3 PRESCRIBED BURNING REDUCES BIODIVERSITY

FACTS ABOUT PRESCRIBED BURNING AND WILDFIRE IN SOUTH-WEST FORESTS

Inappropriate fire regimes pose a high risk to Australian mammal species.

Endemic Australian land mammal fauna has suffered an extraordinary rate of extinction (>10% of the 273 species) since European settlement, compared with only one extinction in continental North America since European settlement[1]. A further 21% of Australian endemic land mammal species are now assessed to be threatened, indicating that the rate of loss of 1–2 extinctions per decade is likely to continue. The 29 Australian endemic mammal extinctions comprise 35% of the world's modern mammal extinctions. Some 1.5% of the world's 5500 mammal species are extinct, a proportion substantially less than Australia's 10%. Woinarski et al.[1] quantified threat factors to mammal species. After feral cats, **inappropriate fire regimes are the second greatest threat factor**, followed by foxes.

Inappropriate fire regimes are threatening animal and plant species.

In Western Australia's Forest Management Area, where prescribed burning by the Department of Biodiversity, Conservation and Attractions (DBCA) and its predecessors has been extensive since 1952, there are now 42 threatened animal species and 129 threatened plant species. Threatened animal and plant species have increased by 24 and 51 respectively, since the end of last century[2,3]. That is, on average, one additional animal species and two additional plant species have been added to the threatened species lists each year.

	Status 1999					Status 2019					Status 2024					
	V	E	CE	EX	Total*	V	E	CE	EX	Total*	V	E	CD	CE	EX	Total*
Flora	**25**	**28**	**25**	**(1)**	**78**	**31**	**41**	**41**	**(1)**	**113**	**34**	**50**		**45**	**(6)**	**129**
Frogs	2	1			3	2		1		3	2			1		3
Birds**	4	1			5	2	5			7	2	5	1	1		9
Fish					0	2	4			6	2	4				6
Invertebrates	1	2	1		4	2	5	4		11	3	7		4		14
Mammals	5			(3)	5	2	2	2	(3)	6	2	2	2	2	(3)	8
Reptiles			1		1			1		1	1			1		2
Total fauna	**12**	**4**	**2**	**(3)**	**18**	**10**	**16**	**8**	**(3)**	**34**	**12**	**18**	**3**	**9**	**(3)**	**42**

V = vulnerable; E = endangered; CD = conservation (habitat) dependent; CE = critically endangered; EX = extinct.
* Total threatened species doesn't include extinct species . ** Nonmigratory birds

Why is biodiversity important?

Biodiversity provides many basic human needs: food, shelter and medicine, and crucial services: pollination, seed dispersal, climate regulation, water purification, nutrient cycling and control of agricultural pests [1].

Biodiversity losses increase the likelihood of disease spread from animals to humans (zoonotic diseases), and therefore could worsen epidemics that harm humans and wildlife[4]. Zoonotic diseases include: COVID-19, Lyme disease, Ebola virus, influenza, HIV, the plague, Salmonella and rabies[5].

South-western Australia is a biodiversity hotspot. This means that it has a high level of biodiversity **that is highly threatened**.

Prescribed burning kills all components of biodiversity: mammals, birds, reptiles, frogs, insects, fungi and plants, including critical habitat trees. DBCA does not admit to this death toll, yet species are being added to, not removed from the lists of vulnerable, endangered and critically endangered plants and animals. The pretence that everything is all right is a clear indication that DBCA has lost its way.

The current prescribed burning regime is not protecting biodiversity.

The primary objectives of fire management for conserving biodiversity are[9]:

"Protection of fire-sensitive and fire-dependent ecosystems and niches, including riparian zones, aquatic ecosystems, and peat wetlands." Yet

- rivers are often used to control prescribed burn extent;
- many peat wetlands have been burnt;
- granite outcrops are burnt;
- DBCA burns tingle and karri forests, areas that were not burnt by Indigenous peoples.

Prescribed burning in peat swamps results in the loss of peat beds accumulated over a period of around 5000 years.

Source: Bradshaw et al. (2018)[6] Figure 3.

Changed burning regimes in south-west forests are pushing species and ecosystems to extinction.

Prescribed burning is carried out in either spring or autumn with a return interval of around 5–7 years in jarrah forest and 8–11 years in karri forest, compared with a pre-European, wildfire burn frequency of 81 years in jarrah and much longer in karri forest (Bradshaw et al.[6]), with wildfires generally occurring in summer. This frequent burning with a different seasonal pattern from naturally-occurring fire is affecting plant and animal species and ecological communities, as many species need many years to re-colonise burnt areas or to mature to an age at which they can reproduce. Two-thirds of south-west prescribed burns are carried out in spring. Spring burning destroys many flowering plants before they produce seed, kills nesting birds and can leave smouldering logs that may re-ignite and start wildfires throughout the summer. The table below lists recovery times for some fauna species after burning (Bradshaw[7]).

There are now 8 threatened mammals in south-west forests, including the Woylie and the Western Ringtail Possum, which are critically endangered, and the Red-Tailed and South-Western Brush-Tailed phascogales, which are conservation-dependent.

Minimum time for recovery after fire for some fauna species:

Species	Recovery time (years)	Status
Western Ringtail Possum	> 11	CE
Tammar Wallaby	25–30	
Woylie	25–30	CE
Honey Possum[8]	26	
Quokka	30–40	V
Numbat	25–30	E
Splendid Fairy-Wren	> 12	
Red-winged Fairy-Wren	> 12	
Mallee Fowl	20– >55	V

V = vulnerable; E = endangered; CE = critically endangered

Western Australia's faunal emblem, the Numbat, is endangered and needs habitat that is fire-free for more than 25–30 years to thrive.
Source: Humane Society International Australia.

Changed burning regimes in south-west forests are pushing species and ecosystems to extinction.

South-west forest flora and fungi have survived and evolved for millions of years with wildfires started only by lightning. Although it was previously thought that fire was required for many south-west native plants to propagate, whether there are any plant species that fail to reproduce in the absence of fire is not known with any certainty[6]. There is no scientific evidence that plants are genetically adapted to fire.

Prescribed burns at the frequency with which they are carried out in south-west forests are pushing plant species to extinction. Unnatural fire regimes threaten ecological communities such as:

- *Banksia* woodlands[12]
- *Empodisma* peat swamp[13]
- red, yellow and Rate's tingle forest[13]
- jarrah (*Eucalyptus marginata*) and other forests, in which prescribed burning on a 5–7 year rotation is likely to permanently simplify the litter flora and invertebrate fauna, with far-reaching effects on forest health and hygiene[6]

and individual plant species, for example:

- young karri trees (*Eucalyptus diversicolor*), which are fire-sensitive for up to 25 years[6]
- *Corymbia ficifolia* (red flowering gum), which needs 25 years without fire to survive. Current frequency and intensity of fire are preventing the successful recruitment of new juvenile trees to replace those killed[13].

'Fire regimes that cause declines in biodiversity' have been identified as a key threatening process[12] under the *Environment Protection and Biodiversity Conservation Act 1999*. Prescribed burning, through changes to fire spatial pattern, increased plant disease spread and changed ecosystem characteristics (e.g. habitat and predator interactions), has been identified as affecting *Banksia* woodlands (E), the Western Ground Parrot (CE), White-Cheeked Honey Eater (not listed) and the Woylie (CE)[12].

Prescribed burning of banksia woodland in southwestern Western Australia. Source: Bradshaw et al. (2018)[6] Figure 3.

Tingle tree destroyed by frequent burning

Source: South-West Forests Defence Foundation Inc.

The current prescribed burning regime in south-west forests leaves few areas unburnt for more than 15 years.

DBCA claims it includes fire regimes that provide habitat diversity[9]. This is clearly not true as its aim is to have very little area with time-since-burn of more than 15 years (mustard colour in graph below). In 2004 and 2013 there was very little in the Central Jarrah Landscape Conservation Unit (LCU) with time-since-fire of more than 18 years. The lack of long unburnt forest impacts animals that have long recovery times after fire, including the threatened Western Ringtail Possum, Woylie, Quokka, Numbat and Mallee Fowl. **Negligible long unburnt forest habitat (>30 years since burn) is maintained.**

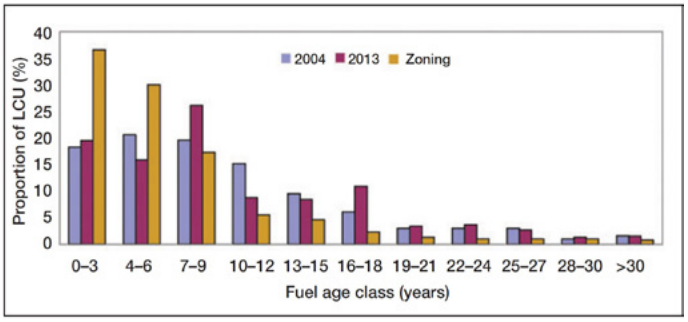


Figure 6 from Burrows & McCaw[10]. Fuel age class distribution in 2004 and 2013 and the theoretical distribution under a zoning fire-management strategy for the Central Jarrah Landscape Conservation Unit. See next page for zoning.

Burnt Empodisma peat swamp
Source: South-West Forests Defence Foundation Inc.

The current prescribed burning regime is not protecting built infrastructure and people.

The *Position Statement: Prescribed burning on vested lands*[9] states:

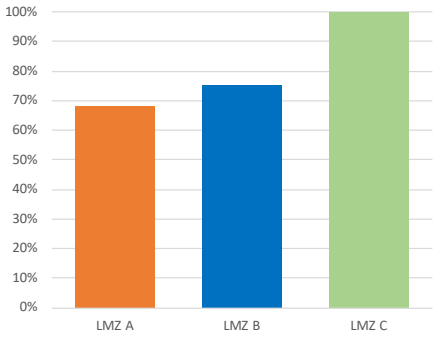
Effective and sustainable fire management practices should consist of:

• protection of life, property and community assets.

DBCA has annual prescribed burn targets for three land management zones (LMZ A–C) defined by distance from infrastructure, and an overall target of 200 000 ha:

	Distance	Target area (ha)
LMZ A	Within 3.5 km	20 000
LMZ B	3.5 to 11 km	70 000
LMZ C	Greater than 11 km	110 000

Over the past 8 years the areas burnt in LMZ A and LMZ B, close to infrastructure, have been under target, while in LMZ C, remote from infrastructure, the target was achieved or exceeded.



Area burnt as a percentage of the target area in the different zones for the 8 years 2015/16 to 2022/23 inclusive from DBCA annual reports.

DBCA's prescribed burns do not achieve the targets close to infrastructure, where they would be most likely to protect people's lives and community assets, but do so remote from settlements, where large areas can be burnt with less effort, cost and risk.

The biodiversity of south-west forests is being severely impacted by this approach.

In prescribed burns DBCA is allowed to harm or kill any number of threatened plants and animals.

Under Section 40 of the state's *Biodiversity Conservation Act 2016*, the Environment Minister may authorise taking (killing) or disturbance of threatened species. For example, authorisation number TFA 2324-0111 authorises DBCA to take or disturb any number of individual animals of 21 threatened species, including the critically-endangered Woylie and Western Ringtail Possum, during prescribed burning in the Frankland District in 2023–24. DBCA obtains similar authorisation for other prescribed burns.

A burnt critically-endangered Western Ringtail Possum photographed by Allison Dixon after a prescribed burn at Warrungup Spring in 2018. **The prescribed burn killed 17 of the 22 individuals being monitored**[11]. Source: Allison Dixon.

The federal *Environment Protection and Biodiversity Conservation Act 1999* (*EPBC Act*) provides environmental protection Australia-wide. Exempt activities include continued lawful land uses that were occurring before July 2000 that have continued in the same location without enlargement, expansion or intensification. DBCA's prescribed burning program is more intensive that previously, with aerial ignition being the norm and fires left to burn at an intensity dictated by the weather conditions, not by control at ground level. The *EPBC Act* is not being applied to protect the south-west's precious biodiversity. This coupled with the state situation under which DBCA's Minister endorses DBCA to undertake prescribed burns (effectively DBCA endorsing itself) means that there is a lack of scrutiny at both levels of government of this harmful practice. This is despite:

- the drier and warmer climate, which is changing fire regimes and forest ecology;
- the increasing number of flora and fauna species being added to the threatened species lists. In the Forest Management Area, 24 fauna species and 51 flora species have been added since the end of last century.

There is no formal consultation process in either the design of the burn program, or the planning of individual burns. There is no independent assessment of burns. The Conservation and Parks Commission has a legal duty to assess DBCA's implementation of management plans. It has not assessed a DBCA prescribed burn since 2006. With a single agency responsible for planning the burns, doing the burns and subsequently judging their success, there is a serious failure of oversight.

Threatened mammals in south-west forests:

Bettongia penicillata ogilbyi	Woylie, Brush-Tailed Bettong	CE
Dasyurus geoffroii	Chuditch	V
Myrmecobius fasciatus	Numbat	E
Petrogale lateralis lateralis	Black-Flanked/-Footed Rock-Wallaby	E
Phascogale calura	Red-Tailed Phascogale	CD
Phascogale tapoatafa	South-Western Brush-Tailed Phascogale	CD
Pseudocheirus occidentalis	Western Ringtail Possum	CE
Setonix brachyurus	Quokka	V

In addition to the mammals listed, there have been 3 extinctions: *Bettongia lesueur graii* (Burrowing Bettong; in 1940s), *Perameles myosuros* (Marl; in 1910s) and *Potorous platyops* (Broad-Faced Potoroo; in 1870s).

V = vulnerable; E = endangered; CD = conservation (habitat) dependent; CE = critically endangered; EX = extinct.

Live Quokka on Rottnest Island.
Source: South-West Forests Defence Foundation Inc.

Dead Quokka found after the 2018 DBCA escaped prescribed burn at Poison Hill in Nuyts block, D'Entrecasteaux National Park[13].

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