

Comments on Bill Gammage's *The biggest estate on earth*

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The hypothesis that Bill Gammage presents in *The biggest estate on earth*¹ is that the Australia encountered by the first Europeans when they invaded the continent beginning in 1788 was not as nature made it but as the Aboriginal people had fashioned it over millennia, mainly through their skilful and purposeful use of fire, which for convenience he calls '1788 fire'.

While he presents well-researched and useful statements and pictures by the early European arrivals, Gammage pushes his hypothesis too far, exaggerating his claims, making errors of fact and relying on selective references. These short-comings are examined with reference to Western Australia.

Exaggeration

Gammage exaggerates his claims about the frequency and extent of 1788 fire beyond what the evidence supports. For example, he says that "sooner or later [the Aboriginal people] burnt everywhere" (page 162), that "Most of Australia was burnt about every 1-5 years depending on local conditions and purposes" (page 168) and that "Some places were managed more closely than others, but none were beyond the pale" (page 321). This cannot be true. For example, there are (or were) extensive peatlands in WA's south-west, with organic matter accumulated over thousands of years. These peatlands could not have developed and remained there if the areas had been burnt as frequently as Gammage claims.

Gammage says that control fires (i.e., prescribed burns) "remain too few" (page 321) but presents no evidence to support his claim. Recent research shows that in fire-prone ecosystems characterised by a projected warming and drying climate, and increasing fire hazard, adaptive approaches to fire management may need to include lengthened intervals for prescribed fire to best support the *in situ* persistence of perennial plant species and plant biodiversity.²

There has been a big decline in fauna species in south-west WA. It is reasonable to assume that frequent extensive burning since the WA Forests Department began its controlled burning program in 1952 has contributed to this decline by injuring and killing fauna and destroying habitat, leaving susceptible fauna exposed to predation by foxes and cats. There are five species of birds and six species of mammals found in WA's three south-west forest regions now on the State's endangered species list, many of which require long unburnt habitat or long intervals between fires for survival. Increased frequency and extent of burning could drive them closer to extinction. WA's Environment Minister has admitted there is no methodology for reliably estimating the number of dead or injured fauna following bushfires or prescribed burns.³

Errors of fact

There are errors of fact in the book. For example, Gammage says that karri was burnt "about every five years in late summer" (page 165). Prior to European occupation, there used to be 230,000 ha of karri forest.⁴ There is no way the Noongar people would or could have burnt the whole karri forest every five years. Unlogged karri forest has a closed canopy and is (or was until WA's rainfall dropped by 20 per cent and logging opened up the canopy) so moist that it is difficult to burn even using all modern technologies and tactics to start a fire. Furthermore, young karri trees (up to 25 years of age) are killed by fire.⁵ If the Noongar people had burnt the karri forest "about every five years", it is

¹ Gammage, Bill (2011) *The biggest estate on earth*. Allen & Unwin, NSW, Australia.

² Enright, N.J., Fontaine, J.B., Lamont, B.B., Miller, B.P. & Westcott, V.C. (2014) Resistance and resilience to changing climate and fire regime depend on plant functional traits. *Journal of Ecology*, **102**, 572-1581

³ Western Australia, Legislative Council Question On Notice No. 3015 of 2010.

⁴ Conservation Commission of Western Australia (2013). Forest Management Plan 2014-2023.

⁵ Conservation Commission of Western Australia (2008) Forest Management Plan 2004-2013 Mid-term audit of performance report, p. 176.

unlikely WA would have had the karri forest found by the first Europeans as there would have been little or no recruitment when veteran trees died and fell over.

Sylvia Hallam says that the Noongar people did not burn the karri forest (see Attachment) and it is well recognised that long-unburnt and unlogged karri forest has a low 'fuel load'.⁶ A hypothesis the opposite of Gammage's is that the karri forest found by the first Europeans was open and easily traversed not because the Noongar people burnt it frequently but because they didn't burn it at all.

Gammage says that grass trees need fire to flower (page 243). This is not true of one Western Australian grass tree species, the balga (*Xanthorrhoea preissii*).⁷ It is a very long time since the balga on the Nedlands golf course were burnt and they flower, if only rarely. Fire promotes massive simultaneous flowering of balga but it is not essential for flowering.

"Burn rings on Grass Tree trunks" do not "indicate many more fires before 1788 than after" (page 96). The David Ward hypothesis, that the burn rings show that the Noongar people burnt the jarrah forest every three to four years and the tuart forest every two to four years (the 'believing the balga' hypothesis), was demolished by four reputable scientists whose paper, "Anomalies in grasstree fire history reconstruction for south-western Australian vegetation,"⁸ was published in *Austral Ecology* in 2007 and was available to Gammage. Peer reviewed research has found that burning in Australia increased, not decreased, after European occupation.⁹

The categorical statement that "Gliders and possums like frequent fire" (page 168) is incorrect. Western ringtail possums (*Pseudocheirus occidentalis*) do not like frequent fire. Research by WA scientists shows that they require stands unburnt for about 20 years and that current fire management in south-west WA of one fuel reduction burn per decade ensures that most remnants of native vegetation will sooner or later become completely unsuitable for the retention of resident populations of this endangered species.

Selective references

Gammage is selective in his choice and use of references. For example, he quotes Sylvia Hallam's *Fire and hearth* in support of 1788 fire (for example, pages 65, 173) but ignores her statements about the absence of 1788 fire in the karri forest (see Attachment).

In the bibliography there are listed seven papers by David Ward, most of which explicitly promote his 'believing the balga' hypothesis. There is only one paper listed on research that challenges Ward's hypothesis¹⁰ and no reference to the Miller *et al.* paper, "Error in the inference of fire history from grasstrees," published in 2007.⁶ Since Gammage wrote his book, the same four scientists have published a paper, "Grasstree stem analysis reveals insufficient data for inference of fire history,"¹¹ which completely demolishes Ward's hypothesis.

⁶ "Very long-unburnt stands in the karri forest, for example, eventually become quite open, with grass or dense bracken and only an occasional specimen of the taller, longer-lived acacias or hakeas as remnants of the original scrub layers." Underwood, R.J. and Christensen, P.E.S. (1981). *Forest fire management in Western Australia*. Forests Department of Western Australia, Government Printing Office, Perth.

⁷ A Queensland species of *Xanthorrhoea* also flowers without fire. See McKillup, S.C. & McKillup, R.B. (2013) Fire does not stimulate flowering of the grasstree, *Xanthorrhoea latifolia* subsp. *latifolia* in central Queensland. *Australian Journal of Botany*, **61**, 558-565.

⁸ Miller, B.P., Walshe, T., Enright, N.J. & Lamont, B.B. (2007) Error in the inference of fire history from grasstrees. *Austral Ecology*, **32**, 908-916.

⁹ Mooney, S.D. *et al.* (2011) Late Quaternary fire regimes of Australasia, *Quaternary Science Reviews*, **30**, Issues 1-2, 28-46.

¹⁰ Enright, N.J. *et al.* (2005) Anomalies in grasstree fire history reconstruction for south-western Australian vegetation. *Austral Ecology*, **30**, 668-673.

¹¹ Miller, B.P., Walshe, T., Enright, N.J. & Lamont, B.B. (2012) Grasstree stem analysis reveals insufficient data for inference of fire history. *Journal of the Royal Society of Western Australia*, **95**, Part 2, 95-102.

Conclusion

The biggest estate on earth contains useful research but is unhelpful in the debate about appropriate fire management in Western Australia. Unfortunately, it is being used to promote increased use of prescribed fire when in the face of a hotter, drier climate in WA we should be burning less, not more.

Attachment

Hallam, S.J. (1979) *Fire and hearth*. Advocate Press Pty Ltd, Melbourne.

“The country along the south coast, from Augusta to King George Sound, is still very difficult for Europeans to master – a wide coastal strip of sand hills and swamps, with steep granite hills and great karri forests behind. One of the few early accounts (Anon. 1833b) comes from a party who in 1831 beached their whale-boat near present Northcliffe and, being unable to launch it again in heavy surf, walked to Augusta and from there to the Murray. The coast was well inhabited. On Nornalup Inlet they met Aborigines who ‘conducted us to their wells’ (*ibid*: 115). Near the Gardner River they ‘heard the natives and saw their fires about a mile up the river’ (*ibid*: 116). Even on the south coast it was the absence of firing which was remarkable. On April 21, with the boat beached north-west of Point d’Entrecasteaux:

... I and Mitchell ascended the first range of Sand Hills . . . the country in the immediate neighbourhood *not having been recently burnt*, I could not get beyond the second range though we were walking upwards of three hours (*ibid*: 118) [Author’s emphasis - SJH]

“It is unlikely that the whole of the jarrah, and above all the karri, forests were burnt through frequently and consistently in the far south, as were the western and eastern margins of the south-west triangle of forest near the more densely inhabited coastal plain on the one hand and the more open mallee and sandheath coastal plain of the drier interior on the other (Gardner 1959).” Pages 25- 26

“Farther south the forest triangle was wider east to west, penetrated less by early European settlers and probably also by Aborigines.” Page 26

“The farther south, the damper and denser the forest.... The karri forests behind the south coast were even thicker and less frequented. Bannister in 1831 passed through first jarrah and then karri on an ill-calculated route from the Swan to [King George] Sound.” Page 27

“They met no people.... If the karri forests were burnt at all they were burnt only patchily, for example, on their western margin, near the Blackwood River, but rarely in the inaccessible interior. Aborigines used these forests only where they could move easily between forest and coast or forest and grass or heath.” Page 27

“The karri forest of the wetter south coast had been less exposed and liable to fire, though not unaffected on its coastal margin.” Page 55

“... some areas, for instance the heavily wooded heart of the forest triangle in the South-west, and particularly the karri areas in the far south, never supported a high biomass, nor really intensive human activity and population.” Page 107