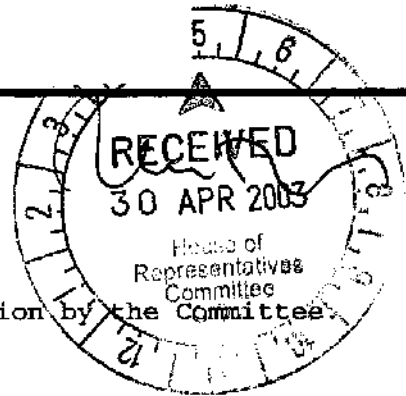


Newsome, Silvana (REPS)

From: David Horton [drhorton@ozemail.com.au]  
 Sent: Tuesday, 29 April 2003 11:28 AM  
 To: Committee, Bushfires (REPS)  
 Subject: Submission to fire enquiry



Please consider the following submission for consideration by the Committee.

#### Biography of author of submission

Dr David Horton has thirty years academic experience as biologist, prehistorian and palaeoecologist. He was born in Perth, WA in 1945. Educated in state schools in Perth, he entered the University of Western Australia at 16, completing a rare double major in Zoology and Physiology, and Zoology Honours in 1965. In 1968 he completed a Masters in Zoology at the University of New England, then uniquely completed both a PhD in biogeography and a Bachelor of Arts in Archaeology and English in 1973 followed by a post-doctoral fellowship in biogeography at University of York. In 1974 he became Palaeoecologist at the Australian Institute of Aboriginal and Torres Strait Islander Studies (AIATSIS). Involved in many archaeological excavations he was interested in the relationship between Aborigines and the environment, and published dozens of academic papers, monographs and in 1991 the book 'Recovering the Tracks' (the history of Australian archaeology). From 1984 until retirement in 1998 he was head of Aboriginal Studies Press. In 1988 Dr Horton became General Editor of The Encyclopaedia of Aboriginal Australia. He planned, supervised, wrote half the entries, designed, edited and published the work. Launched by the Prime Minister in 1994 it won numerous awards, including the NSW Premier's Literary Award for 'Book of the Year' and the WA Premier's Award for non-fiction. He also designed, programmed and developed an award winning interactive CD-ROM version and created, designed and produced the map 'Aboriginal Australia' in 1996. Recognition of his Encyclopaedia achievements came with the rare Doctor of Letters degree by examination from the University of New England in 1997. During his career Dr Horton has carried out field work in biology over much of eastern Australia and subsequently conducted archaeological fieldwork throughout eastern Australia, including Cape York, northern NSW, Victoria and Tasmania. His publications include over 70 academic papers on evolution, biogeography, ecology, and 50,000 years of Australia prehistory. Dr Horton lives on his farm at Gundaroo near Canberra. He has a wife, two adult daughters and a grandson. He continues his writing career, publishing in 2000 his new book 'The Pure State of Nature', an extensive study of Aboriginal history and the past and future of the Australian environment, focusing on both the use of fire and the reason for faunal extinction. He is currently working on two new books and a number of articles on history and on indigenous and environmental topics.

#### SUBMISSION

There are a great many beliefs about fire in Australia, and in recent months we have seen strident demands that action be taken in response to those beliefs. The beliefs are widely held by the public, partly because they are extensively promoted by populist scientists and the media, and partly because they appear to represent 'common sense'. Unfortunately most of these beliefs either are untrue or are misinterpretations. The Committee must put aside what it believes to be the case, and resist popular pressure. It might be useful to keep in mind that the belief that the Sun revolved around the Earth was strongly held by the public, was promoted by clergy and scientists, and was firmly rooted in common sense. It was nevertheless completely wrong.

#### 1. 'Fire is a normal part of the Australian environment'.

Well, yes and no. There are records of fires in Australia going back millions of years. There will undoubtedly have been fires all over the world from the time that there was enough vegetation to burn. Evidence in Australia is so limited that we have absolutely no idea of the number of fires in the past, nor of any change in frequency through time, nor of the different regions where fires occurred, nor of the effect of fires on vegetation. So to say that fire is a normal part of the environment is no different to saying that floods, storms, droughts and landslides are normal parts of the Australian environment.

#### 2. 'The Australian environment is adapted to fire'.

Not true. This is usually said to be a consequence of the first point. But no animals are adapted to fire, and very few if any plants are. Almost everything that people are

referring to in terms of adaptation to fire is really just the ability of plants and animals to recover from catastrophic events, and some species are better than others at this. The only possible example of plants being particularly well suited to recovery after fire comes from Western Australia with the suggestion that some species seem to respond to the presence of chemicals in smoke with enhanced germination. However this is very preliminary work, there is no evidence that it is an adaptation rather than just a general response of plants to some chemical, and whatever the meaning for the species concerned there are no general implications for the use of fire. No Australian plant 'needs' fire. Conversely there are large numbers of species, almost all in fact, which are badly affected by fire. There is a need for much more study, but there are already many examples of species that will undoubtedly go extinct if their habitats are burnt at intervals less than 7 or 10 or 20 years or even more.

3. 'The amount of fire increased when Aborigines arrived in Australia'. Not demonstrated and probably not true. The only evidence relating to this proposition is that of charcoal particles found in palaeontological sites (please note that suggestions by some authors that 'we know what Aborigines do today in Arnhem Land and we can extrapolate from this across the whole continent over 50,000 years' are simply wishful thinking). There is much debate about what changes in particles might mean because there are too many variables involved. There are major changes in charcoal from long before humans arrived on the continent, and there are changes afterwards in different directions. There are no sites in which there can be found a link between human activity and fire activity. Given that there were fires burning in Australia millions of years before human arrival, and that there were changes (of whatever kind) in the nature of those fires, it is impossible to separate out the effects (if any) of Aboriginal practices. What is likely to be the case is that there were climatic changes in the past, which resulted in vegetation changes, which in turn resulted in changes in fire. For example a climatic change resulting in more electrical storms would potentially provide more lightning to start fires, a change to drier conditions might make fires more likely to burn larger areas. Those natural links continued after humans arrived in Australia (and continue today) and it seems to me that we will never be able to separate what effect if any Aborigines had on the fire regime. My best guess is that there was probably little effect. Fires would start in about the same numbers, but whereas before 50,000 years ago they all started by lightning strike (with perhaps some minor volcanic effects at times) after 50,000 years ago fires could start either by lightning or by an escaped hunting fire, the total number of such fires remaining about the same.

4. 'The use of fire by Aborigines changed the vegetation of Australia'. Not true. You only need look at the map of Australian vegetation as it was 200 years ago to instantly disprove this proposition. Vegetation patterns are directly related to climate, soil, topography and evolutionary history. This could not be the case if Aboriginal use of fire had had any impact. Grasslands grow where they do because of combinations such as poor soils, flat lands, high temperatures and low rainfall, they are not areas where Aboriginal burning removed forests. The forests grow where they do now just as they did in the past. Changes in distribution of vegetation over time are directly related to climatic changes. There is also no evidence that the form of vegetation in a particular area is related to use of fire. The early reports of occasional landscapes described as 'park-like', so important in the fire-stick farming idea, have no bearing on it. Early European observers of Australia knew that Aborigines didn't practise agriculture. Here was the only continent on which no one practised agriculture. This being the case, the early observers knew that what they would be seeing as they explored was a wilderness of forests with thick undergrowth. There was no other alternative possible, if people didn't clear land it was wilderness. They were therefore surprised, and found it noteworthy, when they came across areas that had less undergrowth and apparently more widely spaced trees. Such reports were therefore accentuated (and the normal landscape ignored), and accentuated too because the colonists were farmers and were looking for areas to pasture sheep and grow crops. Observers had no way of knowing that variations in soils, topography and climate could cause significant variations in Australia without human intervention. Nor did they usually know whether a fire might have influenced the landscape some years before, nor, if it had, how that fire had started. It is far less excusable for writers 200 years later to also expect to see thick forest everywhere and to ignore all the descriptions of non-parklike conditions. There is also a propensity to take not just observations by early nineteenth century observers at face value, without any attempt to establish what they could have observed and what they actually were observing and whether they had an agenda which influenced what was reported, but also their theories about what was going on. There is an amazing trust in the observations and ideas of untrained observers, writing long before the development of modern science or anthropology, and who were dealing with a complex society which is only now, after some 50 years of sophisticated observations, beginning to be understood.

5. 'The amount of fire decreased 200 years ago in Australia'. There is no evidence for this. People who say it assume that Aborigines introduced a lot more fire into Australia and therefore when they died out in some areas or were moved out, the amount of fire must have decreased. But this is purely assumption. A proposition designed to bolster this idea that Aborigines had turned the Australian landscape into a park is that some areas have 'reverted' to thick wilderness when Aboriginal use of fire stopped. But such accounts are poorly documented, limited in extent, and almost certainly just a part of a spectrum of vegetation change in which some areas may have become 'thicker' and others 'thinner'. There is also a lack of knowledge about European use of fire in the early nineteenth century, a failure to recognise the effects of domestic and feral animals and plants, and the loss of native herbivores, and land clearance and fire suppression attempts, and a failure to analyse 200 years of climatic change. The supposed presence and absence of Aboriginal fire is not a simple cause and effect experiment. There is also a lack of understanding that whether or not human use of fire can effect vegetation change, it is undoubtedly true that vegetation change as a result of climatic change will cause a change in fire regimes. Confusion of cause and effect is often a problem in science in any attempt to unravel historical events.

6. 'Aborigines regularly and frequently burned the forests'.

It is curious that if you read Sylvia Hallam's book, a book in which every camp fire, every burnt piece of land, every observation and theory by a settler, is seen as examples of 'fire stick farming', you find no record of the use of fire in forest by Aborigines in SW Western Australia. Dr Hallam searched every piece of literature and even she could find no evidence of Aborigines carrying out what would now be called 'prescribed burning' or 'hazard reduction' in forests. This is also true for eastern Australia. Aborigines, except in the rain forests of far north Queensland, generally didn't live in forests, nor spend much time in them at all. To my knowledge there are no records of Aborigines setting fire to the forests or doing anything which we could possibly describe as 'prescribed burning'. Outside the forests the record in Western Australia shows nothing of the kind of behaviour that proponents of prescribed burning like to think Aborigines did. The model demands that 'fire stick farming', in contrast to fires in recent times, was conducted in cool seasons when the conditions were such as to allow little gentle fires to run very slowly and quietly. Hence Aborigines would have burnt the bush in Spring or Autumn with moisture in the ground and vegetation, and little wind. In fact historic reports show the majority of fires burning in Summer. In Sylvia Hallam's work for example, of about 100 references to fire she records, 63 are in the months of December to March. Of the other 35 or so 13 are not references to bushfires, and in 14 it is unclear when the fire had actually been burning. In very few of those 35 is it clear that a fire had been caused by Aborigines. Attempts had to be made to discourage Aboriginal use of fire in the summer. Another report suggests fires being set on very windy days. The supposed reason? Aborigines knew that on windy days the flames would be kept low! This is the kind of contradiction that you get when you start with a theory and fit the evidence to it, instead of the other way round.

7. 'Aborigines in northern and central Australia use fire to manage the environment today and this is a good model for the rest of Australia'. Well, yes and no. Certainly some Aboriginal groups in these areas have told some anthropologists in recent years that they thought they were managing the bush by using fire. There was no indication of how old such beliefs or practices were, nor of the reality of the beliefs. I have a suspicion that at least some of what are reported as Aboriginal beliefs may in fact have been derived from the anthropologists themselves who came with theories about what should have been happening, and the Aborigines themselves then claimed these beliefs as their own. I also suspect that at least some of the fire use may have been derived more from European pastoral practices acquired by Aboriginal stockmen in the nineteenth century and then thought by Aborigines to be Aboriginal tradition 100 years later. Finally I suspect that at least some of the instances which are given of Aboriginal control of fire may simply be reports of natural fire behaviour responding to terrain variations. However, even if there is some kernel of traditional behaviour involved, it tells us nothing about what may have been the case in the distant past, nor what may have been the case in other parts of Australia. Finally the response of spinifex clumps to fire, or the behaviour of fire in open tropical woodlands with little litter and few shrubs, is quite different to the behaviour of fire in forest. Burning spinifex country or tropical woodlands in short is of no relevance in considering the question of 'prescribed burning' in eastern or south western forests

8. 'Litter on the forest floor is just ...'.  
Litter on the forest floor is not just ... or 'hazard' but a vital part of the

material that enables the forest, and all the organisms in it, to survive. Litter, like mulch in a garden, performs many functions. It protects the soil from drying out, recycles nutrients from fallen leaves and branches and dead trees, keeps the upper layers cool for surface roots of shrubs and trees, protects the soil against erosion. It provides a home for thousands of small animals, plants, fungi and micro-organisms which are essential to the functioning of the forest. Without the litter layer trees will begin dying in forests as surely as do those isolated specimens of gum trees standing alone in sheep paddocks. Without all the interactions of predators and prey and scavengers among the animals in litter, pest species can erupt, plants remain unfertilised, soils lack nutrients and aeration.

9. 'Litter on the forest floor continues to build up indefinitely without fire'. This idea arises when there is a severe drought. In fact litter breaks down at the same rate as it falls, once it has reached a certain level. The point at which equilibrium is reached will vary between different vegetation types, different soils and topography, and different seasons. In drought the dryness will slow down the rate of decay and there may be a thickening of the upper layer. This thickening will in itself help to improve the moisture near the soil and get decay going again, as will the return of moist conditions. Fire in fact will break the sequence of decay, by drying the soil, removing the mulching effect, sterilising the soil and killing the micro-organisms that cause decay. New litter falling on to such a sterilised bare surface will not break down for some years until the decay cycle can be re-established.

10. 'Forests need to be managed'.

This is a most extraordinary view of ecology. The forests of Australia are of a form that represents the endpoints of millions of years of evolution of both the organisms in the forest and the interaction between those organisms. That is, forests maintained and managed themselves for a very long time before Aborigines arrived on the continent and for an even longer time before Europeans arrived. Forests are able to do this, as are all other ecosystems, by the interactions between the thousands of species which make up a natural system. Those interactions balance out in order to maintain ecosystems in a constant average state over time. They also allow recovery after catastrophic events, and allow accommodation to gradual climatic change. The high biodiversity of forests (as compared to say grasslands) is a result of two major factors - the vertical dimension the trees provide, and the growth, aging, death and decay of individual trees. The more diverse a system is the better it is able to cope with catastrophe, the more biodiversity is reduced the greater the chance of pest or disease or inability to respond to climate change. The reason that a pine or blue gum plantation needs to be managed is that the natural systems have been totally stripped away and the only way these crops (for that is what they are, a plantation is not a forest) can survive is to be constantly interfered with by people and have constant inputs in the form of fertilisers, pest control, weed removal, provision of water, pruning, thinning and such like. After the cropping the soils are degraded and will not stand indefinite cropping. Natural forests do not need management, and in fact management attempts may well simplify and degrade ecosystems.

11. 'Prescribed burning will prevent bushfires'.

Not true. I considered previously the effect of 'prescribed burning' on litter decomposition, pointing out that by drying and sterilising soil the litter would probably increase. There are other important considerations before the headlong rush to 'prescribed burning' gains speed. First, 'prescribed burning' will undoubtedly change the nature of the shrub layer in forests in unpredictable ways. Plant species which can recover after fire will be favoured, those which cannot will disappear. It may well be that the species favoured carry fire more readily than those selected against. Similarly the loss of small animal species will have unpredictable effects in turn on the growth and survival of various plants. Removal of mature trees and fallen branches and logs will similarly break cycles of relative animal and plant abundance. If more and more fire trails are pushed through forest and more and more fire breaks are bulldozed, then one of the inevitable effects will be the increased incidence of weeds and feral animals into forests and consequently increased risk of fire as a result, for example, of the presence of stands of flammable weeds. If sheep and cattle and horses are reintroduced to forests then they will also help the spread of weeds, and compact the soil, and increase erosion, and change the balance between native plant species, and affect native animal species. All of those impacts are also likely to increase the likelihood of fire. Similarly just the presence of more and more people with more and more access along fire trails, or involved in logging or pastoral activities all increase the chance of accidental fires from cigarettes, campfires, or vehicles. It is no good to simply say that a fire equation proves that less fuel equals less fire. A forest is a complex environment, and we need to think of effects well beyond those of simplistic fire kill four equations. A question to be asked is

whether fire is more likely to start in or burn through an area with closed canopy, healthy moist soil and litter, and fire sensitive shrubs growing in a cool and shady environment, or an area opened up by fire with dry soil and litter and with fire tolerant shrubs growing in a light and warm environment. It should also be considered that 'prescribed burning' operations quite often lead to escaped fires when there are unexpected wind changes or inadequate supervision. Finally, one of the big factors in the bushfire problems of recent years has been the great increase in arson. One estimate I saw was that at least three quarters of fires were the result of arson or accident, and many cases of arson probably remain undetected. One effect of arson is that there are many more individual fires burning at one time, which greatly over-stretches fire fighting resources and makes the chance of loss of life and property damage greater. It is arguable that the increase in arson in recent times may well be attributable to the incessant political and media demands for 'prescribed burning' ('if the officials are burning the bush then why shouldn't I?'), to 'expert' claims that fire does no harm to the bush, and to the glamorous media treatment of the excitement and drama of fire fighting

12. 'Prescribed burning causes no environmental damage'. Completely untrue. To summarise, fire causes environmental damage by (a) removing leaf litter and breaking the recycling of nutrients and destroying habitat occupied by thousands of species, (b) changing the balance of plants in the herb and shrub layers and (c) exposing an area to weeds and to pest animals such as mice rats and rabbits, all of which tend to be the first invaders into recently burnt land and which can prevent the re-establishment of the original ecosystem. This damage will be the case whether the fire is a deliberate burn or a wildfire. The major difference is that wildfires occur at irregular intervals and leave unburnt areas from which the burnt patches can eventually be recolonised. They usually occur in summer when most species have completed breeding activities. Frequent 'prescribed burning' burns every two or three years will leave no areas from which species can recolonise, and in any case most species (except, ironically, feral species) are unable to recolonise in that sort of interval. Burning in Spring will destroy breeding colonies, and many small animals only have one breeding season. An additional consideration is that Australian forests are now so reduced and fragmented that recolonisation is very difficult, and are under so many other ecological threats and pressures that frequent fire would be the final and decisive factor in causing irreversible damage. The Committee should also look at the context of what is being proposed in the way of 'prescribed burning'. The recently prepared 'Biodiversity Audit' report confirms what anyone who has looked around has long known - the environment of Australia is in great trouble and the problem is going rapidly worse. National Parks and wilderness areas have been set aside in an attempt to preserve at least some of the great diversity of forested environments, biodiversity that is being lost at a rapid rate in unprotected areas. To attack these areas with constant firing will undoubtedly cause further massive loss of biodiversity, and such losses are of great concern for the sustainable future of this country. In short, if biodiversity continues to be lost then the Australian continent is not sustainable in the long term.

In summary then:

- (a) Increased 'prescribed burning' will cause great and irreversible ecological damage
- (b) Whether it would be effective in reducing bushfire risk is at best debatable, and there are many circumstances in which the risk could be increased.
- (c) The basic dilemma is this - if 'prescribed burning' is to be effective then it would have to be done very very frequently, but the more frequently you do it the more damage you cause.

With those conclusions I am frequently asked to say what my answer is. In a sense this is the wrong question. Much of the debate on bushfires in Australia is based on the false premise that if a fire happens it is someone's fault and all risk can be removed by the correct behaviour (based of course on common sense). I don't believe this, anymore than I think you can remove the risk of floods in Bangladesh, volcanoes in Indonesia, droughts in Africa or blizzards in Alaska. However I think there are a number of approaches which could be usefully taken which might improve things. 1. There should be studies to try to understand and reduce arson attacks. Heavier penalties might help (it could be argued that the crime of arson should rank as the most serious crime in Australia), but ultimately we need to change public attitudes to fire and let people understand the damage caused by fire. Changing media approaches, and undertaking education programs might help. 2. Similarly there need to be studies of the causes of accidental fires with the aim of greatly reducing those. Both education programs and changes in design of equipment and work practices might reduce the number of fires caused by cigarette butts, camp fires, trains, electricity wires, tractors, electric fencing, welding, chainsaws and so on. In Australia in the summer it should be assumed that all areas are under total fire bans except on rare

occasions, instead of the present reverse procedure where total fire bans are in place only rarely. 3. Many others have made this point but Australia needs to be much more careful about where it allows houses and tourist facilities to be built in forested areas, and, when they are built, to be much more careful about the design and building materials of such structures. Building wooden houses on stilts on the edge of a gorge for example and then demanding that all the trees be cut down to prevent fire seems to me a very strange approach. The present scattering of valuable property all over the forested areas is resulting in a great demand for fire fighting resources which can't be met, and means that fire fighters are constantly forced into property protection mode (and their lives put at risk) instead of trying to put fires out. 4. Considerable resources must be put into the equipment needs of firefighters. In many ways we are still fighting fires in the same way as we did 100 years ago. A research and development effort comparable to just a part of the effort that is put into defence equipment development could see substantial improvement in our ability to both control fires and keep fire fighters safe. In particular there needs to be investigation of how best to hit lightning fires that start in rugged country before they build up force. If Australia were to develop new equipment it would be much in demand in other parts of the world. 5. Finally the committee could exert pressure on the government to sign the Kyoto protocol, and to try to influence the Americans to also do so. It should be evident by now that whatever the possible costs to Australia of implementing the protocols, agricultural losses caused by extreme climatic events, and the gradual heating up and drying out of the continent will be much greater. Fire events are also likely to greatly increase with more frequent droughts, high temperatures and strong winds. In relation to fire, the direct financial losses are huge and the indirect environmental losses are going to be much greater over time. Such approaches would certainly be much more productive, and much less damaging than a mistaken belief in the value and benign nature of 'prescribed burning'. Destroying something in order to save it is never a useful approach. David Horton Gundaroo, NSW 29 April 2003

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Works include: 'The Encyclopaedia of Aboriginal Australia'; 'The Pure State of Nature'; 'Aboriginal Australia' map; 'Recovering the Tracks'.