Preliminary Overview of Independent Assessments of Wirradale & Mt Lindesay Offset Mapping

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1. Introduction and Methodology

1.1 Previous Independent Inspections

North West Ecological Services spent two days inspecting the vegetation of *Wirradale* and *Mt Lindesay* properties on the 7th and 9th of January 2013. This investigation targeted six areas mapped as White Box – Stringybark Grassy Woodland occurring at elevations above 930 m. In addition the vegetation viewable from the Mt Lindesay road was also viewed for potential correlation with the critically endangered White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Grassland Ecological Community (White Box CEEC) listed under the *Environmental Protection and Biodiversity Conservation Act 1999.* Within this inspection 30 sites were inspected. Less than half of the sites were primarily herbaceous and only four sites may have contained the requisite dominant species for the CEEC however it was determined that these stands would fall outside of the determination based on other selection criteria. The study further concluded that even if and where such small CEEC occurrences may be found that the compositional differences between sites from the project area (approximately 300 m altitude) and these properties (above 930 m) would not make a comparable offset.

A further investigation of 13 sites was undertaken by The Envirofactor (Hawes 2013) on the 26th of August 2013 within four mapped locations of White Box – Stringybark Grassy Woodland. Approximately 180 ha was investigated of which only one site approximately 1 ha in size was found to conform to the CEEC with two other small areas of approximately 0.5 ha each. This preliminary investigation suggested that no areas of White Box – Stringybark Grassy Woodland consistent with the CEEC listing occurred within the four remnants mapped as such by Cumberland Ecology. However during the traverses approximately 2 ha of woodland potentially conforming to the CEEC were seen.

1.2 Current Independent Inspection

This current investigation conducted a review of the accuracy of the current mapping of *Wirradale* and *Mt Lindesay* properties on the 24th of January 2014. This investigation was carried out within the same sub-sampled areas as the previous two independent investigations. While areas searched concentrated on currently mapped White Box – Stringybark Grassy Woodland, investigation sites were also placed within other mapped vegetation types. A total of 40 rapid data points (RPD) were placed in order to assess the accuracy of current mapping. These sites were placed approximately every 300 m during meanders in order not to bias placement. The location of each RPD was

recorded using a GPS. The information collected included at least the three dominant flora species in each definable strata, if that many occurred. These species were scored individually for their percentage cover and the total cover of each strata was also recorded. At each RPD four photographs were taken in an East, South, West and Northerly direction.

1.3 Determination of Mapping Accuracy

The site from the previous two investigations along with the sites placed during this current one have been combined in order to assess the accuracy of the current proposed mapping. Sites have been grouped into suggested Plant Community Types by dominants. In total 85 sites were available for mapping verification. All sites were compared against the currently mapped types.

1.4 Caveat

This current investigation and the previous two inspections should be seen only as preliminary and proper and accurate determination of accuracy of the proposed mapping should include a more thorough investigation across the whole proposed offset site. This should include both RPD and Full Floristic Survey sites which also record the structural characteristics necessary to properly determine the CEEC occurrence based on the selection criteria given within its determination. An accurate independent investigation should also include statistical analysis of floristics using standard and approved methodology and mapping should be done using ADS40 imagery if this is available.

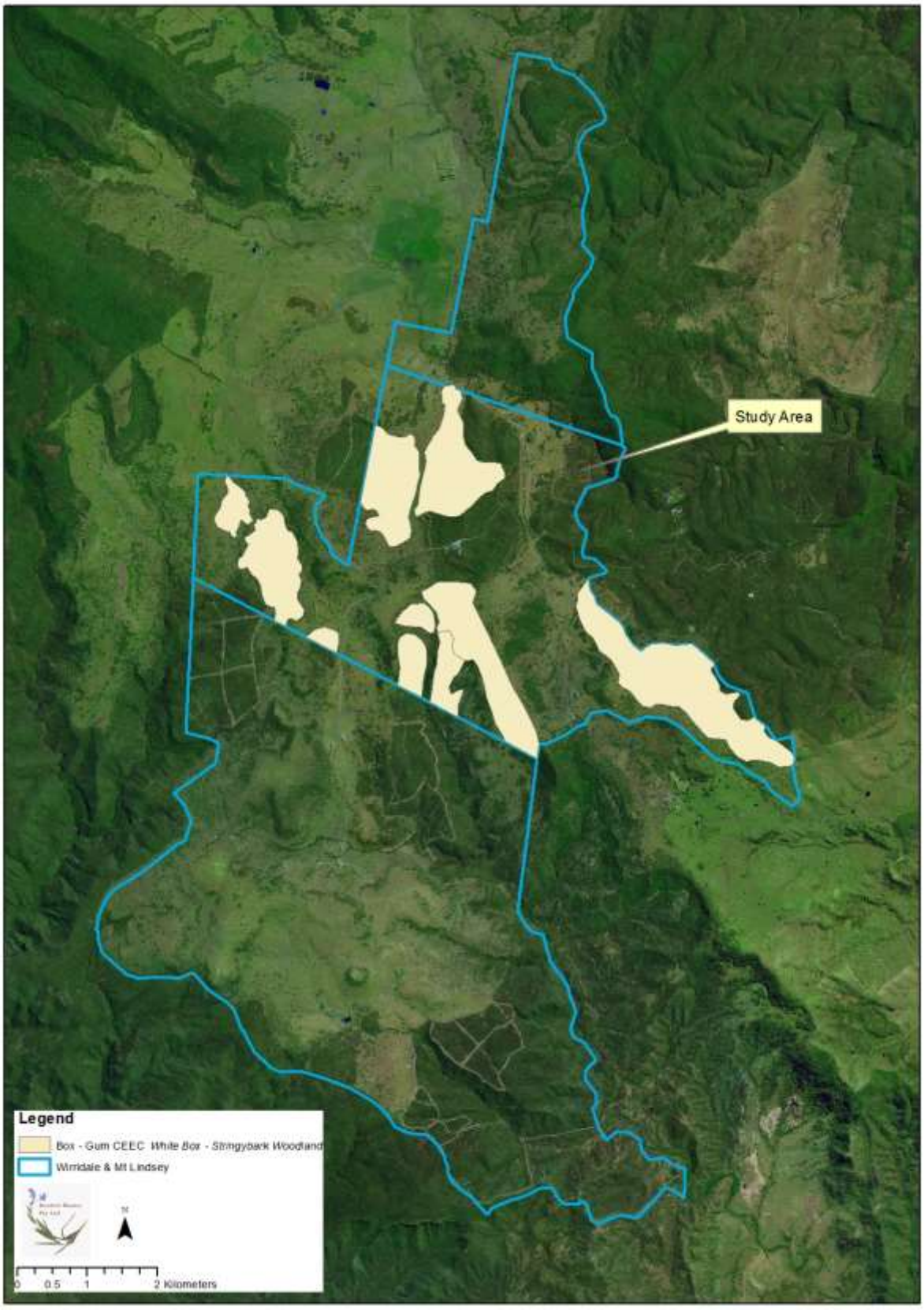


Fig. 1: Sub-area sampled within the *Wirradale* and *Mt Lindesay* properties and the approximate current mapping drafted by Cumberland Ecology of White Box – Stringybark Grass Woodland (CEEC).

2. Results & Discussion

Of the 85 sites available two were found to occur outside the current boundaries of the properties under investigation and were removed, thus 83 sites were available for testing mapping accuracy, 68 of which occurred within the mapped CEEC (White Box – Stringybark Grassy Woodland). Of the 83 sites within the boundary of the study area only three (4%) were considered to match the current mapping. Thus upfront the current mapping of communities within the site is an extremely poor misrepresentation of what is present on the ground. Surprisingly the most dominant overstorey species within the site included in decreasing order *Eucalyptus laevopinea* (Silvertop Stringybark), *Eucalyptus bridgesiana* (Apple Box), *Eucalyptus melliodora* (Yellow Box), *Eucalyptus andrewsii* (Western New England Blackbutt), *Eucalyptus prava* (Orange Gum), *Eucalyptus viminalis* (Manna Gum), *Eucalyptus elliptica* (Round-leafed Gum), *Eucalyptus albens* (White Box), *Eucalyptus blakelyi* (Blakely's Red Gum), *Angophora floribunda* (Rough-barked Apple) and *Eucalyptus macrorhyncha* (Red Stringybark) (Appendix D). The Community types currently mapped include:

Manna Gum - Yellow box - Blakely's Redgum open forest

Roughbarked Apple - Blakely's Red gum riparian grassy woodland

Stringybark - Blakely's Redgum grassy open forest

White box - Stringybark grassy woodland

Yellow box - Blakely's Redgum grassy woodland

None of these community types list the most of the more frequent and dominant species such as *Eucalyptus bridgesiana, Eucalyptus andrewsii, Eucalyptus prava* and *Eucalyptus elliptica*. If these species are some of the most dominant within the location they should be represented within the definitions of the types found. Based on the currently mapped types given by Cumberland Ecology one would assume that many of the least frequent overstorey species (*Eucalyptus blakelyi, Eucalyptus albens*) are in fact the most common and dominant which they were not. Furthermore the communities listed by Cumberland Ecology as occurring are primarily herbaceous and grass dominant communities however a majority of the communities found within the site were shrub dominated communities with dense mid storeys of *Olearia viscidula* (Daisy Bush) and *Olearia elliptica* (Sticky Daisy) (Appendix D & E).

The independent survey sites were allocated by the author to five general Plant Community Types (PCTs) that most closely aligned to the species found within them that have been suggested to occur

within the Namoi and Border Rivers/Gwydir Catchments. Most of the independent survey sites recorded the vegetation type present as PCT563 Silvertop Stringybark – Apple Box – White Box Shrubby Woodland.

Hawes (2013) and this current study collected information in a similar fashion (a total of 53 sites). Although PCT563 has White Box as a component of its title, within the study area White Box was rarely found within sites and only occurred as a subdominant within five of the 53 sites surveyed by Hawes (2013) and those within this current survey. Of these five sites three were dominated by dense shrub layers of 35-50% which would exclude them from the CEEC criteria (Appendix C) and an additional site White Box only accounted for 2%, again likely excluding it from the CEEC criteria due to a lack of requisite species (Appendix C), thus leaving only 1 of the 53 sites to be likely to fulfil the criteria of the CEEC determination. Only three sites (3%) conformed to the current Cumberland Ecology mapping within the investigation sub area.

A total of 68 sites (out of the total of 83 sites) were placed within areas currently mapped as White Box – Stringybark Grassy Woodland of which only two locations (3%) potentially matched the CEEC. Four sites (6%) were found to potentially conform to the CEEC determination, however proper determination would need to include an assessment by the placement of a 20 x 50 m reference site and also meeting the other required selection criteria given within the determination, neither of which was done at any of these four sites. Some locations outside of the mapped CEEC are likely to fall within the determination (areas dominated by White Box and/or Blakely's Red Gum and Yellow Box) and therefore there is potential within other mapped units that small patches of CEEC would be found. Based on these observations within a sub-area of the total there may be a 95% or greater error rate in the Cumberland Ecology mapping of the White Box – Stringybark Grassy Woodland (CEEC).

3. Conclusions

It is the inescapable conclusion based on the sampling of 83 sites that the extent of the CEEC mapped by Cumberland Ecology is vastly overstated and perusal of the data collected within other mapped units that the other vegetation types are equally poorly circumscribed and mapped. Based on the results reviewed herein, the on-ground extent of this critically endangered ecological community is approximately 5% of the area mapped as such by Cumberland Ecology but that some small isolated occurrences may occur within other mapped units. If these results are typical for the whole offset area it could be assumed that only approximately 200 ha of CEEC maybe present within the offset properties however a thorough on ground investigation would be required to confirm or

deny this estimate across the entire offset area. Overall the mapping of all communities may be in error as much as the error found for the CEEC. The findings of Hawes (2014) that only small isolated patches of CEEC occur within the site are upheld from the observations and sampling conducted within this investigation. Throughout the study site the main reasons for the CEEC not occurring is that most of the sample sites did not and would not have had any of the requisite species as dominants (i.e. White Box, Blakely's Red Gum or Yellow Box). In many locations these species were minor components but never dominants or subdominants. Furthermore most locations were shrub dominated systems including areas dominated by White Box which would exclude them from the CEEC. Lastly there is a requirement for sites to be both of a minimum size with a minimum requisite number of understorey species present (Appendix C).

It is also the opinion of the author that any remnant of White box CEEC found at/or near the altitudinal limit of this community (approximately 800-1000 m a.s.l.) will not be representative of the CEEC as found in and around Maules Creek at 300-400 m a.s.l. What minor areas of CEEC that may occur within the designated offset are not likely to contain the same species composition as the White box CEEC community that may be cleared in Leard State Forest.

It is highly recommendation that a thorough independent investigation is undertaken to properly verify the extent of CEEC within the offset areas and to properly map all the communities within the offset. It is clear from this preliminary investigation that the mapping of all community types by Cumberland Ecology is likely to be erroneous, not just the CEEC. Such an investigation should include both full floristic and rapid sites, analysis and the use of high definition imagery such as ADS40. It is highly likely that the results of such an investigation will significantly reduce the amount of CEEC mapped, but may also include further small areas not currently mapped as such.

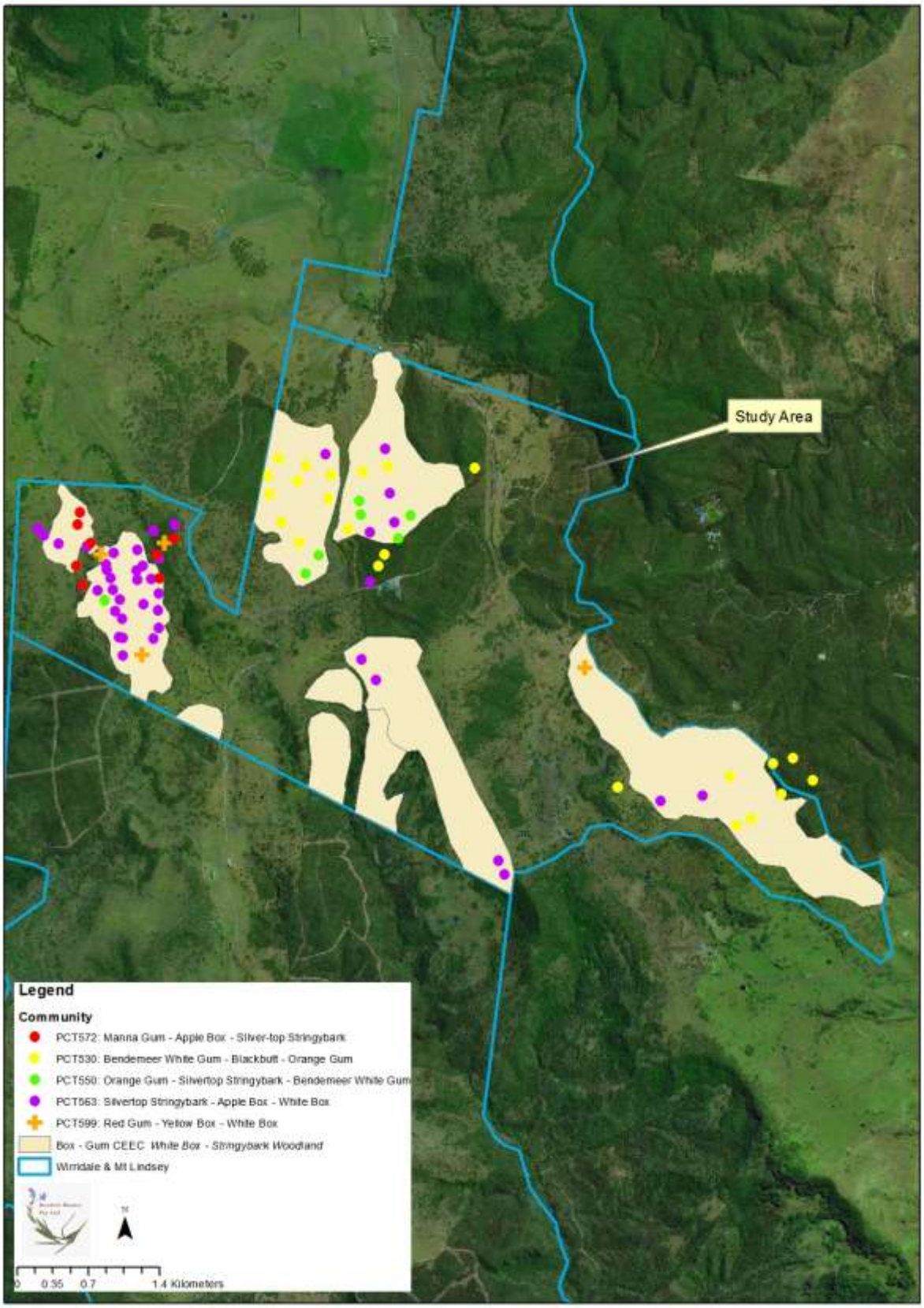


Fig. 2: Locations of 85 independent reference sites and potential Plant Community Type allocation (as defined herein) overlayed across the Cumberland Ecology mapping of White Box –Stringybark Grass Woodland (CEEC).

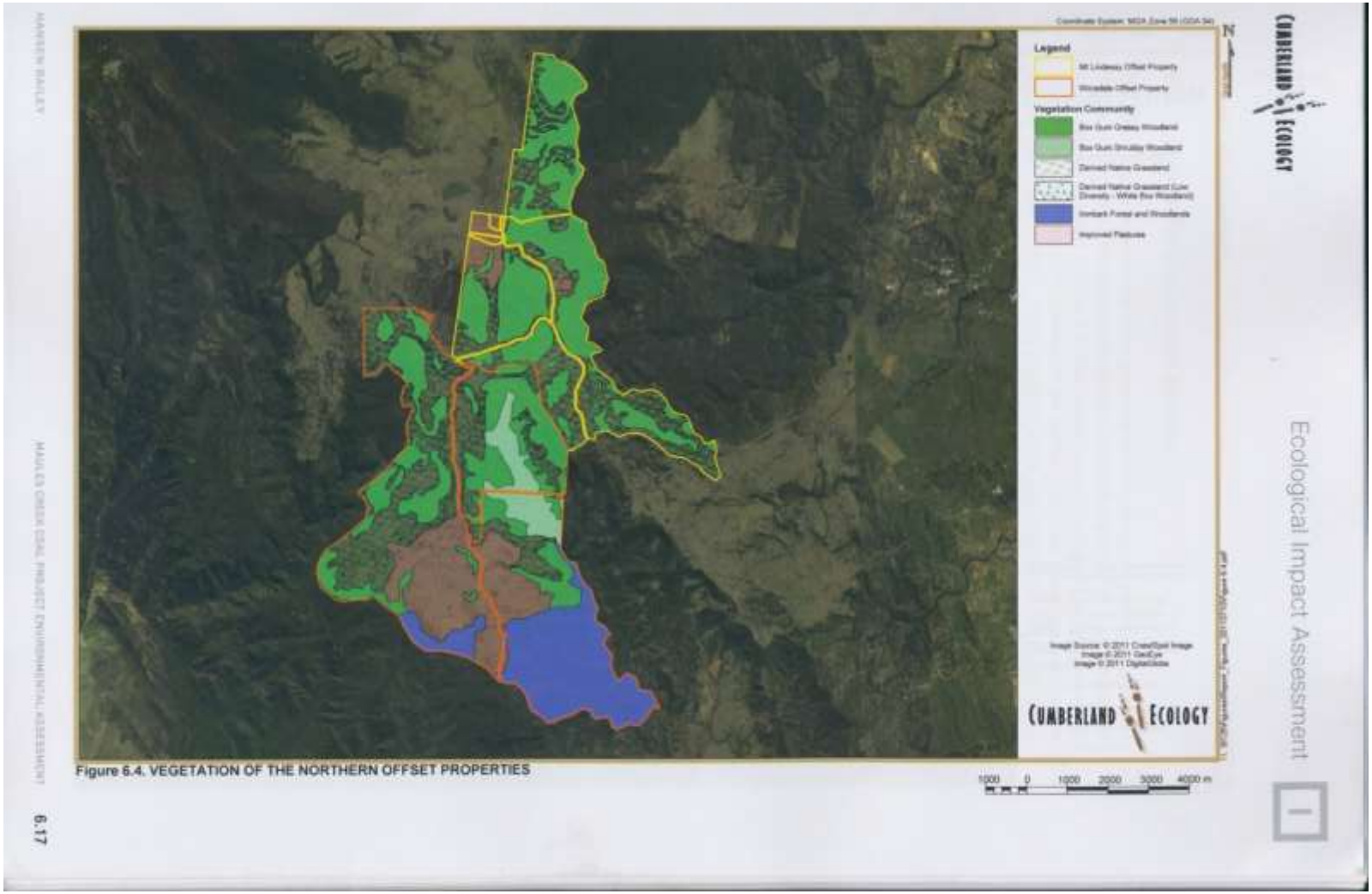


Fig. 3: Initial Environmental Assessment vegetation map July 2011 showing Maules Creek offset properties *Wirradale* and *Mt Lindesay*. Note extent of Box Gum Critically Endangered Ecological Community (CEEC) in green.

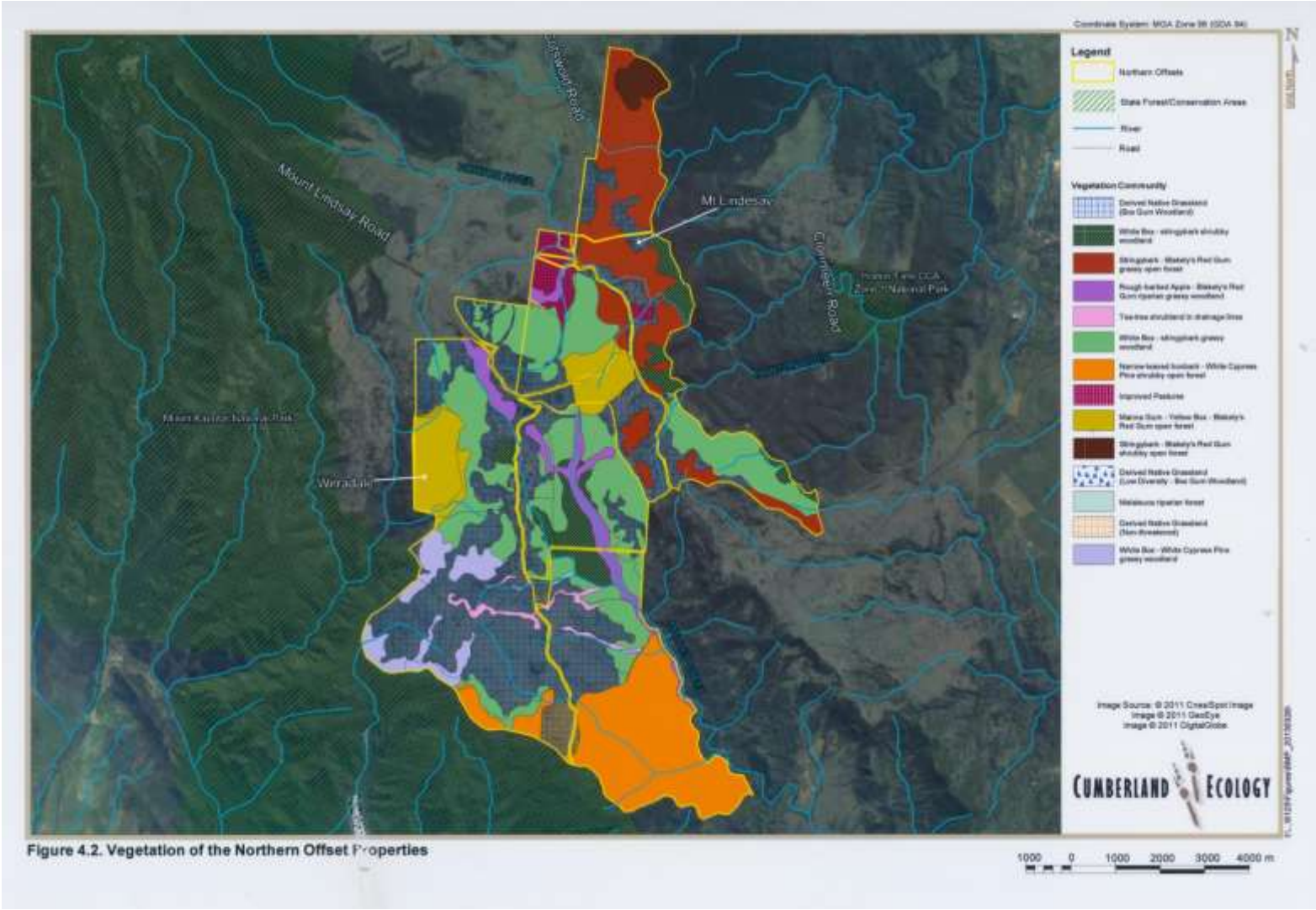


Figure 4.2. Vegetation of the Northern Offset Properties

Fig. 4: Biodiversity Management Plan June 2013 vegetation map of the offset properties *Wirradale* and *Mt Lindesay* - note extent of Critically Eendangered Ecological Community in green, yellow, brown and pink

References

Hawes, W. (2013) Results of Field Assessment of Four Areas Mapped as White Box – Stringybark Grassy Woodland on the Offset Properties *Wirradale* and *Mt Lindesay*. Unpublished Report.

North West Ecological Services (2013) Results from Field Assessment of Maules Creek Coal Offset properties *Wirradale* & *Mt Lindesay,* targeting sections of vegetation mapped as White Box – Stringybark Grassy Woodland. Unpublished Report.

Appendix A

General site information recorded by Dr J. Hunter 24th January 2014.

Site	Date	Region	Datum	Easting	Northing	Altitude	OS H Max	OS H Min	OS C Max	OS C min	MS H Max	MS H Min	MS C Max	MS C Min	US H Max	US H Min	US C Max	US C Min	PCT
1143	24/01/2014	56	94	236059	6640037	990	15	12	45	30	3	1	30	20	0.6	0.1	50	40	510
1144	24/01/2014	56	94	235894	6639864	955	20	14	50	40	3	1	20	10	0.6	0.1	40	30	510
1145	24/01/2014	56	94	235934	6639636	930	16	10	30	25	3	1	15	10	0.6	0.1	80	70	510
1146	24/01/2014	56	94	235937	6639484	925	16	12	45	35	3	1	15	10	0.3	0.1	20	10	563
1147	24/01/2014	56	94	235942	6639316	920	14	8	50	40	3	1	15	10	0.4	0.1	40	30	563
1148	24/01/2014	56	94	235958	6639146	944	16	10	40	30	3	1	15	10	0.5	0.1	15	10	563
1149	24/01/2014	56	94	235911	6639043	964	16	12	35	30	4	1	50	40	0.7	0.1	40	30	563
1150	24/01/2014	56	94	235805	6638874	973	12	6	40	30	5	1	10	5	0.6	0.1	60	50	599
1151	24/01/2014	56	94	235614	6638861	944	10	6	50	40	4	1	8	3	0.8	0.1	30	20	563
1152	24/01/2014	56	94	235604	6639034	948	16	12	40	30	3	1	25	15	0.5	0.1	60	50	563
1153	24/01/2014	56	94	235571	6639033	956	16	12	35	25	5	1	45	35	0.5	0.1	50	40	563
1154	24/01/2014	56	94	235517	6639293	940	18	12	45	35	4	1	60	50	0.5	0.1	40	30	563
1155	24/01/2014	56	94	235410	6639391	933	10	6	50	40	5	1	50	40	0.5	0.1	30	20	550
1156	24/01/2014	56	94	235332	6639482	923	18	15	45	35	4	1	30	20	0.5	0.1	40	30	563
1157	24/01/2014	56	94	235181	6639525	921	12	5	20	15	3	1	15	10	0.5	0.1	50	40	510
1158	24/01/2014	56	94	235114	6639716	926	22	15	40	30	3	1	15	10	0.7	0.1	60	50	510
1159	24/01/2014	56	94	235239	6639945	946	24	18	40	30	3	1	15	10	0.6	0.1	40	30	510
1160	24/01/2014	56	94	235349	6639841	960	14	8	30	15	4	1	15	10	0.5	0.1	60	50	599
1161	24/01/2014	56	94	235474	6639857	970	16	9	40	30	3	1	20	15	0.5	0.1	50	40	563
1162	24/01/2014	56	94	244778	6639994	980	15	8	40	30	3	1	20	15	0.8	0.1	40	30	563
1163	24/01/2014	56	94	244719	6640058	967	16	12	20	15	3	1	10	5	0.7	0.1	40	30	563
1164	24/01/2014	56	94	235850	6640099	977	20	12	50	40	3	1	30	20	0.4	0.1	30	20	563
1165	24/01/2014	56	94	236056	6640168	997	16	12	40	30	3	1	20	15	0.5	0.1	60	50	563

Site	Date	Region	Datum	Easting	Northing	Altitude	OS H Max	OS H Min	OS C Max	OS C min	MS H Max	MS H Min	MS C Max	MS C Min	US H Max	US H Min	US C Max	US C Min	PCT
1166	24/01/2014	56	94	238007	6639708	950	20	12	45	35	3	1	40	30	0.7	0.1	40	30	563
1167	24/01/2014	56	94	238081	6639867	957	25	18	45	35	3	1	50	40	0.5	0.1	50	40	530
1168	24/01/2014	56	94	238134	6639983	964	24	18	50	40	3	1	40	30	0.5	0.1	30	20	530
1169	24/01/2014	56	94	238257	6640147	995	14	8	45	35	2	1	40	30	0.5	0.1	30	20	530
1170	24/01/2014	56	94	238257	6640147	1,009.00	15	8	50	40	2	1	25	15	0.4	0.1	15	10	550
1171	24/01/2014	56	94	238369	6640380	1,013.00	15	8	50	40	3	1	40	30	0.3	0.1	20	15	550
1172	24/01/2014	56	94	243972	6640880	994	20	12	40	35	2.5	1	40	30	0.6	0.1	60	50	530
1173	24/01/2014	56	94	238126	6640848	946	18	8	50	40	2	0.5	25	20	0.5	0.1	40	30	530
1174	24/01/2014	56	94	237881	6640789	940	15	10	50	40	2	1	10	5	0.5	0.1	15	10	530
1175	24/01/2014	56	94	237566	6640742	944	15	10	50	40	2	1	30	20	0.5	0.1	20	15	530
1176	24/01/2014	56	94	237319	6640813	963	15	10	50	40	2	1	30	20	0.5	0.1	20	15	530
1177	24/01/2014	56	94	237048	6640878	986	18	14	50	40	2.5	1	25	15	0.3	0.1	10	5	530
1178	24/01/2014	56	94	236947	6640701	998	20	14	45	35	3	1	35	25	0.5	0.1	30	20	530
1179	24/01/2014	56	94	236975	6640517	999	20	14	45	35	2.5	1	25	15	0.6	0.1	30	20	530
1180	24/01/2014	56	94	237111	6640245	959	18	12	40	30	2	1	30	20	0.4	0.1	15	5	530
1181	24/01/2014	56	94	237289	6640063	946	20	14	50	40	2	1	30	20	0.4	0.1	40	30	530
1182	24/01/2014	56	94	237372	6639754	958	16	12	45	35	2.5	1	35	25	0.3	0.1	15	10	550

Appendix B

Site verification of NWES sites 133 – 291, Hawes sites 1045 – 1057, and Hunter sites 1143 – 1182.

Note that only

Site	Easting	Northing	Community	Correct	Cumberland Ecology Mapped Unit
133	239,412.00	6,637,041.00	563	No	White Box - Stringybark Grassy Woodland
134	239,480.00	6,636,907.00	563	No	White Box - Stringybark Grassy Woodland
136	240,543.00	6,637,824.00	530	No	White Box - Stringybark Grassy Woodland
137	240,972.00	6,637,709.00	563	No	White Box - Stringybark Grassy Woodland
138	241,381.00	6,637,789.00	563	No	White Box - Stringybark Grassy Woodland
139	241,641.00	6,637,989.00	530	No	White Box - Stringybark Grassy Woodland
140	242,059.00	6,638,137.00	530	No	White Box - Stringybark Shrubby Woodland
141	242,249.00	6,638,201.00	530	NA	
142	242,457.00	6,637,994.00	530	NA	
143	242,155.00	6,637,843.00	530	No	White Box - Stringybark Shrubby Woodland
144	241,873.00	6,637,587.00	530	No	White Box - Stringybark Grassy Woodland
145	241,736.00	6,637,507.00	530	No	White Box - Stringybark Grassy Woodland
146	240,156.00	6,638,979.00	599	Yes	White Box - Stringybark Grassy Woodland
147	237,764.00	6,640,217.00	530	No	White Box - Stringybark Grassy Woodland
148	237,553.00	6,640,502.00	530	No	White Box - Stringybark Grassy Woodland
149	237,860.00	6,640,501.00	550	No	White Box - Stringybark Grassy Woodland
150	237,880.00	6,640,364.00	550	No	White Box - Stringybark Grassy Woodland
151	237,487.00	6,639,944.00	550	No	White Box - Stringybark Grassy Woodland
152	235,118.00	6,640,242.00	510	No	White Box - Stringybark Grassy Woodland
153	235,103.00	6,640,116.00	510	No	White Box - Stringybark Grassy Woodland
154	235,203.00	6,639,909.00	510	No	White Box - Stringybark Grassy Woodland
155	235,406.00	6,639,746.00	563	No	White Box - Stringybark Grassy Woodland
282	235,414.00	6,639,690.00	563	No	White Box - Stringybark Grassy Woodland
283	235,457.00	6,639,611.00	563	No	White Box - Stringybark Grassy Woodland
284	235,481.00	6,639,496.00	563	No	White Box - Stringybark Grassy Woodland
285	235,555.00	6,639,406.00	563	No	White Box - Stringybark Grassy Woodland
286	235,716.00	6,639,609.00	563	No	White Box - Stringybark Grassy Woodland
287	235,709.00	6,639,699.00	563	No	White Box - Stringybark Grassy Woodland
288	235,768.00	6,639,749.00	563	No	White Box - Stringybark Grassy Woodland
289	235,704.00	6,639,901.00	563	No	White Box - Stringybark Grassy Woodland
290	237,961.00	6,638,943.00	563	No	White Box - Stringybark Grassy Woodland
291	238,113.00	6,638,750.00	563	No	White Box - Stringybark Grassy Woodland
1045	235,964.00	6,639,987.00	599	No	White Box - Stringybark Grassy Woodland
1046	235,916.00	6,639,829.00	563	No	White Box - Stringybark Grassy Woodland
1047	235,857.00	6,639,623.00	563	No	White Box - Stringybark Grassy Woodland
1048	235,794.00	6,639,375.00	563	No	White Box - Stringybark Grassy Woodland
1049	235,589.00	6,639,216.00	563	No	White Box - Stringybark Grassy Woodland

Site	Easting	Northing	Community	Correct	Cumberland Ecology Mapped Unit
1050	235,204.00	6,639,911.00	563	No	White Box - Stringybark Grassy Woodland
1051	234,927.00	6,639,924.00	563	No	White Box - Stringybark Grassy Woodland
1052	237,980.00	6,640,194.00	563	No	White Box - Stringybark Grassy Woodland
1053	238,213.00	6,640,303.00	563	No	White Box - Stringybark Grassy Woodland
1054	238,155.00	6,640,592.00	563	No	White Box - Stringybark Grassy Woodland
1055	238,084.00	6,641,026.00	563	No	White Box - Stringybark Grassy Woodland
1056	237,502.00	6,640,937.00	563	No	White Box - Stringybark Grassy Woodland
1057	237,247.00	6,640,661.00	530	No	White Box - Stringybark Grassy Woodland
1143	236,059.00	6,640,037.00	510	No	Rough-barked Apple - Blakely's Red Gum Riparian Grassy Forest
1144	235,894.00	6,639,864.00	510	No	Rough-barked Apple - Blakely's Red Gum Riparian Grassy Forest
1145	235,934.00	6,639,636.00	510	No	Rough-barked Apple - Blakely's Red Gum Riparian Grassy Forest
1146	235,937.00	6,639,484.00	563	No	White Box - Stringybark Grassy Woodland
1147	235,942.00	6,639,316.00	563	No	White Box - Stringybark Grassy Woodland
1148	235,958.00	6,639,146.00	563	No	White Box - Stringybark Grassy Woodland
1149	235,911.00	6,639,043.00	563	No	White Box - Stringybark Grassy Woodland
1150	235,805.00	6,638,874.00	599	Yes	White Box - Stringybark Grassy Woodland
1151	235,614.00	6,638,861.00	563	No	White Box - Stringybark Grassy Woodland
1152	235,604.00	6,639,034.00	563	No	White Box - Stringybark Grassy Woodland
1153	235,571.00	6,639,033.00	563	No	White Box - Stringybark Grassy Woodland
1154	235,517.00	6,639,293.00	563	No	White Box - Stringybark Grassy Woodland
1155	235,410.00	6,639,391.00	550	No	White Box - Stringybark Grassy Woodland
1156	235,332.00	6,639,482.00	563	No	White Box - Stringybark Grassy Woodland
1157	235,181.00	6,639,525.00	510	No	Derived Native Grassland
1158	235,114.00	6,639,716.00	510	No	Derived Native Grassland
1159	235,239.00	6,639,945.00	510	No	White Box - Stringybark Grassy Woodland
1160	235,349.00	6,639,841.00	599	Yes	White Box - Stringybark Grassy Woodland
1161	235,474.00	6,639,857.00	563	No	White Box - Stringybark Grassy Woodland
1162	234,778.00	6,639,994.00	563	No	Derived Native Grassland
1163	234,719.00	6,640,058.00	563	No	Derived Native Grassland
1164	235,850.00	6,640,099.00	563	No	Rough-barked Apple - Blakely's Red Gum Riparian Grassy Forest
1165	236,056.00	6,640,168.00	563	No	Rough-barked Apple - Blakely's Red Gum Riparian Grassy Forest
1166	238,007.00	6,639,708.00	563	No	Manna Gum - Yellow Box - Blakely's Red Gum Open Forest
1167	238,081.00	6,639,867.00	530	No	Manna Gum - Yellow Box - Blakely's Red Gum Open Forest
1168	238,134.00	6,639,983.00	530	No	Manna Gum - Yellow Box - Blakely's Red Gum Open Forest
1169	238,257.00	6,640,147.00	530	No	White Box - Stringybark Grassy Woodland
1170	238,257.00	6,640,147.00	550	No	White Box - Stringybark Grassy Woodland
1171	238,369.00	6,640,380.00	550	No	White Box - Stringybark Grassy Woodland
1172	238,972.00	6,640,880.00	530	No	Stringybark - Blakely's Red Gum Grassy Open Forest
1173	238,126.00	6,640,848.00	530	No	White Box - Stringybark Grassy Woodland
1174	237,881.00	6,640,789.00	530	No	White Box - Stringybark Grassy Woodland
1175	237,566.00	6,640,742.00	530	No	White Box - Stringybark Grassy Woodland
1176	237,319.00	6,640,813.00	530	No	White Box - Stringybark Grassy Woodland
1177	237,048.00	6,640,878.00	530	No	White Box - Stringybark Grassy Woodland

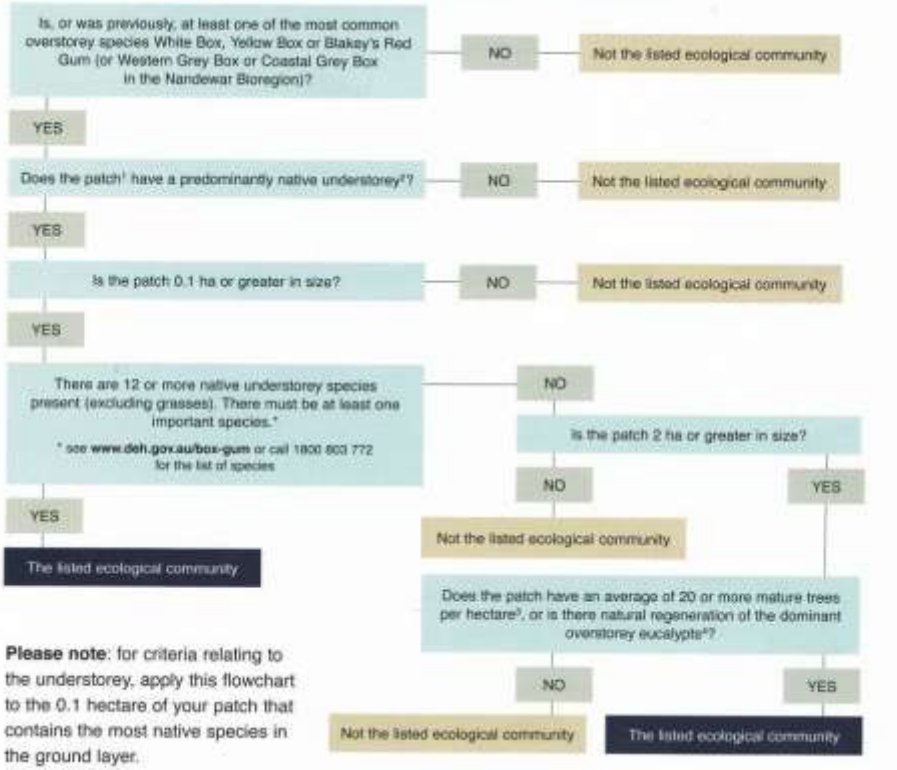
Site	Easting	Northing	Community	Correct	Cumberland Ecology Mapped Unit
1178	236,947.00	6,640,701.00	530	No	White Box - Stringybark Grassy Woodland
1179	236,975.00	6,640,517.00	530	No	White Box - Stringybark Grassy Woodland
1180	237,111.00	6,640,245.00	530	No	White Box - Stringybark Grassy Woodland
1181	237,289.00	6,640,063.00	530	No	White Box - Stringybark Grassy Woodland
1182	237,372.00	6,639,754.00	550	No	White Box - Stringybark Grassy Woodland

Appendix C

Minimum condition criteria for the Commonwealth listed White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland. (from *White box –Yellow Box – Blakely's Red Gum grassy woodlands and derived native grasslands.* Nationally threatened species and ecological communities. EPBC Act Policy Statements Department of Environment and Heritage 2006). Box – Gum 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 *Eucalyptus moluccana*) may also be dominant or co-dominant. The tree-cover is generally discontinuous and consists of widely spaced trees of medium height in which the canopies are clearly separated. Associated species and occasionally co-dominant species include but are not restricted to Grey Box, Fuzzy Box, Apple Box, Red Box, Red Stringybark, White Cypress Pine, Black Cypress Pine, Long-leaved Box, New England Stringybark, Brittle Gum, Candlebark, Argyle Apple, Kurrajong and Drooping She-oak.. **Note that:** 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.

The flowchart below represents the lowest condition at which patches are included in the listed ecological community. This is not the ideal state of the ecological community. Large patches, those that link remnants in the landscape, those that occur in highly cleared areas, those that contain rare, declining or threatened species, and those that represent the entire range of the ecological community, are important for the long-term future of the ecological community.

Determining if your land has an area of the listed ecological community



Please note: for criteria relating to the understorey, apply this flowchart to the 0.1 hectare of your patch that contains the most native species in the ground layer.

[1] Patch – a patch is a continuous area containing the ecological community (areas of other ecological communities such as woodlands dominated by other species are not included in a patch). In determining patch size it is important to know what is, and is not, included within any individual patch. The patch is the larger of:
- an area that contains five or more trees in which no tree is greater than 75 m from another tree, or
- the area over which the understorey is predominantly native.

Patches must be assessed at a scale of 0.1 ha (1000m²) or greater.

[2] A predominantly native ground layer is one where at least 50 per cent of the perennial vegetation cover in the ground layer is made up of native species. The best time of the year to determine this is late autumn when the annual species have died back and have not yet started to regrow. (At other times of the year, you can determine whether something is perennial or not is if it is difficult to pull out of the soil. Annual species pull out very easily.)

[3] Mature trees are trees with a circumference of at least 125 cm at 130 cm above the ground.

[4] Natural regeneration of the dominant overstorey eucalypts when there are mature trees plus regenerating trees of at least 15 cm circumference at 130 cm above the ground.

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Appendix D

Summed Cover: at each of the 40 sites surveyed within this current investigation the cover of each of three dominant species from each strata were given an individual cover score. These have been summed over the 40 sites and ranked to assess the most dominant species within the site. The sum of rank has been calculated based on the 40 new sites from this investigation and the 13 sites from Hawes (2014). Within both survey programs the dominant three species from each strata could be ranked with the most dominant at a site being given a score of 3 and the least dominant a score of 1; these have been summed across the 53 sites to assess the most common and dominant species within the study area.

Species	Summed Cover	Species	Sum of rank
Olearia viscidula	420	*Olearia viscidula*	103
Eucalyptus laevopinea	403	*Eucalyptus laevopinea*	74
Poa sieberiana	298	*Poa sieberiana*	62
Eucalyptus bridgesiana	292	*Olearia elliptica*	58
Microlaena stipoides	246	*Eucalyptus bridgesiana*	51
Olearia elliptica	195	*Microlaena stipoides*	48
Eucalyptus melliodora	192	*Angophora floribunda*	42
Pultenaea cuneata	177	*Eucalyptus melliodora*	41
Aristida personata	170	*Pultenaea cuneata*	39
Eucalyptus andrewsii	153	*Dodonaea viscosa*	38
Dodonaea viscosa	151	*Eucalyptus andrewsii*	25
Eucalyptus prava	128	*Aristida personata*	24
Cymbopogon refractus	110	*Goodenia hederacea*	24
Eucalyptus viminalis	110	*Cymbopogon refractus*	22
Eucalyptus elliptica	105	*Aristida caput-medusae*	21
Eucalyptus albens	87	*Eucalyptus viminalis*	20
Aristida jerichoensis	82	*Aristida jerichoensis*	19
Eucalyptus blakelyi	79	*Eucalyptus elliptica*	18
Angophora floribunda	65	*Eucalyptus prava*	18
Eucalyptus macrorhyncha	65	*Eucalyptus blakelyi*	17
Goodenia hederacea	60	*Eucalyptus albens*	13
Poa labillardieri	60	*Eucalyptus macrorhyncha*	12
Themeda triandra	50	*Melichrus urceolatus*	11
Aristida caput-medusae	45	*Aristida vagans*	9
Hovea lanceolata	43	*Hydrocotyle laxiflora*	8
Brachyloma daphnoides	40	*Themeda triandra*	8
Pteridium esculentum	35	*Bursaria spinosa*	7
Rytidosperma pallidum	35	*Hovea lanceolata*	7
Dichondra repens	26	*Monotoca scoparia*	7
Melichrus urceolatus	26	*Pteridium esculentum*	7
Juncus usitatus	20	*Brachyloma daphnoides*	6
Dichelachne micrantha	17	*Pimelea neo-anglica*	6

Species	Summed Cover	Species	Sum of rank
Acaena novae-zelandiae	15	*Poa labillardieri*	6
Echinopogon caespitosus	15	*Rytidosperma pallidum*	6
Monotoca scoparia	15	*Acaena novae-zelandiae*	5
Pennisetum alopecuroides	15	*Austrostipa scabra*	4
Lepidosperma laterale	14	*Lepidosperma laterale*	4
Pimelea neo-anglica	14	*Dichelachne micrantha*	3
Imperata cylindrica	10	*Dichondra repens*	3
Lomandra multiflora	10	*Echinopogon caespitosus*	3
Rytidosperma erianthum	10	*Indigofera adesmiifolia*	3
Rytidosperma longifolium	10	*Lomandra multiflora*	3
Indigofera adesmiifolia	8	*Notelaea microcarpa*	3
Bursaria spinosa	7	*Rytidosperma racemosum*	3
Notelaea microcarpa	7	*Acacia rubida*	2
Acacia rubida	5	*Callitris endlicheri*	2
Callitris endlicheri	5	*Callitris glaucophylla*	2
Desmodium brachypodum	5	*Desmodium brachypodum*	2
Gompholobium huegelii	5	*Exocarpos cupressiformis*	2
Lissanthe strigosa	5	*Imperata cylindrica*	2
Xanthorrhoea johnsonii	5	*Juncus usitatus*	2
Callitris glaucophylla	4	*Leptospermum polygalifolium*	2
Pomax umbellata	3	*Lissanthe strigosa*	2
Cheilanthes sieberi	2	*Pennisetum alopecuroides*	2
Lomandra longifolia	2	*Rytidosperma longifolium*	2
Geranium solanderi	1	*Cassinia laevis*	1
Opercularia diphylla	1	*Cheilanthes sieberi*	1
Scutellaria humilis	1	*Geranium solanderi*	1
		Gompholobium huegelii	1
		Hibbertia obtusifolia	1
		Lomandra longifolia	1
		Opercularia diphylla	1
		Pomax umbellata	1
		Rytidosperma erianthum	1
		Scutellaria humilis	1
		Xanthorrhoea johnsonii	1

Appendix E

Typical example of each suggested Plant Community Type within the area surveyed during this investigation.

Fig 1. PCT572 Manna Gum – Apple – Silvertop Stringybark

Fig 2. PCT530 Bendemeer White Gum – Blackbutt – Orange Gum Shrubby Woodland.

Fig 3. PCT550 Orange gum – Silvertop Stringybark – Bendemeer White Gum Shrubby Woodland.

Fig 4. PCT563 Silvertop Stringybark – Apple Box – White Box Shrubby Woodland.

Fig 5: PCT599 Red Gum – Yellow Box – White Box Grassy Woodland.