Maules Creek Coal Mine Additional Offset Areas Vegetation Mapping

Prepared by AMBS Ecology & Heritage
for Whitehaven Coal Limited

Final

June 2021

AMBS Reference: 19764

AMBS Ecology & Heritage
www.ambs.com.au contact@ambs.com.au 02 9518 4489

Document Information

Citation:	AMBS Ecology & Heritage (2021), *Maules Creek Coal Mine Additional Offset Areas Vegetation Mapping*. Consultancy report for Whitehaven Coal Limited.
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**

Contents

Tables

Figures

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**

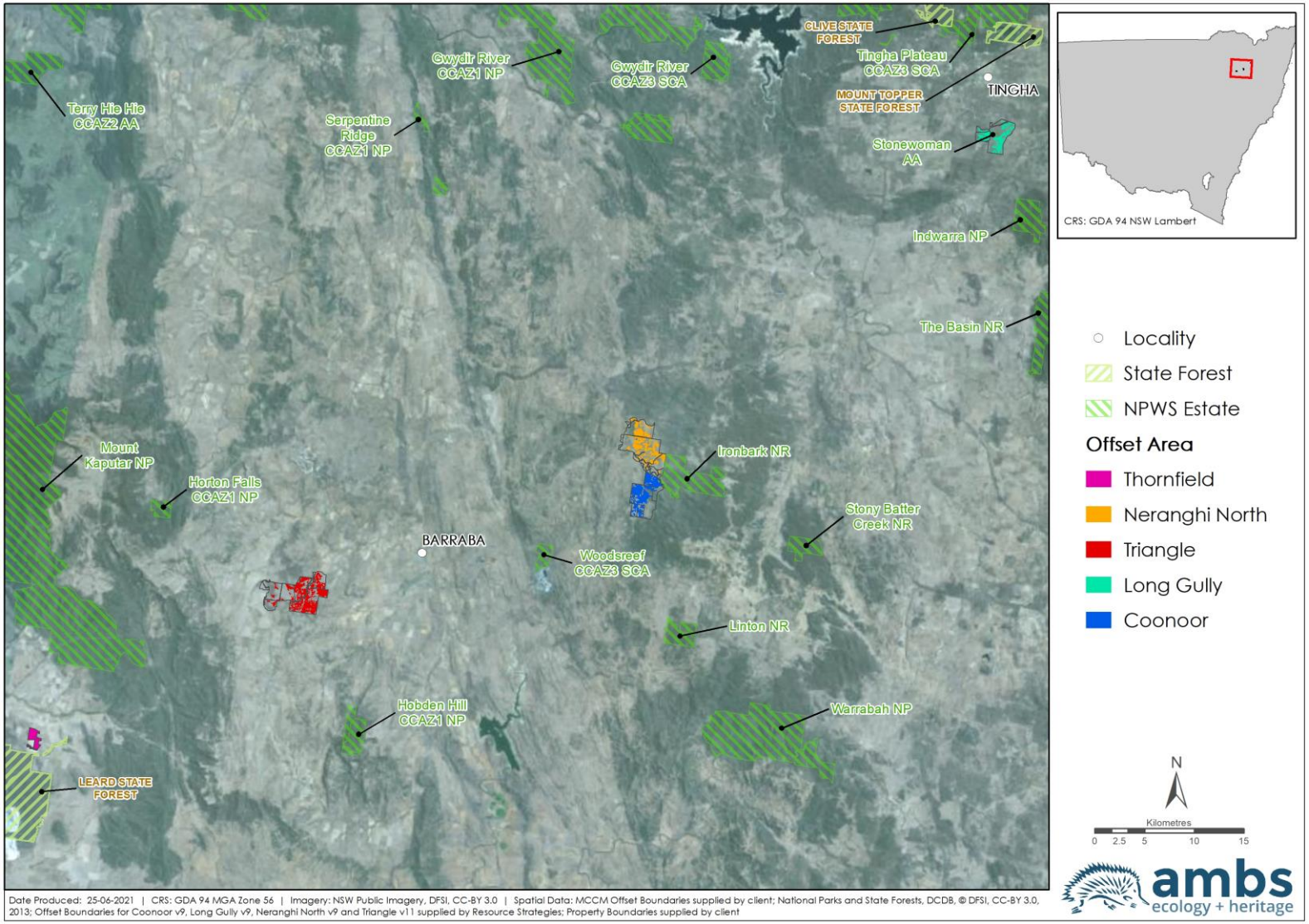


Figure 1.1 Location of the Study Area

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.

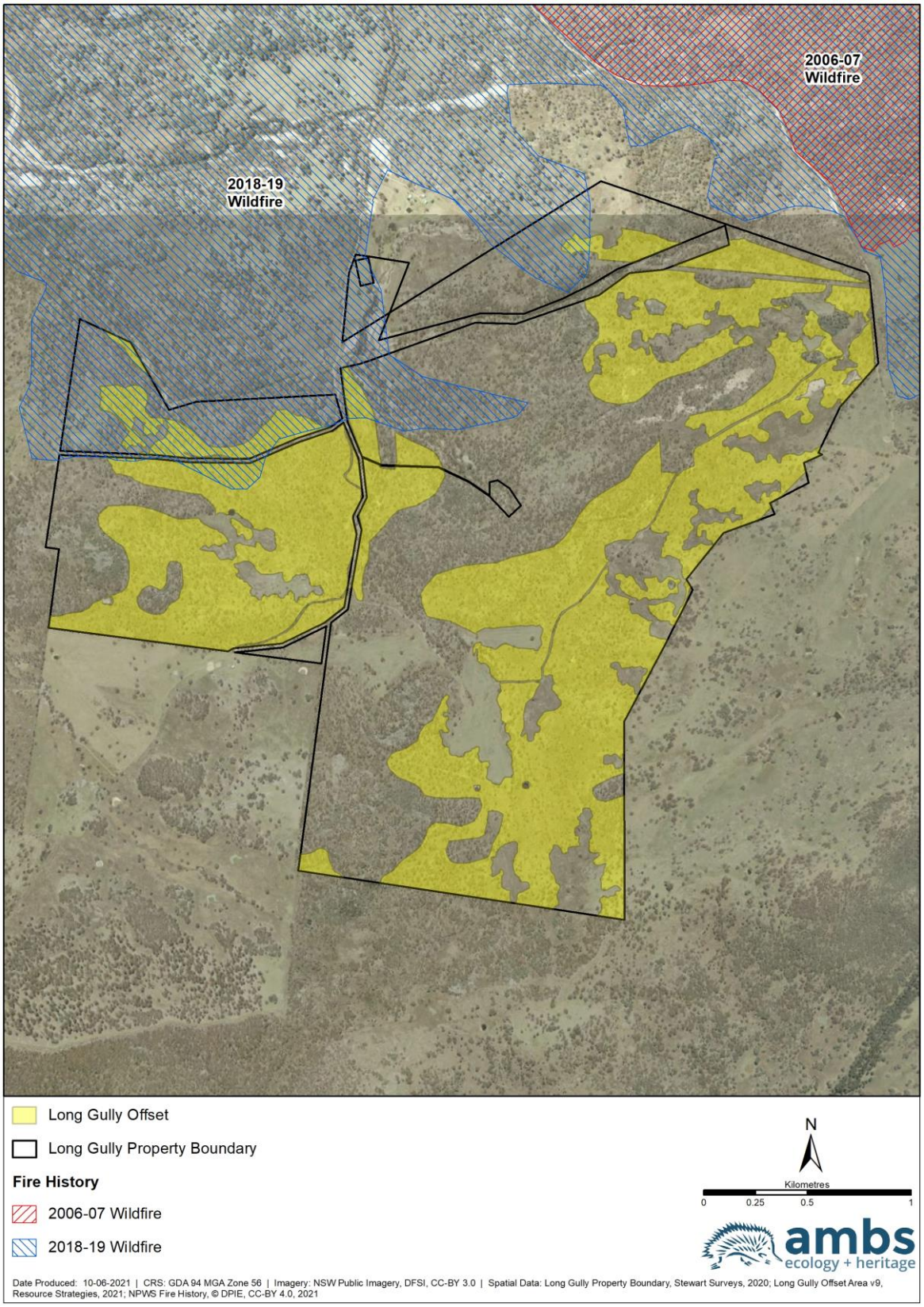


Figure 1.2 Recent Fires on the Long Gully Property

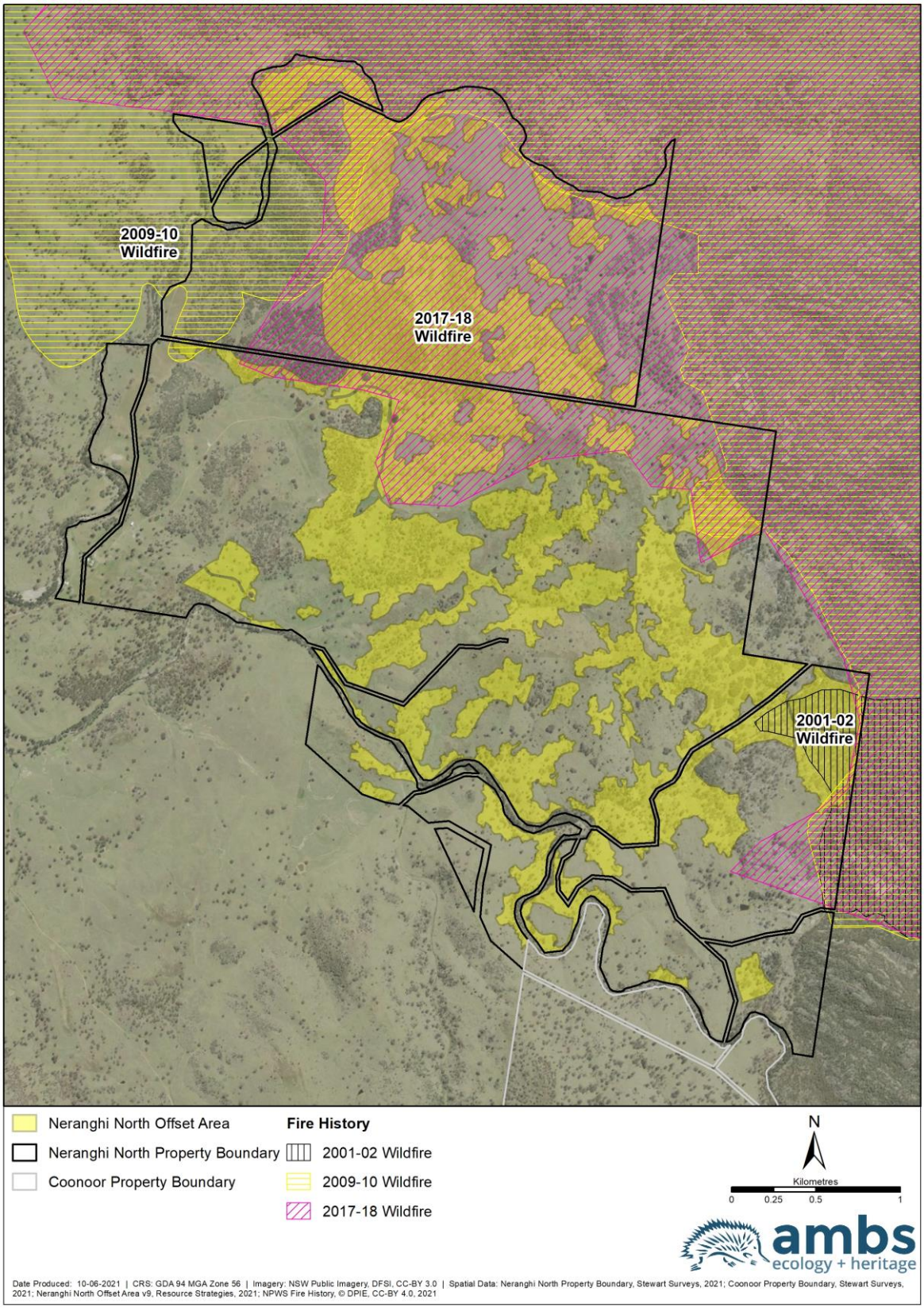


Figure 1.3 Recent Fires on the Neranghi North Property

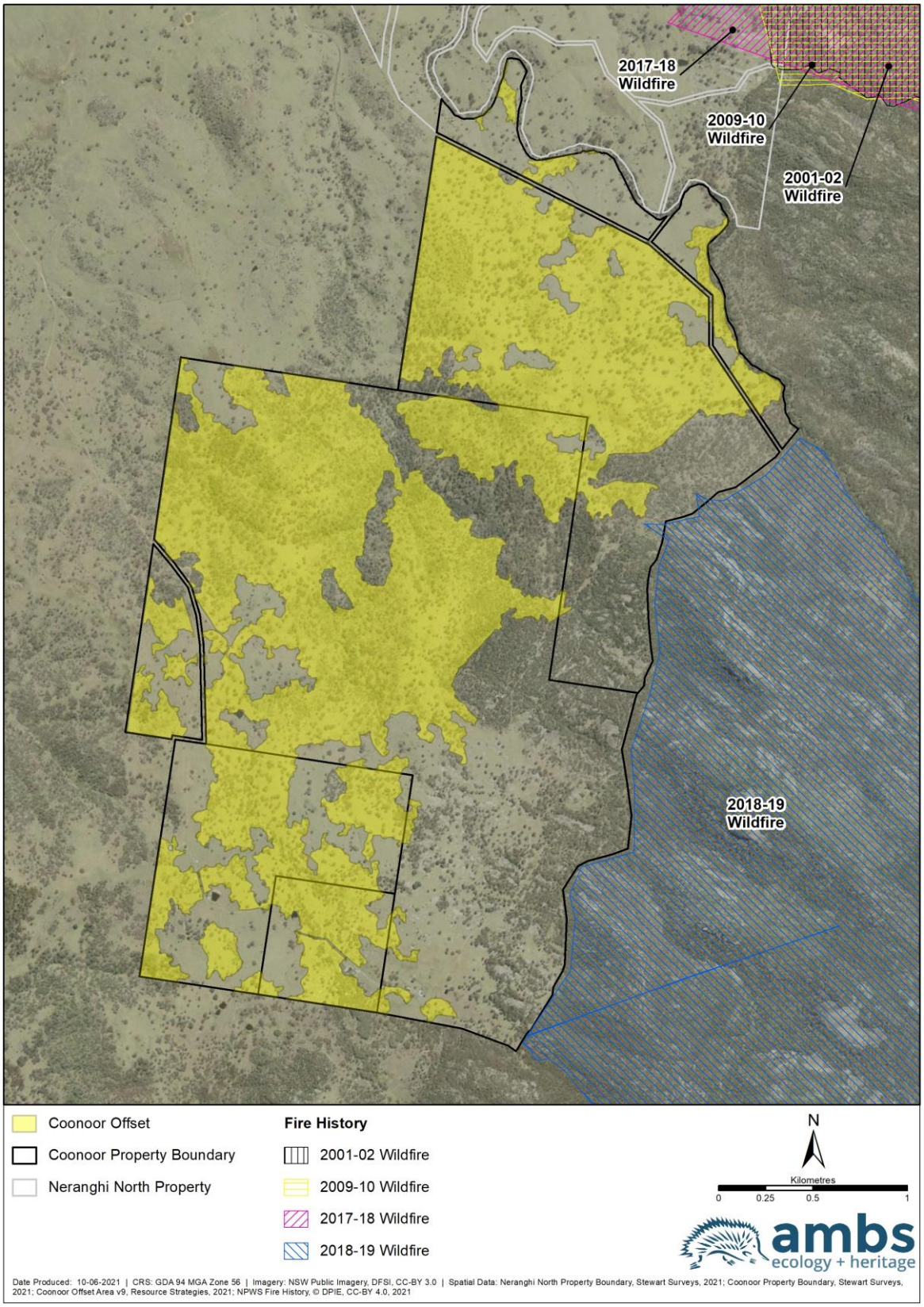


Figure 1.4 Recent Fires on the Coonoor Property

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.

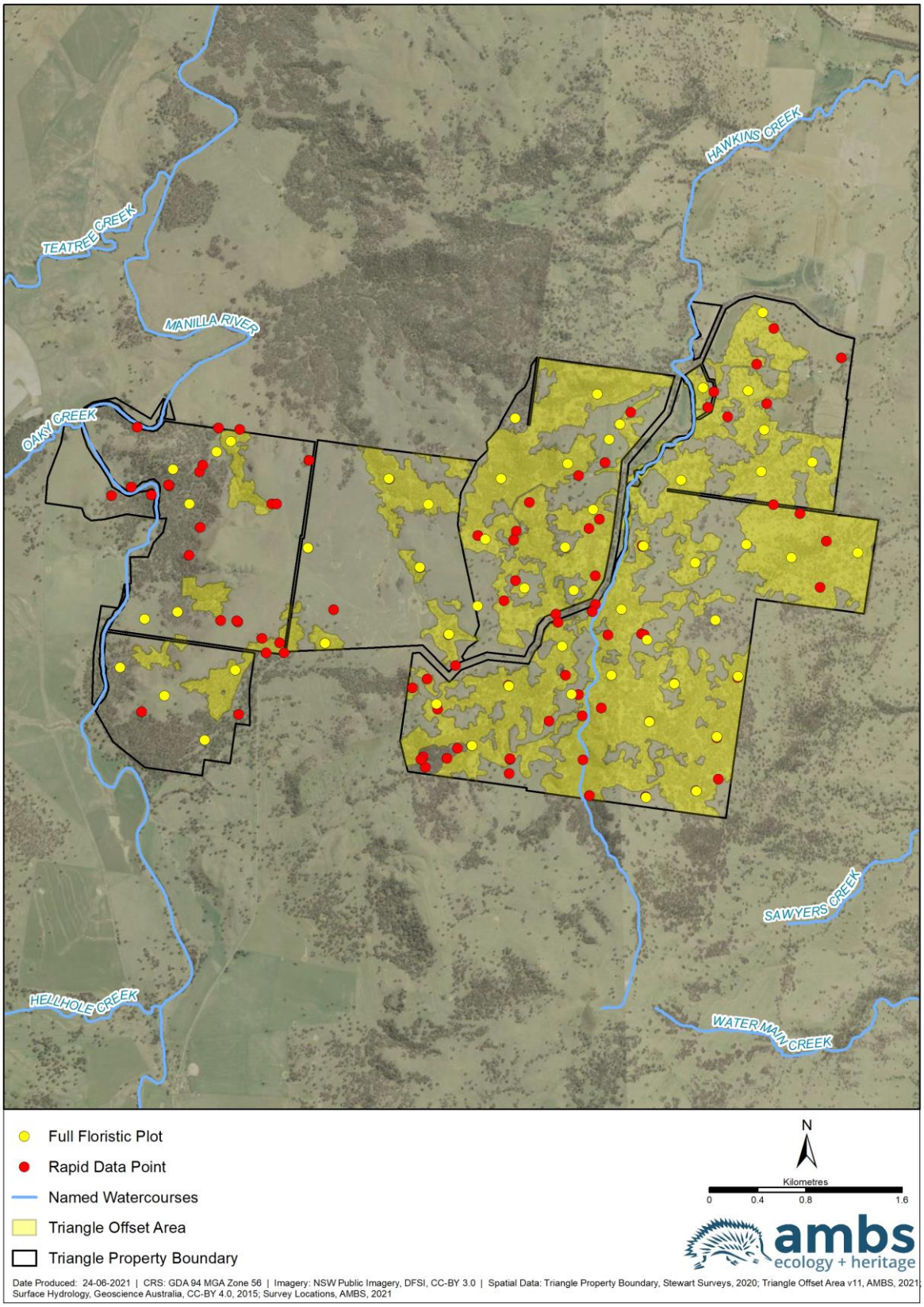


Figure 2.1 Locations of Full Floristic Plots and Rapid Data Points on the Triangle Property

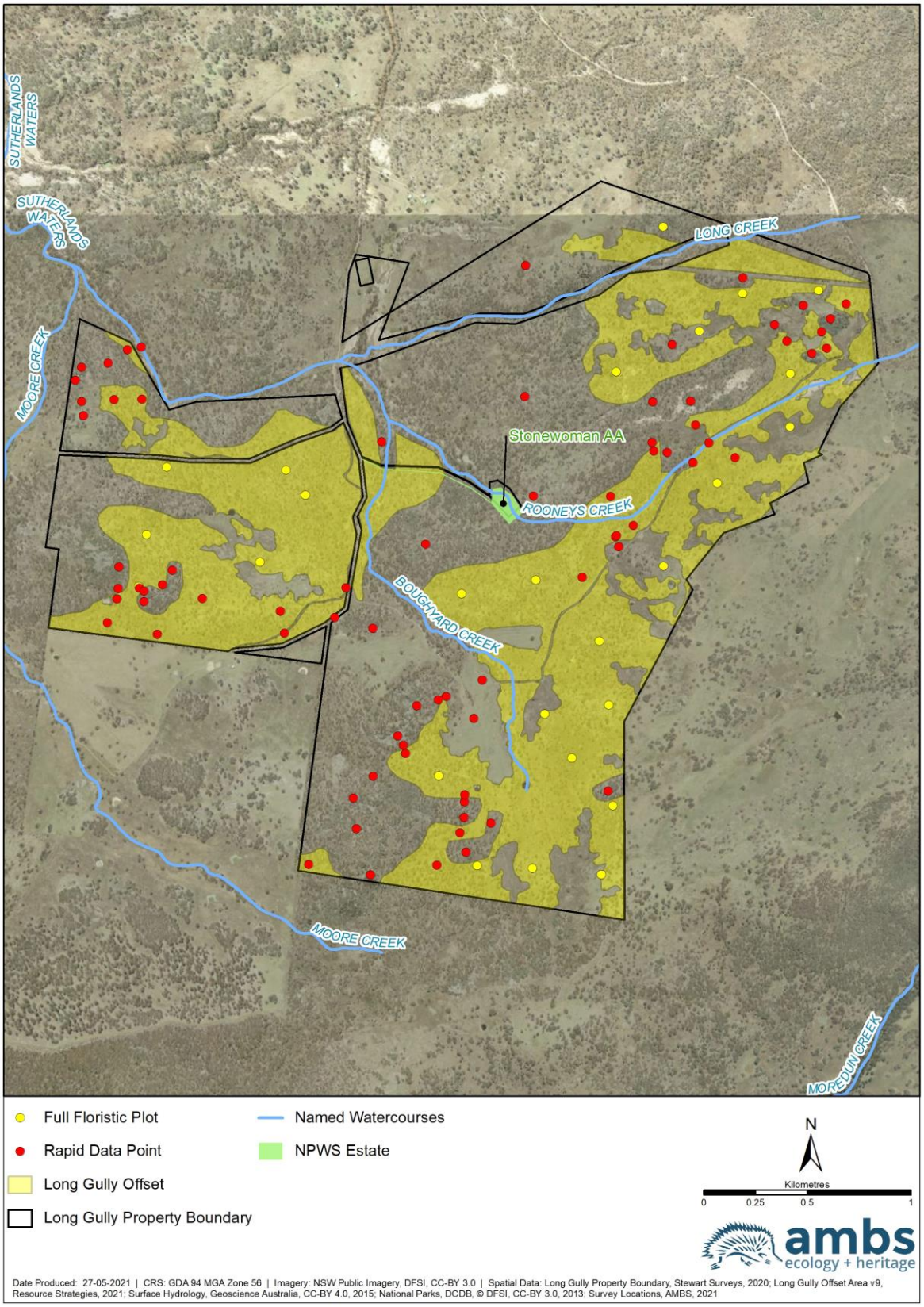


Figure 2.2 Locations of Full Floristic Plots and Rapid Data Points on the Long Gully Property

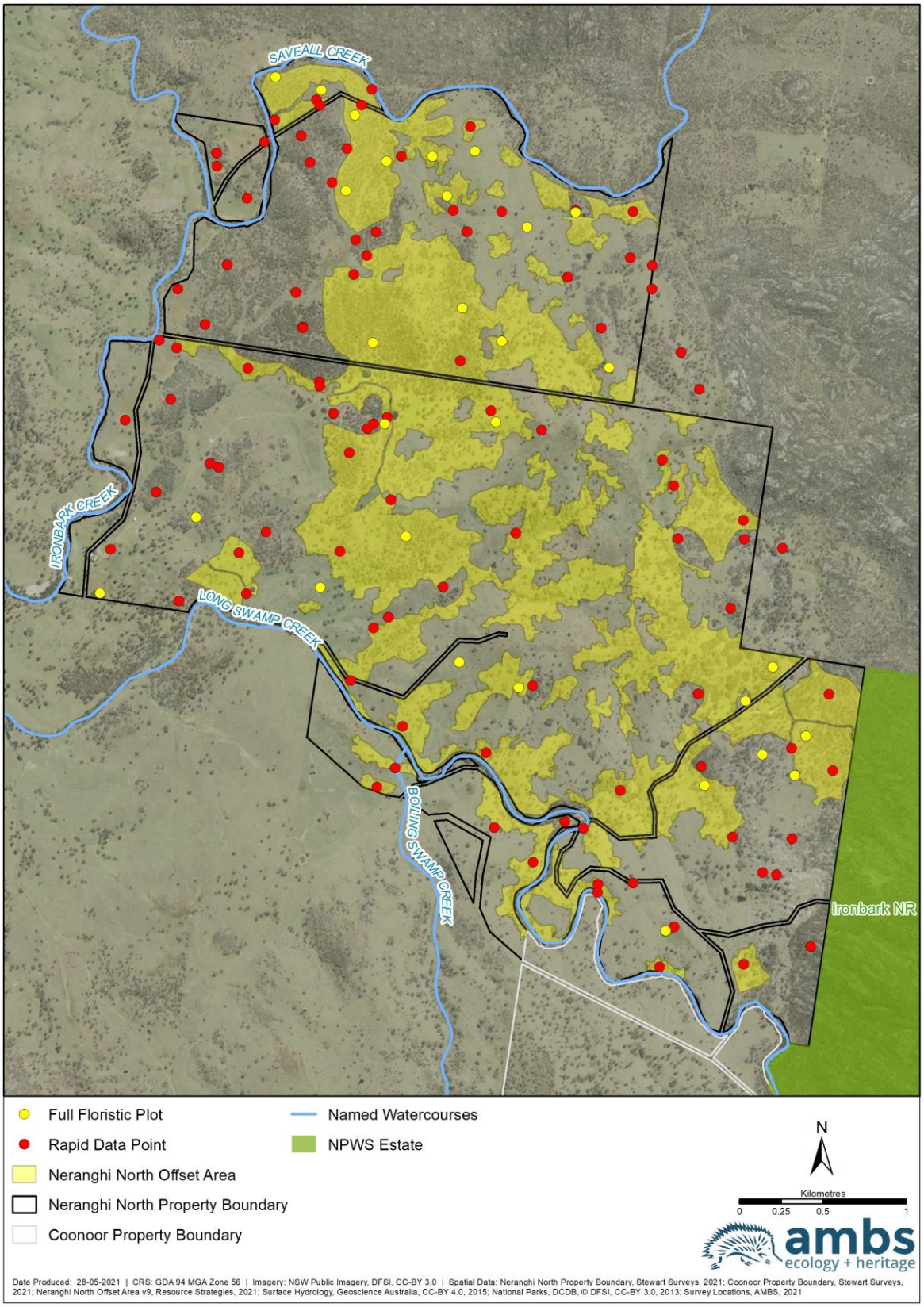


Figure 2.3 Locations of Full Floristic Plots and Rapid Data Points on the Neranghi North Property

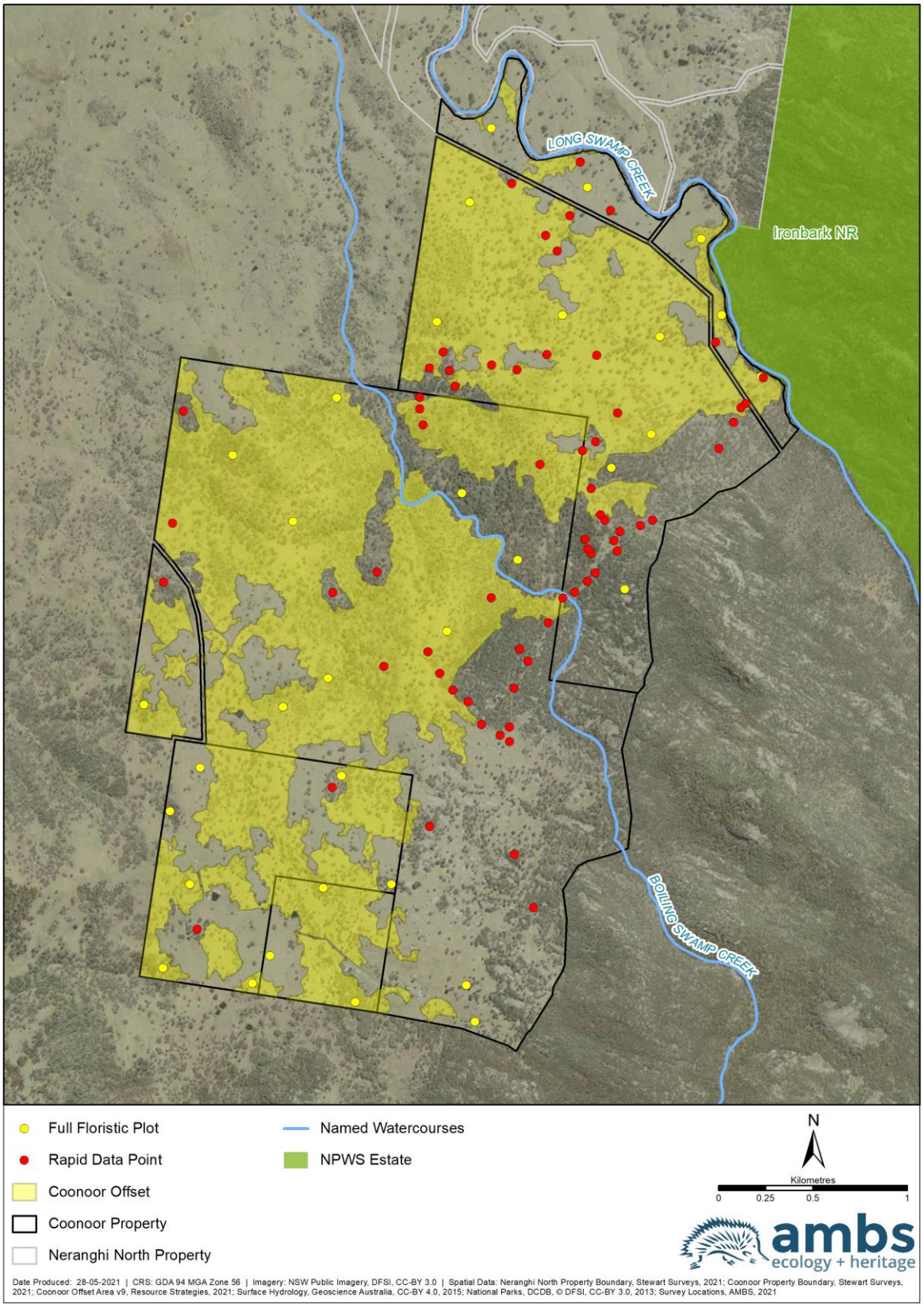


Figure 2.4 Locations of Full Floristic Plots and Rapid Data Points on the Coonoor Property

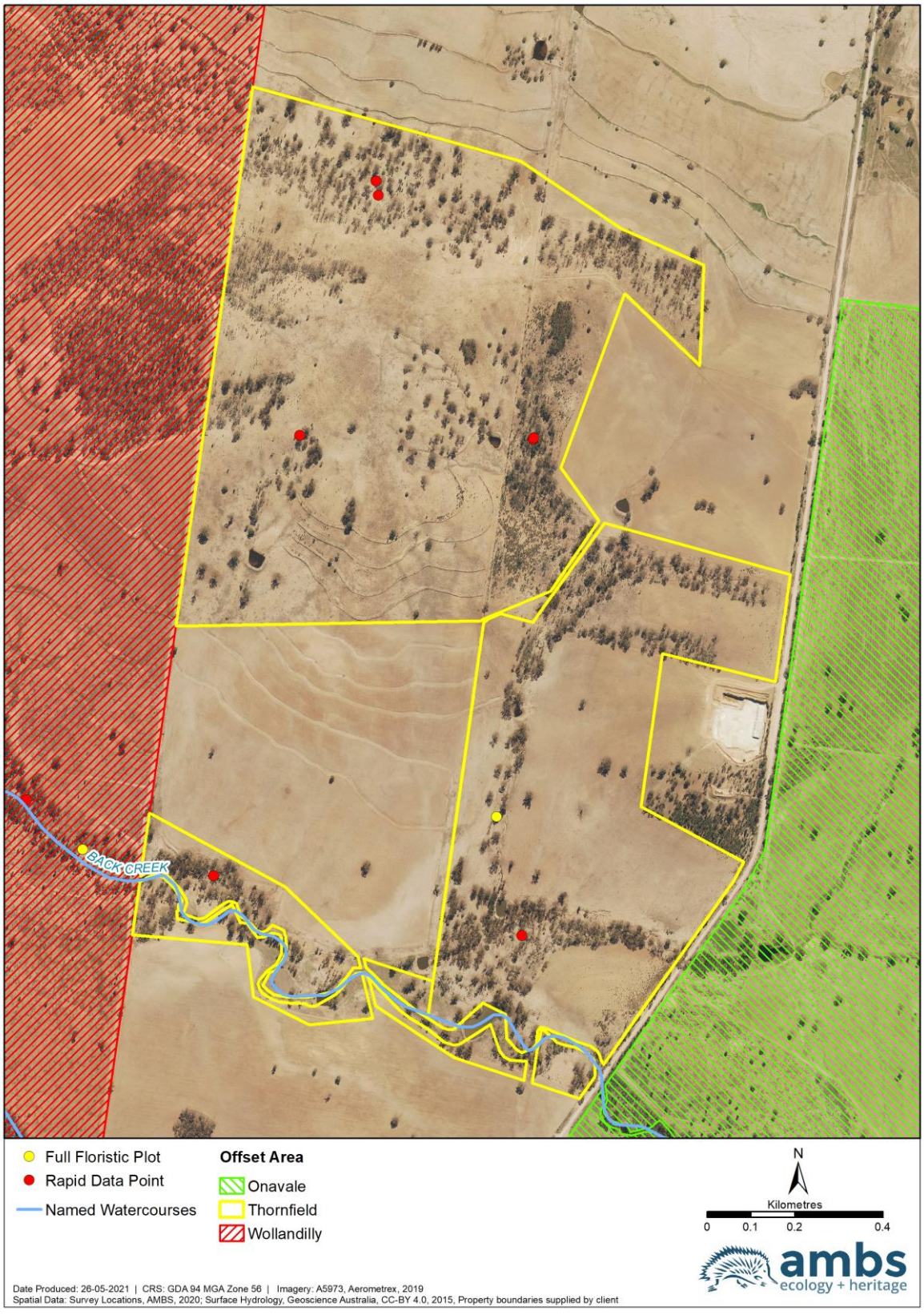


Figure 2.5 Locations of Full Floristic Plots and Rapid Data Points on the Thornfield Property

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)

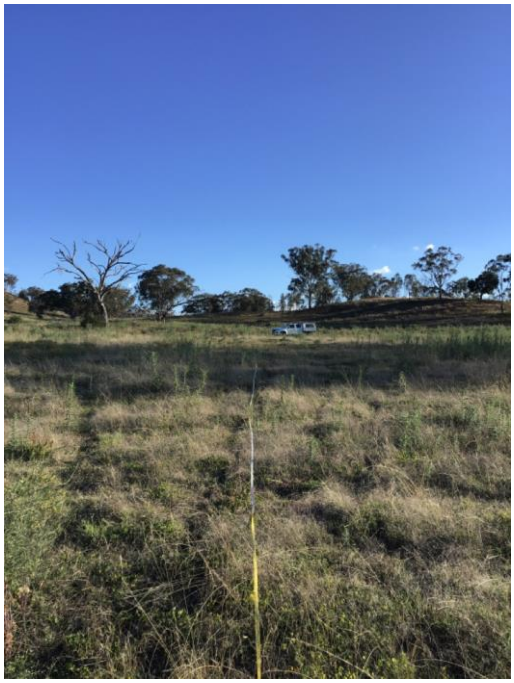


Plate 3.2 Typical patch of Box-Gum Woodland CEEC in grassland form (Triangle)

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.

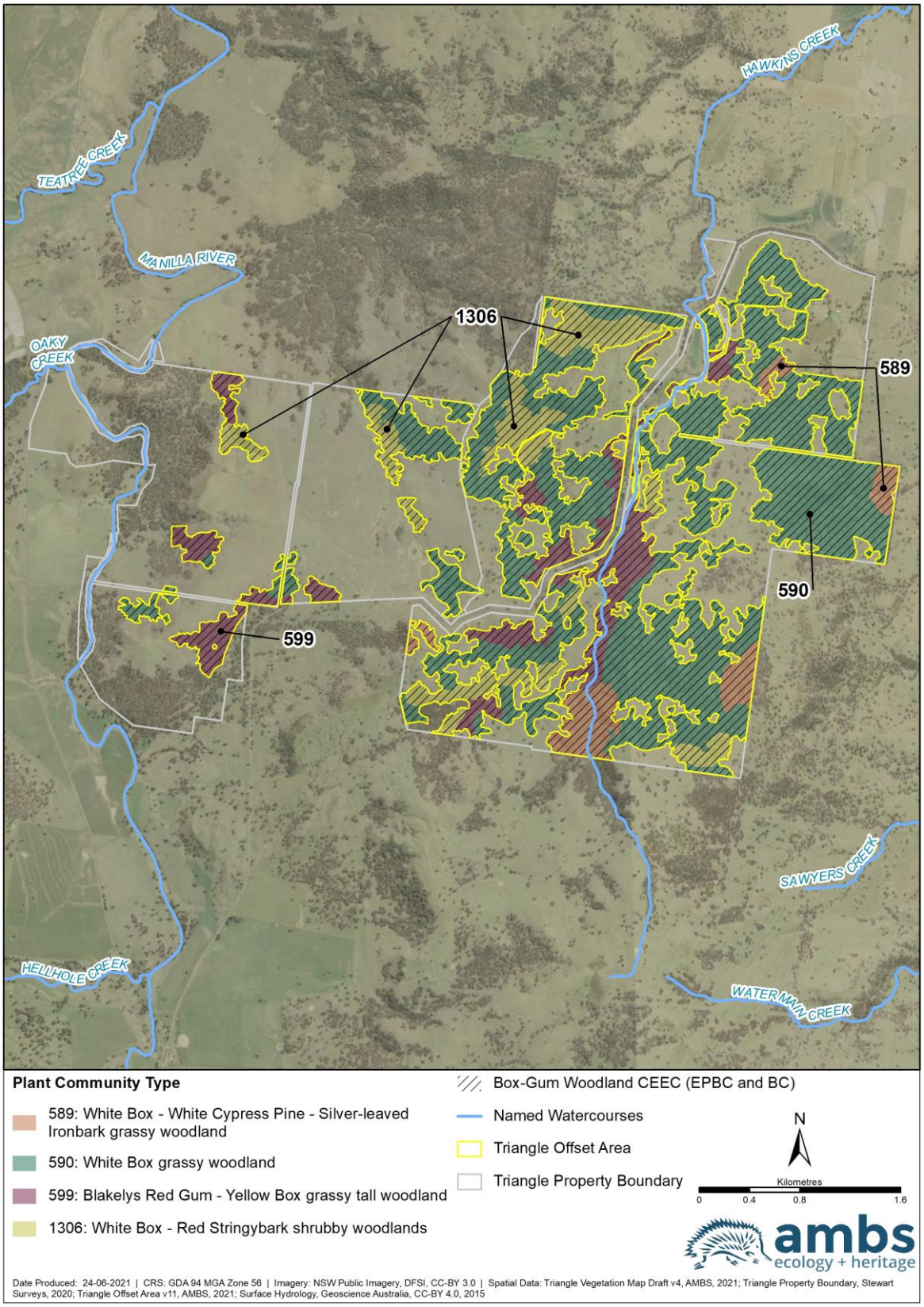


Figure 3.1 Plant Community Type Map for Triangle Proposed Offset Area

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.

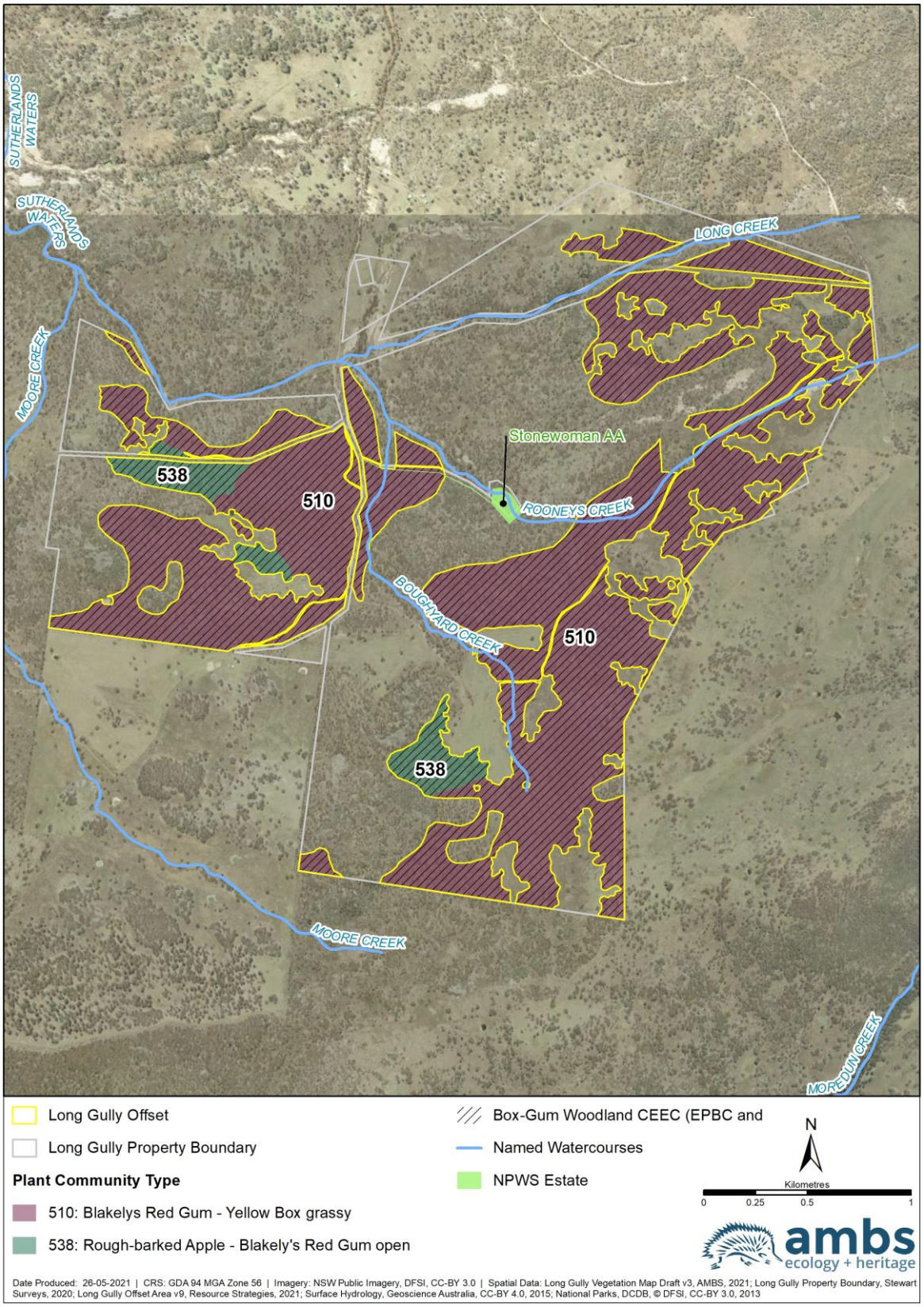


Figure 3.2 Plant Community Type Map for Long Gully Proposed Offset Area

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.

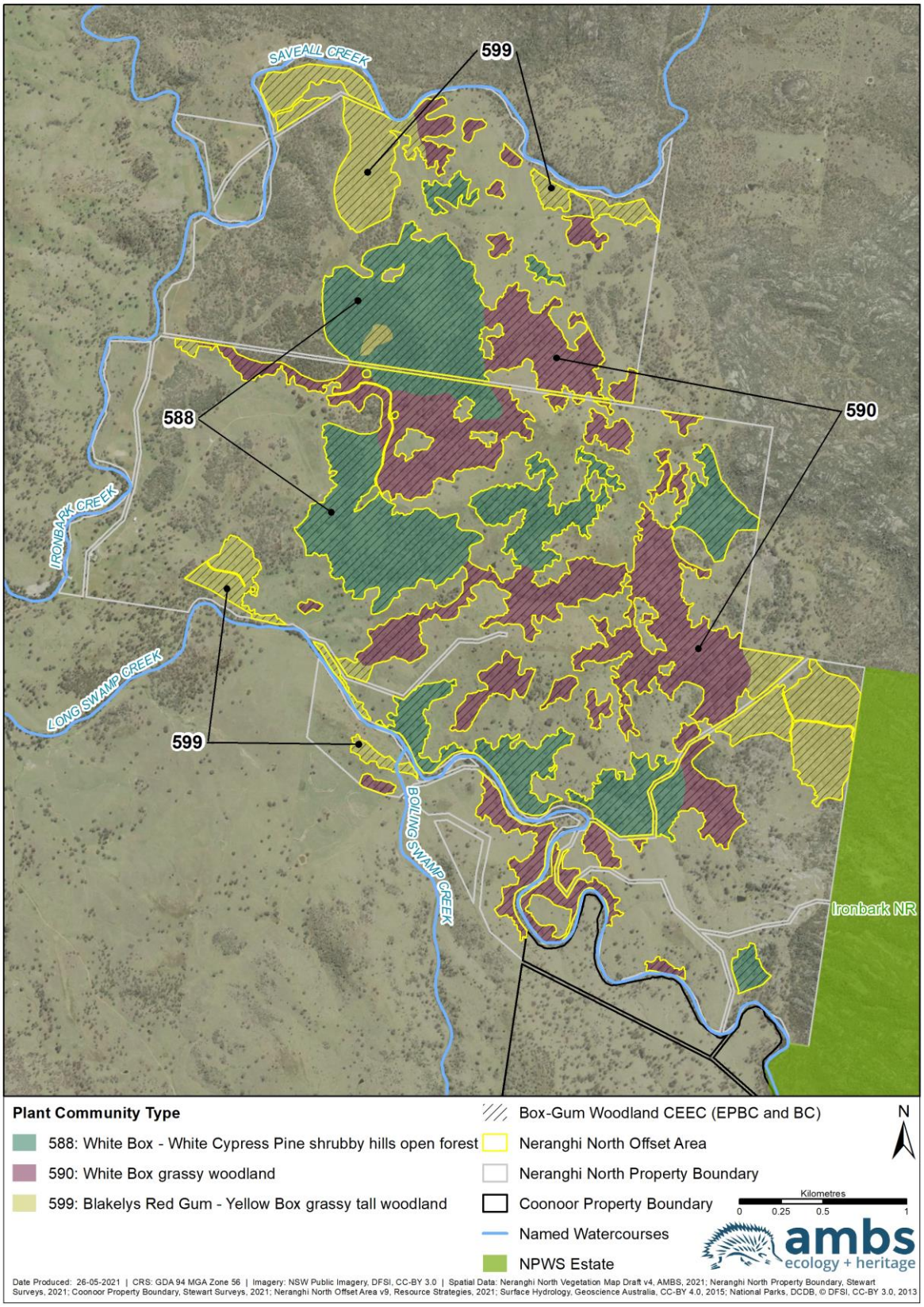


Figure 3.3 Plant Community Type Map for Neranghi North Proposed Offset Area

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.

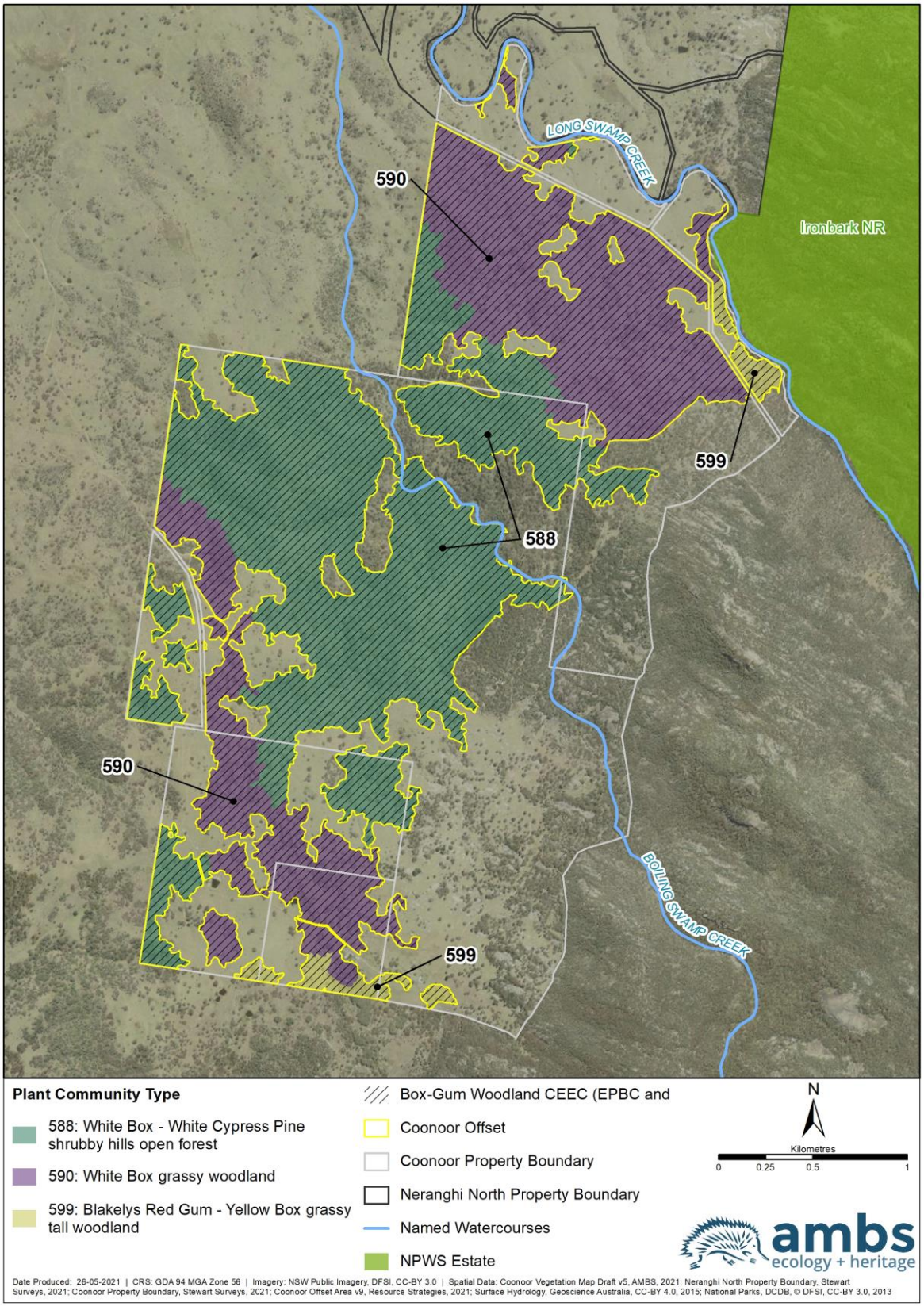


Figure 3.4 Plant Community Type Map for Coonoor Proposed Offset Area

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.

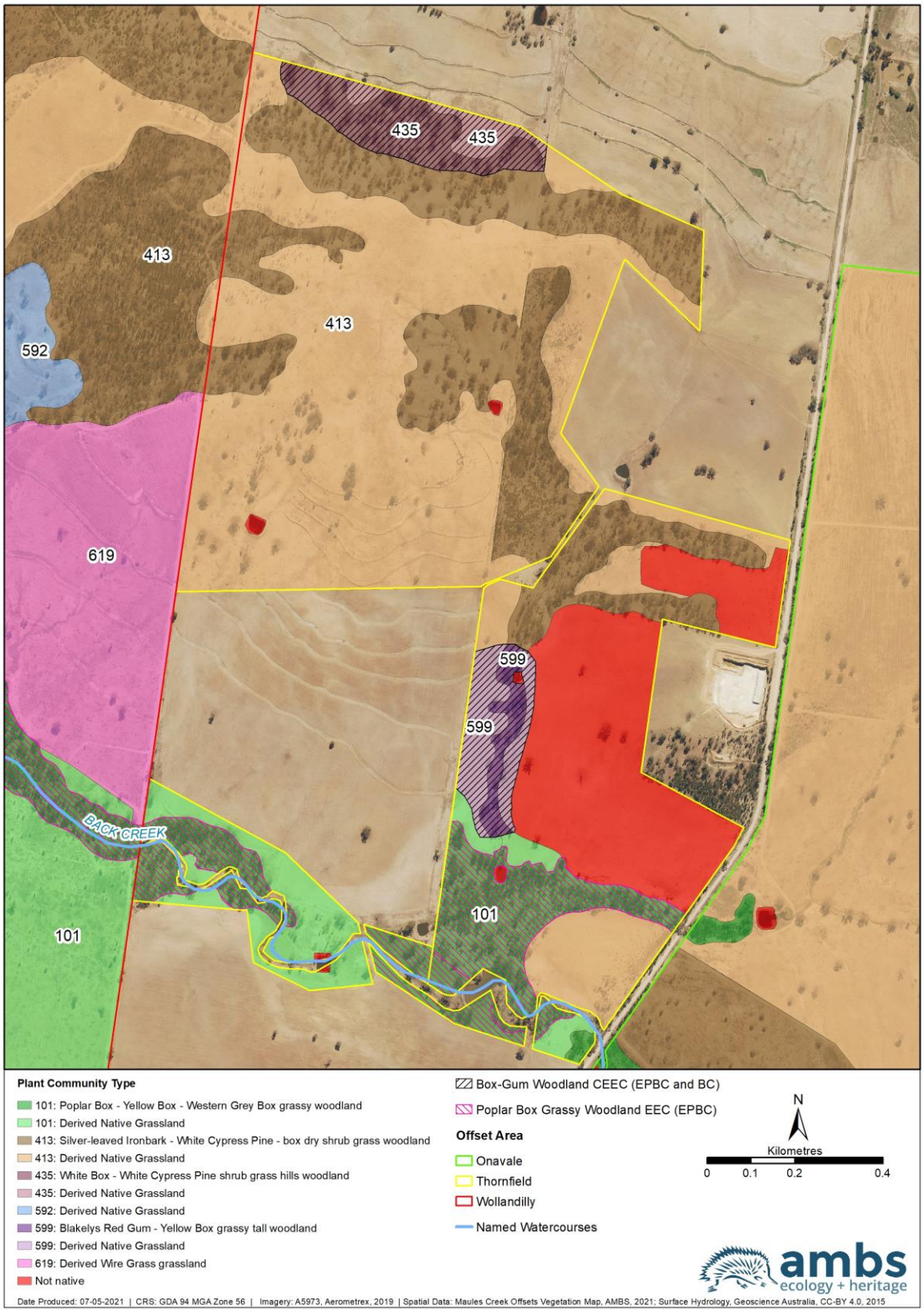


Figure 3.5 Plant Community Type Map for Thornfield Proposed Offset Area

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.

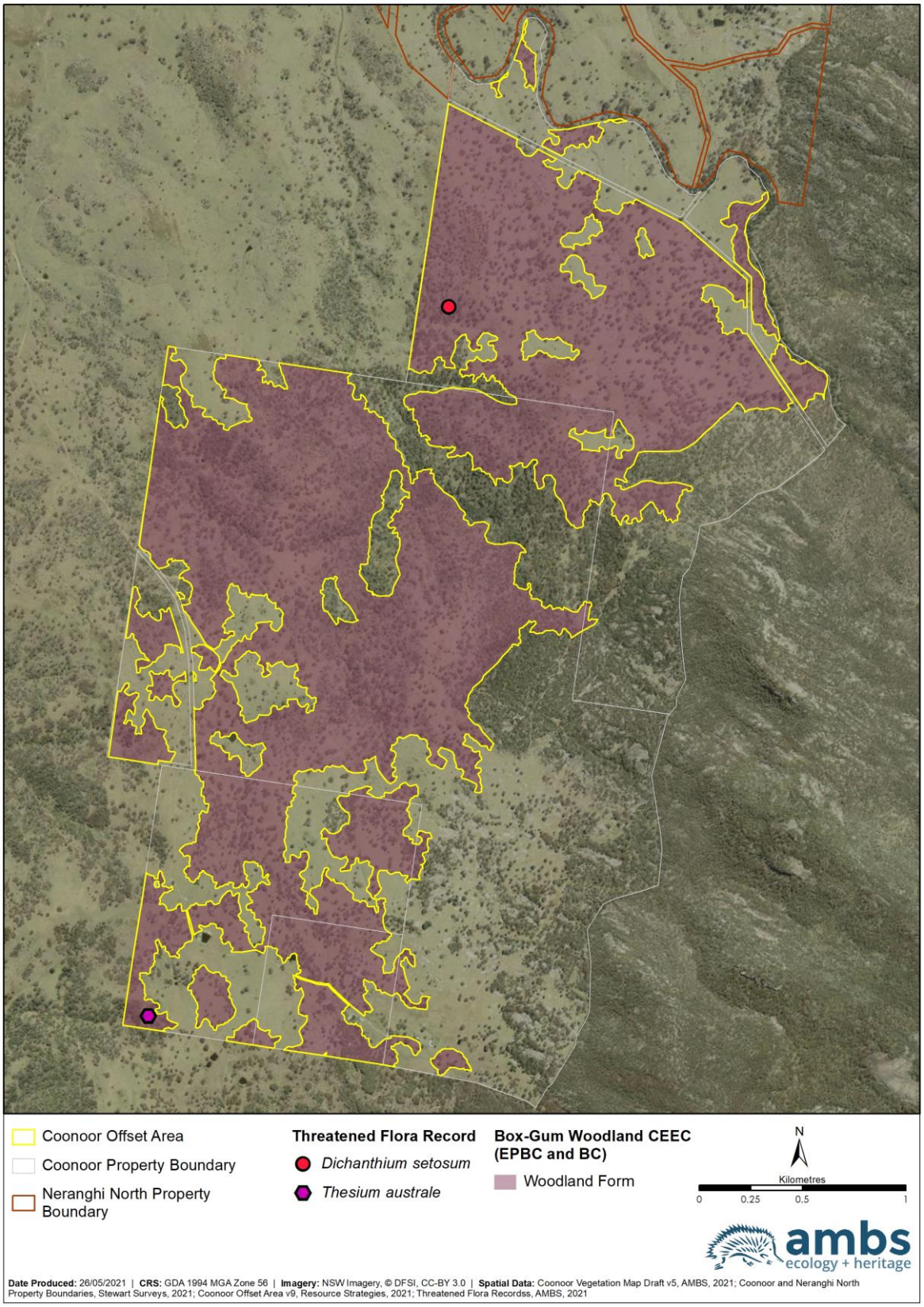


Figure 5.1 Threatened Plant Species Recorded in the Coonoor Proposed Offset Area During this Study

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.

References

AMBS (2021) *Maules Creek Coal Mine Additional Offset Areas Habitat Mapping*. Prepared for Whitehaven Coal Limited.

Australian Bureau of Agriculture and Resource Economics and Sciences (2018) *Fires in Australia's Forests 2011-16.* https://www.agriculture.gov.au/abares/forestsaustralia/forest-data-maps-and-tools/spatial-data/forest-fire

Bureau of Meteorology (2021) *Australian Climate Data Online*. http://www.bom.gov.au/climate/data/index.shtml.

Clarke, K.R. and Gorley, R.N. (2015) *PRIMER v7: User Manual/Tutorial*. PRIMER-E Plymouth. http://updates.primer-e.com/primer7/manuals/User_manual_v7a.pdf

Department of Agriculture, Water and the Environment (2021) *Interim Biogeographic Regionalisation for Australia (IBRA), Version 7*. Department of Agriculture, Water and the Environment.

Department of Planning, Industry and Environment (2021a) *Australian Soil Classification Mapping, NSW*. New South Wales Department of Planning, Industry and Environment. https://data.nsw.gov.au/data/dataset/australian-soil-classification-asc-soil-type-map-of-nsweaa10

Department of Planning, Industry and Environment (2021b) *Landuse Mapping for NSW 2017 v1.2*. New South Wales Department of Planning, Industry and Environment. https://datasets.seed.nsw.gov.au/dataset/nsw-landuse-2017-v1p2-f0ed

Department of Planning, Industry and Environment (2021c) *BioNet Systematic Flora Survey Database*. New South Wales Department of Planning, Industry and Environment. https://www.environment.nsw.gov.au/research/VISplot.htm

Department of Planning, Industry and Environment (2021d) *Great Soils Group Mapping, NSW*. New South Wales Department of Planning, Industry and Environment. https://data.gov.au/dataset/ds-nsw-bb1f895b-ceaa-45eb-a056-3423fd7588d9/details?q=Great%20Soil%20Group%20(GSG)%20Soil%20Type%20map%20of%20NSW

Department of Planning, Industry and Environment (2021e) *BioNet Vegetation Classification Database.* https://www.environment.nsw.gov.au/NSWVCA20PRapp/LoginPR.aspx?ReturnUrl=%2fNSWVCA20PRapp%2fdefault.aspx.

Geoscience Australia (2021a) *National Surface Water Information: Surface Hydrology Lines-Regional*. http://www.ga.gov.au/scientific-topics/water/national-surface-water-information

Geoscience Australia (2021b) *Continental Geology Section: 1:250 000 geological map series*. https://www.ga.gov.au/about/projects/resources/continental-geology

National Parks and Wildlife Service (2020) *Fire History - Wildfires and Prescribed Burns*. New South Wales National Parks and Wildlife Service. https://data.nsw.gov.au/data/dataset/fire-history-wildfires-and-prescribed-burns-1e8b6

Office of Environment and Heritage (2015) *Regional Vegetation Mapping for the Border River/ Gwydir and Namoi Regions*. New South Wales Office of Environment and Heritage.

https://data.nsw.gov.au/data/dataset/border-rivers-gwydir-namoi-regional-native-vegetation-map-version-2-0-vis_id-420443dc7

Threatened Species Scientific Committee (2006) *Commonwealth Listing Advice on White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* Threatened Species Scientific Committee http://www.environment.gov.au/biodiversity/threatened/conservation-advices/white-box-yellow-box-blakely%27s-red-gum-grassy-woodlands-derived-native-grasslands.

Threatened Species Scientific Committee (2020) *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. https://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species/nsw-threatened-species-scientific-committee/determinations/final-determinations/2020/white-box-yellow-box-critically-endangered-ecological-community-listing

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

Family	Genus	Scientific Name	Establishment
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

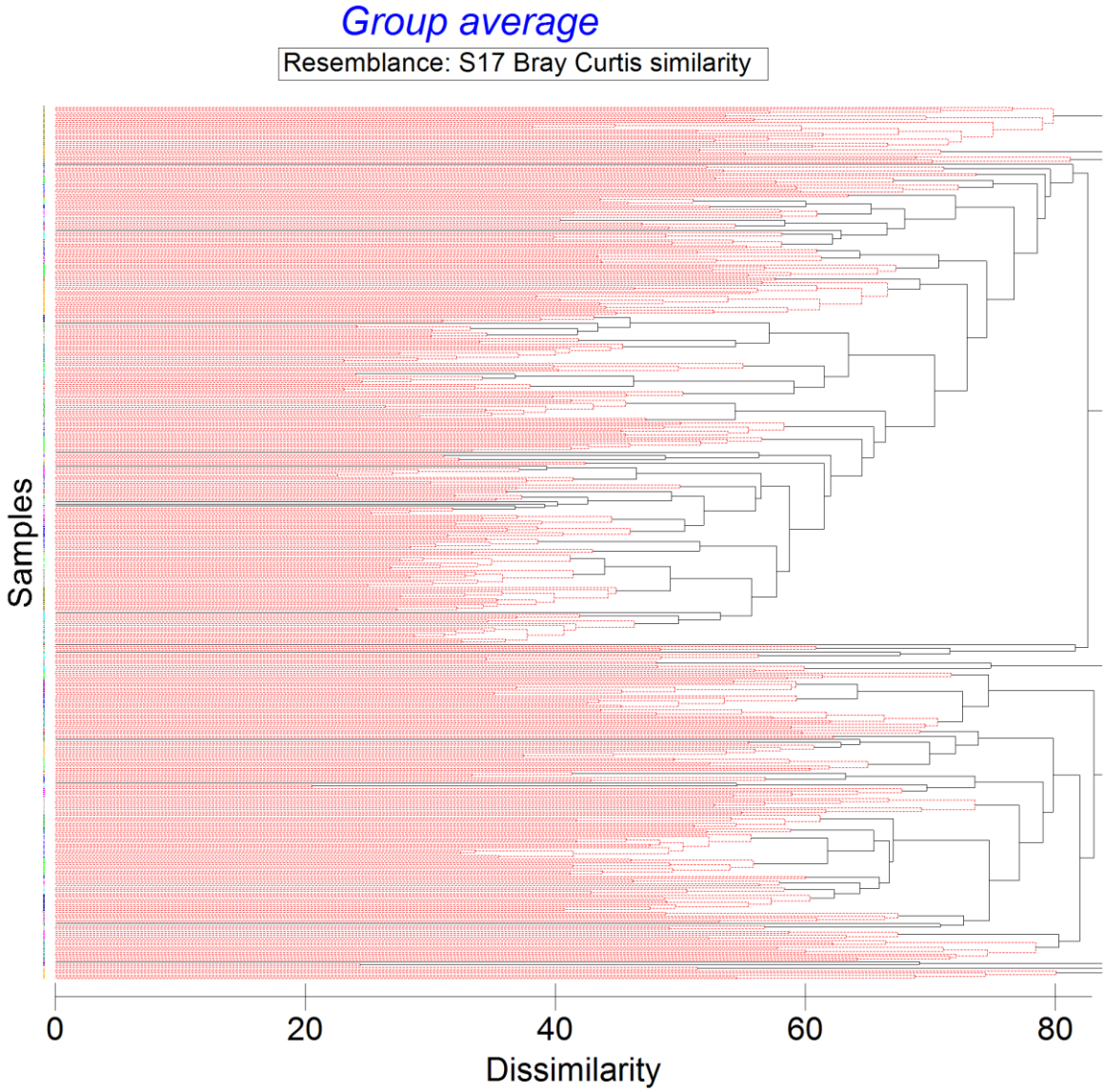
Family	Genus	Scientific Name	Establishment
Poaceae	Vulpia	*Vulpia myuros*	Introduced
Polygalaceae	Polygala	*Polygala japonica*	Native
Polygonaceae	Acetosella	*Acetosella vulgaris*	Introduced
Polygonaceae	Persicaria	*Persicaria decipiens*	Native
Polygonaceae	Polygonum	*Polygonum aviculare*	Introduced
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*

Appendix B: Output of Floristic Analysis

Cluster analysis dendrogram



Plot group membership

Survey	Site	Group
Appledore_CEEC_AMBS	ADFF0000	bd
Appledore_CEEC_AMBS	ADFF0001	bd
Appledore_CEEC_AMBS	ADFF0002	bd
Appledore_CEEC_AMBS	ADFF0003	bd
Appledore_CEEC_AMBS	ADFF0004m	bd
Appledore_CEEC_AMBS	ADFF0008	bd
Appledore_CEEC_AMBS	ADFF1000	bd
Appledore_CEEC_AMBS	ADFF1001	bd
Appledore_CEEC_AMBS	ADFF0005	am
Appledore_CEEC_AMBS	ADFF0006	am
Arrowfield_CEEC_AMBS	ARFF0015	ad
Arrowfield_CEEC_AMBS	ARFFJS01	ad
Arrowfield_CEEC_AMBS	ARFF0020	af
Arrowfield_CEEC_AMBS	ARFF0024	af
Arrowfield_CEEC_AMBS	ARFF0025	af
Arrowfield_CEEC_AMBS	ARFF0031	af
Arrowfield_CEEC_AMBS	ARFF0021	ai
Arrowfield_CEEC_AMBS	ARFF1002	ai
Arrowfield_CEEC_AMBS	ARFF0033	ae
Arrowfield_CEEC_AMBS	ARFFJS02	ae
Arrowfield_CEEC_AMBS	ARFFJS03	ae
Arrowfield_CEEC_AMBS	ARFFJS04	ae
Arrowfield_CEEC_AMBS	ARFF0036s	ah
Arrowfield_CEEC_AMBS	ARFF0037a	ah
Arrowfield_CEEC_AMBS	ARFF1001	ah
Arrowfield_CEEC_AMBS	ARFF1003	ah
Arrowfield_CEEC_AMBS	ARFF1004	ah
Arrowfield_CEEC_AMBS	ARFF1005	ah
Arrowfield_CEEC_AMBS	ARFF1006	ah
Arrowfield_CEEC_AMBS	ARFF1007	ah
Arrowfield_CEEC_AMBS	ARFF1008	ah
Arrowfield_CEEC_AMBS	ARFF1009	ah
BORNIRON	BI001	cm
BORNIRON	BI002	cm
BORNIRON	BI004	cm
BORNIRON	BI009	cm
BORNIRON	BI010	cm
BORNIRON	BI042	cm
BORNIRON	BI044	cm
BORNIRON	BI048	cm
BORNIRON	BI053	cm
BORNIRON	BI003	cv
BORNIRON	BI058	cv
BORNIRON	BI059	cv
JTH_TA	JTHTA31	cv
LongGully_CEEC_AMBS	WRFF0023	cv

Survey	Site	Group
BORNIRON	BI005	a
BORNIRON	BI006	a
BORNIRON	BI008	a
BORNIRON	BI015	a
BORNIRON	BI019	a
BORNIRON	BI020	a
BORNIRON	BI026	a
BORNIRON	BI034	a
BORNIRON	BI047	a
BORNIRON	BI055	a
BORNIRON	BI065	a
BORNIRON	BI066	a
BORNIRON	BI071	a
BORNIRON	BI075	a
BORNIRON	BI083	a
BORNIRON	BI091	a
BORNIRON	BI094	a
BORNIRON	BI109	a
BORNIRON	BI125	a
BORNIRON	BI126	a
BORNIRON	BI127	a
BORNIRON	BI128	a
BORNIRON	BI007	cg
BORNIRON	BI078	cg
BORNIRON	BI089	cg
BORNIRON	BI011	cn
BORNIRON	BI012	cn
BORNIRON	BI013	cn
BORNIRON	BI029	cn
BORNIRON	BI052	cn
BORNIRON	BI101	cn
BORNIRON	BI014	ci
BORNIRON	BI017	ci
BORNIRON	BI022	ci
BORNIRON	BI023	ci
BORNIRON	BI027	ci
BORNIRON	BI032	ci
BORNIRON	BI035	ci
BORNIRON	BI040	ci
BORNIRON	BI043	ci
BORNIRON	BI016	ch
BORNIRON	BI024	ch
BORNIRON	BI031	ch
BORNIRON	BI037	ch
BORNIRON	BI038	ch
BORNIRON	BI041	ch
BORNIRON	BI045	ch

Survey	Site	Group
BORNIRON	BI046	ch
BORNIRON	BI049	ch
BORNIRON	BI051	ch
BORNIRON	BI054	ch
BORNIRON	BI103	ch
BORNIRON	BI105	ch
BORNIRON	BI018	cl
BORNIRON	BI030	cl
BORNIRON	BI036	cl
BORNIRON	BI080	cl
BORNIRON	BI021	bt
BORNIRON	BI085	bt
BORNIRON	BI090	bt
BORNIRON	BI025	ck
BORNIRON	BI028	ck
BORNIRON	BI039	ck
BORNIRON	BI102	ck
BORNIRON	BI033	ce
BORNIRON	BI050	ce
BORNIRON	BI056	ce
BORNIRON	BI063	ce
BORNIRON	BI064	ce
BORNIRON	BI086	ce
JTH_TA	JTHTA27	ce
JTH_TA	JTHTA30	ce
MACINTYRE	MCT251	ce
BORNIRON	BI057	cf
BORNIRON	BI060	cf
BORNIRON	BI061	cf
BORNIRON	BI098	cf
BORNIRON	BI106	cf
BORNIRON	BI108	cf
BORNIRON	BI110	cf
BORNIRON	BI062	co
BORNIRON	BI067	b
BORNIRON	BI068	b
CMT	COB001	b
CMT	COB002	b
BORNIRON	BI069	cb
BORNIRON	BI070	bu
BORNIRON	BI072	bu
BORNIRON	BI073	ct
GEDBSWBP	SWB828D	ct
BORNIRON	BI074	by
BORNIRON	BI082	by
BORNIRON	BI084	by
BORNIRON	BI092	by

Survey	Site	Group
BORNIRON	BI093	by
BORNIRON	BI099	by
BORNIRON	BI107	by
BORNIRON	BI076	ca
BORNIRON	BI077	ca
BORNIRON	BI079	ca
BORNIRON	BI081	cc
GEDBSWBP	SWB828I	cc
BORNIRON	BI087	bz
BORNIRON	BI088	bz
GEDBSWBP	SWB828H	bz
BORNIRON	BI095	cd
BORNIRON	BI096	cd
BORNIRON	BI097	cd
BORNIRON	BI100	cd
NVMP	NPWS	cd
BORNIRON	BI104	bw
BORNIRON	BI116	bw
BORNIRON	BI111	cp
BORNIRON	BI112	cp
BORNIRON	BI115	cp
BORNIRON	BI113	cj
BORNIRON	BI114	cj
BORNIRON	BI117	bx
BORNIRON	BI118	bx
BORNIRON	BI119	bx
BORNIRON	BI120	bx
BORNIRON	BI121	bx
BORNIRON	BI122	bx
BORNIRON	BI123	bx
BORNIRON	BI124	bv
BRG	FF	cr
GEDBSWBP	SWB920A	cr
JTH_TA	JTHTA42	cr
MACINTYRE	MCT247	cr
MACINTYRE	MCT250	cr
MACINTYRE	MCT253	cr
MER_BRG	MER0037C	cr
MER_BRG	MER0037T	cr
WESTERN	UNE15020	cr
WESTERN	UNE15026	cr
WESTERN	UNE15044	cr
CMT	CMA0049	n
CMT	COB016	n
NVMP	NPWS	n
NVMP	NPWS	n
CMT	CMA0050	g

Survey	Site	Group
CMT	COB058	g
NANDE_WRA	NBFF1500	g
NVMP	NPWS	g
CMT	COB003	h
CMT	COB007	h
NVMP	NPWS	h
NVMP	NPWS	h
WESTERN	UNE15025	h
CMT	COB012	p
CMT	COB024	p
CMT	COB025	p
NVMP	NPWS	p
CMT	COB013	o
CMT	COB029	l
CMT	COB030	l
CMT	COB031	l
CMT	COB046	l
CMT	COB047	l
CMT	COB040	q
CMT	COB053	q
CMT	COB054	q
CMT	COB057	q
CMT	COB059	q
Coonoor_CEEC_AMBS	COFF0000	au
Coonoor_CEEC_AMBS	COFF0006	au
Coonoor_CEEC_AMBS	COFF0020	au
Coonoor_CEEC_AMBS	COFF0021	au
Coonoor_CEEC_AMBS	COFF0001	as
Coonoor_CEEC_AMBS	COFF0025	as
Coonoor_CEEC_AMBS	COFF0029	as
Coonoor_CEEC_AMBS	COFF0002	al
Coonoor_CEEC_AMBS	COFF0008new	ao
Coonoor_CEEC_AMBS	COFF0019	ao
Coonoor_CEEC_AMBS	COFF0010	d
Coonoor_CEEC_AMBS	COFF1000	az
Coonoor_CEEC_AMBS	COFF4006	az
Coonoor_CEEC_AMBS	COFF4012	az
CoonoorSouth_CEEC_AMBS	COFF3011	az
CoonoorSouth_CEEC_AMBS	COFF3013	az
CoonoorSouth_CEEC_AMBS	COFF3014	az
Coonoor_CEEC_AMBS	COFF4000	ac
Coonoor_CEEC_AMBS	COFF4010	ac
Coonoor_CEEC_AMBS	COFF4011	ac
CoonoorSouth_CEEC_AMBS	COFF3005	ac
CoonoorSouth_CEEC_AMBS	COFF3009	ac
Coonoor_CEEC_AMBS	COFF4001	ba
Coonoor_CEEC_AMBS	COFF4004	ba

Survey	Site	Group
Neranghi_CEEC_AMBS	NEFF0004	ba
Neranghi_CEEC_AMBS	NEFF0008	ba
Neranghi_CEEC_AMBS	NEFF0023	ba
Triangle_CEEC_AMBS	TRFF2000	ba
Coonoor_CEEC_AMBS	COFF4002	av
Coonoor_CEEC_AMBS	COFF4003	at
Coonoor_CEEC_AMBS	COFF4008	at
Coonoor_CEEC_AMBS	COFF4009	ay
Coonoor_CEEC_AMBS	COFF4014	ay
CoonoorSouth_CEEC_AMBS	COFF3006	ay
CoonoorSouth_CEEC_AMBS	COFF3012	ay
CoonoorSouth_CEEC_AMBS	COFF3002	aw
CoonoorSouth_CEEC_AMBS	COFF3004	ax
GEDBSWBP	SWB900A	e
GEDBSWBP	SWB901A	e
MACINTYRE	MCT406	e
MACINTYRE	MCT407	e
JTH_FEN	FEN15	cu
JTH_FEN	FEN16	cu
JTH_ID	ID01	c
JTH_ID	ID02	c
JTH_ID	ID17	c
JTH_ID	ID42	c
JTH_ID	ID03	bs
JTH_ID	ID05	bs
JTH_ID	ID06	bs
JTH_ID	ID07	bs
JTH_ID	ID08	bs
JTH_ID	ID09	bs
JTH_ID	ID15	bs
JTH_ID	ID25	bs
JTH_ID	ID39	bs
JTH_ID	ID40	bs
JTH_ID	ID41	bs
JTH_ID	ID04	bq
JTH_ID	ID19	bq
JTH_ID	ID20	bq
JTH_ID	ID21	bq
JTH_ID	ID29	bq
JTH_ID	ID35	bq
JTH_ID	ID36	bq
JTH_ID	ID37	bq
JTH_ID	ID10	bp
JTH_ID	ID24	bp
JTH_ID	ID27	bp
JTH_ID	ID38	bp
JTH_ID	ID11	br

Survey	Site	Group
JTH_ID	ID12	br
JTH_ID	ID18	br
JTH_ID	ID22	br
JTH_ID	ID26	br
JTH_ID	ID30	br
JTH_ID	ID34	br
JTH_ID	ID13	bo
JTH_ID	ID23	bo
JTH_ID	ID28	bo
JTH_ID	ID31	bo
JTH_ID	ID14	bn
JTH_ID	ID16	bn
JTH_TA	JTHTA28	cq
JTH_TA	JTHTA29	cq
JTH_TA	JTHTA32	cq
MACINTYRE	MCT248	cq
MACINTYRE	MCT264	cq
LongGully_CEEC_AMBS	WRFF0000	z
LongGully_CEEC_AMBS	WRFF0015	z
LongGully_CEEC_AMBS	WRFF0019	z
LongGully_CEEC_AMBS	WRFF0001	y
LongGully_CEEC_AMBS	WRFF0009	y
LongGully_CEEC_AMBS	WRFF0010	y
LongGully_CEEC_AMBS	WRFF0020	y
LongGully_CEEC_AMBS	WRFF0003	w
LongGully_CEEC_AMBS	WRFF0013	w
LongGully_CEEC_AMBS	WRFF0014	w
LongGully_CEEC_AMBS	WRFF0021	w
LongGully_CEEC_AMBS	WRFF0022	x
LongGully_PCT_AMBS	WRPC0000	aa
LongGully_PCT_AMBS	WRPC0002	aa
LongGully_PCT_AMBS	WRPC0007	aa
LongGully_PCT_AMBS	WRPC0001	ab
LongGully_PCT_AMBS	WRPC0003	ab
LongGully_PCT_AMBS	WRPC0004	ab
LongGully_PCT_AMBS	WRPC0005	ab
LongGully_PCT_AMBS	WRPC0006	ab
LongGully_PCT_AMBS	WRPC0008	ab
LongGully_PCT_AMBS	WRPC0009	ab
LongGully_PCT_AMBS	WRPC0010	ab
LongGully_PCT_AMBS	WRPC0011	ab
LongGully_PCT_AMBS	WRPC0012	ab
MACINTYRE	MCT206	s
MACINTYRE	MCT218	s
MACINTYRE	MCT219	s
MACINTYRE	MCT448	s
MACINTYRE	MCT449	s

Survey	Site	Group
MACINTYRE	MCT207	t
MACINTYRE	MCT217	t
MACINTYRE	MCT452	t
MACINTYRE	MCT460	t
NANDE_WRA	NBFF1495	t
NANDE_WRA	NBFF1496	t
NANDE_WRA	NBFF1497	t
MACINTYRE	MCT220	r
MACINTYRE	MCT221	r
MACINTYRE	MCT436	r
MACINTYRE	MCT277	bm
MACINTYRE	MCT278	bm
MACINTYRE	MCT293	bm
MACINTYRE	MCT294	bm
MACINTYRE	MCT326	bj
MACINTYRE	MCT409	f
Triangle_CEEC_AMBS	TRFF1000	f
MACINTYRE	MCT431	bl
MER_BRG	MER0038	bk
MER_BRG	MER0039	bk
MER_BRG	MER0125C	bk
Neranghi_CEEC_AMBS	NEFF0000	aj
Neranghi_CEEC_AMBS	NEFF0002	aj
Neranghi_CEEC_AMBS	NEFF0003	aj
Neranghi_CEEC_AMBS	NEFF0010	aj
Neranghi_CEEC_AMBS	NEFF0025	aj
Neranghi_CEEC_AMBS	NEFF1000	aj
Neranghi_CEEC_AMBS	NEFF2002	aj
Neranghi_CEEC_AMBS	NEFF2007	aj
Neranghi_CEEC_AMBS	NEFF0001	v
Neranghi_CEEC_AMBS	NEFF0006	v
Neranghi_CEEC_AMBS	NEFF0012	v
Neranghi_CEEC_AMBS	NEFF0013	v
Neranghi_CEEC_AMBS	NEFF0014	v
Neranghi_CEEC_AMBS	NEFF0019	v
Neranghi_CEEC_AMBS	NEFF0020	v
Neranghi_CEEC_AMBS	NEFF0027	v
Neranghi_CEEC_AMBS	NEFF2000	v
Neranghi_CEEC_AMBS	NEFF2008	v
Neranghi_CEEC_AMBS	NEFF2009	v
Triangle_CEEC_AMBS	TRFF0017	v
Triangle_CEEC_AMBS	TRFF0029	v
Triangle_CEEC_AMBS	TRFF0038	v
Triangle_CEEC_AMBS	TRFF0041	v
Triangle_CEEC_AMBS	TRFF0051W	v
Triangle_CEEC_AMBS	TRFF0057	v
Triangle_CEEC_AMBS	TRFF0058	v

Survey	Site	Group
Neranghi_CEEC_AMBS	NEFF0005	bc
Neranghi_CEEC_AMBS	NEFF0021a	bc
Neranghi_CEEC_AMBS	NEFF0022	bc
Neranghi_CEEC_AMBS	NEFF0016	ag
Neranghi_CEEC_AMBS	NEFF0017	ag
Neranghi_CEEC_AMBS	NEFF0018	ag
Neranghi_CEEC_AMBS	NEFF2004	ag
NVMP	NPWS	cs
NVMP	NPWS	j
NVMP	NPWS	j
NVMP	NPWS	j
NVMP	NPWS	j
NVMP	NPWS	k
NVMP	NPWS	k
NVMP	NPWS	m
NVMP	NPWS	m
NVMP	NPWS	i
NVMP	NPWS	i
Reno_CEEC_AMBS	JSREFF001	aq
Reno_CEEC_AMBS	REFF0000	aq
Reno_CEEC_AMBS	REFF0012	aq
Reno_CEEC_AMBS	REFF0014	aq
Reno_CEEC_AMBS	REFF0023	aq
Reno_CEEC_AMBS	REFF0002	be
Reno_CEEC_AMBS	REFF0003	be
Reno_CEEC_AMBS	REFF0004	be
Reno_CEEC_AMBS	REFF0007	be
Reno_CEEC_AMBS	REFF0009	be
Reno_CEEC_AMBS	REFF0010m	be
Reno_CEEC_AMBS	REFF0013	be
Reno_CEEC_AMBS	REFF0015m	be
Reno_CEEC_AMBS	REFF1000	be
Reno_CEEC_AMBS	REFF0006	ap
Reno_CEEC_AMBS	REFF0016	ar
Reno_CEEC_AMBS	REFF0018	ar
Reno_CEEC_AMBS	REFF0019	ar
Reno_CEEC_AMBS	REFF0022	ar
Reno_CEEC_AMBS	REFF0017	an
Reno_CEEC_AMBS	REFF0020	an
Triangle_CEEC_AMBS	TRFF0000	bf
Triangle_CEEC_AMBS	TRFF0003	bf
Triangle_CEEC_AMBS	TRFF0013	bf
Triangle_CEEC_AMBS	TRFF0016	bf
Triangle_CEEC_AMBS	TRFF0018	bf
Triangle_CEEC_AMBS	TRFF0020	bf
Triangle_CEEC_AMBS	TRFF0021	bf
Triangle_CEEC_AMBS	TRFF0022	bf

Survey	Site	Group
Triangle_CEEC_AMBS	TRFF0024	bf
Triangle_CEEC_AMBS	TRFF0025	bf
Triangle_CEEC_AMBS	TRFF0027	bf
Triangle_CEEC_AMBS	TRFF0032	bf
Triangle_CEEC_AMBS	TRFF0045	bf
Triangle_CEEC_AMBS	TRFF00011N	bi
Triangle_CEEC_AMBS	TRFF0001n	bi
Triangle_CEEC_AMBS	TRFF0002	bi
Triangle_CEEC_AMBS	TRFF0005n	bi
Triangle_CEEC_AMBS	TRFF0006N	bi
Triangle_CEEC_AMBS	TRFF0007s	bi
Triangle_CEEC_AMBS	TRFF0008n	bi
Triangle_CEEC_AMBS	TRFF0009s	bi
Triangle_CEEC_AMBS	TRFF0012s	bi
Triangle_CEEC_AMBS	TRFF0014s	bi
Triangle_CEEC_AMBS	TRFF0015n	bi
Triangle_CEEC_AMBS	TRFF0023s	bi
Triangle_CEEC_AMBS	TRFF0056E	bi
Triangle_CEEC_AMBS	TRFF0010N	bg
Triangle_CEEC_AMBS	TRFF0028	ak
Triangle_CEEC_AMBS	TRFF0030	ak
Triangle_CEEC_AMBS	TRFF0031	ak
Triangle_CEEC_AMBS	TRFF0033	ak
Triangle_CEEC_AMBS	TRFF0034	ak
Triangle_CEEC_AMBS	TRFF0035	ak
Triangle_CEEC_AMBS	TRFF0036	ak
Triangle_CEEC_AMBS	TRFF0037	ak
Triangle_CEEC_AMBS	TRFF0040	bb
Triangle_CEEC_AMBS	TRFF0043	bb
Triangle_CEEC_AMBS	TRFF0044	bb
Triangle_CEEC_AMBS	TRFF0047	bb
Triangle_CEEC_AMBS	TRFF0049	bb
Triangle_CEEC_AMBS	TRFF0050	bb
Triangle_CEEC_AMBS	TRFF0052s	bh
Triangle_CEEC_AMBS	TRFF0053w	bh
Triangle_CEEC_AMBS	TRFF0065S	bh
Triangle_CEEC_AMBS	TRFF0055	u
Triangle_CEEC_AMBS	TRFF0061	u

Appendix C: PCT Photographs

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

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

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

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

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

562: Tumbledown Red Gum - White Cypress Pine - Caley's Ironbark shrubby open forest

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

589: White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland

590: White Box grassy woodland

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

1306: White Box - Red Stringybark shrubby woodlands

Appendix D: PCT and TEC Areas by Proposed Offset Area

Table A. Area of PCT within Proposed Offset Areas

Plant Community Type	Coonoor	Long Gully	Neranghi North	Thornfield	Triangle	Total
101: Derived Native Grassland				8.8		**8.8**
101: Poplar Box - Yellow Box - Western Grey Box grassy woodland				16.6		**16.6**
1306: White Box - Red Stringybark shrubby woodlands					93.3	**93.3**
413: Derived Native Grassland				70.2		**70.2**
413: Silver-leaved Ironbark - White Cypress Pine - box dry shrub grass woodland				37.1		**37.1**
435: Derived Native Grassland				1.7		**1.7**
435: White Box - White Cypress Pine shrub grass hills woodland				5.6		**5.6**
510: Blakely's Red Gum - Yellow Box grassy woodland		330.7				**330.7**
538: Rough-barked Apple - Blakely's Red Gum open forest		22.2				**22.2**
588: White Box - White Cypress Pine shrubby hills open forest	324.8		224.9			**549.7**
589: White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland					47.8	**47.8**
590: Derived Native Grassland						**0**
590: White Box grassy woodland	233.7		238.3		491.6	**963.6**
599: Blakely's Red Gum - Yellow Box grassy tall woodland	15.4		103.8	1.7	109.2	**230.1**
599: Derived Native Grassland				3.7		**3.7**
Not native				25.4		**25.4**
Total	**573.9**	**352.9**	**567**	**170.8**	**741.9**	**2406.5**

Table B. Area of Box-Gum Woodland Listed Under the EPBC Act and BC Act within Proposed Offset Areas

	Plant Community Type	Coonoor	Long Gully	Neranghi North	Thornfield	Triangle	Total
Box-Gum Woodland CEEC (Grassland Form)	435: Derived Native Grassland				1.7		1.7
	590: Derived Native Grassland						0
	599: Derived Native Grassland				3.7		3.7
	Total Box-Gum Woodland CEEC (Grassland Form)	0	0	0	5.4	0	5.4
Box-Gum Woodland CEEC (Woodland Form)	1306: White Box - Red Stringybark shrubby woodlands					93.3	93.3
	435: White Box - White Cypress Pine shrub grass hills woodland				5.6		5.6
	510: Blakely's Red Gum - Yellow Box grassy woodland		330.7				330.7
	538: Rough-barked Apple - Blakely's Red Gum open forest		22.2				22.2
	588: White Box - White Cypress Pine shrubby hills open forest	324.8		224.9			549.7
	589: White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland			238.3		47.8	47.8
	590: White Box grassy woodland	233.7		103.8		491.6	963.6
	599: Blakely's Red Gum - Yellow Box grassy tall woodland	15.4			1.7	109.2	230.1
	Total Box-Gum Woodland CEEC (Woodland Form)	573.9	352.9	567	7.3	741.9	2243
	Total Box-Gum Woodland CEEC	**573.9**	**352.9**	**567**	**12.7**	**741.9**	**2248.4**