

## Submission Number: NND.001.00960

### Submission Of: David Pannell

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What is your submission based on? I am making this submission based on my professional knowledge, qualifications or experience or on behalf of a group or organisation

What is your area of professional expertise?

If you are lodging your submission on behalf of a group or organisation, what is the name of the group or organisation? Centre for Environmental Economics and Policy, University of Western Australia

#### Your Submission

In your experience, what areas of the bushfire emergency response worked well?

In your experience, what areas of the bushfire emergency response didn't work well?

In your experience, what needs to change to improve arrangements for preparation, mitigation, response and recovery coordination for national natural disaster arrangements in Australia?

This submission is made by Professor David Pannell, Director of the Centre for Environmental Economics and Policy, University of Western Australia.

My submission relates to this part of the Royal Commission's Terms of Reference: "Australia's arrangements for improving resilience and adapting to changing climatic conditions, what actions should be taken to mitigate the impacts of natural disasters".

Over the past 8 years, I have led and contributed to a number of research projects investigating the economics of various strategies to mitigate bushfire risk in different contexts. These analyses have integrated a wealth of information of different types in a risk-management framework to provide overall assessments of the strategies. Information drawn into the analyses includes information about: the fires (their frequency, location, intensity, spread), the assets at risk (different types of assets, their locations and values), the various mitigation strategies (their effectiveness, their constraints and their costs), fire suppression (it's effectiveness and cost), weather conditions (the effects of different weather conditions on fire risks, and the frequencies of those conditions) and the evolution of risk over time as different factors change this risk (climate change, population growth, land use changes).

My collaborators and I have done case studies in four Australian states: Western Australia, South Australia, Victoria, New South Wales.

The different studies analysed different combinations of fire management options. The common element in all the studies was prescribed burning to reduce fuel loads, but in particular cases we also analysed land-use planning to exclude assets from high-risk areas, retrofitting of houses to make them more fire-resistant, fire breaks, and increasing fuel management in private land as a result of well-designed community education programs.

This type of analysis is complex and data-intensive. We obtained the required data from a variety of sources, including using sophisticated fire simulation models where available, drawing on existing data and statistics, and at times asking local experts to make judgments to fill critical information gaps. Despite the variations in context and methods, we have learned some clear lessons across the various analyses.

The results for prescribed burning were somewhat variable in different contexts, but overall, we found that the long-run benefits of prescribed burning tend to outweigh the costs in most cases.

On the other hand, we found that prescribed burning leads to reductions in average losses that are modest relative to the overall losses due to fires. These modest reductions in losses are worth pursuing – they exceed the costs and risks of prescribed burning – but it means that we need to have realistic expectations about what prescribed burning can do for us. Especially in extremely bad ("catastrophic") fire conditions, losses can still be large, even with the best possible prescribed burning strategy in place. The fires that occur in these most extreme conditions cause the majority of losses, and this explains why the gains from applying prescribed burning are modest compared to the total losses.

One of the questions we looked at was whether prescribed burning should be done close to properties or more distantly. Burning closer to properties has higher benefits, because it increases the chance that a recent prescribed burn will block the passage of a bushfire. However, burning closer to properties also has higher costs, because of the need for additional fire-fighting crews and equipment to reduce the risk of prescribed burns escaping and doing more damage than they prevent. In a detailed analysis of these trade-offs, we found that the costs of burning close to houses outweighed the benefits.

In the analysis we did for the Perth Hills, we found that strong land-use planning policy, preventing people from moving into high-risk areas, was the most cost-effective strategy. However, in this analysis we were not able to model the likelihood that some members of the community would be opposed to being excluded from areas of high amenity value (but high fire risk). This means that there would probably be additional transaction costs to government in trying to further strengthen land-use planning restrictions designed to avoid bushfire losses. In my view, however, this strategy is still worthy of further attention.

A clear finding was that a broad policy of retrofitting houses to reduce their likelihood of burning was not economically efficient. Such a policy

imposes substantial costs on a large number of houses to avoid the loss of a much smaller number of houses, and we found that the numbers do not stack up.

Finally, in one case where we had access to a fire simulation model, we looked at possible impacts of climate change on future losses from fires (in 2030 and 2090). In brief, the additional losses due to climate change were large, potentially very large. In the media discussions during and following the recent fires, some commentators were suggesting that the key response needed in response to climate change is a strengthening of prescribed burning regimes. While there certainly can be benefits from prescribed burning, our analysis shows that there is no way that increased prescribed burning could come close to offsetting the worsening fire risk from even modest climate change. Indeed, increasing prescribed burning may not even be feasible following climate change, as climate change narrows the window of time within which prescribed burning can be done without excessive risk. From a bushfire perspective, Australia would have a lot to gain from effective international action to mitigate climate change. This suggests that we should be playing a stronger role in the global climate policy process.

Is there anything else you would like to tell the Royal Commission?

Do you agree to your submission being published? Yes I agree to my submission being published in my name