NSW INDEPENDENT BUSHFIRE INQUIRY

Submission by

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and

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Cover: The forest springs to life post fire. Photo by Buzz.

Executive Summary

Our submission

The Institute of Foresters of Australia and Australian Forest Growers (hereafter referred to as the 'Institute[1]') is Australia's representative body for forestry professionals and forest growers. Established in 1935, the Institute has over 1000 members engaged in all aspects of forest management, research, academia, forest growing, farm forestry and conservation in Australia. Its members have led the field of fire management and research in Australian Forests over many decades.

The Institute has a standing Forest Fire Management Committee comprising leading experts from around Australia and provides opportunities for the broader fire management community to further knowledge and understanding of fire management in Australia. The March 2019 Subtropical Fire Forum held in Lismore is an example of the work of the Institute in this area and included some prescient warnings of the potential consequences of an increasingly restrictive regulatory environment and recent lapses in proactive fire management throughout Australia.

Most foresters have had personal responsibility for bushfire mitigation and suppression at some stage during their career. They have generally also gained far more experience and understanding of fire in the natural environment than any other firefighters, largely through the operational use of fire during prescribed burning operations for silvicultural or conservation purposes, and for forest fuel reduction.

The Institute welcomes the opportunity to have input into the NSW Government Inquiry into the 2019/20 Fire season in NSW. In our submission below, we have addressed the Terms of Reference in which our members have leading expert knowledge.

This written submission can be supported by a verbal presentation to the Independent Inquiry or the provision of more detailed written information if required.

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Note: *Throughout this submission some terms are used interchangeably to describe the same thing. The attached* ***Appendix 2*** *defines and explains these terms and we recommend it as an important part of this submission.*

[1] The Institute of Foresters of Australia (IFA) and Australian Forest Growers (AFG) merged in early 2019. This new merged identify, is an internationally recognised professional association.

Independent Inquiry's Terms of Reference

1. The causes of, and factors contributing to, the frequency, intensity, timing and location of, bushfires in NSW in the 2019-20 bushfire season, including consideration of any role of weather, drought, climate change, fuel loads and human activity.

The ongoing severe drought certainly played a major contributing role in the fire behaviour during the 2019/20 fire season in NSW and elsewhere. Climate change scientists have already warned that climate change will result in increased fire weather with an associated increased intensity of wildfires (bushfires)[2].

The Institute believes it is important to address those areas where Government, Community and individual land managers can act immediately and directly to address wildfire threat. We also believe that the focus should seek to find a better balance between prevention and amelioration, with emergency response. These are mutually reinforcing priorities. Improved capability in wildfire prevention will result in greater capacity to respond to emergencies.

Many, although not all Australian forests are highly flammable and through the frequent application of low intensity fire by indigenous cultures for many thousands of years, many forests have naturally adapted to cope with periodic fire.

In more recent times, fire in Australia's forested landscapes has been managed by professionally trained and experienced forest managers who have given approximately equal weighting to pre-fire season mitigation measures (such as fuel reduction and maintaining forest access), and in-season emergency fire suppression. Generally, the capability to successfully manage forest fire has been closely related to the management of forests for timber production, because it provides a strong economic imperative and employs an experienced and well equipped workforce operating within the forest.

Over the past 35-years, the decline of native forest timber production in pursuit of the creation of conservation areas has coincided with a shift away from pre-season fire mitigation measures to an unbalanced fire management approach dominated by in-season emergency fire suppression. A protectionist view of forest ecosystems, underpinned by passive management and human exclusion, has contributed to the excessive build-up of fuels in forests that have historically had low levels of fuel due to regular low intensity fires. As a consequence, forests that have excessive fuel loads have experienced large uncontrollable wildfire with resultant catastrophic impacts on ecosystems and rural communities.

[2] Bushfire is an Australian term for any unplanned landscape fire in grassland, woodland, heathland or forest and is a term used in this Inquiry's terminology. However, as it is sometimes only used to mean "forest" fire it has an element of ambiguity about it. Wildfire is the international term used for any unplanned fire in grassland, woodland, heathland or forest. As it is less ambiguous term and internationally understood, wildfire is the preferred term used by the Institute as an internationally recognised body. To be consistent with this edict, this submission will from now on use the term wildfire when referring to unplanned forest fire.

The Institute strongly advocates for:

- Management of fuel loads across the entire forested landscape at levels consistent with traditional aboriginal land management practices of frequent, regular planned low-intensity fire. Research by CSIRO and State-based forest management agencies over many decades, and then in recent times research by the Bushfire Cooperative Research Centre and the Bushfire and Natural Hazards Research Centre has demonstrated the impact of fuel loads on fire behaviour in different topographic and climatic conditions. This research has led to the development of reliable models of fire behaviour which have withstood the test of time.
- Restoration and maintenance of access roads, tracks and firebreaks to facilitate both prescribed burning[3] operations and rapid ground-based response to wildfire, including safe and accessible access for undertaking back burning.
- Maintenance of strong forestry and timber industry sectors in rural areas ensuring a resource base of specialist trained and experienced personnel and heavy equipment to facilitate rapid and direct response to bushfire emergencies.

2. The preparation and planning by agencies, government, other entities and the community for bushfires in NSW, including current laws, practices and strategies, and building standards and their application and effect.

The Institute's expertise lies in forest science and management rather than organisational planning and building standards so our submission on this topic is limited to recommending a review of the current legal framework to ensure that land managers are:

- held responsible for management of fuel loads to appropriate scientifically based levels reflecting the evolutionary ecology of forested landscapes and fire behaviour models, and
- protected from prosecution or disciplinary action in the event of escapes from properly planned and executed prescribed burning operations.

[3] The term "Prescribed Burning" refers to fires which have been carefully planned and documented before implementation with a clearly stated set of management objectives and carried out under clearly prescribed conditions based on fire science.

"Burning Off" is also a deliberately lit fire to achieve certain outcomes, but is done without careful documentation or prescription settings and usually implemented based on the past experience of the owner of the fire. "Controlled Burns", "Cool Burns", "Hazard Reduction Burns", "Regeneration Burns", "Slash Burns" , "Fuel Reduction Burns", "Ecological Burns", "Habitat Burns" and "Backburns" are all forms of Prescribed Burns, if properly planned and executed.

3. Responses to bushfires, particularly measures to control the spread of the fires and to protect life, property and the environment, including:

- immediate management, including the issuing of public warnings
- resourcing, coordination and deployment
- equipment and communication systems.

The Institute notes, with concern, an increasing reliance on the use of very expensive tools and technology, such as aerial water bombers, fire suppression chemicals and, at times inadequately informed, computer modelling. Whilst technology certainly has an important role to play in fire management, the use of expensive technology should not be at the expense of conventional fire prevention/amelioration and rapid and aggressive ground-based fire control using experienced and well-trained forest firefighting crews including timber harvesting crews skilled in using heavy plant and equipment.

A feature of the current approach to forest fire-fighting is an unrealistic obsession with avoiding fire-fighting risks to an extent that can at times inhibit the capacity to control fires in a timely manner and counter-productively result in greater fire impacts and losses.

This exaggerated risk avoidant attitude that has recently crept into NSW firefighting culture with the reduced emphasis on wildfire mitigation has resulted in increased funding of its emergency wildfire suppression model. This resulted in increasing numbers of firefighting aircraft, particularly the expensive larger aircraft. While proper use of firefighting aircraft is supported, the recent escalation and its huge expense seems hard to justify. The Institute encourages the independent review to investigate the efficiencies and effectiveness of the aircraft used in 2019/20.

Forest wildfire risk can be better managed with experienced forestry and timber industry personnel that work in the forest on a daily basis and are therefore comfortable and capable of working effectively with high intensity fire. Although a vital and valuable resource, the Rural Fire Service (RFS) does not have the specialist training and experience in forest firefighting that forestry and timber industry workers do.

Of course it can be unwise and unproductive to attempt to control intense fire in extreme conditions by direct attack. However, extreme days are often followed by a series of days and nights with more benign weather when direct ground-based attack using heavy equipment, trained and experienced personnel, backburning, mop-up and patrol can make the difference between a relatively small, contained fire and a catastrophic outcome. A review of meteorological conditions over the period from initial ignition to final control of the major fires in NSW during the 2019/20 fire season will reveal that there were periods of relatively benign conditions where, given adequate access, trained and experienced forest firefighting personnel with appropriate equipment, fires could have been controlled to much smaller perimeters than was the final outcome.

The Institute considers that maintaining a strong native forest timber industry is an integral part of the solution to the recent increase in the magnitude of forest fires. This is precisely because those working within that sector live and breathe forest and fire management on a daily basis.

The Institute considers that strategies are needed to strengthen the specialist skills that are critical to forest firefighting, including backburning. Anecdotal evidence suggests that in the recent fire season there were many inappropriate backburning[4] operations undertaken by personnel not adequately trained in forest firefighting. In some instances, backburns escaped resulting in uncontrolled large scale wildfires that severely impacted communities and infrastructure. Backburning is a critically important tool for forest firefighting where water sources are often scarce, however backburning requires specialist expertise and experience to be undertaken safely and effectively. Having a network of well-maintained tracks and roads is also critical for successful and safe backburning.

5. Preparation and planning for future bushfire threats and risks.

Prevention or amelioration should be the first priority in preparation for future bushfires.
In the preparation for future bushfire threats and risks, there needs to be appreciation of the fact that, of all the factors influencing fire behaviour, fuel loads are the only one that can be directly controlled at a relevant scale.

The role of the RFS should be reviewed to ensure that an increased priority be given to risk minimisation. Of course this must not come at the expense of emergency response capability.

Responsibility for wildfire risk mitigation through fuel management, in accordance with the *National Bushfire Management Policy Statement for Forests and Rangelands*[5], should remain with land managers, both private and public land managers. This should be facilitated with appropriate regulation and guidelines after appropriate performance measures are developed to meet the fourteen gaols of the National Bushfire Management Policy.

An independent government body should be established to oversight the performance of those with legislative responsibility for wildfire risk minimisation.

Skills, experience, resources and infrastructure obtained and developed during fuel management activities are invaluable in subsequent firefighting operations. Volunteer firefighters should be encouraged to gain valuable experience in forest fire management through assisting land managers in prescribed burning operations.

At the legislative and regulatory level, a review of the legal and administrative environment currently regulating fuel management is required. The responsibility for risk amelioration should rest with land managers and they should be protected from the risk of prosecution or disciplinary action in the event of escapes from properly planned, resourced and executed fuel management operations.

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[4] Backburning is a planned burning operation used to control the spread of an uncontrolled fire. It is used as an indirect form of fire control and should be carried out after extensive consideration and with skilled fire crews. Backburning is a major strategic decision only to be made by an Incident Controller at a wildfire. Sometimes people will refer to Prescribed Burning as Backburning, but this is not correct. It is true that Backburning is one special form of Prescribed Burning, but Prescribed Burning is far broader than just Backburning.

[5] Forest Fire Management Group (2014). National Bushfire Management Policy Statement for Forest and Rangelands. Prepared by The Forest Fire Management Group for The Council of Australian Governments. 28pp. http://www.afac.com.au/docs/default-source/assets/national-bushfire-management-policy.pdf

Government should ensure that public land management agencies, as well as private corporations and individuals, are adequately resourced and supported with training, equipment and infrastructure to effectively manage forested areas in relation to fuel loads and ecological health.

Developments in satellite technology should continue to be used to provide land managers and emergency response agencies with real time relevant information to aid in fire planning, fire behaviour monitoring, suppression and management of prescribed fire operations. Access to integrated real time data should be improved through continuous development of data gathering and communications technologies.

6. Land use planning and management and building standards, including appropriate clearing and other hazard reduction, zoning, and any appropriate use of indigenous practices.

The Institute is concerned at the relatively recent development of a protectionist philosophy towards natural area management. Given the tens of millennia of landscape management by indigenous peoples and the evolution of the Australian biota, especially since the last Ice Age under this regime, attempts to exclude human activity and regular planned fire from forested landscapes are not in the best interests of conserving natural ecosystems nor in protecting lives and assets in modern society.

Prior to the 2019/20 season there was evidence that the Asset Protection Zone approach alone does not work, especially under severe weather conditions, which we must expect more of under a changing climate. The fire which impacted Canberra in January 2003 demonstrated the need for a landscape scale approach to fire management.

The 2019/20 fire season has also demonstrated that the approach to focus of prescribed burning to reduce fuels in Asset Protection Zones without complementary landscape prescribed burning for wildfire mitigation fails to protect lives and assets. High intensity fires coming from forests with heavy fuel loads cannot be contained or controlled by narrow fuel reduced zones close to assets. The Currowan fire provides one such example. Rather a landscape scale approach to prescribed burning for wildfire mitigation (sometimes referred to as hazard reduction[6]) needs to be adopted, in addition to asset protection approaches, to ensure that fires can be more readily and rapidly brought under control in the forest.

[6] According to standard risk assessment procedures, a "Hazard" is a source of potential harm or a situation with potential to cause loss if a value or asset is exposed to it. Fine forest fuels are often referred to as a "Hazard", but it is not the fuel that is the hazard, but the nature of the fire that it might support. The real hazards are aspects of fire such as radiation, convective heat, embers and smoke. Therefore, "Hazard Reduction Burning" and "Fuel Reduction Burning" refers to "Prescribed Burning" that changes the "Fuel Level" in a way that reduces the level of radiation, convective heat, number of embers and amount of smoke produced during a fire.

7. Appropriate action to adapt to future bushfire risks to communities and ecosystems.

Observed increases in both the frequency and severity of fire seasons are due essentially to two factors:

- Climate change leading to increases in the number of high fire-risk days and the length of the fire season
- Disrupted landscape-based fire management since colonial times, and especially in more recent decades, with the development of a protectionist philosophy to natural area management.

Clearly the second of these factors gives us the greater immediate opportunity to adapt and protect communities and ecosystems. A complete return to Aboriginal landscape management is not entirely possible or universally appropriate given post-European settlement land use change and modern community structures. However, evidence from elsewhere in Australia and overseas shows that a return to the spatial and temporal patterns of fire management practiced by indigenous people can build resilience of communities and ecosystems, and help to manage future bushfire risks. Importantly, implementing Aboriginal fire management and cultural burning techniques can help to increase and improve human connection to nature and build the specialist skill sets required to manage forest wildfires

8. Emergency responses to bushfires, including overall human and capital resourcing.

Emergency response to bushfires depends on a trained and qualified workforce with relevant local experience. The trend by Government to reduce the size of forest management agencies and to focus them primarily on timber production rather than holistic management of forests has compromised this capability. Similarly, the contraction of the timber industry has deprived rural communities of an invaluable resource of experienced forest firefighters. Moreover, changes to the approaches to managing both state forests and conservation areas has severely compromised road and track access within the forested landscape making it more difficult to undertake fuel reduction activities, successfully deploy fire crews for first attack and safely undertake backburning.

The 2019/20 fire season provided a stark reminder of the reliance on the heavy machinery and skill set of forestry contractors that is critical to bushfire fighting.

We have noted, above, that increasing reliance on expensive and relatively inefficient aerial water bombing and chemical retardant has distracted the firefighting and strategic planning efforts away from thoughtful and timely implementation of ground-based containment lines and appropriate backburning. In 2019/20 this contributed to large out-of-control fires that may have been contained to relatively small perimeters with more efficient, timely and assertive ground-based strategies.

The key to improving and maintaining emergency response capability lies in:

- Trained and experienced forest fire fighters with local experience honed in off-season fire management operations;
- Maintenance, at a regional level, of a heavy machinery fleet of forest-capable equipment with skilled operators;
- Restoration and maintenance of road, track and firebreak infrastructure to facilitate rapid access to remote forest areas

APPENDICES

Appendix 1: IFA Position Paper 3.1: The role of fire in Australian forests and woodlands[7]

The Institute of Foresters of Australia (IFA) advocates a better appreciation of the important and complex role that fire plays in the evolution and maintenance of Australian ecosystems and its potential to significantly impact on social, economic and cultural values. The IFA also advocates for better management of bushfires and prescribed fires, including the need for further scientific research and the systematic monitoring and review of fire management with the results being made available to policy makers, land managers, fire services and the community.

Fire is one of the most important factors in the ecology of Australian forests and woodlands. Hence, the managers of both public and private forests must understand the role of fire both in meeting land management objectives and in minimising the potential for adverse impacts on human life and property.

The Issues

Fire is an essential element of the Australian natural environment that cannot be removed. It is integral to maintaining environmental processes such as nutrient cycling, adaptation and evolution via gene expression and redistribution, faunal and floral composition and structure, hydrological processes and habitat formation and maintenance.

However, uncontrolled fire can also be destructive, potentially leading to human death, loss of houses, infrastructure and services, loss of amenity, impact on water flows and water quality, loss of habitat, loss of soil and soil nutrients and loss or degradation of other forest values such as timber. The impact of fire can also extend beyond the burnt area with smoke from bushfires or planned burns having potential to cause visibility problems, adversely affect human health, and damage crops such as wine grapes.

To manage for the protection of human life and biodiversity, fire must be viewed and managed at a landscape scale and over long timeframes even though its impact, at any one time, may be local and immediate. To this end, fire in the natural environment must be managed by professionally trained, experienced and accredited forest managers, not just emergency service agencies.

There has been an increasing reliance on the use of tools and technology, such as aircraft, firefighting vehicles, fire suppression chemicals, computer models and voluntary evacuation ("leave early") to control fires and reduce the loss of human life. This has been at the expense of rapid and aggressive early fire control using experienced and well trained

[7] Available at: https://www.forestry.org.au/Forestry/About/Position_statements_policies/IFA_policies/Forestry/About_the_Forestry/Position_statement_policies.aspx?hkey=d18cfb2c-ce37-4178-8de2-7e24d25399d9

ground crews in direct attack strategies early in the fire's development which, in most cases, is more likely to be effective than indirect attack strategies.

Position Statement

The IFA recognises that:

Fire is an essential ecological factor, which has an important and ongoing role in maintaining biodiversity and ecological processes in Australian forests and woodlands.

- The ecological effects of fire vary according to the season, frequency, intensity, patchiness and scale of burning within a landscape.
- Bushfires can have effects that are significant at local, regional and global spatial scales and operate on timescales from the immediate to impacting over decades or centuries.
- Bushfires can be a very real threat to human life, property, economic and cultural values, social function and environmental values.

The IFA considers that:

- Every fire management program should be objectives-based and outcome-focused. The objectives should be set out in management plans based on legislative requirements, government policy and public consultation. Objectives must cover the protection of human life, property, economic and cultural values, social function and environmental values.
- Short-term fire management objectives should be consistent with long-term, landscape-scale fire and land management objectives.
- A decision to deliberately exclude fire from naturally fire-prone forests and woodlands will have adverse consequences for ecosystem productivity and function in the long-term.
- Because of the complex interaction of factors affecting fire and land management, there can be some uncertainty about the outcomes of different strategies and operations, therefore a risk-based assessment is a good way to approach fire management. Given the uncertainty in all the contributing factors and their interactions, the application of sound risk management principles gives the best likelihood of achieving specific management objectives. Having an outcomes focus, with well-defined performance measures, will lead to a system whereby the results of fire management strategies can be identified and measured over a long timeframe.
- The Australian, State and Territory governments have a responsibility to provide adequate resources for coordinated research and systematic monitoring of the behaviour, environmental effects and social impacts of bushfires and to provide inter-generational continuity of skills, capability and resources.
- The focus in all fire management programs should be around Prevention, Preparedness, and Fire Regime management and there needs to be a move away from relying primarily on Response and Recovery.
- The use of fire in the landscape by many Traditional Owners is acknowledged. Traditional knowledge and burning practices have great potential to contribute to positive social and environmental outcomes. Fire management can be used to reintroduce traditional knowledge to communities where it has been lost.
- All fire management operations should put a high priority on fire-fighter safety. However, the level of risks taken should be commensurate with the potential benefits to be gained, cognisant of the fact that fire-fighting is inherently risky and that trying

to avoid all risk may inhibit the capacity to control fire in a timely manner and result in greater impacts and losses.

- Fire-fighting aircraft, tools and technology are not a substitute for effective on-ground fire-fighting. The primary focus of fire control should always be around on-ground efforts with aircraft, tools and technology being used to make on-ground efforts safer and more effective.
- Planned burning must be undertaken to enable forests and woodlands to be managed sustainably in the long-term, including the ability to evolve and adapt to climate change, physical disturbances, pests and diseases.
- Communication and consultation between forest managers, emergency response agencies and other stakeholders is vital to establish management objectives, including levels of "acceptable bushfire risk" for successful planning and fire management activities.
- Adaptive fire management ("learning by doing", monitoring and recording with scientific analysis) should always be used.
- Many aspects of forest fire management are common globally. It is important to exchange knowledge and expertise nationally and internationally to extend the range and depth of knowledge and experience in bushfire policy, research and management.

Supporting Documents

AFAC (2012). *Bushfire Glossary*. Prepared by the Rural and Land Management Group for AFAC Agencies. Australasian Fire and Emergency Service Authorities Council. 36pp. http://www.afac.com.au/docs/default-source/doctrine/bushfire-terminology.pdf

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Appendix 2: Clarifying some Forest Fire Management Terminology

Institute members are encouraged to use the comprehensive, standard reference list of fire terms used in Australia published by the Australasian Fire and Emergency Services Authorities Council (AFAC 2012). This paper is to provide to clarify some commonly misused fire management terms.

Wildfire or Bushfire?

Bushfire is an Australian term for any unplanned landscape fire in grassland, woodland, heathland or forest. However, it is sometimes only used to mean "forest" fire and so has an element of ambiguity about it. **Wildfire** is the international term used for any unplanned fire in grassland, woodland, heathland or forest. However, it is sometimes taken to imply fires are of high intensity, when wildfire can be low and/or high intensity, but are all "unplanned". Wildfire is a less ambiguous term and internationally understood and therefore our preferred term.

Planned Burn / Controlled Burn / Prescribed Burn / Cool Burn / Hazard Reduction Burn / Ecological Burn / Habitat Burn / Burning Off?

The preferred term is "**Prescribed Burn**" for fires which have been carefully planned and documented before implementation with a clearly stated set of management objectives and carried out under clearly prescribed conditions based on fire science. "**Burning Off**" is also a deliberately lit fire to achieve certain outcomes, but is done without careful documentation or prescription settings and usually implemented based on the past experience of the owner of the fire. "Controlled Burns", "Cool Burns", "Hazard Reduction Burns", "Regeneration Burns", "Slash Burns" , "Fuel Reduction Burns", "Ecological Burns", "Habitat Burns" and "Backburns" are all forms of Prescribed Burns.

Backburning or Prescribed Burning?

Backburning is a planned burning operation used to control the spread of an uncontrolled fire. It is used as an indirect form of fire control and should be carried out after extensive consideration and with skilled fire crews. Backburning is a major strategic decision only to be made by an Incident Controller at a wildfire. Sometimes people will refer to Prescribed Burning as Backburning, but this is not correct. It is true that Backburning is one special form of **Prescribed Burning**, but Prescribed Burning is far broader than just Backburning.

Backburning or Burning-Out?

Backburning involves lighting a new, independent fire ahead of a wildfire front so as to remove all the fuels from a designated control line back to the wildfire front. Typically the backburn will be burning back into the wind and hence its name. When a backburn and a fire front meet, the local fire intensity is likely to be increased. Under conditions when a wildfire cannot be controlled by direct attack, maintaining control of a backburn is a very risky and difficult strategy to implement and therefore must be sanctioned by the Incident Controller of a Wildfire. **Burning-Out** may involve small or very large areas of deliberate lighting, but it is done within the limits of an existing fire area, hence it is a tactical decision that can be made of Operational leaders on the fireline or by the Incident Controller. The aim of a burning-out operation is to consume all the fuels within fire control lines under mild

and controlled conditions to prevent spotting or intense fire runs breaching the control lines under any expected more severe weather conditions.

"Fuel Load" or "Fuel Level"?

"Fuel Level" is a relative measure of the fuel based on the arrangement, structure, composition, proportion of dead material, and thickness of the fuel elements in the fuel complex. Generally, the "Fuel Level" refers to the **"Fine Fuel"** component of the fuel complex, i.e. that fuel that burns in the flaming zone of a fire and is generally taken to be dead vegetative material less than 6 mm in thickness and live vegetation less than 2 mm thick. The Fuel Level is often assessed using a visual guide such as the Overall Fine Fuel Hazard Guide written by Hines *et al.* (2010). **"Fuel Load"** is one aspect of the fuel level related to the weight of fuel per unit area, often expressed in terms of tonnes per hectare (t/ha). "Fuel Load" is important in calculating the heat release and intensity of fires, but it does not capture other important attributes of fuels that influence fire behaviour. Under dry conditions, the fuel consumed by a fire will also include larger sized pieces of dead woody fuel, >6 mm thickness, that contribute to the depth of the flaming zone, residual heating of vegetation and soil, and the strength of the convective plume above the fire. "Fuel Level" is much better related to attributes of fire behaviour such as flame height, and rate of spread.

"Hazard Reduction"?

According to standard risk assessment procedures, a "**Hazard**" is a source of potential harm or a situation with potential to cause loss if a value or asset is exposed to it. Fine fuels are often referred to as a "Hazard", but it is not the fuel that is the hazard, but the nature of the fire that it might support. The real hazards are aspects of fire such as radiation, convective heat, embers and smoke. Therefore, "**Hazard Reduction Burning**" and "**Fuel Reduction Burning**" refers to **"Prescribed Burning"** that changes the "**Fuel Level**" in a way that reduces the level of radiation, convective heat, number of embers and amount of smoke produced during a fire.

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