

Briefing Note

To: Murrumbateman Landcare Group
cc: Jacqui Stol and Annaliese Caston
From: Umwelt (Australia) Pty Ltd
Author: David Moore
Date: 22 September 2021
Subject: Murrumbateman Cemetery Woodland Assessment

Purpose

Umwelt (Australia) Pty Ltd was engaged to undertake an assessment of the quality and extent of box-gum woodland in Zone 2a, and assess the condition of Zones 2b and 2c in the Murrumbateman Cemetery, NSW (**Figure 2.1**). The objective of the assessment of Zone 2a was to determine whether vegetation present at this location meets listing criteria and condition thresholds for the critically endangered ecological community *White Box - Yellow Box – Blakely's Red Gum Woodland* listed under the *NSW Biodiversity Conservation Act* (BC Act 2016) and/or this community's listing under the *Commonwealth Environmental Protection and Biodiversity Act 1999* (EPBC Act). In addition, boundaries of Zone 2a were also reviewed. The objective of the assessment of Zones 2b and 2c was to identify and map areas of degradation.

Outcomes/Key messages

This briefing note summarises the findings of the assessment conducted in Zone 2a on 6 November 2020 and in Zones 2b and 2c on 29 June 2021.

Box-gum woodland in Zone 2a meets the classification and condition criteria for the critically endangered ecological community *White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland* listed under the BC Act. Box-gum woodland in Zone 2a does not meet the classification and condition criteria for the critically endangered ecological community *White Box – Yellow Box – Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands* listed under the EPBC Act.

Degraded areas in the northern and eastern portion of Zone 2c were identified and mapped. An area that has been heavily mown in the northern portion of Zone 2c was also identified and mapped.

1.0 Methods

Assessment of Zone 2a consisted of an ecologist conducting one floristic vegetation plot and a step-point transect on 6 November 2020 in accordance with the Biodiversity Assessment Method (BAM) (DPIE, 2020). The plot comprised an assessment of groundcover, structure and functional attributes throughout a 20 x 50 m area. Floristic diversity, structure and composition was assessed within a 20 x 20 m subsection of the plot. Parallel transects were undertaken to identify all flora species in the 20 x 20 m plot. Flora species recorded within the plot and their estimated abundance and extent is provided in **Appendix A**. The floristic data was entered into the BAM calculator and compared against benchmark values for its respective PCT to calculate a VI score that can be used for future monitoring.

Dominant and characteristic flora species recorded in the plot were considered in the identification of the most appropriate PCT in Zone 2a. Soil, landform and distributional information were also assessed during the process of determining the best matching PCT. The distribution of box-gum woodland in the Murrumbateman Cemetery was mapped using rapid assessment of native vegetation present at the site.

Patches were considered against diagnostic criteria for critically endangered ecological community *White Box – Yellow Box – Blakely’s Red Gum Grassy Woodland and Derived Native Grassland* listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) and the critically endangered ecological community *White Box – Yellow Box – Blakely’s Red Gum Grassy Woodlands and Derived Native Grasslands* listed under the Commonwealth *Environmental Protection and Biodiversity Act 1999* (EPBC Act). In addition, floristic data and patch values were considered against condition thresholds for the EPBC Act listed critically endangered ecological community (*White box-yellow box-Blakely’s red gum grassy woodlands and derived native grasslands*, Department of Agriculture, Water and the Environment, 2006).

Assessment of Zones 2b and 2c consisted of a site walkover by an ecologist on 29 June 2021. The condition of vegetation was examined, and the boundaries of degraded areas within these zones identified were delineated on the basis of recent management and native groundcover condition.

2.0 Results

2.1 Vegetation and Plant Community Types in Zone 2a

Zone 2a was classified as Plant Community Type (PCT) 1330 - Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion due to its geographic and topographic location, the occurrence of Yellow Box (*Eucalyptus melliodora*) and Blakely’s Red Gum (*Eucalyptus blakelyi*) and the presence of diagnostic native grasses and forbs including Yanganbil (*Austrostipa bigeniculata*), wattle matt-rush (*Lomandra filiformis*), weeping grass (*Microlaena stipoides*), kangaroo grass (*Themeda triandra*) and variable glycine (*Glycine tabacina*). Whilst native species were present in the groundcover, it was largely dominated by exotic grasses and forbs. This may have occurred due to a recent disturbance. A full description of PCCT 1330 is provided below in **Table 2.1**.

Table 2.1 PCT: 1330 Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion

PCT Name	PCT 1330– Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion
Vegetation formation	Grassy Woodlands
Vegetation Class	Southern Tableland Grassy Woodlands
PCT Percent Cleared	94%
Vegetation Description	Woodland with a sparse shrub layer and dense grassy groundcover. Occurs on loamy soils on undulating terrain between 500 and 900 m on the tablelands.
PCT1330 in Zone 2a	
General Description	Zone 2a comprises open grassy woodland lacking a shrub layer and supporting a predominantly exotic understorey. The patch of woodland in Zone 2a contains several native grasses and forbs.
Condition Class	<i>Low. This condition class was assigned due to the lack of a midstorey and the dominance of exotic species in the ground stratum.</i>
Extent in Zone 2a	0.18 hectares (ha)
Canopy	The canopy is dominated by Yellow Box and Blakely's Red Gum.
Midstorey	The midstorey lacks any shrubs.
Ground Stratum	The ground stratum is dominated by exotic grasses and forbs. While not dominant, diagnostic native grasses and forbs including Yanganbil (<i>Austrostipa bigeniculata</i>), wattle matt-rush (<i>Lomandra filiformis</i>), weeping grass (<i>Microlaena stipoides</i>), kangaroo grass (<i>Themeda triandra</i>) and variable glycine (<i>Glycine tabacina</i>) are present.
Average native groundcover (%)	38.2
Average exotic groundcover (%)	55
Composition condition score	52.9
Structure condition score	84.3
Function condition score	49
Vegetation Integrity Score	60.2



Legend

- Study Area
- Cemetery Perimeter
- Degraded
- Inconsistent Mowing
- Zone 2a - original
- Zone 2a - revised
- Zone 2b
- Zone 2c

FIGURE 2.1

Murrumbateman Cemetery Vegetation Zones

2.2 Vegetation condition in Zones 2b and 2c

Degraded areas were identified within the northern and eastern portions of Zone 2b (**Figure 2.1**). A spill pile and associated area of bare earth is present near the northern perimeter of Zone 2b whilst degradation associated with a vehicle track is present in the eastern portion of Zone 2b. Umwelt is unable to determine if there is link between the installation of the water tank and the degraded areas within the eastern portion of Zone 2b.

The mowing regime within the far northern portion of Zone 2c is inconsistent with the mowing regime within the rest of Zone 2c (**Figure 2.1**). While the groundcover remains predominantly native, regular mowing has the potential to reduce persistence of some disturbance sensitive species, and consequently, regularly mown areas may be degraded.

3.0 Threatened Ecological Community Assessment

3.1 BC Act listed *White Box – Yellow Box – Blakely’s Red Gum Grassy Woodland and Derived Native Grassland* CEEC assessment

Vegetation within Zone 2a was assessed against the diagnostic criteria for *White Box – Yellow Box – Blakely’s Red Gum Grassy Woodland and Derived Native Grassland* critically endangered ecological community listed under the BC Act (DECC 2007, TSSC 2020) (**Table 3.1**).

Vegetation in Zone 2a conforms to the BC Act listed CEEC, *White Box - Yellow Box - Blakely’s Red Gum Grassy Woodland and Derived Native Grassland* on the basis that it is dominated by *Eucalyptus blakelyi* and *Eucalyptus melliodora* and has a native understorey.

Table 3.1 Assessment of key characteristics for BC Act listed *White Box – Yellow Box – Blakely’s Red Gum Grassy Woodland and Derived Native Grassland*

Key Characteristics	Response
Is the site on the tablelands or western slopes of NSW?	The Project Area is located on the NSW South Western Slopes bioregion (Inland slopes) on red-brown loamy soil.
Does the site contain, or would the site have recently been likely to contain White Box, Yellow Box or Blakely’s Red Gum?	Zone 2a contains a canopy consisting of Yellow Box, or Blakely’s Red Gum.
Is the ground layer mainly grassy?	Yes, Zone 2a consists of a grassy ground layer.
If the site has been degraded, is the potential for assisted natural regeneration of the tree layer or the understorey (e.g., by removing grazing, weeds, etc)?	The site has been degraded but a canopy is retained. While the groundcover is degraded, it has the potential for regeneration.
BC Act listed <i>White Box – Yellow Box – Blakely’s Red Gum Grassy Woodland and Derived Native Grassland</i>	The vegetation in Zone 2a conforms with the BC Act listed <i>White Box – Yellow Box – Blakely’s Red Gum Grassy Woodland and Derived Native Grassland</i>

3.2 EPBC Act listed *White Box – Yellow Box – Blakely’s Red Gum Grassy Woodlands and Derived Native Grasslands* CEEC assessment

Vegetation within Zone 2a was assessed against the diagnostic criteria and condition thresholds for EPBC Act listed *White Box – Yellow Box – Blakely’s Red Gum Grassy Woodlands and Derived Native Grasslands* *critically endangered ecological community* (DEH, 2006) as shown in **Table 3.2**. Vegetation zone 2a does not meet the minimum condition thresholds for listing under the EPBC Act as the ground stratum was dominated by perennial exotic grasses. Additionally, only 10 of 12 native understorey species were recorded within the BAM plot, however it should be noted additional species may occur outside the 0.04 ha plot.

If the entire Murrumbateman Cemetery was to be assessed as a single patch, under the assumption that the native dominated grasslands conform with EPBC listed Box-Gum Woodland, this site would conform with the EPBC Act listed *White Box – Yellow Box – Blakely’s Red Gum Grassy Woodlands and Derived Native Grasslands* CEEC.

Table 3.2 Assessment of key characteristics for EPBC Act listed *White Box – Yellow Box – Blakely’s Red Gum Grassy Woodlands and Derived Native Grasslands*

Key Characteristics	Response
Is, or was previously, at least one of the most common overstorey species White Box, Yellow Box or Blakely’s Red Gum?	The most common overstorey species in Zone 2a is Yellow Box. Blakely’s Red Gum is also present.
Does the patch have an understorey comprising ≥50% total cover of native perennial species?	The patch has an understorey dominated by perennial exotic grasses.
Is the patch ≥0.1 ha in size?	At 0.18 ha the patch in Zone 2a is part of a patch of box-gum woodland greater than 0.1 ha in size.
There are 12 or more native understorey species present (excluding grasses). There must be at least one important species.	There were only 10 native understorey species (excluding grasses) recorded within the floristic plot in Zone 2a. It should be noted that additional species may be present within the larger 0.1 ha area, and on a precautionary basis the site should be considered to meet criteria in this location. The important species <i>Bulbine bulbosa</i> , <i>Glycine tabacina</i> and <i>Tricoryne elatior</i> were recorded.
EPBC Act listed <i>White Box – Yellow Box – Blakely’s Red Gum Grassy Woodlands and Derived Native Grasslands</i>	The patch in Zone 2a, when assessed in isolation, does not meet the minimum thresholds for EPBC Act listed TEC due to the high cover of perennial exotic grasses (.

4.0 Conclusion

Box-gum woodland in Zone 2a conforms with the BC Act listed *White Box - Yellow Box - Blakely’s Red Gum Grassy Woodland and Derived Native Grassland* CEEC. Box-gum woodland in Zone 2a does not meet the criteria for the EPBC Act listed *White Box – Yellow Box – Blakely’s Red Gum Grassy Woodlands and Derived Native Grasslands* CEEC due to the dominance of exotic perennial grasses.

If the entire Murrumbateman Cemetery was to be assessed as a single patch, under the assumption that the native dominated grasslands conform with EPBC listed Box-Gum Woodland, this site would conform with the EPBC Act listed *White Box – Yellow Box – Blakely’s Red Gum Grassy Woodlands and Derived Native Grasslands* CEEC.

Degraded areas were identified within the northern and eastern portions of Zone 2b (**Figure 2.1**). A spill pile and associated area of bare earth is present near the northern perimeter of Zone 2b whilst degradation associated with a vehicle track is present in the eastern portion of Zone 2b.

The mowing regime within the far northern portion of Zone 2c is inconsistent with the mowing regime within the rest of Zone 2c (**Figure 2.1**). While the groundcover remains predominantly native, regular mowing has the potential to reduce persistence of some disturbance sensitive species, and consequently, regularly mown areas may be degraded.

5.0 References

Department of Environment and Climate Change (DECC) 2007. *White Box-Yellow Box - Blakely's Red Gum Woodland*. NSW Government.

<https://www.environment.nsw.gov.au/resources/threatenedspecies/EECWhiteboxLowRes.pdf>

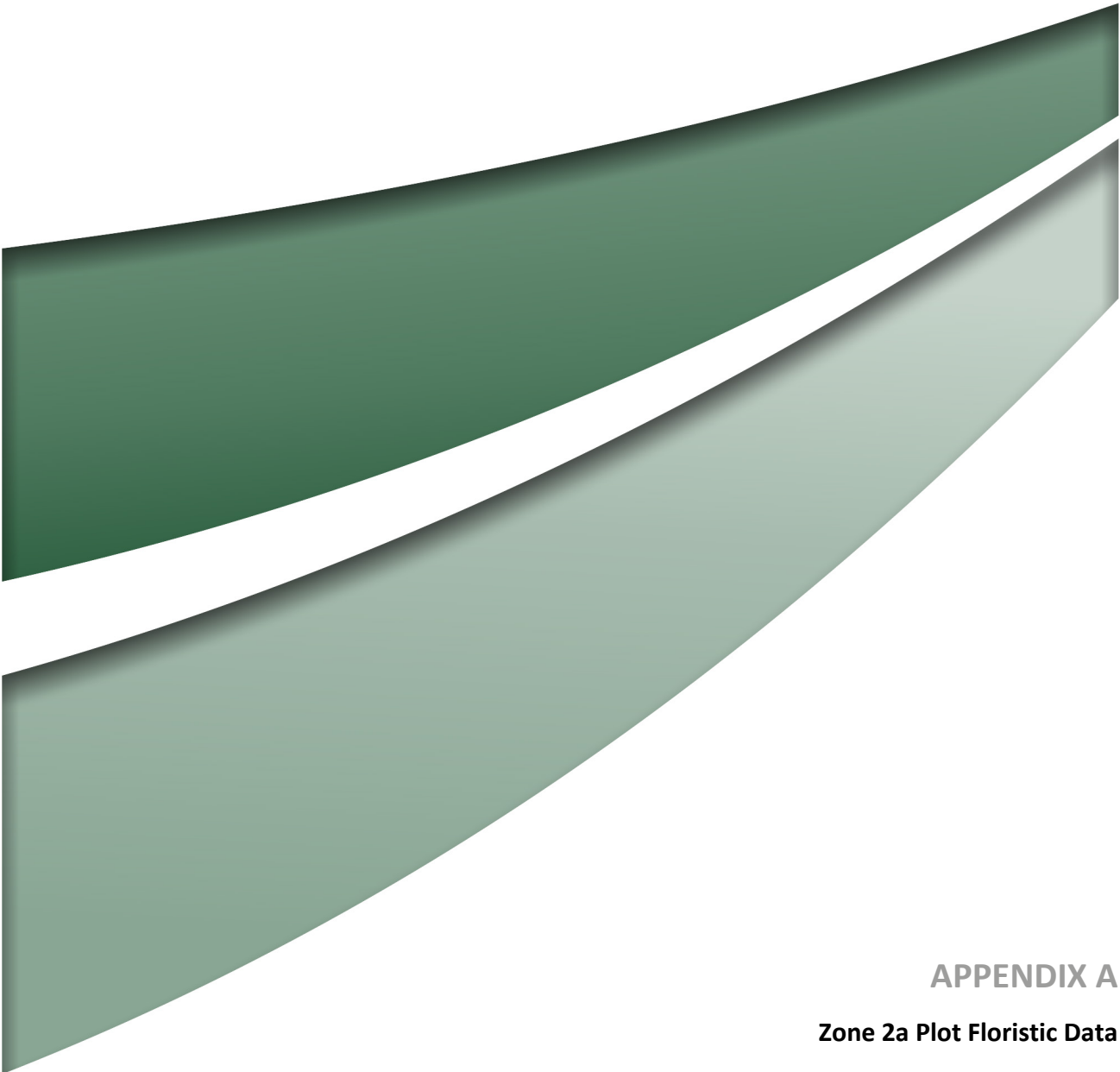
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Office of Environment and Heritage (OEH) 2019. *Vegetation Information System (VIS)*. NSW Government.

Threatened Species Scientific Committee (TSSC) 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 Government. <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

Zone 2a Plot Floristic Data

Zone 2a Plot Floristic Data

Family name	Scientific Name	Common Name	Cover (%)	Abundance	Growth Form
Asteraceae	<i>Arctotheca calendula</i>	capeweed	0.5	500	N/A
Poaceae	<i>Austrostipa bigeniculata</i>	yanganbil	25	2,000	Grass & grasslike (GG)
Poaceae	<i>Austrostipa scabra</i>	speargrass	0.5	500	Grass & grasslike (GG)
Poaceae	<i>Avena spp.</i>	oats	2	1,000	N/A
Poaceae	<i>Bromus catharticus</i>	praire grass	1	300	N/A
Poaceae	<i>Bromus diandrus</i>	great brome	1	1,000	N/A
Poaceae	<i>Bromus hordeaceus</i>	soft brome	3	300	Growth Form
Asphodelaceae	<i>Bulbine bulbosa</i>	bulbine lily	0.1	30	Forb (FG)
Asteraceae	<i>Chondrilla juncea</i>	skeleton weed	0.1	100	N/A
Crassulaceae	<i>Crassula sieberiana</i>	Australian stonecrop	0.1	300	Forb (FG)
Poaceae	<i>Dactylis glomerata</i>	cocksfoot	2	300	N/A
Chenopodiaceae	<i>Einadia nutans</i>	climbing saltbush	2	500	Forb (FG)
Poaceae	<i>Elymus scaber</i>	common wheatgrass	0.2	100	Grass & grasslike (GG)
Myrtaceae	<i>Eucalyptus blakelyi</i>	blakely's red gum	3	2	Tree (TG)
Myrtaceae	<i>Eucalyptus melliodora</i>	yellow box	20	2	Tree (TG)
Fabaceae (Faboideae)	<i>Glycine tabacina</i>	variable glycine	1	500	Other (OG)
Brassicaceae	<i>Hirschfeldia incana</i>	buchan weed	0.1	5	N/A
Asteraceae	<i>Hypochaeris radicata</i>	catsear	0.2	100	N/A
Asteraceae	<i>Lactuca serriola</i>	prickly lettuce	0.1	10	N/A
Poaceae	<i>Lolium perenne</i>	perennial ryegrass	80	2,000	N/A
Lomandraceae	<i>Lomandra filiformis</i>	wattle matt-rush	0.1	10	Grass & grasslike (GG)
Poaceae	<i>Microlaena stipoides</i>	weeping grass	40	2,000	Grass & grasslike (GG)
Malvaceae	<i>Modiola caroliniana</i>	red-flowered mallow	0.1	50	N/A
Scrophulariaceae	<i>Orobanche minor</i>	broomrape	0.1	10	N/A
Oxalidaceae	<i>Oxalis spp.</i>	-	0.1	200	Forb (FG)
Caryophyllaceae	<i>Petrorhagia nanteuilii</i>	proliferous pink	0.1	50	N/A
Poaceae	<i>Phalaris aquatica</i>	phalaris	1	200	N/A
Plantaginaceae	<i>Plantago debilis</i>	shade plantain	0.5	300	Forb (FG)
Plantaginaceae	<i>Plantago lanceolata</i>	lamb's tongues	2	2,000	N/A
Polygonaceae	<i>Polygonum aviculare</i>	wireweed	0.2	500	N/A
	<i>Prunus spp.</i>	-	0.1	5	N/A
Polygonaceae	<i>Rumex brownii</i>	swamp dock	0.1	10	Forb (FG)
Poaceae	<i>Rytidosperma spp.</i>	wallaby grass	0.2	100	Grass & grasslike (GG)
Lamiaceae	<i>Salvia verbenaca</i>	vervain	0.1	20	N/A
Asteraceae	<i>Sonchus oleraceus</i>	common sowthistle	0.5	500	N/A
Poaceae	<i>Themeda triandra</i>	kangaroo grass	0.5	100	Grass & grasslike (GG)
Asteraceae	<i>Tragopogon spp.</i>	-	0.1	10	N/A
Anthericaceae	<i>Tricoryne elatior</i>	yellow autumn-lily	0.1	20	Forb (FG)
Fabaceae (Faboideae)	<i>Trifolium arvense</i>	haresfoot clover	0.2	1,000	N/A
Fabaceae (Faboideae)	<i>Trifolium glomeratum</i>	clustered clover	0.5	1,000	N/A
Campanulaceae	<i>Wahlenbergia communis</i>	tufted bluebell	0.2	300	Forb (FG)