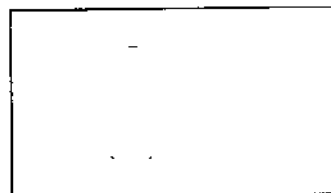


**Submission to House of
Representatives Select
Committee on the Recent
Australian Bushfires**

G J Gray

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I am a Professional Forester, and was employed by State Forests of NSW for 37 years up until my retirement in 2001. During my employment, which took me from the North coast of NSW to Eden in the South and into the large pine plantations of Lithgow and Bombala, fire management was a significant part of my duties. Throughout this time I was a member of various Fire Prevention Associations and their replacement, the Regional Fire Associations. I was chairman of the Southern Region Fire Association for 4 years until it was disbanded.

I have also been an active member of a number of Bushfire Management Committees, which are Shire based and provide the only forum for interagency interaction other than the remote Bushfire Council.

I have served on several incident management teams for large wildfires as Controller or as Deputy Controller and have been involved in numerous other fires as on ground fire boss or as controller.

I did not have any role in the recent fires and my comments derive from my long association with the fire fighting fraternity and apply to the East Coast of NSW, from the Great Dividing Range to the sea. This is the area supporting most of the population and most of the forested land, the area to the west of this, the Western Slopes and Plains are essentially grasslands and have their own suite of issues.

Before getting down to specific comment I would first like to explore some definitions and to dispel some myths.

Hazard Reduction: This is the term used to describe any practice that modifies the fuel available to burn; this can be by mechanical means - clearing / slashing, chemical means - herbicide or more commonly using low intensity fire. **Hazard reduction is not designed to stop bushfires!** By reducing fuel loads, that is the vegetation available to the fire, it reduces the intensity of the fire and may allow attack by fire fighters to contain and subsequently extinguish the fire. By its very nature it is most effective in the first season after the reduction but its effect will last for several years. However to be effective in reducing intensity of fires it **must** be practised over broad areas building up a mosaic of managed fuels at varying levels of effectiveness.

In the South East of NSW, acknowledged as one of the more severe fire climates in Australia, broad area hazard reduction needs to treat between 10% and 20% of the area annually to be effective. This translates to burning about every 7 to 8 years, as not every year will allow successful fuel reduction.

Backburning: This is a **firefighting** technique employed when the fire intensity is too great to work directly on the fire front and control lines have to be established some distance away. The term derives from the practice of burning back into the on coming fire using the natural draft of the fire to draw the "backburn" into the fire thus removing fuel and intensity allowing the fire to be controlled. This is always a hazardous undertaking as it is easy to loose control and add to the fire intensity.

Submission to House of Representatives Committee on the Recent Australian Bushfires GJ Gray
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Blowup days: There are some conditions under which fire intensities are so great that it is not possible to attempt control. The factors contributing to this revolve around dryness of the fuel, wind speed and the amount of fuel available. Typically a blowup day will have temperatures in the high 30's, humidity under 10%, wind speeds of 50 km and above, have experienced a significant rainfall deficit over several months and an ignition source. Under these conditions the bare ground appears to burn and fire will be impossible to keep within control lines. If a fire starts under these conditions successful containment can only be achieved if fire fighters are on the scene within a few minutes and in numbers with mechanical support. The Timbilica fire near Eden NSW, November 1980, burnt 35000 Ha in the first 9 hours under weather conditions of 45° C; 9% humidity; NW wind gusting to 70 kph. Firefighting units were on the scene within 15 minutes of the first sighting of flames from a nearby fire tower with a large dozer on site 10 minutes later followed by numerous other units within 35 minutes. This response was not enough to hold the fire under these "blowup" conditions.

I do not intend to make a comment on all of the terms of reference but I believe my expertise will allow me to provide some observations that are pertinent to your deliberations.

(b) The causes and risk factors contributing to impact and severity;

Recognition needs to be given to the fact that the Australian bush has a quite different character to-day compared to 200 years ago (DG Ryan, JR Ryan, BJ Starr, *The Australian Landscape – Observations of Explorers and Early Settlers*)¹ and the past 15-20 years has exacerbated the situation with very large contiguous tracts of land managed as wilderness with limited access and without an emphasis on fire management. Much of this land in NSW was previously unallocated Crown land, which the Fire Prevention Associations had a mandate to protect. These lands were subject to an aerial hazard reduction program, which was a significant contributor to fuel reduction, and to an extensive fire trail network, which allowed reasonable access.

The basis for management of these forested lands from a fire perspective is set out very clearly in Dr R G Florence's paper, "The Ecological Basis of Forest Fire Management in NSW 1994".²

Also in NSW there has been legislation which has tended to exclude the use of fire as a control tool, not because of its specific requirements but because of the perception that compliance is expensive, onerous, time consuming and requirements to exclude fire completely from some vegetation types makes it all too hard. This has effectively reduced broad area hazard reduction.

There is very little hard evidence to support theories as to burning intervals and their effects on the environment as such research needs long term funding and commitment. State Forests of NSW established the Eden Burning Study in the mid 80's and whilst some results are coming to hand the lack of solid funding support means that the project is languishing and may collapse. .

¹ See appendix 1

² See appendix 2

In 1994 the Southern Region Fire Association published "Improving bushfire management for southern NSW". This study analysed the causes of bushfire over the Region and found differing patterns depending on the type of agriculture practiced, the level of development and the nature of the bushland. Along the tablelands lightning was a significant cause, probably reflecting the large areas of bushland held as Crown land and the propensity for dry lightning storms along the ranges, whereas at Nowra on the coast 28% of all fires came from illegal ignitions reflecting the settlement patterns of that area.

The phenomena of lightning storms that are unaccompanied by substantial rain is quite common but in most years the fuel is broken up by moist gullies and large fires do not develop. However, drought conditions such as experienced this year increase the quantity of fuel available for burning. Thus, where multiple lightning strikes occur, there is a high likelihood that detection and initial attack to contain the fires when they are small will not be quick enough and will fail, leading to amalgamation of fires either as a management strategy or because of their natural development.

These very large fires then have the potential to breakout under "Blowup" conditions over a wide front, presenting an uncontrollable fire that will make a major run of 20 or so kilometres. Usually these conditions do not last for more than a day, allowing fire fighters an opportunity to return to the fight with the cooler evening conditions although the pattern may be repeated within a few days as meteorological conditions tend to cycle about every 5-6 days or so.

Management options, which place very little reliance on regular fuel management over large areas, are doomed to fail under these conditions. Reliance on natural barriers or hand constructed trails in areas of high fuel loads is futile once conditions allow flame heights of 1-2 metres, and this is achieved at very low fire danger ratings of around 5 for fuel loads of 20 tons/ha. With very limited access to much of this land the ability to get heavy earthmoving machinery to the fire in a timely manner is impossible.

Obviously any procrastination in attacking any bushfire has the potential to allow the fire to get away under "blowup" conditions, which may develop several days after the fire became established.

Aircraft are seen by some to offer the solution to remote firefighting, helicopters can deliver manpower to remote sites and can be used to dump water or retardant, fixed wing aircraft suitably equipped can deliver retardant, but as has been shown, unless this happens within a few minutes of the fire starting let alone being discovered it will also fail and the costs associated with this type of attack are astronomical.

From a fire fighter safety perspective there is only a small window of opportunity for successful suppression under these conditions before fire crews have to be withdrawn due to the rapid escalation of the fire. This consideration may result in not making an early initial attack if the safety of crews cannot be guaranteed due to the inability to retrieve them in the event of the fire getting away

Planning for fire management **MUST** be undertaken for the 'worst possible' fire danger. Whilst 'worst possible' can't be defined the concept requires managers to identify risks and to seek

ways of mitigating them rather than planning for “average” conditions and hoping to rise to the occasion when extreme conditions arise.

There are serious issues created by land tenure and the willingness of the landholder to participate in hazard reduction strategies especially those involving fire. State Forests has a positive attitude to hazard reduction as it is seen as an essential tool to protect the valuable forest asset however the quite stringent controls external regulators have introduced either as part of the Pollution Licence or as part of the RFA have severely restricted burning as a tool. These restraints have the effect of reducing hazard reduction by causing operators to err on the conservative side to avoid prosecution rather than to concentrate on achieving broad area fuel management.

National Parks take a very constrained attitude to hazard reduction burning and mainly concentrate on ‘protection’ strategies around the interface with identified assets. Because this does not address fuel loadings over a wide area it is very limited in its effectiveness. In general they see so many constraints to large scale burning and take such a ‘no risk’ (to the environment) stance they very rarely achieve annual targets which are far too small in any case to be effective over 100’s of thousands of hectares.

The changes taking place in private lands across much of the coastal areas are also very significant to managing fire across the landscape. There is a much higher incidence of absentee landowners on smaller holdings, many of whom are not from a rural environment and who are unfamiliar with the use of fire for hazard reduction and in any case are often not able to undertake the work when conditions are suitable. Often these people have a strong environmental concern which manifests itself in adopting a ‘hands off let nature take its course’ attitude often based on the assumption that there are fire fighters out there, as there are in the city, who will put any fires out. If one landholder declines to participate in a planned hazard reduction burn the work necessary to isolate that one property can make the operation impossible. Whilst there are provisions in place to overcome such behaviour, in practice there is no time and few resources to pursue non-complying landholders. Also most of this type of hazard reduction relies on the volunteer fire fighters to implement. This group have little access to the machinery needed to carry out this work efficiently and are often confined to weekend operations, resulting in burns that are too hot or ones that fail to reach their target.

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

There is considerable debate as to the environmental impact of hazard reduction but there is little hard evidence to support the anti burning attitudes, which tend to be supported by various ‘environmental’ legislation. In Western Australia where broad area aerial hazard reduction was practised for many years studies have shown no significant adverse environmental consequences. The Eden Burning Study Area was set up as a long term experiment to look at the effects of frequency of burning, whilst it has only been running since 1984 and shortage of funds has limited the results to some extent, early indications are that there has been no loss of species as a result of frequent burning.

More work needs to be done in this area to give clear and unequivocal advice regarding impacts.

I will take you back to my earlier comments regarding hazard reduction and its effect on bushfire; hazard reduction is not designed to either prevent nor put out bushfire, it is only a tool used to reduce the fuel available to fire to make it possible to use conventional fire fighting methods to control the fire in relative safety. That it is effective in reducing fuel is beyond doubt. Where the technique is limited is when the fuel reduction is not part of an extensive strategy for modifying fuel loads over the whole landscape rather than in a few narrow fringes.

With the use of aerial incendiaries large areas can be treated under optimum conditions very cheaply. However if numerous constraints are placed on the operation to meet 'the precautionary principle' because, to be able to answer for every square meter of the burn area is very costly and time consuming, but failure to do so may result in prosecution. Hazard reduction by fire must be seen as a non-threatening process for the purposes of the NSW Threatened Species legislation

To effect control of bushfires requires resources, an effective strategy, and a management team to implement the plan. But the first requirement is to identify that there is a fire. The detection of bushfires may be from established fire lookout towers, aerial surveillance or individuals. Within NSW State Forests have for many years used established lookout towers and have a far reaching network along coastal NSW. The cost of manning these towers is largely born by that agency and in times of tight budgets risks may be taken to reduce levels of surveillance and whilst this may be acceptable to the agency in many cases, surveillance of the private lands and or National Park is lost.

Aerial surveillance is at best ad hoc and tends to be run on a needs basis when there has been evidence of lightning activity. When 'blowup' conditions are experienced, light aircraft, including helicopters, become so unstable that they become useless as a viewing platform. Also because of the way aircraft are used, fires taking off after the aircraft flies over may remain undetected for several hours. This is not the case with fire lookout towers.

The use of aircraft in fire control has become an extraordinary cost in that numbers of small helicopters are often engaged to dump water on active fire line or in some cases used to 'construct' fire line. Water used in this way is very ineffective and only marginally improved by using fire retardant or foam. The Australasian Fire Authorities Council (AFAC)³ paper on the effectiveness of aircraft is attached as an appendix as it provides a very good summary of the role of aircraft from the nations most experienced bush fire fighters. If the money spent on hiring aircraft at the recent fires was put into researching how they could be used more effectively, the cost of firefighting would be reduced enormously. In my experience reliance on retardant or foam without on ground backup by trained fire fighters is all but useless under anything other than very mild conditions, and under active fire conditions can be very dangerous to ground crew depending on the strategy for their safety.

³ See appendix 3

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

As I have alluded to previously, work in this area should first be directed at efficient fire surveillance. A way needs to be found to provide a network of fire towers across the landscape, which can provide constant surveillance. These towers could use electronic (video) means rather than have individuals in each tower (lightning may be a problem). Alternatively it may be possible to use satellite surveillance providing it is cost effective and often enough. Looking at these alternatives is financially beyond individual agencies particularly if the suppression of bushfire is not seen as an overriding priority.

Specific detailed work is needed to refine the effect of hazard reduction burning on the environment and to balance any deleterious effects with those of devastating fires as we have just experienced. The Eden Fire Study experiment is unique and because it is up and running provides an opportunity to gain the knowledge needed to resolve some of the argument. Ideally this work should come under the auspices of an organization like CSIRO so that the long term work required won't be at the mercy of annual commercial budget decisions of State Forests of NSW.

Another area of research is that of effective use of aircraft and the training of fire fighters in their use. Inexperienced fire fighters who are not accountable for the cost of the control tend to call in aircraft often to circumstances that are quite inappropriate for their use. In particular, dropping small buckets (200 litre) of plain water on active fire line with slow turn around times, is all but useless except as a last ditch effort to protect life or property. Much more work needs to be done to research the way in which aircraft and retardants can contribute to firefighting and to train fire fighters in their use.

(f) The appropriateness of existing planning and building codes

The Australian Standard for Building in Fire Prone Areas AS3959 provides the guidelines in this area, but it falls to local government to implement. It should be remembered that fire-resisting construction methods are designed to reduce risk, not to allow houses built in almost wilderness conditions to withstand bushfire. The conditions of the standard **MUST** be supported by other protection means, principally setbacks from vegetation and fuel reduction but also including access, water supply etc. The current setback recommendation has been empirically derived and urgently needs to be quantified. There is also scope for further work in relation to ember attack on houses to better understand why some houses survive whilst the neighbouring house is destroyed.

Problems exist in maintaining fire precautions once buildings are approved because of the desire of homeowners to 'live in the bush'. This issue can only be attacked by public education campaigns directed at the issues of reduced fuel loads at the urban interface, maintaining fuel reduced areas around the home and keeping houses protected from ember attack.

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

For small fires the existing arrangements in NSW work quite well; in most communities there is good liaison between the four key agencies of State Forests, National Parks, Fire Brigade and Rural Fire Service through the Bushfire Management Committee, which is currently Shire based. However large fires of the type seen recently are demanding larger and larger management teams, which tend to draw in relatively inexperienced people who assume very significant authority. This resource hungry control set up is not resulting in better fire management. Because the bill is being picked up by someone else (Rural Fire Service) for these emergency events there is little accountability and an incentive to move to this form of management as a costing exercise rather than a fire control imperative. This control structure is built on the Australian Interagency Incident Management System (AIIMS) model that tries to ensure that the fire is managed locally.

As an example of the way incident management teams have become unwieldy at the recent Snowy Mountains fire, the day shift for 16 February at Jindabyne was managing 16 helicopters, 1 Sky crane and 4 fixed wing aircraft. The control centre personnel totalled 37 of which 5 were incident management team, 18 were planners, 14 logistics; in addition there were 5 managing air operations (not pilots) and they were supporting 71 personnel actually on the fire line. All this 16 days after the last day of severe weather and when all fires were at mop-up or patrol stage! All but three of the control centre staff was from National Parks.

I believe that the time has come to look at a few specialist positions, very experienced in firefighting operations, to be brought in to direct the firefighting for large scale fires. Such a departure from present practice needs to be carefully researched and staffed, but relying on drawing fire managers from current staff positions may be putting inappropriate managers in charge because of their seniority within their organisation, rather than because of their firefighting expertise.

RECOMMENDATIONS

1. That broad area hazard reduction strategies be adopted over all bushland regardless of tenure with the aim of establishing a mosaic of areas with reduced fuel loads which will reduce fire intensity and provide conditions that will allow reasonable success for conventional firefighting with appropriate safety for fire crews.
2. That financial support be provided to research through long term experiment the effect of various burning frequencies on the Australian bush. This research should be co-ordinated and managed by a dedicated research body such as the CSIRO rather than left to individual agencies whose funding priorities may change over time.
3. That studies, similar to the Southern Region Fire Association's "Improving Bushfire Management for Southern NSW 1994", be undertaken over other areas subject to bushfire risk to give a more comprehensive understanding of the history of fires and to track trends.
4. That the Australian Fire Authorities Council views on Aircraft use be accepted and used as the basis for comprehensive research to identify cost effective ways of using aircraft. Along with this, training must be provided for both pilots and firefighters so that the exorbitant costs can be contained and more effective use made of the resource.
5. That more emphasis be given to fire surveillance and quick response so that fires can be kept small and contained before they develop to a scale that can result in a catastrophe under severe weather conditions. Strategies that should be looked at include a regularly manned extensive fire lookout network serving all land tenures, as well as newer electronic forms of surveillance. This must be centrally co-ordinated across all agencies.
6. That the assumptions upon which standards for fire protection are based and the application of building setback be re-examined in the light of recent fire events. This will require further research to verify or amend current models.
7. That the existing fire management organisation, which is based on the AIIMS methodology, be examined to develop a less resource hungry model with specialist firefighters trained to undertake the fire management role, rather than using existing line managers who may not have the experience necessary to make appropriate firefighting decisions.