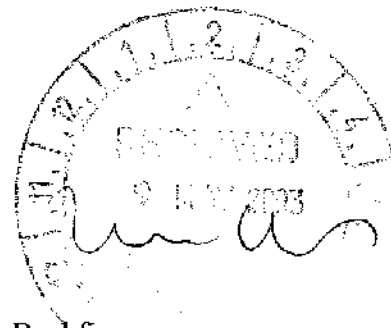




Risk Management
Community Safety
Wildfire Protection
Project Management

Your Ref:
Our Ref:

09 May 2003



Committee Secretary
Select Committee on the Recent Australian Bushfires
Parliament House
CANBERRA ACT 2600

Submission No.202

Dear Sir/Madam

Submission to the Select Committee on the recent Australian Bushfires

SUMMARY

At regular intervals significant bushfires occur in Australia. Some of these fires result in the loss of lives and buildings, but also in damage to, or destruction of, infrastructure, plantations, farms and ecosystems. The full cost of such fires to the community and government extends well beyond the physical replacement value of an asset. In most cases, the full cost of bushfires is not known.

Existing bushfire management practices and systems appear to be adequate for some 95-98% of the fires, with losses kept to a minimum. However, existing systems and practices fail to prevent significant losses in 2-5% of the bushfires. Historically, these fires burn under severe fire weather conditions and have fire intensities, even in hazard reduced areas, which by far exceed the capacity of fire appliances and/or aircraft to successfully suppress them.

Over the past decades major improvements have been made to fire suppression capabilities. Communications, training, mapping and appliances have been upgraded, and aerial fire suppression has been introduced in many areas. This may have enabled fire services and land management agencies to contain some fires which would have developed into major bushfire emergencies in previous years. Nevertheless, these improvements to fire suppression capabilities failed to prevent losses during the recent major bushfires in Australia.

Since the 1940s the variables which contribute to building loss are known, and solutions for the survival of people and buildings in bushfires have been developed. Nevertheless, we continue to see fatalities and significant building losses. In most cases, building and planning requirements fail to address bushfire safety, and in many areas where bushfire safety requirements are applied, they are inadequate to prevent losses.

The *Australian Standard for the Construction of buildings in bushfire-prone areas* (AS3959) is unworkable. It does not provide a practical hazard assessment tool and fails to prescribe performance criteria which are commensurate with respective levels of bushfire attack. Furthermore, this standard only applies to areas which have been declared by fire services or local governments as *bushfire-prone*. Even in those areas which have been designated as *bushfire-prone* the standard does not apply to, for example, schools, hospitals, commercial buildings, or observatories for that matter.

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It is most likely that the inquiry into the recent bushfires will receive submissions which highlight the need for more hazard reduction burning, for more fire fighting aircraft and appliances, and for more resources in general. However, the existing approach and systems have clearly failed to prevent the recent major bushfires and subsequent losses. Although it may be desirable to further increase resources, a fundamentally different approach is necessary to significantly decrease bushfire risk in communities and to buildings, infrastructure, plantations and farms, but also the environment. An integrated bushfire risk management approach is required, which allows for well informed decision making.

Unfortunately, comprehensive and well informed risk assessments have not been undertaken to date. Such assessments would clearly identify bushfire risk areas and the strategies that should be applied to minimise bushfire risk. The Australian Standard for Risk Management (AS/NZS 4360:1999) and the *Introduction for Emergency Risk Management Reference Pack* (EMA, 1999) could provide the framework for this.

However, very few individuals in the relevant agencies have the capacity, or adequate training, to implement a comprehensive wildfire risk management approach. Formal training in wildfire risk management, say at tertiary level, is also not available. As a result, inadequate hazard or risk models are currently in use. Some only deal with hazards, while others tend to address symptomatic issues and fail to resolve the underlying, fundamental problems. An independent review process to assess whether current wildfire risk management strategies are effective, is also not in place.

The problem of implementing a comprehensive wildfire risk management approach is exacerbated by the fact that many agencies are heavily biased towards response and fire operations, rather than risk management and safer communities, and that few personnel have formal training in wildfire risk management. Furthermore, agencies are, generally, self-regulating. They provide operational functions, training, research and audit roles, but they also provide advice to governments. This has the potential to stifle continuous improvement, and has in many cases resulted in a culture that does not have a capacity to learn.

The formation of the *Cooperative Research Centre for Bush Fire* has the potential to significantly improve knowledge about bushfires and bushfire risk management. However, it should be remembered that the management board of the centre consists of the very people who to date have generally failed to make fundamental changes to bushfire risk management practices in Australia, which in turn has resulted in the recent major bushfires and losses. Vision and leadership is required to develop and implement an alternative, and comprehensive approach to wildfire risk management.

RECOMMENDATIONS

1. That the *Select Committee on the Recent Bush Fires* focuses on fundamental problems in relation to wildfire risk management, rather than on symptomatic issues such as whether more hazard reduction burning should be undertaken, or whether more and bigger aircraft are needed.
2. That a comprehensive wildfire risk management approach is developed and implemented, which integrates community resilience or vulnerability attributes, and hazard assessments.
3. That formal training in wildfire risk management, at post secondary and tertiary level, is developed to improve the capacity of personnel in the fire and emergency services, and land management agencies, to implement comprehensive wildfire risk management strategies, which in turn will provide for a safer community.
4. That current land development and building regulations are reviewed and improved, to ensure that minimum wildfire risk management requirements are adequately applied.
5. That wildfire risk management training is integrated into courses for architects, town planners, land and/or national park managers, foresters, and personnel responsible for building maintenance and safety.
6. That a research program is established in the areas of wildfire risk management, wildfire behaviour, people behaviour (civilians and emergency services personnel), and building safety.

TERMS OF REFERENCE

(a) The extent and impact of the bushfires on the environment, private and public assets and local communities.

During the 2002/03 fire season a large number of major bushfires burned in Western Australia. These fires resulted in a fatality (fire fighter), building losses, and damage to plantations as well as ecosystems. Extensive media coverage on the Eastern States fires limited publicity on the Western Australian fires. In order to obtain a more complete picture of the bushfire situation in Australia, it is recommended that the Committee obtains a summary of the 2002/03 fires in Western Australia, from the Fire and Emergency Services Authority and the Department of Conservation and Land Management.

(b) The causes and risk factors contributing to the impact and severity of the bushfires, including land management practices and policies in national parks, state forests, other Crown land and private property.

Lightning was a more prominent cause of fires during 2002/03 fire season, compared to previous years. However, arson and escapes from burning off and/or fire control operations remained major causes of fires.

Agencies claim that Western Australia has an extensive hazard reduction burning program in place to reduce wildfire risk. Nevertheless, significant fires and losses still occur every year. This suggests that hazard reduction burning on its own is insufficient to minimise risk.

An integrated approach to wildfire risk management, which incorporates national parks, state forests, Crown land and private property, is currently not in place. As a result, communities and their infrastructure and assets, such as buildings, plantations and farms, as well as ecological and biodiversity values, are exposed to significant risks. Furthermore, the lack of an integrated approach to wildfire risk management significantly reduces the effectiveness of the existing hazard reduction programs.

(c) The adequacy and economic and environmental impact of hazard reduction and other strategies for bushfire prevention, suppression and control.

It is interesting to note that *hazard reduction* features prominently in the terms of reference of the Select Committee. It could be inferred that hazard reduction burning is seen as the key strategy to mitigate against bushfires and their losses. Research and case studies have clearly shown that this not the case. Hazard reduction burning is only one of the strategies which can be applied to minimise the extent of, and losses from bushfires.

It is hoped that the Select Committee will not be drawn into the discussion of whether more or less burning is required. These are symptomatic problems which can be resolved once agencies and communities address the underlying, fundamental issues. It is strongly recommended that the Select Committee focuses on the fundamental changes that are required to introduce a comprehensive wildfire risk management approach, which in turn will provide for safer communities, well protected forestry and agriculture, as well as sustainable conservation and biodiversity. Such an approach will provide for well informed decision making, and will deal with the question of hazard reduction burning at the appropriate level.

Unfortunately, a lot of hype exists about hazard reduction burning, with one group demanding that more burning is required to prevent major wildfires, while the other group claims that too much burning is done and that this has a negative impact on conservation values. The issue becomes quite emotional when agencies claim that lives and homes will be lost unless hazard reduction burning is undertaken. Factual information is rarely presented in these arguments.

The following is an extract from a research paper which discusses the limitations of hazard reduction burning. The full paper is attached to this submission.

FUEL REDUCTION BURNING

Fuel, hazard reduction, or prescribed burning has long been advocated to minimise the threat of bush fires to homeowners. In Western Australia, a comprehensive prescribed burning program is undertaken throughout the State's forests, nature reserves and national parks. The Department of Conservation and Land Management (CALM) reports that as a result of the burning program the average size of fires has declined, and major property losses, injuries and fatalities have been avoided (CALM, 1994). Similar reports have also been made in relation to fires in other states (Petris, 1995).

However, a number of studies and research papers do not support the above reports. Both Simmons (1988) and Bora (1994) observed that fuel loads can reach significant levels within 2-3 years after a fire. Even CALM's own research indicates that fuels accumulate to levels where head fires can not be successfully suppressed under average fire danger conditions, after only 5-7 years in jarrah and 6-8 year in karri forests (CALM, 1994). This leaves only a short period during which fuel reduction burning is effective. Furthermore, when this information is adjusted to take very high and extreme fire weather conditions into account, it could be argued that the time taken for fuels to accumulate to levels where fires can not be successfully controlled is much less.

There is additional evidence that fires burning under severe fire weather conditions will travel through recently burned bush areas, sometimes at high intensities. A number of houses were, for example, destroyed in December 1990, during a fire which burned under extreme fire weather conditions in the Brisbane Water National Park near Gosford (NSW). The fire travelled through a number of areas that had burnt less than 5 years prior to the wildfire, including the entire valley behind the town. The fire travelled downhill through the valley, which had been burned only 13 months before the wildfire (Bradstock, 1995).

Bradstock (1998) found that 95% of bush fires, which resulted in fatalities and significant building losses, occurred on days of very high and extreme fire danger. Under these conditions, he argued, fuel reduction burning had little or no impact on fire behaviour. Furthermore, Bradstock suggested that the risk from bush fires can not be significantly reduced though prescribed burning, even if it is undertaken at very frequent intervals.

The severity of wildfires burning under extreme fire weather conditions, through forests that had been hazard reduced, was also highlighted during the fires of 1961 in the south west of Western Australia. One of these fires impacted on Dwellingup, where 132 dwellings, a district hospital, 2 service stations, 3 general stores, offices, 2 saw mills and 74 vehicles were destroyed. These losses occurred despite that fact that *most of the forests in the Dwellingup division had been controlled burnt in recent years, and the litter on various parts of the forest represented accumulations generally speaking, of from 0-8 years. During this fire, buildings were commencing to catch alight long before the advancing fire reached the outskirts* [of the town of Dwellingup] (Rogers, 1961).

McArthur (1961) researched the Dwellingup fire and prepared a report for the Royal Commission. He found that *on many occasions a head fire burned quite rapidly through forests that had only been burned in the previous spring. Although these fires burned at lower intensity, they frequently ... [spotted] ahead for some distance.* He also states that *it is obvious that recently control-burnt country will not stop the spread of a fire on a day of extreme fire danger*

In more recent work, Jasper (1999) challenges the value of prescribed burns adjacent to urban developments in relation to life and property protection. Furthermore, James (1999) suggests that the results of his study indicate that *prescribed burning was of limited effectiveness as a fire management strategy for the Blue Mountains*.

The above reports indicate that prescribed burning alone is not sufficient to protect homes from bush fires. It is, however, acknowledged that hazard reduction burning can be a valid and effective strategy for strategic fire management and for conservation. It is important that the limitations of hazard reduction burning are recognised, and that residents in the urban interface are made aware that alternative fire protection measures are required to minimise the threat from bush fires, in addition to hazard reduction burning.

Extract from *Bush Fire Threat to Homeowners* (Braun, 2002)

As discussed under (b) above, the current hazard management strategies are inadequate to prevent major bushfires and losses in Western Australia. However, this inadequacy is more related to the fact that the hazard reduction program is not part of an integrated, comprehensive wildfire risk management approach in Western Australia. It is not suggested that more hazard reduction burning should be undertaken. The key is that significant hazards still exist in close proximity to communities and their assets. Managing these hazards would be more important and more effective than undertaking additional, large scale hazard reduction burning.

The economic and environmental impact of hazard reduction can be significant. It has been found that many rare and endangered species of flora and fauna, as well as whole ecosystems, require long unburned areas to survive. The practice of maintaining large areas in a hazard reduced state (eg young fuel ages) can therefore be highly detrimental to biodiversity and conservation values. Unfortunately, biodiversity and environmental health are currently not part of the economic reporting framework. Should these variables be introduced, it may be found that hazard reduction burning results in significant economic losses, possibly exceeding damage and losses sustained within the build environment during wildfires.

The above comments are not intended to stop hazard reduction burning. It is felt that an integrated approach should be taken, which balances community safety and biodiversity needs, and which combines different risk management strategies, such as hazard management adjacent to buildings, building maintenance and community education, to reduce the risk of losses in a bushfire.

The failure to adequately manage bushfires, and hazard reduction burns, can lead to economic as well as environmental impacts. During 2002/03, a number of fires in Western Australia could have been contained while they were relatively small. However, fire agencies failed to adequately manage these fires, which subsequently burned into plantations, or burned large areas of valuable habitat.

In one case a hazard reduction burn flared up under extreme fire weather conditions. It burned more than 8,000ha of native vegetation, before it burned into 2-4 year old blue gum plantations and green pastures, which effectively halted the spread of this high intensity fire.

A significant economic impact also exists as a result of regulations based on poorly informed decisions. For example, plantation growers are required to maintain 15m to 20m wide fire breaks along property boundaries, whereas in many cases land owners with dense native vegetation or crops may not be required to maintain fire breaks at all. Research has shown that fire breaks are unable to stop the spread of head fires even under moderate fire behaviour. The cost of providing excessive fire breaks and the subsequent damage as a result of soil erosion, is therefore not justified. Plantation companies would generally be prepared to maintain strategic access for fire appliances, similar to those required around subdivisions in high bushfire risk areas. However, discussions to resolve these issues are often suppressed by the relevant authorities.

It is understood that issues similar to those raised above, also apply to areas outside Western Australia.

(d) Appropriate land management policies and practices to mitigate the damage caused by bushfires to the environment, property, community facilities and infrastructure and the potential environmental impact of such policies and practices.

A comprehensive and integrated approach to bushfire risk management would provide guidance for appropriate land management policies and practices. Such an approach has to be based on sound research and good information.

Unfortunately, in many areas land management policies on wildfire risk management are developed in isolation of the overall needs of the community, industry and the environment. An integrated approach is rarely achieved, which often results in conflict between different interest groups and, more importantly, it results in inadequate bushfire risk management within communities and ecosystems.

It should be noted that formal training in wildfire risk management at post secondary and tertiary level is not available, which exacerbates the problem. Furthermore, key performance indicators which accurately reflect bushfire risk are not applied. As a result, performance of agencies, and the level of bushfire risk to communities and ecosystems can not be measured.

(e) Any alternative or developmental bushfire mitigation and prevention approaches, and the appropriate direction of research into bushfire mitigation.

As discussed above, hazard reduction burning is one of the strategies which can be applied to mitigate against bushfires. Hazard reduction burning provides only a limited level of protection, especially under severe fire weather conditions.

Existing systems and practices have failed to prevent the recent major bushfires and losses. This is despite the significant increase in resources, improvements in training and communications, as well as the introduction of aerial fire suppression.

A fundamental change in bushfire risk management is necessary in order to significantly reduce bushfire risk in Australia. An integrated approach is required, which combines existing knowledge about bushfire behaviour, fire suppression, building survival and people behaviour, but which also provides for ongoing research and continuous learning. A multi-disciplinary team should be established to develop a practical bushfire risk model which incorporates a comprehensive risk assessment framework, realistic risk management strategies, as well as an independent review loop, to ensure that bushfire risks are actually reduced.

Vision and leadership is required to develop and implement the alternative approach to bushfire risk management. The formation of the *Cooperative Research Centre for Bush Fire* is a major step forward. But its success may be limited if it does not provide for a change in direction, from the existing reactive approach to bushfire management, to one that deals with the underlying, fundamental changes that are required.

Future research should focus on:

- existing bushfire risk management systems and the reasons for their failure
- development of an integrated bushfire risk model
- behaviour of residents in a fire emergency
- behaviour of fire and emergency services personnel in a fire emergency
- building survival
- planning and building requirements
- detailed investigations into bushfire behaviour during major fires
- effectiveness of fire suppression strategies

(f) The appropriateness of existing planning and building codes, particularly with respect to urban design and land use planning, in protecting life and property from bush fires.

Significant variations exist across Australia in relation to planning requirements. Nevertheless, it appears that the existing planning and building codes fail to provide an adequate level of protection from bushfires. Furthermore, existing guidelines for plantation fire protection appear to be based on outdated requirements, and on poor information.

The *Australian Standard for the Construction of buildings in bushfire-prone areas (AS3959)* fails to provide a practical hazard assessment tool and fails to prescribe performance criteria which are commensurate with respective levels of bushfire attack. Furthermore, this standard only applies to areas which have been declared by fire services or local governments as *bushfire-prone*. Even in those areas which have been designated as *bushfire-prone* the standard does not apply to, for example, schools, hospitals, commercial buildings, or observatories for that matter.

An urgent overhaul is required in these areas. Sufficient knowledge about the level of bushfire attack, and the mechanisms involved in building loss during a bushfire is available to develop practical and effective codes, which do not have to have a significant economic impact on new developments.

However, in many cases the knowledge on bushfire risk management held by personnel associated with planning and building controls, in fire services as well as planning and building agencies and industries, may often be insufficient. It may be necessary to first provide training to these personnel, before effective solutions can be developed and implemented.

(g) The adequacy of current response arrangements for fire fighting.

Response arrangements vary significantly between States, and within States. In relation to fires in Western Australia, it has been observed that fire response and incident management capabilities were inadequate to deal with fires above moderate to high intensity. As a result, the risk to fire fighters, the community and its assets are at unacceptable levels. The following were some of the issues which were observed:

- response plans were not in place
- personnel were not trained in incident management
- few fire crew were trained in bushfire suppression
- comprehensive maps for fire control were not available
- early detection of fires was not initiated after a lightning storm
- incident management teams were not in place
- fire equipment failed, and/or crews were unable to operate it
- resources were not used effectively

Urgent action is required to improve the situation, not only in relation to volunteer fire fighters, but also to Fire Services managers.

(h) The adequacy of the deployment of fire fighting resources, including an examination of the efficiency and effectiveness of resource sharing between agencies and jurisdictions.

Although significant improvements have been made in this area, there are many opportunities for improvement. In many cases appliances, fire hose couplings, radios and training are not fully compatible across agencies and jurisdictions. This results in reduced efficiencies, but it can also result in significant risks to fire personnel. Furthermore, it results in additional costs where resources operate across agency or jurisdictional boundaries.

It is important to note that, traditionally, fire fighting resources came from fire services, land management agencies or the forestry. Significant fire fighting capabilities, both in terms of equipment as well as knowledge, are held by communities, farmers, as well as private plantation growers. Fire services should integrate these resources into the overall fire management strategy, so that these additional resources can safely and effectively operate during major bushfire emergencies, where fire agencies are generally overwhelmed.

(i) Liability, insurance coverage and related matters.

It is interesting to note that on a number of occasions insurance companies, as well as managers in the insurance council referred to bushfires as natural disasters where losses can, generally, not be prevented. Most insurance companies do not undertake bushfire risk assessments, and do not provide rebates or discounts to clients who implement effective bushfire risk management strategies. This creates a culture where bushfire mitigation is no longer a relevant risk management strategy.

As a consequence, the cost of bushfire insurance increases each time insurance companies are faced with significant payouts. In the extreme case insurance for some industries may no longer be cost effective. This may have a major economic impact in the event of large bushfire losses, in particular where an industry provides significant employment in an area (eg plantation industry).

Solutions may be developed which provide a partnership between the insurance industry, fire services, industry and the community, to develop sustainable solutions in relation to insurance cover, as well as bushfire risk management.

(j) The roles and contributions of volunteers, including current management practices and future trends, taking into account changing social and economic factors.

Volunteers play a significant role in bushfire protection in Australia. It would not be economically sustainable to fund an equivalent workforce to replace volunteer fire fighters. A significant effort may have to be made to ensure that suitable volunteers are retained and new ones recruited into the brigades. Furthermore, solutions may need to be developed to ensure that volunteers are not exposed to undue financial burdens, such as loss of income, or the threat of losing employment. A solution could, for example, be based on the model currently in place for reservists in the armed forces.

Volunteers may fill many roles, from fire fighter to incident controller in a major fire emergency. The focus for recruiting volunteers is often on fire response, rather than on bushfire risk management and safer communities. A concerted effort is required to change this trend, and to encourage volunteers, or members of the community, to take on bushfire risk management planning functions, as part of brigade activities. In addition it is necessary to provide training in bushfire risk management to volunteers and brigades.

Please do not hesitate to contact me on 08 9853 2171, should you have any queries.

Yours sincerely

Klaus Braun

About the Author:

Klaus Braun is the Principal of the ICS Group, which specialises in wildfire risk management and community safety. Projects completed recently include:

- wildfire risk management strategies for local governments;
- bushfire risk management framework for Western Australian schools;
- development and implementation of a national wildfire protection strategy for a hardwood plantation company;
- wildfire behaviour research in native vegetation and blue gum plantations;
- wildfire investigations.

Klaus Braun has been invited to present three papers to the 3rd International Wildland Fire Conference, in Sydney in October 2003:

- *Wildfire Risk - Integrating community resilience and vulnerability attributes and hazard assessments to provide a comprehensive risk model*
- *Bush Fire Ready Schools – A wildfire risk management project in Western Australia*
- *Wildfire Protection in the City of Albany – A risk management framework that integrates community safety and biodiversity*

Other research papers:

- *Bush Fire Threat to Homeowner*, presented at the Fire Symposium in Perth, April 2002.
- *Wildfire Risk Mapping – Including the Community*, presented at the Australasian Fire Authorities Council Conference in Darwin, August 2001.

Prior to forming the ICS Group, Klaus Braun worked with the Fire and Emergency Services Authority as Manager Wildfire Prevention for Western Australia, Operations Manager and Regional Fire Safety Officer.