BUSHFIRE FRONT

"mild fires not wild fires"

New research supports fuel reduction burning in WA forests:

a Bushfire Front review

1. A watershed paper has just been published

The Bushfire Front has welcomed publication of a significant fire research project in Western Australia's karri forest. The paper, entitled '*Fuel weight and understorey hazard dynamics in mature karri (Eucalyptus diversicolor) forests in southwest Western Australia',* is published on-line in the peer-reviewed journal *Australian Forestry.* The full paper can be read here: https://doi.org/10.1080/00049158.2023.2251249

2. Key finding

The research demonstrates that bushfire fuels do not disappear in karri forests which are left long-unburnt. On the contrary, it provides data that shows very high levels of flammable bushfire fuels continue to persist in forests that have been unburnt for almost 100 years.

These findings demolish the theory that, "if forests are retained unburnt, they will become more bushfire-safe". This theory is being promoted by some university academics and environmentalists as an argument to support their view that fuel-reduction burning (the key to successful bushfire control) must cease.

3. Background

Bushfires threaten lives, homes, community assets and economic infrastructure. They also harm biodiversity and the environment. Prescribed burning of southwest WA forests since the 1950s, together with a well trained and equipped suppression capability, has been the cornerstone to reducing the harmful impacts of bushfires. If bushfire fuels are minimised by periodic mild controlled fires, uncontrolled summer wildfires are easier to control and do less damage.

Despite scientific evidence and the experience of firefighters, some theorists claim that prescribed burning doesn't work. They assert that "there is no evidence that fuel reduction has any value in wildfire control" and, worse, that it actually increases the fire hazard because it promotes the development of understorey vegetation. They then go on to claim that if forests are left unburnt, then eventually the bushfire fuel on the forest floor will decompose and will no longer constitute a fire hazard. These flawed assertions have gained ground with some members of the public and some politicians and are a threat to current bushfire policies.

4. The new research

New research does not support the "disappearing fuel" theory.

The study was undertaken in the karri forest in 2021-22 and was led by internationally-recognised bushfire scientist Dr Neil Burrows. Dr Burrows was awarded the honour of an Australian Fire Service Medal in 2020 for his lifetime of research into bushfire science and fire ecology. The Burrows team, supported by volunteers, studied the weight of flammable bushfire fuel and the structure of the understorey vegetation in karri forests, and measured changes with time since the last fire.

Fuel weight is expressed as tonnes per hectare. This tonnage directly affects the intensity, or the amount of heat energy and thus the difficulty of control, of a bushfire. The heavier the fuel, the higher is the potential intensity. Not only difficulty of control, but the level of damage caused by a fire is directly linked to the fire's intensity.

Every experienced firefighter across history understands this rule of thumb: ***Heavy fuels promote high intensity bushfires that are difficult, dangerous and costly to suppress, and which cause harm to communities and the environment***. They also understand the corollary: in forests carrying light fuels, summer wildfires can be readily controlled even under adverse weather conditions.

5. Findings

Dr Burrows and his colleagues studied fuels at 72 sites, mostly in virgin karri forests, in southwest national parks and State forests. Fuel age in the study sites, or the time since the last fire, ranged from 1 year to 92 years.

They found that ***flammable fine dead fuel*** (which comprises leaves, twigs and bark shed from trees), accumulated on or near the forest floor for 25-30 years after fire, then plateaued as the rate of decomposition equalled the rate of accession.

After 25-30 years since a fire, the average fuel weight was about 50 tonnes per hectare, with some sites exceeding 60 tonnes per ha. ***The significance of this fuel weight is that most firefighting operations will only succeed in fuels of about 8 tonnes per hectare or less.***

Three sites were studied in karri forests unburnt for 92 years. In these sites the average fuel weight was about 65 tonnes per hectare.

6. Understorey hazard

Across the whole study, most (about 94%) of the fuel weight was made up of flammable fine dead material. The live understorey vegetation contributed only about 6% of fuel weight.

When it comes to fuel weight, from which bushfire's derive their energy, the karri forest understorey (comprising shrubs and small trees) was found to be insignificant.

As with fuel weight, the 'understorey hazard' (which varies with the height, cover and proportion of understorey plants that are dead), increased for the first 20-30 years after fire. It then peaked and began to decline. After 60+ years, it was at about 60% of its peak value. Because of its low weight, the understorey vegetation contributes very little energy to the bushfire spread process at any stage in its development.

7. What we now know for certain

This new research demonstrates conclusively that a long period of fire exclusion does not result in the dissipation of the forest fuel hazard to 'safe' levels.

Even if it were possible to exclude fire permanently from the forests (something nobody has ever succeeded in doing across history), the total weight of flammable dead fine fuel would remain dangerously high. It is true that the understorey hazard would decline, but understorey vegetation contributes little energy to the bushfire intensity and rate of spread.

8. Implications for bushfire policy

The new research supports a policy of prescribed burning with low intensity fire at an interval of about 8 years. Such a program will maintain fine fuel weight at less than about 40% of the peak value, and understorey hazard at less than about 50% of the peak value, over about half of the karri forest area.

Reducing fuel weight and understorey hazard by periodic prescribed burning will reduce bushfire rate of spread, intensity, flame size and spotting potential, making fires easier, cheaper and safer to suppress, and ensuring they do less damage.

The Bushfire Front congratulates Dr Burrows and his team on their ground-breaking research into karri forest fuels and welcomes the fact that this strongly supports the WA government's wise policy of periodic fuel reduction burning in the forest. This is the key to protecting lives, community and economic assets and the environment from damaging high-intensity summer bushfires.

Perth, Western Australia, 16 October 2023