

HOW TO SELECT THE MOST SUITABLE FUEL MANAGEMENT STRATEGIES TO REDUCE BUSHFIRE RISK

ABOUT THIS PROJECT

This research was conducted as one part of the Bushfire and Natural Hazards CRC's *Improved decision support for natural hazard risk reduction* project.

AUTHORS

Dr Amelie Jeanneau, Prof Holger Maier and Dr Aaron Zecchin, University of Adelaide; Adj A/Prof Hedwig van Delden, University of Adelaide and Research Institute for Knowledge Systems; Roel Vanhout, Research institute for Knowledge Systems; Tim McNaught, Department of Fire and Emergency Services, WA. Contact amelie.jeanneau@adelaide.edu.au.

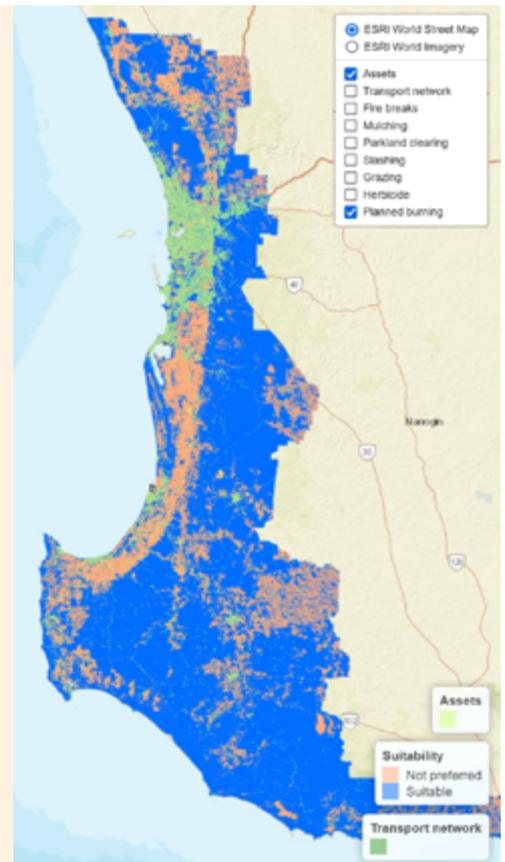
SUMMARY

Planned burning is one of the most common fuel management strategies for reducing bushfire risk at the rural-urban interface. However, future application of this method

is under threat in parts of Australia due to increased safety concerns from climate change and urban expansion. This part of the *Improved decision support for natural hazard risk reduction* project developed the Fuel Management Suitability Tool, to provide fire and land managers with a centralised source of information to help plan fuel management strategies.

The tool is a digital spatial modelling application that assesses the suitability of a range of fuel management options for any location based on a variety of features. Fire and land managers can use the final outputs (in the form of digital maps) to develop local bushfire risk management plans under current or plausible future conditions. It has recently been used in a case study to assess different fuel management techniques in south-west Western Australia. To use the tool, contact Dr Amelie Jeanneau at amelie.jeanneau@adelaide.edu.au.

Right: THIS RESEARCH PRESENTS THE FUEL MANAGEMENT SUITABILITY TOOL THAT CAN BE USED BY FIRE AND LAND MANAGERS TO VISUALISE THE IMPACTS OF DIFFERENT FIRE MANAGEMENT STRATEGIES. THIS IMAGE SHOWS THE TOOL'S OUTPUTS (VISUALISED AS DIGITAL MAPS) WHEN ASSESSING THE SUITABILITY OF PLANNED BURNING IN SOUTH-WEST WA.



BACKGROUND

As the pressure from climate change and concerns about the safety of planned burning are growing, there is a need to determine how suitable different fuel (vegetation) management options are under plausible future conditions.

Fuel reduction or management remains an effective way to reduce bushfire risk at the rural-urban interface, with planned burning being one of the most common strategies, but its safe application might be limited in future by climate change (for example, shrinking/shifting windows of opportunity), urban expansion and potential adverse societal outcomes (for example, smoke impact).

For this reason, fire managers need access to detailed information to help them make informed, evidence-based decisions and select fuel management strategies that are most compatible with their specific local environments, particularly under uncertain future conditions.

BUSHFIRE AND NATURAL HAZARDS CRC RESEARCH

Researchers developed the Fuel Management Suitability Tool using a case study of bushfire risk in Western Australia, by identifying different potential fuel management strategies and assessing the information and knowledge needed to apply them. Using

the outputs from the tool, which display as digital maps, fire and land managers can select the fuel management layers of interest and zoom in on their specific location, providing a varied portfolio of mitigation activities to choose from.

Questions that can be answered by the tool include:

1. What are the most critical elements to consider when deciding if a fuel management activity can be conducted?
2. When can each activity be conducted? When are these activities likely to be most effective?
3. Where can each activity be applied?

4. What resources does each technique require in terms of training, equipment and materials?
5. What are the costs, benefits and impacts (social and environmental) associated with each fuel management activity?

The results from a literature review and survey of local government departments in WA were used to: (i) create a General Guidance Framework (used to inform the new tool) for comparing fuel management strategies given a set of landscape features, resources and constraints (see Jeanneau et al. 2021a in Further Reading) and (ii) define selection criteria and decision rules to create maps of applicability for different fuel management activities (which would become the outputs of the Fuel Management Suitability Tool, see image on page 1).

The tool provides a simple and flexible way to select a range of appropriate fuel management activities and adapt them to specific local conditions.

RESEARCH FINDINGS

The application of the Fuel Management Suitability Tool in WA demonstrated that more than one fuel management activity is typically suitable at any location, providing a greater choice of mitigation options for fire and land managers.

Planned burning and grazing options have the potential to be applied at larger scales across most of the region, while mechanical fuel reduction methods (for example, fire breaks, slashing, etc.) might be more applicable close to key assets (for example, infrastructure, utilities) and residential areas.

However, the reliability of the results is variable, as the results from the literature review and the online survey highlighted that some mitigation activities were better understood than others (for example, forest thinning, mulching, grazing and planned burning).

It is difficult to obtain reliable information on the economic cost of different mitigation activities, resulting in very large cost ranges, and so these figures will need to be adjusted on a case-by-case basis.

HOW CAN THIS RESEARCH BE USED?

The Fuel Management Suitability Tool provides fire and land managers with the information and knowledge they need to select suitable, evidence-based fuel management strategies for their particular circumstances. This assists them with preparing an effective fuel management plan.

These resources can also be used to identify where different types of fuel

management approaches would be suitable and desirable under a range of plausible future scenarios based on projected climate data, population and demographics growth projections (see Jeanneau et al. 2021b in Further Reading).

The information within the tool could be expanded with local knowledge from other Australian regions outside of WA. The online survey designed for this research could be sent to fire and land managers from other states and could apply to a range of industries. Any additional surveys' results would capture a broader set of local knowledge about the limitations and possibilities of applying different mitigation options to reduce bushfire risk.

Output maps from the tool could be hosted on an online platform (as shown in the image on page 1) to provide an interactive way to present and communicate results.

FURTHER READING

Jeanneau A, Zecchin A, van Delden H, McNaught T & Maier H (2021a) Guidance framework for the selection of different fuel management strategies, Bushfire and Natural Hazards CRC.

Jeanneau A, Zecchin A, van Delden H, McNaught T & Maier H (2021b) Identifying opportunities for the use of different fuel management strategies in Western Australia, Bushfire and Natural Hazards CRC.

Riddell GA, van Delden H, Maier H & Zecchin A (2020) Tomorrow's disasters - embedding foresight principles into disaster risk assessment and treatment, *International Journal of Disaster Risk Reduction*, 45, DOI:10.1016/j.ijdr.2019.101437.

Riddell GA, van Delden H, Dandy GC, Zecchin A & Maier H (2018) Enhancing the policy relevance of exploratory scenarios: generic approach and application to disaster risk reduction, *Futures*, 99, DOI:10.1016/j.futures.2018.03.006.

END-USER STATEMENT

"In the context of an increasingly competitive environment for finite resources, designing efficient and effective mitigation programs becomes increasingly critical to sustaining investment. This research demonstrated the complexity in decision making about the type of activity and the different approaches/considerations planners currently take to determining the appropriate activity. The Fuel Management Suitability Tool is designed to support decision making across both different spatial and temporal scales. Importantly, the integration of the spatial element with current and potential future considerations should provide greater insight into appropriate mitigation strategies building on different activities applied over time. The application of a tool to guide the bushfire risk management planners towards a singular or varied suite of mitigation activities, that suits both the local and spatial context, is an important step towards the development of mitigation programs that can achieve efficient and effective use of resources."

Tim McNaught, Department of Fire and Emergency Services, WA

The Bushfire and Natural Hazards CRC has been incorporated into Natural Hazards Research Australia, the new national centre for natural hazard resilience and disaster risk reduction. The new Centre is funded by the Australian Government.

Hazard Notes are prepared from available research at the time of publication to encourage discussion and debate. The contents of *Hazard Notes* do not necessarily represent the views, policies, practises or positions of any of the individual agencies or organisations who are stakeholders of the Bushfire and Natural Hazards CRC.

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