

24/03/20

Dear Members of the Inquiry,

**Re: hazard reduction burning**

Inevitably the recent bushfire disasters are raising questions about hazard reduction (HR) burning, often perpetuating myths or partial truths. We have expertise and experience in this issue, and ask that you consider the complexities of this critical matter. We have not divided up this response into the four broad categories of the terms of reference as this issue naturally spans all four (causes, preparation, response, other matters).

We have carried out strategic HR burning on our 180 ha property annually since 2002, burning different strips every year. Most years, other landowner's HR fires have escaped and burnt onto our property (sometimes several in one year). This has never caused us concern because these wildfires inevitably reach areas where, because of our periodic HR burning, the fuel is insufficient to carry a fire. We have designed a strategy which provides habitat diversity for flora and fauna, and is promoting regrowth of native forest. We live with the daily evidence that effective, systematic, comprehensive HR burning can be a safe successful management tool for native vegetation.

In NSW, depending on the applicable fire district, the Rural Fire Service (RFS) or Fire and Rescue NSW (FRNSW) issues the various forms of permission that allow HR burning on private land. The conduct of this is the responsibility of land owners or managers, though the RFS or FRNSW carry out some burns. Other state agencies such as the National Parks and Wildlife Service (NPWS), the Forestry Corporation of NSW, Crown Lands and local government authorities carry out HR burning on the land they manage. This submission, based on our experience, deals with the specific issue of HR burning on private rural land, where the RFS is the relevant fire agency. We detail below the reasons this system is not functioning properly. While we refer to the NSW situation, many of our comments are applicable in other jurisdictions. In summary, the RFS's primary focus is on fighting unintended fires. They are risk averse and have neither the skills, mindset nor time to manage or to carry out effective broadscale HR burning. Indeed, they actively prevent HR burning in some contexts, and do not sympathetically promote it. Last financial year, 11,145 ha of authorised hazard reduction was planned on private land across all NSW (c. 70% by HR burning), of which just over half actually occurred (4,470 ha of private landowner and agency burning).<sup>1</sup> There are tens of *millions* of hectares of privately owned native vegetation in NSW. Is such burning remotely adequate?

The only comprehensive solution would be to have a separate organisation with paid staff whose roles included:

- skilled employees to assist land managers to do HR burning and, where required, to carry out the HR burning themselves;
- educating and supporting the community on safe legal burning; and
- controlling the free-for-all 'asset protection' burning during the period before permits are required, thus minimising the early season bushfires, and advocating for burners with the appropriate permissions so that we are not prevented from burning because unauthorised and/or unskilled burners have let their fires get away.

In addition, we suggest liaison between the Commonwealth, State and Territory governments and the insurance industry, as a way of encouraging landowners to take an active role in HR burning (either directly themselves, or through granting permission for an external service to carry out this burning) and other strategies to protect their assets, such as clearing round homes, investing in water tanks, pumps and hoses, and perhaps taking into account those who actively volunteer for the RFS or equivalent state or territory services (hence reduce the community-wide loss of property). We are concerned that insurance premiums are likely to rise sharply in bushfire-prone areas, with no assessment of the measures a landowner has taken to mitigate risk (analogous to the discounts

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<sup>1</sup> See footnote 3 for details. 72% of completed HR works on private land were conducted by burning (total 4,470 ha) and the balance by mechanical means. The RFS do not give a comparable breakdown by method for the target (i.e. intended not achieved) areas.

insurance companies offer those with burglar alarms or safe driving histories). This would provide an additional incentive for landowners to engage with effective hazard reduction.

We also strongly support a 'stay or go (early)' policy (still allowed, to some extent, under various policies such as 'Prepare. Act. Survive'). This gives landowners an incentive to prepare for fire, and in normal conditions, allows many assets to be protected with no injury or loss of life. It also helps bush residents cope with the trauma of wildfires by allowing us to be active participants in preparing for, and responding to, the inevitable risks in the bush we love. We know this policy has risks, but evacuation may be a dangerous response to a fast moving or unexpected fire, whilst staying is only safe if the landowner is well-prepared including having thought through exactly what it means to face a fire. If landowners expect they will be forcibly evacuated, what is the incentive to invest in the pumps, tanks, hoses, personal protective equipment and training that may save lives and assets? Media images (and personal observation) from the recent bushfires of residents wearing thongs, shorts and singlets or t-shirts, holding garden hoses and defiantly stating their intention to protect their homes, illustrate the gulf between appropriate fire preparation and sometime community ignorance about exposure to fire. Indeed, such imagery is potentially dangerous when it celebrates such inadequacy as valiant. However, it would be grossly unjust to equate such naivety with the well-prepared, informed landowner who decides to stay. The solution is surely meaningful public education. In addition, if more HR burning occurred on private land, more landowners might understand the imperative to take fire seriously.

We detail below our background with fire, the challenges preventing effective HR burning, our suggested solutions, and also comment on less useful solutions we keep hearing at this time.

### **Our background**

As a summary of our fire credentials: Graham Griffin is a landscape ecologist, for twenty-nine years a scientist/senior research scientist at CSIRO in Alice Springs. He was the project leader for several pyroecological studies on bushfires and fire management in the NT funded by the NT Bushfires Council, NT Parks and Wildlife Commission, and the Australian National Parks and Wildlife Service (now Parks Australia). His work involved lighting and monitoring many extremely large, high-intensity spinifex fires (from 200-300 ha to several well over 10,000 ha). He designed and implemented a successful fire management strategy for Uluru Kata Tjuta National Park. Through burning different patches in the park in any one year, this used temporal diversity (variation in the time since the last fire) to increase spatial diversity (different response stages post-fire) hence fostered biodiversity and inhibited the passage of large wildfires. This was incorporated in the park's plan of management. Graham worked closely with the Anangu owners of the park, was a member of the board of management for 14 years and vice-chair for seven of those years. Graham also developed a method of assessing the suitability of country for fire management using remote sensing (with satellite imagery) of fuel loads and distribution, fire behaviour models derived from his experimental fires, and his understanding of the ecological effects of fire as measured in his research. In other work, he used remote sensing over extremely large areas of the central Australian mountain ranges (over 130,000 km<sup>2</sup>, for the Conservation Commission of the NT) and Great Sandy Desert (c. 2,000 km of seismic lines and exploration roads, for Shell Development (Australia)), identifying the history of lightning-ignited fires and their impact on different vegetation communities, or the role of unrehabilitated seismic lines in disrupting natural (lightning-ignited) burning patterns. Graham has published 42 articles or chapters in peer-reviewed journals or books, written over 100 consultancy and technical reports (66 with Sarah Dunlop) and contributed a variety of other scientific and technical papers and presentations.

Sarah Dunlop is an environmental anthropologist. She worked for almost two decades with Aboriginal people in the NT. Her PhD (in China) researched traditional pastoral land use patterns and land degradation. Graham and Sarah currently run an environmental research and data analysis consultancy business. Sarah has sole authored about 80 anthropological reports, and co-authored data analysis and environmental reports with Graham. Since 2002, Sarah and Graham have lived in a bush area (between Grafton and the coast, in northern NSW), where we manage 180 ha of mainly tall eucalypt forest. Every year since then we have carried out systematic HR burning.

Graham has been a NSW RFS volunteer since 2002, and played an active role in the current fires, responding to callouts over many months (11 September to 20 December 2019) in the Clarence and Richmond Valleys, at some stages every day and/or night. We lived through months of anxiety about fires reaching our own place, with months of choking smoke and the air raining burnt leaves. While Graham was out saving other people's homes, Sarah had the fire hoses out and the fire pumps ready

in case she had to defend our home. We would not have made this decision without our several decades of hands-on experience with fire, and the results of that fire management practice on our property. Ultimately we were amongst the lucky ones, with fires sometimes visible from our windows but sparing this stretch of the coast.

### **Issues with current HR burning practices**

#### **Why burn?**

Typically a canopy fire is only sustained if there is sufficient undergrowth (surface fuel) over a reasonably large area. When that burns, it dries out the canopy, permitting a large, intense fire, an active crown fire which is capable of spotting over far greater distances than a surface fire. In normal fire conditions, even if the bush burns again within several years of HR treatment, it won't sustain consistent spread, is unable to sustain an active crown fire, and only carries low intensity fires. Such a surface fire is likely to be much safer and easier to control than a fast forest fire fuelled by thick undergrowth. Some of the confusion over this issue arises because many landowner HR burns that we observe in our region are far too small to have much impact on a fire under any conditions. They are also often ineffective at removing surface fuels. Just as a single motorway or river won't stop some wildfires, for HR burning to have any effect on the intensity and spread of fires on a regional scale, far larger areas need to be subject to HR burning strategies (i.e. periodic rotational burning) than currently occurs. HR burning cannot stop fires in extreme conditions when ultra-dry environments may allow independent crown fires i.e. when canopies carry fires even without undergrowth fires. We heard media reports of this occurring in the recent season, though we did not observe this ourselves. In 'usual' conditions, HR burning greatly mitigates against serious fires. Ecological damage is minimised by burning different portions of a landscape in rotation over several years, reducing the risk of large fires and allowing native flora and fauna access to the varied natural resources present at different stages of the post-fire recovery. A common misconception about HR burning is that the goal is to stop fires dead, and hence HR burning is deemed a failure when this does not occur. This ignores the real goals and achievements of such burning. Even under this season's conditions, the presence of thick bush and grass up to (and touching or overhanging) properties has on many occasions made the task of volunteer firefighters more difficult and dangerous than if fuel loads had been reduced by periodic HR burning (and other sensible asset protection). (This comment comes from firsthand involvement as a RFS volunteer defending other communities in the recent season.)

In this submission, we use the term 'HR burning' but such a strategy, if effective, is also a form of good environmental management, and we could equally call this 'environmental burning'. The patch dynamics which our HR burning creates (described below) lead to a heterogeneous environment. Areas burnt more or less recently will be home to varying suites of post-fire vegetation and fauna. In addition, by staggering the timing of fire over a property, some years those fires will, by virtue of varying conditions even in the same month in different years, be hotter or colder, again enhancing environmental diversity. This provides food and habitat for a wide range of native flora and fauna, and is more resilient to pressures (such as wildfires). People are sometimes misled into thinking that the desired outcome, a varied environment, requires micro-management and deliberate planning to achieve each patch. The process is far simpler: burn different parts of the land to be managed on a cyclical basis, not so frequently that fires will not carry, and not so infrequently that fuel loads build up dangerously. Burn at the right time of year for that part of the country. Avoid any fire-sensitive vegetation (which often won't burn anyway). Nature does the rest.

#### **Who gets blamed?**

The media air vague assertions that the RFS should do more, that greenies prevented HR burning, or that the NPWS (or other parks services) have the resources to do HR burning but simply failed to do this. These are, in our experience, ignorant and unhelpful suggestions. With climate change, it is likely the bushfire season will extend and the window for safe HR burning diminish. It is completely unreasonable to expect volunteers to bear the burden of fighting bushfires for much of the year, then once that is over, to donate their time to managing other people's land by carrying out HR burning. Indeed, many volunteers already resent the times they are asked to attend alongside paid services such as the NPWS to assist with HR burning on public land. If, as is sometimes claimed, the NPWS already have the resources to carry out more burning, why do they feel the need to call on the RFS to assist with their existing schedule? Added to this, many RFS volunteers are landowners and need to use the brief period of safe HR burning to carry out their own land management. It is simply unrealistic and unfair to expect RFS volunteers to carry out the extensive HR burning that is required to reduce the risk of severe wildfires across the whole landscape.

In our experience, the primary factors discouraging HR burning are a widespread lack of skill, equipment and time to carry out the burning, coupled with the RFS's risk averse approach to enforcing regulations which affect landowners who wish to burn (discussed below). By 'skill' we mean: (a) an understanding of fire behaviour given local vegetation, topography and weather patterns; (b) the ability to design suitable HR burning prescriptions to achieve effective outcomes; and (c) the ability to safely carry out those prescriptions. The resource limitation applies to private landowners and, in terms of personnel and relevant skills for land management, to the parks service and the RFS themselves. We are aware that elsewhere in the state, the RFS carries out more HR burning (on varied land tenures) than occurs in this region. However, the total area of HR burning on private land across all of NSW is so small, the RFS cannot be doing much on private land anywhere in the state. In this area, the RFS becomes involved only if a private landowner or manager requests assistance. Over almost two decades here, the only such burning we are aware of locally has been rare, trivial, and often pointless. For example, on one occasion a landowner asked the RFS to burn a log-pile which, when the volunteers attended, was too green to burn. On other occasions, the target burn area was insignificant (usually less than a hectare). There is no coordinated HR burning strategy involving private landowners and the RFS (or indeed, providing any synergy between properties), nor do the volunteers have the human resources to carry out systematic burns, were landowners suddenly to start requesting greater RFS assistance.

For 2018/2019, the RFS *Annual Report*<sup>2</sup> states that the "RFS and partner agencies" (NPWS, Forestry Corporation and other) treated 184,295 hectares through hazard reduction burning across all land tenures across all of NSW (pp. 30, 116). Of these, only 4,470 ha of private land were subject to authorised HR burns across the whole of NSW. This includes both burns by private landowners with no agency presence, and fires which the RFS or other agencies conducted; no breakdown is provided.<sup>3</sup> Burning occurred with authorisation from 398 HR Certificates on private land (p. 114).<sup>4</sup> These Certificates (environmental approvals, discussed further below) are required for all landowner HR fires other than relatively limited fires such as asset protection and some log-pile fires. The RFS will only burn on private land if necessary environmental approvals have been granted. The drought did hinder HR burning (p. 30) so that, for private land, only 56% of target HR work (burning or mechanical) occurred (p. 117). However, even had the target been met (i.e. double occurred), the resulting figures, for a state with as much bush as NSW, is tiny.

About 61% of NSW is covered in native vegetation<sup>5</sup>; about 9.5% of NSW is formally protected in public conservation reserves<sup>6</sup>; and the Forestry Corporation manages about 3% of NSW<sup>7</sup>. Of course not all of the latter two categories are native vegetation. Hence, more than 49% of NSW is native vegetation which is neither conservation reserve nor state forest. Not all of this is private land nor is all of it suitable for HR burning. However, the magnitude of this figure (conservatively, over 39 million ha of native vegetation which is neither conservation reserve nor state forest) does put in context the state-wide 4,470 ha of authorised HR burning on private land. This suggests our observations about the minimal role of authorised HR burning in our local region have broader relevance.

The net result, in our experience, is that current HR burning is inadequate and piecemeal. We live in a region of mainly natural bush (used largely for pastoralism, forestry or private rural residences). Drive up any road and you can see the result of years of no burning over many properties: deep accumulations of leaf and bark litter, tangles of weeds and shrubs, and fallen trees, branches and shrubs. When such areas burn (as they do, inevitably, due to humans or lightning), the fierce fires are difficult to control. After many years of no burning, HR burning ideally requires large teams and very careful burning, whereas regular burning keeps fuel loads to a level where fires can be managed by a couple of people with relatively simple equipment. As an example, when we started burning our land, much of it hadn't been burnt for years. We didn't have the ability to call on large teams to assist us,

<sup>2</sup> [https://www.rfs.nsw.gov.au/\\_data/assets/pdf\\_file/0004/129892/NSW-RFS-Annual-Report-2018-19-web.pdf](https://www.rfs.nsw.gov.au/_data/assets/pdf_file/0004/129892/NSW-RFS-Annual-Report-2018-19-web.pdf) (accessed March 2020)

<sup>3</sup> The annual report does not specify who carried out this burning. We checked (17/03/20) with the RFS officer responsible for the annual report. He confirmed that this area represented the total HR burning on private land, whether by the RFS, private landowners or other agencies, and whether or not covered by an HR Certificate or permit. HR burns by private landowners not covered by any formal authorisation are presumably excluded since there is no mechanism to collect such information.

<sup>4</sup> Again, the annual report does not specify whose burning on private land was covered by the Certificates, but the RFS confirmed this was private landowner and RFS/other agency burning.

<sup>5</sup> NSW Environment Protection Authority. 2018 (accessed March 2020). *NSW State of the Environment 2018 (SoE 2018)*. <https://www.soe.epa.nsw.gov.au/>

<sup>6</sup> *SoE 2018*

<sup>7</sup> <https://www.forestrycorporation.com.au/about/our-estate> (accessed March 2020). This includes private land managed by the Forestry Corporation, but is mostly State Forest.

hence had to burn very slowly and carefully, very small areas at a time, when initially dealing with high fuel loads. It was difficult, but once a cycle of periodic burning has been established, the process becomes much easier.

### How to burn.

Safe, effective HR burning on private land does not require the usual RFS toolkit of graders, trucks and water-bombing helicopters. We use our own property as an example here. It includes steep slopes running along a low range covered with tall forest, and extends down to the valley flats which are a mixture of rehabilitating bush and blady grass/bracken.

In normal fire conditions, our experience is that our bush will carry a fire about five or six years after the last effective (sustaining surface) fire. With a fire frequency less often than that (bar the couple of years' leeway we allow ourselves), the fuel level increases so that HR burns are difficult to control. With a fire frequency more often than that, HR fires will generally be so partial as to be ineffective at reducing fuel loads, though blady grass and bracken can burn annually. We have therefore divided up our land (180 ha) into eight blocks: an asset protection area round the house which we burn each year, and seven larger strips covering the rest of the property which we burn (or attempt to burn: more of this below) on a rotating basis, one per year. Because we have prevented excessive fuel loads building up, during the periodic HR burn within each strip, patches of bush will remain unburnt, so the fires do not make a clean sweep. This heterogeneity within each strip and between strips minimises environmental impacts: wildlife can easily escape a fire and recolonise afterwards, seed banks for regeneration are not destroyed, and the fires are infrequent enough we are maintaining tall forest rather than leading to the wholesale death of trees and wildlife seen during severe bushfires. The timing of fire return will vary with the local environment, and the return time appears to be decreasing with climate change, but the general principle will still apply across most areas.

On the lower portions of our property, we have slashed tracks. We have a trailer-mounted firefighting pump and water tank which we use to 'black out' the edge of the fires along the firebreaks. The higher ridges of our property are too steep for the trailer (and definitely too steep for any RFS vehicles). We use a mowed or raked line and backpack sprays here. The key ingredients to burning with these tools are time, labour, attention, and flexibility. Even though we only need to burn on, say, 12 days/nights in a year, we find we have to quarantine a whole month from other commitments, so that we can burn when the weather is suitable. This involves being on call to burn, but skipping days/nights when the weather is too hot, windy or wet (or if the RFS suspends permission to burn: more of this below). In recent drier years we've found we have had to do much of our burning at night. This is exhausting (as is running up and down our steep slopes with a firebug (drip torch) and/or backpack spray) but in August it is possible to conduct a slow controlled burn during the cold nights, when a fire in the same location during the day would be hot and risky. We burn in small stages, starting by burning on the upslope upwind side of the block we wish to burn, initially burning right along the border, then walking back and burning say 10 cm further into the block, then burning a strip of 30 cm ... gradually increasing the width burnt until we have a secure border. As we complete one border we work down the adjoining borders, until we can burn larger sections within the block, until finally sufficient patches are burnt. We then spend days patrolling the boundaries, initially waking up several times a night to do this, and continuing such vigilance if there are risks such as a burning tree which we cannot extinguish. This process is slow, labour-intensive, requires immense concentration and attention to the specifics of weather, vegetation, slope, aspect etc, and cannot be interrupted once started until a perimeter is complete. However, it provides a strategy for safe controlled burning with relatively little equipment and minimal environmental damage. We have successfully used this method every year since 2002, though we have been frustrated in the extent of burning we could do in both 2018 and 2019 due to the RFS region-wide suspension of permission for HR burning (discussed below).

Our strategy is not the only approach to burning, of course. We have outlined our method because it indicates the potential for successful, effective HR burning, and also the commitment necessary to carry this out as private individuals. While we strongly support the role private landowners can play in managing land with fire, it requires more skill and time than many landowners can commit. In this area, many landowners never burn. Others don't do much more than light up a line, then watch helplessly as the fire careers off until controlled by the RFS. Another major problem occurs when people light fires but do not commit the time and resources for long-term monitoring and containment (smouldering logs and the like may reignite and trees fall many days after a fire). Indeed, in most years since we've been here, neighbours' fires have burnt onto our place, though they have never been problematic due to our regular rotational burning which means any invasive fire will sooner or later reach an area with low fuel loads. (The protection evident in 'normal' years would probably have

been less effective during these last exceptionally dry summer fires.) Were the RFS, or an organisation with a similar skill set, to attempt HR burning on our lot, it would be resource-intensive and environmentally destructive (requiring many more graded lines, as well as the presence of fire trucks and crews). Even were volunteer labour available, there would be operating costs to the RFS, opportunity costs since crews would be tied up with HR burning hence unavailable for bushfires, and of course the impost on the volunteers' lives. Indeed, it would be impossible on slopes which are too steep for graded lines; our approach, with hours of walking up and down the slopes with backpack sprays burning off raked or mowed lines, is beyond the fitness levels of most RFS volunteers. HR management on private land requires a different mindset and a different set of skills from firefighting or backburning to control bushfires.

#### Challenges to carrying out HR burning.

The most obvious challenge is the decreasing window of opportunity for safe and effective burning. Burning seasons and conditions obviously vary across the country, but we use our local area as an example. We have tried mid-winter burning here, but found that before the grass is dried off by frost, fires tend to kill grass without consuming it. This leaves a standing crop of dead fuel which actually increases the fire risk unless a second HR burn is carried out in August. Many shrubs go into senescence over winter; a fire in autumn, before this happens, risks killing shrubs, whereas a similar fire in late winter is less likely to do this. We also observe that many attempts at HR burning by other land managers in autumn involve a lot of effort with very little reduction in fuel, since fires often won't carry then. By September, we know to expect hot windy weather when burning is too risky. This means August, in this area, is about our only window of opportunity to burn.

The regulatory framework is another significant constraint. Note, we are not saying there should be no regulation, but that **a combination of under-regulation and risk-averse application of regulations hinders those of us attempting responsible HR management.**

To explain: permits are required during the Bush Fire Danger period. This usually extends from 1 October to 31 March, though it may be declared over a longer time depending on local conditions.<sup>8</sup> Outside the season requiring permits, landowners do not have to seek permission to carry out HR burning in the asset protection zone (APZ) around the home as (if) specified in the development consent. The RFS webpage contains various documents to assist in calculating an APZ but this is not straightforward, and, contrary to popular belief, does not provide one rule-of-thumb buffer for all homes regardless of slope, location and vegetation. The concept of an 'APZ burn' is therefore poorly understood by many landowners.

For HR burning outside the APZ, landowners must apply to the RFS for an HR Certificate (Environmental Approval), which we use each year for our strip burning. Generally the RFS (paid staff) will inspect the area of the proposed burn to ensure it has adequate firebreaks. A Certificate requires that we notify neighbours and the RFS immediately before proposed burns. To prevent HR burns being used to circumvent land clearing laws, HR Certificates may only be issued over the same area with a minimum specified fire frequency (depending on mapped vegetation types). While laudable in theory, in practice this is inflexible, not taking into account the difference between mapped and actual vegetation, changing fire return rates with climate change nor the actual condition of vegetation on the ground. It also fails to make allowance for the patchy nature of our burns: if, say we burn 30% of the area covered by a Certificate in one year (a figure we report to the RFS each year) but then reapply to the RFS for a Certificate over the unburnt areas of the original area without waiting the specified fire return period (relevant to the burnt areas), the Certificate will be refused because the RFS simply records the entire application area as burnt. Their staff appear to have neither the skills nor discretionary powers to inspect the bush and assess that yes, it can (or should) be safely burnt this season without causing environmental damage, or even that yes, while the RFS geographic information system (GIS) shows the area as burnt, in fact this portion was not burnt in the last HR burn hence does meet the fire frequency criterion. Note that this limitation also applies to the HR burn areas as reported by the RFS: the 4,470 ha of private land treated by HR fire in 2018/19 does not take into account what proportion of those areas did burn. In our experience, for all but trivial plots, realistic assessments would often be  $\leq 50\%$  (sometimes far less) of the stated treated area.

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<sup>8</sup> For a summary of necessary permissions, see: RFS. (undated, accessed March 2020). *Before You Light That Fire*. Lidcombe: RFS. [https://www.rfs.nsw.gov.au/\\_\\_data/assets/pdf\\_file/0013/12451/BeforeYouLightThatFire.pdf](https://www.rfs.nsw.gov.au/__data/assets/pdf_file/0013/12451/BeforeYouLightThatFire.pdf)



Pile burning for HR purposes may also require an HR Certificate.<sup>9</sup> Burns that are not for HR purposes (e.g. agricultural burning or clearing vegetation) may require other forms of environmental approval.<sup>10</sup> We are only concerned with HR burning on private land in this document.

During the permit season, landowners must also get a permit from the RFS or FRNSW (depending on area), and all permissions for burning may be suspended by the RFS under special circumstances (such as a 'Section 44' declaration) or total fire-ban days. Permit officers, authorised to issue permits, include RFS paid staff and also volunteers (Graham is currently one of the latter). Typically a prospective burner will attend the RFS district headquarters or the home address of a volunteer permit officer, i.e. the process does not require inspection of the area of the proposed fire (except as has separately occurred for HR Certificates, if required). The permit officer has to be satisfied that the burning will meet certain requirements (e.g. have environmental approvals if relevant). Permits contain specific and generic conditions such as wind or fire danger levels under which burning is prohibited. The process for issuing Certificates is relevant, in that, it currently does not involve a detailed assessment and inspection of an individuals' firefighting equipment, preparation or skill levels. Moreover, it would be inappropriate for such a responsibility to be expected of volunteer permit officers, who, during the small HR fire season are often busy with their own HR burning. In other words, while permits are a useful form of regulation, in that the prospective burners' intentions go through some vetting, and the conditions prohibit burning under certain risky weather conditions, this is a relatively minimalist form of authorisation.

Anecdotally, from observation, and from the total number of burns with Certificates across all of NSW, very few of our neighbours go through the Certificate process. Instead, what appears to happen is that private landowners burn during the non-permit season, when smoke from fires can be passed off as APZ burns (which don't require special permission), whether they meet APZ criteria or not. Other fires carried out at this time include pile and rubbish burning. Such areas of prospective burns are not inspected, nor are landowners vetted to see if they have the skills and equipment necessary for a safe burn. Inevitably some of these burns escape. More seriously for us, in both 2018 and 2019, as a result of escapee landowner fires, bushfires started up, the RFS suspended all burning, and we were unable to carry out the majority of our HR burning program. Both times we had completed our own APZ burn successfully and safely, and, despite dry conditions, were able to control our fires given our meticulous approach to burning, and safe strategies such as night burning. It was incredibly frustrating to be told by the RFS (staff) that we could not burn because "you landowners' fires are escaping and causing hundreds of thousands of dollars of damage" when it was not our fires that had escaped. **The net effect of the regulatory framework is to allow a free-for-all during the non-permit season, when potentially unskilled landowners burn without permission (though some such fires are clearly more than APZ fires), but then to prohibit all landowner fires as soon as such unvetted fires escape, regardless of whether landowners have been through the appropriate paperwork and inspections to demonstrate we have the necessary firebreaks etc, and regardless of our long-term demonstrated history of safe controlled burning.**

**The RFS are primarily a firefighting organisation, which makes them risk averse.** Of course an organisation responsible for firefighting must prevent loss of life and property and environmental damage through minimising bushfire risks. However, it is one thing to focus on the immediate dangers posed by an out-of-control fire. It requires a different risk calculus to assess whether HR burning ought to occur. No HR burning, no matter how well conducted, is ever entirely risk free. Without HR burning, the risk of bushfires occurring and intensifying is far greater. We acknowledge that weighing up these two issues is complex. However, in our experience the RFS repeatedly withdraws permission for HR burning when some could, with skill, still occur safely (i.e. with minimal risks), because the RFS are focussed on immediate risks (potential bushfires). This means they downplay the long-term risk that results from repeatedly preventing sufficient HR burning. It is no doubt easier to ban all burning in conditions when fires will carry than to apply a more calibrated approach to assessing prospective burners. This in the long term acts as a de facto ban on effective HR burning, whatever the RFS rhetoric about supporting such practices. **The current RFS approach means that, in our (and our neighbours') experience the greatest hindrance to HR burning in this area is not, as popular opinion would have it, green regulations or greenie principles. It is the RFS, who are unwilling to accept the small risk of escapee fires in late winter conditions and instead prevent HR burning thus worsening bushfires when they come.** Of course at any time of year, in some conditions it is appropriate to ban all HR burning. However, in the last couple of years, the RFS has

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<sup>9</sup> RFS. (undated, accessed March 2020). *Standards for Pile Burning*. Lidcombe: RFS.  
[https://www.rfs.nsw.gov.au/\\_data/assets/pdf\\_file/0012/13323/Standards-for-Pile-Burning.pdf](https://www.rfs.nsw.gov.au/_data/assets/pdf_file/0012/13323/Standards-for-Pile-Burning.pdf)

<sup>10</sup> See footnote 8.

been prohibiting HR burning when it could have been carried out safely (by those with the appropriate permissions, having demonstrated their skills and preparation) by extending a ban beyond the period justified by bushfires and fire risk. **Our climate allows landowners a small window of opportunity in which to burn, and by its very nature effective HR burning requires conditions when fires will carry; if the RFS continues to ban all fires as soon as fires carry, then they are making effective HR burning impossible.**

We suggest permission for landowner burning would be better managed by another organisation which specialises in HR burning.

### **A specialist HR burning service**

We propose the establishment of a service (of entirely paid employees) who specialise in HR burning. Staff would have skills in pyroecology, HR burning, and weeds and feral animal control. Their roles would include:

- educating and supporting the community to carry out safe legal burning. For example, one of our neighbours, a lifelong farmer, lit a fire without the appropriate paperwork. He had done this for years without any problems, but this particular fire burnt onto a neighbour's land, though it did not cause any damage nor was it a risk to life or property. The firelighter did the responsible thing and called 000. As a result, he was fined (a hefty fine) by the RFS and discouraged from future burning. A far more productive response would have been for the RFS (or the new regulatory body) to offer to assist him with the paperwork so his fires could be properly certified, and to assist him to continue his long-term good management by fire. There is deep-seated resentment amongst many of the old farming families about the requirement that they ask permission to carry out land management they've done for years. In addition, some landowners may find paperwork and webpages of regulations more off-putting than agencies familiar with the content imagine, unless encouragement is offered.
- building up a relationship of trust not confrontation with landowners. In recent years it is curious how many bush or grass fires were, allegedly, caused by 'a slasher hitting a rock' (despite the burnt area including a smouldering log-pile or the like). The current relationship between RFS paid staff and private landowners encourages such 'dog at my homework' excuses: landowners who honestly admit that their fires escaped, or who call 000 as a precautionary measure (if their fire escapes its intended bounds regardless of the risk it poses), get castigated and in some cases fined. Of course regulations have to be enforced and penalties applied if the situation warrants. However, it is counterproductive to discourage candour. We need an organisation whose primary focus is to improve and encourage future safe HR burning.
- assessing the suitability of country for HR burning. This requires a more nuanced approach than the current inflexible reliance on mapped vegetation categories, inaccurate (coarse-grained) records of fire history, and rule-of-thumb inflexible rules about desirable rates of fire return. It needs specialists with the skills and discretionary powers to authorise HR burning in relation to the existing status of specific bush, not according to boundaries on a GIS or a hypothetical model of landscape types and fire.
- assisting landowners to develop fire management plans. These need not be complex documents: our own, as described above, defines the APZ round our home and related assets, then divides the rest of the property into seven east-west strips. We burn the APZ every year, and endeavour to burn one strip a year on a rotational basis. In some properties this process would also involve identifying sensitive ecosystems (e.g. fire-sensitive endangered species) which should not be burnt. In practice, those areas we don't want to burn simply won't burn (are too wet) so it is not an issue for us, though some landscapes may require mapping and protection of fire-sensitive areas. There is no mystery or complicated strategy required, and the primary challenge is ensuring fires remain within the proposed burn area (see below). Again, there is the need to manage to actual not legalistic definitions of sensitivity. For example, we're aware of two cases where landowners were presented with large fire-exclusion zones by the RFS on the basis of a single record of an endangered species, in one case some birds (no longer present) and in one case a snake (only seen once, in the house, and then relocated). Of course burning needs to protect sensitive species and ecosystems, but imposition of such conditions on the basis of database records alone does little for real conservation whilst greatly hindering HR burning.



In addition, HR burning at the individual property level will have a greater impact on fire mitigation across the region if there is some regional HR burning strategy.

This approach requires gaining sufficient landowner confidence in the service, and participation (potentially in coordination with national parks and other public land managers), so that it is meaningful to draw up regional plans which address questions like the following:

- How much land needs to burn (total area, total blocks of land to be burnt over the full cycle) to be effective?
- How often (local fire return rate)?
- What is the target area to burn each year?
- What size blocks should burn? Note that 'burning' a block does not mean burning all the bush within a block's perimeters. Once a regular cycle of burning is instituted, most bush will not burn in its entirety except in extreme wildfires; this is good, instituting a natural patchiness within each block, a fine-grained random patchiness within the deliberate mosaic of blocks treated by HR burning in different years.
- Hence, what is the target number of blocks to burn?
- What is the target spatial arrangement of blocks to burn?
- What time of year is suitable for HR fires in this area?
- What sort of block perimeters are necessary to allow HR burners to control fire in specific local ecosystems?
- Should a specific block burn this year? Should it burn today, in these conditions?
- Will a specific block burn this year/today?
- Some landowners have the skills, equipment and time to carry out their own burning. Let them do it. Other landowners do not. Indeed, the sort of burning we carry out requires a high level of fitness. Some landowners simply can't run up and down slopes with firebugs and backpack sprays for hours on end. Safe and effective HR burning will only occur on such properties if skilled crews of HR burners are available. We suggest these crews should be paid not volunteers (the RFS struggles to find sufficient volunteers as it is; what is the likelihood people would volunteer to carry out other people's land management for free? Witness the recent fire disaster when those volunteers willing and able to attend were called out repeatedly over months, turning their normal lives upside down.) The new service should, however, be free to the landowner (or at most require a contribution for the modest costs a landowner would bear if burning themselves, such as fuel for firebugs). If landowners cooperate, the community at large benefits; indeed, there will only be a community benefit if sufficient land is managed with HR burning to mitigate the risk of severe wildfires. The crews will need resources such as: the two-person landcruiser-mounted firefighting pump and tank the RFS calls a 'category 9' or 'cat 9', backpack sprays, firebugs, personal protective equipment, rakes etc. They will also need to arrange or to create fire breaks in some circumstances. The expectation should be that landowners provide as much support as they are able (e.g. slashing existing breaks) i.e. this service is not intended to carry out tasks that are a landowner's normal responsibility. Nor will this service use the normal RFS toolbox of helicopters and, except in very selective circumstances, graders: they will not be working under the time constraints posed by an out-of-control fire, and will be required to minimise environmental damage.

While it takes two of us about 12 days (nights) spread over a month to do our desired burning each year, a professional HR burning crew would be able to burn much more quickly if they were able to devote more resources. For example, four people with two firefighting units (such as the cat 9) would reduce the time required for a similar HR burn to ours to a few days or nights, since teams could be tackling more than one boundary at a time (safe burning generally requires a minimum of two people at each active location, one burning and one monitoring with firefighting equipment). On properties where all the proposed burn area was accessible with a cat 9, an entire year's burning (of the size we do) could potentially be carried out over one day or night by two cat

9s (provided the burn area boundaries had been cleaned in advance, and people (landowners or crew) monitored fire boundaries as necessary afterwards).

One obvious concern is the number of teams needed to complete sufficient burns in the relatively short windows available in a given area. One partial solution would be for teams to move seasonally, building up familiarity with a number of parts of Australia. They could be deployed most efficiently if this was a national service, though the same principle could also occur within the larger states. For example, HR burning in NSW generally occurs in early spring from Sydney northwards, but in autumn south of there, though this varies with annual conditions.<sup>11</sup> Across the country, there is even more variation, for example, most HR burning in the Top End occurs in the dry season (autumn-mid-spring). Teams could only be moved to areas where they understood specific local conditions: as stated above, whilst general principles underly any burning strategy, successful safe burning depends on how that specific bush will burn under local weather patterns.

**Skilled burning relies on the firefighter's understanding, for that specific area, of the interacting factors of slope, aspect, wind, humidity, temperature, direct sunlight, likely changes in these weather variables, types of plants, fuel loads, time of day etc: a small variation in one factor can make the difference between a fire refusing to burn, a good clean controllable burn, and a dangerously fast or flaring fire.** (This is especially so for relatively low-tech burning without an environmentally damaging proliferation of wide graded breaks.) Year-round tasks would include building up the trust of the local community, training, fire management plan development, ensuring that proposed burn areas had adequate boundaries ready for the HR burn season, feral animal and weed responses, and (potentially) assisting with bushfire fighting.

- It would be optional for landowners to engage this service, hence the onus would be on the service to carry out community education so landowners saw the benefit of inviting them onto their land. Where feasible, landowners should be encouraged to receive training so they could work alongside the HR fire managers, so they could gain experience and expertise in HR burning. As we suggest above, if insurers took the landowners' fire-preparedness into account when determining premiums, this would be an added incentive for landowners to engage with HR burning. The HR burning crews could also be available to assist the NPWS or equivalent parks service in situations where they currently request volunteer support for HR burning.
- This new service would work closely with the RFS (and potentially be available as an extra resource during bushfires). The current RFS role of assessing and issuing authorisations for burning (HR Certificates and permits) would be reallocated to this service. There would need to be careful consideration about the relative roles of the two services in the assessment of fire risk conditions, but supposing the RFS retains responsibility for declaring when HR burning is (il)legal (via total fire bans, suspension of permits, requirement for permits, suspension of Certificates), this new service would liaise with the RFS about HR burning and advocate for those wishing to carry out HR burning. In the current situation, landowners have no recourse: if the RFS says we can't burn, that's it, even if we know this is greatly increasing the risks we will face if (when) the wildfire arrives. We need advocates, or another agency involved in the decision-making process as to whether fires are permitted or not. We need an antidote to the RFS knee-jerk reaction to escapee fires, which is to ban all HR fires.
- The legal basis for such a service (including indemnities and insurance) would require thought and resources. Yet again, the issue resolves to: are the effects of uncontrolled bushfires acceptable? Or is it preferable to have regulated, skilled fire management with adequate insurance to cover rare unintended property damage?
- The service should also include those with expertise in feral animals and weeds. Both wildfires and HR burning may increase these problems unless proactively managed. Conversely, HR burning coupled with other forms of control can be used to tackle weed problems.
- We also suggest the current regulatory framework is inadequate, and needs revising. To recap:

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<sup>11</sup> RFS (undated; accessed 28/02/2020). *Standards for Low Intensity Bush Fire Hazard Reduction Burning (for Private Landholders)*. Granville: RFS, p. 8. [https://www.rfs.nsw.gov.au/\\_data/assets/pdf\\_file/0011/13322/Standards-for-Low-Intensity-Bush-Fire-Hazard-Reduction-Burning.pdf](https://www.rfs.nsw.gov.au/_data/assets/pdf_file/0011/13322/Standards-for-Low-Intensity-Bush-Fire-Hazard-Reduction-Burning.pdf)

- in the period before permits are required, it in effect allows open-slather burning with no oversight for all but a minority who take their legal responsibilities seriously and apply for Certificates and hence go through the assessment process;
- inevitably some of the unskilled burners' fires will get away;
- the RFS then ban all fires while there are bushfires;
- the RFS then refuse to allow resumption of burning, even if conditions are safe, even though some landowners have been through the rigorous process of applying for a Certificate – why must responsible landowners be tarred with the same brush as the rest?
- The solution must either be:
  - to require that all those intending to burn go through an application process to demonstrate they have adequate firebreaks, skills and equipment to manage the proposed fires. This would have to apply even to those intending APZ burns in the non-permit season; or
  - to allow such APZ burning (or other burning that passes as APZ burning, whether or not it is) to occur without prior assessment of the burners' ability, but NOT to respond, when some of these fires inevitably get away, by banning HR burning for the rest of the usual burning period. RFS paid staff typically give the following reasons for refusing anyone permission to burn once some fires have got away:
    - "All RFS crews are busy so we cannot afford any more escapee fires hence all HR burning is prohibited", and/or
    - "Since fires have got away it is obviously too risky for any HR burning", and/or
    - "Since fires have caused damage, no further HR fires will be allowed this season".

If the current unvetted burning is permitted, the RFS will have to abandon these responses, or else they are de facto banning adequate HR burning. In other words, if burning without assessment or oversight is permitted in some periods, those authorising HR burning must distinguish such burners from those who go through the assessment process, and calibrate the fire risk determination process so that those burners with demonstrated skills (who have subjected themselves to the assessment process) are allowed to burn even if some unskilled burners' fires have escaped.
  - A partial solution might be to require permits year-round. This might stop some unauthorised burning. However, permits are issued without an on-ground assessment of the prospective burners' equipment, preparation and skills, nor would it be appropriate to expect volunteer Permit Officers to have the skills, time or responsibility to make such assessments.
- Another technical problem with the current process is that fire ratings ('high', 'very high' etc) are issued for entire regions, and the RFS makes decisions about whether burning will be allowed across their whole region, without taking local conditions into account. In our area (as in many) rainfall is spatially variable. We live on the coastal fringe where very small storms cruise up the coast, many of which don't penetrate inland, and their effect on the coastal region may also be highly variable. For example, one year we were advised by the (paid) RFS staff (based inland to us) that we should be carrying out our HR burning at that time (earlier than normal) as August was likely to be risky. While that might have been good advice for further inland, we were squelching in rain and HR burning was plain impossible for us at that time (and the fire risk for us in August would, if assessed locally, have been correspondingly lower than that assessed across the region as a whole). We accept that it is not always feasible to make localised assessments. However, it would be desirable to set up a framework so that decisions about, for example, whether HR burning can proceed, do take local conditions into account, especially in spatially heterogeneous areas such as the Clarence Valley (spanning coast, floodplain and ranges).
- For such a service to be effective, it would need to be adequately resourced over a long time period. The strategy we advocate for good environmental management and hazard reduction requires an ongoing cycle of part-burning any given property (or any given locality, if properties are themselves small) over a number of years. This will take time to establish. In addition, while a

professional service would (we hope) have better resources and more personnel than private landowners, some of the same limitations facing private landowners would still apply, such as seasonally-dictated short windows of opportunity for effective burning, and within that window, periods where burning is prevented by weather or other constraints. On both an individual property scale, and also a regional level, HR burning is largely a waste of time unless a large enough area is burnt on a systematic basis, and unless fires burn effectively. (Burning at a time of year when there is virtually no risk of bushfires may seem safe, but the net result is a lot of diesel and petrol mix burnt, a little charred leaf litter, much frustrating labour, and a negligible decrease in fuel loads). **It would be pointless to set up such a service without giving it the resources both to get landowners on side and then to carry out burning over what add up to large areas across the region.** It would be unrealistic to expect an immediate decrease in bushfire activity or severity, as even participating properties (unless very small) should not be burnt in their entirety in any single year. **It would require many years to get enough landowners to participate, and then to establish and work through the property-level and locality-level cycles of burning different areas in rotation.** Such a service (and the associated practices) should be seen like an insurance policy, an ongoing commitment which must be maintained in conditions when risks are perceived to recede, against those inevitable times when disasters would otherwise loom.

### **Other strategies sometimes suggested for improving (or replacing) HR burning**

- One solution periodically suggested is training for land owners. While superficially attractive, we are aware that this is rarely effective. We have observed two programs of fire training. We were contracted by the NSW government to review 'Land Alive' (an initiative to encourage participation in bio-banking by NSW local Aboriginal land councils). This included 'Hotspots' fire management being offered to Aboriginal Green Teams. In addition, as landowners we have participated, along with 43 other properties in the neighbourhood, in the Upper Coldstream Biodiversity Project (part-funded by the Commonwealth 'Clean Energy Future' Biodiversity Fund). This also included HR fire training for those who were interested. Our overall assessment of such schemes is that despite the enthusiasm of trainers and trainees the net result is nil (or negligible) new burning, because effective burning requires:
  - an investment in equipment which was beyond the means of, or low priority for, most participants (while HR burning does not need large fire trucks or helicopters, it does need effective means of fire control, at the very least a trailer- or ute-mounted firefighting pump with its own tank, backpack sprays for more inaccessible areas, and personal protective equipment);
  - a huge commitment of time – as stated above, for any but the most trivial burns, you can't just set aside a Saturday afternoon to do it, but have to be available day and night over an extended period, not burning when it's too hot, windy or wet, and making use of every opportunity and then putting in the long hours (over days or weeks) to patrol the burn and mop up any boundary fires after the action; and
  - a much greater understanding of fire behaviour/fuel/weather/time of day/topography etc than even a good course can supply in a few days in specific weather and terrain. Such an understanding only comes from lengthy hands-on experience.

Training in HR burning may have some place, especially if landowners are given the opportunity to get hands-on experience by working beside a specialist HR team. By itself, training is not a solution.

- Indigenous fire management is the other popular panacea. It is useful to recognise that the Australian bush has burnt (due to human and lightning-ignited fires) for thousands of years, and that fire does not 'destroy' the bush if managed appropriately. However, the two key factors in effective HR management are knowledge of local country (when it should burn, how it should burn, how it will burn), and managing fire so it remains within designated boundaries. *Local* land owners and managers (whether Indigenous or not) and those with an understanding of specific *local* ecosystems will have far more applicable knowledge than Indigenous fire managers from a distant part of Australia. In addition, traditional Indigenous burning did not have to worry about property boundaries, fixed assets or legal constraints, nor did it include the tools to allow precision burning to artificial lines. We make this statement on the basis of years' of experience with fire management and traditional owners in the NT. We are concerned that an overemphasis on Indigenous people's use of fire, for example researching or reinventing traditional methods, at best

will divert valuable resources from fire management; at worst it will set people up for failure, because **the goals, challenges and techniques of modern HR burning have little in common with that relevant to a pre-European geography**. We already know how to manage with fire. We already know how to burn safely. The issue is providing skilled personnel and resources to carry this out, and a regulatory framework which encourages it.

- Grazing may be appropriate as a commercial land use on private land, but those suggesting it as a conservation tool (for example, for hazard reduction on national parks) ignore inevitable impacts. These include soil disturbance from hard-hoofed animals promoting erosion and weed invasion, the impacts of selective grazing on native flora (again, potentially favouring weeds), trampling which affects tree recruitment, dispersal of viable weed seeds in faeces, and the direct impacts of browsing and rubbing on shrubs etc. In addition, livestock focus on green-pick not dry shrubs, and grazing does not manage fuel such as the annually peeling bark in eucalypt forests, leaf litter or fallen branches. Early in our time here, we experimented with using stock at low levels on our valley flats (by agisting for other people). We concluded that our periodic HR burning was preferable: it reduced fuel loads whilst allowing the native bush to rehabilitate, a process that did not occur while cattle or horses were present. Indeed, the effect of livestock was to keep large areas of blady grass, which burns fast and fiercely and will burn again the next year. In contrast, fire is much easier to control in the forest that is slowly regrowing under our current fire management. (If we'd sought to replace the blady grass with fodder grasses, that would've been moving even further from our goals, conserving natural ecosystems.)

## **Conclusion**

As a final comment, we believe many of the fire-related issues reflect **partial assessments of risk**. The RFS are a firefighting service and hence they tend to prevent HR burns as soon as they perceive the risk of escapee fires is higher than some low threshold. From our perspective, this reflects a poor assessment of relative risks over time. In effect, by banning HR burns which have some risk of escaping in moderate conditions, the RFS massively increases the risk that without HR burns, subsequent wildfires will, sooner or later, be much fiercer and harder to control in the bushfire season. Of course no fire is entirely safe. The most skilled, conscientious burner may light a fire which escapes with an unpredictably falling tree or a freak flare up of sparks. The response should not be to ban HR burning that season, nor indeed to castigate that burner as incapable, but to recognise HR burning is our best strategy for mitigating against bushfires. We need to do it as safely and effectively as possible. Hence our suggestion that management and execution of HR burning should be reallocated to a body with expertise in land management through HR burning. The plainly inadequate status quo regulates HR burning by a body oriented to preventing fire, to be carried out over uncoordinated small areas by an assortment of more-or-less skilled individuals, with little support for those wanting to do the right thing. The current regime inevitably leads to far less HR burning than is needed for effective bushfire mitigation, while also every year including too many HR fires which turn into (often small) bushfires requiring RFS attendance.

Likewise, those who decry a 'stay or go (early)' policy during bushfires focus on the real risks associated with staying, while ignoring the risk-reduction carried out by those who plan to stay to defend our homes. This latter option gives us the incentive to install decent firefighting tanks and pumps with adequate fire breaks. A reversal in this policy risks discouraging landowners from taking the reasonable steps that may save their homes and indeed lives (sometimes fires approach too quickly for evacuation to be possible, even if that is the landowners' intention). And of course in most years 'stay or go' allows numerous landowners to save assets, without any loss of life or injury. 'Stay or go' also recognises the diversity between landowners in terms of the topography and vegetation around their homes, and the preparation and experience of landowners themselves. In the recent fires, we knew staying to defend our house might involve a terrifying experience. We have both faced large fires, and are both experienced with fire. We knew it involved risk. Any action in life involves risk. Many people happily live with risks that we would not find acceptable (being obese or smoking, for example). However, in relation to fires, we made what we still believe is a rational decision that given the large cleared area round our house, our recent HR burning in the APZ zone, our system of reducing the fuel load across our whole property (albeit suspended for the last two years thanks to the RFS), the way we'd built our house, our water tanks and firefighting pumps and our experience with fire, we had a very good chance of saving our home, and even if that failed, we were in a situation where we could save our own lives. A mandatory evacuation regime would have made us feel powerless, angry, and deeply resentful that because many people were poorly prepared for fire, we were being denied the chance to make an informed decision about our own ability to protect our home (our way of life, our existence).

We anticipate that our suggested new HR burning service will be dismissed on the basis of cost. **What cost the current bushfires?** Isn't it better to invest in a sustainable long-term land management strategy, than to focus on patching up the pieces after the inevitable disasters? Indeed, nothing can undo the tragic loss of human life of the last season, nor the devastating impacts of such huge hot fires on native fauna and flora. Whilst HR burning cannot prevent bushfires in extreme periods, if carried out effectively, on a large enough area, in our experience it would reduce some risks under all conditions, and prevent serious fires in most conditions. Of course HR burning is not the only response needed to mitigate and manage fires. Is this any reason to make the task harder for ourselves? Why reserve our heroic efforts for the disasters? Why the refusal to recognise that fire is a natural part of the Australian bush, a component we can never eliminate but we can (partially) harness?

The current season's vast fires provide a rare opportunity. If systematic broadscale HR burning were introduced now, for large parts of NSW we could concentrate on the unburnt bush areas. As the bush slowly recovers in the wildfire areas, it could be incorporated into HR burning strategies over a number of years. The longer we wait for fuel loads to build up across vast swaths of bush, the more daunting the challenges.

In this submission we focus on the HR burning issue. However, anthropogenic climate change remains a pressing issue. No HR burning strategy can counteract the more severe droughts, hotter temperatures and other extremes that ongoing climate change is likely to entail. As a society, we need to do what we can to minimise climate change, whilst also planning for the fires that will always come.

If we can give you any more information that would help, please let us know.

Yours sincerely

Sarah Dunlop and Graham Griffin