
Poplar Box Grassy Woodland on Alluvial Plains	101: Poplar Box - Yellow Box - Western Grey Box grassy woodland										50.3	**50.3**
	244: Poplar Box grassy woodland			13.3								**13.3**
Semi-evergreen Vine Thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	147: Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket						0.3					**0.3**
Total EECs Listed Under the EPBC Act		**0**	**0**	**13.3**	**0**	**0**	**0.3**	**0**	**2.2**	**0**	**50.3**	**66.1**

Table D. Area of Box-Gum Woodland CEEC Listed Under the BC Act within MCCM Offset Areas

Conservation Agreement Group		Kelso, Velyama and Louenville			Mt Lindsay	Oakleigh / Onavale	Roseglass and Bimbooria		Teston South	Wirradale and Wongala South	Wollandilly	NEW TOTAL
Offset Area		**Kelso**	**Louenville**	**Velyama**	**Mt Lindsay**	**Onavale**	**Bimbooria**	**Roseglass**	**Teston South**	**Wirradale and Wongala South**	**Wollandilly**	
Box Gum Woodland CEEC (Grassland Form)	435: Derived Native Grassland			3		30	160.3	94.3	17.6	704.4		1009.6
	510: Derived Native Grassland				81					255.9		336.9
	569: Derived Snow Grass +/- Kangaroo Grass +/- Wild Sorghum tussock grassland				92.5					10.6		103.1
	571: Derived Native Grassland				45.7							45.7
	599: Derived Native Grassland										17.3	17.3
Total Box Gum Woodland CEEC (Grassland Form) by Offset Area				3	219.2	30	160.3	94.3	17.6	970.9	17.3	1512.6
Total Box Gum Woodland CEEC (Grassland Form) by Conservation Agreement Group		3			219.2	30	254.6		17.6	970.9	17.3	1512.6
Box Gum Woodland CEEC (Woodland Form)	435: White Box - White Cypress Pine shrub grass hills woodland	4	36	69.8		10.3	212.9	19.5	63.1	348.4	27.5	791.5
	508: Blakelys Red Gum - Stringybark - Rough-barked Apple open forest				15.5							15.5
	510: Blakelys Red Gum - Yellow Box grassy woodland				609.6					381.4		991
	571: Ribbon Gum - Rough-barked Apple - Yellow Box grassy woodland				35.8							35.8
	599: Blakelys Red Gum - Yellow Box grassy tall woodland										24.8	24.8
Total Box Gum Woodland CEEC (Woodland Form) by Offset Area		4	36	69.8	660.9	10.3	212.9	19.5	63.1	729.8	52.3	1858.6
Total Box Gum Woodland CEEC (Woodland Form) by Conservation Agreement Group		109.8			660.9	10.3	232.4		63.1	729.8	52.3	1858.6
Total Box Gum Woodland CEEC by Offset Area		**4**	**36**	**72.8**	**880.1**	**40.3**	**373.2**	**113.8**	**80.7**	**1700.7**	**69.6**	**3371.4**
Total Box Gum Woodland CEEC by Conservation Agreement Group		**112.8**			**880.1**	**40.3**	**487**		**80.7**	**1700.7**	**69.6**	**3371.4**

Table E. Area of Endangered Ecological Communities Listed Under the BC Act within MCCM Offset Areas

Conservation Agreement Group		Kelso, Velyama and Louenville			Mt Lindsay	Oakleigh / Onavale	Roseglass and Bimbooria		Teston South	Wirradale and Wongala South	Wollandilly	Total
EEC Listed Under the BC Act	**Plant Community Type**	**Kelso**	**Louenville**	**Velyama**	**Mt Lindsay**	**Onavale**	**Bimbooria**	**Roseglass**	**Teston South**	**Wirradale and Wongala South**	**Wollandilly**	
Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	81: Western Grey Box - cypress pine shrub grass shrub tall woodland								2.2			2.2
Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions	147: Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket						0.3					0.3
Total EECs Listed Under the BC Act							**0.3**		**2.2**			**2.5**

APPENDIX D

MAULES CREEK COAL MINE ADDITIONAL OFFSET AREAS VEGETATION MAPPING

Maules Creek Coal Mine Additional Offset Areas Vegetation Mapping

Prepared by AMBS Ecology & Heritage
for Whitehaven Coal Limited

Final

June 2021

AMBS Reference: 19764

Document Information

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AMBS Ref:	19764
Versions:	Final issued 30 June 2021

Executive Summary

The Maules Creek Coal Mine (MCCM) is subject to an approval (EPBC 2010/5566) granted under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act).

EPBC 2010/5566 requires its holder, Aston Coal 2 Pty Limited (Aston), to secure a package of offset areas which includes a specified quantity of EPBC Act listed White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland Critically Endangered Ecological Community and habitat for the regent honeyeater, swift parrot and greater long-eared bat.

Condition 11A of EPBC 2010/5566 provides for Aston to include replacement and new offsets in its package of offset areas (additional offset areas).

As per condition 11A(a) of EPBC 2010/5566, the primary purpose of this study is to identify and verify both the quantity and condition classes of the EPBC Act listed White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland Critically Endangered Ecological Community on additional offset areas within five properties referred to as "Triangle", "Long Gully", "Neranghi North", "Coonoor" and "Thornfield".

AMBS Ecology & Heritage Pty Ltd (AMBS) was engaged to undertake this study, which involved a desktop review of relevant information and field surveys of the vegetation across these five properties.

Based on AMBS' assessment, the confirmed quantity and condition classes of the EPBC Act listed White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland Critically Endangered Ecological Community within each of the additional offset areas is summarised in the below table:

	Area (ha) in each condition class		
Offset Area	**An overstorey of eucalypt trees exists, but there is no substantial native understorey.**	**A native understorey exists, but the trees have been cleared.**	**Both a native understorey and an overstorey of eucalypts exist in conjunction.**
Triangle	0	0	741.9
Long Gully	0	0	352.9
Neranghi North	0	0	567
Coonoor	0	0	573.9
Thornfield	0	5.4	7.3
Total	**0**	**5.4**	**2243**

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1 Introduction

1.1 Background and Purpose

Aston Coal 2 Pty Limited (Aston), a subsidiary of Whitehaven Coal Limited, is the holder of an approval under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) for the Maules Creek Coal Mine (MCCM).

Condition 9 of the EPBC Act approval for the MCCM (EPBC 2010/5566) states:

> **Direct Offsets**
>
> 9. The person taking the action must register legally binding conservation covenants over offset areas containing, to the satisfaction of the **Minister**, no less than:
>
> a. 9,334 ha of an equivalent or better quality of habitat for the regent honeyeater, swift parrot and greater long-eared bat; and
>
> b. 5,532 ha of an equivalent or better quality of the White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community.

For the purpose of meeting the direct offsets requirement under condition 9, condition 11A of EPBC 2010/5566 provides for Aston to include replacement and new offsets in its package of offset areas (additional offset areas). Condition 11A states:

> **Replacement and new offsets**
>
> 11A. For the purpose of condition 9, the offset areas may include additional offset areas to the offset areas which were the subject of **independent review** under conditions 10 and 11 if:
>
> a) the person taking the action submits a report to the **Minister** for approval, which has been subject to **additional independent review**, that identifies and verifies the quantity and **condition classes** of White Box—Yellow Box— Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community and the quantity and quality of **habitat** for the regent honeyeater, swift parrot and greater long-eared bat within the additional offset areas;
>
> b) that report is submitted to the **Minister** for approval by 30 June 2022, unless otherwise agreed by the **Minister** in writing; and
>
> c) the **Minister** has approved that report.
>
> The person taking the action must publish the report on its website within 30 days of the **Minister's** approval, unless otherwise agreed by the **Minister** in writing.

AMBS Ecology & Heritage Pty Ltd (AMBS) was engaged to undertake vegetation surveys across five properties referred to as “Triangle”, “Long Gully”, “Neranghi North”, “Coonoor” and “Thornfield”. Defined areas within these five properties are proposed as additional offset areas under condition 11A of EPBC 2010/5566.

As per condition 11A(a) of EPBC 2010/5566, the primary purpose of this study is to identify and verify both the quantity and "condition classes"[1] of the EPBC Act listed White Box-Yellow Box-Blakely’s Red Gum Grassy Woodland and Derived Native Grassland Critically Endangered Ecological Community within these additional offset areas.

[1] This is defined to mean: "One of three states in which the White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community may exist, as defined within the Commonwealth listing advice for the listing of this ecological community as critically endangered under the EPBC Act."

Part 4 of the Commonwealth listing advice (TSSC 2006) states:

> The White Box – Yellow Box – Blakely's Red Gum grassy woodlands that existed prior to European settlement now exists as remnants in three different states.
>
> The three states are:
> • An overstorey of eucalypt trees exists, but there is no substantial native understorey.
> • A native understorey exists, but the trees have been cleared.
> • Both a native understorey and an overstorey of eucalypts exist in conjunction.

This study forms one part of the report required under condition 11A of EPBC 2010/5566. The study titled "Maules Creek Coal Mine Additional Offset Areas Habitat Mapping" (AMBS 2021) forms the other part of the report required under condition 11A of EPBC 2010/5566.

The report (comprising both studies) will be subject to "additional independent review", and ultimately submitted to the Minister for approval, under condition 11A.

1.2 Scope and Objectives

The scope of work for this study involves the survey and documentation of native vegetation communities and threatened ecological communities (TECs) within the proposed offset areas selected on each of the five properties. The objectives of the study include the following:

- description of plant community types (PCTs) within the study area, including:
  - species relied upon for identification of vegetation type and relative abundance;
  - justification of evidence used to identify a PCT;
  - mapping of the extent of vegetation communities within the study area, including cleared areas; and
- identification and mapping of TECs according to the relevant State and Commonwealth listings under the New South Wales (NSW) *Biodiversity Conservation Act 2016* (BC Act) and the EPBC Act.

1.3 Location of the Study Areas

The Triangle property is located approximately 15 kilometres (km) west of the township of Barraba, NSW. The Long Gully property is located approximately 5 km south of the township of Tingha, NSW. The Neranghi North and Coonoor properties are located approximately 25 km and 23 km north-east of the township of Barraba, NSW, respectively. The Thornfield property is located between the existing Wollandilly and Onavale offset areas, approximately 24 km north-east of Boggabri, NSW. The locations of the properties are shown on Figure 1.1. The area covered by the proposed offset area on each property is shown in Table 1.1.

Table 1.1 Area of Proposed Offset Area on Each Property

Proposed Offset Area	Area (ha)
Triangle	741.9
Long Gully	352.9
Neranghi North	567.1
Coonoor	574.1
Thornfield	171.3
Total	**2,407.3**

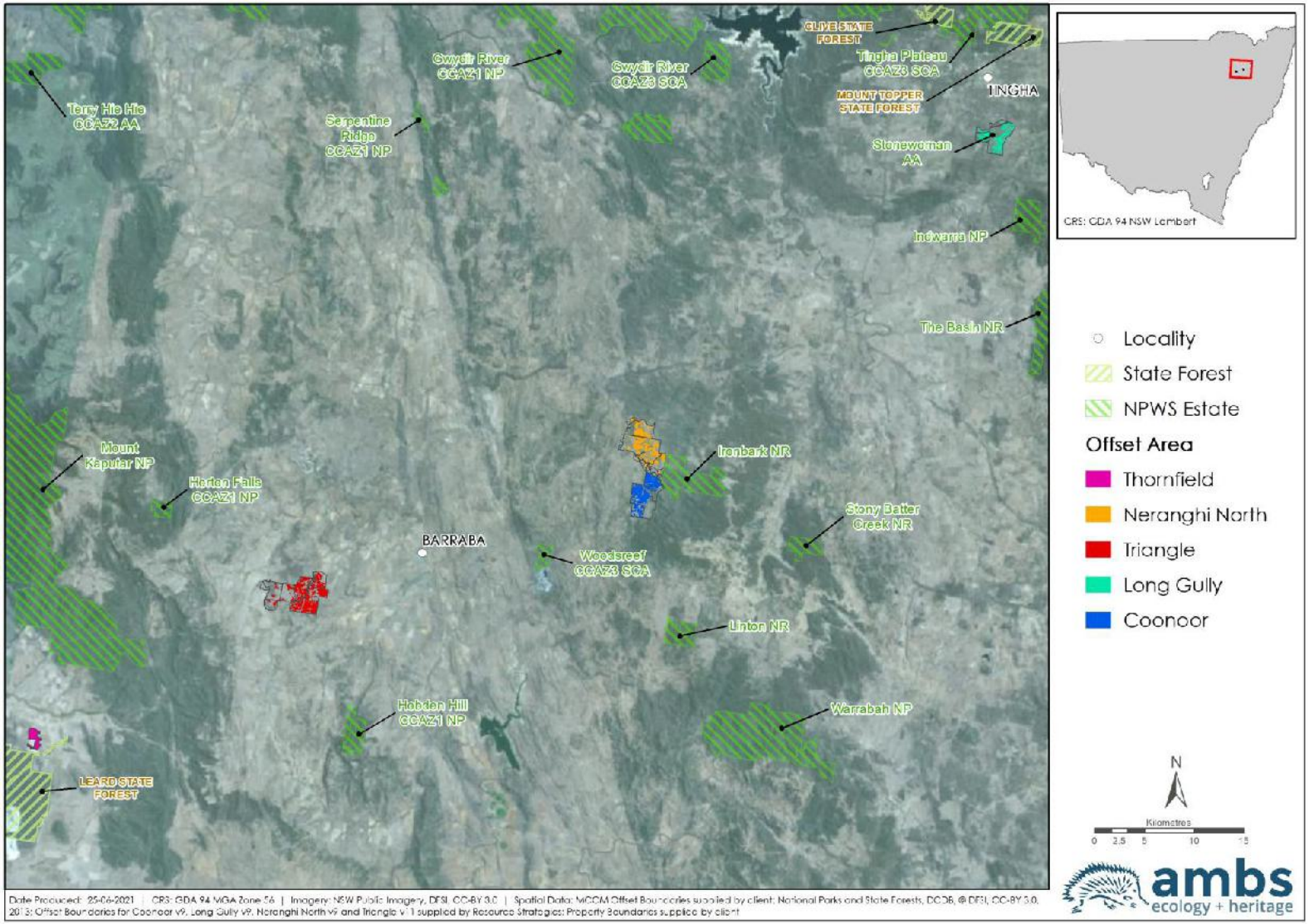

Figure 1.1 Location of the Study Area

1.4 Bioregion and Landscape

The Triangle property is in the Peel Interim Biogeographic Regionalisation for Australia (IBRA) Sub-region of the Nandewar Bioregion (Department of Agriculture, Water and the Environment [DAWE] 2021). The property includes alluvial flats, low hills and steeper ridges.

The Long Gully property is in the Tingha Plateau Interim Biogeographic Regionalisation for Australia (IBRA) Sub-region of the New England Tablelands Bioregion (DAWE 2021). The property includes low hills, flats and ephemeral creeklines.

The Neranghi North and Coonoor properties lie on the boundary of the Peel IBRA Sub-region of the Nandewar Bioregion and the Eastern Nandewar Sub-region of the New England Tablelands Bioregion (DAWE 2021). The properties include alluvial flats, low hills and steeper ridges.

The Thornfield property is in the Liverpool Plains IBRA Sub-region of the Brigalow Belt South Bioregion (DAWE 2021). The property includes alluvial flats and low hills.

1.5 Climate

Weather records for the Triangle property were taken from the Barraba (Clifton Lane) meteorological station (54003), which is approximately 13.2 km from the property (Bureau of Meteorology [BoM] 2021). Annual rainfall in the locality of the Triangle property has been observed to be highly variable between 1990-2019, with a mean annual rainfall of 667 millimetres (mm) and ranging from 118 mm in 2019 to 980 mm in 1996 (BoM Station 54003). The seven years from 2013-2019 had mostly below average annual rainfall, in particular in 2019 (118 mm). However, mean annual rainfall was above average in 2020 (817 mm).

For the Triangle property, the average minimum temperature of the coldest month (July) is 0.2 degrees Celsius (°C) and the average maximum temperature of the coldest month is 16.3°C. The average minimum temperature of the warmest month (January) is 16.6°C and the average maximum temperature of the warmest month is 32.1°C.

Temperature records for the Long Gully property were taken from the Inverell Research Centre meteorological station (56018) and rainfall records from the Tingha Post Office meteorological station (56033) and Inverell (Raglan St) (56242), which are approximately 29 km, 6.1 km and 27.4 km from the property respectively (BoM 2021). Annual rainfall in the locality of the Long Gully property has been observed to be highly variable between 1990-2019, with a mean annual rainfall of 787 mm and ranging from 285 mm in 2019 to 1059 mm in 2011 (BoM Station 56033). The seven years from 2013-2019 had mostly below average annual rainfall and the previous two years have seen considerably below average rainfall, with 512 mm recorded in 2018 and 285 mm in 2019. However, monthly rainfall in the months of January, February, March, April (BoM station 56033) and October 2020 (BoM station 56242) was higher than average.

For the Long Gully property, the average minimum temperature of the coldest month (July) is 3.7°C and the average maximum temperature of the coldest month is 16.2°C (BoM station 56018). The average minimum temperature of the warmest month (January) is 16.7°C and the average maximum temperature of the warmest month is 30.6°C.

Rainfall records for the Neranghi North and Coonoor properties were taken from the Barraba (Neranghi) meteorological station (54023) and temperature records from the Barraba (Clifton Lane) meteorological station (54003), which are situated approximately 3.4 km and 25 km from the property respectively (BoM 2021). Where rainfall data were not available for BoM Station 54023 (for October 2020), rainfall data from BoM station 54003 were used. Annual rainfall in the

locality of the Neranghi North property has been observed to be highly variable between 1990-2019, with mean annual rainfall of 697 mm and ranging from 199 mm in 2019 to 961 mm in 2011. The seven years from 2013-2019 had mostly below average rainfall and the previous two years have seen considerably below average rainfall, with 465 mm recorded in 2018 and 199 mm in 2019. However, monthly rainfall in the months of January, February, March, April, May and August 2020 was higher than the 1990-2019 monthly averages. A total of 24.4 mm of rainfall was recorded in the month prior to surveys being undertaken on the Neranghi North property. The only rainfall recorded during the survey period was 3.8 mm on 13 October 2020. A total of 219 mm of rainfall was recorded in the month prior to surveys being undertaken on the Coonoor property. No rainfall was recorded during the survey period.

For the Neranghi North and Coonoor properties, the 1990-2019 average minimum temperature of the coldest month (July) is 0.3°C and the average maximum temperature of the coldest month is 16.7°C. The average minimum temperature of the warmest month (January) is 16.9°C and the average maximum temperature of the warmest month is 32.8°C.

Rainfall records for the Thornfield property were taken from the Boggabri (Kanownda) meteorological station (55076) and temperature records from the Narrabri (Airport) meteorological station (54038) which are situated approximately 8 km and 35.1 km from the property (BoM 2021). Annual rainfall in the locality of the Thornfield property has been observed to be highly variable between 1990-2019, with mean annual rainfall of 599.2 mm and ranging from 244.5 mm in 2019 to 877 mm in 2011. The seven years from 2013-2019 had mostly below average rainfall and the previous two years have seen considerably below average rainfall, with 390.5 mm recorded in 2018 and 244.5 mm in 2019. However, monthly rainfall in the months of January, February, March, April, May, and August 2020 was higher than the 1990-2019 monthly averages. A total of 30.8 mm of rainfall was recorded in the month prior to surveys being undertaken on the property. No rainfall was recorded during the survey period.

For the Thornfield property, the 1990-2019 average minimum temperature of the coldest month (July) is 0.4°C and the average maximum temperature of the coldest month is 16.7°C. The average minimum temperature of the warmest month (January) is 16.8°C and the average maximum temperature of the warmest month is 32.8°C.

1.6 Topography and Drainage

The Triangle property consists of low rolling hills with some steeper ridges and lies in the Manilla River sub-catchment of the Namoi River catchment. The main drainage lines on the property are the Manilla River, which forms part of the western boundary of the property and Hawkins Creek, which drains into it (Geoscience Australia 2021a).

The topography of the Long Gully property consists of low rolling hills and flats in the Copes Creek sub-catchment of the Gwydir River catchment. The main drainage lines on the property are Boughyard, Rooney's and Long Creeks, which drain into north into Sutherland Waters and then into Copes Creek (Geoscience Australia 2021a).

The topography of the Neranghi North property consists of undulating to rolling slopes with low hills and lies within the Macdonald/Manilla sub-catchment of the Namoi River catchment. The main drainage lines on the property are Ironbark, Long Swamp, Boiling Swamp and Saveall Creeks, which converge and drain into the Manilla River to the South-West of the property (Geoscience Australia 2021a).

The topography of the Coonoor property consists primarily of low rolling hills, with some steeper ridges and alluvial flats. The main drainage lines on the property are Long Swamp and Boiling Swamp Creeks, which flows north west into Ironbark Creek, a tributary of the Manilla river (Geoscience Australia 2021a).

The topography of the Thornfield property consists primarily of alluvial flats with some low, rolling hills. The main drainage line on the property is Back Creek, an ephemeral tributary of Maules Creek (Geoscience Australia 2021a).

Table 1.2 shows the minimum and maximum elevation at each property.

Table 1.2 Elevation within Each Property Derived from Geoscience Australia 1 Second DEMs

Property	Min (m)	Max (m)
Triangle	590	820
Long Gully	806	891
Neranghi North	560	820
Coonoor	600	880
Thornfield	316	370

Note: m = metres.

1.7 Geology and Soils

The surface lithology of the Triangle property primarily consists of Devonian siltstone and mudstones, with small areas of intrusive basaltic rock, mainly in the west of the property (Geoscience Australia 2021b). Soils on the property are primarily Sodosols, with some areas of Rudosols and Tenosols (Department of Planning, Industry and Environment [DPIE] 2021a).

The surface lithology of the Long Gully property primarily consists of fine-grained granites and adamellites (Geoscience Australia 2021b). Soils on the property are primarily relatively low fertility Sodosols, Rudosols and Tenosols (DPIE 2021a).

The surface lithology of the Neranghi North and Coonoor properties primarily consists of Devonian-Carboniferous sedimentary rocks including quartz-rich pebbly sandstone, and Permian S-type granites to a lesser extent (Geoscience Australia 2021b). Soils on the property are primarily Rudosols and Tenosols, with a minor occurrence of Chromosols and Sodosols (DPIE 2021a).

The surface lithology of the Thornfield property primarily consists of early Permian sedimentary claystones and sandstones (Geoscience Australia 2021b). Soils on the property are primarily Chromosols and Sodosols (DPIE 2021a).

1.8 Land Use and Disturbance

The primary historical land use of the Triangle, Long Gully, Neranghi North, Coonoor and Thornfield properties is grazing of natural and improved pastures, with a small amount of cropping on the Triangle, Neranghi North and Thornfield properties (DPIE 2021b).

1.9 Fire History

No recent wildfires or prescribed burns were recorded on the Triangle property in recent years by either Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) (ABARES 2018) or NSW National Parks and Wildlife Service (NPWS) (NPWS 2020).

The most recent wildfire recorded within the Long Gully property was the Tingha Plateau Wildfire, which impacted patches in the north-west of the study area in 2019 (NPWS 2020).

The northern and eastern sections of Neranghi North were impacted by the Bonnay Tamworth Wildfire in 2018 (NPWS 2020).

Parts of Coonoor were impacted by the 2018-19 Rockview bushfire and again during the recent 2019-20 Bonnay Rd bushfire, however the offset area was not impacted (NPWS 2020).

No recent wildfires or prescribed burns were recorded on the Thornfield property in recent years by either ABARES (2018) or NPWS (2020).

Figures 1.2 to 1.4 show the impact of recent fires on the proposed offset areas.

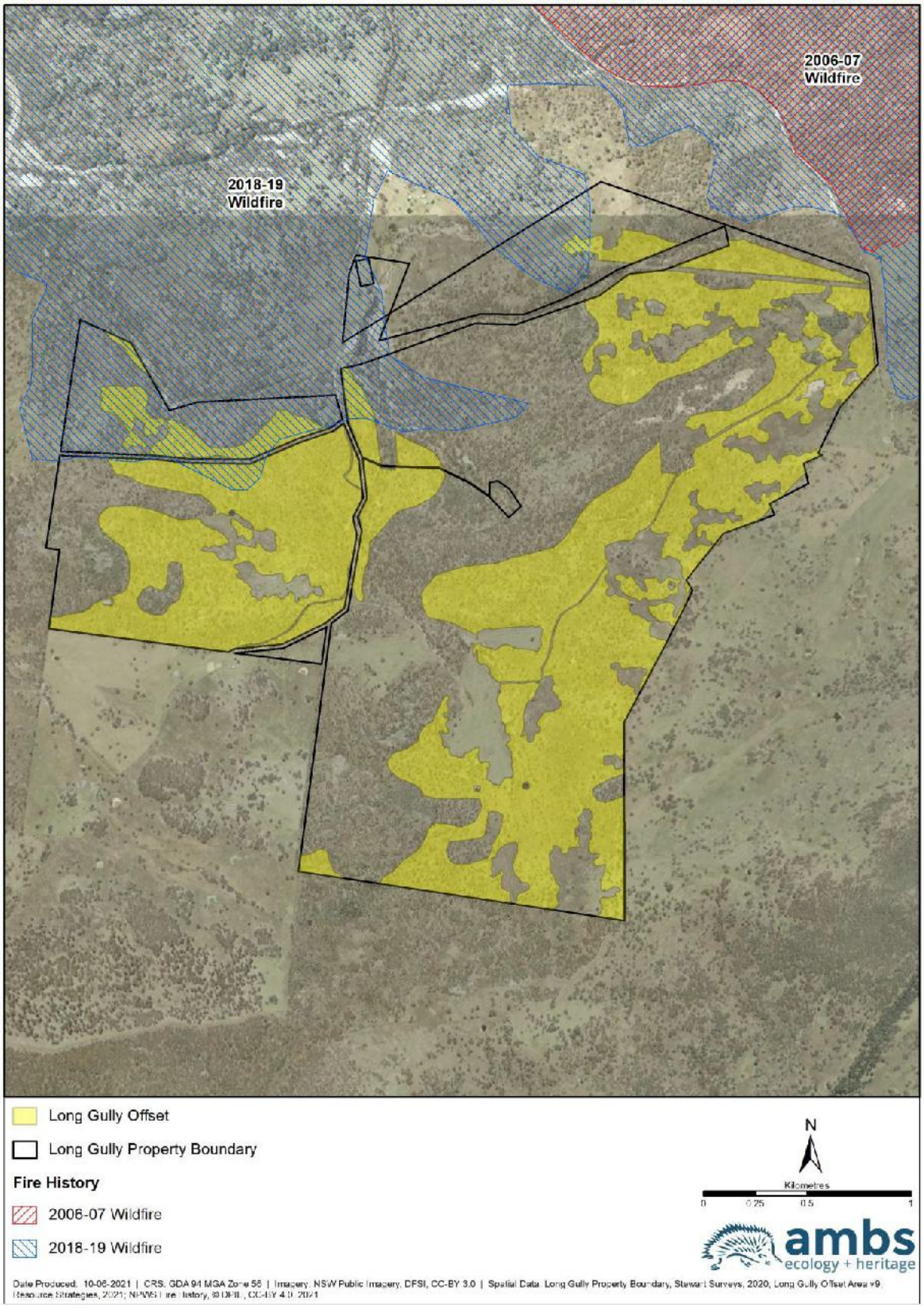

Figure 1.2 Recent Fires on the Long Gully Property

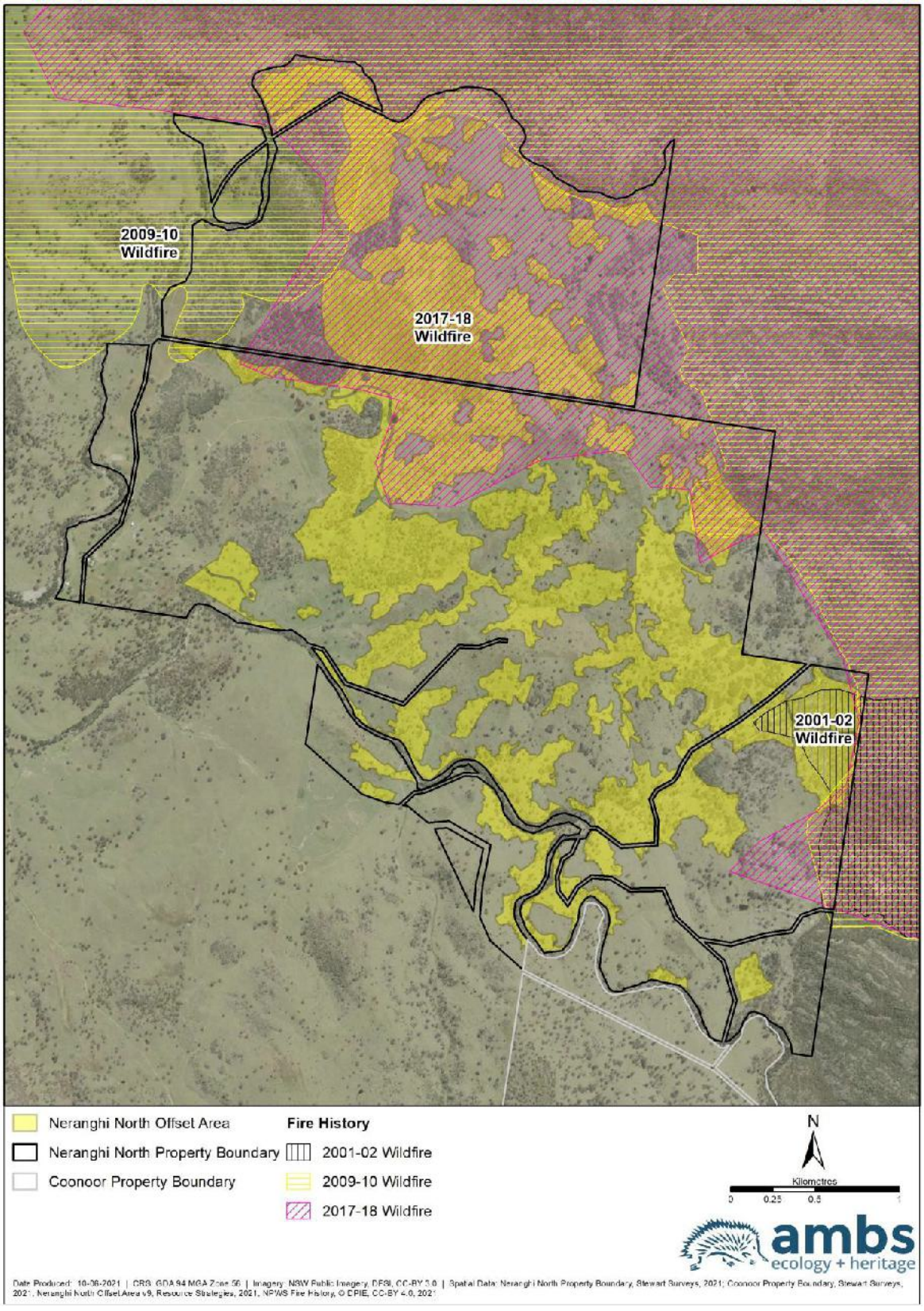

Figure 1.3 Recent Fires on the Neranghi North Property

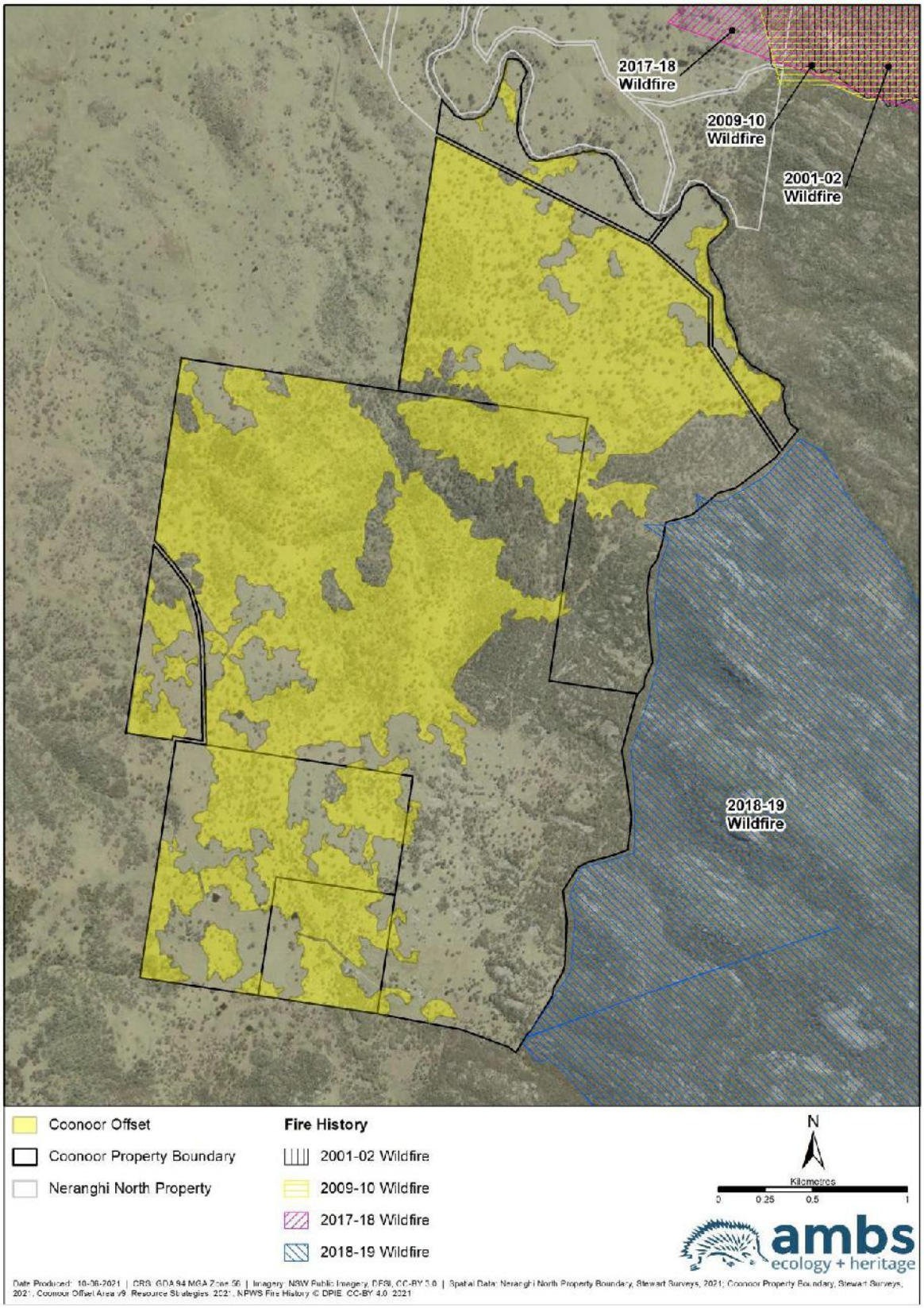

Figure 1.4 Recent Fires on the Coonoor Property

2 Methods

2.1 Desktop and Literature Review

A review of the following database information covering the study area was undertaken:

- *Regional vegetation mapping for the Border River/Gwydir and Namoi regions* (OEH 2015).
- *Australian Soil Classification mapping, NSW* (DPIE 2021a).
- *BioNet Atlas systematic flora survey database* (DPIE 2021c).
- *BioNet Atlas vegetation classification database* (DPIE 2021e).
- *Great Soils Group Mapping, NSW* (DPIE 2021d).
- *National Surface Water Information: Surface Hydrology Lines - Regional* (Geoscience Australia 2021a).
- *Continental Geology Section: 1:250 000 geological map series* (Geoscience Australia 2021b).
- *Fires in Australia's Forests 2011-16* (ABARES 2018).
- *Fire History - Wildfires and Prescribed Burns* (NPWS 2020).

2.2 Field Surveys

2.2.1 Timing

Field surveys were undertaken between 14 July 2020 and 1 April 2021. Target plot locations were selected based on regional vegetation mapping (OEH 2015), visual assessment of vegetation patterns and topographic position. Field surveys were supervised by Michael Somerville. Michael is a botanist with over 14 years' professional experience and specialist technical knowledge in the field. He is an accredited Biodiversity Assessment Method (BAM) assessor. Personnel experience and qualifications are given below in Table 2.1.

Table 2.1 Experience and Qualifications of Survey Personnel

Name	Company	Qualifications	Experience
Michael Somerville	AMBS	Bachelor of Science	14 years' experience
		Graduate Diploma in Natural Resource Management	
		Accredited BAM Assessor	
Gabriella Hoban	AMBS	Bachelor of Environmental Management (Ecology)	4 years' experience
Dr James Schlunke	AMBS	Bachelor of Science (Honours)	10 years' experience
		PhD	
		Accredited BAM Assessor	
Tom O'Sullivan	AMBS	Master of Environmental Studies	24 years' experience
Mark Robinson	AMBS	Associate Diploma in Horticulture	30 years' experience
		Graduate Diploma in Environment Management	
		Master of Environment & Restoration	
Elise Connolly	AMBS	Diploma of Conservation and Land Management	7 years' experience
		Advanced Diploma of Environmental Management	
		Accredited BAM Assessor	
Dr Colin Bower	Premise	Bachelor of Science (Honours)	30 years' experience
		PhD	
		Accredited BAM Assessor	
Sally Kirby	Premise	Bachelor of Science	20 years' experience
Isobel Colson	Premise	Bachelor of Science (Honours)	6 years' experience

A summary of the field survey dates, areas surveyed, and personnel are provided in Table 2.2.

Table 2.2 Survey Timing and Personnel

Dates	Property Surveyed	Personnel
6-13 Oct 2020	Triangle	Michael Somerville, James Schlunke, Tom O'Sullivan, Manuel Lequerica Tamara, Colin Bower, Isobel Colson, Sally Kirby, Gabriella Hoban
2-4 Feb 2021	Triangle	Tom O'Sullivan, Manuel Lequerica Tamara
20-23 Oct 2020	Long Gully	Michael Somerville, James Schlunke, Elise Connolly, Tom O'Sullivan, Mark Robinson
9-12 Feb 2021	Long Gully	Tom O'Sullivan, Anne Baumann
29 Sept-1 Oct 2020	Neranghi North	Mark Robinson, Gabriella Hoban
20-22 Oct 2020	Neranghi North	Michael Somerville, James Schlunke, Tom O'Sullivan, Gabriella Hoban, Mark Robinson, Colin Bower, Isobel Colson
9-11 Mar 2021	Neranghi North	James Schlunke, Anne Baumann
1-3 Dec 2020	Coonoor	Michael Somerville, James Schlunke, Mark Robinson, Elise Connolly, Manuel Lequerica Tamara
23-26 Feb 2021	Coonoor	James Schlunke, Mark Robinson
30 Mar-1 Apr 2021	Coonoor	James Schlunke, Tom O'Sullivan
14 and 22 July 2020	Thornfield	Michael Somerville, James Schlunke, Gabriella Hoban

2.2.2 Weather Conditions

Total rainfall, average maximum temperatures and average minimum temperatures for each survey period are given in Table 2.3.

Table 2.3 Weather Conditions During Survey Periods

Dates	Property Surveyed	Rainfall Total (mm)	Temp Av. Max (°C)	Temp Av. Min (°C)
6-13 Oct 2020	Triangle	3.8	26.7	6.3
2-4 Feb 2021	Triangle	11.6	30.1	14.8
20-23 Oct 2020	Long Gully	4.4	24.4	10.6
9-12 Feb 2021	Long Gully	0	28.9	12.9
29 Sept-1 Oct 2020	Neranghi North	1.2	21.7	3.2
20 Oct-22 Oct 2020	Neranghi North	12.2	25.8	10.8
9-11 Mar 2021	Neranghi North	29	23.7	15.1
1-3 Dec 2020	Coonoor	3	38.7	20.8
23-26 Feb 2021	Coonoor	37.4	27.9	14.5
30 Mar-1 Apr 2021	Coonoor	0	24.8	7.5
14 and 22 July 2020	Thornfield	0	16.55	5.1

2.2.3 Floristic Plots

A total of 55 full floristic plots were collected at the Triangle property, 26 at the Long Gully property, 29 at the Neranghi North property, 33 at the Coonoor property and 1 at the Thornfield property (Figures 2.1 – 2.5). Information on dominant species, native species diversity, weed cover and shrub cover was recorded in order to assess areas against the EPBC Act criteria for the Box-Gum Woodland CEEC (Threatened Species Scientific Committee [TSSC] 2006).

Full floristic plots were undertaken within a 20 m x 20 m quadrat, nested within a 20 m x 50 m transect. Table 2.4 below provides a summary of data collected at full floristic plots.

Table 2.4 Attributes collected in full floristic plots

Attribute	20 m x 20 m	20 m x 50 m
Notes on landform	Yes	
Notes on soils and parent geology	Yes	
Overall cover of each stratum	Yes	
All flora species along with cover, abundance, stratum and growth form	Yes	
Assessment of native shrub cover at 5 m intervals		Yes
Assessment of native grass cover at 5 m intervals		Yes
Count of total number of regenerating overstorey individuals <5 m Diameter at Breast Height (DBH) (also recorded by species)		Yes
Count of total number of regenerating overstorey individuals 5-40-centimetre (cm) DBH (also recorded by species)		Yes
Count of total number of mature overstorey individuals >40 cm DBH (also recorded by species)		Yes
Total length of fallen logs		Yes
Count of trees with hollows		Yes
Landscape and portrait photo taken from each end of transect		Yes

Threatened plant species were opportunistically recorded (rather than targeted) during the survey work.

2.2.4 Rapid Data Points

A total of 91 rapid data points were undertaken at the Triangle property, 77 at the Long Gully property, 100 at the Neranghi North property, 66 at the Coonoor property and 6 at the Thornfield property. Rapid data points were collected in order to assist in the delineation of patch boundaries and to provide additional information for the assessment of patches against the relevant criteria for the Box-Gum Woodland CEEC. At each of these points the dominant canopy species were recorded and, if relevant, notes on exotic dominance and shrub cover. At a subset of these points additional data were collected including an assessment of native cover and height of each stratum, notes on other relevant features and a photograph of the vegetation. The locations of rapid data points sampled by AMBS are shown in Figures 2.1 – 2.5.

2.2.5 Plant Community Type Identification

A multivariate cluster analysis of full floristic plot data was undertaken to develop a set of floristic groups. The cluster analysis is described in more detail in Section 2.3. The resulting groups were then assigned to PCTs based on the characteristic species of the group as well as abiotic variables of the associated plot locations, including soils, geology and topography. Assignment of groups to PCT was based on the published descriptions and associated data for PCTs included in the *BioNet Vegetation Classification Database* (DPIE 2021e). Rapid data points and a small number of full floristic plots that were undertaken after the cluster analysis were then assigned individually to PCTs based on dominant species and abiotic features.

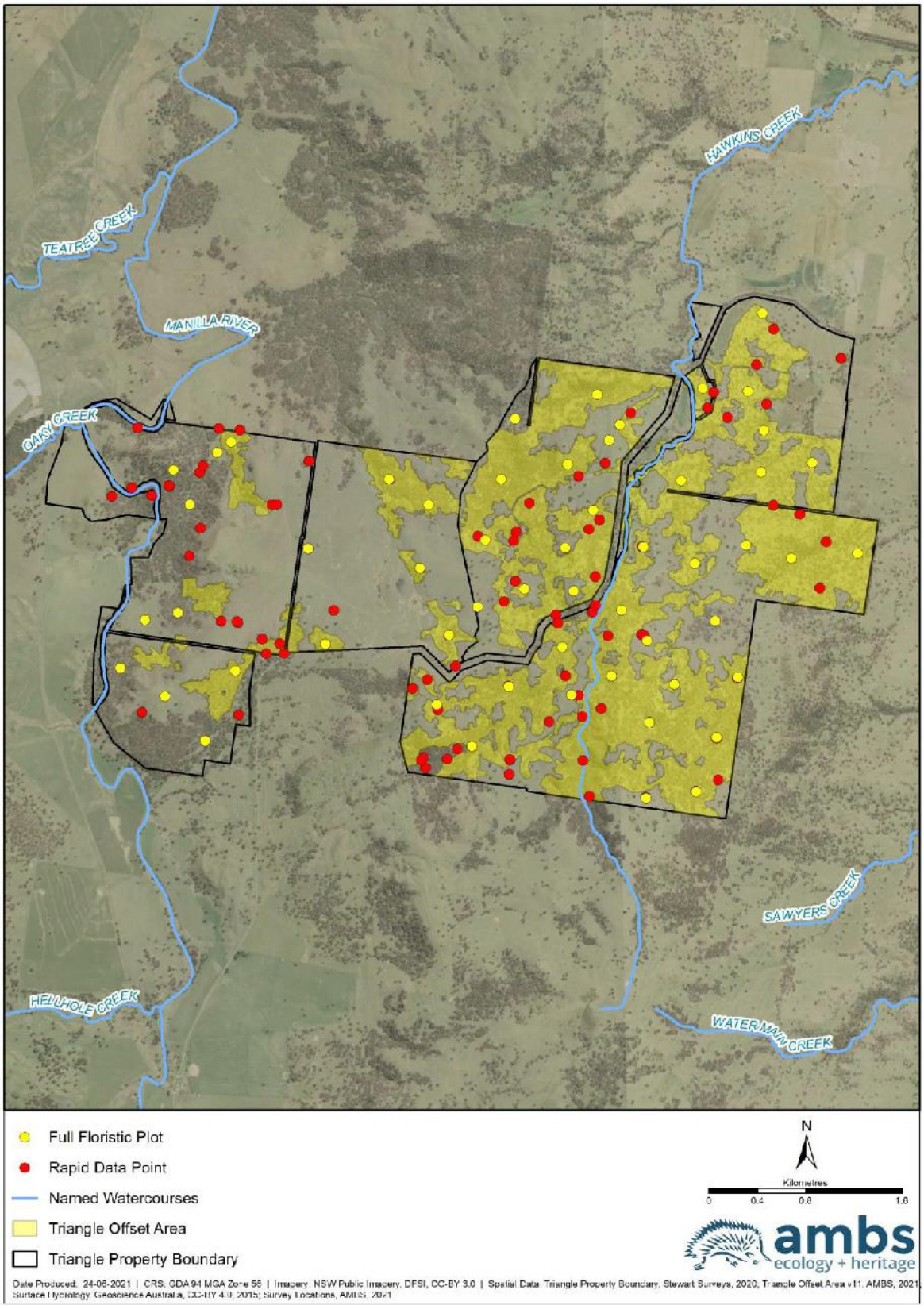

Figure 2.1 Locations of Full Floristic Plots and Rapid Data Points on the Triangle Property

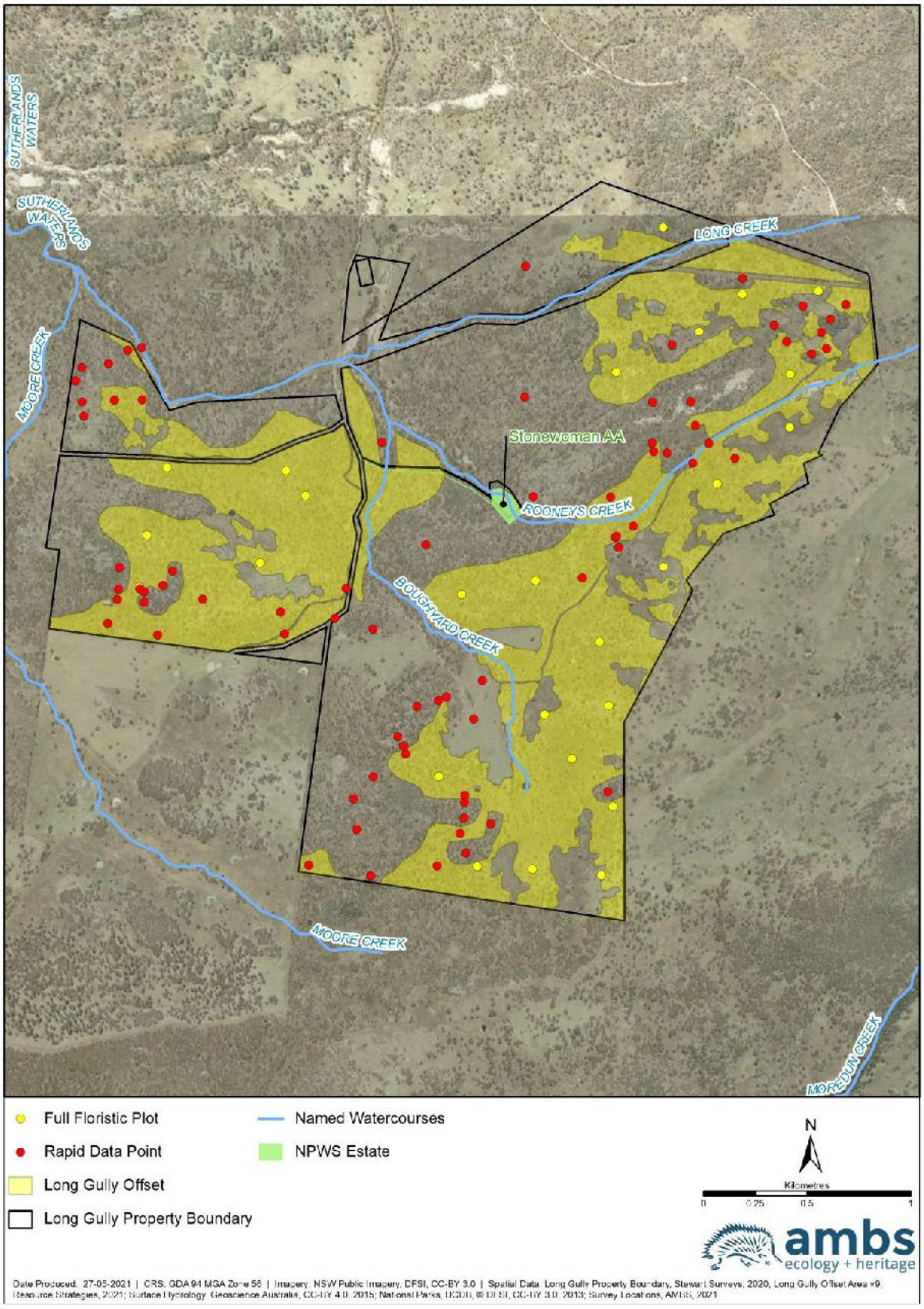

Figure 2.2 Locations of Full Floristic Plots and Rapid Data Points on the Long Gully Property

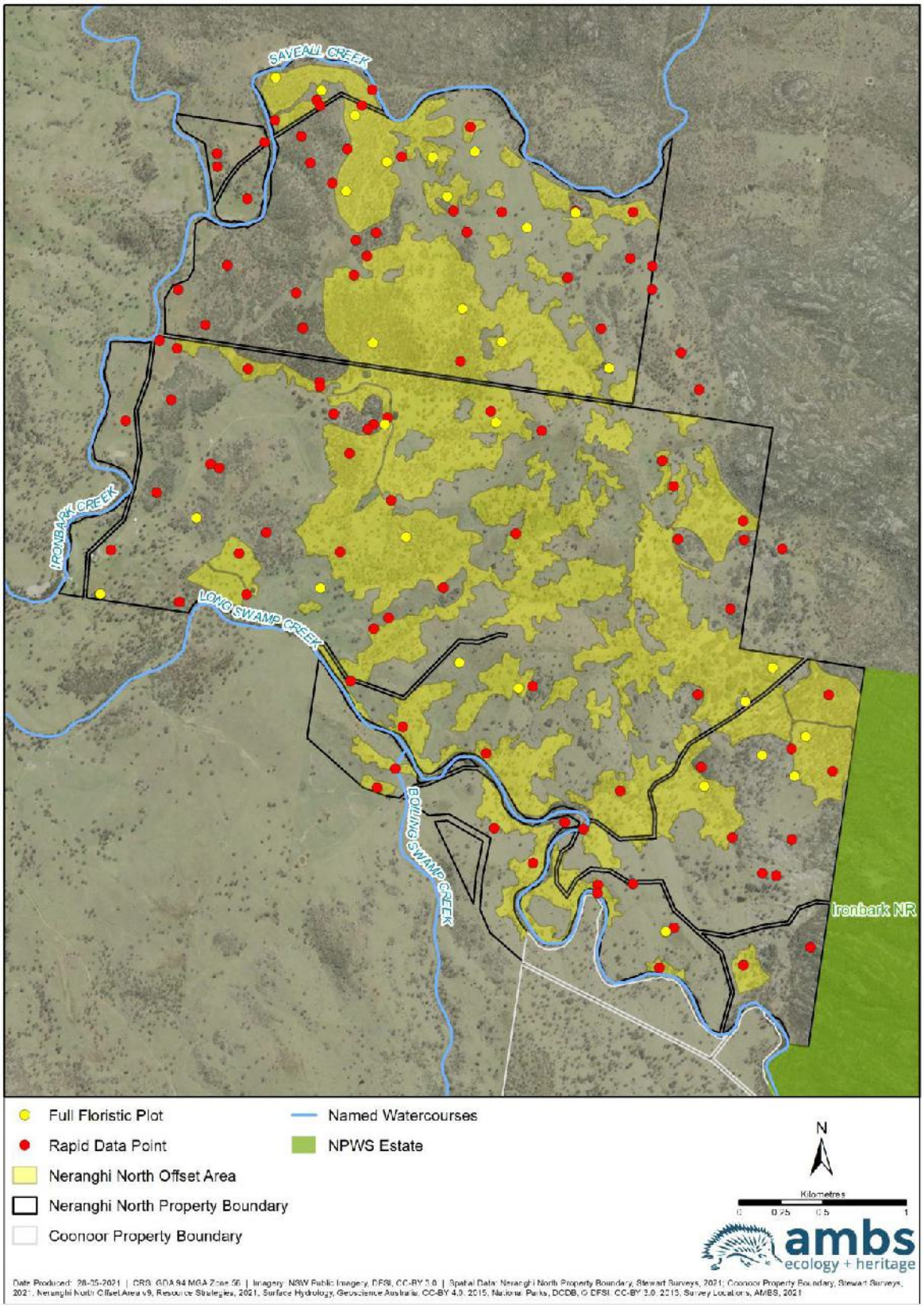

Figure 2.3 Locations of Full Floristic Plots and Rapid Data Points on the Neranghi North Property

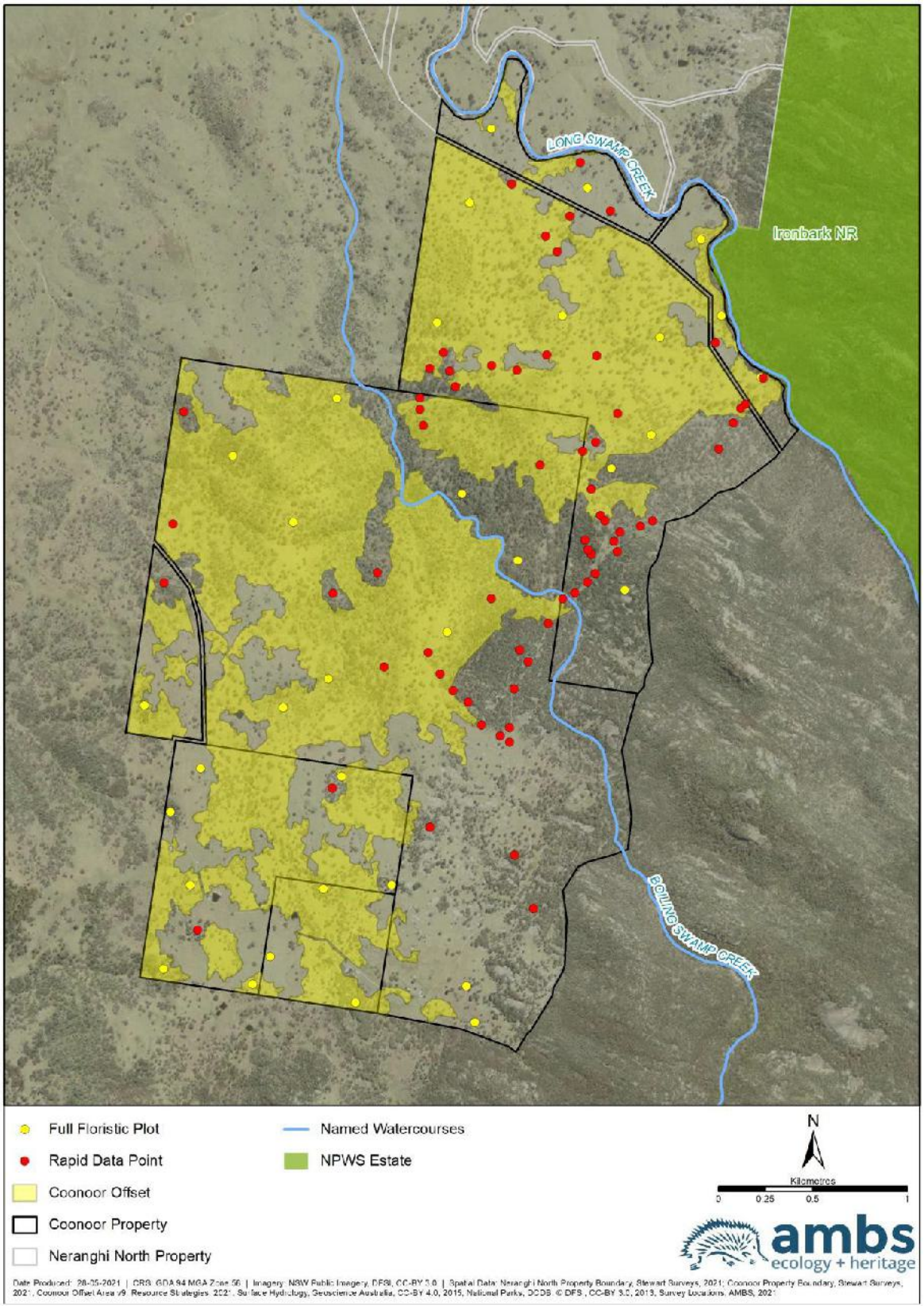

Figure 2.4 Locations of Full Floristic Plots and Rapid Data Points on the Coonoor Property

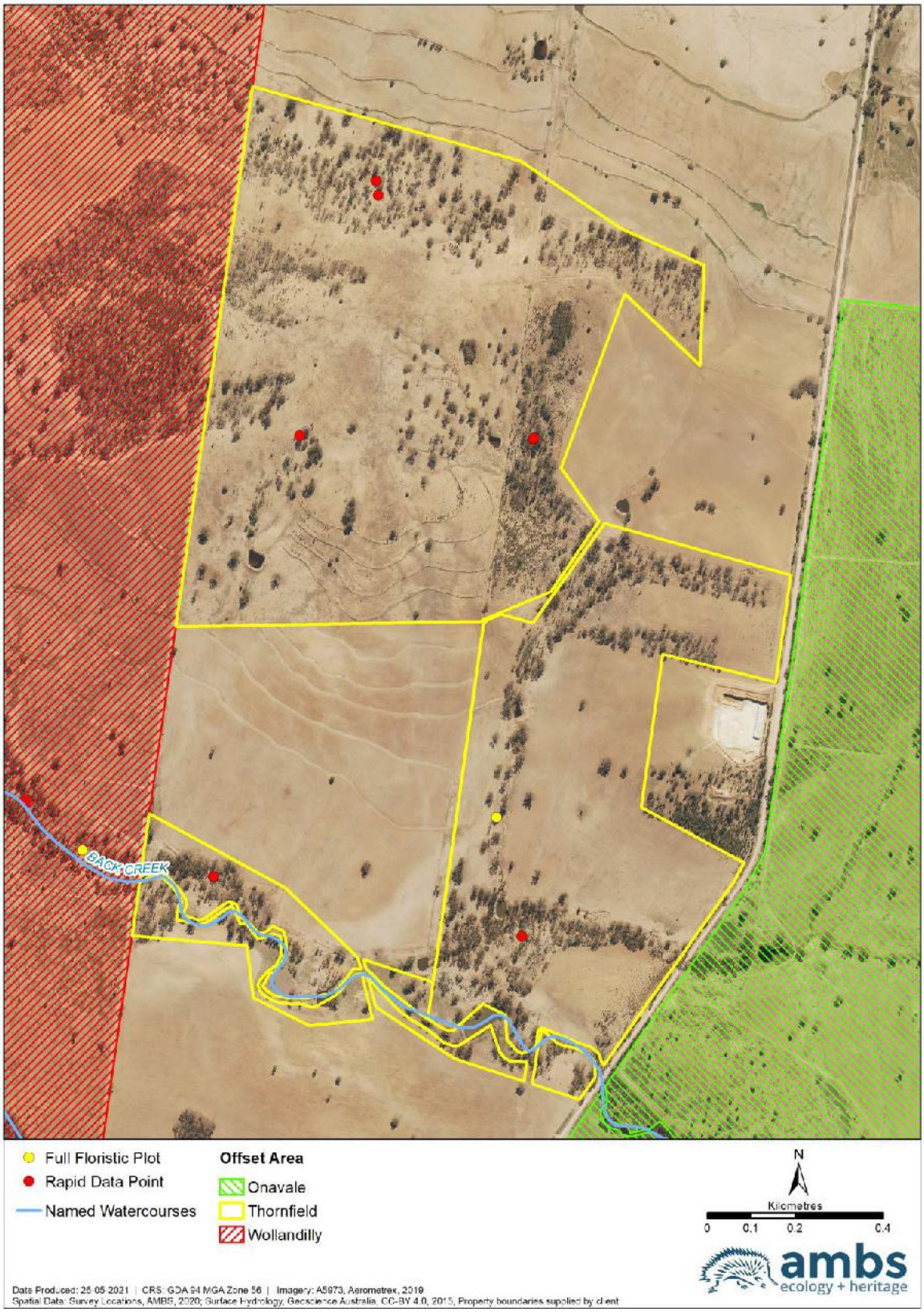

Figure 2.5 Locations of Full Floristic Plots and Rapid Data Points on the Thornfield Property

2.2.6 Box-Gum Woodland CEEC Identification and Mapping

Box-Gum Woodland CEEC listed under the EPBC Act

Areas with the potential to fit the criteria for the Box-Gum Woodland CEEC were sampled with both full floristic plots and rapid data points. This data was used to assess patches against the *Commonwealth Listing Advice on White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* (Box-Gum Woodland CEEC Listing Advice) (TSSC 2006). Vegetation community boundaries were assigned on the basis of data and observations collected in the field and aerial photograph interpretation. The following criteria, taken from the Box-Gum Woodland CEEC Listing Advice (TSSC 2006) were used to assess areas for mapping as the Box-Gum Woodland CEEC:

- *Box – Gum Grassy Woodlands and Derived Grasslands are characterised by a species-rich understorey of native tussock grasses, herbs and scattered shrubs, and the dominance, or prior dominance, of White Box, Yellow Box or Blakely's Red Gum trees. In the Nandewar Bioregion, Grey Box (Eucalyptus microcarpa or E. moluccana) may also be dominant or codominant. The tree-cover is generally discontinuous and consists of widely-spaced trees of medium height in which the canopies are clearly separated.*
- *Associated, and occasionally co-dominant, trees include, but are not restricted to: Grey Box (Eucalyptus microcarpa), Fuzzy Box (E. conica), Apple Box (E. bridgesiana), Red Box (E. polyanthemos), Red Stringybark (E. macrorhyncha), White Cypress Pine (Callitris glaucophylla), Black Cypress Pine (C. endlicheri), Long-leaved Box (E. goniocalyx), New England Stringybark (E. caliginosa), Brittle Gum (E. mannifera), Candlebark (E. rubida), Argyle Apple (E. cinerea), Kurrajong (Brachychiton populneus) and Drooping She-oak (Allocasuarina verticillata).*
- *Ecological community occurs in areas where rainfall is between 400 and 1200 mm per annum, on moderate to highly fertile soils at altitudes of 170 metres to 1200 metres.*
- *Shrub cover in this ecological community is naturally patchy, and shrubs may be dominant only over a very localised area. Shrub cover should therefore be assessed over the entire remnant, not just in a localised area. A remnant with a significant ground layer of tussock grasses, and where the distribution of shrubs is scattered or patchy, is part of the ecological community. In shrubby woodlands, the dominance of native tussock grasses in the ground layer of vegetation is lost. Therefore, a remnant with a continuous shrub layer, in which the shrub cover is greater than 30%, is considered to be a shrubby woodland and so is not part of the listed ecological community.*
- *Remnant attributes, such as shrubbiness, should be measured on a scale of 0.1 hectares or greater.*
- *Areas in which an overstorey exists without a substantially native understorey are degraded and are no longer a viable part of the ecological community. Although some native species may remain, in most of these areas the native understorey is effectively irretrievable. In order for an area to be included in the listed ecological community, a patch must have a predominantly native understorey.*
- *Therefore, in order to be the listed ecological community, an understorey patch, in the absence of overstorey trees, must have a high level of native floral species diversity, but only needs to be 0.1 hectares or greater in size. A patch in which the perennial vegetation of the ground layer is dominated by native species, and which contains at least 12 native, non-grass understorey species (such as forbs, shrubs, ferns, grasses and sedges) is considered to have a sufficiently high level of native diversity to be the listed ecological community. At least one of the understorey species should be an important species (e.g. grazing-sensitive, regionally significant or uncommon species; such as Kangaroo Grass or orchids) in order to indicate a reasonable condition.*

- *Areas with both an overstorey and understorey present are also considered of sufficiently good condition to be part of the listed ecological community if the understorey meets any of the conditions above, or if they have a predominantly native understorey, are two hectares or above in size, and have either natural regeneration of the overstorey species or 20 or more mature trees per hectare.*

Box-Gum Woodland CEEC listed under the BC Act

Areas of potential Box-Gum Woodland CEEC were also assessed against the criteria set out in the *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 – Critically Endangered Ecological Community listing NSW Threatened Species Scientific Committee – Final Determination* (TSSC 2020). The key difference between the NSW BC Act listing and the Commonwealth EPBC Act listing is that the latter requires one of the following:

- An intact tree layer and predominately native ground layer; or
- An intact native ground layer with a high diversity of native plant species but no remaining tree layer.

For listing under the BC Act, areas with predominately native canopy, dominated by the relevant species, but with a predominately non-native ground layer, are also included within the Box-Gum Woodland CEEC.

2.3 Quantitative Data Analysis

A hierarchical cluster analysis of full floristic plot data was undertaken to group plots into floristic groups and inform the assignment of plots to PCT (Appendix B). Full floristic plots used in this analysis included plots collected by AMBS for this study as well as AMBS vegetation monitoring plots on the proposed offset areas and full floristic plots held in the *BioNet Systematic Flora Survey Database* (DPIE 2021c). Only native flora species were included in the analysis and species which occurred in only a single plot were removed. All cover and abundance scores were converted to a Braun-Blanquet style cover score of 1-6.

The cluster analysis was undertaken using the Primer software package (Clarke and Gorely 2015) based on Bray-Curtis dissimilarity values. An agglomerative hierarchical classification using a flexible unweighted pair group method with arithmetic mean clustering strategy was applied to derive 40 groups. The resulting groups were assigned to the best fit PCT based on dominant species and abiotic variables of the member plots. Additional types, which did not come out of the cluster analysis due to level of sampling, were added intuitively based on plot data. Some plots were reassigned to a different PCT than the original statistical group based on consideration of landscape position, soils, geology and dominant flora species.

2.4 Rounding

All of the PCT and CEEC areas tabled in this report are expressed to one decimal place and have been rounded down to be conservative. This results in a cumulative rounding down effect in some of the totals.

3 Results

3.1 Triangle

3.1.1 Plant Community Types and Descriptions

Approximately 741.9 ha of native vegetation was mapped on Triangle, across four separate PCTs. Table 3.1 below provides a list of the mapped PCTs and total areas mapped of each. Detailed descriptions of mapped PCTs are provided below. A map showing the distribution of PCTs across this proposed offset area is included as Figure 3.1.

Table 3.1 Mapped Plant Community Types for Triangle

PCT Label	BC Act Status*	EPBC Act Status*	Area (ha)
589: White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland	CE	CE	47.8
590: White Box grassy woodland	CE	CE	491.6
599: Blakely's Red Gum - Yellow Box grassy tall woodland	CE	CE	109.2
1306: White Box - Red Stringybark shrubby woodlands	CE	CE	93.3
		Total	**741.9**

Note: All areas of PCT are equivalent to the Box-Gum Woodland CEEC listed under the BC Act and EPBC Act.

* Conservation status under the BC Act and/or EPBC Act (current as of June 2021). CE = Critically Endangered.

PCT 589

PCT Name: *White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion*

Vegetation Class: Western Slopes Grassy Woodlands

EPBC Status: Box-Gum Woodland CEEC

BC Status: Box-Gum Woodland CEEC

PCT 589 is a tall woodland to open forest, dominated by *Eucalyptus albens* (White Box) and *Callitris glaucophylla* (White Cypress Pine) and sometimes including *E. melliodora* (Yellow Box). In some cases, *E. melanophloia* may be an associated species, however no *E. melanophloia* were observed on the property. The shrub layer is typically sparse but may be denser in patches and commonly includes *Pimelea neo-anglica* (Poison Pimelea), *Notelaea microcarpa* (Native Olive) and *Dodonaea viscosa* (Sticky Hop Bush). The ground layer may be relatively dense and dominated by a mix of grasses and forbs. Common grasses include *Chloris ventricosa* (Plump Windmill Grass), *Austrostipa scabra* (Spear Grass), *Microlaena stipoides* (Weeping Grass) and *Sporobolus creber* (Slender Rats Tail Grass). Common forb species include *Daucus glochidiatus* (Native carrot), *Euchiton sphaericus* and *Calotis lappulacea* (Yellow Burr Daisy). The ground fern *Cheilanthes sieberi* (Poison Rock Fern) is also a common component of the ground layer.

Within the study area this community occurs on hills in steeper terrain, often on exposed aspects.

PCT 590

PCT Name: *White Box grassy woodland on the Inverell basalts mainly in the Nandewar Bioregion*

Vegetation Class: Western Slopes Grassy Woodlands

EPBC Status: Box-Gum Woodland CEEC

BC Status: Box-Gum Woodland CEEC

PCT 590 is a woodland to open woodland dominated by *Eucalyptus albens* (White Box), often in association with *Angophora floribunda* (Rough-barked Apple) *and Callitris glaucophylla* (White Cypress Pine). *Eucalyptus melliodora* (Yellow Box) may also be present. Shrubs are typically sparse or absent and may include *Pimelea neo-anglica* (Poison Pimelea) and *Notelaea microcarpa* (Native Olive). The ground later is typically dense and dominated by grasses and forbs. Common grass species include *Panicum effusum* (Hairy Panic), *Bothriochloa macra* (Red Grass), *Austrostipa scabra* (Spear Grass) and *Aristida vagans* (Threeawn Speargrass). Common forb species include *Plantago debilis, Vittadinia sulcata, Dichondra* sp. A and *Glycine tabacina*. This community is floristically and structurally similar to PCT 589, which it grades into, however it typically has a more open canopy and occurs on flatter terrain.

Within the study area this community occurs on flats and low hills.

PCT 599

PCT Name: *Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion*

Vegetation Class: Western Slopes Grassy Woodlands

EPBC Status: Box-Gum Woodland CEEC

BC Status: Box-Gum Woodland CEEC

PCT 599 is a tall woodland dominated by *Eucalyptus blakelyi* (Blakely's Red Gum) and *Eucalyptus melliodora* (Yellow Box). The shrub layer is absent to sparse and includes species such as *Acacia implexa* (Hickory Wattle) and *Pimelea neo-anglica* (Poison Pimelea). The ground cover is usually mid-dense to dense and dominated by grasses and forbs. Grass species include *Bothriochloa macra* (Red Grass), *Dichanthium sericeum* (Queensland Blue Grass), *Microlaena stipoides* (Weeping Grass) and *Aristida vagans*. Common forb species *include Geranium solanderi* (Native Geranium)*, Chrysocephalum apiculatum* (Yellow Buttons), *Daucus glochidiatus* (Native Carrot), *Swainsona galegifolia* and *Plantago debilis.*

Within the study area, this community occurs on alluvial flats along drainage lines.

PCT 1306

PCT Name: *White Box - Red Stringybark shrubby woodlands on basalt slopes of the Nandewar Bioregion and Brigalow Belt South Bioregion*

Vegetation Class: North-west Slopes Dry Sclerophyll Woodlands

EPBC Status: Box-Gum Woodland CEEC

BC Status: Box-Gum Woodland CEEC

PCT 1306 is a woodland to tall woodland dominated by *Eucalyptus albens* (White Box) and *E. macrorhyncha* (Red Stringybark), often in association with *Angophora floribunda* (Rough-barked Apple) and *Callitris glaucophylla* (White Cypress Pine). Considerable die back of *E. macrorhyncha* in the canopy due to drought stress was observed. The shrub layer is variable and may be relatively dense on steeper sites; however, most occurrences of this community in the study area had a relatively sparse shrub layer. Common shrub species include *Dodonaea viscosa* (Sticky Hop Bush), *Notelaea microcarpa* (Native Olive), *Cassinia quinquefaria* and *Olearia elliptica* (Sticky Daisy Bush). The ground layer is typically mid-dense to dense and dominated by a range of grasses and forbs. Common grass species include *Microlaena stipoides* (Weeping Grass), *Bothriochloa macra* (Red Grass) and *Chloris ventricosa*. Common forb species include *Plantago debilis, Geranium solanderi* (Native Geranium), *Daucus glochidiatus* (Native Carrot) and *Cymbonotus lawsonianus* (Bears-ear). The sedges *Cyperus gracilis* (Slender Flat-sedge) and *Carex inversa* are also common components of the ground layer.

PCT 1306 is the best fit for occurrences of this vegetation in the study area. However, within the study area this community tends to have a sparser shrub layer than the generic PCT as described in the *BioNet Vegetation Classification* database (DPIE 2021e). The community within the study area fits the definition for the Box-Gum Woodland CEEC, as described in the Box-Gum Woodland CEEC Listing Advice (TSSC 2006) where the shrub layer has a cover of less than 30%.

Within the study area this community occurs on hills in steeper terrain, often on more sheltered aspects.

3.1.2 Threatened Ecological Communities

All four of the PCTs mapped across the Triangle proposed offset area are equivalent to the Box-Gum Woodland CEEC listed under the EPBC Act (TSSC 2006). These PCTs within the proposed offset area are also part of the Box-Gum Woodland CEEC listed under the BC Act (TSSC 2020).

The average number of native species in the ground layer was 37, with a range of 16 to 52 species. All plots had 12 or more native, non-grass species in the ground layer, with an average of 27 and a range from 12 to 39 species recorded. The average number of important species recorded per plot was 11, with a range from 2 to 19. Table 3.2 lists the important species observed and the frequency of observation. Plate 3.1 shows a typical patch of Box-Gum Woodland CEEC in woodland form.

Table 3.2 Important Species Recorded in Triangle Proposed Offset Area

Scientific Name	Frequency	Scientific Name	Frequency
Acacia decora	8.3%	*Hypericum gramineum*	19.4%
Ajuga australis	55.6%	*Indigofera adesmiifolia*	13.9%
Arthropodium milleflorum	11.1%	*Lagenophora stipitata*	2.8%
Arthropodium minus	2.8%	*Linum marginale*	47.2%
Asperula conferta	52.8%	*Lotus australis*	5.6%
Bulbine bulbosa	41.7%	*Microseris lanceolata*	2.8%
Calotis lappulacea	77.8%	*Microtis parviflora*	2.8%
Cheilanthes distans	16.7%	*Oxytes brachypoda*	77.8%
Chrysocephalum apiculatum	61.1%	*Pimelea curviflora*	41.7%
Daucus glochidiatus	91.7%	*Plantago varia*	11.1%
Desmodium varians	75.0%	*Poranthera microphylla*	13.9%
Dianella longifolia	11.1%	*Ranunculus lappaceus*	2.8%
Dichelachne crinita	5.6%	*Sida corrugata*	25.0%
Dichelachne micrantha	27.8%	*Solenogyne dominii*	5.6%

Scientific Name	Frequency	Scientific Name	Frequency
Dichopogon fimbriatus	11.1%	*Stackhousia monogyna*	8.3%
Galium gaudichaudii	5.6%	*Swainsona behriana*	2.8%
Glycine clandestina	19.4%	*Swainsona reticulata*	5.6%
Glycine tabacina	83.3%	*Themeda triandra*	5.6%
Goodenia pinnatifida	11.1%	*Velleia paradoxa*	2.8%
Hardenbergia violacea	19.4%	*Viola betonicifolia*	13.9%
Hibbertia obtusifolia	11.1%		

Patches of derived native grassland that were derived from the Box-Gum Woodland CEEC, which were assessed as having less than 20 mature trees per ha, were also mapped. Patches that were dominated by native species including at least 12 non-grass native ground cover species and were at least 2 ha in size were also included as fitting the EPBC Act criteria for the Box-Gum Woodland CEEC. Plate 3.2 shows a typical patch of Box-Gum woodland CEEC in grassland form.

Plate 3.1 Typical patch of Box-Gum Woodland CEEC in woodland form (Triangle)

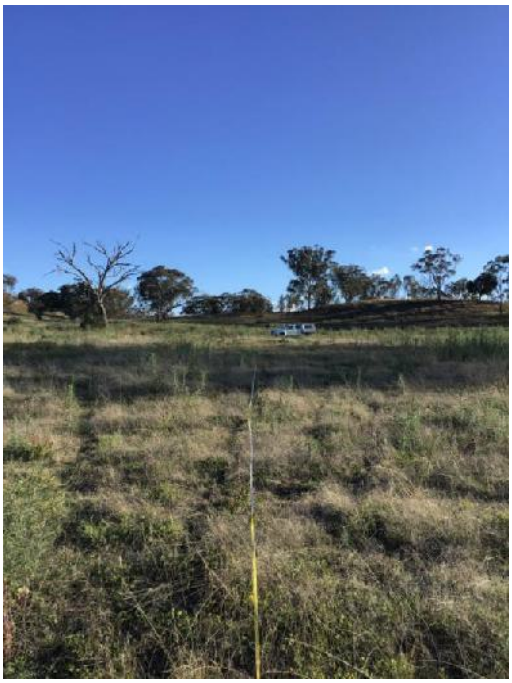

Plate 3.2 Typical patch of Box-Gum Woodland CEEC in grassland form (Triangle)

Areas of low native diversity and high cover of exotic plant species as well as areas with high shrub cover were excluded from the Box-Gum Woodland CEEC mapping.

Approximately 741.9 ha of the Box-Gum Woodland CEEC (woodland form) listed under the EPBC Act and BC Act was mapped across PCTs 589, 590, 599 and 1306.

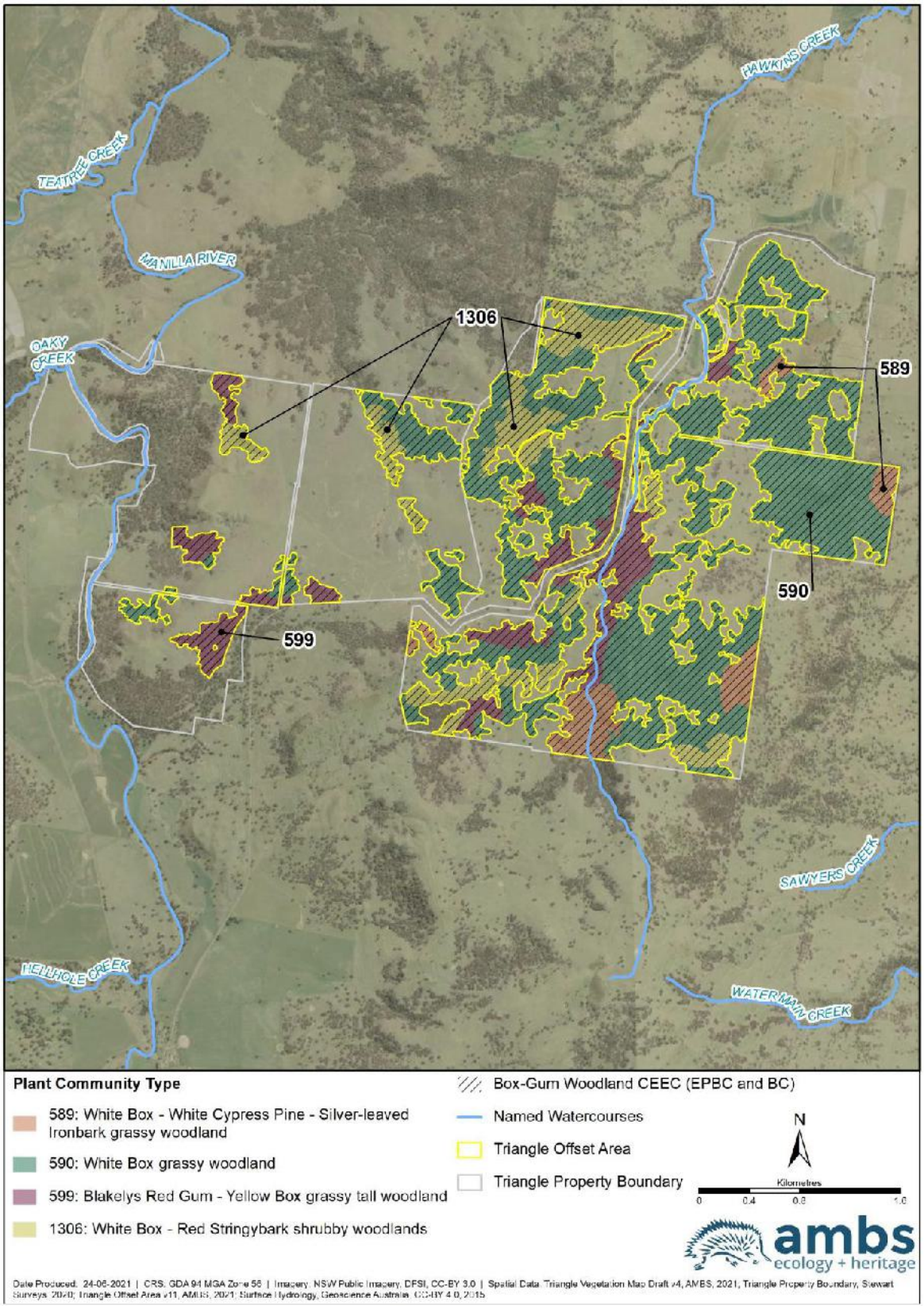

Figure 3.1 Plant Community Type Map for Triangle Proposed Offset Area

3.2 Long Gully

3.2.1 Plant Community Types and Descriptions

Approximately 352.9 ha of native vegetation was mapped within the proposed offset area on Long Gully, across two separate PCTs. Table 3.3 below provides a list of the mapped PCTs and total areas mapped of each. Detailed descriptions of mapped PCTs are provided below. A map showing the distribution of PCTs across this proposed offset area is included as Figure 3.2.

Table 3.3 Mapped Plant Community Types for Long Gully

PCT Label	BC Act Status*	EPBC Act Status*	Area (ha)
510: Blakely's Red Gum - Yellow Box grassy woodland	CE	CE	330.7
538: Rough-barked Apple - Blakely's Red Gum open forest	CE	CE	22.2
		Total	**352.9**

Note: All areas of PCT are equivalent to the Box-Gum Woodland CEEC listed under the BC Act and EPBC Act.

* Conservation status under the BC Act and/or EPBC Act (current as of June 2021). CE = Critically Endangered.

PCT 510

PCT Name: *Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion*

Vegetation Class: Western Slopes Grassy Woodlands

EPBC Status: Box-Gum Woodland CEEC

BC Status: Box-Gum Woodland CEEC

PCT 510 is a tall woodland dominated by *Eucalyptus blakelyi* (Blakely's Red Gum) and *E. melliodora* (Yellow Box), often in association with *Angophora floribunda, E. bridgesiana* and *E. macrorhyncha*. The shrub layer is absent to sparse and includes species such as *Acacia implexa* (Hickory Wattle), *A. doratoxylon* (Currawang) and *Leptospermum brevipes* (Slender Tea-tree). The ground cover is usually mid-dense to dense and dominated by grasses and forbs. Grass species include *Arundinella nepalensis* (Reedgrass), *Bothriochloa decipiens* (Red Grass), *Aristida ramosa* (Purple Wiregrass), *Microlaena stipoides* (Weeping Grass) and *Eragrostis leptostachya (Paddock Lovegrass)*. Common forb species *include Haloragis heterophylla* (Rough Raspwort)*, Chrysocephalum apiculatum* (Yellow Buttons), *Daucus glochidiatus* (Native Carrot), *Desmodium varians* (Slender Tick-trefoil) and *Glycine clandestina.* The ground fern *Cheilanthes sieberi* (Poison Rock Fern) is also a common component of the ground layer.

Within the study area, this community occurs on deeper soils on flats.

PCT 538

PCT Name: *Rough-barked Apple – Blakely's Red Gum open forest of the Nandewar Bioregion and western New England Tableland Bioregion*

Vegetation Class: Northern Tableland Dry Sclerophyll Forests

EPBC Status: Box-Gum Woodland CEEC

BC Status: Box-Gum Woodland CEEC

PCT 538 is a woodland to open forest dominated by *Angophora floribunda* and *Eucalyptus blakelyi*, often in association with *E. macrorhyncha* (Red Stringybark). Shrubs are typically sparse and may include *Olearia elliptica* (Sticky Daisy Bush) and *Leptospermum brevipes* (Slender Tea-tree). The ground layer is usually relatively dense and comminated by a range of grasses and forbs. Common grass species include *Aristida ramosa* (Purple Wire Grass), *Cymbopogon refractus* (Barbed Wire Grass), *Digitaria brownii* (Cotton Panic Grass) and *Microlaena stipoides* (Weeping Grass). Common forb species in the ground layer include *Hydrocotyle tripartita* (Pennywort), *Haloragis heterophylla* (Rough Raspwort), *Hypericum gramineum* (Small St. John's Wort) and *Euchiton sphaericus*. The ground fern *Cheilanthes sieberi* (Poison Rock Fern) is also a common component of the ground layer.

Within the study area, this community occurs on lower slopes and flats.

3.2.2 Threatened Ecological Communities

Both of the PCTs mapped across the Long Gully proposed offset area are equivalent to the Box-Gum Woodland CEEC listed under the EPBC Act (TSSC 2006). These PCTs are also part of the Box-Gum Woodland CEEC listed under the BC Act (TSSC 2020).

The average number of native species in the ground layer was 39, with a range of 14 to 55 species. All plots had 12 or more native-non grass species in the ground layer, with an average of 28 and a range from 12 to 45 species recorded. The average number of important species recorded per plot was 10, with a range from 1 to 17. Table 3.4 lists the important species observed and the frequency of observation. Plate 3.3 shows a typical patch of Box-Gum Woodland CEEC in woodland form.

Table 3.2 Important Species Recorded in Long Gully Proposed Offset Area

Scientific Name	Frequency	Scientific Name	Frequency
Ajuga australis	4.8%	*Goodenia hederacea*	4.8%
Arthropodium minus	4.8%	*Hardenbergia violacea*	9.5%
Asperula conferta	38.1%	*Hibbertia obtusifolia*	33.3%
Calotis cuneifolia	33.3%	*Hypericum gramineum*	90.5%
Calotis lappulacea	4.8%	*Leptorhynchos squamatus*	9.5%
Cheilanthes distans	42.9%	*Microtis unifolia*	9.5%
Chrysocephalum apiculatum	95.2%	*Pimelea curviflora*	28.6%
Daucus glochidiatus	23.8%	*Podolepis jaceoides*	47.6%
Desmodium varians	61.9%	*Poranthera microphylla*	61.9%
Dianella longifolia	23.8%	*Pterostylis bicolor*	14.3%
Dichelachne micrantha	4.8%	*Themeda triandra*	14.3%
Dichopogon fimbriatus	47.6%	*Tripogon loliiformis*	19.0%
Diuris dendrobioides	9.5%	*Triptilodiscus pygmaeus*	47.6%
Glycine clandestina	71.4%	*Zornia dyctiocarpa var. dyctiocarpa*	57.1%
Glycine tabacina	71.4%		

Plate 3.3 Typical patch of Box-Gum Woodland CEEC in woodland form (Long Gully)

Areas of low native diversity and greater than 50% of total ground cover made up of exotic plant species, as well areas with high shrub cover, were excluded from the Box-Gum Woodland CEEC mapping.

Approximately 352.9 ha of the Box-Gum Woodland CEEC (woodland form) listed under the EPBC Act and BC Act was mapped across PCTs 510 and 538.

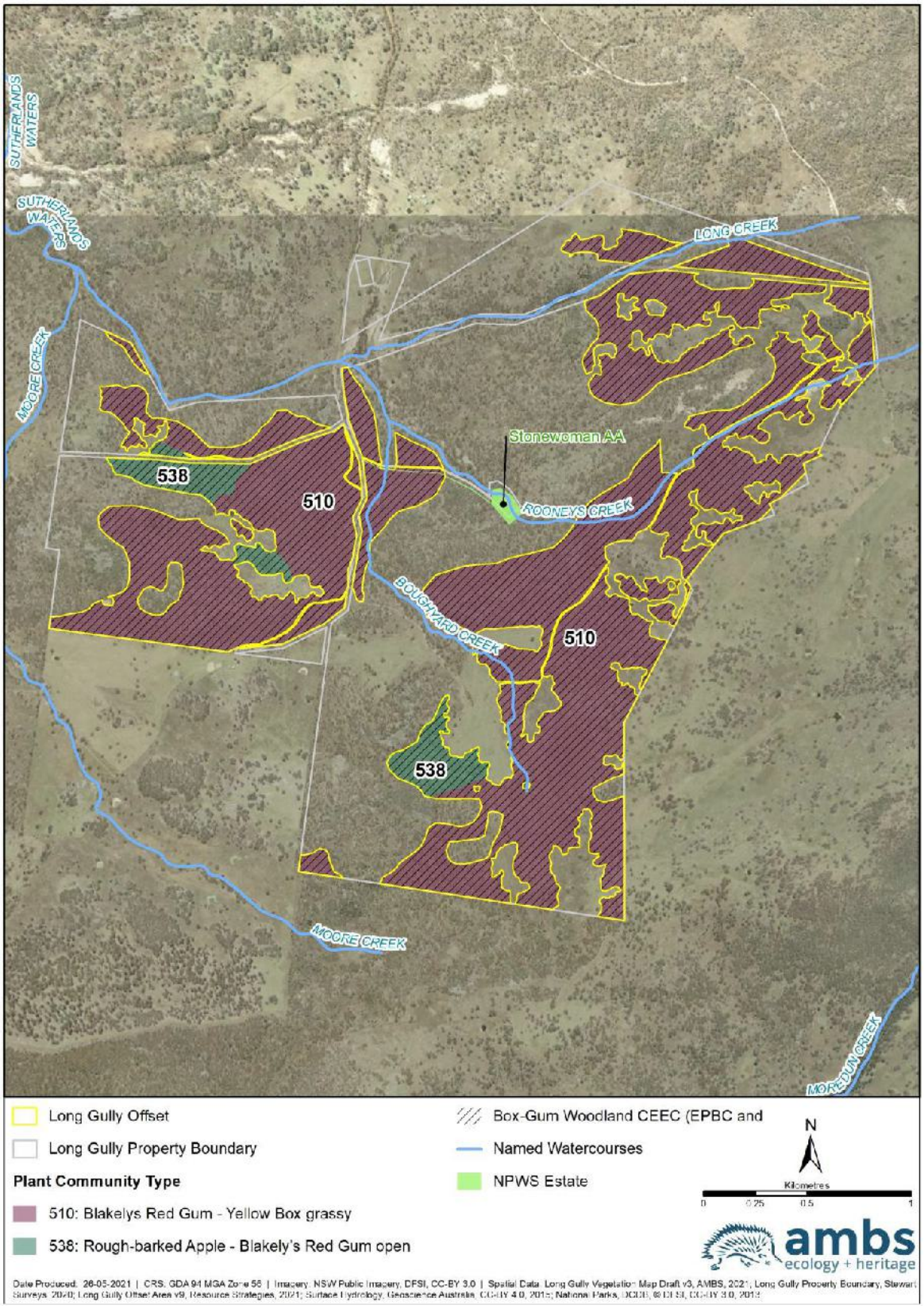

Figure 3.2 Plant Community Type Map for Long Gully Proposed Offset Area

3.3 Neranghi North

3.3.1 Plant Community Types and Descriptions

Approximately 567 ha of native vegetation was mapped within the proposed offset area on Neranghi North, across three separate PCTs. Table 3.5 below provides a list of the mapped PCTs and total areas mapped of each. Detailed descriptions of mapped PCTs are provided below. A map showing the distribution of PCTs across this proposed offset area is included as Figure 3.3.

Table 3.5 Mapped Plant Community Types for Neranghi North

PCT Label	BC Act Status*	EPBC Act Status*	Area (ha)
588: White Box - White Cypress Pine shrubby hills open forest	CE	CE	224.9
590: White Box grassy woodland	CE	CE	238.3
599: Blakely's Red Gum - Yellow Box grassy tall woodland	CE	CE	103.8
		Total	**567**

Note: All areas of PCT are equivalent to the Box-Gum Woodland CEEC listed under the BC Act and EPBC Act.

* Conservation status under the BC Act and/or EPBC Act (current as of June 2021). CE = Critically Endangered.

PCT 588

PCT Name: *White Box - White Cypress Pine shrubby hills open forest mainly in the Nandewar Bioregion*

Vegetation Class: North-west Slopes Dry Sclerophyll Woodlands

EPBC Status: Box-Gum Woodland CEEC

BC Status: Box-Gum Woodland CEEC

PCT 588 is a tall woodland to open forest, dominated by *Eucalyptus albens* (White Box) and *Callitris glaucophylla* (White Cypress Pine), with a relatively shrubby understorey. *Eucalyptus dealbata* (Tumbledown Red Gum) is also a common component of the overstorey. Shrub cover is variable, with steeper, rockier sites tending to have higher shrub cover. Common shrub species include *Notelaea microcarpa* (Native Mock Olive), *Cassinia laevis* (Cough Bush) and *Olearia elliptica* (Sticky Daisy Bush). The ground layer is typically mid dense and dominated by grass species, including *Aristida ramosa* (Purple Wire Grass), *Bothriochloa macra* (Red Grass), *Microlaena stipoides* (Weeping Grass) and *Sporobolus creber* (Western Rat-tail Grass). Common forb species include *Geranium solanderi* (Native Geranium), *Dichondra sp. A* (a Kidney Weed), *Hydrocotyle laxiflora* (Stinking Pennywort) and *Cymbonotus lawsonianus* (Bears Ear). The ground fern *Cheilanthes sieberi* (Poison Rock Fern) is also a common component of the ground layer.

This is the best fit PCT for occurrences of this type in the study area, however within the study area this community tends to have a highly variable shrub layer. This community within the study area fits the definition for the Box-Gum Woodland CEEC where the shrub layer has a cover of less than 30%.

Within the study area this community occurs on hills in steeper terrain.

PCT 590

PCT Name: *White Box grassy woodland on the Inverell basalts mainly in the Nandewar Bioregion*

Vegetation Class: Western Slopes Grassy Woodlands

EPBC Status: Box-Gum Woodland CEEC

BC Status: Box-Gum Woodland CEEC

PCT 590 is a woodland to open woodland dominated by *Eucalyptus albens* (White Box), often in association with *Brachychiton populneus* (Kurrajong). *Eucalyptus blakelyi* (Blakey's Red Gum) and *Angophora floribunda* (Rough-barked Apple) may also be present. Shrubs are typically sparse or absent and may include *Cassinia laevis* (Cough Bush) and *Notelaea microcarpa* (Native Olive). The ground later is typically dense and dominated by grasses and forbs. Common grass species include *Panicum effusum* (Hairy Panic), *Austrostipa verticillata* (Slender Bamboo Grass), *Austrostipa scabra* (Spear Grass) and *Chloris ventricosa* (Plump Windmill Grass). Common forb species include *Calotis lappulacea* (Yellow Burr Daisy)*, Desmodium varians* (Slender Tick-trefoil), *Dichondra* Sp. A (a Kidney Weed) and *Glycine tabacina*.

Within the study area this community occurs on flats and low hills.

PCT 599

PCT Name: *Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion*

Vegetation Class: Western Slopes Grassy Woodlands

EPBC Status: Box-Gum Woodland CEEC

BC Status: Box-Gum Woodland CEEC

PCT 599 is a tall woodland dominated by *Eucalyptus blakelyi* (Blakely's Red Gum) and *Eucalyptus melliodora* (Yellow Box). The shrub layer is absent to sparse and includes species such as *Acacia implexa* (Hickory Wattle) and *Pimelea neo-anglica* (Poison Pimelea). The ground cover is usually mid-dense to dense and dominated by grasses and forbs. Grass species include *Bothriochloa macra* (Red Grass), *Dichanthium sericeum* (Queensland Blue Grass), *Microlaena stipoides* (Weeping Grass) and *Aristida vagans*. Common forb species *include Geranium solanderi* (Native Geranium)*, Chrysocephalum apiculatum* (Yellow Buttons), *Daucus glochidiatus* (Native Carrot), *Swainsona galegifolia* and *Plantago debilis.*

Within the study area, this community occurs on alluvial flats along drainage lines.

3.3.2 Threatened Ecological Communities

All three of the PCTs mapped across the Neranghi North proposed offset area are equivalent to the Box-Gum Woodland CEEC listed under the EPBC Act (TSSC 2006). These PCTs within the proposed offset area are also part of the Box-Gum Woodland CEEC listed under the BC Act (TSSC 2020).

The average number of native species in the ground layer was 36, with a range of 21 to 54 species. All plots had more than 12 native, non-grass species in the ground layer, with an average of 28 and a range from 18 to 43 species recorded. The average number of important species recorded per plot was 10, with a range from 3 to 19. Table 3.6 lists the important species observed and the frequency of observation. Plate 3.4 shows a typical patch of Box-Gum Woodland CEEC in woodland form.

Table 3.6 Important Species Recorded in Neranghi North Proposed Offset Area

Scientific Name	Frequency	Scientific Name	Frequency
Ajuga australis	50.0%	*Hibbertia obtusifolia*	50.0%
Arthropodium minus	12.5%	*Hypericum gramineum*	12.5%
Asperula conferta	62.5%	*Linum marginale*	6.3%
Bulbine bulbosa	18.8%	*Oxytes brachypoda*	43.8%
Calotis lappulacea	75.0%	*Pimelea curviflora*	12.5%
Cheilanthes distans	50.0%	*Plantago varia*	6.3%
Chrysocephalum apiculatum	75.0%	*Podolepis jaceoides*	6.3%
Chrysocephalum semipapposum	12.5%	*Poranthera microphylla*	12.5%
Daucus glochidiatus	75.0%	*Pterostylis bicolor*	6.3%
Desmodium varians	75.0%	*Sida corrugata*	31.3%
Dianella longifolia	6.3%	*Swainsona behriana*	6.3%
Dianella revoluta	6.3%	*Swainsona monticola*	6.3%
Dichelachne micrantha	25.0%	*Swainsona reticulata*	12.5%
Dichopogon fimbriatus	50.0%	*Themeda triandra*	18.8%
Galium gaudichaudii	6.3%	*Triptilodiscus pygmaeus*	6.3%
Glycine clandestina	37.5%	*Velleia paradoxa*	6.3%
Glycine tabacina	81.3%	*Wurmbea dioica subsp. dioica*	6.3%
Goodenia hederacea	12.5%	*Zornia dyctiocarpa var. dyctiocarpa*	6.3%

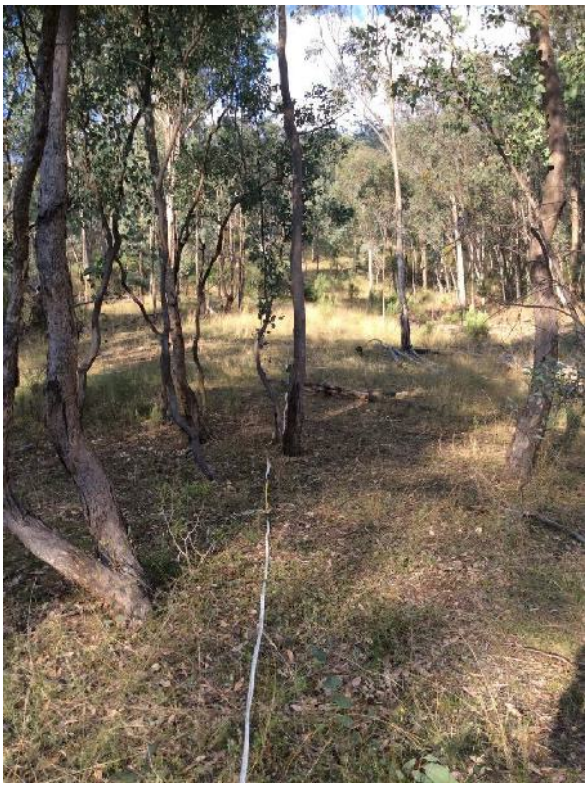

Plate 3.4 Typical patch of Box-Gum Woodland CEEC in woodland form (Neranghi North)

Areas of low native diversity and high cover of exotic plant species as well as areas with high shrub cover were excluded from the Box-Gum Woodland CEEC mapping.

Approximately 567 ha of the Box-Gum Woodland CEEC (woodland form) listed under the EPBC Act and BC Act was mapped across PCTs 588, 590 and 599.

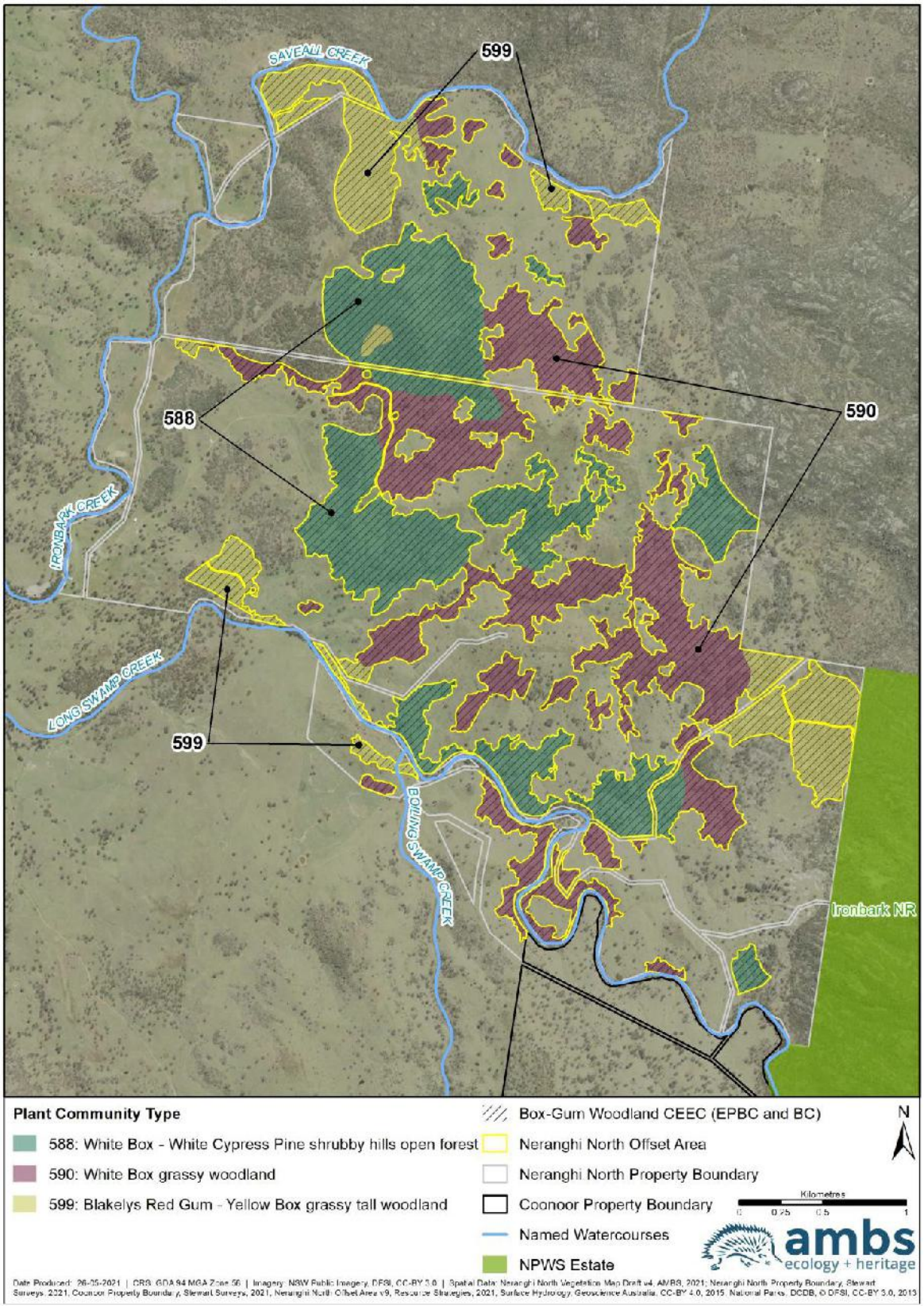

Figure 3.3 Plant Community Type Map for Neranghi North Proposed Offset Area

3.4 Coonoor

3.4.1 Plant Community Types and Descriptions

Approximately 573.9 ha of native vegetation was mapped within the proposed offset area on Coonoor, across three separate PCTs. Table 3.7 below provides a list of the mapped PCTs and total areas mapped of each. Detailed descriptions of mapped PCTs are provided below. A map showing the distribution of PCTs across this proposed offset area is included as Figure 3.4.

Table 3.7 Mapped Plant Community Types for Coonoor

PCT Label	BC Act Status*	EPBC Act Status*	Area (ha)
588: White Box - White Cypress Pine shrubby hills open forest	CE	CE	324.8
590: White Box grassy woodland	CE	CE	233.7
599: Blakely's Red Gum - Yellow Box grassy tall woodland	CE	CE	15.4
		Total	**573.9**

Note: All areas of PCT are equivalent to the Box-Gum Woodland CEEC listed under the BC Act and EPBC Act.

* Conservation status under the BC Act and/or EPBC Act (current as of June 2021). CE = Critically Endangered.

PCT 588

PCT Name: *White Box - White Cypress Pine shrubby hills open forest mainly in the Nandewar Bioregion*

Vegetation Class: North-west Slopes Dry Sclerophyll Woodlands

EPBC Status: Box-Gum Woodland CEEC

BC Status: Box-Gum Woodland CEEC

PCT 588 is a tall woodland to open forest, dominated by *Eucalyptus albens* (White Box) and *Callitris glaucophylla* (White Cypress Pine), with a relatively shrubby understorey. *Eucalyptus dealbata* (Tumbledown Red Gum) is also a common component of the overstorey. Shrub cover is variable, with steeper, rockier sites tending to have higher shrub cover. Common shrub species include *Notelaea microcarpa* (Native Mock Olive), *Cassinia laevis* (Cough Bush) and *Olearia elliptica* (Sticky Daisy Bush). The ground layer is typically mid dense and dominated by grass species, including *Aristida ramosa* (Purple Wire Grass), *Bothriochloa macra* (Red Grass), *Microlaena stipoides* (Weeping Grass) and *Sporobolus creber* (Western Rat-tail Grass). Common forb species include *Geranium solanderi* (Native Geranium), *Dichondra sp. A* (a Kidney Weed), *Hydrocotyle laxiflora* (Stinking Pennywort) and *Cymbonotus lawsonianus* (Bears Ear). The ground fern *Cheilanthes sieberi* (Poison Rock Fern) is also a common component of the ground layer.

This is the best fit PCT for occurrences of this type in the study area, however within the study area this community tends to have a highly variable shrub layer. Although this community is not associated with the Box-Gum Woodland CEEC within the *BioNet Vegetation Classification* database (DPIE 2020e), occurrences of this community within the study area fit the definition for the Box-Gum Woodland CEEC where the shrub layer has a cover of less than 30%.

Within the study area this community occurs on hills in steeper terrain.

PCT 590

PCT Name: *White Box grassy woodland on the Inverell basalts mainly in the Nandewar Bioregion*

Vegetation Class: Western Slopes Grassy Woodlands

EPBC Status: Box-Gum Woodland CEEC

BC Status: Box-Gum Woodland CEEC

PCT 590 is a woodland to open woodland dominated by *Eucalyptus albens* (White Box), often in association with *Brachychiton populneus* (Kurrajong). *Eucalyptus blakelyi* (Blakey's Red Gum) and *Angophora floribunda* (Rough-barked Apple) may also be present. Shrubs are typically sparse or absent and may include *Cassinia laevis* (Cough Bush) and *Notelaea microcarpa* (Native Olive). The ground later is typically dense and dominated by grasses and forbs. Common grass species include *Panicum effusum* (Hairy Panic), *Austrostipa verticillata* (Slender Bamboo Grass), *Austrostipa scabra* (Spear Grass) and *Chloris ventricosa* (Plump Windmill Grass). Common forb species include *Calotis lappulacea* (Yellow Burr Daisy), *Desmodium varians* (Slender Tick-trefoil), *Dichondra* Sp. A (a Kidney Weed) and *Glycine tabacina*.

Within the study area this community occurs on flats and low hills.

PCT 599

PCT Name: *Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion*

Vegetation Class: Western Slopes Grassy Woodlands

EPBC Status: Box-Gum Woodland CEEC

BC Status: Box-Gum Woodland CEEC

PCT 599 is a tall woodland dominated by *Eucalyptus blakelyi* (Blakely's Red Gum) and *Eucalyptus melliodora* (Yellow Box). The shrub layer is absent to sparse and includes species such as *Acacia implexa* (Hickory Wattle) and *Pimelea neo-anglica* (Poison Pimelea). The ground cover is usually mid-dense to dense and dominated by grasses and forbs. Grass species include *Bothriochloa macra* (Red Grass), *Dichanthium sericeum* (Queensland Blue Grass), *Microlaena stipoides* (Weeping Grass) and *Aristida vagans*. Common forb species *include Geranium solanderi* (Native Geranium), *Chrysocephalum apiculatum* (Yellow Buttons), *Daucus glochidiatus* (Native Carrot), *Swainsona galegifolia* and *Plantago debilis.*

Within the study area, this community occurs on alluvial flats along drainage lines.

3.4.2 Threatened Ecological Communities

All three of the PCTs mapped across the proposed Coonoor offset area are equivalent to the Box-Gum Woodland CEEC listed under the EPBC Act (TSSC 2006). These PCTs within the offset area are also part of the Box-Gum Woodland CEEC listed under the BC Act (TSSC 2020).

The average number of native species in the ground layer was 51, with a range of 29 to 66 species. All plots had more than 12 native, non-grass species in the ground layer, with an average of 36 and a range from 22 to 49 species recorded. The average number of important species recorded per plot was 11, with a range from 2 to 16. Table 3.8 lists the important species observed and the frequency of observation. Plate 3.5 shows a typical patch of Box-Gum Woodland CEEC in woodland form.

Table 3.8 Important Species Recorded in the Coonoor Proposed Offset Area

Scientific Name	Frequency	Scientific Name	Frequency
Ajuga australis	14.8%	*Indigofera adesmiifolia*	7.4%
Alternanthera nana	18.5%	*Lagenophora stipitata*	7.4%
Arthropodium milleflorum	22.2%	*Linum marginale*	7.4%
Arthropodium minus	25.9%	*Lotus australis*	3.7%
Asperula conferta	63.0%	*Ophioglossum lusitanicum*	3.7%
Calotis lappulacea	70.4%	*Oxytes brachypoda*	63.0%
Cheilanthes distans	44.4%	*Pimelea curviflora*	25.9%
Chrysocephalum apiculatum	66.7%	*Plantago varia*	7.4%
Desmodium varians	77.8%	*Polygala japonica*	3.7%
Dianella longifolia	25.9%	*Poranthera microphylla*	11.1%
Dichanthium sericeum	22.2%	*Ranunculus lappaceus*	3.7%
Dichelachne crinita	7.4%	*Sida corrugata*	48.1%
Dichelachne micrantha	14.8%	*Solenogyne dominii*	3.7%
Dichopogon fimbriatus	22.2%	*Sorghum leiocladum*	7.4%
Galium gaudichaudii	7.4%	*Stackhousia monogyna*	7.4%
Glycine clandestina	55.6%	*Swainsona reticulata*	11.1%
Glycine tabacina	85.2%	*Themeda triandra*	18.5%
Hardenbergia violacea	3.7%	*Thesium australe*	3.7%
Hibbertia obtusifolia	33.3%	*Tricoryne elatior*	14.8%
Hypericum gramineum	7.4%	*Zornia dyctiocarpa var. dyctiocarpa*	25.9%

Plate 3.5 Typical patch of Box-Gum Woodland CEEC in woodland form (Coonoor)

Areas of low native diversity and high cover of exotic plant species as well as areas with high shrub cover were excluded from the Box-Gum Woodland CEEC mapping.

Approximately 573.9 ha of the Box-Gum Woodland CEEC (woodland form) listed under the EPBC Act and BC Act was mapped across PCTs 588, 590, 599.

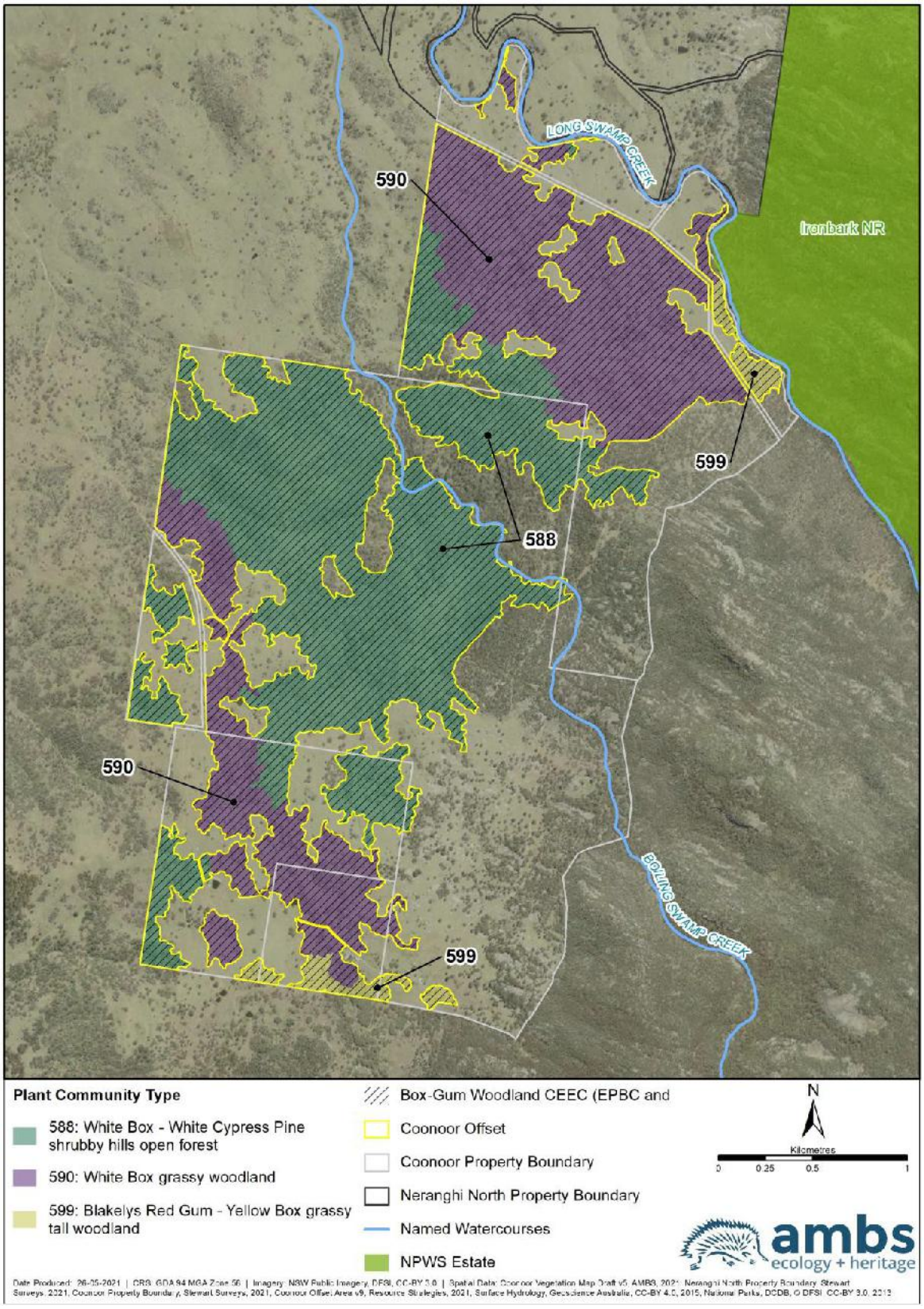

Figure 3.4 Plant Community Type Map for Coonoor Proposed Offset Area

3.5 Thornfield

3.5.1 Plant Community Types and Descriptions

Approximately 145.4 ha of native vegetation was mapped on Thornfield, across four separate PCTs. In addition, a relatively large area (25.4 ha) of non-native vegetation was mapped, largely made up of previously cultivated areas with a high cover of exotic flora species. Table 3.5 below provides a list of the mapped PCTs and total areas mapped of each. Detailed descriptions of mapped PCTs are provided below. A map showing the distribution of PCTs across this proposed offset area is included as Figure 3.5.

Table 3.9 Mapped Plant Community Types for Thornfield

PCT Label		BC Act Status*	EPBC Act Status*	Area (ha)
101:	Poplar Box – Yellow Box – Western Grey Box grassy woodland		E[1]	16.6
101:	Derived Native Grassland			8.8
413:	Silver-leaved Ironbark – White Cypress Pine – box dry shrub grass woodland			37.1
413:	Derived Native Grassland			70.2
435:	White Box – White Cypress Pine shrub grass hills woodland	CE[2]	CE[2]	5.6
435:	Derived Native Grassland	CE[2]	CE[2]	1.7
599:	Blakely's Red Gum - Yellow Box grassy tall woodland	CE[2]	CE[2]	1.7
599:	Derived Native Grassland	CE[2]	CE[2]	3.7
			Total	**145.4**

* Conservation status under the BC Act and/or EPBC Act (current as of June 2021). CE = Critically Endangered; E = Endangered.

1 Approximately 16.2 ha equivalent to the Poplar Box Grassy Woodland EEC listed under the EPBC Act.

2 Equivalent to the Box-Gum Woodland CEEC listed under the BC Act and EPBC Act.

PCT 101

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: Brigalow Clay Plain Woodlands

EPBC Status: *Poplar Box Grassy Woodland on Alluvial Plains* (Poplar Box Grassy Woodland EEC) (Part)

BC Status: N/A

PCT 101 is tall woodland or open woodland dominated by *Eucalyptus populnea* subsp. *bimbil* (Poplar Box) sometimes with *Eucalyptus melliodora* (Yellow Box), *Callitris glaucophylla* (White Cypress Pine), *Eucalyptus melanophloia* (Silver-leaved Ironbark). A very sparse shrub layer may be present, or it is absent. Shrub species include *Geijera parviflora* (Wilga), *Notalea microcarpa* (Mock Olive), *Maireana microphylla, Capparis mitchellii* (Wild Orange) and *Alectryon oleifolius* (Western Rosewood). The ground cover is usually dense and is dominated by a rich array of grass and forb species. Grass species include *Austrostipa verticillata*, *Dichanthium sericeum* subsp. *sericeum, Bothriochloa decipiens, Rytidosperma bipartitum, Enteropogon acicularis, Aristida personata, Aristida ramosa, Austrostipa aristiglumis, Austrostipa scabra* subsp. *scabra, Themeda australis, Eulalia aurea, Paspalidium jubiflorum, Chloris truncata* and *Chloris ventricosa*. Forb species include *Rumex brownii, Einadia nutans, Cotula australis, Maireana enchylaenoides, Erodium crinitum, Calotis lappulacea, Rostellularia adscendens* subsp. *adscendens, Sida corrugata, Oxalis exilis, Einadia hastata, Vittadinia dissecta* var. *hirta, Vittadinia muelleri, Vittadinia sulcata, Chrysocephalum apiculatum, Solanum cinereum, Abutilon oxycarpum, Dichondra* sp. A,

Wahlenbergia stricta subsp. *stricta, Pycnosorus globosus, Goodenia fascicularis* and *Brunoniella australis*.

Within the study area, this community occurs on alluvial flats along drainage lines as both an intact woodland and a derived native grassland (DNG).

PCT 413

PCT Name: *Silver-leaved Ironbark - White Cypress Pine - box dry shrub grass woodland of the Pilliga Scrub - Warialda region, Brigalow Belt South Bioregion*

Vegetation Class: North-west Slopes Dry Sclerophyll Woodlands

EPBC Status: N/A

BC Status: N/A

PCT 413 is a tall to mid-high woodland or open forest dominated by *Eucalyptus melanophloia* (Silver-leaved Ironbark) and *Callitris glaucophylla* (White Cypress Pine) sometimes with *Eucalyptus albens,* or *Eucalyptus populnea* subsp. *bimbil*. The small tree *Alectryon oleifolius* subsp. *elongatus* may be present. The shrub layer is usually sparse but mid-dense in places and includes *Acacia deanei* subsp. *paucijuga, Solanum ferocissimum, Beyeria viscosa*, several subspecies of *Dodonaea viscosa, Acacia decora, Geijera parviflora, Abutilon oxycarpum, Pimelea microcephala* subsp. *microcephala* and *Cassinia laevis*. The ground cover is sparse and includes grasses such as A*ristida vagans, Cymbopogon refractus, Poa sieberiana, Enteropogon acicularis, Austrostipa verticillata, Austrostipa scabra* subsp. *scabra* and *Microlaena stipoides*. The mat-rushes *Lomandra multiflora subsp. multiflora* or *Lomandra filiformis* subsp. *filiformis* are often present. Forbs include *Einadia hastata, Calotis cuneifolia, Einadia nutans* subsp. *nutans Eremophila debilis, Chrysocephalum apiculatum, Opercularia diphylla, Bulbine semibarbata* and *Ranunculus sessiliflorus*. Climbers include *Glycine tabacina* and *Desmodium varians*.

Within the study area, this community occurs on flats and low hills as both an intact woodland and a DNG.

PCT 435

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: Box-Gum Woodland CEEC

BC Status: Box-Gum Woodland CEEC

PCT 435 is a mid-high woodland dominated by *Callitris glaucophylla* (White Cypress Pine) and *Eucalyptus albens* (White Box), with *Eucalyptus blakelyi* (Blakely's Red Gum) and *Brachychiton populneus* subsp. *populneus* (Kurrajong) also sometimes present in the overstory. Depending on grazing intensity, the shrub layer can be sparse to dense and includes *Cassinia quinquefaria, Acacia implexa* (Hickory Wattle), *Acacia penninervis* var. *penninervis* (Mountain Hickory), *Geijera parviflora* (Wilga), *Olearia elliptica* subsp. *elliptica* (Sticky Daisy Bush), *Dodonaea viscosa* subsp. *angustifolia* (Hop-bush), *Teucrium betchei* and *Cassinia sifton* (Sifton Bush). The ground cover is mid-dense and includes grass species such as *Aristida personata* (Purple Wire Grass)*, Cymbopogon*

refractus (Barbed Wire Grass)*, Themeda australis* (Kangaroo Grass)*, Rytidosperma racemosum* var. *racemosum, Austrostipa verticillata* (Slender Bamboo Grass) and *Austrostipa scabra* subsp. *scabra* (Spear Grass). Common forb species include *Calotis lappulacea* (Yellow Burr Daisy)*, Vittadinia sulcata, Einadia nutans* subsp. *nutans* (Climbing Saltbush)*, Wahlenbergia communis* (Tufted Bluebell)*, Dianella longifolia* var. *longifolia* (Blue Flax-Lily)*, Swainsona galegifolia* (Smooth Darling Pea)*, Dichondra* sp. A and *Daucus glochidiatus* (Native Carrot). The scramblers *Desmodium brachypodum* or *Desmodium varians* may be common.

Within the study area, this community occurs on flats and lower slopes as both an intact woodland and a DNG. This community is equivalent to the Box-Gum Woodland CEEC (EPBC Act and BC Act) in some cases, however it may not be equivalent where shrub cover is too high or where condition is too low.

PCT 599

PCT Name: *Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion*

Vegetation Class: Western Slopes Grassy Woodlands

EPBC Status: Box-Gum Woodland CEEC

BC Status: Box-Gum Woodland CEEC

PCT 599 is a tall woodland dominated by *Eucalyptus blakelyi* (Blakely's Red Gum) and *Eucalyptus melliodora* (Yellow Box). The shrub layer is absent to sparse and includes species such as *Acacia implexa, Olearia elliptica* subsp. *elliptica, Geijera parviflora, Myoporum montanum*, or *Pimelea neo-anglica*. The ground cover is usually mid-dense to dense dominated by grasses and forbs. Grass species include *Aristida personata, Austrostipa verticillata, Themeda australis, Bothriochloa macra* or *Dichanthium sericeum*. Forb species *include Dichondra repens, Geranium solanderi, Hydrocotyle laxiflora, Rumex brownii, Scutellaria humilis, Hypericum gramineum, Senecio quadridentatus, Haloragis heterophylla, Dianella longifolia* var. *longifolia* and *Chrysocephalum apiculatum.*

Within the study area, this community occurs on alluvial soils on flats along drainage lines as both an intact woodland and a DNG.

3.5.2 Threatened Ecological Communities

On Thornfield two TECs were mapped. Approximately 12.7 ha of the Box-Gum Woodland CEEC listed under the EPBC Act and BC Act was mapped across all of PCT 435*, White Box - White Cypress Pine shrub grass hills woodland* and PCT 599*, Blakely's Red Gum - Yellow Box grassy tall woodland*. This included approximately 5.4 ha of grassland form and 7.3 ha of woodland form. In addition, approximately 16.2 ha of the area mapped as PCT 101 conforms to the EPBC Act-listed Poplar Box Grassy Woodland EEC.

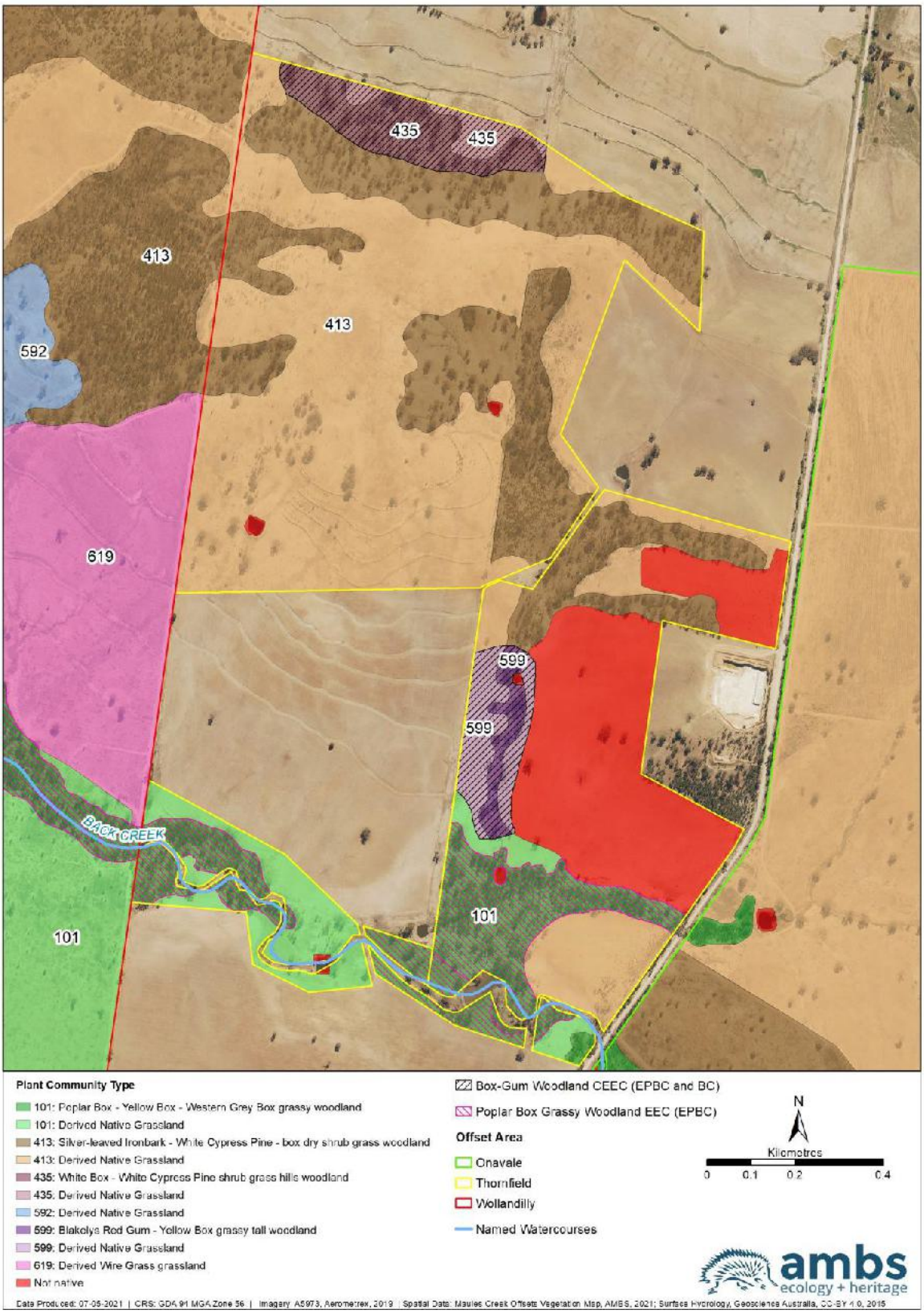

Figure 3.5 Plant Community Type Map for Thornfield Proposed Offset Area

4 Summary of the Threatened Ecological Communities

4.1 Box-Gum Woodland CEEC (EPBC Act)

A total of approximately 2,248.4 ha of the Box-Gum Woodland CEEC listed under the EPBC Act was mapped across all proposed offset areas. This includes 2,243 ha of woodland form and 5.4 ha of grassland form. The Box-Gum Woodland CEEC is a grassy woodland with an overstorey dominated by *Eucalyptus albens* (White Box), *Eucalyptus melliodora* (Yellow Box) and *Eucalyptus blakelyi* (Blakely's Red Gum) often in association with *Angophora floribunda* (Rough-barked Apple). The shrub layer is typically sparse or absent, with common species including *Geijera parviflora* (Wilga), *Notelaea microcarpa* (Native Mock Olive) and *Acacia implexa* (Hickory Wattle). The ground layer is typically dominated by grasses and forbs, with common grass species including *Austrostipa scabra* (Speargrass), *Austrostipa verticillata* (Slender Bamboo Grass), *Aristida ramosa* (Purple Wire Grass), *Themeda australis* (Kangaroo Grass), and *Bothriochloa* spp. (Red Grass).

Box-Gum Woodland CEEC occurs on higher fertility soils in a range of landscape positions, from slopes to alluvial flats. The Box-Gum Woodland CEEC occurs in the study area as an intact woodland, as a DNG and as a disturbed woodland with a regenerating canopy woodland. Table 4.1 below provides a summary of the area of Box-Gum Woodland CEEC listed under the EPBC Act mapped on each of the proposed offset areas.

Table 4.1 Area of Box-Gum Woodland CEEC Listed Under the EPBC Act Mapped by Proposed Offset Area

Offset Area	Box-Gum Woodland CEEC (Grassland Form)	Box-Gum Woodland CEEC (Woodland Form)	Total
Triangle	0	741.9	**741.9**
Long Gully	0	352.9	**352.9**
Neranghi North	0	567	**567**
Coonoor	0	573.9	**573.9**
Thornfield	5.4	7.3	**12.7**
Total	**5.4**	**2,243**	**2,248.4**

4.2 Box-Gum Woodland CEEC (BC Act)

All areas that were mapped as Box-Gum Woodland CEEC listed under the EPBC Act also met the definition for inclusion under the NSW BC Act. No additional areas were mapped as Box-Gum Woodland CEEC listed under the BC Act that did not meet the definition for inclusion under the EPBC Act.

5 Threatened Plant Species

Two threatened plant species were recorded in the proposed offset areas, both of which are listed as threatened under the BC Act and the EPBC Act. Table 5.1 lists the threatened species recorded and their status under the EPBC Act and BC Act.

Table 5.1 Threatened Species Recorded in the Proposed Offset Areas

Scientific Name	Common Name	EPBC Act Status*	BC Act Status*
Thesium australe	Austral Toadflax	Vulnerable	Vulnerable
Dichanthium setosum	Bluegrass	Vulnerable	Vulnerable

* Conservation status under the BC Act and/or EPBC Act (current as of June 2021).

Approximately ten individuals of *Thesium australe* were recorded from one location and approximately 50 individuals of *Dichanthium setosum* were recorded from one location on the Coonoor proposed offset area. Figure 5.1 shows the locations of threatened species recorded in the proposed offset areas during this study.

Also recorded during this study were:

- approximately ten individuals of *Homoranthus prolixus* (Granite Homoranthus), which is listed as Vulnerable under both the EPBC Act and BC Act, which were located within the Coonoor property outside of the proposed offset area boundary; and
- approximately 100 individuals of *Dichanthium setosum*, which were located in a second location within the Coonoor property outside of the proposed offset area boundary.

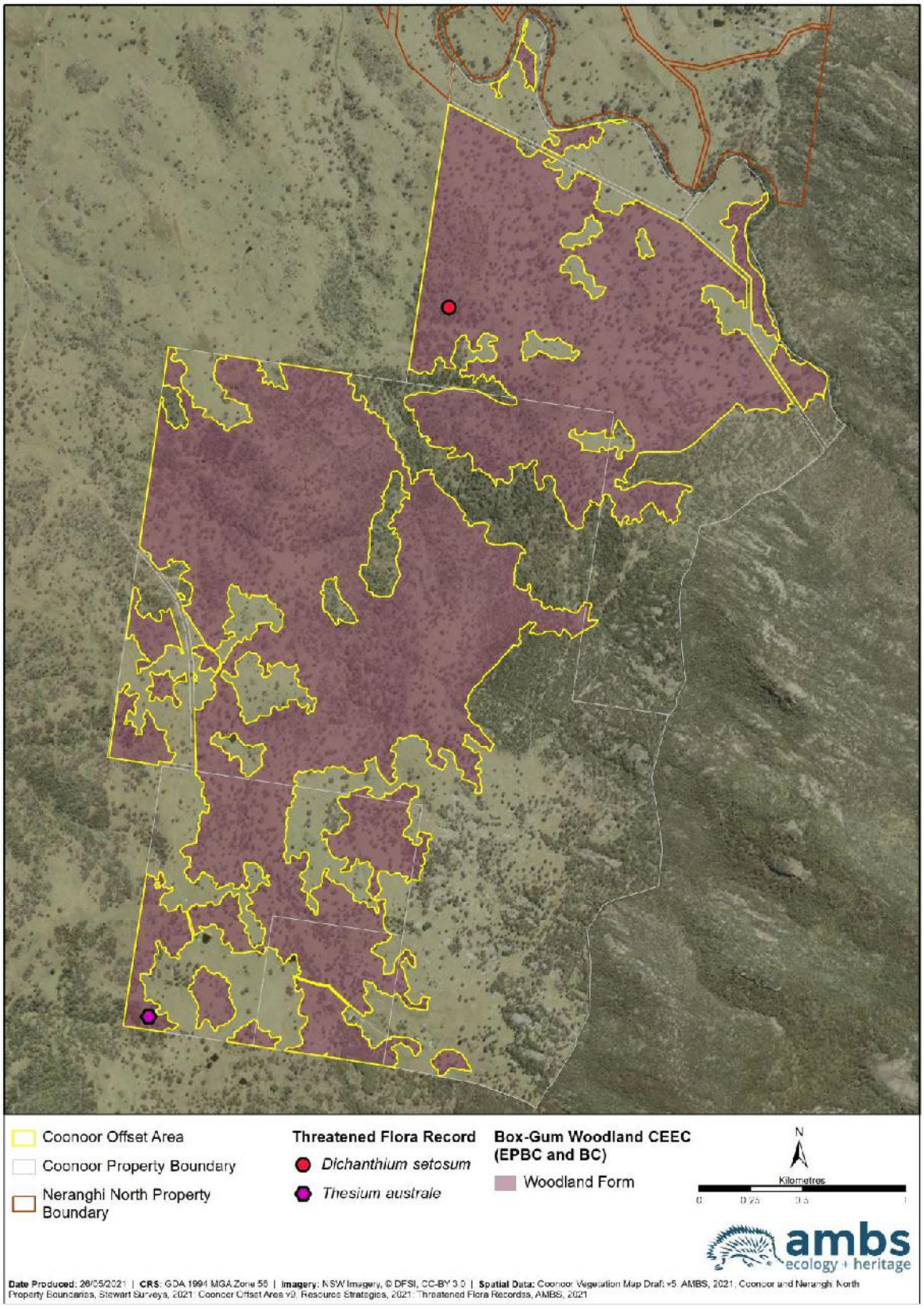

Figure 5.1 Threatened Plant Species Recorded in the Coonoor Proposed Offset Area During this Study

6 Conclusions

A total of 708 plant taxa in 84 families were recorded during surveys to determine the PCTs in the proposed offset areas. Of these, 470 were native plant taxa. A full plant species list is included as Appendix A.

Two TECs listed under the EPBC Act were identified in the proposed offset areas:

- Box-Gum Woodland CEEC listed under the EPBC Act (comprising 2,243 ha of woodland and 5.4 ha of DNG, total of 2,248.4 ha); and
- Poplar Box Grassy Woodland EEC.

As per condition 11A(a) of EPBC 2010/5566, the below table summarises the confirmed quantity and "condition classes" of the EPBC Act listed Box-Gum Woodland CEEC within each of the additional offset areas:

	Area (ha) in each condition class		
Offset Area	**An overstorey of eucalypt trees exists, but there is no substantial native understorey.**	**A native understorey exists, but the trees have been cleared.**	**Both a native understorey and an overstorey of eucalypts exist in conjunction.**
Triangle	0	0	741.9
Long Gully	0	0	352.9
Neranghi North	0	0	567
Coonoor	0	0	573.9
Thornfield	0	5.4	7.3
Total	**0**	**5.4**	**2243**

One TEC listed under the BC Act was identified in the proposed offset areas, namely the Box-Gum Woodland CEEC listed under the BC Act (comprising 2,243 ha of woodland and 5.4 ha of DNG, total of 2,248.4 ha).

Two threatened plant species were recorded in the proposed offset areas, both of which are listed as threatened under the BC Act and EPBC Act.

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Appendix A: Plant Species List

Family	Genus	Scientific Name	Establishment
Acanthaceae	Acanthus	*Acanthus spinosus*	Introduced
Acanthaceae	Brunoniella	*Brunoniella australis*	Native
Acanthaceae	Rostellularia	*Rostellularia adscendens*	Native
Acanthaceae	Rostellularia	*Rostellularia adscendens var. adscendens*	Native
Amaranthaceae	Alternanthera	*Alternanthera denticulata*	Native
Amaranthaceae	Alternanthera	*Alternanthera nana*	Native
Amaranthaceae	Alternanthera	*Alternanthera sp. A*	Native
Amaranthaceae	Amaranthus	*Amaranthus hybridus*	Introduced
Amaranthaceae	Amaranthus	*Amaranthus powellii*	Introduced
Amaranthaceae	Amaranthus	*Amaranthus spp.*	-
Amaranthaceae	Gomphrena	*Gomphrena celosioides*	Introduced
Anthericaceae		Anthericaceae indeterminate	-
Anthericaceae	Arthropodium	*Arthropodium milleflorum*	Native
Anthericaceae	Arthropodium	*Arthropodium minus*	Native
Anthericaceae	Arthropodium	*Arthropodium sp. A*	Native
Anthericaceae	Arthropodium	*Arthropodium sp. B*	Native
Anthericaceae	Arthropodium	*Arthropodium spp.*	Native
Anthericaceae	Dichopogon	*Dichopogon fimbriatus*	Native
Anthericaceae	Dichopogon	*Dichopogon spp.*	Native
Anthericaceae	Dichopogon	*Dichopogon strictus*	Native
Anthericaceae	Tricoryne	*Tricoryne elatior*	Native
Anthericaceae	Tricoryne	*Tricoryne spp.*	Native
Apiaceae	Cyclospermum	*Cyclospermum leptophyllum*	Introduced
Apiaceae	Daucus	*Daucus carota*	Introduced
Apiaceae	Daucus	*Daucus glochidiatus*	Native
Apiaceae	Hydrocotyle	*Hydrocotyle hirta*	Native
Apiaceae	Hydrocotyle	*Hydrocotyle laxiflora*	Native
Apiaceae	Hydrocotyle	*Hydrocotyle sibthorpioides*	Native
Apiaceae	Hydrocotyle	*Hydrocotyle species 1*	Native
Apiaceae	Hydrocotyle	*Hydrocotyle spp.*	Native
Apiaceae	Hydrocotyle	*Hydrocotyle tripartita*	Native
Apiaceae	Trachymene	*Trachymene incisa*	Native
Apiaceae	Trachymene	*Trachymene spp.*	Native
Apocynaceae	Gomphocarpus	*Gomphocarpus fruticosus*	Introduced
Apocynaceae	Gomphocarpus	*Gomphocarpus spp.*	Introduced
Apocynaceae	Marsdenia	*Marsdenia spp.*	Native
Apocynaceae	Parsonsia	*Parsonsia eucalyptophylla*	Native
Apocynaceae	Tweedia	*Tweedia coerulea*	Introduced
Asphodelaceae	Bulbine	*Bulbine bulbosa*	Native
Asphodelaceae	Bulbine	*Bulbine semibarbata*	Native
Asphodelaceae	Bulbine	*Bulbine spp.*	Native
Asteraceae	Arctotheca	*Arctotheca calendula*	Introduced
Asteraceae		Asteraceae indeterminate	-
Asteraceae	Bidens	*Bidens pilosa*	Introduced
Asteraceae	Bidens	*Bidens spp.*	Introduced
Asteraceae	Bidens	*Bidens subalternans*	Introduced
Asteraceae	Brachyscome	*Brachyscome spp.*	Native
Asteraceae	Calotis	*Calotis cuneifolia*	Native
Asteraceae	Calotis	*Calotis dentex*	Native

Family	Genus	Scientific Name	Establishment
Asteraceae	Calotis	*Calotis hispidula*	Native
Asteraceae	Calotis	*Calotis lappulacea*	Native
Asteraceae	Calotis	*Calotis spp.*	Native
Asteraceae	Carduus	*Carduus pycnocephalus*	Introduced
Asteraceae	Carduus	*Carduus spp.*	Introduced
Asteraceae	Carduus	*Carduus tenuiflorus*	Introduced
Asteraceae	Carthamus	*Carthamus lanatus*	Introduced
Asteraceae	Cassinia	*Cassinia laevis*	Native
Asteraceae	Cassinia	*Cassinia quinquefaria*	Native
Asteraceae	Cassinia	*Cassinia spp.*	Native
Asteraceae	Centaurea	*Centaurea melitensis*	Introduced
Asteraceae	Centaurea	*Centaurea spp.*	Introduced
Asteraceae	Chondrilla	*Chondrilla juncea*	Introduced
Asteraceae	Chrysocephalum	*Chrysocephalum apiculatum*	Native
Asteraceae	Chrysocephalum	*Chrysocephalum semipapposum*	Native
Asteraceae	Cirsium	*Cirsium spp.*	Introduced
Asteraceae	Cirsium	*Cirsium vulgare*	Introduced
Asteraceae	Conyza	*Conyza bonariensis*	Introduced
Asteraceae	Conyza	*Conyza parva*	Introduced
Asteraceae	Conyza	*Conyza spp.*	Introduced
Asteraceae	Cotula	*Cotula australis*	Native
Asteraceae	Cotula	*Cotula spp.*	-
Asteraceae	Craspedia	*Craspedia spp.*	Native
Asteraceae	Cymbonotus	*Cymbonotus lawsonianus*	Native
Asteraceae	Euchiton	*Euchiton involucratus*	Native
Asteraceae	Euchiton	*Euchiton japonicus*	Native
Asteraceae	Euchiton	*Euchiton sphaericus*	Native
Asteraceae	Euchiton	*Euchiton spp.*	Native
Asteraceae	Gamochaeta	*Gamochaeta antillana*	Introduced
Asteraceae	Gamochaeta	*Gamochaeta calviceps*	Introduced
Asteraceae	Gamochaeta	*Gamochaeta purpurea*	Introduced
Asteraceae	Gamochaeta	*Gamochaeta spp.*	Introduced
Asteraceae	Glossocardia	*Glossocardia bidens*	Native
Asteraceae	Gnaphalium	*Gnaphalium polycaulon*	Introduced
Asteraceae	Hypochaeris	*Hypochaeris albiflora*	Introduced
Asteraceae	Hypochaeris	*Hypochaeris glabra*	Introduced
Asteraceae	Hypochaeris	*Hypochaeris radicata*	Introduced
Asteraceae	Hypochaeris	*Hypochaeris spp.*	Introduced
Asteraceae	Isoetopsis	*Isoetopsis graminifolia*	Native
Asteraceae	Lactuca	*Lactuca saligna*	Introduced
Asteraceae	Lactuca	*Lactuca serriola*	Introduced
Asteraceae	Lagenophora	*Lagenophora gracilis*	Native
Asteraceae	Lagenophora	*Lagenophora montana*	Native
Asteraceae	Lagenophora	*Lagenophora stipitata*	Native
Asteraceae	Leontodon	*Leontodon rhagadioloides*	Introduced
Asteraceae	Leptorhynchos	*Leptorhynchos squamatus*	Native
Asteraceae	Microseris	*Microseris lanceolata*	Native
Asteraceae	Olearia	*Olearia elliptica*	Native
Asteraceae	Olearia	*Olearia viscidula*	Native
Asteraceae	Onopordum	*Onopordum acanthium subsp. acanthium*	Introduced
Asteraceae	Picris	*Picris angustifolia*	Native
Asteraceae	Picris	*Picris spp.*	Native

Family	Genus	Scientific Name	Establishment
Asteraceae	Podolepis	*Podolepis jaceoides*	Native
Asteraceae	Podolepis	*Podolepis omissa*	Native
Asteraceae	Podolepis	*Podolepis spp.*	Native
Asteraceae	Pseudognaphalium	*Pseudognaphalium luteoalbum*	Native
Asteraceae	Schkuhria	*Schkuhria pinnata var. abrotanoides*	Introduced
Asteraceae	Senecio	*Senecio bathurstianus*	Native
Asteraceae	Senecio	*Senecio lageniformis*	Native
Asteraceae	Senecio	*Senecio madagascariensis*	Introduced
Asteraceae	Senecio	*Senecio quadridentatus*	Native
Asteraceae	Senecio	*Senecio spp.*	-
Asteraceae	Senecio	*Senecio tenuiflorus*	Native
Asteraceae	Sigesbeckia	*Sigesbeckia australiensis*	Native
Asteraceae	Sigesbeckia	*Sigesbeckia orientalis subsp. orientalis*	Native
Asteraceae	Silybum	*Silybum marianum*	Introduced
Asteraceae	Solenogyne	*Solenogyne bellioides*	Native
Asteraceae	Solenogyne	*Solenogyne dominii*	Native
Asteraceae	Solenogyne	*Solenogyne spp.*	Native
Asteraceae	Soliva	*Soliva sessilis*	Introduced
Asteraceae	Soliva	*Soliva stolonifera*	Introduced
Asteraceae	Sonchus	*Sonchus asper*	Introduced
Asteraceae	Sonchus	*Sonchus oleraceus*	Introduced
Asteraceae	Sonchus	*Sonchus spp.*	-
Asteraceae	Tagetes	*Tagetes minuta*	Introduced
Asteraceae	Taraxacum	*Taraxacum officinale*	Introduced
Asteraceae	Taraxacum	*Taraxacum spp.*	-
Asteraceae	Tolpis	*Tolpis barbata*	Introduced
Asteraceae	Triptilodiscus	*Triptilodiscus pygmaeus*	Native
Asteraceae	Vernonia	*Vernonia cinerea*	Native
Asteraceae	Vittadinia	*Vittadinia cervicularis*	Native
Asteraceae	Vittadinia	*Vittadinia condyloides*	Native
Asteraceae	Vittadinia	*Vittadinia cuneata*	Native
Asteraceae	Vittadinia	*Vittadinia cuneata var. cuneata*	Native
Asteraceae	Vittadinia	*Vittadinia cuneata var. cuneata f. cuneata*	Native
Asteraceae	Vittadinia	*Vittadinia cuneata var. hirsuta*	Native
Asteraceae	Vittadinia	*Vittadinia dissecta*	Native
Asteraceae	Vittadinia	*Vittadinia dissecta var. hirta*	Native
Asteraceae	Vittadinia	*Vittadinia gracilis*	Native
Asteraceae	Vittadinia	*Vittadinia muelleri*	Native
Asteraceae	Vittadinia	*Vittadinia pterochaeta*	Native
Asteraceae	Vittadinia	*Vittadinia pustulata*	Native
Asteraceae	Vittadinia	*Vittadinia spp.*	Native
Asteraceae	Vittadinia	*Vittadinia sulcata*	Native
Asteraceae	Xanthium	*Xanthium occidentale*	Introduced
Asteraceae	Xanthium	*Xanthium spinosum*	Introduced
Asteraceae	Xanthium	*Xanthium spp.*	Introduced
Asteraceae	Xerochrysum	*Xerochrysum bracteatum*	Native
Asteraceae	Xerochrysum	*Xerochrysum spp.*	Native
Bignoniaceae	Pandorea	*Pandorea pandorana*	Native
Boraginaceae	Cynoglossum	*Cynoglossum australe*	Native
Boraginaceae	Echium	*Echium plantagineum*	Introduced
Boraginaceae	Heliotropium	*Heliotropium amplexicaule*	Introduced
Brassicaceae	Brassica	*Brassica spp.*	Introduced

Family	Genus	Scientific Name	Establishment
Brassicaceae		Brassicaceae indeterminate	-
Brassicaceae	Capsella	*Capsella bursa-pastoris*	Introduced
Brassicaceae	Cardamine	*Cardamine hirsuta*	Introduced
Brassicaceae	Cardamine	*Cardamine spp.*	-
Brassicaceae	Lepidium	*Lepidium africanum*	Introduced
Brassicaceae	Lepidium	*Lepidium bonariense*	Introduced
Brassicaceae	Lepidium	*Lepidium spp.*	-
Brassicaceae	Rapistrum	*Rapistrum rugosum*	Introduced
Brassicaceae	Sisymbrium	*Sisymbrium irio*	Introduced
Brassicaceae	Sisymbrium	*Sisymbrium officinale*	Introduced
Cactaceae	Opuntia	*Opuntia spp.*	Introduced
Cactaceae	Opuntia	*Opuntia stricta*	Introduced
Campanulaceae	Isotoma	*Isotoma fluviatilis*	Native
Campanulaceae	Lobelia	*Lobelia spp.*	Native
Campanulaceae	Wahlenbergia	*Wahlenbergia communis*	Native
Campanulaceae	Wahlenbergia	*Wahlenbergia gracilenta*	Native
Campanulaceae	Wahlenbergia	*Wahlenbergia gracilis*	Native
Campanulaceae	Wahlenbergia	*Wahlenbergia luteola*	Native
Campanulaceae	Wahlenbergia	*Wahlenbergia spp.*	Native
Campanulaceae	Wahlenbergia	*Wahlenbergia stricta*	Native
Campanulaceae	Wahlenbergia	*Wahlenbergia stricta subsp. alterna*	Native
Campanulaceae	Wahlenbergia	*Wahlenbergia stricta subsp. stricta*	Native
Caryophyllaceae	Arenaria	*Arenaria leptoclados*	Introduced
Caryophyllaceae	Arenaria	*Arenaria serpyllifolia*	Introduced
Caryophyllaceae	Arenaria	*Arenaria spp.*	Introduced
Caryophyllaceae		Caryophyllaceae indeterminate	-
Caryophyllaceae	Cerastium	*Cerastium glomeratum*	Introduced
Caryophyllaceae	Cerastium	*Cerastium spp.*	Introduced
Caryophyllaceae	Cerastium	*Cerastium vulgare*	Introduced
Caryophyllaceae	Gypsophila	*Gypsophila tubulosa*	Native
Caryophyllaceae	Paronychia	*Paronychia brasiliana*	Introduced
Caryophyllaceae	Petrorhagia	*Petrorhagia dubia*	Introduced
Caryophyllaceae	Petrorhagia	*Petrorhagia nanteuilii*	Introduced
Caryophyllaceae	Petrorhagia	*Petrorhagia spp.*	Introduced
Caryophyllaceae	Polycarpon	*Polycarpon tetraphyllum*	Introduced
Caryophyllaceae	Scleranthus	*Scleranthus spp.*	-
Caryophyllaceae	Spergularia	*Spergularia brevifolia*	Native
Caryophyllaceae	Spergularia	*Spergularia rubra*	Introduced
Caryophyllaceae	Stellaria	*Stellaria media*	Introduced
Caryophyllaceae	Stellaria	*Stellaria spp.*	-
Centrolepidaceae	Centrolepis	*Centrolepis strigosa subsp. strigosa*	Native
Chenopodiaceae	Chenopodium	*Chenopodium cristatum*	Native
Chenopodiaceae	Chenopodium	*Chenopodium spp.*	-
Chenopodiaceae	Dysphania	*Dysphania carinata*	Native
Chenopodiaceae	Dysphania	*Dysphania cristata*	Native
Chenopodiaceae	Dysphania	*Dysphania pumilio*	Native
Chenopodiaceae	Dysphania	*Dysphania spp.*	Native
Chenopodiaceae	Einadia	*Einadia hastata*	Native
Chenopodiaceae	Einadia	*Einadia nutans*	Native
Chenopodiaceae	Einadia	*Einadia nutans subsp. nutans*	Native
Chenopodiaceae	Einadia	*Einadia polygonoides*	Native
Chenopodiaceae	Einadia	*Einadia spp.*	Native

Family	Genus	Scientific Name	Establishment
Chenopodiaceae	Einadia	*Einadia trigonos*	Native
Chenopodiaceae	Einadia	*Einadia trigonos subsp. leiocarpa*	Native
Chenopodiaceae	Einadia	*Einadia trigonos subsp. stellulata*	Native
Chenopodiaceae	Maireana	*Maireana enchylaenoides*	Native
Chenopodiaceae	Maireana	*Maireana microphylla*	Native
Chenopodiaceae	Sclerolaena	*Sclerolaena birchii*	Native
Clusiaceae	Hypericum	*Hypericum gramineum*	Native
Colchicaceae	Wurmbea	*Wurmbea biglandulosa*	Native
Colchicaceae	Wurmbea	*Wurmbea dioica subsp. dioica*	Native
Colchicaceae	Wurmbea	*Wurmbea spp.*	Native
Commelinaceae	Commelina	*Commelina cyanea*	Native
Commelinaceae	Murdannia	*Murdannia graminea*	Native
Convolvulaceae	Convolvulus	*Convolvulus angustissimus*	Native
Convolvulaceae	Convolvulus	*Convolvulus erubescens*	Native
Convolvulaceae	Convolvulus	*Convolvulus graminetinus*	Native
Convolvulaceae	Convolvulus	*Convolvulus recurvatus subsp. recurvatus*	Native
Convolvulaceae	Convolvulus	*Convolvulus spp.*	-
Convolvulaceae	Dichondra	*Dichondra repens*	Native
Convolvulaceae	Dichondra	*Dichondra sp. Inglewood*	Native
Convolvulaceae	Evolvulus	*Evolvulus alsinoides*	Native
Convolvulaceae	Evolvulus	*Evolvulus alsinoides var. decumbens*	Native
Crassulaceae	Crassula	*Crassula colorata*	Native
Crassulaceae	Crassula	*Crassula sieberiana*	Native
Cucurbitaceae	Cucumis	*Cucumis myriocarpus subsp. leptodermis*	Introduced
Cucurbitaceae	Cucumis	*Cucumis spp.*	-
Cucurbitaceae		Cucurbitaceae indeterminate	-
Cupressaceae	Callitris	*Callitris endlicheri*	Native
Cupressaceae	Callitris	*Callitris glaucophylla*	Native
Cyperaceae	Carex	*Carex appressa*	Native
Cyperaceae	Carex	*Carex breviculmis*	Native
Cyperaceae	Carex	*Carex inversa*	Native
Cyperaceae	Carex	*Carex spp.*	Native
Cyperaceae		Cyperaceae indeterminate	-
Cyperaceae	Cyperus	*Cyperus aggregatus*	Introduced
Cyperaceae	Cyperus	*Cyperus betchei subsp. betchei*	Native
Cyperaceae	Cyperus	*Cyperus difformis*	Native
Cyperaceae	Cyperus	*Cyperus flavidus*	Native
Cyperaceae	Cyperus	*Cyperus fulvus*	Native
Cyperaceae	Cyperus	*Cyperus gracilis*	Native
Cyperaceae	Cyperus	*Cyperus laevis*	Native
Cyperaceae	Cyperus	*Cyperus spp.*	-
Cyperaceae	Cyperus	*Cyperus squarrosus*	Native
Cyperaceae	Eleocharis	*Eleocharis spp.*	Native
Cyperaceae	Fimbristylis	*Fimbristylis dichotoma*	Native
Cyperaceae	Lepidosperma	*Lepidosperma laterale*	Native
Cyperaceae	Lipocarpha	*Lipocarpha microcephala*	Native
Cyperaceae	Schoenus	*Schoenus apogon*	Native
Cyperaceae	Scleria	*Scleria mackaviensis*	Native
Cyperaceae	Scleria	*Scleria spp.*	Native
Dilleniaceae	Hibbertia	*Hibbertia acicularis*	Native
Dilleniaceae	Hibbertia	*Hibbertia obtusifolia*	Native
Dilleniaceae	Hibbertia	*Hibbertia pilifera*	Native

Family	Genus	Scientific Name	Establishment
Dilleniaceae	Hibbertia	*Hibbertia spp.*	Native
Droseraceae	Drosera	*Drosera burmanni*	Native
Droseraceae	Drosera	*Drosera hookeri*	Native
Droseraceae	Drosera	*Drosera peltata*	Native
Droseraceae	Drosera	*Drosera spp.*	Native
Ericaceae	Brachyloma	*Brachyloma daphnoides*	Native
Ericaceae		Ericaceae indeterminate	-
Ericaceae	Leucopogon	*Leucopogon muticus*	Native
Ericaceae	Leucopogon	*Leucopogon spp.*	Native
Ericaceae	Lissanthe	*Lissanthe strigosa*	Native
Ericaceae	Lissanthe	*Lissanthe strigosa subsp. subulata*	Native
Ericaceae	Melichrus	*Melichrus urceolatus*	Native
Ericaceae	Monotoca	*Monotoca scoparia*	Native
Euphorbiaceae	Euphorbia	*Euphorbia drummondii*	Native
Euphorbiaceae	Euphorbia	*Euphorbia spp.*	-
Euphorbiaceae		Euphorbiaceae indeterminate	-
Fabaceae (Caesalpinioideae)	Senna	*Senna spp.*	-
Fabaceae (Faboideae)	Desmodium	*Desmodium gunnii*	Native
Fabaceae (Faboideae)	Desmodium	*Desmodium spp.*	Native
Fabaceae (Faboideae)	Desmodium	*Desmodium varians*	Native
Fabaceae (Faboideae)		Fabaceae indeterminate	-
Fabaceae (Faboideae)	Glycine	*Glycine clandestina*	Native
Fabaceae (Faboideae)	Glycine	*Glycine latifolia*	Native
Fabaceae (Faboideae)	Glycine	*Glycine spp.*	Native
Fabaceae (Faboideae)	Glycine	*Glycine stenophita*	Native
Fabaceae (Faboideae)	Glycine	*Glycine tabacina*	Native
Fabaceae (Faboideae)	Glycine	*Glycine tomentella*	Native
Fabaceae (Faboideae)	Hardenbergia	*Hardenbergia violacea*	Native
Fabaceae (Faboideae)	Hovea	*Hovea lanceolata*	Native
Fabaceae (Faboideae)	Indigofera	*Indigofera adesmiifolia*	Native
Fabaceae (Faboideae)	Lotus	*Lotus australis*	Native
Fabaceae (Faboideae)	Medicago	*Medicago arabica*	Introduced
Fabaceae (Faboideae)	Medicago	*Medicago laciniata*	Introduced
Fabaceae (Faboideae)	Medicago	*Medicago lupulina*	Introduced
Fabaceae (Faboideae)	Medicago	*Medicago minima*	Introduced
Fabaceae (Faboideae)	Medicago	*Medicago orbicularis*	Introduced
Fabaceae (Faboideae)	Medicago	*Medicago polymorpha*	Introduced
Fabaceae (Faboideae)	Medicago	*Medicago sativa*	Introduced
Fabaceae (Faboideae)	Medicago	*Medicago spp.*	Introduced
Fabaceae (Faboideae)	Medicago	*Medicago truncatula*	Introduced
Fabaceae (Faboideae)	Melilotus	*Melilotus indicus*	Introduced
Fabaceae (Faboideae)	Oxytes	*Oxytes brachypoda*	Native
Fabaceae (Faboideae)	Pultenaea	*Pultenaea cuneata*	Native
Fabaceae (Faboideae)	Rhynchosia	*Rhynchosia minima*	Native
Fabaceae (Faboideae)	Swainsona	*Swainsona behriana*	Native
Fabaceae (Faboideae)	Swainsona	*Swainsona galegifolia*	Native
Fabaceae (Faboideae)	Swainsona	*Swainsona monticola*	Native
Fabaceae (Faboideae)	Swainsona	*Swainsona oroboides*	Native
Fabaceae (Faboideae)	Swainsona	*Swainsona reticulata*	Native
Fabaceae (Faboideae)	Swainsona	*Swainsona spp.*	Native
Fabaceae (Faboideae)	Trifolium	*Trifolium angustifolium*	Introduced

Family	Genus	Scientific Name	Establishment
Fabaceae (Faboideae)	Trifolium	*Trifolium arvense*	Introduced
Fabaceae (Faboideae)	Trifolium	*Trifolium campestre*	Introduced
Fabaceae (Faboideae)	Trifolium	*Trifolium cernuum*	Introduced
Fabaceae (Faboideae)	Trifolium	*Trifolium dubium*	Introduced
Fabaceae (Faboideae)	Trifolium	*Trifolium glomeratum*	Introduced
Fabaceae (Faboideae)	Trifolium	*Trifolium hirtum*	Introduced
Fabaceae (Faboideae)	Trifolium	*Trifolium pratense*	Introduced
Fabaceae (Faboideae)	Trifolium	*Trifolium repens*	Introduced
Fabaceae (Faboideae)	Trifolium	*Trifolium spp.*	Introduced
Fabaceae (Faboideae)	Trifolium	*Trifolium striatum*	Introduced
Fabaceae (Faboideae)	Trifolium	*Trifolium subterraneum*	Introduced
Fabaceae (Faboideae)	Trifolium	*Trifolium tomentosum*	Introduced
Fabaceae (Faboideae)	Trifolium	*Trifolium vesiculosum*	Introduced
Fabaceae (Faboideae)	Zornia	*Zornia dyctiocarpa var. dyctiocarpa*	Native
Fabaceae (Mimosoideae)	Acacia	*Acacia blakei subsp. diphylla*	Native
Fabaceae (Mimosoideae)	Acacia	*Acacia caesiella*	Native
Fabaceae (Mimosoideae)	Acacia	*Acacia decora*	Native
Fabaceae (Mimosoideae)	Acacia	*Acacia doratoxylon*	Native
Fabaceae (Mimosoideae)	Acacia	*Acacia implexa*	Native
Fabaceae (Mimosoideae)	Acacia	*Acacia neriifolia*	Native
Fabaceae (Mimosoideae)	Acacia	*Acacia paradoxa*	Native
Fabaceae (Mimosoideae)	Acacia	*Acacia rubida*	Native
Fabaceae (Mimosoideae)	Acacia	*Acacia spp.*	-
Fabaceae (Mimosoideae)	Acacia	*Acacia stenophylla*	Native
Gentianaceae	Centaurium	*Centaurium erythraea*	Introduced
Gentianaceae	Centaurium	*Centaurium spp.*	Introduced
Gentianaceae	Centaurium	*Centaurium tenuiflorum*	Introduced
Geraniaceae	Erodium	*Erodium cicutarium*	Introduced
Geraniaceae	Erodium	*Erodium crinitum*	Native
Geraniaceae	Erodium	*Erodium moschatum*	Introduced
Geraniaceae	Geranium	*Geranium retrorsum*	Native
Geraniaceae	Geranium	*Geranium solanderi*	Native
Geraniaceae	Geranium	*Geranium solanderi var. solanderi*	Native
Geraniaceae	Geranium	*Geranium spp.*	-
Goodeniaceae	Brunonia	*Brunonia australis*	Native
Goodeniaceae	Goodenia	*Goodenia bellidifolia subsp. argentea*	Native
Goodeniaceae	Goodenia	*Goodenia bellidifolia subsp. bellidifolia*	Native
Goodeniaceae	Goodenia	*Goodenia cycloptera*	Native
Goodeniaceae	Goodenia	*Goodenia glabra*	Native
Goodeniaceae	Goodenia	*Goodenia hederacea*	Native
Goodeniaceae	Goodenia	*Goodenia hederacea subsp. hederacea*	Native
Goodeniaceae	Goodenia	*Goodenia macbarronii*	Native
Goodeniaceae	Goodenia	*Goodenia pinnatifida*	Native
Goodeniaceae	Goodenia	*Goodenia spp.*	Native
Goodeniaceae	Velleia	*Velleia paradoxa*	Native
Haloragaceae	Gonocarpus	*Gonocarpus elatus*	Native
Haloragaceae	Gonocarpus	*Gonocarpus micranthus*	Native
Haloragaceae	Gonocarpus	*Gonocarpus spp.*	Native
Haloragaceae	Haloragis	*Haloragis heterophylla*	Native
Hypoxidaceae	Hypoxis	*Hypoxis hygrometrica*	Native
Hypoxidaceae	Hypoxis	*Hypoxis hygrometrica var. villosisepala*	Native
Hypoxidaceae	Hypoxis	*Hypoxis spp.*	Native

Family	Genus	Scientific Name	Establishment
Iridaceae		Iridaceae indeterminate	-
Iridaceae	Sisyrinchium	*Sisyrinchium rosulatum*	Introduced
Iridaceae	Sisyrinchium	*Sisyrinchium spp.*	Introduced
Juncaceae	Juncus	*Juncus australis*	Native
Juncaceae	Juncus	*Juncus bufonius*	Introduced
Juncaceae	Juncus	*Juncus capitatus*	Introduced
Juncaceae	Juncus	*Juncus filicaulis*	Native
Juncaceae	Juncus	*Juncus flavidus*	Native
Juncaceae	Juncus	*Juncus homalocaulis*	Native
Juncaceae	Juncus	*Juncus ochrocoleus*	Native
Juncaceae	Juncus	*Juncus sarophorus*	Native
Juncaceae	Juncus	*Juncus spp.*	-
Juncaceae	Juncus	*Juncus subsecundus*	Native
Juncaceae	Juncus	*Juncus usitatus*	Native
Juncaceae	Luzula	*Luzula flaccida*	Native
Juncaceae	Luzula	*Luzula spp.*	Native
Lamiaceae	Ajuga	*Ajuga australis*	Native
Lamiaceae		Lamiaceae indeterminate	-
Lamiaceae	Lamium	*Lamium amplexicaule*	Introduced
Lamiaceae	Marrubium	*Marrubium vulgare*	Introduced
Lamiaceae	Mentha	*Mentha satureioides*	Native
Lamiaceae	Plectranthus	*Plectranthus parviflorus*	Native
Lamiaceae	Plectranthus	*Plectranthus suaveolens*	Native
Lamiaceae	Salvia	*Salvia reflexa*	Introduced
Lamiaceae	Salvia	*Salvia verbenaca*	Introduced
Lamiaceae	Scutellaria	*Scutellaria humilis*	Native
Lamiaceae	Stachys	*Stachys arvensis*	Introduced
Lamiaceae	Teucrium	*Teucrium betchei*	Native
Linaceae	Linum	*Linum marginale*	Native
Linaceae	Linum	*Linum spp.*	-
Lomandraceae	Lomandra	*Lomandra bracteata*	Native
Lomandraceae	Lomandra	*Lomandra confertifolia*	Native
Lomandraceae	Lomandra	*Lomandra confertifolia subsp. pallida*	Native
Lomandraceae	Lomandra	*Lomandra filiformis*	Native
Lomandraceae	Lomandra	*Lomandra filiformis subsp. coriacea*	Native
Lomandraceae	Lomandra	*Lomandra filiformis subsp. filiformis*	Native
Lomandraceae	Lomandra	*Lomandra longifolia*	Native
Lomandraceae	Lomandra	*Lomandra multiflora subsp. multiflora*	Native
Lomandraceae	Lomandra	*Lomandra spp.*	Native
Loranthaceae	Amyema	*Amyema miquelii*	Native
Loranthaceae	Amyema	*Amyema pendula*	Native
Loranthaceae	Amyema	*Amyema spp.*	Native
Luzuriagaceae	Eustrephus	*Eustrephus latifolius*	Native
Luzuriagaceae	Geitonoplesium	*Geitonoplesium cymosum*	Native
Lythraceae	Lythrum	*Lythrum hyssopifolia*	Native
Lythraceae	Lythrum	*Lythrum spp.*	-
Malaceae	Cotoneaster	*Cotoneaster spp.*	Introduced
Malvaceae	Brachychiton	*Brachychiton populneus*	Native
Malvaceae	Malva	*Malva parviflora*	Introduced
Malvaceae	Malva	*Malva spp.*	-
Malvaceae	Modiola	*Modiola caroliniana*	Introduced
Malvaceae	Sida	*Sida corrugata*	Native

Family	Genus	Scientific Name	Establishment
Malvaceae	Sida	*Sida cunninghamii*	Native
Malvaceae	Sida	*Sida hackettiana*	Native
Malvaceae	Sida	*Sida spinosa*	Introduced
Malvaceae	Sida	*Sida spp.*	-
Malvaceae	Sida	*Sida trichopoda*	Native
Moraceae	Ficus	*Ficus rubiginosa*	Native
Myoporaceae	Eremophila	*Eremophila debilis*	Native
Myrtaceae	Angophora	*Angophora floribunda*	Native
Myrtaceae	Calytrix	*Calytrix tetragona*	Native
Myrtaceae	Eucalyptus	*Eucalyptus albens*	Native
Myrtaceae	Eucalyptus	*Eucalyptus albens <--> moluccana*	Native
Myrtaceae	Eucalyptus	*Eucalyptus blakelyi*	Native
Myrtaceae	Eucalyptus	*Eucalyptus blakelyi <--> dealbata*	Native
Myrtaceae	Eucalyptus	*Eucalyptus bridgesiana*	Native
Myrtaceae	Eucalyptus	*Eucalyptus caleyi*	Native
Myrtaceae	Eucalyptus	*Eucalyptus dealbata*	Native
Myrtaceae	Eucalyptus	*Eucalyptus macrorhyncha*	Native
Myrtaceae	Eucalyptus	*Eucalyptus melliodora*	Native
Myrtaceae	Eucalyptus	*Eucalyptus moluccana*	Native
Myrtaceae	Eucalyptus	*Eucalyptus spp.*	Native
Myrtaceae	Leptospermum	*Leptospermum brevipes*	Native
Myrtaceae	Leptospermum	*Leptospermum spp.*	Native
Nyctaginaceae	Boerhavia	*Boerhavia dominii*	Native
Oleaceae	Jasminum	*Jasminum lineare*	Native
Oleaceae	Jasminum	*Jasminum suavissimum*	Native
Oleaceae	Notelaea	*Notelaea microcarpa*	Native
Onagraceae	Epilobium	*Epilobium billardierianum subsp. cinereum*	Native
Onagraceae	Oenothera	*Oenothera spp.*	Introduced
Ophioglossaceae	Ophioglossum	*Ophioglossum lusitanicum*	Native
Orchidaceae	Cymbidium	*Cymbidium canaliculatum*	Native
Orchidaceae	Cymbidium	*Cymbidium spp.*	Native
Orchidaceae	Diuris	*Diuris dendrobioides*	Native
Orchidaceae	Diuris	*Diuris spp.*	Native
Orchidaceae	Eriochilus	*Eriochilus cucullatus*	Native
Orchidaceae	Microtis	*Microtis parviflora*	Native
Orchidaceae	Microtis	*Microtis spp.*	Native
Orchidaceae	Microtis	*Microtis unifolia*	Native
Orchidaceae		Orchidaceae indeterminate	-
Orchidaceae	Pterostylis	*Pterostylis bicolor*	Native
Orchidaceae	Pterostylis	*Pterostylis rufa*	Native
Orchidaceae	Pterostylis	*Pterostylis spp.*	Native
Orchidaceae	Thelymitra	*Thelymitra spp.*	Native
Oxalidaceae	Oxalis	*Oxalis chnoodes*	Native
Oxalidaceae	Oxalis	*Oxalis exilis*	Native
Oxalidaceae	Oxalis	*Oxalis perennans*	Native
Oxalidaceae	Oxalis	*Oxalis radicosa*	Native
Oxalidaceae	Oxalis	*Oxalis rubens*	Native
Oxalidaceae	Oxalis	*Oxalis spp.*	-
Oxalidaceae	Oxalis	*Oxalis thompsoniae*	Introduced
Papaveraceae	Argemone	*Argemone ochroleuca subsp. ochroleuca*	Introduced
Phormiaceae	Dianella	*Dianella longifolia*	Native
Phormiaceae	Dianella	*Dianella longifolia var. longifolia*	Native

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Phormiaceae	Dianella	*Dianella revoluta*	Native
Phormiaceae	Dianella	*Dianella spp.*	Native
Phrymaceae	Mimulus	*Mimulus gracilis*	Native
Phyllanthaceae	Breynia	*Breynia spp.*	Native
Phyllanthaceae	Phyllanthus	*Phyllanthus spp.*	Native
Phyllanthaceae	Phyllanthus	*Phyllanthus subcrenulatus*	Native
Phyllanthaceae	Phyllanthus	*Phyllanthus virgatus*	Native
Phyllanthaceae	Poranthera	*Poranthera microphylla*	Native
Phytolaccaceae	Phytolacca	*Phytolacca octandra*	Introduced
Pittosporaceae	Billardiera	*Billardiera scandens*	Native
Pittosporaceae	Bursaria	*Bursaria spinosa*	Native
Plantaginaceae	Linaria	*Linaria arvensis*	Introduced
Plantaginaceae	Linaria	*Linaria pelisseriana*	Introduced
Plantaginaceae	Plantago	*Plantago debilis*	Native
Plantaginaceae	Plantago	*Plantago lanceolata*	Introduced
Plantaginaceae	Plantago	*Plantago spp.*	-
Plantaginaceae	Plantago	*Plantago turrifera*	Native
Plantaginaceae	Plantago	*Plantago varia*	Native
Plantaginaceae	Veronica	*Veronica arvensis*	Introduced
Plantaginaceae	Veronica	*Veronica calycina*	Native
Plantaginaceae	Veronica	*Veronica persica*	Introduced
Plantaginaceae	Veronica	*Veronica plebeia*	Native
Poaceae	Aira	*Aira cupaniana*	Introduced
Poaceae	Aira	*Aira elegantissima*	Introduced
Poaceae	Aira	*Aira spp.*	Introduced
Poaceae	Anthosachne	*Anthosachne scabra*	Native
Poaceae	Aristida	*Aristida personata*	Native
Poaceae	Aristida	*Aristida ramosa*	Native
Poaceae	Aristida	*Aristida spp.*	Native
Poaceae	Aristida	*Aristida vagans*	Native
Poaceae	Aristida	*Aristida warburgii*	Native
Poaceae	Arundinella	*Arundinella nepalensis*	Native
Poaceae	Austrostipa	*Austrostipa mollis*	Native
Poaceae	Austrostipa	*Austrostipa scabra*	Native
Poaceae	Austrostipa	*Austrostipa setacea*	Native
Poaceae	Austrostipa	*Austrostipa spp.*	Native
Poaceae	Austrostipa	*Austrostipa verticillata*	Native
Poaceae	Axonopus	*Axonopus fissifolius*	Introduced
Poaceae	Bothriochloa	*Bothriochloa decipiens var. decipiens*	Native
Poaceae	Bothriochloa	*Bothriochloa macra*	Native
Poaceae	Bothriochloa	*Bothriochloa spp.*	Native
Poaceae	Briza	*Briza minor*	Introduced
Poaceae	Bromus	*Bromus catharticus*	Introduced
Poaceae	Bromus	*Bromus diandrus*	Introduced
Poaceae	Bromus	*Bromus hordeaceus*	Introduced
Poaceae	Bromus	*Bromus molliformis*	Introduced
Poaceae	Bromus	*Bromus rubens*	Introduced
Poaceae	Bromus	*Bromus spp.*	-
Poaceae	Capillipedium	*Capillipedium parviflorum*	Native
Poaceae	Catapodium	*Catapodium rigidum*	Introduced
Poaceae	Cenchrus	*Cenchrus clandestinus*	Introduced
Poaceae	Chloris	*Chloris gayana*	Introduced

Family	Genus	Scientific Name	Establishment
Poaceae	Chloris	*Chloris spp.*	-
Poaceae	Chloris	*Chloris truncata*	Native
Poaceae	Chloris	*Chloris ventricosa*	Native
Poaceae	Cymbopogon	*Cymbopogon refractus*	Native
Poaceae	Cynodon	*Cynodon dactylon*	Native
Poaceae	Cynosurus	*Cynosurus echinatus*	Introduced
Poaceae	Dactyloctenium	*Dactyloctenium radulans*	Native
Poaceae	Dichanthium	*Dichanthium sericeum*	Native
Poaceae	Dichanthium	*Dichanthium sericeum subsp. sericeum*	Native
Poaceae	Dichanthium	*Dichanthium setosum* (V*)	Native
Poaceae	Dichanthium	*Dichanthium spp.*	Native
Poaceae	Dichelachne	*Dichelachne crinita*	Native
Poaceae	Dichelachne	*Dichelachne micrantha*	Native
Poaceae	Dichelachne	*Dichelachne parva*	Native
Poaceae	Dichelachne	*Dichelachne rara*	Native
Poaceae	Dichelachne	*Dichelachne sieberiana*	Native
Poaceae	Dichelachne	*Dichelachne spp.*	Native
Poaceae	Digitaria	*Digitaria brownii*	Native
Poaceae	Digitaria	*Digitaria ciliaris*	Introduced
Poaceae	Digitaria	*Digitaria diffusa*	Native
Poaceae	Digitaria	*Digitaria divaricatissima*	Native
Poaceae	Digitaria	*Digitaria spp.*	-
Poaceae	Echinochloa	*Echinochloa colona*	Native
Poaceae	Echinopogon	*Echinopogon caespitosus*	Native
Poaceae	Echinopogon	*Echinopogon intermedius*	Native
Poaceae	Echinopogon	*Echinopogon nutans*	Native
Poaceae	Echinopogon	*Echinopogon ovatus*	Native
Poaceae	Echinopogon	*Echinopogon spp.*	Native
Poaceae	Eleusine	*Eleusine spp.*	Introduced
Poaceae	Eleusine	*Eleusine tristachya*	Introduced
Poaceae	Elymus	*Elymus plurinervis*	Native
Poaceae	Elymus	*Elymus spp.*	Native
Poaceae	Enneapogon	*Enneapogon gracilis*	Native
Poaceae	Enneapogon	*Enneapogon nigricans*	Native
Poaceae	Enteropogon	*Enteropogon acicularis*	Native
Poaceae	Entolasia	*Entolasia stricta*	Native
Poaceae	Eragrostis	*Eragrostis alveiformis*	Native
Poaceae	Eragrostis	*Eragrostis brownii*	Native
Poaceae	Eragrostis	*Eragrostis cilianensis*	Introduced
Poaceae	Eragrostis	*Eragrostis elongata*	Native
Poaceae	Eragrostis	*Eragrostis lacunaria*	Native
Poaceae	Eragrostis	*Eragrostis leptostachya*	Native
Poaceae	Eragrostis	*Eragrostis lugens*	Native
Poaceae	Eragrostis	*Eragrostis mexicana*	Introduced
Poaceae	Eragrostis	*Eragrostis parviflora*	Native
Poaceae	Eragrostis	*Eragrostis pilosa*	Introduced
Poaceae	Eragrostis	*Eragrostis spp.*	-
Poaceae	Eriochloa	*Eriochloa pseudoacrotricha*	Native
Poaceae	Eulalia	*Eulalia aurea*	Native
Poaceae	Hordeum	*Hordeum hystrix*	Introduced
Poaceae	Hordeum	*Hordeum leporinum*	Introduced
Poaceae	Hordeum	*Hordeum spp.*	Introduced

Family	Genus	Scientific Name	Establishment
Poaceae	Hyparrhenia	*Hyparrhenia hirta*	Introduced
Poaceae	Imperata	*Imperata cylindrica*	Native
Poaceae	Lachnagrostis	*Lachnagrostis filiformis*	Native
Poaceae	Lolium	*Lolium perenne*	Introduced
Poaceae	Lolium	*Lolium rigidum*	Introduced
Poaceae	Lolium	*Lolium spp.*	Introduced
Poaceae	Melinis	*Melinis repens*	Introduced
Poaceae	Microlaena	*Microlaena stipoides*	Native
Poaceae	Microlaena	*Microlaena stipoides var. stipoides*	Native
Poaceae	Panicum	*Panicum effusum*	Native
Poaceae	Panicum	*Panicum schinzii*	Introduced
Poaceae	Panicum	*Panicum simile*	Native
Poaceae	Panicum	*Panicum spp.*	-
Poaceae	Paspalidium	*Paspalidium constrictum*	Native
Poaceae	Paspalidium	*Paspalidium criniforme*	Native
Poaceae	Paspalidium	*Paspalidium distans*	Native
Poaceae	Paspalidium	*Paspalidium gracile*	Native
Poaceae	Paspalidium	*Paspalidium spp.*	Native
Poaceae	Paspalum	*Paspalum dilatatum*	Introduced
Poaceae	Paspalum	*Paspalum distichum*	Native
Poaceae	Phalaris	*Phalaris paradoxa*	Introduced
Poaceae	Poa	*Poa labillardierei var. labillardierei*	Native
Poaceae	Poa	*Poa sieberiana*	Native
Poaceae	Poa	*Poa spp.*	-
Poaceae		Poaceae indeterminate	-
Poaceae	Rostraria	*Rostraria cristata*	Introduced
Poaceae	Rostraria	*Rostraria spp.*	Introduced
Poaceae	Rytidosperma	*Rytidosperma caespitosum*	Native
Poaceae	Rytidosperma	*Rytidosperma carphoides*	Native
Poaceae	Rytidosperma	*Rytidosperma fulvum*	Native
Poaceae	Rytidosperma	*Rytidosperma laeve*	Native
Poaceae	Rytidosperma	*Rytidosperma longifolium*	Native
Poaceae	Rytidosperma	*Rytidosperma monticola*	Native
Poaceae	Rytidosperma	*Rytidosperma racemosum*	Native
Poaceae	Rytidosperma	*Rytidosperma racemosum var. obtusatum*	Native
Poaceae	Rytidosperma	*Rytidosperma racemosum var. racemosum*	Native
Poaceae	Rytidosperma	*Rytidosperma richardsonii*	Native
Poaceae	Rytidosperma	*Rytidosperma setaceum*	Native
Poaceae	Rytidosperma	*Rytidosperma spp.*	Native
Poaceae	Setaria	*Setaria parviflora*	Introduced
Poaceae	Setaria	*Setaria pumila*	Introduced
Poaceae	Setaria	*Setaria spp.*	-
Poaceae	Sorghum	*Sorghum leiocladum*	Native
Poaceae	Sporobolus	*Sporobolus creber*	Native
Poaceae	Sporobolus	*Sporobolus elongatus*	Native
Poaceae	Themeda	*Themeda triandra*	Native
Poaceae	Tragus	*Tragus australianus*	Native
Poaceae	Tripogon	*Tripogon loliiformis*	Native
Poaceae	Urochloa	*Urochloa panicoides*	Introduced
Poaceae	Urochloa	*Urochloa piligera*	Native
Poaceae	Vulpia	*Vulpia bromoides*	Introduced
Poaceae	Vulpia	*Vulpia muralis*	Introduced

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Poaceae	Vulpia	*Vulpia myuros*	Introduced
Polygalaceae	Polygala	*Polygala japonica*	Native
Polygonaceae	Acetosella	*Acetosella vulgaris*	Introduced
Polygonaceae	Persicaria	*Persicaria decipiens*	Native
Polygonaceae	Polygonum	*Polygonum aviculare*	Introduced
Polygonaceae	Rumex	*Rumex brownii*	Native
Portulacaceae	Portulaca	*Portulaca oleracea*	Native
Primulaceae	Lysimachia	*Lysimachia arvensis*	Introduced
Proteaceae	Persoonia	*Persoonia spp.*	Native
Pteridaceae	Cheilanthes	*Cheilanthes distans*	Native
Pteridaceae	Cheilanthes	*Cheilanthes sieberi*	Native
Pteridaceae	Cheilanthes	*Cheilanthes sieberi subsp. sieberi*	Native
Pteridaceae	Pellaea	*Pellaea calidirupium*	Native
Pteridaceae	Pellaea	*Pellaea falcata*	Native
Ranunculaceae	Clematis	*Clematis glycinoides*	Native
Ranunculaceae	Clematis	*Clematis microphylla*	Native
Ranunculaceae	Clematis	*Clematis spp.*	Native
Ranunculaceae	Ranunculus	*Ranunculus lappaceus*	Native
Ranunculaceae	Ranunculus	*Ranunculus sessiliflorus*	Native
Ranunculaceae	Ranunculus	*Ranunculus sessiliflorus var. sessiliflorus*	Native
Ranunculaceae	Ranunculus	*Ranunculus spp.*	Native
Rhamnaceae	Cryptandra	*Cryptandra amara*	Native
Rosaceae	Acaena	*Acaena echinata*	Native
Rosaceae	Acaena	*Acaena spp.*	Native
Rosaceae	Rosa	*Rosa rubiginosa*	Introduced
Rosaceae	Rubus	*Rubus anglocandicans*	Introduced
Rosaceae	Rubus	*Rubus fruticosus sp. agg.*	Introduced
Rosaceae	Rubus	*Rubus parvifolius*	Native
Rosaceae	Rubus	*Rubus spp.*	-
Rosaceae	Rubus	*Rubus ulmifolius*	Introduced
Rubiaceae	Asperula	*Asperula conferta*	Native
Rubiaceae	Asperula	*Asperula spp.*	-
Rubiaceae	Galium	*Galium gaudichaudii*	Native
Rubiaceae	Galium	*Galium leptogonium*	Native
Rubiaceae	Galium	*Galium murale*	Introduced
Rubiaceae	Galium	*Galium propinquum*	Native
Rubiaceae	Galium	*Galium spp.*	-
Rubiaceae	Opercularia	*Opercularia aspera*	Native
Rubiaceae	Opercularia	*Opercularia diphylla*	Native
Rubiaceae	Opercularia	*Opercularia hispida*	Native
Rubiaceae	Opercularia	*Opercularia spp.*	Native
Rubiaceae	Pomax	*Pomax umbellata*	Native
Rubiaceae	Psydrax	*Psydrax odorata subsp. buxifolia f. buxifolia*	Native
Rubiaceae	Psydrax	*Psydrax oleifolia*	Native
Rubiaceae	Psydrax	*Psydrax spp.*	Native
Rubiaceae	Richardia	*Richardia stellaris*	Introduced
Rutaceae	Correa	*Correa reflexa var. reflexa*	Native
Santalaceae	Thesium	*Thesium australe* (V*)	Native
Sapindaceae	Dodonaea	*Dodonaea viscosa*	Native
Sapindaceae	Dodonaea	*Dodonaea viscosa subsp. angustifolia*	Native
Scrophulariaceae	Gratiola	*Gratiola pedunculata*	Native
Scrophulariaceae	Gratiola	*Gratiola spp.*	Native

Family	Genus	Scientific Name	Establishment
Scrophulariaceae	Misopates	*Misopates orontium*	Introduced
Scrophulariaceae		Scrophulariaceae indeterminate	-
Scrophulariaceae	Verbascum	*Verbascum thapsus subsp. thapsus*	Introduced
Scrophulariaceae	Verbascum	*Verbascum virgatum*	Introduced
Solanaceae	Datura	*Datura ferox*	Introduced
Solanaceae	Solanum	*Solanum amblymerum*	Native
Solanaceae	Solanum	*Solanum americanum*	Native
Solanaceae	Solanum	*Solanum chenopodioides*	Introduced
Solanaceae	Solanum	*Solanum cinereum*	Native
Solanaceae	Solanum	*Solanum nigrum*	Introduced
Solanaceae	Solanum	*Solanum opacum*	Native
Solanaceae	Solanum	*Solanum parvifolium subsp. parvifolium*	Native
Solanaceae	Solanum	*Solanum spp.*	-
Stackhousiaceae	Stackhousia	*Stackhousia monogyna*	Native
Stackhousiaceae	Stackhousia	*Stackhousia muricata*	Native
Stylidiaceae		Stylidiaceae indeterminate	-
Thymelaeaceae	Pimelea	*Pimelea curviflora*	Native
Thymelaeaceae	Pimelea	*Pimelea curviflora var. divergens*	Native
Thymelaeaceae	Pimelea	*Pimelea curviflora var. sericea*	Native
Thymelaeaceae	Pimelea	*Pimelea linifolia*	Native
Thymelaeaceae	Pimelea	*Pimelea linifolia subsp. linifolia*	Native
Thymelaeaceae	Pimelea	*Pimelea neo-anglica*	Native
Thymelaeaceae	Pimelea	*Pimelea simplex subsp. simplex*	Native
Thymelaeaceae	Pimelea	*Pimelea spp.*	Native
Thymelaeaceae	Pimelea	*Pimelea strigosa*	Native
Urticaceae	Urtica	*Urtica dioica*	Introduced
Urticaceae	Urtica	*Urtica incisa*	Native
Urticaceae	Urtica	*Urtica urens*	Introduced
Verbenaceae	Verbena	*Verbena bonariensis*	Introduced
Verbenaceae	Verbena	*Verbena caracasana*	Introduced
Verbenaceae	Verbena	*Verbena gaudichaudii*	Native
Verbenaceae	Verbena	*Verbena rigida var. rigida*	Introduced
Verbenaceae	Verbena	*Verbena spp.*	-
Violaceae	Melicytus	*Melicytus dentatus*	Native
Violaceae	Viola	*Viola betonicifolia*	Native
Zygophyllaceae	Tribulus	*Tribulus micrococcus*	Native

V** Denotes species listed as Vulnerable under the EPBC Act and BC Act*