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Royal Commission into Natural Disaster Arrangements
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Dear Commissioners

Thank you for the opportunity to make a submission to the Royal Commission into National Natural Disaster Arrangements. In providing this submission WWF-Australia express our sincere condolences for the loss of life, homes and community infrastructure that perished as a result of the 2019-20 bushfires in Australia. Our sincere appreciation is extended to the efforts of the Federal Government for its response to the bushfire crisis, to the respective State governments for their management of the crisis and to all the fire services, their members and volunteers.

Our submission addresses Terms of Reference F and G.

WWF-Australia is part of the WWF International Network, the world's largest independent conservation organisation. WWF's global mission is to 'stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature'. WWF-Australia has approximately one million financial and non-financial supporters.

WWF-Australia as an organisation has a 40-year history of working on wildlife conservation in Australia with scientists, communities, farmers, business and government. During the 2019-20 bushfire crisis we doubled our efforts to support our partners who have been impacted on the ground. We have provided advice and recommendations to Government on possible future actions to recover the wildlife populations lost during the crisis.

WWF-Australia harbour deep concerns that the recent fires may have triggered extinction events for a range of threatened species and ask that the Federal Government respond at a speed and scale worthy of the crisis at hand. Although the fires are now extinguished, we ask that the Government recognise that timing remains critical for the communities, landscapes and threatened flora and fauna in need of recovery support.

WWF-Australia are grateful for the constructive and collaborative way in which the Government have welcomed our support and response throughout the 2019-20 bushfire crisis. On 8 January 2020 WWF-Australia scaled-up our fundraising efforts and response to the bushfire crisis when we launched the WWF-Australia international appeal to establish an \$30m Australian Wildlife and Nature Recovery Fund. This fund allowed WWF-Australia to conduct threatened species impact assessments across several priority NSW fire affected landscapes using Koala detection dogs, drone technology and ecological surveys. We were also able to support the NSW Government Save Our Species Team to deploy emergency food drops for isolated fire affected species as well as provide support across numerous

wildlife response, protection and restoration initiatives. WWF-Australia remains committed to harnessing further funds received to assist bushfire response efforts that benefit both people and nature.

If you require further information, please contact [REDACTED], Chief Conservation Officer, WWF-Australia on [REDACTED] or [REDACTED].

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Dermot O’Gorman
Chief Executive Officer
WWF-Australia

Terms of Reference F: Ways in which Australia could achieve greater national coordination and accountability — through common national standards, rule-making, reporting and data-sharing — with respect to key preparedness and resilience responsibilities, including for the following:

- i. land management, including hazard reduction measures;**
- ii. wildlife management and species conservation, including biodiversity, habitat protection and restoration;**
- iii. land-use planning, zoning and development approval (including building standards), urban safety, construction of public infrastructure, and the incorporation of natural disaster considerations;**

Specific recommendations

- i. land management, including hazard reduction measures;*

Hazard reduction measures have a role to play in reducing the likelihood of fires of low and moderate intensity, particularly using a risk-based approach that prioritises protection of infrastructure and key environmental assets such as protected areas, threatened species habitat and rainforest. However, they do not stop fires developing into *severe*, *extreme* and *catastrophic* fires once they escape containment, become crown fires, or are fanned by hot temperatures and strong gusty winds.

Forest fires switch from being fuel-dominated to weather-dominated when the McArthur Forest Fire Danger Index exceeds 50, on a scale of 1 to 100+. For such *severe* fires, and *extreme* fires (FFDI of 75+) and *catastrophic* fires (100+), previous hazard reduction measures are rendered ineffective. Eastern and southern Australia experienced FFDI values well above average in spring and summer, with values at or well above 100 (*catastrophic*).¹ Under these conditions crown fires spread regardless of how much fuel is on the forest floor and in mid-story vegetation.

This is particularly so when pyrocumulonimbus, or flammagenitus, weather systems form above bushfires.² These fire clouds produce extremely strong and gusty winds, fanning flames that cannot be contained by fire suppression. Ember attacks now causes spot fires to ignite bushfires many kilometres beyond fire fronts.

‘Hazard reduction’ refers to cool season burns or killing trees but the hazard most in need of reduction is global heating. Heating of Earth’s atmosphere is drying out forests and land in southern Australia, causing drought and bushfires to be more intense, more frequent and more dangerous.^{3,4} Climate change is increasing the likelihood of large fires with severe, extreme and catastrophic forest fire danger index scores.

Increasing atmospheric concentrations of greenhouse gases are also indirectly fuelling bushfires through strengthening the climate signals of two key regional weather systems: the El Nino Southern Oscillation (ENSO) and Indian Ocean Dipole (IOD). The IOD index peaked at almost +2 in October 2019, a near-record, which meteorologists say significantly contributed to the Black Summer fires in eastern Australia

¹ Bureau of Meteorology, Australian Government. *Special Climate Statement 72—dangerous bushfire weather in spring 2019*, 18 December 2019. Viewed 8 April 2020. Available for viewing at <http://www.bom.gov.au/climate/current/statements/scs72.pdf>.

² Bureau of Meteorology, Australian Government. *When bushfires make their own weather*. Viewed 28 April 2020. Available for viewing at <http://media.bom.gov.au/social/blog/1618/when-bushfires-make-their-own-weather/>

³ CSIRO, *Climate change information for Australia*. Viewed 7 April 2020. Available for viewing at <https://www.csiro.au/en/Research/OandA/Areas/Oceans-and-climate/Climate-change-information>

⁴ Climate Change in Australia, *Projections for Australia’s NRM Regions*. See projections for *Eastern Australia* and *Southern Australia* clusters. Viewed 7 April 2020. Available for viewing at <https://www.climatechangeinaustralia.gov.au/en/climate-projections/future-climate/regional-climate-change-explorer/super-clusters/>

and higher air temperatures in southwest Western Australia. Significantly, the 2019-20 bushfires could have been more severe if eastern Australia had also experienced an El Niño, which was neutral.

Clearing wider fire breaks and buffers around built and natural assets can help reduce the risk of low and moderate intensity fires escaping containment lines. However, deforestation is a primary cause of biodiversity decline in Australia. Bulldozing or falling trees to establish wider fire breaks and buffers, if implemented at scale across southern Australia, would inevitably further fragment landscapes and destroy threatened species habitat and dispersal corridors

Matters of national environmental significance protected under the *Environment Protection and Biodiversity Conservation Act 1999 (Cth)* (the EPBC Act), and environmental assets recognised under state environment and planning laws, should be protected from significant impact.

The response to the Black Summer bushfires should be to increase the net area of Australia's forests and woodlands rather than more deforestation and forest degradation. Forests are a natural climate solution that are fundamental to reducing national and global greenhouse gas emissions to secure a stable climate. Accordingly, the impacts of additional cool season burns and any widening fire breaks and buffers, in terms of lost habitat or ecological integrity, must be far outweighed by policies and programs to significantly expand the area of forests and woodlands across Australia.

Fire ecologists have stated that forests subject to planned cool season burns can still burn in extreme and catastrophic fires only several years later due to climate change drying out vegetation. Examples include forests scorched in Victoria's Black Saturday fires, Black Summer fires, in southwest Western Australia,⁵ and in general in southeast Australia.^{6,7} Forest fragmentation, such as from native forest logging and weed invasion, increases fire severity as it increases penetration of light and winds, and reduces humidity, on the forest floor. In turn this dries the canopy, thereby predisposing a forest to an extreme or catastrophic canopy fire. Taylor *et al.* (2104) found that logged forests were prone to higher severity fires because opening closed forests makes them drier and more flammable.⁸

Priority should be given to restoring the natural fire resistance of forests by reducing fragmentation. This is particularly critical for naturally moist and fire-sensitive forests such as rainforests, which burnt during the Black Summer fires, as well as other fires in previous years, such as in Central Queensland in December 2018⁹ and Tasmania in early 2019.¹⁰

⁵ Enright, N.J., and Fontaine, J.B. (2013). Climate Change and the Management of Fire-Prone Vegetation in Southwest and Southeast Australia. *Geographical Research*, 51. Available at <https://doi.org/10.1111/1745-5871.12026>

⁶ Morton, A. *Hazard reduction burning had little to no effect in slowing extreme bushfires*. The Guardian, 6 February 2020. Available for viewing at <https://www.theguardian.com/environment/2020/feb/06/hazard-reduction-burning-had-little-to-no-effect-in-slowng-this-summers-bushfires>

⁷ RMIT ABC. *Are hazard reduction burns effective in managing bushfires? The answer is complicated*. 20 Dec 2019. Available for viewing at <https://www.abc.net.au/news/2019-12-20/hazard-reduction-burns-bushfires/11817336>

⁸ Taylor, C., *et al.*, 2014. Nonlinear Effects of Stand Age on Fire Severity. *Conservation Letters*, 7, 355-370. Available for download at <https://conbio.onlinelibrary.wiley.com/doi/full/10.1111/conl.12122>

⁹ Queensland Reconstruction Authority, Queensland Government, April 2019. *Central Queensland Bushfires Recovery Plan 2018-2021*. Viewed 28 April 2020. Available for download at https://www.qra.qld.gov.au/sites/default/files/2019-05/0330%20QRA%20CenQLD%20Bushfire%20RecPlan%202018-21%20HRes_0.pdf

¹⁰ Fire Centre Research Hub, University of Tasmania. *The 2019 Tasmanian fires so far: what has burned and where?* Viewed 28 April 2020. Available for viewing at <https://firecentre.org.au/the-2019-tasmanian-fires-so-far-what-has-burned-and-where/>

Catastrophic bushfires are essentially impossible for firefighters to stop once burning. Concerted global action to prevent dangerous global heating, including by Australia, is required to mitigate the impacts of extreme and catastrophic fires, which are fuelled by declining rainfall, rising air temperatures and declining humidity. Global heating is reducing the number of days per year suitable for safe hazard reduction burns. Spring and autumn are rapidly becoming unsafe for planned burns, thereby limiting the safe window to winter. This window will continue to shorten as Earth heats. A 2015 review of climate-induced variations in global wildfire danger from 1979 to 2013 found an 18.7% increase in the length of the fire season in large areas of the Americas and Europe.¹¹ The risk of cool season burns escaping containment and creating major bushfires will continue to grow, thereby further limiting reliance upon hazard reduction.

Further restricting and banning entry into forests during extreme and catastrophic fire days is warranted to reduce and avoid the risk of human induced ignitions, whether accidental or deliberate. This would require further expansions in the installation and monitoring of remote surveillance cameras in forests, particularly at key entry points, to enable monitoring and rapid response to ignitions caused by lightning, long distance ember attack, accidental fires from forest users, and suspicious activity that could lead to arson.

Firefighters are increasingly reliant upon aerial bombardment of fire retardant to suppress fires. This is essentially the only option for fire suppression in remote or inaccessible forests with no – or unsafe – road access for fire appliances and trucks. Yet Australia lacks sufficient numbers of large aerial water bombing planes and heavy light helicopters to suppress the increasing numbers of large, intense and fast moving bushfires. Governments should significantly increase funding for the purchase and hiring of large aerial water bombers to enable their rapid deployment to extinguish low and moderate intensity fires before they can develop into severe, extreme and catastrophic fires.

¹¹ Jolly, W., Cochrane, M., Freeborn, P. *et al.* Climate-induced variations in global wildfire danger from 1979 to 2013. *Nat Commun*, 6, 7537 (2015). <https://doi.org/10.1038/ncomms8537>

ii. *wildlife management and species conservation, including biodiversity, habitat protection and restoration;*

Much of Australia's terrestrial wildlife and forests are adapted to coping with fire. However, the unprecedented 2019-20 bushfires were devastating for Australia's wildlife due to their extent, intensity and longevity.

The fires are estimated to have killed more than 1.25 billion vertebrate animals.^{12,13} This estimate was derived by the extrapolation of the methodology and results from a 2007 report to WWF-Australia assessing the loss of fauna from land clearing in NSW.¹⁴ WWF-Australia will soon release a subsequent report by independent faunal ecologists based that updates and amends the assumptions underpinning the 2007 report to estimate the mortality of vertebrate fauna from the 2019-20 bushfires.

The impact of the bushfires on wildlife was exacerbated by prior deforestation and forest degradation, and the lack of rainfall and increasing air and soil temperatures experienced across much of eastern Australia in recent years. Wildlife which survived the flames and smoke subsequently died due to lack of unoccupied habitat, starvation, dehydration, disease, predation and stress.

Lack of funding of National Parks fire management officers, and defunding in some jurisdictions, prevents adequate hazard reduction burns and fire suppression. The Australian Government has a key role in increasing resourcing for state national parks agencies to manage fuel loads.

Governments need to invest in protecting refuge areas for wildlife that did not burn due to high natural resistance to fire and climate change. Protection should either be via legislative designation of critical habitats, covenants with landholders or purchase to bring critical refuge areas into the public reserve system. WWF has advocated for the Australian Government to restore \$170 million per year in funding to the National Reserve System Program from the existing Natural Heritage Trust budget, which would be budget neutral, to enhance the capacity of state national parks agencies to manage fuel loads, plan for hazard reduction burns and implement fire suppression.¹⁵

Koala abundance fell 80 to 85% in burnt forests in six locations in north-eastern NSW, based upon comparisons by expert koala consultancy [Biolink](#) of pre- and post-fire koala survey data.¹⁶ The analyses will be published in the scientific literature, with a manuscript able to be provided from June 2020. WWF-Australia estimates the bushfires could have burnt up to two billion trees.¹⁷ The number of burnt trees that died is unknown. However, the figure could tally many hundreds of millions of trees, including

¹² The University of Sydney. *A statement about the 480 million animals killed in NSW bushfires since September*. Published 3 January 2020. Available for viewing at <https://www.sydney.edu.au/news-opinion/news/2020/01/03/a-statement-about-the-480-million-animals-killed-in-nsw-bushfire.html>

¹³ WWF-Australia. *Statement from WWF-Australia on Australia's bushfire emergency*. Published 7 January 2020. Available for viewing at <https://www.wwf.org.au/news/news/2020/statement-from-wwf-australia-on-australia-s-bushfire-emergency#gs.345ne7>.

¹⁴ Johnson, C., Cogger, H., Dickman, C. and Ford, H. 2007. *Impacts of Landclearing; The Impacts of Approved Clearing of Native Vegetation on Australian Wildlife in New South Wales*. WWF-Australia Report, WWF-Australia, Sydney.

¹⁵ WWF-Australia, 2017. *Building Nature's Safety Net 2016: The state of Australian terrestrial protected areas 2010-2016*. Report by WWF-Australia, Sydney, p3, 18 pp. Viewed 24 April 2020. Available for viewing at

<https://www.wwf.org.au/ArticleDocuments/353/pub-building-natures-safety-net-2016-28jun17.pdf.aspx?Embed=Y>

¹⁶ Hannam, P, *Koala losses 'spectacularly huge' after NSW drought, bushfires*. Sydney Morning Herald, 18 February 2020.

¹⁷ This figure assumes an average of 154 trees growing per hectare of land burnt, based on average tree density data for Australia provided to WWF by the [Crowther Lab](#), across more than 12.6 million hectares of forest and woodland.

hollow-bearing old growth trees many hundreds of years old, ancient Gondwanan rainforest and threatened plants and ecological communities.

WWF-Australia is unaware whether the fires, particularly very hot long-lasting fires, have killed a significant proportion of the seedbank and propagule bank buried in the soil and on the soil surface. However, personal communications with fire experts and vegetation ecologists indicate a substantial loss of seeds and propagules may have occurred, which will hinder natural forest recovery.

A key threatening process nomination for *Changed fire regimes that cause biodiversity decline* was submitted to the federal environment department for consideration in 2007. After 13 years, no decision has been made by an environment minister whether to list, or not list, this process under Federal environmental law.

The following information is provided on the Department of Agriculture, Water and the Environment's website:¹⁸

The assessment timeframe for this key threatening process nomination was extended from 30 September 2010 until 31 March 2011 due to a delay in the public consultation period which occurred as a result of the tragic Victorian bushfires. The extension allowed the TSSC to consider the information learned in enquiries following these tragic fires.

The Threatened Species Scientific Committee provided its finalised advice to the Minister in March 2011.

The timeframe for the Minister to make a decision on whether to list this key threatening process was extended to 31 August 2013 to allow for further consultation with state and territory governments and to allow the Minister to consider the department's review of key threatening processes. This timeframe was then further extended to 29 November 2013 to allow the Committee to review the further input from the states and territories.

In light of the Black Summer fires, WWF-Australia recommends this key threatening process be listed under the EPBC Act with haste, and a threat abatement plan be developed to support actions to reduce the impact of changed fires on biodiversity.

Climate change risks Australia's native forests switching from a sink to a source of forest carbon emissions. Australia's 132 million hectares of native forests, including woodland forest, and store 22 billion tons of carbon.¹⁹ This is the seventh largest forest biome on Earth.²⁰

WWF-Australia estimates the bushfires released an estimated 400 to 700 million tons of carbon dioxide equivalent of greenhouse gases.²¹ This represents a very significant carbon pollution event that added to global heating, which the UK Met Office estimates contributed 2% of the projected increase in

¹⁸ Department of Agriculture, Water and the Environment. *Extensions to EPBC Act listing assessment and decision timeframes*. Viewed 6 April 2020. Available for viewing at

<https://www.environment.gov.au/biodiversity/threatened/nominations/extensions>

¹⁹ Department of Agriculture, Australian Government. *Fast forest facts*. Viewed 8 April 2020. Available for viewing at

<https://www.agriculture.gov.au/abares/forestsaustralia/fast-forest-facts#type-and-extent-of-australias-forests>

²⁰ Blanch, S. and Taylor, M. 2019. *Towards Two Billion Trees*. Report prepared for WWF-Australia, Sydney, 24pp, see p21.

Available for download at <https://www.wwf.org.au/news/news/2019/wwf-s-towards-two-billion-trees-plan-to-aid-koala-bushfire-recovery#gs.377v1r>

²¹ Bishop, J. 2020. *Valuing natural capital losses from bushfires*. Report prepared for WWF-Australia, Sydney, 13 pp.

atmospheric carbon dioxide concentrations from 2019 to 2020.²² This significant carbon pollution event will contribute to further Australian bushfires through a positive feedback loop that escalates forest carbon emissions from fires and droughts driven by global heating.

Recommendations

The Commonwealth and State Governments should:

- commit to Australia becoming a global leader in the transition to renewable energy to establish a safe climate under the Paris Climate Agreement. This is essential to protect forests from extreme and catastrophic bushfires;
- explore greater restrictions on building new infrastructure, as well as a planned retreat for the highest risk human settlements and infrastructure, from bushfire prone forests to reduce risk, driven by global heating, to life and property;
- support large scale natural regeneration of forests post-bushfires. This should include removing livestock grazing, eradication of feral herbivores, weed eradication, and cessation of bulldozing regrowth vegetation;
- if the above is found inadequate, and if warranted, deploy innovative mechanisms for enhancing post-fire forest recovery. This could include, for example, large-scale drone direct seeding into, or adjacent to, burnt vegetation where natural revegetation is hampered by tree deaths and reduced viability of soil seedbanks, or in remote or steep lands where safety concerns prohibit access by people for standard tree planting;
- mobilise finances to catalyse large-scale tree planting in strategic locations on cleared land to reconnect fragmented landscapes, where natural recovery is inadequate and other enhanced recovery options are unsuited;
- protect matters of national environmental significance protected under the *Environment Protection and Biodiversity Conservation Act 1999*, and environmental assets recognised under State environment and planning laws, from significant impact from bushfires, where feasible, and hazard reduction measures;
- establish a national bushfire program,²³ in collaboration with states and territories, to provide for enhanced fire management coordination, nationally consistent data collection and analyses, fire mapping, monitoring and reporting on causes and impacts, and provision of information to landholders and the public;
- implement sediment and erosion control measures on priority steep slopes, riparian zones, wetland buffers and highly erodible soils in firegrounds to stabilise soils and prevent sediment and nutrient pollution of waterways;
- further restrict and ban entry into forests during extreme and catastrophic fire days to reduce and avoid the risk of human induced ignitions, whether accidental or deliberate;
- expanded programs for the installation and monitoring of remote surveillance cameras in forests, particularly at key entry points, to enable monitoring and rapid response to ignitions caused by

²² Madge, G. *Australian bushfires help push forecast 2020 CO₂ rise*. Met Office, United Kingdom. Viewed 8 April 2020. Available for viewing at <https://www.metoffice.gov.uk/about-us/press-office/news/weather-and-climate/2020/2020-global-co2-forecast>

²³ David Bowman, D., & Bradstock, R. A. (2020). Australia needs a national fire inquiry - these are the 3 key areas it should deliver in. Faculty of Science, Medicine and Health - Papers: Part B. Retrieved from <https://ro.uow.edu.au/smhpapers1/1129>

lightning, long distance ember attack, accidental fires from forest users, and suspicious activity that could lead to arson;

- significantly increase funding for the purchase and hiring of large aerial water bombers to enable their rapid deployment to extinguish low and moderate intensity fires before they can develop into severe, extreme and catastrophic fires;
- restore \$170 million per year in funding to the National Reserve System Program from the existing Natural Heritage Trust budget, which would be budget neutral, to enhance the capacity of state national parks agencies to manage fuel loads, plan for hazard reduction burns and implement fire suppression;
- list as a key threatening process *Changed fire regimes that cause biodiversity decline* under the EPBC Act; and,
- exclude large scale tree thinning, livestock grazing and post-fire salvage logging from burnt areas in public conservation reserves and state forests.

iii. *land-use planning, zoning and development approval (including building standards), urban safety, construction of public infrastructure, and the incorporation of natural disaster considerations;*

Land-use planning, land-use zoning and development assessment processes should be reformed to provide enhanced protections from bushfire for built and natural assets. Approval of development of houses and other infrastructure, for example, deep in forests requires forest destruction beyond the development footprint to create large asset protection zones. The Black Summer bushfires show that even when houses in forested landscapes are surrounded by large cleared and grassed buffer zones, firestorms and ember attacks from very hot and fast-moving fires quickly overwhelm such defences. For severe, extreme and catastrophic fires, they will increasingly become ineffective bushfire mitigation measures. Rather, greater separation should be established through development assessment processes between valuable infrastructure and forests.

One of the lessons reinforced by the 2019-20 bushfire crisis is that natural disasters do not respect jurisdictional boundaries and there is clearly a need for greater national coordination and accountability. The establishment of the National Bushfire Recovery Agency on 6 January 2020, modelled on the North Queensland Livestock Industry Recovery Agency, and the Victorian Bushfire Reconstruction and Recovery Authority, is an important step towards addressing this need. However, the National Bushfire Recovery Agency is to operate for only two years and is tasked with the post-bushfire recovery. Given the ongoing impact of climate change, what is needed now is a permanent dedicated Commonwealth agency tasked with national coordination in preparing for, responding to and directing post-recovery work in conjunction with the States and Territories. WWF-Australia therefore recommends the establishment of a National Natural Disaster and Resilience Agency tasked with coordinating the work of the Commonwealth, States and Territories in preparing for and recovering from natural disasters.

Term of Reference G: Any ways in which the traditional land and fire management practices of Indigenous Australians could improve Australia’s resilience to natural disasters.

For more than a decade, WWF-Australia has partnered with Indigenous communities and organisations to co-design and deliver conservation and sustainable land and sea management outcomes. We have seen firsthand the significant environmental, social and economic benefits of properly resourced, Indigenous-led traditional management approaches. We have been encouraged by the increased interest in traditional land and fire management practices during and in the aftermath of the 2019-2020 bushfires.

There are many ways in which these practices could improve Australia’s resilience to natural disasters. For example, data collated by the Darwin Centre for Bushfire Research at Charles Darwin University, has shown that since cultural burning was reintroduced on a large scale in Northern Australia, “the area of land destroyed by wildfires has more than halved, from 26.5m hectares in 2000, to just 11.5m hectares in 2019.”²⁴ The revival of cultural burning in Australia’s southeast is at a much earlier stage than in Northern Australia, and faces some different challenges, but has great potential to allow “Indigenous groups to re-establish access to and connect with Country, rebuild cultural knowledge, and protect animals and ecosystems that are important to them”²⁵. WWF-Australia, and many of our Indigenous partners, are confident that these approaches can play a vital role in strengthening Australia’s resilience to natural disasters.

Cultural burning, however, is not a silver bullet. Traditional land and fire management represents a “holistic set of practices that link the management of conservation and productive values to the environmental and cultural services upon which they depend.”²⁶ There are concerns that the growing interest in “Aboriginal people’s fire management may be limited to specific burning techniques, without appreciating that this is deeper knowledge about how to live with Country that can inform state, territory and national policy and practice more broadly.”²⁷

It is crucial that these practices not be considered in isolation of the cultural and operational contexts in which they function and not be seen as a one-size-fits-all approach. Incorporating traditional fire management approaches into Australia’s disaster risk reduction regime will require increased investment in broader Indigenous cultural and natural resource management (CNRM), including increased long-term funding for Indigenous ranger groups, land councils, Aboriginal corporations, grassroots community organisations and other groups delivering cultural authority in managing Country.

It is also important to recognise that within that cultural and operational context, Indigenous men and women may have different roles in fire management²⁸. Investment should, therefore, include targeted measures to promote the increased participation of women in Indigenous land and fire management.

²⁴ Allam, L (2020, 19 January) *Right fire for right future: how cultural burning can protect Australia from catastrophic blazes* The Guardian. <https://www.theguardian.com/australia-news/2020/jan/19/right-fire-for-right-future-how-cultural-burning-can-protect-australia-from-catastrophic-blazes>

²⁵ McKemey, M et al (2019) “Cross-cultural Monitoring of a Cultural Keystone Species Informs Revival of Indigenous Burning of Country in South-Eastern Australia” *Human Ecology* 47, 893-904

²⁶ The Victorian Traditional Owner Cultural Fire Knowledge Group (2019) *The Victorian Traditional Owner Cultural Fire Strategy*

²⁷ Williamson, Markham & Weir (2020) *Aboriginal peoples and the response to the 2019-2020 bushfires*, Working Paper No. 134/2020, Centre for Aboriginal Economic Policy Research, Australian National University, Canberra

²⁸ See, for example, CSIRO and NAILSMA (2016) *Report on the National Indigenous Fire Knowledge and Fire Management Forum* Darwin

Moreover, any consideration of drawing on Indigenous traditional practices to strengthen Australia's resilience to natural disasters should be complemented by concerted efforts to ensure that Australia's disaster management regime better responds to the unique impacts of disasters on Indigenous wellbeing. Indigenous people have been uniquely and disproportionately affected by the 2019-2020 bushfires. While comprising only 2.3% of the total population of NSW and Victoria, Indigenous people represented nearly 5.4% of the 1.55 million people living in fire-affected areas of those states²⁹.

For many Indigenous people, connection to Country is a significant factor in Social and Emotional Wellbeing³⁰ and the destruction of key cultural sites and loss of cultural keystone species has been keenly felt by many of our partners. We encourage the Royal Commission to consider not only how Indigenous traditional practices may improve disaster preparedness, but also how Australia's approaches to disaster response could better address the needs and priorities of Indigenous people.

Specific recommendations

1. Ensure that a broad group of Indigenous fire practitioners and Indigenous rangers from different parts of the country are involved in the development and implementation of any efforts to incorporate traditional land and fire management into Australia's disaster preparedness planning. WWF-Australia would welcome the opportunity to assist in convening such a group.
2. Ensure that efforts to promote and support Indigenous fire management are rooted in broader cultural and natural resource management frameworks and include long-term funding for Indigenous rangers and other Indigenous CNRM groups, with targeted funding to support women's participation and leadership.
3. Recognising the unique impacts that natural disasters can have on Indigenous Social and Emotional Wellbeing, ensure Indigenous representation on relevant committees involved in all decision-making, planning and implementation of disaster risk management.

²⁹ McKerney et al.

³⁰ Gee, G., Dudgeon, P., Schultz, C., Hart, K., & Kelly, K. (2014). Social Determinants of Aboriginal and Torres Strait Islander Social and Emotional Wellbeing; In Purdie, Dudgeon, Walker (Ed.), *Working Together: Aboriginal and Torres Strait Islander Mental Health and Wellbeing Principles and Practice / History and Contexts/Aboriginal and Torres Strait Islander Social and Emotional Wellbeing*.