# Eucalypts in the Greater Blue Mountains World Heritage Area (99 not out!)

prepared: August 2021

by Alan Page

This analysis could not have been completed without the generous advice and encouragement of Margaret Baker, Judy & Peter Smith, and Ian Brown.

#### 1. Preface

In 2000 the Greater Blue Mountains gained its <u>world heritage listing</u> due to its flora and fauna diversity, and for the number of eucalypts.

Note: "eucalypt" used in this document refers to the species of *Eucalyptus*, *Angophora* and *Corymbia* of the family Myrtaceae. And when counting the number of species, a species with two subspecies (such as *Eucalyptus mannifera*) counts as two species.

The 1998 Nomination (see 1.1a Sources) listed 90 eucalypt species.

In 2010 Tim Hager and Doug Benson produced a "definitive list" of 96 eucalypt species that have been recorded within the Greater Blue Mountains World Heritage Area (GBMWHA) (see 1.1b Sources).

In 2020, an Australian Government State Party Report (see 1.1c Sources), noted three additional species —

- ✓ Angophora subvelutina
- ✓ Eucalyptus dealbata
- ✓ Eucalyptus expressa

that brought the total of eucalypt species to 99. This is the foundation of this report - the definitive list.

The classification of flora species is by no means static, and species are continually being reclassified or are being found within the GBMWHA.

#### 1.1 Sources

The sources for this analysis are:

a) The 1998 Nomination. "Nomination of the Greater Blue Mountains Area for inscription on the World Heritage List by the Government of Australia 1998".

Prepared by the NSW National Parks and Wildlife Service in association with Environment Australia.

- b) The 2010 Paper. "The Eucalypts of the Greater Blue Mountains World Heritage Area: distribution, classification and habitats of the species of Eucalyptus, Angophora and Corymbia (family Myrtaceae) recorded in its eight conservation reserves."

  By Tim Hager and Doug Benson.
- c) <u>State Party Report</u>. "State Party Report on the state of conservation of the Greater Blue Mountains Area World Heritage property (Australia)"

Prepared by the Australian Government in December 2020 due to a request from the World Heritage Committee.

- d) PlantNet. The Royal Botanic Garden's NSW Flora Online.
- e) <u>Angophora subvelutina Paper</u>. "Angophora subvelutina (Myrtaceae) on atypical diatreme habitat at Glenbrook: an addition to the eucalypt list for the Greater Blue Mountains World Heritage Area"

Prepared by Judy Smith, Peter Smith and Doug Benson. (October 2018)

- f) Glen Gallic Mallee (Eucalyptus dealbata subsp. aperticola). "Glen Gallic Mallee (Eucalyptus dealbata subsp. aperticola, Myrtaceae), a new taxon from the sandstone escarpment of the Hunter Valley, New South Wales"

  Telopea paper by Stephen A.J. Bell and Dean Nicolle (September 2020)
- g) <u>Eucalyptus expressa</u>. "Eucalyptus expressa (Myrtaceae): a distinctive new stringybark from the sandstone ranges northwest of Sydney, New South Wales"

Telopea paper by Stephen A.J. Bell and Dean Nicolle (August 2012)

The analysis method used in preparing this document was to take the definitive list and marry it to a PlantNet extract of eucalypts in the eight GBMWHA reserves. It was also compared to the 1998 Nomination.

#### 1.2 The GBMWHA Reserves

The one million hectare GBMWHA is comprised of eight reserves, namely -

♦ Blue Mountains National Park (B)
♦ Thirlmere Lakes National Park (T)

♦ Gardens of Stone National Park (G)
♦ Wollemi National Park (W)

♦ Kanangra-Boyd National Park (K)
♦ Yengo National Park (Y)

♦ Nattai National Park (N)
♦ Jenolan Karst Conservation Reserve (J).

Note: The first letter of the reserve is used in the tables below.

A description of these reserves can be found on the <u>Blue Mountains Nature website</u>.

The area or definition of the GBMWHA reserves has not changed since it was inscribed in 2000. That is, all subsequent additions to the eight reserves (including inholdings) that have been gazetted by the NSW Government, are not part of the GBMWHA.

There's been 57 gazetted additions since 2000. A preliminary estimate of the total size of these additions is around 40,000 ha.

Another consideration is that the recording of the location of some plants has been obfuscated or generalised in an effort to avoid plant theft or tampering – especially of threatened species. And of course old records may lack the accuracy provided by modern technology.

So putting all these considerations together makes it difficult to deduce whether some recorded locations of plants are within a reserve **and** within the GBMWHA itself.

# 2. How many eucalypts are in the GBMWHA?

There are 99 confirmed species of eucalypt in the GBMWHA – The Definitive List.

There's a further 11 species that may be found within the GBMWHA and/or are awaiting formal description.

An update to the definitive list is shown in Section 3. Section 4 has the 11 possible additions.

#### 3. The Definitive List

#### 3.1 Summary

The list of species defined in the 2010 Paper plus the three State Party Report species have undergone some changes due to renaming and reclassifying.

The PlantNet database was used to provide common names, threatened species and the GBMWHA reserves in which they occur.

#### 3.2 Renamed/reclassified Species

The following species in the 2010 Paper or State Party Report have been renamed or reclassified.

- Angophora costata is now Angophora costata subsp. costata
- Angophora euryphylla is now Angophora costata subsp. euryphylla
- ◆ Eucalyptus dealbata is now Eucalyptus dealbata subsp. aperticola
- Eucalyptus moorei is now Eucalyptus moorei subsp. moorei
- Eucalyptus nublia is now Eucalyptus nubilis
- ◆ Eucalyptus praecox is now Eucalyptus lactea
- ◆ Eucalyptus sclerophylla is now Eucalyptus racemosa

# 3.3 Threatened Species

Six of the GBMWHA eucalypts are classified as threatened species in the NSW *Biodiversity Conservation Act* (BCA) and/or the Commonwealth's *Environment Protection and Biodiversity Conservation Act* (EPBC). These are –

Species	Common Name	NSW BCA	C'wealth EPBC
Eucalyptus aggregata	Black Gum	<u>vulnerable</u>	<u>vulnerable</u>
Eucalyptus benthamii	Camden White Gum	<u>vulnerable</u>	vulnerable
Eucalyptus cannonii	Capertee Stringybark	<u>vulnerable</u>	
Eucalyptus corticosa	Creswick Apple Box	<u>vulnerable</u>	
Eucalyptus fracta	Broken Back Ironbark	<u>vulnerable</u>	
Eucalyptus macarthurii	Camden Woollybutt	<u>endangered</u>	<u>endangered</u>

# 3.4 The Definitive List (updated)

The list below includes a link to the species' PlantNet entry. The reserve where the species has been recorded is taken from PlantNet; the first letter of the reserve's name is shown.

The Updated Definitive List (Table A)

Scientific Name	link	Common Name	В	G	K	Ν	Т		Υ	J
Angophora bakeri	link	Narrow-leaved Apple	В			N	Т	W	Υ	
Angophora costata subsp. costata	<u>link</u>	Sydney Red Gum	В		K	Ν		W	Υ	
Angophora costata subsp. euryphylla	link							W	Υ	
Angophora floribunda	<u>link</u>	Rough-barked Apple	В	G	K	Ν	Т	W	Υ	
Angophora hispida	<u>link</u>	Dwarf Apple, Banda (Cadigal)	В					W	Υ	
Angophora subvelutina	<u>link</u>	Broad-leaved Apple	В							
Corymbia eximia	<u>link</u>	Yellow Bloodwood	В			Ν	Т	W	Υ	
Corymbia gummifera	<u>link</u>	Red Bloodwood	В		K	Ν	Т	W	Υ	
Corymbia maculata	link	Spotted Gum						W	Υ	
Corymbia trachyphloia subsp. amphistomatica	<u>link</u>	White Bloodwood						W		
Eucalyptus agglomerata	<u>link</u>	Blue-leaved Stringybark	В		K	Ν	Т	W	Υ	
Eucalyptus aggregata	<u>link</u>	Black Gum	В							J
Eucalyptus aenea	<u>link</u>							W		
Eucalyptus albens	<u>link</u>	White Box	В	G		Ν		W		
Eucalyptus amplifolia subsp. amplifolia	<u>link</u>	Cabbage Gum	В			Ν		W	Υ	
Eucalyptus apiculata	<u>link</u>	Narrow-leaved Mallee Ash	В	G	K	Ν		W		
Eucalyptus baeuerlenii	<u>link</u>	Baeuerlen's Gum	В							
Eucalyptus baueriana	<u>link</u>	Blue Box	В					W	Υ	
Eucalyptus bensonii	<u>link</u>							W		
Eucalyptus benthamii	<u>link</u>	Camden White Gum	В			Ν				
Eucalyptus beyeriana	<u>link</u>	Beyer's Ironbark	В					W	Υ	
Eucalyptus bicostata	<u>link</u>	Southern Blue Gum, Eurabbie			K			W		J
Eucalyptus blakelyi	<u>link</u>	Blakely's Red Gum	В	G	K			W	Υ	
Eucalyptus blaxlandii	<u>link</u>	Blaxland's Stringybark	В	G	K	Ν		W		J
Eucalyptus bosistoana	link	Coast Grey Box	В		K	Ν				
Eucalyptus bridgesiana	<u>link</u>	Apple Box	В	G	K			W		
Eucalyptus burgessiana	<u>link</u>	Faulconbridge Mallee Ash	В		K	Ν		W		
Eucalyptus caleyi subsp. caleyi	<u>link</u>							W		

Eucalyptus camphora subsp. camphora	link	Broad-leaved Sally	В					W		
Eucalyptus cannonii	link	Capertee Stringybark		G				W		
Eucalyptus capitellata	link	Brown Stringybark							Υ	
Eucalyptus conica	link	Fuzzy Box						W		
Eucalyptus consideniana	link	Yertchuk	В	G		N		W	Υ	
Eucalyptus corticosa	link	Creswick Apple Box						W		
Eucalyptus crebra	link	Narrow-leaved Ironbark, muggago	В	G	K	N		W	Υ	
Eucalyptus cunninghamii	link	Cliff Mallee Ash	В			Ν				
Eucalyptus cypellocarpa	link	Monkey Gum	В	G	K	N		W		J
Eucalyptus dalrympleana subsp.	link	Mountain Gum	В	G	K			•••		J
dalrympleana		Garnam Garn		Ŭ	• •					Ŭ
Eucalyptus dawsonii	link	Slaty Gum				N		W		
Eucalyptus dealbata subsp. aperticola	link	Glen Gallic Mallee						W		
Eucalyptus deanei	link	Mountain Blue Gum	В		K	N	т	W	Υ	
• • • • • • • • • • • • • • • • • • • •	link	Giant Mallee Ash	В		- 1 \	.,	•	**	•	
Eucalyptus dendromorpha	link	Broad-leaved Peppermint	В	G	K			W		J
Eucalyptus dives	link	Dwyer's Red Gum		J	IX			W		J
Eucalyptus dwyeri	link	-	В		K	N		W	Υ	
Eucalyptus elata		• •	В	G	K	N		W	Y	J
Eucalyptus eugenioides	<u>link</u>	Thin-leaved Stringybark	Б	G	r	IN				J
Eucalyptus expressa	link	Wollemi Stringybark	Ь	0	V			W	Υ	
Eucalyptus fastigata	link	Brown Barrel	В	G	K			W	V	J
Eucalyptus fergusonii subsp.	<u>link</u>							W	Υ	
dorsiventralis	Dark.	Ded Issahad	_	_	17			144	\/	
Eucalyptus fibrosa	<u>link</u>	Red Ironbark	В	G	K	N		W	Y	
Eucalyptus fracta	link	Broken Back Ironbark	_	_			_	W	Υ	
Eucalyptus globoidea	<u>link</u>	White Stringybark	В	G		N	Т	W		
Eucalyptus hypostomatica	<u>link</u>		В			N			Υ	
Eucalyptus lactea	<u>link</u>	Brittle Gum		G				W		
Eucalyptus laevopinea	<u>link</u>	Silver-top Stringybark						W		
Eucalyptus laophila	<u>link</u>		В	G				W		
Eucalyptus ligustrina	<u>link</u>	Privet-leaved Stringybark	В	G		N				
Eucalyptus macarthurii	<u>link</u>	Camden Woollybutt			K					
Eucalyptus macrorhyncha	<u>link</u>	Red Stringybark	В	G				W		
Eucalyptus mannifera subsp. gullickii	<u>link</u>	Mountain Spotted Gum	В	G	K					
Eucalyptus mannifera subsp. mannifera	<u>link</u>	Brittle Gum	В	G				W		
Eucalyptus melliodora	<u>link</u>	Yellow Box	В	G	K	Ν		W		J
Eucalyptus michaeliana	<u>link</u>	Brittle Gum, Hillgrove Gum						W	Υ	
Eucalyptus moluccana	link	Grey Box, Terriyergro (D'harawal)	В	G		Ν		W	Υ	
Eucalyptus moorei subsp. moorei	<u>link</u>	Little Sally	В							
Eucalyptus muelleriana	<u>link</u>	Yellow Stringybark	В							
Eucalyptus multicaulis	link	Whipstick Ash	В	G				W		
Eucalyptus notabilis	<u>link</u>	Mountain Mahogany	В			Ν		W		
Eucalyptus nubilis	<u>link</u>	Blue-leaved Ironbark		G				W		
Eucalyptus obliqua	<u>link</u>	Messmate	В		K					
Eucalyptus oreades	link	Blue Mountains Ash	В	G	K	Ν		W		
Eucalyptus ovata	<u>link</u>	Swamp Gum	В							
Eucalyptus paniculata subsp.	link	Grey Ironbark	В					W	Υ	
paniculata	_									
Eucalyptus parramattensis subsp.	link	Parramatta Red Gum					Т	W	Υ	
parramattensis										
Eucalyptus pauciflora	link	White Sally, Snow Gum	В		K			W		J
Eucalyptus pilularis	link	Blackbutt	В		K				Υ	
Eucalyptus piperita	link	Sydney Peppermint	В	G	K	N	Т	W	Y	
Eucalyptus pilyanthemos subsp.	link	Red Box		G				W		
polyanthemos										
Eucalyptus prominula	link	Stringybark						W	Υ	
Eucalyptus prominula Eucalyptus punctata	link	Grey Gum	В	G	K	Ν	Т	W	Y	J
	link	White-topped Box	В	J	11	N	•		-	J
Eucalyptus quadrangulata	link	Narrow-leaved Scribbly Gum	В	G		N		W	V	
Eucalyptus raciota subsp. radiata	link	Narrow-leaved Scribbly Guill Narrow-leaved Peppermint	В	G	K	N		W		J
Eucalyptus radiata subsp. radiata		ranow-leaved reppetititit	ט		K			٧V		J
Eucalyptus ralla	link	Pad Mahagany	_		r\	N		W		
Eucalyptus resinifera subsp. resinifera	link	Red Mahogany	В	-		NI				
Eucalyptus rossii	<u>link</u>	Inland Scribbly Gum	В	G		N		W		

Eucalyptus rubida subsp. rubida	link	Candlebark			K			W		
,			_						` '	
Eucalyptus saligna	<u>link</u>	Sydney Blue Gum	В		K			W	Υ	
Eucalyptus scias subsp. scias	link	Large-fruited Red Mahogany						W		
Eucalyptus sideroxylon	link	Mugga Ironbark	В		K	Ν		W		
Eucalyptus sieberi	link	Silvertop Ash	В	G	K	Ν	Т	W		J
Eucalyptus smithii	<u>link</u>	Ironbark Peppermint	В		K	Ν				J
Eucalyptus sparsifolia	link	Narrow-leaved Stringybark	В	G	K	Ν	Т	W	Υ	J
Eucalyptus squamosa	link	Scaly Bark	В			Ν		W	Υ	
Eucalyptus stellulata	link	Black Sally	В		Κ					J
Eucalyptus stricta	link	Blue Mountains Mallee Ash	В	G	K			W		
Eucalyptus tenella	<u>link</u>	Stringybark	В	G	K			W		
Eucalyptus tereticornis	<u>link</u>	Forest Red Gum, Buringoa	В	G	K	Ν		W	Υ	
Eucalyptus viminalis	<u>link</u>	Ribbon Gum	В	G	K	Ν		W		J

#### 4. Possibles

#### 4.1 Summary

This set of eucalypt species are the ones that -

- have been recorded within the GBMWHA but need to be verified as a GBMWHA eucalypt
- are awaiting formal description
- ♦ have not yet been recorded within the GBMWHA, but are in very close proximity.

They're contenders to be included as GBMWHA eucalypts. In most cases they need a botanist to find and record them as being within the GBMWHA.

Possibles (Table B)

Scientific Name	link	Common Name	В	G	K	Ν	Т	W	Υ	J
Eucalyptus copulans	<u>link</u>									
Eucalyptus dealbata subsp. dealbata	<u>link</u>	Tumbledown Red Gum								
Eucalyptus goniocalyx	<u>link</u>	Long-leaved Box, Bundy	В	G	K			W		
Eucalyptus gregsoniana	<u>link</u>	Wolgan Snow Gum	В							
Eucalyptus luehmanniana	<u>link</u>	Yellow Top Mallee Ash								
Eucalyptus microcarpa	<u>link</u>	Western Grey Box						W		
Eucalyptus nobilis	<u>link</u>	Ribbon Gum								
Eucalyptus pulverulenta	<u>link</u>	Silver-leaved Mountain Gum								
Eucalyptus siderophloia	<u>link</u>	Grey Ironbark	В					W		
Eucalyptus sp. Howes Swamp Creek	<u>link</u>								Υ	
Eucalyptus umbra	<u>link</u>	Broad-leaved White Mahogany							Υ	

#### 4.2 Eucalyptus copulans

The NSW Threatened Species website describes it as follows -

"E. copulans is not considered to be a distinct species, but rather a hybrid between E. stellulata and E. moorei. E. copulans is intermediate in many characteristics between these two species."

It adds -

"No original trees remain extant. Three additional specimens have been planted in Council Reserve along Jamison Creek at Wentworth Falls in the Blue Mountains, NSW. These were propagated from the last extant tree. A larger population is thought to have occurred historically in the locality."

Both NSW and the Commonwealth class it as endangered.

*E. copulans* was not listed in the 1998 Nomination, but was included as a "Potential additional species" in the 2010 Paper. It noted –

"Not recorded in GBMWHA reserves. Highly localised at Wentworth Falls (but only recorded just outside the GBMWHA reserve boundary)."

Jamison Creek flows into the Blue Mountains National Park where it joins the Kedumba River which flows into Lake Burragorang.

#### 4.3 Eucalyptus dealbata subsp. dealbata

*Eucalyptus dealbata* was in the 1998 Nomination and 2020 State Party Report but not as a subspecies. It was not in the 2010 Paper.

In 2020, the new classification of the *aperticola* subspecies triggered the creation of *Eucalyptus dealbata* subsp. *dealbata*.

The 2020 paper, <u>Glen Gallic Mallee (*Eucalyptus dealbata* subsp. *aperticola*) resulted in *E. dealbata* having two subspecies - *aperticola* and *dealbata*.</u>

With only *E. dealbata* subsp. *aperticola* being recorded in the GBMWHA. *E. dealbata* subsp. *dealbata* is close to the Wollemi and Gardens of Stone National Parks' boundaries near Glen Davis.

# 4.4 Eucalyptus goniocalyx

Eucalyptus goniocalyx was in the 1998 Nomination, but not in the 2010 Paper.

PlantNet shows occurrences in the Blue Mountains, Wollemi, Kanangra-Boyd and Gardens of Stone NPs including -

- In 1984 "Jenolan gorge on Moorara Boss 9 km E Jenolan Caves".
- In 1988 "Bindook central Tablelands".
- In 1995 "10.8 km from Capertee towards Glen Davis, on a southerly ridge top in the Garden of Stone National Park".

The <u>Australian Plant Name Index (APNI) entry</u> for *E. goniocalyx* has references to *E. cypellocarpa*; and <u>viceversa</u>. *E. cypellocarpa* is in the Definitive List. PlantNet has *E. goniocalyx* as a 15m high tree, and *E. cypellocarpa* as 50m (sometimes 65 m) high.

#### 4.5 Eucalyptus gregsoniana

A 1952 PlantNet entry reads "Collector: EJ Gregson – "Little Flat S of Mt Wilson". This would place it in the Blue Mountains National Park – which wasn't gazetted until 1959.

The Australian Plant Name Index (APNI) reads -

"This species is named in honour of the late Edward J. Gregson, of Mt Wilson, whose keen and accurate observations on eucalypts, especially of the Blue Mountains area, were of great value during the 1950's."

A 1954 PlantNet entry reads -

"Blackheath (near Baptist Church). Destroyed by road workers July, 1954."

There are entries in 2011 and 2015 that record findings on Newnes Plateau.

*E. gregsoniana* was not listed in the 1998 Nomination, but was included as a "Potential additional species" in the 2010 Paper. It noted –

"Not recorded in GBMWHA reserves. Sporadic and scattered, in mallee heath on sandy soils of limited drainage in elevated areas; Wadbilliga to Newnes Plateau (on margin of GBMWHA)."

#### 4.6 Eucalyptus luehmanniana

E. luehmanniana has not been mentioned in the various documents and papers as possibly being in the GBMWHA. PlantNet describes it as "confined to coastal plateau between the Hawkesbury River and Bulli."

However PlantNet also contains two old records of it being in the Blue Mountains - 1896 at Mt. Wilson and 1905 at Lawson. The former by J.H. Maiden; the latter by R.T. Baker – both noted botanists.

### 4.7 Eucalyptus microcarpa

E. microcarpa was listed in the 1998 Nomination, but not in the 2010 Paper.

PlantNet reads -

"Widespread and locally abundant, in grassy woodland on loamy soils of moderate fertility; west from Mudgee district."

However, two 1965 records in PlantNet place it in the Capertee Valley near Glen Davis.

#### 4.8 Eucalyptus nobilis

*E. nobilis* was not listed in the 1998 Nomination, but was included as a "Potential additional species" in the 2010 Paper. It noted –

"Reported near Mount Coricudgy (Stephen Bell pers. com. 2010). Still to be confirmed."

Although PlantNet reads -

"Locally abundant, in tall grassy or wet forest on fertile loamy soils, eastern falls of tablelands; north from Barrington Tops."

It has several recorded findings near Nullo Mountain which is surrounded by the Wollemi National Park.

#### 4.9 Eucalyptus pulverulenta

E. pulverulenta has not been mentioned in the various documents and papers as possibly being in the GBMWHA. PlantNet describes it as "Rare and scattered, in small stands almost in the understorey of grassy woodland on relatively poor soil; from Bathurst to Bombala."

Both NSW and the Commonwealth class it as vulnerable.

PlantNet has several records of it along the upper Coxs River – but being a vulnerable species, "*locality and coordinates are withheld*". The lower Coxs River flows through the Blue Mountains National Park into Lake Burragorang

#### 4.10 Eucalyptus siderophloia

*Eucalyptus siderophloia* was in the 1998 Nomination, but not in the 2010 Paper as it was, at that time, not recorded within the GBMWHA.

However, a 2015 PlantNet recording has it as being in the Blue Mountains National Park – "Woods Creek, near Grose River."

#### 4.11 Eucalyptus sp. Howes Swamp Creek

The NSW Threatened Species website describes it as follows -

"The taxonomic status of Eucalyptus sp. Howes Swamp Creek is uncertain and it has yet to be described as a species." And it "occurs within a small area of alluvium on Howes Swamp Creek ... within Wollemi National Park."

Both NSW and the Commonwealth class it as endangered.

The 2010 Paper notes "Awaiting formal description before inclusion in the GBMWHA list."

# 4.12 Eucalyptus umbra

E. umbra was listed in the 1998 Nomination, but not in the 2010 Paper.

A 1962 PlantNet finding reads -

"1.5 miles [2.4 km] N of Bucketty (Kulaura - Wollombi road)."

("Kulaura" is probably "Kulnura".)

The Great Northern Road around Bucketty marks the eastern boundary of the Yengo NP.