



OFFICIAL



## IBOC Bushfire Research Subcommittee

### Selected Research Papers of Interest for 2025

The papers listed below have been selected by the IBOC Bushfire Research Subcommittee to share recent research that is relevant to fire management practice. We provide plain-language summaries to make this information accessible to the broader community. These summaries are published on our website twice a year.

### Selected New Research January – August 2025 by Bushfire Research Priority Theme

**Theme 1 Managing bushfire risk and supporting planned burning – 3 papers selected**

**Theme 2: Fire impacts on biodiversity** – no papers selected

**Theme 3: Information and people** 3 papers selected

**Theme 4: Building community resilience** - no papers selected

**Theme 5: Improving operational effectiveness** - no papers selected

**Theme 6 Psychological wellbeing** - no papers selected

| No. | Peer reviewed literature  | Theme | Overview (What or why is this paper important)   | Paper Summary   |
|-----|---|-------|--|---|
| 1   | <p>Hollis J, Cruz M, McCaw W, Gould J, Samson S. <a href="#">An efficient and comprehensive field protocol for assessing fuel characteristics for fire behaviour modelling in Australian open forests</a> MethodsX, 14, 2025, 103345</p>  | 1     | <p>Current fuel inventory assessments are largely visual. This protocol integrates various sampling methods and is more accurate. However, it currently takes 1-2 hours per forest block.</p>                      | <p>Accurate information about forest fuels—such as leaf litter, fallen wood, bark, and understorey plants—is essential for predicting fire behaviour.</p> <p>This paper introduces a practical, standardised method for measuring these fuels in Australian forests.</p> <p>The protocol uses simple tools and clear steps to collect data on fuel quantity, height, and cover, replacing older visual estimates that were often inaccurate.</p> <p>It also supports validation of satellite data and will assist to improve fire modelling.</p> <p>By providing reliable fuel measurements, this method helps fire managers plan safer prescribed burns, forecast fire danger, and reduce wildfire risks, contributing to better land management and community safety.</p> |
| 2   | <p>Pickering B, Kultaev D, Holyland B, Ababei D. Penman T. <a href="#">The changing risk of fire to human and environmental assets under climate induced altered fire regimes in south-east Australia.</a> International Journal of Disaster Risk Reduction 127 (2025) 105668</p> | 1     | <p>There is increasing evidence that planned burning has modest benefits during extreme fire weather events as will become more likely due to climate change &amp; that alternate strategies will be required.</p> | <p>This study looked at how climate change will affect bushfire risk in Victoria’s Central Highlands and whether current management practices can reduce that risk.</p> <p>Using long-term computer simulations, researchers found that future fires will be larger and more intense, increasing threats to homes, farms, forests, and wildlife.</p> <p>The findings show that climate-driven changes will overwhelm traditional strategies, and fire managers need new approaches tailored to different assets.</p> <p>Planning for these future conditions is essential to safeguard communities and the environment as fire seasons become more severe.</p>  |
| 3   | <p>Fisher R, Legge S. Catt G, Cliff H. <a href="#">Extensive fires in Australia’s northern spinifex deserts – investigating the 2023 ‘Black Spring’ and the influence of indigenous fire management.</a> International Journal of Wildland Fire 34, WF25002.</p>                  | 1     | <p>Extensive fires in the northern spinifex desert during 2023 were able to be interrupted when they met areas previously burnt in planned fires.</p>  | <p>In 2023, huge fires swept across Australia’s northern deserts, burning over 294,000 square kilometres—three times the size of the 2019/20 Black Summer forest fires.</p> <p>These fires followed heavy rainfall that boosted grass growth, creating high fuel loads. Lightning strikes triggered most ignitions, and fires spread rapidly, sometimes covering 25,000 square kilometres in five days.</p> <p>Indigenous ranger programs that use planned burning helped slow fire spread in some areas, showing that traditional</p>  |

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|     |  |       |  | <p>knowledge combined with modern techniques can reduce wildfire impacts.</p> <p>The study warns that climate change may make such extreme fire years more common, highlighting the need for proactive management.</p>  |
| 4   | <p>Windsor D, Galvin P. <a href="#">Working in Partnership on Cultural Fire: Application of a Lessons Management Approach</a>. Australian Journal of Emergency Management.40(2) 2025.</p>            | 3     | <p>Learnings and principles for working effectively in partnership on cultural fire,</p>                                       | <p>This paper documents how a lessons management methodology was applied to derive key learnings arising from the delivery of cultural fire initiatives in Western Australia.</p> <p>23 Lessons were grouped into 3 main themes; Demonstrating Cultural Competence, Enabling 2-Way Learning and Navigating Authorising Environments.</p> <p>The lessons are supported by case studies and provide guidance to those interested in supporting cultural fire and cross cultural collaborations between non indigenous organisations and First Nations organisations.</p>  |
| 5   | <p>Padamsey K, Liebenberg A, Wallace R, Oosthuizen J. <a href="#">Exposures of Western Australian Wildland Firefighters: Insights from Real-Time Monitoring</a>. Fire 8(3) 98. 2025.</p>             | 3     | <p>Paper provides evidence of the health risks of smoke to emergency services personnel during planned burns and wildfire.</p> | <p>This study measured smoke exposure for firefighters during bushfires and planned burns in Western Australia.</p> <p>The Firefighters were exposed to high levels of smoke particles, especially larger particles (PM10).</p> <p>Some readings of carbon monoxide and volatile organic compounds were high enough to raise health concerns, and monitoring limits were often reached, meaning true exposures might be higher.</p> <p>No clear increase in polycyclic aromatic hydrocarbons was detected in urine samples.</p> <p>Firefighters generally underestimated their exposure, and overall exposure levels during prescribed burns and bushfires were similar.</p> <p>Recommendations include better respiratory protection, health monitoring, and training.</p> |
| 6   | <p>Gili j, Viana M, van Drooge B. <a href="#">Firefighter exposure to polycyclic aromatic hydrocarbons and black carbon during prescribed burns and wildfires</a>. Chemosphere 386 (2025) 144615</p> | 3     | <p>More evidence of the health risks of smoke to emergency services personnel during planned burns and wildfire.</p>           | <p>This research examined firefighter exposure to harmful substances during planned burns and wildfires in Spain. It focused on cancer-linked chemicals called polycyclic aromatic hydrocarbons and black carbon particles.</p> <p>Firefighters who ignite fires faced the highest exposure, followed by those managing fire lines, while vehicle operators had the lowest risk. Even short shifts can lead to significant health risks,</p>  |

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|     |                          |       |  | <p>with lifetime cancer risk for ignition tasks exceeding safety limits.</p> <p>Recommendations include better protective equipment, safer ignition methods, and rotating tasks to reduce exposure. The study shows that even controlled burns can pose serious health risks, making improved safety measures essential.</p> |

The views, opinions, findings, and recommendations expressed in these papers and articles are strictly those of the author(s). They do not necessarily reflect the views of the IBOC Bushfire Research Subcommittee or the organisations represented on the committee. The information contained in this publication is provided by the Bushfire Centre of Excellence, Department of Fire and Emergency Services voluntarily as a public service. A rigorous quality assurance process is applied to papers before their selection is finalised. This document has been prepared in good faith and is derived from sources believed to be reliable and accurate at the time of publication. Nevertheless, the reliability and accuracy of the information cannot be guaranteed.