



Australian Academy of Science

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The Secretary
Senate Finance and Public Administration Committees
PO Box 6100
Parliament House
Canberra ACT 2600

2 June 2020

By email: fpa.sen@aph.gov.au

Dear Secretary,

Australian Academy of Science Submission to the Inquiry into lessons to be learned in relation to the Australian bushfire season 2019-20.

The Australian Academy of Science welcomes the opportunity to provide a submission to the Senate Inquiry into lessons to be learned in relation to the Australian bushfire season 2019-20.

[Science and the 2019-20 Bushfire season](#)

The Australian megafires of 2019-20 had a devastating impact on our people, our environment and our economy, and its effects will continue to be felt for some time. The scale of these bushfires was unprecedented, both in the Australian and global context.

Scientific evidence shows that as the world warms due to human-induced climate change, we experience an increase in the frequency and severity of extreme weather events. As a nation, we must deal with extreme weather events more effectively than we currently do. As such events become more frequent and severe, we must adapt Australia and Australians accordingly, and strengthen our mitigation efforts.

Bushfires, along with other weather and climate challenges, pose complex and wide-ranging problems. Population growth, climate change, temperature extremes, droughts, storms, wind, and floods are intersecting and entangled. These must be addressed together.

The Academy's Fellows are contributing and will continue to contribute their scientific expertise to government and other decision makers in the interest of advancing our nation.

The Academy is resolute that the response to the bushfires must extend beyond the immediate and essential need to rebuild and recover. While immediate responses are important, broader issues including habitat restoration; biodiversity and species preservation; land, water and wildlife management; urban planning; building standards; and agricultural practices will need careful and measured consideration.

To this end, the Academy is preparing a series of expert briefs on bushfire recovery, assessing different aspects of the bushfire threat and how we can become more resilient. The briefs provide a scientific

perspective to inform policy questions relating to the impact of the bushfires. We will present these briefs to the Senate as soon as they are available, in the hope and expectation that they will prove useful to the Committee's inquiry.

The briefs

The briefs will cover the following topics:

- **Ecosystem services:** This brief will discuss the impact of the bushfires on the services that Australia's ecosystems provide – clean food and water; regulation of climate, water and diseases; primary production and soil formation; spiritual, educational, cultural and recreational values – and how these services can be safeguarded.
- **Human health:** This brief, developed in conjunction with the Australian Academy of Health and Medical Research, will discuss the impact of the bushfires on human health and how those impacts can be moderated.
- **Indigenous cultural burning:** This brief will discuss the intersection of Indigenous Australian cultural practices with fire management research, and how both knowledge systems can be integrated to provide insight into fire management practices.
- **Soil condition:** This brief will discuss the impact of the bushfires on soil condition, and the effects this will have on agriculture. It also discusses mechanisms for ensuring soil quality is retained.
- **Wildlife monitoring:** This brief will discuss the impacts of the bushfire on Australia's native wildlife, and the role of immediate and long-term monitoring to inform protection and maintenance actions to preserve our unique ecosystems.
- **Remote sensing and data availability:** This brief will discuss the use of advanced technology and sophisticated data assets to improve our understanding of bushfires.
- **Prescribed burning:** This brief will summarise the available research on prescribed burning and its effect on the spread and intensity of bushfires.

Additionally, the Academy's submission to the review of the *Environment Protection and Biodiversity Conservation Act 1999* may be relevant to the Committee's inquiry, particularly the paper *Resilience to Disaster*. This paper is attached; the full submission can be found at [the Academy website](#).

It is important for the Senate – and all Australians – to have trustworthy information and answers about impacts of the 2019-20 megafires. With much misinformation in the public domain about the cause and impacts of the bushfires, we urge Australians to continue to consult reputable sources of evidence-based information such as the Australian Academy of Science, CSIRO and the Bureau of Meteorology.

Climate and bushfires

Bushfire risk is closely linked with changes in global climate. The number of extreme fire risk days has grown over past decades, particularly in south eastern Australia and away from the coast. Hotter and drier conditions, especially in southern Australia, will cause further increases in the number of high fire-risk days and in the length of the fire season. The Academy's publication [The Science of Climate Change: Questions and Answers](#) discusses the likely impacts of climate change including the risk profile for Australian bushfires. A forthcoming publication, *Australia at Three Degrees*, will look at projected scenarios for Australia based on the most likely climate change pathways identified by the Intergovernmental Panel for Climate Change, based on comprehensive data, research and analysis.

The [CSIRO Bushfires Explainer](#) provides a concise, science-based description of the link between the 2019-20 bushfires and climate change. A more detailed analysis can be found in the Bureau of Meteorology [Annual Climate Statement 2019](#).

Science of fuel management

The management of fuel loads often attracts comment and debate. Earlier this year, the Academy and Bushfire and Natural Hazards CRC worked together to deliver a symposium – the National Fire Fuels Science Forum – to provide an evidence base around this topic. Due to COVID-19, the forum was held as a series of webinars with up to 500 attending each week and hundreds more watching the recordings. The series enabled a broad range of people from around Australia and the world to hear discussion of the issues, science, constraints, beliefs, culture and myths around hazard reduction burning in Australia. The recordings of the webinar, links to publications mentioned in the webinar and extended Q&A session with the speakers are available on [CRC's Hazard Channel](#). The speaker presentation slides, questions from the audience and background papers are available on the [event website](#), and the Academy can provide a synthesis of the webinars on request.

The International Journal of Wildland Fire has also devoted an issue to [“Adaptive Prescribed Burning in Australia for the Early 21st Century – Context, Status, Challenges”](#), which contains peer reviewed papers that the inquiry may wish to consult.

Protecting threatened ecosystems

The vast extent of the 2019/20 bushfires means ecosystems burned that had never or rarely been subjected to fire before. Other ecosystems experienced repeat burns that severely impacted new growth before it was able to fully replenish and recover. Credible assessments based on estimated species densities are that more than a billion vertebrate animals were killed in the fires. In response to these fires, the Department of Agriculture, Water and the Environment (DAWE) rapidly responded with immediate monitoring, in conjunction with other organisations and researchers, to prioritise actions to recover affected species and ecosystems. DAWE released [a list of animals requiring urgent management intervention](#), including 17 bird, 20 mammal, 23 reptile, 16 frog, 5 invertebrate, 22 spiny crayfish and 16 freshwater fish species, and updated .

Continued monitoring of species at risk of increased threats, as well as transparent, consistent and accessible monitoring data, will allow researchers and policy makers to ensure that damaged ecosystems are able to recover, providing better protection to threatened species and ecosystems. A [monitoring handbook](#) produced for DAWE by Darren Southwell of the Threatened Species Recovery Hub of the National Environmental Science Programme provides an initial basis for this monitoring.

It is also important that unknown ecosystems and biodiversity be identified and documented, in order to ensure a comprehensive knowledge base from which to understand the impact of bushfires and other threats. This is the mission of the Academy initiative [Taxonomy Australia](#).

The role of science in public policy

The Australian Academy of Science strongly supports the principle that public policy should be informed by the best available evidence. All levels of government need to ensure that evidence is used to inform decision making, and that the evidence base is up to date and comprehensive.

Scientific evidence is not the only input that policy makers need to assess in reaching decisions about what, if any, interventions are necessary on any given topic. However, science is often a critical input to

public policy and the advice of scientists must play an important and obvious role. Public policy is more effective and has greater public support when it is actively informed by the best available evidence.

Why we can trust science

In keeping with our mission to provide independent and authoritative scientific advice and to celebrate and support excellence in Australian science, the Academy wishes to provide additional comment on the nature of science and the use of science to inform public policy. These points are relevant to the inquiry as they address the importance of ensuring that public policy decisions are informed by the best possible advice.

Australians trust science, and trust scientists. This trust has developed because the scientific process is based on fidelity to data, a robust peer review process, transparency, responsiveness to new information, and a respect for the expertise embedded in scientists and scientific organisations and Australian universities.

Good science leads to better public policy

The hallmarks of good science are demonstrated expertise, accurate and unbiased reporting, and a commitment to opening one's work to the scrutiny of peers and the public. For this reason, scientists are more inclined to trust research that appears in peer-reviewed literature and is open to examination, critique and discussion. This openness builds trust, and this trust allows scientists to expand their own thinking and their own hypotheses, leading to a deeper understanding of the world. Public policy is always improved when it is based on greater understanding.

To discuss or clarify any aspect of this submission, to discuss the schedule for providing the briefs, or to arrange further consultations with the Academy and its Fellowship, please contact Dr Stuart Barrow at stuart.barrow@science.org.au or 02 6201 9464.

Yours sincerely,

Professor John Shine AC PresAA

President

The Australian Academy of Science