



A farmer and volunteer firefighter's personal perspective on fire management practices in south-west Western Australian forests

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I am a 67-year-old farmer, volunteer fire fighter and environmental activist. I have lived and farmed on my families properties adjoining the tingle forest of south-west Western Australia (WA) for over 50 years. In this paper I argue that current prescribed burning regimes in south-west WA are counter productive in terms of managing wildfire risk and are damaging to the health and diversity of its forests.

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DATE RECEIVED:

March 27, 2017

KEYWORDS:

Fire management, fire ecology, Tingle forest, south west Western Australia, prescribed burning

INTRODUCTION

I was seven years old when my family arrived in Tingledale, south-west Western Australia. It was 1960 and the forests behind our dairy farm were my backyard and playground, with the Frankland River less than a kilometre from our boundary. These forests were established as the Walpole-Nornalup National Park in the 1920's as they were seen as being very unique on a global scale. In between milking cows and feeding pigs, I can recall running barefoot at full speed through the open understorey Tingle forest, which had a broad leaf rush or leaf litter floor, down to the river to catch marron (*Cherax cainii*) during my times off. Fig. 1 shows an example of such open understorey forest, dominated by Red Tingle and Yellow Tingle (*Eucalyptus jacksonii* and *Eucalyptus guilfoylei*).

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Figure 1: Long unburnt Tingle forest, 80 years without fire in Walpole-Nornalup National Park WA with open understory stem density of 150 stems/ha (Photo: Tony Pedro, 2011).

It was in these forests in the mid to late 1960's that I witnessed the lighting of the first major prescribed burn in this forest type, and the subsequent effects that the fire had on the forest ecology. This forest hadn't been burned since 1937, so 30 odd years had passed without a fire. Initially the Forest Department, predecessor of The Department of Parks and Wildlife (DPAW) couldn't burn it, it failed to ignite, so they came back in the middle of summer (February) and lit it up then. It turned into a wildfire. I vividly remember numerous ancient and previously healthy tingles, some a thousand years old,

catching fire at their base and eventually over the next day or two come crashing to the ground, shaking our house, due to the devastating effects of this single fire event. They have broad buttresses and when the leaf litter caught alight the fire created hollows which developed the fires within the trees, see Fig. 2 What was a beautiful forest was now this burned-out wreck, it was devastating.

Due to this prescribed burn, within five years the previous open understorey forest dominated by large Tingle and Karri trees (approx. 150 understorey stems per hectare) had been turned into an impenetrable Wattle and Hazel thicket with some 100,000 – 150,000 stems per hectare. Within 10 years, the understorey had grown to four to five metres in height, it was still impenetrable and so I stopped going to the river. Fig , 3 shows the development of thick understorey 12 years after a prescribed burn.

I then started to take keen interest in fire and its effect on different vegetation types and noticed that the same phenomenon was happening with other vegetation types such as Jarrah (*Eucalyptus marginata*) forests or coastal heathland, namely, that long unburned country had an open understorey and burned country developed an impenetrable thicket.

This Tingle forest next to my property years later began to recover with the understorey opening up once again, resembling the open understorey character which I recall from my youth. It is a major concern of mine that the government's policy of prescribed burning of all Australian forests will continue this cycle of destruction followed by the generation of unnaturally high fuel loads due to the mass germination of understorey species after a prescribed burn.



Figure 2: Prescribed burn in the Valley of the Giants in 1999 showing serious structural damage to the base of Tingles still underway 3 - 4 hours after the understorey has been aerial burned often resulting in the collapse or severe damage of up to 60% of mature Tingles (up to 1000 years old) (Photo: Tony Pedro, 1999).

PRESCRIBED BURNING POLICY, FUEL LOADS AND FOREST HEALTH

I believe that the type of fire management being practiced in south-west WA forests does not reduce wildfire risk and is harmful to forest health and biodiversity. Mass germination of understorey species in forests after prescribed burns causes high fuel load (Fig. 3). This is very different to what I believe is the natural state of the forests. In my experience, if left unburned, understorey species occur sparsely throughout the forest (Fig. 1), thereby maintaining a sustainable seed bank in the soil without the need for fire.



Figure 3: Valley of the Giants - 12 years after, the 1999 prescribed burn has created a stem density of 150,000 stems/ha. The forest now has a tall, dense understory capable of throwing fire to the mature tree canopy, thereby turning an open parkland forest with declining fuels into a serious fire hazard (Photo: Tony Pedro, 2011).

I believe that these delicate ecosystems, the only forests of their type in the world, cannot continue to cope with the fire regimes imposed on them by Australian government authorities DPAW and the Department of Fire and Emergency Services (DFES). I believe that the current policy of burning to 'mineral earth' is highly damaging to the forest and ecosystems. Subsoil components are altered which benefit fungi species such as dieback (*Phytophthora cinnamomi*). The soil temperatures rise in a post prescribed burn area in the summer to about 25°C, whereas in a long-unburned forest with an insulated litter floor, the temperature will be around 15°C. The dieback fungi are promoted by the higher soil temperatures. So, the regular burning is setting up an environment that suits dieback.

I have suggested to DPAW that they should leave these forests of long unburned declining fuels alone to continue their decline and if desperate to light fires, then burn areas that they have already burned because there they have already set up the cycle of propagation of understory and high fuel loads. Senior people at DPAW argue that this is not the case, that the Australian forests don't achieve declining fuel and that they are constantly inclining. This is demonstrably false: if you had a constant incline, then the understory would slowly build up the trees and you would end up with leaf litter metres deep. In fact, in long-unburned 50-100-year-old forests that I know you end up with a rush floor and a leaf litter 300-400mm thick. The amount of decomposition balances the amount of litter so you end up with a stable and balanced environment with the litter fill decomposing and feeding the forest.

I believe that some of the senior people within DPAW are starting to realise that this is a phenomenon and are now targeting these areas to destroy this evidence.

The current method used by DPAW to measure fuel loads is flawed. It measures dead biomass at a much higher level than propagated understory. This is an inappropriate method of determining litter or fuel levels in all forests and coastal heath. Unfortunately, this leads to a policy whereby long unburned areas are targeted by DPAW and the department of fire and emergency Services (FESA) for urgent prescribed burning. When in fact they have achieved a declining fuel status.

An example of this policy is taking place now in mid-summer of 2017. DPAW plans to aerial burn areas

of the Valley of the Giants known as Blocks 033 and 012, which contain long unburned Karri (*Eucalyptus diversicolor*) and tingle forests (see Fig 4). So far, local farmers and conservationists, wishing to film the difference in fire volatility in long unburned areas and prescribed burned areas (1999) within block 012 have prevented this from going ahead.



Figure 4: Prescribed burn planned for long unburnt tingle and karri forest, 80 years without fire in WalpoleNornalup National Park, south-west WA (Photo: Tony Pedro).

FIRE IN AUSTRALIAN CULTURE

In my view fire has been used in Australian culture to gain a sense of control over the environment and reduce fears of the undomesticated landscape (see also (Watson 2014)). Fire is used to mitigate or weaken the natural environment. This has developed into an aspect of the Australian culture now being exported to other countries. Australia is seen as a world leader in this form of land management despite its shocking impact.

DPAW are highly skilled at prescribed burning, they edge burn the forest perimeter to establish a reliable boundary and then drop incendiary bombs using helicopters. Recently a 8000 ha Jarrah forest west of the Kent River, near Denmark WA, was prescribe burned with an intensity equivalent to a wildfire. It will take 50 to 100 years to recover. However, repetitive prescribed burning will prevent any recovery.

DECLINING FUEL LEVELS IN LONG-UNBURNED FORESTS

From what I have observed in south-west WA, different forest types reach the stage of sparse low-fuel under-storey at different ages after a fire event; karri/tingle forests take 30-40 years, jarrah/red gum take 25-35 years, coastal heath takes 20-30 years.

The government departments have a policy of burning karri and tingle forests every 15-20 years and jarrah and coastal heath every 7-8 years, so from the figures I have just mentioned, all this achieves is a continuous propagation of the understorey and a more dangerous forest in my opinion than the long-unburned forests, because the long-unburned forests don't create canopy fires unless they are subject to extreme conditions. Recently burned forests that have dense understorey will develop into a canopy fire under much milder conditions, as the fire is thrown from the tall understorey to tree canopy.

DPAW regularly talk about mosaic, or biodiversity burning but there is a huge difference between what

they say and what they actually do. In fact, a mosaic burn to them is a nuisance, although it sounds good from an ecological point of view. As it leaves unburned patches with still smoldering pieces left which are prone to reigniting and turn into wildfires. In fact, they want very little left unburned so that they don't have to be bothered coming back to deal with fires that re-light in unburned areas within the block prescribe burned.

DPAW have a quota to burn of around 200,000 ha per year. They will often allow a wildfire to spread through to an adjacent bloc, if it isn't threatening a community, because the funding comes from Federal and not state government for a wildfire. So, a wildfire becomes an advantage due to the fact that it burns out country that would have required prescribed burning. They can then keep the money allotted for the block burned for more prescribed burning elsewhere. An independent authority to monitor is desperately needed to avoid such compromised decision making about fire management.

ABORIGINAL BURNING PRIOR TO EUROPEAN SETTLEMENT

There is a well-established misinterpretation of traditional Aboriginal fire management within the Australian continent. DPAW and other Australian land management authorities say they are copying what the Aborigines did. This seems to be the common propaganda used Australia wide. Records from lake and peat cores actually show that the very opposite was the case; fire frequency has become much more common under European management ((Mooney et al. 2011)).

The Aboriginal peoples used fire, in small areas very strategically and with a degree of control we cannot begin to understand. They used fire with amazing control over small areas of the landscape, attracting the game to these small areas for easy hunting and entrapment. I believe the vast majority of the land in Australian landscape was left to manage itself. Evolution developed forests and landscapes along with some Aboriginal influence.

Aboriginal land care and fire management was described to me by a district elder, Jack Williams, whom I met at a Conservation and Land Management (CALM, the predecessor to DPAW) many years ago, and whom I respect enormously. CALM stated that they were following Aboriginal mosaic burning techniques, something that is stated with great regularity. The elder, aged around 80 at the time, said nothing for the duration. I caught up with him outside the seminar venue and asked him his opinion of government policy, which claimed to follow Aboriginal broad scale burning in the SW forests. Our exchange went as follows:

Initially, he said to me 'I don't have time to talk about this shit, I'm too busy trying to stop my kids getting on drugs and they have no housing. My important issues are social issues, not what these idiots think they know about what we did.' I persisted and asked, 'but you must have a point of view about it all'? With tears in his eyes he explained that what was suggested in the seminar as following his ancestor's fire management practices was so far from the truth that he did not even bother to try and correct the government policy. 'I will tell you how we did it: when we were ready to leave our summer camp site in mid to late autumn (April-June) and we could see a cold front coming and knew it was going to rain soon, a group of us would be sent by the elders to the area selected for next seasons camp site, near an estuary or river, and light a fire or a series of fires. Knowing the wind direction and conditions until the cold front and rain came, we could predict the shape and size of the camp area for next season. Its new growth would attract game from the vast area we had chosen to leave unburned'. Having grown up in his country, I could understand his methods. However, seeing so many CALM and now DPAW prescribed burns develop into wildfires, I asked him what would happen if he lit one of these fires and mis-timed the rain and a major fire developed. He then got really angry with me and said, 'if we made a mistake like that we would get speared in the back of our legs, you got it right or you were in big trouble'. He pulled up his trouser legs and asked me, 'Do you see any scars on my legs?' He was so angry that he roared off in his car.

I remember feeling very foolish for asking him these questions. Since then, I have gotten to know him and his family quite well and we have discussed the topic in more depth and gained great respect for their skills. He has since died and I thank him for learning so much from him in such a short time

This meeting gave me a good understanding of the degree of land care that Aboriginal people achieved. It's obvious to anyone that puts any thought into it that to suggest the Aboriginal population could hold down the whole of Australia's natural environment through burning is just ridiculous, foolish, stupid, impossible, fraudulent, in my opinion.

This is the degree of sensitivity to the environment that I believe we will have to learn from people like Jack Williams if we are to allow our forests and landscapes to recover.

I've also talked to senior people within Aboriginal organisations about this issue and believe that they fear to contest current fire regimes. Privately they have said to me that if they can't prove to the federal government that their land has been managed by Aboriginal people, then this could jeopardise their right to claim Land Rights because the land may have just sat idle with no management. Therefore, they go along with the rhetoric that they used fire to manage country. There is a lot of money involved in land rights which can then be put towards social priorities for their communities which from their perspective is now more important than the natural environment because if their social wellbeing continues to decline, then they have lost everything. It's a tragedy, they should have more say in how the land is cared for free of this blackmail.

SUGGESTIONS TO IMPROVE FIRE MANAGEMENT

The prime reason that prescribed burning is used nationally is because it is seen as the only solution to prevent a wildfire. I have been part of the fire brigade structure for 40 years and I realised that the whole fire suppression system is hopeless throughout Australia. In no other industry on earth do we use equipment so out of date and poorly designed for the job than that used for bushfire suppression in Australian forests. Turning up to a bushfire with a truck is about as effective as arriving at a house fire with a plastic bucket. Trucks cannot be driven into the bush to access fires. In most bushfires, the units are useless, and a bulldozer has to be brought to the fire, but they take hours to arrive, by which time a wildfire may well have developed and become very difficult to bring under control. The opportunity to put the fire out while it is still small is lost time and time again.

Witnessing this on many occasions, I invented a machine (Fig. 5) to overcome this problem and invested \$100,000 to build a self-accessing fire-fighting unit (a converted "skidder" used by the forestry industry that can access the forest, grab a log and drag it to where trucks can get to using their own blade). They are capable of quickly traversing the environment in which they are to work, while carrying water, and clearing their own tracks or creating firebreaks. I believe that this machine may well be the most advanced ground-based bushfire suppression unit in Australia, however, Government departments have shown no interest in trialling it, saying that it does not conform with the recognised fire-fighting unit design. I believe that the use of fast-response equipment such as this provides a more sustainable alternative to fuel reduction burning for the purpose of bushfire prevention in Australian forests.

The fire unit is now used to protect my property, which comprises 1000 acres of 60 year-long unburned Jarrah and she-oak (*Allocasuarina*) country. This forest and heath is now declining its litter or fuel levels each year. It still requires high quality surveillance and rapid attack to maintain this forest in a healthy state. I believe that bushfire surveillance in Australia is extremely poor. This was highlighted by the lack of action by DPAW or DFES staff following the reception of satellite information on the evening of the 5th January 2016 with regards to the Waroona wildfire in January 2016. The fires were not noted until 6:30am on the 6th January when DPAW staff arrived for work. Australian bushfire surveillance is 25 years behind available technology, for example Satellite and computer monitoring ground cameras are not taken advantage of to any degree.



Figure 5: The author next to the fire-fighting unit built from a forestry log skidder: 'Pedro's Frontline Fire Fighter' (Photo: Anthony Kerr, 2017).

This new generation of suppression equipment along with high quality surveillance and aerial support has the capacity to change our current policy whereby we take a negative attitude assuming that we are incapable of putting fires out so we light them instead, requiring huge sums of money that should be spent developing equipment and skills to become the world's best at suppression rather than the world's best at lighting bush fires.

KEY RECOMMENDATIONS

Looking ahead, I have several recommendations with respect to fire management in Australian forests and landscapes.

First, effort should be made to maintain long unburned forest areas throughout Australia. These areas should form the basis of investigations, which compare fuel levels over time in unburned areas with those under current fire management. A new technique for measuring fuel levels in the forests and heaths should be developed for this purpose, which must take into account both living and dead biomass in appropriate weightings. The long-term effects of prescribed burning on the ecology of forest areas should also be compared against the unburned areas to increase our knowledge of the relationships between fire regimes and threatened species.

Second, Research into forest ecology and the relationship between prescribed burning and fuel levels should be conducted by independent organisations such as university ecological departments or the King's Park Herbarium. A research institution of this type should be funded independently of government departments to ensure no conflict of interest jeopardises the research outcomes as I believe has been the case with government departments fire ecology research to date.

Third, the use of effective rapid response fire-fighting equipment should be trialled against the current truck based equipment. This type of equipment must be complimented with effective early bushfire detection methods to enable fire suppression before small fires develop into wildfires. With the technological advances in satellite and camera monitoring over the years, this shouldn't be too difficult,

but early detection systems haven't changed much in years. Bush fire surveillance in Australia is extremely poor. I believe that remote sensing camera surveillance working in conjunction with Satellite based national analysing system could improve our suppression capacity and reduce the reliance on prescribed burning to avoid wild fires.

Fourth, there is a popular view of pre-European settlement burning practices that the Australian flora had been recently and regularly burned. From what I understand, the opposite was the case. Large parts of Australia were long-unburned, free of Aboriginal fire management, although they successfully managed relatively small portions of it with fire. It is my view that Aborigines have to decide whether what is happening now is replicating what they did in pre-European times. If they say that this is not the case, then there needs to be some thorough scientific research into how the landscape should be cared for. This evidence is held within peat swamps, old tree rings, soil profiles and Antarctic ice cores and just need to be researched by an independent body. In the interim, the few examples of long unburnt natural environment throughout Australia should be preserved.

CONCLUSION

I have argued that current fire management practices in south-west Australia are counterproductive in terms of fire risk and damaging to the natural environment. It could take another 50-100 years before this turns around, which I'm afraid will result in many species becoming extinct. We must become the world's leaders at fire suppression, not ignition. Unfortunately, the current policy of prescribed burning is seen by the state and federal governments and politically advantageous as it appears to be protecting the public from wildfire when, in fact, the reverse is the case.

The press supports DPAW and won't challenge them, the local government wouldn't challenge DPAW, nor will the universities, so there isn't much support for what I believe is the correct way to care for these forests. One influence I can have is on my own private property which includes 1,000 acres of pristine unfired native forest. I hold this property as a private conservation reserve and would welcome contact from ecologists interested in conducting research on the property.

ACKNOWLEDGEMENTS

I would like to recognise several people who contributed significantly to my understanding of this issue. My mother Susan Pedro (died aged 94 – Oct. 2016). Susan and I often visited south-west forest and would try to interpret the health and time free of fire or otherwise. Susan also studied Aboriginal settlements in the Denmark area in an attempt to understand their degree of land management. Jack Williams (Aboriginal elder) from Albany who gave me a clear insight into their land care methods and the degree of fire control they developed. Alex Syme (recently died aged 67) gave most of his adult life trying to improve WA land care.

REFERENCES

Watson, Don. 2014. *The Bush: Travels in the Heart of Australia*. Penguin Australia.

Mooney, S.D., S.P. Harrison, P.J. Bartlein, A.-L. Daniiau, J. Stevenson, K.C. Brownlie, S. Buckman, et al. 2011. "Late Quaternary Fire Regimes of Australasia". *Quaternary Science Reviews* 30 (1–2): 28–46. doi:<http://dx.doi.org/10.1016/j.quascirev.2010.10.010>.